

BID DOCUMENTS
SPECIFICATIONS
VOLUME I
DIV 0 – DIV 12

CONSTRUCT NEW COMMUNITY LIVING CENTER (CLC)

Project No. 595-601



Lebanon VA Medical Center
Lebanon, PA

Miller-Remick LLC
1010 Kings Highway South
Building Two – 2nd Floor
Cherry Hill, New Jersey 08034
(856) 429-4000

February 9, 2023



12-21-21

**DEPARTMENT OF VETERANS AFFAIRS
 VHA MASTER SPECIFICATIONS**

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SECTION 01 00 00
GENERAL REQUIREMENTS

PART 1- GENERAL

1.1 SAFETY REQUIREMENTS

- A. Refer to section 01 35 26, SAFETY REQUIREMENTS for safety and infection control requirements.

1.2 GENERAL INTENTION

- A. Contractor shall completely prepare site for building operations, including demolition and removal of existing structures, and furnish labor and materials and perform work for the "Construct New CLC" project, VA Project #595-601, at the Lebanon VA Medical Center in Lebanon, PA as required by drawings and specifications.
- B. Visits to the site by Bidders may be made only by appointment with the Medical Center Engineering Officer.
- C. Offices of Miller-Remick, LLC, as Architect-Engineers, will render certain technical services during construction. Such services shall be considered as advisory to the Government and shall not be construed as expressing or implying a contractual act of the Government without affirmations by Contracting Officer or his duly authorized representative.
- D. Before placement and installation of work subject to tests by testing laboratory retained by Department of Veterans Affairs, the Contractor shall notify the COR in sufficient time to enable testing laboratory personnel to be present at the site in time for proper taking and testing of specimens and field inspection. Such prior notice shall be not less than three work days unless otherwise designated by the COR.
- E. All employees of general contractor and subcontractors shall comply with VA security management program and obtain permission of the VA police, be identified by project and employer, and restricted from unauthorized access.

1.3 STATEMENT OF BID ITEM(S)

- A. ITEM I, GENERAL CONSTRUCTION: All work as required by drawings and specifications, including general construction, alterations, roads, walks, grading, drainage, mechanical, electrical, plumbing, fire protection, utility systems, necessary removal of existing structures

and construction, and certain other items. Work includes all labor, material, equipment, and supervision to perform the required construction work on this project.

The project will provide for the initial phase of a multi-phase project to construct a new Community Living Center (CLC) at the Lebanon, PA VAMC. The initial phase consists of one new resident hospice building with a garage, a portion of the main loop road, and associated parking and one new Mechanical Room/Link Building connected by an enclosed corridor with a future connection to Phase 2. All infrastructure related to the construction of a new building is included in this phase. The new buildings are type IIB (000), new greenfield, of approximately 18,500 sf (total), in a currently unoccupied parcel of land facing Building 18.

- B. ADD ALTERNATE NO.1: Interior and Exterior Cameras provided by the Contractor. Scope indicated on drawings/specifications represents Add Alternate No. 1. Base Bid Scope shall be that all security cameras are to be provided by the VA. Electrical contractor responsible for conduit, backbox and wiring to each camera location.
- C. ADD ALTERNATE NO.2: Trees at Perimeter of the Loop Road provided by the Contractor. Scope indicated on drawings/specifications represent Add Alternate No. 2. Base Bid Scope shall be that all trees at perimeter of loop road are to be provided by the VA.
- D. ADD ALTERNATE NO.3: Gas Service Main provided by the Contractor. Scope indicated on drawings/specifications represent Add Alternate No. 3. Base Bid Scope shall that gas service main to be provided by the VA and Utility Company.
- E. ADD ALTERNATE NO.4: Add Sidewalks Along Loop Road. Scope indicated on drawings/specifications represent Add Alternate No. 4. Base Bid Scope shall not include the sidewalks along the loop road.
- F. ADD ALTERNATE NO.5: Add Dining Room and Multipurpose Room Patios/Walls. Scope indicated on drawings/specifications represent Add Alternate No. 5. Base Bid Scope shall eliminate dining room and multipurpose room patios (including slabs on grade) and walls. Exterior walk-off turned down slabs on grade (sim to 2/S501) shall be included in base bid at Dining Room Door 124 and Multipurpose Room Bi-Fold Door. Mow strips and grass shall also be included in base bid.

- G. ADD ALTERNATE NO.6: Fit Out Patient's Laundry Room 136. Scope indicated on drawings/specifications represent Add Alternate No. 6. Base Bid Scope shall shell Patient's Laundry Room 136. Wall to main kitchen will be 1-hour rated and door will be 45-minute rated door with closer hardware. Ceiling and finishes shall be eliminated. Laundry washing machine and dryer equipment shall be eliminated and electrical infrastructure for washer and dryer shall not be installed. Circuit breakers for washer and dryer shall be labeled as shown on panel schedules for "future use". Plumbing fixture rough-ins only shall be provided. Replace (2) Type B1 lighting fixtures with (1) Type S1 lighting fixture. VAV Box (1-TUS-AB9) and associated ductwork, elbows, diffuser, damper, piping, valves, controls, thermostat and accessories, etc. serving room 136 shall not be installed. Ceiling exhaust grille (EG-2) serving room 136 shall not be installed. Terminate duct with open wire mesh screen after final branch takeoff. Provide airflow volume damper and balance to 150 cfm exhaust. 18x12 transfer duct and (2) associated transfer return grilles (RG-2) located in room 136 and room 140 corridor shall not be installed. 6" diameter aluminized dryer exhaust vent ductwork, wall penetration, vent cap and associated accessories, etc. serving room 136 laundry dryer shall not be installed.
- H. ADD ALTERNATE NO.7: Expand Length of Loop Road/Turnaround. Civil drawings indicate Base Bid Design Scope and Add Alternate No. 7 Scope. Electrical drawings represent Add Alternate No. 7 scope. Electrical Base Bid Scope shall be a reworked loop road and turnaround resulting in the installation of (3) fewer Type G1 site lighting pole fixtures and their associated underground conduit and feeders.
- I. ADD ALTERNATE NO.8: Fit Out Western Wing. Scope indicted on drawings/specifications represent Add Alternate No. 8. Base Bid Scope shall shell western wing including finishes and ceiling grid. Corridor to remain finished, slab on grade and below grade utilities with stub ups capped 6" above floor shall be installed. Cap above ceiling piping branches from corridor mains to 6" within room. Separate and cap ends of DHW & DHWR mains for future resident room fitout. Shelling shall include rooms 100, 100A, 101, 101A, 102, 102A, 103, 103A, 114, 104, 104A, 105, 105A, 106, 106A including walls between rooms. Soiled

utility 115, Spa 123, Spa TLT 123A and Resident Corridor 168 are fit out to include finishes. Doors 100, 101, 102, 103, 114, 104, 105 and 106 are eliminated. 45-minute rated doors, and associated rated closers, are provided of same dimension and location to doors 101 and 105. Walls on both sides (6A) are converted to 1-hour rated walls 6B, and Memory Boxes Tile wall pockets, etc. in the corridor walls are prepped for future boxes and material stud openings, but not installed. In lieu of boxes, a fully gypsum sheathed wall will be installed. Supply and return air terminal units (1-TUS-XXXX and 1-TUR-XXXX) and associated ductwork, piping, valves, controls, air devised and accessories, etc. served by (1-AHU-C) shall not be installed (with the exclusion of supply terminal unit (1-TUS-C168) on 2nd floor serving room 168 Corridor). Install hot water heaters (1-UH-C1 and 1-UH-C2). Refer to equipment schedule for additional information. Unit heaters shall not be installed under Add Alternate No. 8. Resident TLT ceiling exhaust grilles, registers, etc. shall not be installed. Terminate all exhaust branch ductwork with open ended duct and wire mesh screen upstream of room 168 resident corridor wall. Balance each exhaust branch to airflow indicated by Add Alternate branch air device shown. Install (2) additional space temperature/humidity controllers (1 for each shell space - plan north and plan south). Install exhaust fan (1-EF-C). Fan shall activate upon rise in space temperature/humidity above 85 degrees F/75% RH. Integrate controls with BAS. Air handling unit (1-AHU-C) and associated ductwork, fittings, elbows, damper, piping, valves, controls, and accessories, etc. shall not be installed (with the exclusion of outdoor air intake louver size 48x48 located in 220 west mech room plan west wall). Provide insulated back pan at louver connection. Heating hot water circulation pump (1-P-C) and associated piping, valves, elbows, controls, and accessories, etc. serving 1-AHU-C heating hot water coil shall not be installed. Return exhaust fan (1-REF-C) and associated ductwork, filter module (1-HEPA-C). Controls and accessories, etc. shall not be installed. Exhaust fan (1-EF-C) and associated ductwork, fittings, elbows, dampers, controls, and accessories, etc. shall be installed. Bypass ductwork and motorized damper routing to HEPA filter module (1-HEPA-C) shall not be installed. Automation system (BAS) control panel in 220 west mech room shall not

be installed. All controls for equipment in Area C shall extend from BAS panel in room 166 low voltage. Supply terminal unit (1-TUS-C168) and associated ductwork, fittings, elbows, dampers, ceiling air devices, piping, valves, and accessories, etc. shall be installed. Extend 18x10 insulated branch supply ductwork from (1-AHU-AB) main in area B from first floor below. Provide size 18x10 insulated supply duct from (1-AHU-AB) supply duct main to open spine area, through entry to western wing area C to serve supply terminal unit (1-TUS-C168) in western wing area C 2nd floor mechanical attic. Increase supply duct main dimensions as required to maintain maximum 1200 fpm velocity. All ceiling air devices, ductwork, dampers and controls serving 168 corridor shall be installed. Cap 2-1/2" chilled water supply and return piping mains at entry to western wing area C. Cap 2" hot water supply and return piping mains at entry to western wing area C and provide new valved 1-1/2" HWS/R piping to serve HW unit heaters (1-UH-C1 and 1-UH-C2) and supply terminal unit 1-TUS-C168. Extend 1-1/4" HWS/R branch piping for each unit heater and 3/4" HWS/R branch piping to supply terminal unit. Provide all required valves, controls and accessories, etc. Refer to equipment schedules for additional information. Extend 3/4" HWS/R piping, accessories, and controls, etc. serving radiant ceiling panel 1-RCP-2 in room 123A Spa TLT to capped 2" HWS/R mains in 168 Corridor. HEPA exhaust fan (1-HEPA-C) and return fan (1-REF-C) shall not be installed. Exhaust fans (1-EF-C and 1-EF-AB1) shall be installed. Electrical contractor shall provide and install (4) type S1 lighting fixtures, a light switch, and an exit sign in the shell space on the north side of the corridor and (4) type S1 lighting fixtures, a light switch, and an exit sign in the shell space on the south side of the corridor. S1 fixtures shall be circuited to NL2-79. Exit signs shall be circuited to LSL-3. For all conduit runs required for the base bid devices that will be installed in the future fit out of the shelled space, electrical contractor shall provide required conduits with pullstrings from the source panel to the boundary of the shell space along column line 5. All conduits shall terminate in pullboxes above an accessible ceiling for future extension. Electrical contractor shall provide and install (2) duplex receptacles in the shell space on the north side of the corridor and (2) duplex receptacles in the shell

space on the south side of the corridor. Electrical contractor shall provide power to (2) hot water heaters in shell space. Circuit receptables and hot waters heaters to NL1-1. Electrical contractor shall provide and install a pull station and a strobe light at the egress door to both the north and south shelled spaces. Electrical contractor shall provide and installed (2) Type S1 light fixtures, a light switch at the bottom of the ladder and an exit sign. S1 fixtures shall be circuited to NL2-79. Exit sign shall be circuited to LSL-3.

1.4 SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR

- A. Drawings and contract documents may be obtained from the website where the solicitation is posted. Additional copies will be at Contractor's expense.

1.5 CONSTRUCTION SECURITY REQUIREMENTS

A. Security Plan:

1. The security plan defines both physical and administrative security procedures that will remain effective for the entire duration of the project.
2. The General Contractor is responsible for assuring that all sub-contractors working on the project and their employees also comply with these regulations.

B. Security Procedures:

1. General Contractor's employees shall not enter the project site without appropriate badge. They may also be subject to inspection of their personal effects when entering or leaving the project site.
2. Before starting work the General Contractor shall give one week's notice to the Contracting Officer so that security arrangements can be provided for the employees. This notice is separate from any notices required for utility shutdown described later in this section.
3. No photography of VA premises is allowed without written permission of the Contracting Officer.
4. VA reserves the right to close down or shut down the project site and order General Contractor's employees off the premises in the event of a national emergency. The General Contractor may return to the site only with the written approval of the Contracting Officer.

C. Key Control:

1. The General Contractor shall provide duplicate keys and lock combinations to the Contracting Officers Representative (COR) for the purpose of security inspections of every area of project including tool boxes and parked machines and take any emergency action.
2. The General Contractor shall turn over all permanent lock cylinders to the VA locksmith for permanent installation. See Section 08 71 00, DOOR HARDWARE and coordinate.

D. Document Control:

1. Before starting any work, the General Contractor/Sub Contractors shall submit an electronic security memorandum describing the approach to following goals and maintaining confidentiality of "sensitive information".
2. The General Contractor is responsible for safekeeping of all drawings, project manual and other project information. This information shall be shared only with those with a specific need to accomplish the project.
3. Certain documents, sketches, videos or photographs and drawings may be marked "Law Enforcement Sensitive" or "Sensitive Unclassified". Secure such information in separate containers and limit the access to only those who will need it for the project. Return the information to the Contracting Officer upon request.
4. These security documents shall not be removed or transmitted from the project site without the written approval of Contracting Officer.
5. All paper waste or electronic media such as CD's and diskettes shall be shredded and destroyed in a manner acceptable to the VA.
6. Notify Contracting Officer and Site Security Officer immediately when there is a loss or compromise of "sensitive information".
7. All electronic information shall be stored in specified location following VA standards and procedures using an Engineering Document Management Software (EDMS).
 - a. Security, access and maintenance of all project drawings, both scanned and electronic shall be performed and tracked through the EDMS system.

- b. "Sensitive information" including drawings and other documents may be attached to e-mail provided all VA encryption procedures are followed.
- E. Motor Vehicle Restrictions
1. Vehicle authorization request shall be required for any vehicle entering the site and such request shall be submitted 24 hours before the date and time of access. Access shall be restricted to picking up and dropping off materials and supplies.
 2. A limited number of (2 to 5) permits shall be issued for General Contractor and its employees for parking in designated areas only.

1.6 OPERATIONS AND STORAGE AREAS

- A. The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.
- B. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.
- C. The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

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- D. Working space and space available for storing materials shall be as determined by the COR.
- E. Workers are subject to rules of Medical Center applicable to their conduct.
- F. Execute work so as to interfere as little as possible with normal functioning of Medical Center as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others. Use of equipment and tools that transmit vibrations and noises through the building structure, are not permitted in buildings that are occupied, during construction, jointly by patients or medical personnel, and Contractor's personnel, except as permitted by the COR where required by limited working space.
1. Do not store materials and equipment in other than assigned areas.
 2. Provide unobstructed access to Medical Center areas required to remain in operation.
 3. Where access by Medical Center personnel to vacated portions of buildings is not required, storage of Contractor's materials and equipment will be permitted subject to fire and safety requirements.
- G. Utilities Services: Where necessary to cut existing pipes, electrical wires, conduits, cables, etc., of utility services, or of fire protection systems or communications systems (except telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by the COR. All such actions shall be coordinated with the COR or Utility Company involved:
1. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee shall be the responsibility of the Government and not the Contractor.
- H. Phasing:
- The Medical Center must maintain its operation 24 hours a day 7 days a week. Therefore, any interruption in service must be scheduled and coordinated with the COR to ensure that no lapses in operation occur. It is the CONTRACTOR'S responsibility to develop a work plan and schedule detailing, at a minimum, the procedures to be employed, the equipment and materials to be used, the interim life safety measure to

be used during the work, and a schedule defining the duration of the work with milestone subtasks. The work to be outlined shall include, but not be limited to:

To ensure such executions, Contractor shall furnish the COR with a schedule of approximate phasing dates on which the Contractor intends to accomplish work in each specific area of site, building or portion thereof. In addition, Contractor shall notify the COR two weeks in advance of the proposed date of starting work in each specific area of site, building or portion thereof. Arrange such phasing dates to ensure accomplishment of this work in successive phases mutually agreeable to COR and Contractor.

- I. Construction Fence: Before construction operations begin, Contractor shall provide a chain link construction fence, 2.1m (seven feet) minimum height, around the construction area indicated on the drawings. Provide gates as required for access with necessary hardware, including hasps and padlocks. Fasten fence fabric to terminal posts with tension bands and to line posts and top and bottom rails with tie wires spaced at maximum 375mm (15 inches). Bottom of fences shall extend to 25mm (one inch) above grade. Remove the fence when directed by the COR.
- J. When a building and/or construction site is turned over to Contractor, Contractor shall accept entire responsibility including upkeep and maintenance therefore:
 - 1. Contractor shall maintain a minimum temperature of 4 degrees C (40 degrees F) at all times, except as otherwise specified.
 - 2. Contractor shall maintain in operating condition existing fire protection and alarm equipment. In connection with fire alarm equipment, Contractor shall make arrangements for pre-inspection of site with Fire Department or Company (Department of Veterans Affairs or municipal) whichever will be required to respond to an alarm from Contractor's employee or watchman.
- K. Utilities Services: Maintain existing utility services for Medical Center at all times. Provide temporary facilities, labor, materials, equipment, connections, and utilities to assure uninterrupted services. Where necessary to cut existing water, steam, gases, sewer or air pipes, or conduits, wires, cables, etc. of utility services or of fire protection systems and communications systems (including telephone),

they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by the COR.

1. No utility service such as water, gas, steam, sewers or electricity, or fire protection systems and communications systems may be interrupted without prior approval of the COR. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished, work on any energized circuits or equipment shall not commence without a detailed work plan, the Medical Center Director's prior knowledge and written approval. Refer to specification Sections 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, 27 05 11 REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS and 28 05 00, COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY for additional requirements.
 2. Contractor shall submit a request to interrupt any such services to the COR, in writing, 7 days in advance of proposed interruption. Request shall state reason, date, exact time of, and approximate duration of such interruption.
 3. Contractor will be advised (in writing) of approval of request, or of which other date and/or time such interruption will cause least inconvenience to operations of Medical Center. Interruption time approved by Medical Center may occur at other than Contractor's normal working hours.
 4. Major interruptions of any system must be requested, in writing, at least 15 calendar days prior to the desired time and shall be performed as directed by the COR.
 5. In case of a contract construction emergency, service will be interrupted on approval of COR. Such approval will be confirmed in writing as soon as practical.
 6. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee shall be the responsibility of the Government and not the Contractor.
- L. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and the like, and their hangers or supports, which are to be abandoned but are not required to be entirely removed, shall be

sealed, capped or plugged at the main, branch or panel they originate from. The lines shall not be capped in finished areas, but shall be removed and sealed, capped or plugged in ceilings, within furred spaces, in unfinished areas, or within walls or partitions; so that they are completely behind the finished surfaces.

- M. To minimize interference of construction activities with flow of Medical Center traffic, comply with the following:
1. Keep roads, walks and entrances to grounds, to parking and to occupied areas of buildings clear of construction materials, debris and standing construction equipment and vehicles. Wherever excavation for new utility lines cross existing roads, at least one lane must be open to traffic at all times with approval.
 2. Method and scheduling of required cutting, altering and removal of existing roads, walks and entrances must be approved by the COR.
- N. Coordinate the work for this contract with other construction operations as directed by COR. This includes the scheduling of traffic and the use of roadways, as specified in Article, USE OF ROADWAYS.

1.7 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS

- A. The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workers, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.
- B. The Contractor shall protect from damage all existing improvements and utilities at or near the work site and on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the

Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

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- C. Refer to Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS, for additional requirements on protecting vegetation, soils and the environment. Refer to Articles, "Alterations", "Restoration", and "Operations and Storage Areas" for additional instructions concerning repair of damage to structures and site improvements.
- D. Refer to FAR clause 52.236-7, "Permits and Responsibilities," which is included in General Conditions. A National Pollutant Discharge Elimination System (NPDES) permit is required for this project. The Contractor is considered an "operator" under the permit and has extensive responsibility for compliance with permit requirements. VA will make the permit application available at the (appropriate medical center) office. The apparent low bidder, contractor and affected subcontractors shall furnish all information and certifications that are required to comply with the permit process and permit requirements. Many of the permit requirements will be satisfied by completing construction as shown and specified. Some requirements involve the Contractor's method of operations and operations planning and the Contractor is responsible for employing best management practices. The affected activities often include, but are not limited to the following:
1. Designating areas for equipment maintenance and repair;
 2. Providing waste receptacles at convenient locations and provide regular collection of wastes;
 3. Locating equipment wash down areas on site, and provide appropriate control of wash-waters;
 4. Providing protected storage areas for chemicals, paints, solvents, fertilizers, and other potentially toxic materials; and
 5. Providing adequately maintained sanitary facilities.

1.8 RESTORATION

- A. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work. Except as otherwise shown or specified, do not cut, alter or remove any structural work, and do not disturb any

ducts, plumbing, steam, gas, or electric work without approval of the COR. Existing work to be altered or extended and that is found to be defective in any way, shall be reported to the COR before it is disturbed. Materials and workmanship used in restoring work, shall conform in type and quality to that of original existing construction, except as otherwise shown or specified.

- B. Upon completion of contract, deliver work complete and undamaged. Existing work (walls, ceilings, partitions, floors, mechanical and electrical work, lawns, paving, roads, walks, etc.) disturbed or removed as a result of performing required new work, shall be patched, repaired, reinstalled, or replaced with new work, and refinished and left in as good condition as existed before commencing work.
- C. At Contractor's own expense, Contractor shall immediately restore to service and repair any damage caused by Contractor's workers to existing piping and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems (including telephone) which are not scheduled for discontinuance or abandonment.
- D. Expense of repairs to such utilities and systems not shown on drawings or locations of which are unknown will be covered by adjustment to contract time and price in accordance with clause entitled "CHANGES" (FAR 52.243-4) and "DIFFERING SITE CONDITIONS" (FAR 52.236-2).

1.9 PHYSICAL DATA

- A. Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.
 - 1. The indications of physical conditions on the drawings and in the specifications are the result of site investigations by

(FAR 52.236-4)

- B. Subsurface conditions have been developed by core borings and test pits. Logs of subsurface exploration are shown diagrammatically on drawings.
- C. A copy of the soil report will be made available for inspection by bidders upon request to the Engineering Officer at the VA Medical Center, and shall be considered part of the contract documents.

D. Government does not guarantee that other materials will not be encountered, nor that proportions, conditions or character of several materials will not vary from those indicated by explorations. Bidders are expected to examine site of work and logs of borings; and, after investigation, decide for themselves character of materials and make their bids accordingly. Upon proper application to Department of Veterans Affairs, bidders will be permitted to make subsurface explorations of their own at site.

1.10 PROFESSIONAL SURVEYING SERVICES

A. A registered professional land surveyor or registered civil engineer whose services are retained and paid for by the Contractor shall perform services specified herein and in other specification sections. The Contractor shall certify that the land surveyor or civil engineer is not one who is a regular employee of the Contractor, and that the land surveyor or civil engineer has no financial interest in this contract.

1.11 LAYOUT OF WORK

A. The Contractor shall lay out the work from Government established base lines and bench marks, indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at Contractor's own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through Contractor's negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

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B. Establish and plainly mark center lines for each building and corner of column lines and/or addition to each existing building, and such other lines and grades that are reasonably necessary to properly assure that location, orientation, and elevations established for each such

structure, roads, parking lots, are in accordance with lines and elevations shown on contract drawings.

- C. Following completion of general mass excavation and before any other permanent work is performed, establish and plainly mark (through use of appropriate batter boards or other means) sufficient additional survey control points or system of points as may be necessary to assure proper alignment, orientation, and grade of all major features of work. Survey shall include, but not be limited to, location of lines and grades of footings, exterior walls, center lines of columns in both directions, major utilities and elevations of floor slabs:
1. Such additional survey control points or system of points thus established shall be checked and certified by a registered land surveyor or registered civil engineer. Furnish such certification to the COR before any work (such as footings, floor slabs, columns, walls, utilities and other major controlling features) is placed.
- D. During progress of work, and particularly as work progresses from floor to floor, Contractor shall have line grades and plumbness of all major form work checked and certified by a registered land surveyor or registered civil engineer as meeting requirements of contract drawings. Furnish such certification to the COR before any major items of concrete work are placed. In addition, Contractor shall also furnish to the COR certificates from a registered land surveyor or registered civil engineer that the following work is complete in every respect as required by contract drawings.
1. Lines of each building and/or addition.
 2. Elevations of bottoms of footings and tops of floors of each building and/or addition.
 3. Lines and elevations of sewers and of all outside distribution systems.
- E. Upon completion of the work, the Contractor shall furnish the COR one electronic copy and reproducible drawings at the scale of the contract drawings, showing the finished grade on the grid developed for constructing the work, including burial monuments and fifty-foot stationing along new road centerlines. These drawings shall bear the seal of the registered land surveyor or registered civil engineer.

F. The Contractor shall perform the surveying and layout work of this and other articles and specifications in accordance with the provisions of Article "Professional Surveying Services".

1.12 AS-BUILT DRAWINGS

- A. The contractor shall maintain two full size sets of as-built drawings which will be kept current during construction of the project, to include all contract changes, modifications and clarifications.
- B. All variations shall be shown in the same general detail as used in the contract drawings. To ensure compliance, as-built drawings shall be made available for the COR's review, as often as requested.
- C. Contractor shall deliver two approved completed sets of as-built drawings in the electronic version (scanned PDF) to the COR within 15 calendar days after each completed phase and after the acceptance of the project by the COR.
- D. Paragraphs A, B, & C shall also apply to all shop drawings.

1.13 WARRANTY MANAGEMENT

- A. Warranty Management Plan: Develop a warranty management plan which contains information relevant to FAR 52.246-21 Warranty of Construction in at least 30 days before the planned pre-warranty conference, submit one set of the warranty management plan. Include within the warranty management plan all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan must be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesman, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below must include due date and whether item has been submitted or was approved. Warranty information made available during the construction phase must be submitted to the Contracting Officer for approval prior to each monthly invoice for payment. Assemble approved information in a binder and turn over to the Government upon acceptance of the work. The construction warranty period will begin on the date of the project acceptance and continue for the product warranty period. A joint 4 month and 9-month warranty inspection will be conducted, measured from time of acceptance, by the Contactor and the Contracting Officer. Include in the warranty management plan, but not limited to, the following:

1. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the company of the Contractor, subcontractors, manufacturers or suppliers involved.
2. Furnish with each warranty the name, address and telephone number of each of the guarantor's representatives nearest project location.
3. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers and for all commissioned systems such as fire protection and alarm systems, sprinkler systems and lightning protection systems, etc.
4. A list for each warranted equipment item, feature of construction or system indicating:
 - a. Name of item.
 - b. Model and serial numbers.
 - c. Location where installed.
 - d. Name and phone numbers of manufacturers and suppliers.
 - e. Name and phone numbers of manufacturers or suppliers.
 - f. Names, addresses and phone numbers of sources of spare parts.
 - g. Warranties and terms of warranty. Include one-year overall warranty of construction, including the starting date of warranty of construction. Items which have extended warranties must be indicated with separate warranty expiration dates.
 - h. Starting point and duration of warranty period.
 - i. Summary of maintenance procedures required to continue the warranty in force.
 - j. Cross-reference to specific pertinent Operation and Maintenance manuals.
 - k. Organizations, names and phone numbers of persons to call for warranty service.
 - l. Typical response time and repair time expected for various warranted equipment.
5. The plans for attendance at the 4 and 9-month post construction warranty inspections conducted by the government.
6. Procedure and status of tagging of all equipment covered by extended warranties.

7. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- B. Performance Bond: The Performance Bond must remain effective throughout the construction period.
1. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.
 2. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the contractor's expenses, the Contracting Officer will have the right to recoup expenses from the bonding company.
 3. Following oral or written notification of required construction warranty repair work, the Contractor shall respond in a timely manner. Written verification will follow oral instructions. Failure to respond will be cause for the Contracting Officer to proceed against the Contractor.
- C. Pre-Warranty Conference: Prior to contract completion, and at a time designated by the Contracting Officer, the Contractor shall meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. Communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty will be established/ reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contract will be located within the local service area of the warranted construction, be continuously available and be responsive to Government inquiry on warranty work action and status. This

requirement does not relieve the Contractor of any of its responsibilities in conjunction with other portions of this provision.

D. Contractor's Response to Construction Warranty Service Requirements:

Following oral or written notification by the Contracting Officer, the Contractor shall respond to construction warranty service requirements in accordance with the "Construction Warranty Service Priority List" and the three categories of priorities listed below. Submit a report on any warranty item that has been repaired during the warranty period. Include within the report the cause of the problem, date reported, corrective action taken, and when the repair was completed. If the Contractor does not perform the construction warranty within the timeframe specified, the Government will perform the work and back charge the construction warranty payment item established.

1. First Priority Code 1. Perform onsite inspection to evaluate situation, and determine course of action within 4 hours, initiate work within 6 hours and work continuously to completion or relief.
2. Second Priority Code 2. Perform onsite inspection to evaluate situation, and determine course of action within 8 hours, initiate work within 24 hours and work continuously to completion or relief.
3. Third Priority Code 3. All other work to be initiated within 3 work days and work continuously to completion or relief.
4. The "Construction Warranty Service Priority List" is as follows:
 - Code 1-Life Safety Systems
 - a. Fire suppression systems.
 - b. Fire alarm system(s).
 - Code 1-Air Conditioning Systems
 - a. Air conditioning leak in part of the building, if causing damage.
 - b. Air conditioning system not cooling properly.
 - Code 1 Doors
 - a. Overhead doors not operational, causing a security, fire or safety problem.
 - b. Interior, exterior personnel doors or hardware, not functioning properly, causing security, fire or safety problem.
 - Code 3-Doors
 - a. Overhead doors not operational.

- b. Interior/exterior personnel doors or hardware not functioning properly.

Code 1-Electrical

- a. Power failure (entire area or any building operational after 1600 hours).
- b. Security lights.
- c. Smoke detectors.

Code 2-Electrical

- a. Power failure (no power to a room or part of building).
- b. Receptacles and lights not operational (in a room or part of building).

Code 3-Electrical

- a. Exterior lights not operational.

Code 1-Gas

- a. Leaks and pipeline breaks.

Code 1-Heat

- a. Power failure affecting heat.

Code 1-Plumbing

- a. Hot water heater failure.
- b. Leaking water supply pipes.

Code 2-Plumbing

- a. Flush valves not operating properly
- b. Fixture drain, supply line or any water pipe leaking.
- c. Toilet leaking at base.

Code 3- Plumbing

- a. Leaky faucets.

Code 3-Interior

- a. Floors damaged.
- b. Paint chipping or peeling.
- c. Casework damaged.

Code 1-Roof Leaks

- a. Damage to property is occurring.

Code 2-Water (Exterior)

- a. No water to facility.

Code 2-Water (Hot)

- a. No hot water in portion of building listed.

Code 3

a. All work not listed above.

E. Warranty Tags: At the time of installation, tag each warranted item with a durable, oil and water-resistant tag approved by the Contracting Officer. Attach each tag with a copper wire and spray with a silicone waterproof coating. Also submit two record copies of the warranty tags showing the layout and design. The date of acceptance and the QC signature must remain blank until the project is accepted for beneficial occupancy. Show the following information on the tag.

Type of product/material	
Model number	
Serial number	
Contract number	
Warranty period from/to	
Inspector's signature	
Construction Contractor	
Address	
Telephone number	
Warranty contact	
Address	
Telephone number	
Warranty response time priority code	

1.14 USE OF ROADWAYS

- A. For hauling, use only established public roads and roads on Medical Center property and, when authorized by the COR, such temporary roads which are necessary in the performance of contract work. Temporary roads shall be constructed and restoration performed by the Contractor at Contractor's expense. When necessary to cross curbing, sidewalks, or similar construction, they must be protected by well-constructed bridges.
- B. When new permanent roads are to be a part of this contract, Contractor may construct them immediately for use to facilitate building operations. These roads may be used by all who have business thereon within zone of building operations.

- C. When certain buildings (or parts of certain buildings) are required to be completed in advance of general date of completion, all roads leading thereto must be completed and available for use at time set for completion of such buildings or parts thereof.

1.15 TEMPORARY USE OF MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Use of new installed mechanical and electrical equipment to provide heat, ventilation, plumbing, light and power will be permitted subject to written approval and compliance with the following provisions:
1. Permission to use each unit or system must be given by the COR in writing. If the equipment is not installed and maintained in accordance with the written agreement and following provisions, the COR will withdraw permission for use of the equipment.
 2. Electrical installations used by the equipment shall be completed in accordance with the drawings and specifications to prevent damage to the equipment and the electrical systems, i.e. transformers, relays, circuit breakers, fuses, conductors, motor controllers and their overload elements shall be properly sized, coordinated and adjusted. Installation of temporary electrical equipment or devices shall be in accordance with NFPA 70, National Electrical Code, (2014 Edition), Article 590, *Temporary Installations*. Voltage supplied to each item of equipment shall be verified to be correct and it shall be determined that motors are not overloaded. The electrical equipment shall be thoroughly cleaned before using it and again immediately before final inspection including vacuum cleaning and wiping clean interior and exterior surfaces.
 3. Units shall be properly lubricated, balanced, and aligned. Vibrations must be eliminated.
 4. Automatic temperature control systems for preheat coils shall function properly and all safety controls shall function to prevent coil freeze-up damage.
 5. The air filtering system utilized shall be that which is designed for the system when complete, and all filter elements shall be replaced at completion of construction and prior to testing and balancing of system.
 6. All components of heat production and distribution system, metering equipment, condensate returns, and other auxiliary facilities used

- in temporary service shall be cleaned prior to use; maintained to prevent corrosion internally and externally during use; and cleaned, maintained and inspected prior to acceptance by the Government. Boilers, pumps, feedwater heaters and auxiliary equipment must be operated as a complete system and be fully maintained by operating personnel. Boiler water must be given complete and continuous chemical treatment.
- B. Prior to final inspection, the equipment or parts used which show wear and tear beyond normal, shall be replaced with identical replacements, at no additional cost to the Government.
 - C. This paragraph shall not reduce the requirements of the mechanical and electrical specifications sections.
 - D. Any damage to the equipment or excessive wear due to prolonged use will be repaired replaced by the contractor at the contractor's expense.

1.16 TEMPORARY TOILETS

- A. Provide where directed, (for use of all Contractor's workers) ample temporary sanitary toilet accommodations with suitable sewer and water connections; or, when approved by the COR, provide suitable dry closets where directed. Keep such places clean and free from flies, and all connections and appliances connected therewith are to be removed prior to completion of contract, and premises left perfectly clean.

1.17 AVAILABILITY AND USE OF UTILITY SERVICES

- A. The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. The amount to be paid by the Contractor for chargeable electrical services shall be the prevailing rates charged to the Government. The Contractor shall carefully conserve any utilities furnished without charge.
- B. The Contractor, at Contractor's expense and in a workmanlike manner, in compliance with code and as satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of electricity used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and

associated paraphernalia and repair restore the infrastructure as required.

- C. Contractor shall install meters at Contractor's expense and furnish the Medical Center a monthly record of the Contractor's usage of electricity as hereinafter specified.
- D. Heat: Furnish temporary heat necessary to prevent injury to work and materials through dampness and cold. Use of open salamanders or any temporary heating devices which may be fire hazards or may smoke and damage finished work, will not be permitted. Maintain minimum temperatures as specified for various materials:
- E. Electricity (for Construction and Testing): Furnish all temporary electric services.
 - 1. Obtain electricity by connecting to the Medical Center electrical distribution system. The Contractor shall meter and pay for electricity required for electric cranes and hoisting devices, electrical welding devices and any electrical heating devices providing temporary heat. Electricity for all other uses is available at no cost to the Contractor.
- F. Water (for Construction and Testing): Furnish temporary water service.
 - 1. Obtain water by connecting to the Medical Center water distribution system. Provide reduced pressure backflow preventer at each connection as per code. Water is available at no cost to the Contractor.
 - 2. Maintain connections, pipe, fittings and fixtures and conserve water-use so none is wasted. Failure to stop leakage or other wastes will be cause for revocation (at COR's) of use of water from Medical Center's system.
- G. Fuel: Natural and LP gas and burner fuel oil required for boiler cleaning, normal initial boiler-burner setup and adjusting, and for performing the specified boiler tests will be furnished by the Government. Fuel required for prolonged boiler-burner setup, adjustments, or modifications due to improper design or operation of boiler, burner, or control devices shall be furnished and paid by the Contractor at Contractor's expense.

1.18 NEW TELEPHONE EQUIPMENT

- A. The contractor shall coordinate with the work of installation of telephone equipment by others. This work shall be completed before the building is turned over to VA.

1.19 TESTS

- A. As per specification section 23 05 93 the contractor shall provide a written testing and commissioning plan complete with component level, equipment level, sub-system level and system level breakdowns. The plan will provide a schedule and a written sequence of what will be tested, how and what the expected outcome will be. This document will be submitted for approval prior to commencing work. The contractor shall document the results of the approved plan and submit for approval with the as built documentation.
- B. Pre-test mechanical and electrical equipment and systems and make corrections required for proper operation of such systems before requesting final tests. Final test will not be conducted unless pre-tested.
- C. Conduct final tests required in various sections of specifications in presence of an authorized representative of the Contracting Officer. Contractor shall furnish all labor, materials, equipment, instruments, and forms, to conduct and record such tests.
- D. Mechanical and electrical systems shall be balanced, controlled and coordinated. A system is defined as the entire system which must be coordinated to work together during normal operation to produce results for which the system is designed. For example, air conditioning supply air is only one part of entire system which provides comfort conditions for a building. Other related components are return air, exhaust air, steam, chilled water, refrigerant, hot water, controls and electricity, etc. Another example of a system which involves several components of different disciplines is a boiler installation. Efficient and acceptable boiler operation depends upon the coordination and proper operation of fuel, combustion air, controls, steam, feedwater, condensate and other related components.
- E. All related components as defined above shall be functioning when any system component is tested. Tests shall be completed within a reasonable period of time during which operating and environmental

conditions remain reasonably constant and are typical of the design conditions.

- F. Individual test result of any component, where required, will only be accepted when submitted with the test results of related components and of the entire system.

1.20 INSTRUCTIONS

- A. Contractor shall furnish Maintenance and Operating manuals (hard copies and electronic) and verbal instructions when required by the various sections of the specifications and as hereinafter specified.
- B. Manuals: Maintenance and operating manuals and one compact disc (four hard copies and one electronic copy each) for each separate piece of equipment shall be delivered to the COR coincidental with the delivery of the equipment to the job site. Manuals shall be complete, detailed guides for the maintenance and operation of equipment. They shall include complete information necessary for starting, adjusting, maintaining in continuous operation for long periods of time and dismantling and reassembling of the complete units and sub-assembly components. Manuals shall include an index covering all component parts clearly cross-referenced to diagrams and illustrations. Illustrations shall include "exploded" views showing and identifying each separate item. Emphasis shall be placed on the use of special tools and instruments. The function of each piece of equipment, component, accessory and control shall be clearly and thoroughly explained. All necessary precautions for the operation of the equipment and the reason for each precaution shall be clearly set forth. Manuals must reference the exact model, style and size of the piece of equipment and system being furnished. Manuals referencing equipment similar to but of a different model, style, and size than that furnished will not be accepted.
- C. Instructions: Contractor shall provide qualified, factory-trained manufacturers' representatives to give detailed training to assigned Department of Veterans Affairs personnel in the operation and complete maintenance for each piece of equipment. All such training will be at the job site. These requirements are more specifically detailed in the various technical sections. Instructions for different items of equipment that are component parts of a complete system, shall be given

in an integrated, progressive manner. All instructors for every piece of component equipment in a system shall be available until instructions for all items included in the system have been completed. This is to assure proper instruction in the operation of inter-related systems. All instruction periods shall be at such times as scheduled by the COR and shall be considered concluded only when the COR is satisfied in regard to complete and thorough coverage. The contractor shall submit a course outline with associated material to the COR for review and approval prior to scheduling training to ensure the subject matter covers the expectations of the VA and the contractual requirements. The Department of Veterans Affairs reserves the right to request the removal of, and substitution for, any instructor who, in the opinion of the COR, does not demonstrate sufficient qualifications in accordance with requirements for instructors above.

1.21 GOVERNMENT-FURNISHED PROPERTY

- A. The Government shall deliver to the Contractor, the Government-furnished property shown on the Schedule drawings.
- B. Equipment furnished by Government to be installed by Contractor will be furnished to Contractor at the Medical Center.
- C. Contractor shall be prepared to receive this equipment from Government and store or place such equipment not less than 90 days before Completion Date of project.
- D. Notify Contracting Officer in writing, 60 days in advance, of date on which Contractor will be prepared to receive equipment furnished by Government. Arrangements will then be made by the Government for delivery of equipment.
 - 1. Immediately upon delivery of equipment, Contractor shall arrange for a joint inspection thereof with a representative of the Government. At such time the Contractor shall acknowledge receipt of equipment described, make notations, and immediately furnish the Government representative with a written statement as to its condition or shortages.
 - 2. Contractor thereafter is responsible for such equipment until such time as acceptance of contract work is made by the Government.
- E. Equipment furnished by the Government will be delivered in a partially assembled (knock down) condition in accordance with existing standard

commercial practices, complete with all fittings, fastenings, and appliances necessary for connections to respective services installed under contract. All fittings and appliances (i.e., couplings, ells, tees, nipples, piping, conduits, cables, and the like) necessary to make the connection between the Government furnished equipment item and the utility stub-up shall be furnished and installed by the contractor at no additional cost to the Government.

- F. Completely assemble and install the Government furnished equipment in place ready for proper operation in accordance with specifications and drawings.
- G. Furnish supervision of installation of equipment at construction site by qualified factory trained technicians regularly employed by the equipment manufacturer.

1.22 CONSTRUCTION SIGN

- A. Provide a Construction Sign where directed by the COR. All wood members shall be of framing lumber. Cover sign frame with 0.7 mm (24 gage) galvanized sheet steel nailed securely around edges and on all bearings. Provide three 100 by 100 mm (4 inch by 4 inch) posts (or equivalent round posts) set 1200 mm (four feet) into ground. Set bottom of sign level at 900 mm (three feet) above ground and secure to posts with through bolts. Make posts full height of sign. Brace posts with 50 x 100 mm (two by four inch) material as directed.
- B. Paint all surfaces of sign and posts two coats of white gloss paint. Border and letters shall be of black gloss paint, except project title which shall be blue gloss paint.
- C. Maintain sign and remove it when directed by the COR.
- D. Detail Drawing of construction sign showing required legend and other characteristics of sign is shown on the drawings.

1.23 SAFETY SIGN

- A. Provide a Safety Sign where directed by COR. Face of sign shall be 19 mm (3/4 inch) thick exterior grade plywood. Provide two 100 mm by 100 mm (four by four inch) posts extending full height of sign and 900 mm (three feet) into ground. Set bottom of sign level at 1200 mm (four feet) above ground.

- B. Paint all surfaces of Safety Sign and posts with one prime coat and two coats of white gloss paint. Letters and design shall be painted with gloss paint of colors noted.
- C. Maintain sign and remove it when directed by COR.
- D. Standard Detail Drawing Number SD10000-02 (Found on VA TIL) of safety sign showing required legend and other characteristics of sign is shown on the drawings.
- E. Post the number of accident-free days on a daily basis.

1.24 PHOTOGRAPHIC DOCUMENTATION

- A. During the construction period through completion, provide photographic documentation of construction progress and at selected milestones including electronic indexing, navigation, storage and remote access to the documentation, as per these specifications. The commercial photographer or the subcontractor used for this work shall meet the following qualifications:
 - 1. Demonstrable minimum experience of three (3) years in operation providing documentation and advanced indexing/navigation systems including a representative portfolio of construction projects of similar type, size, duration and complexity as the Project.
 - 2. Demonstrable ability to service projects throughout North America, which shall be demonstrated by a representative portfolio of active projects of similar type, size, duration and complexity as the Project.
- B. Photographic documentation elements:
 - 1. Each digital image shall be taken with a professional grade camera with minimum size of 6 megapixels (MP) capable of producing 200x250mm (8 x 10 inch) prints with a minimum of 2272 x 1704 pixels and 400x500mm (16 x 20 inch) prints with a minimum 2592 x 1944 pixels.
 - 2. Indexing and navigation system shall utilize actual AUTOCAD construction drawings, making such drawings interactive on an on-line interface. For all documentation referenced herein, indexing and navigation must be organized by both time (date-stamped) and location throughout the project.
 - 3. Documentation shall combine indexing and navigation system with inspection-grade digital photography designed to capture actual

conditions throughout construction and at critical milestones.

Documentation shall be accessible on-line through use of an internet connection. Documentation shall allow for secure multiple-user access, simultaneously, on-line.

4. Before construction, the building pad, adjacent streets, roadways, parkways, driveways, curbs, sidewalks, landscaping, adjacent utilities and adjacent structures surrounding the building pad and site shall be documented. Overlapping photographic techniques shall be used to ensure maximum coverage. Indexing and navigation accomplished through interactive architectural drawings. If site work or pad preparation is extensive, this documentation may be required immediately before construction and at several pre-determined intervals before building work commences.
5. Construction progress for all trades shall be tracked at pre-determined intervals, but not less than once every thirty (30) calendar days ("Progressions"). Progression documentation shall track both the exterior and interior construction of the building. Exterior Progressions shall track 360 degrees around the site and each building. Interior Progressions shall track interior improvements beginning when stud work commences and continuing until Project completion.
6. As-built condition of pre-foundation utilities and site utilities shall be documented prior to pouring footers, placing concrete and/or backfilling. This process shall include all underground and in-slab utilities within the building(s) envelope(s) and utility runs in the immediate vicinity of the building(s) envelope(s). This may also include utilities enclosed in slab-on-deck in multi-story buildings. Overlapping photographic techniques shall be used to ensure maximum coverage. Indexing and navigation accomplished through interactive site utility plans.
7. As-built conditions of mechanical, electrical, plumbing and all other systems shall be documented post-inspection and pre-insulation, sheet rock or dry wall installation. This process shall include all finished systems located in the walls and ceilings of all buildings at the Project. Overlapping photographic techniques

- shall be used to ensure maximum coverage. Indexing and navigation accomplished through interactive architectural drawings.
8. As-built conditions of exterior skin and elevations shall be documented with an increased concentration of digital photographs as directed by the COR in order to capture pre-determined focal points, such as waterproofing, window flashing, radiused steel work, architectural or Exterior Insulation and Finish Systems (EIFS) detailing. Overlapping photographic techniques shall be used to ensure maximum coverage. Indexing and navigation accomplished through interactive elevations or elevation details.
 9. As-built finished conditions of the interior of each building including floors, ceilings and walls shall be documented at certificate of occupancy or equivalent, or just prior to occupancy, or both, as directed by the COR. Overlapping photographic techniques shall be used to ensure maximum coverage. Indexing and navigation accomplished through interactive architectural drawings.
 10. Miscellaneous events that occur during any Contractor site visit, or events captured by the Department of Veterans Affairs independently, shall be dated, labeled and inserted into a Section in the navigation structure entitled "Slideshows," allowing this information to be stored in the same "place" as the formal scope.
 11. Customizable project-specific digital photographic documentation of other details or milestones. Indexing and navigation accomplished through interactive architectural plans.
 12. Monthly (29 max) exterior progressions (360 degrees around the project) and slideshows (all elevations and building envelope). The slideshows allow for the inclusion of Department of Veterans Affairs pictures, aerial photographs, and timely images which do not fit into any regular monthly photopath.
 13. Weekly (21 Max) Site Progressions - Photographic documentation capturing the project at different stages of construction. These progressions shall capture underground utilities, excavation, grading, backfill, landscaping and road construction throughout the duration of the project.

14. Regular (8 max) interior progressions of all walls of the entire project to begin at time of substantial framed or as directed by the COR through to completion.
 15. Detailed Exact-Built of all Slabs for all project slab pours just prior to placing concrete or as directed by the COR.
 16. Detailed Interior exact built overlapping photos of the entire building to include documentation of all mechanical, electrical and plumbing systems in every wall and ceiling, to be conducted after rough-ins are complete, just prior to insulation and or drywall, or as directed by COR.
 17. Finished detailed Interior exact built overlapping photos of all walls, ceilings, and floors to be scheduled by COR prior to occupancy.
 18. In event a greater or lesser number of images than specified above are required by the COR, adjustment in contract price will be made in accordance with clause entitled "CHANGES" (FAR 52.243-4).
- C. Images shall be taken by a commercial photographer and must show distinctly, at as large a scale as possible, all parts of work embraced in the picture.
- D. Coordination of photo shoots is accomplished through COR. Contractor shall also attend construction team meetings as necessary. Contractor's operations team shall provide regular updates regarding the status of the documentation, including photo shoots concluded, the availability of new Progressions or Exact-Builts viewable on-line and anticipated future shoot dates.
- E. Contractor shall provide all on-line domain/web hosting, security measures, and redundant server back-up of the documentation.
- F. Contractor shall provide technical support related to using the system or service.
- G. Upon completion of the project, final copies of the documentation (the "Permanent Record") with the indexing and navigation system embedded (and active) shall be provided in an electronic media format, typically a DVD or external hard-drive. Permanent Record shall have Building Information Modeling (BIM) interface capabilities. On-line access terminates upon delivery of the Permanent Record.

1.25 FINAL ELEVATION DIGITAL IMAGES

- A. A minimum of four (4) images of each elevation shall be taken with a minimum 6 MP camera, by a professional photographer with different settings to allow the COR to select the image to be printed. All images are provided to the COR on a CD.
- B. Photographs shall be taken upon completion, including landscaping. They shall be taken on a clear sunny day to obtain sufficient detail to show depth and to provide clear, sharp pictures. Pictures shall be 400 mm x 500 mm (16 by 20 inches), printed on regular weight paper, matte finish archival grade photographic paper and produced by a RA4 process from the digital image with a minimum 300 PPI. Identifying data shall be carried on label affixed to back of photograph without damage to photograph and shall be similar to that provided for final construction photographs.
- C. Furnish six (6) 400 mm x 500 mm (16 by 20 inch) color prints of the buildings constructed under this project (elevations as selected by the RE from the images taken above). Photographs shall be artistically composed showing full front elevations. All images shall become property of the Government. Each of the selected six prints shall be place in a frame with a minimum of 2 inches of appropriate matting as a border. Provide a selection of a minimum of 3 different frames from which the SRE will select one style to frame all six prints. Photographs with frames shall be delivered to the COR in boxes suitable for shipping.

1.26 HISTORIC PRESERVATION

- A. Where the Contractor or any of the Contractor's employees, prior to, or during the construction work, are advised of or discover any possible archeological, historical and/or cultural resources, the Contractor shall immediately notify the COR verbally, and then with a written follow up.

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SECTION 01 32 16.15
PROJECT SCHEDULES
(SMALL PROJECTS - DESIGN/BID/BUILD)

PART 1- GENERAL

1.1 DESCRIPTION:

- A. The Contractor shall develop a Critical Path Method (CPM) plan and schedule demonstrating fulfillment of the contract requirements (Project Schedule) and shall keep the Project Schedule up-to-date in accordance with the requirements of this section and shall utilize the plan for scheduling, coordinating and monitoring work under this contract (including all activities of subcontractors, equipment vendors and suppliers). Conventional Critical Path Method (CPM) technique shall be utilized to satisfy both time and cost applications.

1.2 CONTRACTOR'S REPRESENTATIVE:

- A. The Contractor shall designate an authorized representative responsible for the Project Schedule including preparation, review and progress reporting with and to the Contracting Officer's Representative (COR).
- B. The Contractor's representative shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the requirements of this specification section.
- C. The Contractor's representative shall have the option of developing the project schedule within their organization or to engage the services of an outside consultant. If an outside scheduling consultant is utilized, Section 1.3 of this specification will apply.

1.3 CONTRACTOR'S CONSULTANT:

- A. The Contractor shall submit a qualification proposal to the COR, within 10 days of bid acceptance. The qualification proposal shall include:
1. The name and address of the proposed consultant.
 2. Information to show that the proposed consultant has the qualifications to meet the requirements specified in the preceding paragraph.
 3. A representative sample of prior construction projects, which the proposed consultant has performed complete project scheduling services. These representative samples shall be of similar size and scope.

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- B. The Contracting Officer has the right to approve or disapprove the proposed consultant and will notify the Contractor of the VA decision within seven calendar days from receipt of the qualification proposal. In case of disapproval, the Contractor shall resubmit another consultant within 10 calendar days for renewed consideration. The Contractor shall have their scheduling consultant approved prior to submitting any schedule for approval.

1.4 COMPUTER PRODUCED SCHEDULES

- A. The contractor shall provide monthly, to the Department of Veterans Affairs (VA), all computer-produced time/cost schedules and reports generated from monthly project updates. This monthly computer service will include: three copies of up to five different reports (inclusive of all pages) available within the user defined reports of the scheduling software approved by the Contracting Officer; a hard copy listing of all project schedule changes, and associated data, made at the update and an electronic file of this data; and the resulting monthly updated schedule in PDM format. These must be submitted with and substantively support the contractor's monthly payment request and the signed look ahead report. The COR shall identify the five different report formats that the contractor shall provide.
- B. The contractor shall be responsible for the correctness and timeliness of the computer-produced reports. The Contractor shall also responsible for the accurate and timely submittal of the updated project schedule and all CPM data necessary to produce the computer reports and payment request that is specified.
- C. The VA will report errors in computer-produced reports to the Contractor's representative within ten calendar days from receipt of reports. The Contractor shall reprocess the computer-produced reports and associated diskette(s), when requested by the Contracting Officer's representative, to correct errors which affect the payment and schedule for the project.

1.5 THE COMPLETE PROJECT SCHEDULE SUBMITTAL

- A. Within 45 calendar days after receipt of Notice to Proceed, the Contractor shall submit for the Contracting Officer's review; three blue line copies of the interim schedule on sheets of paper 765 x 1070 mm (30 x 42 inches) and an electronic file in the previously approved

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CPM schedule program. The submittal shall also include three copies of a computer-produced activity/event ID schedule showing project duration; phase completion dates; and other data, including event cost. Each activity/event on the computer-produced schedule shall contain as a minimum, but not limited to, activity/event ID, activity/event description, duration, budget amount, early start date, early finish date, late start date, late finish date and total float. Work activity/event relationships shall be restricted to finish-to-start or start-to-start without lead or lag constraints. Activity/event date constraints, not required by the contract, will not be accepted unless submitted to and approved by the Contracting Officer. The contractor shall make a separate written detailed request to the Contracting Officer identifying these date constraints and secure the Contracting Officer's written approval before incorporating them into the network diagram. The Contracting Officer's separate approval of the Project Schedule shall not excuse the contractor of this requirement. Logic events (non-work) will be permitted where necessary to reflect proper logic among work events, but must have zero duration. The complete working schedule shall reflect the Contractor's approach to scheduling the complete project. **The final Project Schedule in its original form shall contain no contract changes or delays which may have been incurred during the final network diagram development period and shall reflect the entire contract duration as defined in the bid documents.** These changes/delays shall be entered at the first update after the final Project Schedule has been approved. The Contractor should provide their requests for time and supporting time extension analysis for contract time as a result of contract changes/delays, after this update, and in accordance with Article, ADJUSTMENT OF CONTRACT COMPLETION.

- B. Within 30 calendar days after receipt of the complete project interim Project Schedule and the complete final Project Schedule, the Contracting Officer or his representative, will do one or both of the following:
1. Notify the Contractor concerning his actions, opinions, and objections.

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2. A meeting with the Contractor at or near the job site for joint review, correction or adjustment of the proposed plan will be scheduled if required. Within 14 calendar days after the joint review, the Contractor shall revise and shall submit three blue line copies of the revised Project Schedule, three copies of the revised computer-produced activity/event ID schedule and a revised electronic file as specified by the Contracting Officer. The revised submission will be reviewed by the Contracting Officer and, if found to be as previously agreed upon, will be approved.
- C. The approved baseline schedule and the computer-produced schedule(s) generated there from shall constitute the approved baseline schedule until subsequently revised in accordance with the requirements of this section.

1.6 WORK ACTIVITY/EVENT COST DATA

- A. The Contractor shall cost load all work activities/events except procurement activities. The cumulative amount of all cost loaded work activities/events (including alternates) shall equal the total contract price. Prorate overhead, profit and general conditions on all work activities/events for the entire project length. The contractor shall generate from this information cash flow curves indicating graphically the total percentage of work activity/event dollar value scheduled to be in place on early finish, late finish. These cash flow curves will be used by the Contracting Officer to assist him in determining approval or disapproval of the cost loading. Negative work activity/event cost data will not be acceptable, except on VA issued contract changes.
- B. The Contractor shall cost load work activities/events for guarantee period services, test, balance and adjust various systems in accordance with the provisions in Article, FAR 52.232 - 5 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS) and VAAR 852.232 - Article 71 Including NAS-CPM for (PAYMENTS UNDER FIXED PRICE CONSTRUCTION).
- C. In accordance with FAR 52.236 - 1 (PERFORMANCE OF WORK BY THE CONTRACTOR) and VAAR 852.236 - 72 (PERFORMANCE OF WORK BY THE CONTRACTOR), the Contractor shall submit, simultaneously with the cost per work activity/event of the construction schedule required by this

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Section, a responsibility code for all activities/events of the project for which the Contractor's forces will perform the work.

- D. The Contractor shall cost load work activities/events for all BID ITEMS including ASBESTOS ABATEMENT. The sum of each BID ITEM work shall equal the value of the bid item in the Contractors' bid.

1.7 PROJECT SCHEDULE REQUIREMENTS

- A. Show on the project schedule the sequence of work activities/events required for complete performance of all items of work. The Contractor Shall:
1. Show activities/events as:
 - a. Contractor's time required for submittal of shop drawings, templates, fabrication, delivery and similar pre-construction work.
 - b. Contracting Officer's and Architect-Engineer's review and approval of shop drawings, equipment schedules, samples, template, or similar items.
 - c. Interruption of VA Facilities utilities, delivery of Government furnished equipment, and rough-in drawings, project phasing and any other specification requirements.
 - d. Test, balance and adjust various systems and pieces of equipment, maintenance and operation manuals, instructions and preventive maintenance tasks.
 - e. VA inspection and acceptance activity/event with a minimum duration of five work days at the end of each phase and immediately preceding any VA move activity/event required by the contract phasing for that phase.
 2. Show not only the activities/events for actual construction work for each trade category of the project, but also trade relationships to indicate the movement of trades from one area, floor, or building, to another area, floor, or building, for at least five trades who are performing major work under this contract.
 3. Break up the work into activities/events of a duration no longer than 20 work days each or one reporting period, except as to non-construction activities/events (i.e., procurement of materials, delivery of equipment, concrete and asphalt curing) and any other activities/events for which the COR may approve the showing of a

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longer duration. The duration for VA approval of any required submittal, shop drawing, or other submittals will not be less than 20 work days.

4. Describe work activities/events clearly, so the work is readily identifiable for assessment of completion. Activities/events labeled "start," "continue," or "completion," are not specific and will not be allowed. Lead and lag time activities will not be acceptable.
 5. The schedule shall be generally numbered in such a way to reflect either discipline, phase or location of the work.
- B. The Contractor shall submit the following supporting data in addition to the project schedule:
1. The appropriate project calendar including working days and holidays.
 2. The planned number of shifts per day.
 3. The number of hours per shift.
- Failure of the Contractor to include this data shall delay the review of the submittal until the Contracting Officer is in receipt of the missing data.
- C. To the extent that the Project Schedule or any revised Project Schedule shows anything not jointly agreed upon, it shall not be deemed to have been approved by the COR. Failure to include any element of work required for the performance of this contract shall not excuse the Contractor from completing all work required within any applicable completion date of each phase regardless of the COR's approval of the Project Schedule.
- D. Compact Disk Requirements and CPM Activity/Event Record Specifications: Submit to the VA an electronic file(s) containing one file of the data required to produce a schedule, reflecting all the activities/events of the complete project schedule being submitted.

1.8 PAYMENT TO THE CONTRACTOR:

- A. Monthly, the contractor shall submit an application and certificate for payment using VA Form 10-6001a reflecting updated schedule activities and cost data in accordance with the provisions of the following Article, PAYMENT AND PROGRESS REPORTING, as the basis upon which progress payments will be made pursuant to Article, FAR 52.232 - 5 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS) and VAAR 852.232 -

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Article 71 Including NAS-CPM for (PAYMENTS UNDER FIXED PRICE CONSTRUCTION). The Contractor shall be entitled to a monthly progress payment upon approval of estimates as determined from the currently approved updated project schedule. Monthly payment requests shall include: a listing of all agreed upon project schedule changes and associated data; and an electronic file (s) of the resulting monthly updated schedule.

- B. Approval of the Contractor's monthly Application for Payment shall be contingent, among other factors, on the submittal of a satisfactory monthly update of the project schedule.

1.9 PAYMENT AND PROGRESS REPORTING

- A. Monthly schedule update meetings will be held on dates mutually agreed to by the COR and the Contractor. Contractor and their CPM consultant (if applicable) shall attend all monthly schedule update meetings. The Contractor shall accurately update the Project Schedule and all other data required and provide this information to the COR three work days in advance of the schedule update meeting. Job progress will be reviewed to verify:
1. Actual start and/or finish dates for updated/completed activities/events.
 2. Remaining duration for each activity/event started, or scheduled to start, but not completed.
 3. Logic, time and cost data for change orders, and supplemental agreements that are to be incorporated into the Project Schedule.
 4. Changes in activity/event sequence and/or duration which have been made, pursuant to the provisions of following Article, ADJUSTMENT OF CONTRACT COMPLETION.
 5. Completion percentage for all completed and partially completed activities/events.
 6. Logic and duration revisions required by this section of the specifications.
 7. Activity/event duration and percent complete shall be updated independently.
- B. After completion of the joint review, the contractor shall generate an updated computer-produced calendar-dated schedule and supply the

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Contracting Officer's representative with reports in accordance with the Article, COMPUTER PRODUCED SCHEDULES, specified.

- C. After completing the monthly schedule update, the contractor's representative or scheduling consultant shall rerun all current period contract change(s) against the prior approved monthly project schedule. The analysis shall only include original workday durations and schedule logic agreed upon by the contractor and COR for the contract change(s). When there is a disagreement on logic and/or durations, the Contractor shall use the schedule logic and/or durations provided and approved by the COR. After each rerun update, the resulting electronic project schedule data file shall be appropriately identified and submitted to the VA in accordance to the requirements listed in articles 1.4 and 1.7. This electronic submission is separate from the regular monthly project schedule update requirements and shall be submitted to the COR within fourteen (14) calendar days of completing the regular schedule update. **Before inserting the contract changes durations, care must be taken to ensure that only the original durations will be used for the analysis, not the reported durations after progress. In addition, once the final network diagram is approved, the contractor must recreate all manual progress payment updates on this approved network diagram and associated reruns for contract changes in each of these update periods as outlined above for regular update periods. This will require detailed record keeping for each of the manual progress payment updates.**
- D. Following approval of the CPM schedule, the VA, the General Contractor, its approved CPM Consultant, RE office representatives, and all subcontractors needed, as determined by the SRE, shall meet to discuss the monthly updated schedule. The main emphasis shall be to address work activities to avoid slippage of project schedule and to identify any necessary actions required to maintain project schedule during the reporting period. The Government representatives and the Contractor should conclude the meeting with a clear understanding of those work and administrative actions necessary to maintain project schedule status during the reporting period. This schedule coordination meeting will occur after each monthly project schedule update meeting utilizing the resulting schedule reports from that schedule update. If the

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project is behind schedule, discussions should include ways to prevent further slippage as well as ways to improve the project schedule status, when appropriate.

1.10 RESPONSIBILITY FOR COMPLETION

- A. If it becomes apparent from the current revised monthly progress schedule that phasing or contract completion dates will not be met, the Contractor shall execute some or all of the following remedial actions:
1. Increase construction manpower in such quantities and crafts as necessary to eliminate the backlog of work.
 2. Increase the number of working hours per shift, shifts per working day, working days per week, the amount of construction equipment, or any combination of the foregoing to eliminate the backlog of work.
 3. Reschedule the work in conformance with the specification requirements.
- B. Prior to proceeding with any of the above actions, the Contractor shall notify and obtain approval from the COR for the proposed schedule changes. If such actions are approved, the representative schedule revisions shall be incorporated by the Contractor into the Project Schedule before the next update, at no additional cost to the Government.

1.11 CHANGES TO THE SCHEDULE

- A. Within 30 calendar days after VA acceptance and approval of any updated project schedule, the Contractor shall submit a revised electronic file (s) and a list of any activity/event changes including predecessors and successors for any of the following reasons:
1. Delay in completion of any activity/event or group of activities/events, which may be involved with contract changes, strikes, unusual weather, and other delays will not relieve the Contractor from the requirements specified unless the conditions are shown on the CPM as the direct cause for delaying the project beyond the acceptable limits.
 2. Delays in submittals, or deliveries, or work stoppage are encountered which make rescheduling of the work necessary.
 3. The schedule does not represent the actual prosecution and progress of the project.

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4. When there is, or has been, a substantial revision to the activity/event costs regardless of the cause for these revisions.
- B. CPM revisions made under this paragraph which affect the previously approved computer-produced schedules for Government furnished equipment, vacating of areas by the VA Facility, contract phase(s) and sub phase(s), utilities furnished by the Government to the Contractor, or any other previously contracted item, shall be furnished in writing to the Contracting Officer for approval.
- C. Contracting Officer's approval for the revised project schedule and all relevant data is contingent upon compliance with all other paragraphs of this section and any other previous agreements by the Contracting Officer or the VA representative.
- D. The cost of revisions to the project schedule resulting from contract changes will be included in the proposal for changes in work as specified in FAR 52.243 - 4 (Changes and will be based on the complexity of the revision or contract change, man hours expended in analyzing the change, and the total cost of the change.
- E. The cost of revisions to the Project Schedule not resulting from contract changes is the responsibility of the Contractor.

1.12 ADJUSTMENT OF CONTRACT COMPLETION

- A. The contract completion time will be adjusted only for causes specified in this contract. Request for an extension of the contract completion date by the Contractor shall be supported with a justification, CPM data and supporting evidence as the COR may deem necessary for determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract. Submission of proof based on revised activity/event logic, durations (in work days) and costs is obligatory to any approvals. The schedule must clearly display that the Contractor has used, in full, all the float time available for the work involved in this request. The Contracting Officer's determination as to the total number of days of contract extension will be based upon the current computer-produced calendar-dated schedule for the time period in question and all other relevant information.
- B. Actual delays in activities/events which, according to the computer-produced calendar-dated schedule, do not affect the extended

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and predicted contract completion dates shown by the critical path in the network, will not be the basis for a change to the contract completion date. The Contracting Officer will within a reasonable time after receipt of such justification and supporting evidence, review the facts and advise the Contractor in writing of the Contracting Officer's decision.

- C. The Contractor shall submit each request for a change in the contract completion date to the Contracting Officer in accordance with the provisions specified under FAR 52.243 - 4 (Changes). The Contractor shall include, as a part of each change order proposal, a sketch showing all CPM logic revisions, duration (in work days) changes, and cost changes, for work in question and its relationship to other activities on the approved network diagram.
- D. All delays due to non-work activities/events such as RFI's, WEATHER, STRIKES, and similar non-work activities/events shall be analyzed on a month-by-month basis.

- - - E N D - - -

Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/23

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SECTION 01 33 23

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This specification defines the general requirements and procedures for submittals. A submittal is information submitted for VA review to establish compliance with the contract documents.
- B. Detailed submittal requirements are found in the technical sections of the contract specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective technical specifications at no additional cost to the government.
- C. VA approval of a submittal does not relieve the Contractor of the responsibility for any error which may exist. The Contractor is responsible for fully complying with all contract requirements and the satisfactory construction of all work, including the need to check, confirm, and coordinate the work of all subcontractors for the project. Non-compliant material incorporated in the work will be removed and replaced at the Contractor's expense.

1.2 DEFINITIONS

- A. Preconstruction Submittals: Submittals which are required prior to issuing contract notice to proceed or starting construction. For example, Certificates of insurance; Surety bonds; Site-specific safety plan; Construction progress schedule; Schedule of values; Submittal register; List of proposed subcontractors.
- B. Shop Drawings: Drawings, diagrams, and schedules specifically prepared to illustrate some portion of the work. Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be integrated and coordinated.
- C. Product Data: Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions, and brochures, which describe and illustrate size, physical appearance, and other characteristics of materials, systems, or equipment for some portion of the work. Samples of warranty language when the contract requires extended product warranties.
- D. Samples: Physical examples of materials, equipment, or workmanship that illustrate functional and aesthetic characteristics of a material or

product and establish standards by which the work can be judged. Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project. Field samples and mock-ups constructed to establish standards by which the ensuing work can be judged.

- E. Design Data: Calculations, mix designs, analyses, or other data pertaining to a part of work.
- F. Test Reports: Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work. Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.
- G. Certificates: Document required of Contractor, or of a manufacturer, supplier, installer, or subcontractor through Contractor. The purpose is to document procedures, acceptability of methods, or personnel qualifications for a portion of the work.
- H. Manufacturer's Instructions: Pre-printed material describing installation of a product, system, or material, including special notices and (MSDS) concerning impedances, hazards, and safety precautions.
- I. Manufacturer's Field Reports: Documentation of the testing and verification actions taken by manufacturer's representative at the job site on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must indicate whether the material, product, or system has passed or failed the test.
- J. Operation and Maintenance Data: Manufacturer data that is required to operate, maintain, troubleshoot, and repair equipment, including manufacturer's help, parts list, and product line documentation. This data shall be incorporated in an operations and maintenance manual.
- K. Closeout Submittals: Documentation necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a phase of construction on a multi-phase contract.

1.3 SUBMITTAL REGISTER

- A. The submittal register will list items of equipment and materials for which submittals are required by the specifications. This list may not be all inclusive and additional submittals may be required by the specifications. The Contractor is not relieved from supplying

submittals required by the contract documents but which have been omitted from the submittal register.

- B. The submittal register will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period.
- C. The VA will provide the initial submittal register in electronic format. Thereafter, the Contractor shall track all submittals by maintaining a complete list, including completion of all data columns, including dates on which submittals are received and returned by the VA.
- D. The Contractor shall update the submittal register as submittal actions occur and maintain the submittal register at the project site until final acceptance of all work by Contracting Officer.
- E. The Contractor shall submit formal monthly updates to the submittal register in electronic format. Each monthly update shall document actual submission and approval dates for each submittal.

1.4 SUBMITTAL SCHEDULING

- A. Submittals are to be scheduled, submitted, reviewed, and approved prior to the acquisition of the material or equipment.
- B. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow time for potential resubmittal. Allow additional review and processing time if submitting more than 5 submittals in a day.
- C. No delay costs or time extensions will be allowed for time lost in late submittals or resubmittals.
- D. All submittals are required to be approved prior to the start of the specified work activity.

1.5 SUBMITTAL PREPARATION

- A. Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.
- B. Collect required data for each specific material, product, unit of work, or system into a single submittal, in PDF (electronic) format, as a single file. Prominently mark choices, options, and portions applicable to the submittal. Partial submittals will not be accepted for expedition of construction effort. Submittal will be returned without review if incomplete.

- C. If available product data is incomplete, provide Contractor-prepared documentation to supplement product data and satisfy submittal requirements.
- D. All irrelevant or unnecessary data shall be removed from the submittal to facilitate accuracy and timely processing. Submittals that contain the excessive amount of irrelevant or unnecessary data will be returned with review.
- E. Provide a transmittal form for each submittal with the following information:
 - 1. Project title and location.
 - 2. Construction contract number.
 - 3. Date of the drawings and revisions.
 - 4. Name, address, and telephone number of subcontractor, supplier, manufacturer, and any other subcontractor associated with the submittal.
 - 5. List specification section with paragraph number and sheet number of the contract drawings by which the submittal is required.
 - 6. When a resubmission, add alphabetic suffix on submittal description. For example, submittal 18 would become 18-R1, to indicate the first resubmission.
 - 7. Product identification and location in project.
- F. The Contractor is responsible for reviewing and certifying that all submittals are in compliance with contract requirements before submitting for VA review. Proposed deviations from the contract requirements are to be clearly identified. All deviations submitted must include a side by side comparison of item being proposed against item specified. Failure to point out deviations will result in VA requiring removal and replacement of such work at the Contractor's expense.
- G. Stamp, sign, and date each submittal transmittal form indicating action taken.
- H. Stamp used by the Contractor on submittal transmittal form to certify that submittal meets contract requirements is to be similar to:

CONTRACTOR
(Firm Name)
_____ Approved
_____ Approved with corrections as noted on submittal data and/or attached sheets(s)
SIGNATURE: _____
TITLE: _____
DATE: _____

1.6 SUBMITTAL FORMAT AND TRANSMISSION

- A. Provide submittals in PDF (electronic) format, with the exception of material samples.
- B. Compile the electronic submittal file as a single, complete document. Name the electronic submittal file specifically according to its contents.
- C. Electronic files must be of sufficient quality that all information is legible. Generate PDF files from original documents so that the text included in the PDF file is both searchable and can be copied. If documents are scanned, Optical Character Resolution (OCR) routines are required.
- D. Submit E-mail electronic submittal documents smaller than 5MB in size to e-mail addresses as directed by the Contracting Officer.
- E. Provide electronic documents over 5MB through an electronic FTP file sharing system. Confirm that the electronic FTP file sharing system can be accessed from the VA computer network. The Contractor is responsible for setting up, providing, and maintaining the electronic FTP file sharing system for the construction contract period of performance.
- F. Provide hard copies of submittals when requested by the Contracting Officer. Up to 3 additional hard copies of any submittal may be requested

at the discretion of the Contracting Officer, at no additional cost to the VA.

1.7 SAMPLES

- A. Submit two sets of physical samples showing range of variation, for each required item.
- B. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified.
- C. When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.
- D. Before submitting samples, the Contractor is to ensure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.
- E. The VA reserves the right to disapprove any material or equipment which previously has proven unsatisfactory in service.
- F. Physical samples supplied maybe requested back for use in the project after reviewed and approved.

1.8 OPERATION AND MAINTENANCE DATA

- A. Submit data specified for a given item within 30 calendar days after the item is delivered to the contract site.
- B. In the event the Contractor fails to deliver O&M Data within the time limits specified, the Contracting Officer may withhold from progress payments 50 percent of the price of the item with which such O&M Data are applicable.

1.9 TEST REPORTS

- A. SRE may require specific test after work has been installed or completed which could require contractor to repair test area at no additional cost to contract.

1.10 VA REVIEW OF SUBMITTALS AND RFIS

- A. The VA will review all submittals for compliance with the technical requirements of the contract documents. The Architect-Engineer for this project will assist the VA in reviewing all submittals and determining contractual compliance. Review will be only for conformance with the applicable codes, standards and contract requirements.

- B. Period of review for submittals begins when the VA COR receives submittal from the Contractor.
- C. Period of review for each resubmittal is the same as for initial submittal.
- D. VA review period is 15 working days for submittals, if less than 5 submittals are submitted in a day. VA review period is 20 working days for submittals if 5 or more submittals are submitted in a single day.
- E. VA review period is 10 working days for RFIs.
- F. The VA will return submittals to the Contractor with the following notations:
 - 1. "Approved": authorizes the Contractor to proceed with the work covered.
 - 2. "Approved as noted": authorizes the Contractor to proceed with the work covered provided the Contractor incorporates the noted comments and makes the noted corrections.
 - 3. "Disapproved, revise and resubmit": indicates noncompliance with the contract requirements or that submittal is incomplete. Resubmit with appropriate changes and corrections. No work shall proceed for this item until resubmittal is approved.
 - 4. "Not reviewed": indicates submittal does not have evidence of being reviewed and approved by Contractor or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals after taking appropriate action.

1.11 APPROVED SUBMITTALS

- A. The VA approval of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing, and other information are satisfactory.
- B. VA approval of a submittal does not relieve the Contractor of the responsibility for any error which may exist. The Contractor is responsible for fully complying with all contract requirements and the satisfactory construction of all work, including the need to check, confirm, and coordinate the work of all subcontractors for the project. Non-compliant material incorporated in the work will be removed and replaced at the Contractor's expense.
- C. After submittals have been approved, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

- D. Retain a copy of all approved submittals at project site, including approved samples.

1.12 WITHHOLDING OF PAYMENT

- A. Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

- - - E N D - - -

OWNER: Department of Veterans Affairs	<h1>SUBMITTAL REGISTER</h1>
PROJECT TITLE: Construct New CLC	
LOCATION: Lebanon VA Medical Center	
CONTRACT NO: 595-601	
CONTRACTOR: TBD	

Line	Specification Section	Specification Name	Description	Item Submitted	Paragraph #	Classification: GOVT or A/E Reviewer
1	01 00 00	General Requirements	Pre-Construction	Construction Security Plan	1.5	GOVT
2	01 32 16.15	Project Schedules	Pre-Construction	Project Schedule	1.5	GOVT
3	01 35 26	Safety Requirements	Pre-Construction	Accident Prevention Plan	1.4	GOVT
4	01 35 26	Safety Requirements	Pre-Construction	Activity Hazard Analysis	1.5	GOVT
5	01 35 26	Safety Requirements	Pre-Construction	Training Records	1.8	GOVT
6	01 35 26	Safety Requirements	Construction	Safety Inspections	1.9	GOVT
7	01 35 26	Safety Requirements	Construction	Accident Reports, OSHA-300 Logs, Man-Hour Reports	1.10	GOVT
8	01 35 26	Safety Requirements	Pre-Construction & Construction	ICRA & Permitting	1.12	GOVT
9	01 35 26	Safety Requirements	Pre-Construction	Tuberculosis Screening	1.13	GOVT
10	01 35 26	Safety Requirements	Pre-Construction	Fire Safety Plan	1.14	GOVT
11	01 35 26	Safety Requirements	Pre-Electrical Work	Activity Hazard Analysis	1.15	GOVT
12	01 35 26	Safety Requirements	Excavation and Trenching	Trenching and Excavation Permit	1.18	GOVT
13	01 35 26	Safety Requirements	Cranes	Crane - Lift Permit	1.19	GOVT
14	01 35 26	Safety Requirements	Confined Space Entry	Confined Space Entry Plan	1.21	GOVT
15	01 35 26	Safety Requirements	Welding and Cutting	Hot Work Permit	1.22	GOVT
16	01 45 29	Testing Laboratory Services	Pre-Construction	Testing Lab Certificate of Accrediation	1 & 3	GOVT
17	01 45 29	Testing Laboratory Services	Pre-Construction	Written/Verbal Reports	1 & 3	GOVT

OWNER: Department of Veterans Affairs	<h1>SUBMITTAL REGISTER</h1>
PROJECT TITLE: Construct New CLC	
LOCATION: Lebanon VA Medical Center	
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Line	Specification Section	Specification Name	Description	Item Submitted	Paragraph #	Classification: GOVT or A/E Reviewer
18	01 57 19	Temporary Environmental Controls	Pre-Construction	Environmental Protection Plan	1.4	GOVT
19	01 74 19	Construction Waste Management	Pre-Construction	Demolition Management Plan	1.5	GOVT
20	01 74 19	Construction Waste Management	Construction	Debris Disposal & Dispersion Report	3.3	GOVT
21	01 91 00	General Requirements for Commissioning	Pre-Construction	Commissioning Plan	1.12.A	GOVT
22	01 91 00	General Requirements for Commissioning	Construction	System Functional Teat Reports	1.12.B	GOVT
23	01 91 00	General Requirements for Commissioning	Construction	Pre-Functional Checklists	1.12.C	GOVT
24	01 91 00	General Requirements for Commissioning	Construction	Test and Inspection Reports	1.12.D	GOVT
25	01 91 00	General Requirements for Commissioning	Construction	Corrective Action Documents	1.12.E	GOVT
26	01 91 00	General Requirements for Commissioning	Construction	Commissioning Issues Log	1.12.F	GOVT
27	01 91 00	General Requirements for Commissioning	Post-Construction	Final Commissioning Report	1.12.G	GOVT
28	01 91 00	General Requirements for Commissioning	Post-Construction	Addendum to Final Commissioning Report	1.12.H	GOVT
29	01 91 00	General Requirements for Commissioning	Post-Construction	Systems Manual	1.12.I	GOVT
30	03 30 53	(SF) Cast-in-Place Concrete	Shop Drawings	Reinforcing Steel	1.4.B	A/E
31	03 30 53	(SF) Cast-in-Place Concrete	Manufacturer's Literature & Data	Concrete Mix Design	1.4.C	A/E
32	03 30 53	(SF) Cast-in-Place Concrete	Manufacturer's Literature & Data	Admixtures and Curing Compounds	1.4.D	A/E
33	03 30 53	(SF) Cast-in-Place Concrete	Certificates	Each Ready Mix Batch	1.4.D	A/E
34	03 30 53	(SF) Cast-in-Place Concrete	Manufacturer's Literature & Data	Concrete anchors	1.4.E	A/E

OWNER: Department of Veterans Affairs	<h1>SUBMITTAL REGISTER</h1>
PROJECT TITLE: Construct New CLC	
LOCATION: Lebanon VA Medical Center	
CONTRACT NO: 595-601	
CONTRACTOR: TBD	

Line	Specification Section	Specification Name	Description	Item Submitted	Paragraph #	Classification: GOVT or A/E Reviewer
35	04 05 13	Masonry Mortar	Manufacturer's Literature & Data	Description of each product	1.4	A/E
36	04 05 13	Masonry Mortar	Test Reports	Mortar & admixtures	1.4	A/E
37	04 05 13	Masonry Mortar	Certificates	As requested in 1.4	1.4	A/E
38	04 05 13	Masonry Mortar	Qualifications	Testing laboratory	1.4	A/E
39	04 40 00	Adhered Stone Masonry Veneer	Data	Product Data	1.3.A	A/E
40	04 40 00	Adhered Stone Masonry Veneer	Samples	Each stone, each color	1.3.B	A/E
41	04 40 00	Adhered Stone Masonry Veneer	List	Materials	1.3.C	A/E
42	04 40 00	Adhered Stone Masonry Veneer	Qualifications	Installer	1.3.D	A/E
43	04 72 00	Cast Stone Masonry	Samples	Cast Stone	1.3.B	A/E
44	04 72 00	Cast Stone Masonry	Drawings	Shop Drawings	1.3.C	A/E
45	04 72 00	Cast Stone Masonry	Certificates	Cast Stone test requirements	1.3.D	A/E
46	04 72 00	Cast Stone Masonry	Data	Previous Cast Stone test results	1.3.E	A/E
47	04 72 00	Cast Stone Masonry	Lab Data	Description/Qualifications	1.3.F	A/E
48	04 72 00	Cast Stone Masonry	Data	Jobs furnished by Mfg	1.3.G	A/E
49	05 12 00	Structural Steel Framing	Drawings	Showing fabrication/installation	1.4	A/E
50	05 12 00	Structural Steel Framing	Sustainable Construction	Identify recycled content	1.4	A/E
51	05 12 00	Structural Steel Framing	Rtest Reports	Welding	1.4	A/E

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52	05 12 00	Structural Steel Framing	Certificates	Steel, welding, paint compliance	1.4	A/E
53	05 12 00	Structural Steel Framing	Qualifications	Fabricator, Installer, Welding	1.4	A/E
54	05 12 00	Structural Steel Framing	Calculations	Design and Connection calcs	1.4	A/E
55	05 21 00	Steel Joist Framing	Shop & Erection Drawings	As requested in 1.5	1.5	A/E
56	05 21 00	Steel Joist Framing	Certificates	Steel Joist Institute compliance	1.5	A/E
57	05 21 00	Steel Joist Framing	Design Calculations	As requested in 1.5	1.5	A/E
58	05 31 00	Steel Decking	Drawings	Submittal Drawings	1.4	A/E
59	05 31 00	Steel Decking	Manufacturer's Literature and Data	Each product	1.4	A/E
60	05 31 00	Steel Decking	Certificates	Product compliance	1.4	A/E
61	05 31 00	Steel Decking	Qualifications	Welding	1.4	A/E
62	05 31 00	Steel Decking	Certifications	Roof installation insurance certification	1.4	A/E
63	05 36 00	Composite Metal Decking	Drawings	Submittal Drawings	1.4	A/E
64	05 36 00	Composite Metal Decking	Manufacturer's Literature and Data	Steel Decking	1.4	A/E
65	05 36 00	Composite Metal Decking	Manufacturer's Recommendation	Steel Decking	1.4	A/E
66	05 36 00	Composite Metal Decking	Test Report	Concrete and Steel Desking	1.4	A/E
67	05 36 00	Composite Metal Decking	Test Report	Stud Base	1.4	A/E
68	05 36 00	Composite Metal Decking	Welding Power Setting	Manufacturer Recommendation	1.4	A/E

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69	05 36 00	Composite Metal Decking	Drawings	Shear Stud Layouts	1.4	A/E
70	05 36 00	Composite Metal Decking	Certifications	Metal Deck	1.4	A/E
71	05 36 00	Composite Metal Decking	Certificates	Compliance	1.4	A/E
72	05 36 00	Composite Metal Decking	Manufacturer's Data	Welding	1.4	A/E
73	05 36 00	Composite Metal Decking	Certificates	Power Actuated Tool Operator	1.4	A/E
74	05 36 00	Composite Metal Decking	Qualifications	Welder's Qualifications	1.4	A/E
75	05 40 00	Cold Formed Metal Framing	Drawings	Shop Drawings	1.4	A/E
76	05 40 00	Cold Formed Metal Framing	Manufacturer's Literature and Data	Steel Components	1.4	A/E
77	05 40 00	Cold Formed Metal Framing	Data	Structural Analysis Data	1.4	A/E
78	05 50 00	Metal Fabrications	Manufacturer's Literature and Data	Each Item Specified	1.3	GOVT
79	05 50 00	Metal Fabrications	Shop Drawings	Each Item Specified	1.3	A/E
80	05 50 00	Metal Fabrications	Manufacturer's Certificates	Live load design		A/E
81	05 50 00	Metal Fabrications	Design Calculations	Live loads and dead loads		A/E
82	06 10 00	Rough Carpentry	Shop Drawings	Framing connection details, fasteners, connections & dimensions	1.3	A/E
83	06 10 00	Rough Carpentry	Manufacturer's Literature & Data	Data for lumber, panels, hardware & adhesives	1.3	A/E
84	06 10 00	Rough Carpentry	Manufacturer's Literature & Data	Wood preservative treatment	1.3	A/E
85	06 10 00	Rough Carpentry	Manufacturer's Literature & Data	Fire retardant treatment from chemical treatment and certification	1.3	A/E

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86	06 10 00	Rough Carpentry	Manufacturer's Literature & Data	Waterborne treatment statement	1.3	A/E
87	06 10 00	Rough Carpentry	Certificates	Manufacturer certificate for unmarked lumber	1.3	A/E
88	06 15 16	Wood Roof Decking	Data	Product Data	13.A	A/E
89	06 15 16	Wood Roof Decking	Samples	Wood Roof Decking	13.B	A/E
90	06 18 00	Glued Laminated Construction	Data	Product Data	15.A	A/E
91	06 18 00	Glued Laminated Construction	Drawings	Shop Drawings	15.B	A/E
92	06 18 00	Glued Laminated Construction	Samples	As required in 15.C	15.C	A/E
93	06 18 00	Glued Laminated Construction	Delegated Design Submittal	As required in 15.D	15.D	A/E
94	06 20 00	Finish Carpentry	Drawings	Shop Drawings	1.5.B	A/E
95	06 20 00	Finish Carpentry	Manufacturer's Literature & Data	Each product, Installation Instructions	1.5.C	A/E
96	06 20 00	Finish Carpentry	Samples	As required in 1.5.D	1.5.D	A/E
97	06 20 00	Finish Carpentry	Certificates	Product Compliance	1.5.E	A/E
98	06 20 00	Finish Carpentry	Qualifications	Fabricator	1.5.F	A/E
99	06 61 00	Fiberglass Column Covers	Certifications	CCT, ACMA	1.4.C	A/E
100	06 61 00	Fiberglass Column Covers	Data	Product Data	1.4.D	A/E
101	06 61 00	Fiberglass Column Covers	Samples	in specified color, texture & finish	1.4.E	A/E
102	07 11 13	Bituminous Dampproofing	Manufacturer's Literature & Data	Description; application instructions	1.4.B	A/E
103	07 21 13	Thermal Insulation	Manufacturer's Literature & Data	Each product	1.4	A/E
104	07 22 00	Roof and Deck Insulation	Drawings	Size, Configuration, Installation Details	1.3	A/E

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105	07 22 00	Roof and Deck Insulation	Manufacturer's Literature & Data	Description of each product	1.3	A/E
106	07 22 00	Roof and Deck Insulation	Samples	Roof insulation & Fasteners	1.3	A/E
107	07 22 00	Roof and Deck Insulation	Qualifications	Installer	1.3	A/E
108	07 26 00	Vapor Retarders	Data	Product Data	1.2.A	A/E
109	07 26 00	Vapor Retarders	Reports	Test Reports	1.3.A	A/E
110	07 27 15	Self-Adhering Sheet Air Barriers	Data	Product Data	1.4.A	A/E
111	07 27 15	Self-Adhering Sheet Air Barriers	Drawings	Shop Drawings	1.4.B	A/E
112	07 31 13	Ashphalt Shingles	Manufacturer's Literature and Data	Description each product, Install instructions, Warranty	1.4.B	A/E
113	07 31 13	Ashphalt Shingles	Samples	Full size shingle in color/texture	1.4.C	A/E
114	07 41 13	Standing-Seam Metal Roof Panels	Qualifications	Fabricator	1.5.A	A/E
115	07 41 13	Standing-Seam Metal Roof Panels	Qualifications	Installer	1.5.B	A/E
116	07 41 13	Standing-Seam Metal Roof Panels	Data	Product Data	1.6.B	A/E
117	07 41 13	Standing-Seam Metal Roof Panels	Drawings	Shop Drawings	1.6.C	A/E
118	07 41 13	Standing-Seam Metal Roof Panels	Samples	Metal Panel	1.6.D	A/E
119	07 42 10.21	Composite Framing Support System	Data	Product Data	1.4.A	A/E
120	07 42 10.21	Composite Framing Support System	Samples	Soffit & accessories	1.4.B	A/E
121	07 42 10.21	Composite Framing Support System	Samples	As required in 1.4.C	1.4.C	A/E

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122	07 42 10.21	Composite Framing Support System	Warranty	Sample	1.4.D	A/E
123	07 42 10.21	Composite Framing Support System	Data	Maintenance Data	1.4.E	A/E
124	07 46 46	Fiber-Cement Siding	Data	Product Data	1.4.A	A/E
125	07 46 46	Fiber-Cement Siding	Samples	Fiber Cement Siding & accessories	1.4.B	A/E
126	07 46 46	Fiber-Cement Siding	Samples	As required in 1.4.C	1.4.C	A/E
127	07 46 46	Fiber-Cement Siding	Warranty	Sample	1.4.D	A/E
128	07 46 46	Fiber-Cement Siding	Data	Maintenance Data	1.4.E	A/E
129	07 60 00	Flashing and Sheet Metal	Shop Drawings	All items specified	1.4	A/E
130	07 60 00	Flashing and Sheet Metal	Manufacturer's Literature & Data	All items specified	1.4	A/E
131	07 72 53	Snow Guards	Data	Product data	1.2.A	A/E
132	07 72 53	Snow Guards	Drawings	Shop Drawings	1.2.B	A/E
133	07 72 53	Snow Guards	Samples	Snow Guards	1.2.C	A/E
134	07 72 53	Snow Guards	Submittal	Design Analysis, Calcs & Quantity	1.2.D	A/E
135	07 72 53	Snow Guards	Qualifications	AS REQUIRED IN 1.3.A	1.3.A	A/E
136	07 72 53	Snow Guards	Reports	Product Test data	1.3.B	A/E
137	07 84 00	Firestopping	Manufacturer's Literature and Data	For Firestopping and Smoke Stopping Types	1.3	A/E
138	07 84 00	Firestopping	List	FM, UL, or WH Classification Numbers of systems installed	1.3	A/E

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139	07 84 00	Firestopping	Certified Laboratory Test Reports	For systems proposed for use that are not listed by FM, UL, or WH	1.3	A/E
140	07 84 00	Firestopping	Firestopping Material Certificates	Compliance with Specified Requirements	1.3	A/E
141	07 84 43	Joint Firestopping	Product Data	Each type of Product	1.4	A/E
142	07 84 43	Joint Firestopping	Product Schedule	As required in 14.B	14.B	A/E
143	07 92 00	Joint Sealants	Qualifications	Installer Qualifications	1.3	A/E
144	07 92 00	Joint Sealants	Certification	Contractor Certification	1.3	A/E
145	07 92 00	Joint Sealants	Product Information	Installation Instructions	1.5	A/E
146	07 92 00	Joint Sealants	Samples	Cured Samples of Each Sealant	1.5	A/E
147	07 92 00	Joint Sealants	Manufacturer's Literature and Data	Primers	1.5	A/E
148	07 92 00	Joint Sealants	Manufacturer's Literature and Data	Sealing Compound, Each Type	1.5	A/E
149	07 92 00	Joint Sealants	Closeout Submittal	Manufacturer Warranty	1.5	A/E
150	07 92 00	Joint Sealants	Warranty	Construction; manufacturer's	1.9	A/E
151	08 11 13	Hollow Metal Doors and Frames	Submittal Drawings	Size, Configuration, Fabrication, Installation Details	1.4	A/E
152	08 11 13	Hollow Metal Doors and Frames	Manufacturer's Literature & Data	Each product	1.4	A/E
153	08 11 13	Hollow Metal Doors and Frames	Manufacturer's Literature & Data	Schedule	1.4	A/E
154	08 11 13	Hollow Metal Doors and Frames	Manufacturer's Literature & Data	Installation Instructions	1.4	A/E
155	08 11 13	Hollow Metal Doors and Frames	Sustainable Construction	Recycled content	1.4	A/E
156	08 11 13	Hollow Metal Doors and Frames	Test Reports	Sound rated doors	1.4	A/E
157	08 11 13	Hollow Metal Doors and Frames	Qualifications	Manufacturer	1.4	A/E

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158	08 11 13	Hollow Metal Doors and Frames	Warranty	Construction	1.8	A/E
159	08 14 23	Impact Resistant Wood Doors	Data	Product Data	1.4.B	A/E
160	08 14 23	Impact Resistant Wood Doors	Drawings	Shop Drawings	1.4.C	A/E
161	08 14 23	Impact Resistant Wood Doors	Samples	Edge Wrapping	1.4.D	A/E
162	08 14 23	Impact Resistant Wood Doors	Warranty	Manufactures	1.4.E	A/E
163	08 14 33	Aluminum-Clad Wood Doors	Data	Product Data	1.5.A	A/E
164	08 14 33	Aluminum-Clad Wood Doors	Drawings	Shop Drawings	1.5.B	A/E
165	08 14 33	Aluminum-Clad Wood Doors	Samples	As required in 1.5.C	1.5.C	A/E
166	08 14 33	Aluminum-Clad Wood Doors	Schedule	Hinged Wood-Framed Glass Doors	1.5.D	A/E
167	08 14 33	Aluminum-Clad Wood Doors	Qualifications	Installer & Tester	1.5.E	A/E
168	08 14 33	Aluminum-Clad Wood Doors	Reports	Field QC	1.5.F	A/E
169	08 14 33	Aluminum-Clad Wood Doors	Warranty	Sample	1.5.G	A/E
170	08 17 10	Integrated Door Assemblies	Drawings	Shop Drawings	1.5.B	A/E
171	08 17 10	Integrated Door Assemblies	Manufacturer's Literature and Data	Product Descriptions and Installation Instructions	1.5.C	A/E
172	08 17 10	Integrated Door Assemblies	Certificates	As required in 1.5.D	1.5.D	A/E
173	08 17 10	Integrated Door Assemblies	Qualifications	Installer	1.5.E	A/E
174	08 17 10	Integrated Door Assemblies	Data	Operation and Maintenance Manuals	1.5.F	A/E

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175	08 31 13	Access Doors and Frames	Drawings	Size, Configuration, Fabrication, Installation Details	1.4	A/E
176	08 31 13	Access Doors and Frames	Manufacturer's Literature and Data	Product Descriptions and Installation Instructions	1.4	A/E
177	08 31 13	Access Doors and Frames	Sustainable Construction	Recycled content	1.4.	A/E
178	08 34 00	Aluminum Framed Top-Hung Sliding Doors	Data	Product Data, Installation instructions	1.4.B	A/E
179	08 34 00	Aluminum Framed Top-Hung Sliding Doors	Drawings	Shop Drawings	1.4.C	A/E
180	08 34 00	Aluminum Framed Top-Hung Sliding Doors	Samples	Door veneer, Aluminum frame	1.4.D	A/E
181	08 34 00	Aluminum Framed Top-Hung Sliding Doors	Certification	Manufacturers	1.4.E	A/E
182	08 34 00	Aluminum Framed Top-Hung Sliding Doors	Warranty	Standard Warranty	1.4.F	A/E
183	08 34 00	Aluminum Framed Top-Hung Sliding Doors	Reports	Test Reports	1.4.G	A/E
184	08 36 13	Sectional Doors	Drawings	Shop Drawings	1.4.B	A/E
185	08 36 13	Sectional Doors	Manufacturer's Literature and Data	Brochures, Installation, & Maintenance	1.4.C	A/E
186	08 36 13	Sectional Doors	Qualifications	Installer	1.4.D	A/E
187	08 36 13	Sectional Doors	Qualifications	Manufacturer	1.4.E	A/E
188	08 36 13	Sectional Doors	Certificates	As required in 1.4.F	1.4.F	A/E
189	08 36 13	Sectional Doors	Warranty	Manufactures	1.4.G	A/E
190	08 41 14	Aluminum Folding Door System	Manufacturer's Literature and Data	As required in 1.3.B	1.3.B	A/E
191	08 41 14	Aluminum Folding Door System	Drawings	Shop Drawings	1.3.C	A/E

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192	08 41 14	Aluminum Folding Door System	Samples	For color selection	1.3.D	A/E
193	08 41 14	Aluminum Folding Door System	QA Submittals	Design Data, Test Reports, Certificates	1.3.F	A/E
194	08 41 14	Aluminum Folding Door System	Manuals	Maintenance Manuals	1.3.G	A/E
195	08 44 13	Glazed Aluminum Curtain Walls	Quality Assurance	As required in 1.3	1.3	A/E
196	08 44 13	Glazed Aluminum Curtain Walls	Manufacturer's Literature & Data	Product Data; Installation & Maintenance Instructions	1.4.B	A/E
197	08 44 13	Glazed Aluminum Curtain Walls	Drawings	Shop Drawings	1.4.C	A/E
198	08 44 13	Glazed Aluminum Curtain Walls	Samples	As required in 1.4.D	1.4.D	A/E
199	08 44 13	Glazed Aluminum Curtain Walls	QA Submittals	Design Data, Test Reports, Certificates	1.4.F	A/E
200	08 44 13	Glazed Aluminum Curtain Walls	Certificates	Manufacturers	1.4.G	A/E
201	08 44 13	Glazed Aluminum Curtain Walls	Reports	Field Reports	1.4.H	A/E
202	08 44 13	Glazed Aluminum Curtain Walls	Qualifications	Welding	1.4.I	A/E
203	08 44 13	Glazed Aluminum Curtain Walls	Qualifications	Testing Laboratory	1.4.J	A/E
204	08 52 00	Aluminum-Clad Wood Windows	Data	Product Data	1.3.B	A/E
205	08 52 00	Aluminum-Clad Wood Windows	Drawings	Submittal Drawings	1.3.C	A/E
206	08 52 00	Aluminum-Clad Wood Windows	Samples	Each exposed product, in specified colors	1.3.D	A/E
207	08 52 00	Aluminum-Clad Wood Windows	Schedule	Project Schedule for Wood Windows	1.3.E	A/E
208	08 52 00	Aluminum-Clad Wood Windows	Qualifications	Installer	1.3.F	A/E

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209	08 52 00	Aluminum-Clad Wood Windows	Reports	Test Reports	1.3.G	A/E
210	08 52 00	Aluminum-Clad Wood Windows	Reports	QC Reports	1.3.H	A/E
211	08 52 00	Aluminum-Clad Wood Windows	Warranties	Sample Manufacturer Warranties	1.3.I	A/E
212	08 56 59	Service and Teller Window Units	Drawings	Submittal Drawings	1.5.B	A/E
213	08 56 59	Service and Teller Window Units	Manufacturer's Literature & Data	Each product	1.4.C	A/E
214	08 56 59	Service and Teller Window Units	Reports	Test Reports	1.4.D	A/E
215	08 56 59	Service and Teller Window Units	Certificates	Compliance with specs	1.4.E	A/E
216	08 71 00	Door Hardware	Hardware Schedule	As specified in table	1.6	GOVT
217	08 71 00	Door Hardware	Samples and Manufacturer's Literature	Items not previously approved	1.6	A/E
218	08 71 00	Door Hardware	Certificate of Compliance; Test Reports	As described	1.6	A/E
219	08 71 13.11	Low Energy Power Assist Door Operators	Drawings	Submittal Drawings	1.5.B	A/E
220	08 71 13.11	Low Energy Power Assist Door Operators	Manufacturer's Literature & Data	Data; Installation & Maintenance Instructions, Warranty	1.5.C	A/E
221	08 71 13.11	Low Energy Power Assist Door Operators	Samples	Door operator	1.5.D	A/E
222	08 71 13.11	Low Energy Power Assist Door Operators	Certificates	Each product UL Listing	1.5.E	A/E
223	08 71 13.11	Low Energy Power Assist Door Operators	Data	Operation and Maintenance Manuals	1.5.F	A/E
224	08 80 00	Glazing	Certificates	As required in 1.4.B	1.4	A/E
225	08 80 00	Glazing	Warranty	Manufactures Warranty	1.4	A/E

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226	08 80 00	Glazing	Manufacturer's Literature & Data	As required in 1.4.D	1.4	A/E
227	08 80 00	Glazing	Pre-Construction Report	Adhesion and Compatibility Test Report	1.4	A/E
228	08 90 00	Louver and Vents	Drawings	Louver and Vent types	1.3	A/E
229	08 90 00	Louver and Vents	Manufacturer's Literature and Data	Each type of Louver and Vent	1.3	A/E
230	08 90 00	Louver and Vents	Samples	Quadruplicate Samples for color approval	1.3	A/E
231	09 05 16	Subsurface Preparation for Floor Finishes	Written approval	Product Compatibility	1.3	A/E
232	09 05 16	Subsurface Preparation for Floor Finishes	Product Data	As required in 1.3.C	1.3	A/E
233	09 05 16	Subsurface Preparation for Floor Finishes	Test Data	Moisture / Ph	1.3	A/E
234	09 06 00	Schedule for Finishes	Samples	Materials and Finishes	1.3	GOVT
235	09 22 16	Non-Structural Metal Framing	Manufacturer's Literature and Data	Various items requested	1.4	A/E
236	09 22 16	Non-Structural Metal Framing	Shop Drawings	Various items requested	1.4	A/E
237	09 22 16	Non-Structural Metal Framing	Test Results	Fire rating, each assembly	1.4	A/E
238	09 29 00	Gypsum Board	Manufacturer's Literature and Data	Cornerbead and Edge Trim; Finishing materials; Laminating adhesive; Gypsum board, each type	1.4.	A/E
239	09 29 00	Gypsum Board	Samples	Cornerbead, Edge Trim, Control Joints	1.4	A/E
240	09 29 00	Gypsum Board	Test Results	Fire rating tests; sound rating test	1.4.	A/E
241	09 29 00	Gypsum Board	Certificates	Certification that products Do Not Contain Asbestos	1.4	A/E
242	09 30 13	Ceramic/Porcelain Tiling	Sustainable Design Submittals	Volatile organic compounds	1.3	A/E

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243	09 30 13	Ceramic/Porcelain Tiling	Samples	As required in 1.3.C	1.3	A/E
244	09 30 13	Ceramic/Porcelain Tiling	Product Data	As required in 1.3.D	1.3	A/E
245	09 30 13	Ceramic/Porcelain Tiling	Certifications	As required in 1.3.E	1.3	A/E
246	09 30 13	Ceramic/Porcelain Tiling	Qualifications	Installers	1.3	A/E
247	09 51 00	Acoustical Ceilings	Submittal Drawings	Drawings	1.5	A/E
248	09 51 00	Acoustical Ceilings	Manufacturer's Literature and Data	Descriptions of each product	1.5	A/E
249	09 51 00	Acoustical Ceilings	Manufacturer's Literature and Data	Ceiling Suspension System	1.5	A/E
250	09 51 00	Acoustical Ceilings	Manufacturer's Literature and Data	Installation instructions	1.5	A/E
251	09 51 00	Acoustical Ceilings	Manufacturer's Literature and Data	Warranty	1.5	A/E
252	09 51 00	Acoustical Ceilings	Samples	Acoustical Units, Each Type	1.5	A/E
253	09 51 00	Acoustical Ceilings	Samples	Suspension system, trim, molding	1.5	A/E
254	09 51 00	Acoustical Ceilings	Samples	Colored markers	1.5	A/E
255	09 51 00	Acoustical Ceilings	Sustainable Construction	Recycled content; biobased content	1.5	A/E
256	09 51 00	Acoustical Ceilings	Certificates	Acoustical Units, Each Type	1.5	A/E
257	09 51 00	Acoustical Ceilings	Qualifications	Manufacturer	1.5	A/E
258	09 51 00	Acoustical Ceilings	Closeout Submittals	O&M Data	1.5	A/E
259	09 54 23	Linear Metal Ceilings	Manufacturer's Literature & Data	As required in 1.4.B	1.4.B	A/E

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260	09 54 23	Linear Metal Ceilings	Drawings	Shop Drawings	1.4.C	A/E
261	09 54 23	Linear Metal Ceilings	Samples	As required in 1.4.D	1.4.D	A/E
262	09 54 23	Linear Metal Ceilings	Certificates	As required in 1.4.E	1.4.E	A/E
263	09 65 13	Resilient Base and Accessories	Manufacturer's Literature & Data	As required in 1.4.B	1.4	A/E
264	09 65 13	Resilient Base and Accessories	Samples	As required in 1.4.C	1.4	A/E
265	09 65 13	Resilient Base and Accessories	Sustainable Construction	Recycled content; biobased content	1.4	A/E
266	09 65 13	Resilient Base and Accessories	Operation & Maintenance Data	Care instructions	1.4	A/E
267	09 65 16	Resilient Sheet Flooring	Manufacturer's Literature & Data	Description, Instructions, Warranty	1.4	A/E
268	09 65 16	Resilient Sheet Flooring	Samples	As required in 1.4.C	1.4	A/E
269	09 65 16	Resilient Sheet Flooring	Sustainable Construction	Low Pollutant-Emitting Materials	1.4	A/E
270	09 65 16	Resilient Sheet Flooring	Certificates	Heat Welded seaming	1.4	A/E
271	09 65 16	Resilient Sheet Flooring	Qualifications	Manufacturer, Installer	1.4	A/E
272	09 65 19	Resilient Tile Flooring	Sustainable Design Submittals	Volatile organic compounds	1.3	A/E
273	09 65 19	Resilient Tile Flooring	Manufacturer's Literature & Data	Description, Manufacturer's Recommendations	1.3	A/E
274	09 65 19	Resilient Tile Flooring	Samples	As required in 1.3.D	1.3	A/E
275	09 65 19	Resilient Tile Flooring	Shop Drawings	Layout of patterns, Edge strip locations	1.3	A/E
276	09 65 19	Resilient Tile Flooring	Test Reports	As required in 1.3.F	1.3	A/E

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277	09 68 00	Carpeting	Sustainable Design Submittals	Volatile organic compounds	1.4	A/E
278	09 68 00	Carpeting	Product Data	As required in 1.4.C	1.4	A/E
279	09 68 00	Carpeting	Samples	Carpet/Floor Edge strip	1.4	A/E
280	09 68 00	Carpeting	Drawings	Shop Drawings	1.4	A/E
281	09 68 00	Carpeting	Maintenance Data	Carpet	1.4	A/E
282	09 68 00	Carpeting	Qualifications	Installer	1.4	A/E
283	09 68 00	Carpeting	Warranty	Manufacturer's	1.4	A/E
284	09 72 16	Vinyl-Coated Fabric Wall Covering	Samples	As required in 1.3.B	1.3.B	A/E
285	09 72 16	Vinyl-Coated Fabric Wall Covering	Certificates	Manufacturers	1.3.C	A/E
286	09 72 16	Vinyl-Coated Fabric Wall Covering	Manufacturer's Literature & Data	As required in 1.3.B	1.3.D	A/E
287	09 72 16	Vinyl-Coated Fabric Wall Covering	Tests	Substrate Moisture	1.3.E	A/E
288	09 84 33	Sound-Absorbing Wall Units	Samples	Fabric Covering	1.3.B	A/E
289	09 84 33	Sound-Absorbing Wall Units	Manufacturer's Literature & Data	As required in 1.3.C	1.3.C	A/E
290	09 84 33	Sound-Absorbing Wall Units	Certificate	Flame spread & smoke development	1.3.D	A/E
291	09 91 00	Painting	Qualifications	For Painter	1.3	A/E
292	09 91 00	Painting	Manufacturer's Literature & Data	For each type of coating	1.3	A/E
293	09 91 00	Painting	Manufacturer's Literature & Data	Current MPI "Approved Product List" for each type of coating	1.3	A/E

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294	09 91 00	Painting	Samples	Identity Markers (if used)	1.3	A/E
295	09 91 00	Painting	Manufacturer's Certificates	Various requirements	1.3	A/E
296	10 21 23	Cubicle Curtain Tracks	Samples	As required in 1.3.B	1.3	A/E
297	10 21 23	Cubicle Curtain Tracks	Drawings	Submittal Drawings	1.3	A/E
298	10 21 23	Cubicle Curtain Tracks	Manufacturer's Literature & Data	As required in 1.3.D	1.3	A/E
299	10 21 23	Cubicle Curtain Tracks	Data	Closeout Material	1.3	A/E
300	10 26 00	Wall and Door Protection	Sustainable Design Submittals	Volatile organic compounds	1.4	A/E
301	10 26 00	Wall and Door Protection	Shop Drawings	Shop Drawings	1.4	A/E
302	10 26 00	Wall and Door Protection	Manufacturer's Literature & Data	Corner Guards, Handrail, Wall Guard	1.4	A/E
303	10 26 00	Wall and Door Protection	Test Report	Tackboard / Frame	1.4	A/E
304	10 26 00	Wall and Door Protection	Qualifications	Manufacturer's	1.4	A/E
305	10 26 00	Wall and Door Protection	Qualifications	Installers	1.4	A/E
306	10 26 00	Wall and Door Protection	Warranty	Manufacturer's	1.4	A/E
307	10 26 00	Wall and Door Protection	Sustainable Design Submittals	Volatile organic compounds	1.4	A/E
308	10 26 00	Wall and Door Protection	Shop Drawings	Shop Drawings	1.4	A/E
309	10 26 00	Wall and Door Protection	Manufacturer's Literature & Data	Corner Guards, Handrail, Wall Guard	1.4	A/E
310	10 26 00	Wall and Door Protection	Test Report	Tackboard / Frame	1.4	A/E

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311	10 26 00	Wall and Door Protection	Qualifications	Manufacturer's	1.4	A/E
312	10 26 00	Wall and Door Protection	Qualifications	Installers	1.4	A/E
313	10 26 00	Wall and Door Protection	Warranty	Manufacturer's	1.4	A/E
314	10 28 00	Toilet, Bath, and Laundry Accessories	Drawings	Submittal Drawings	1.3	A/E
315	10 28 00	Toilet, Bath, and Laundry Accessories	Manufacturer's Literature & Data	Each product	1.3	A/E
316	10 28 00	Toilet, Bath, and Laundry Accessories	Samples	Each product	1.3	A/E
317	10 28 00	Toilet, Bath, and Laundry Accessories	Certificates	Product compliance	1.3	A/E
318	10 28 00	Toilet, Bath, and Laundry Accessories	Qualifications	Manufacturer	1.3	A/E
319	10 28 00	Toilet, Bath, and Laundry Accessories	Operation & Maintenance Data	Care instructions	1.3	A/E
320	10 31 00	Clay Chimney Pots	Manufacturer's Literature & Data	Clay Chimney Installation Instructions	1.4	A/E
321	10 44 13	Fire Extinguisher Cabinets	Manufacturer's Literature & Data	Fire Extinguisher Cabinet	1.2	A/E
322	10 51 13	Metal Lockers	Manufacturer's Literature & Data	Locker Cut sheet	1.3	A/E
323	10 51 13	Metal Lockers	Samples	Locker Color Samples	1.3	A/E
324	11 40 11	Custom Fabricated Food Service Equipment	Submittals	As required in 1.4	1.4	A/E
325	11 40 11	Custom Fabricated Food Service Equipment	Instructions	Operating instructions	1.4.C	A/E
326	11 40 11	Custom Fabricated Food Service Equipment	Submittal Package	As required in 1.4.D, 1.4.E	1.4.D, E	A/E
327	11 40 11	Custom Fabricated Food Service Equipment	Data	Product Data	1.4.H	A/E
328	11 40 11	Custom Fabricated Food Service Equipment	Samples	Finish materials	1.4.I	A/E

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329	11 40 11	Custom Fabricated Food Service Equipment	Instructions	Installation	1.4.J	A/E
330	11 40 11	Custom Fabricated Food Service Equipment	Certificate	Exhaust system tests	1.4.K	A/E
331	11 41 00	Food Storage Equipment	Manufacturer's Literature & Data	As required in 1.4.B	1.4.B	A/E
332	11 41 00	Food Storage Equipment	Drawings	Installation drawings	1.4.C	A/E
333	11 41 00	Food Storage Equipment	Instructions	Operating instructions	1.4.D	A/E
334	11 44 00	Food Cooking Equipment	Manufacturer's Literature & Data	As required in 1.4.B	1.4.B	A/E
335	11 44 00	Food Cooking Equipment	Drawings	Installation drawings	1.4.C	A/E
336	11 44 00	Food Cooking Equipment	Instructions	Operating instructions	1.4.D	A/E
337	11 44 00	Food Cooking Equipment	Submittal Package	As required in 1.4.E, 1.4.F	1.4.E, F	A/E
338	11 44 00	Food Cooking Equipment	Data	Product Data	1.4.G	A/E
339	11 44 00	Food Cooking Equipment	Samples	Finish materials	1.4.H	A/E
340	11 44 00	Food Cooking Equipment	Instructions	Installation	1.4.I	A/E
341	11 44 00	Food Cooking Equipment	Certificate	Exhaust system tests	1.4.J	A/E
342	11 48 00	Cleaning and Disposal Equipment	Manufacturer's Literature & Data	As required in 1.4.B	1.4.B	A/E
343	11 48 00	Cleaning and Disposal Equipment	Drawings	Installation drawings	1.4.C	A/E
344	11 73 00	Ceiling Mounted Patient Lift System	Shop Drawings	Shop Drawings	1.4	A/E
345	11 73 00	Ceiling Mounted Patient Lift System	Certificates	Manufacturer	1.4	A/E

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346	11 73 00	Ceiling Mounted Patient Lift System	Manufacturer's Literature & Data	As required in 1.4.C	1.4	A/E
347	11 73 00	Ceiling Mounted Patient Lift System	Layouts	Lift System	1.4	A/E
348	11 73 00	Ceiling Mounted Patient Lift System	Checklist	Post Installation Inspection	1.4	A/E
349	12 32 00	Manufactured Wood Casework	Manufacturer's Literature & Data	As specified in 1.3	1.3	A/E
350	12 32 00	Manufactured Wood Casework	Samples	As specified in 1.3	1.3	A/E
351	12 32 00	Manufactured Wood Casework	Shop Drawings	As specified in 1.3	1.3	A/E
352	12 32 00	Manufactured Wood Casework	Certification	As specified in 1.3	1.3	A/E
353	12 36 00	Countertops	Shop Drawings	Shop Drawings	1.3	A/E
354	12 36 00	Countertops	Samples	Countertop/Ends, edges, backsplash	1.3	A/E
355	21 08 00	Commissioning of Fire Suppression System	Drawings, Calcs, Reports	Various items requested	1.3	A/E
356	21 13 13	Wet-Pipe Sprinkler System	Certificates	Contractor Qualifications and License	1.4	A/E
357	21 13 13	Wet-Pipe Sprinkler System	Shop Drawings	Detail Drawings	1.4	A/E
358	21 13 13	Wet-Pipe Sprinkler System	Product Data	Manufacturer's Literature and Data	1.4	A/E
359	21 13 13	Wet-Pipe Sprinkler System	Shop Drawings	Hydraulic Calculations	1.4	A/E
360	21 13 13	Wet-Pipe Sprinkler System	Closeout Submittals	As Built Drawings	1.4	A/E
361	21 13 13	Wet-Pipe Sprinkler System	Closeout Submittals	Operation and Maintenance Manuals	1.4	A/E
362	21 13 13	Wet-Pipe Sprinkler System	Closeout Submittals	Maintenance Schedule	1.4	A/E

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363	21 13 13	Wet-Pipe Sprinkler System	Certificates	Certified Test Data	1.4	A/E
364	22 05 12	General Requirements for Plumbing Equipment	Drawings	As required in 1.3.C	1.3	A/E
365	22 05 12	General Requirements for Plumbing Equipment	Maintenance & Operating Manuals	Manuals, as specified	1.3	A/E
366	22 05 19	Meters and Gages for Plumbing Piping	Manufacturer's Literature & Data	As specified in 1.4.C	1.4	A/E
367	22 05 19	Meters and Gages for Plumbing Piping	Maintenance & Operating Manual	Manuals, as specified	1.4	A/E
368	22 05 19	Meters and Gages for Plumbing Piping	Drawings	Shop Drawings as specified in 1.4.E	1.4	A/E
369	22 05 23	General-Duty Valves for Plumbing	Manufacturer's Literature and Data	Valves and backflow preventers	1.4	A/E
370	22 07 11	Plumbing Insulation	Manufacturer's Literature and Data	Full description	1.4	A/E
371	22 07 11	Plumbing Insulation	Drawings	Shop Drawings	1.4	A/E
372	22 08 00	Commissioning of Plumbing Systems	Submittals	as required in 1.4	1.4	A/E
373	22 11 00	Facility Water Distribution	Manufacturer's Literature and Data	Full description	1.4	A/E
374	22 11 23	Domestic Water Pumps	Manufacturer's Literature & Data	As specified in 1.4	1.4	A/E
375	22 11 23	Domestic Water Pumps	Certified Data	All factory & Construction Site test data and reports	1.4	A/E
376	22 11 23	Domestic Water Pumps	Maintenance & Operating Manuals	Manuals, as specified in 1.4.E	1.4	A/E
377	22 11 23	Domestic Water Pumps	Signed Checklist	Completed System Readiness Checklist	1.4	A/E
378	22 11 23	Domestic Water Pumps	Plans & Qualifications	Training Plans; Instructor Qualifications	1.4	A/E
379	22 13 00	Facility Sanitary and Vent Piping	Manufacturer's Literature and Data	Full description	1.4	A/E

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380	22 13 00	Facility Sanitary and Vent Piping	Drawings	Shop Drawings	1.4	A/E
381	22 31 11	Water Softeners	Manufacturer's Literature and Data	As specified in 1.4	1.4	A/E
382	22 31 11	Water Softeners	Drawings	As specified in 1.4.D	1.4	A/E
383	22 31 11	Water Softeners	Signed Checklist	Completed System Readiness Checklist	1.4	A/E
384	22 31 11	Water Softeners	Plans & Qualifications	Training Plans; Instructor Qualifications	1.4	A/E
385	22 34 00	Fuel-Fired Domestic Water Heaters	Manufacturer's Literature and Data	As specified in 1.4	1.4	A/E
386	22 34 00	Fuel-Fired Domestic Water Heaters	Shop Drawings	As specified in 1.4	1.4	A/E
387	22 34 00	Fuel-Fired Domestic Water Heaters	Certificates	Seismic Qualification	1.4	A/E
388	22 34 00	Fuel-Fired Domestic Water Heaters	Operation & Maintenance Data	As specified in 1.4	1.4	A/E
389	22 34 00	Fuel-Fired Domestic Water Heaters	Checklist	System Readiness Checklist	1.4	A/E
390	22 34 00	Fuel-Fired Domestic Water Heaters	Qualifications	As specified in 1.4	1.4	A/E
391	22 40 00	Plumbing Fixtures	Manufacturer's Literature and Data	As specified in 1.4	1.4	A/E
392	22 40 00	Plumbing Fixtures	Instructions	Operating Instructions	1.4	A/E
393	22 40 00	Plumbing Fixtures	Signed Checklist	Completed System Readiness Checklist	1.4	A/E
394	22 40 00	Plumbing Fixtures	Plans & Qualifications	Training Plans; Instructor Qualifications	1.4	A/E
395	22 62 00	Vacuum Systems for Laboratory and Healthcare Facilities	Manufacturer's Literature and Data	As specified in 1.4.C	1.4	A/E
396	22 62 00	Vacuum Systems for Laboratory and Healthcare Facilities	Manufacturer Letter	Station Inlets	1.4	A/E

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397	22 62 00	Vacuum Systems for Laboratory and Healthcare Facilities	Certification	Vacuum Systems	1.4	A/E
398	22 62 00	Vacuum Systems for Laboratory and Healthcare Facilities	Affidavit	As required in 1.4.F	1.4	A/E
399	22 62 00	Vacuum Systems for Laboratory and Healthcare Facilities	Checklist	System Readiness Checklist	1.4	A/E
400	22 62 00	Vacuum Systems for Laboratory and Healthcare Facilities	Plans & Qualifications	Training Plans; Instructor Qualifications	1.4	A/E
401	22 63 00	Gas Systems for Laboratory and Healthcare Facilities	Manufacturer's Literature and Data	As specified in 1.4.C	1.4	A/E
402	22 63 00	Gas Systems for Laboratory and Healthcare Facilities	Manufacturer Letter	Station Inlets	1.4	A/E
403	22 63 00	Gas Systems for Laboratory and Healthcare Facilities	Certification	Gas Systems	1.4	A/E
404	22 63 00	Gas Systems for Laboratory and Healthcare Facilities	Checklist	System Readiness Checklist	1.4	A/E
405	22 63 00	Gas Systems for Laboratory and Healthcare Facilities	Plans & Qualifications	Training Plans; Instructor Qualifications	1.4	A/E
406	23 05 11	Common Work Results for HVAC	Certifications	Welding Certifications	1.4	A/E
407	23 05 11	Common Work Results for HVAC	Certificates	Certification of Manufacturer's Coordination	1.4	A/E
408	23 05 11	Common Work Results for HVAC	Shop Drawings	Coordinated Layout Drawings	1.4	A/E
409	23 05 12	General Motor Requirements for HVAC	Shop Drawings	Shop Drawings	1.4	A/E
410	23 05 12	General Motor Requirements for HVAC	Manuals	IOM Manuals	1.4	A/E
411	23 05 12	General Motor Requirements for HVAC	Certificates	Certification	1.4	A/E
412	23 05 12	General Motor Requirements for HVAC	Test Reports	System Readiness Checklist	1.4	A/E
413	23 05 41	Noise and Vibration Control for HVAC and Piping Equipment	Product Data	Manufacturer's Literature and Data	1.4	A/E

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414	23 05 41	Noise and Vibration Control for HVAC and Piping Equipment	Product Data	Load Calculations	1.4.C	A/E
415	23 05 93	Testing, Adjusting, and Balancing for HVAC	Certificates	Names and Qualifications	1.3.B, 1.4.B	A/E
416	23 05 93	Testing, Adjusting, and Balancing for HVAC	Test Equipment Criteria	Calibration History	1.3.C	A/E
417	23 05 93	Testing, Adjusting, and Balancing for HVAC	Product Data	AABC or NEBB Publications	1.4.C	A/E
418	23 05 93	Testing, Adjusting, and Balancing for HVAC	Report	Various Reports	1.4.D	A/E
419	23 05 93	Testing, Adjusting, and Balancing for HVAC	Report	Test and Balance Reports	1.4.E	A/E
420	23 07 11	HVAC Insulation	Shop Drawings	Shop Drawings	1.4	A/E
421	23 07 11	HVAC Insulation	Samples	Samples	1.4	A/E
422	23 08 00	Commissioning of HVAC Systems	Closeout Submittals	List of Submittals	1.6	A/E
423	23 08 00	Commissioning of HVAC Systems	Pre-Functional Checklists	Pre-Functional Checklists	3.2	GOVT
424	23 08 00	Commissioning of HVAC Systems	Contractors Tests	As required by other sections	3.3	GOVT
425	23 08 00	Commissioning of HVAC Systems	Functional Tests	Signing of CxA produced and witnessed test	3.4	GOVT
426	23 08 00	Commissioning of HVAC Systems	Training	Training Plans	3.5	GOVT
427	23 09 23	Direct Digital Control System for HVAC	Contractor Qualifications	Letters	1.4.A,3,4,5	A/E
428	23 09 23	Direct Digital Control System for HVAC	Warranty	Warranty	1.6	A/E
429	23 09 23	Direct Digital Control System for HVAC	Product Data	Manufacturer's Literature and Data	1.7.B	A/E
430	23 09 23	Direct Digital Control System for HVAC	Certificates	Product Certificates	1.7.C	A/E

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431	23 09 23	Direct Digital Control System for HVAC	Certificates	Product Licenses	1.7.D	A/E
432	23 09 23	Direct Digital Control System for HVAC	Closeout Submittals	As Built Control Drawings	1.7.E	A/E
433	23 09 23	Direct Digital Control System for HVAC	Closeout Submittals	Operation and Maintenance Manuals	1.7.F	A/E
434	23 09 23	Direct Digital Control System for HVAC	Closeout Submittals	Performance Report	1.7.G	GOVT
435	23 11 23	Facility Natural Gas Piping	Manufacturer's Literature and Data	As specified in 1.4	1.4	A/E
436	23 11 23	Facility Natural Gas Piping	Shop Drawings	As specified in 1.4	1.4	A/E
437	23 11 23	Facility Natural Gas Piping	O&M Manuals	As specified in 1.4	1.4	A/E
438	23 11 23	Facility Natural Gas Piping	System Readiness Checklist	As specified in 1.4	1.4	A/E
439	23 11 23	Facility Natural Gas Piping	Training Plans	As specified in 1.4	1.4	A/E
440	23 21 13	Hydronic Piping	Product Data	Manufacturer's Literature and Data	1.4.B-C	A/E
441	23 21 13	Hydronic Piping	Product Data	Manufacturer's Certified Data Report for Pressure Vessels	1.4.D	A/E
442	23 21 13	Hydronic Piping	Certificates	Welder's Qualifications	1.4.E	A/E
443	23 21 13	Hydronic Piping	Shop Drawings	Coordination Drawings	1.4.F	A/E

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444	23 21 13	Hydronic Piping	Closeout Submittals	As Built Piping Diagrams	1.4.G	A/E
445	23 21 23	Hydronic Pumps	Product Data	Manufacturer's Literature and Data	1.4.B	A/E
446	23 21 23	Hydronic Pumps	Closeout Submittals	IO&M information	1.4.C	A/E
447	23 21 23	Hydronic Pumps	Product Data	Submittal - Certified Curves	1.4.D	A/E
448	23 25 00	HVAC Water Treatment	Product Data	Manufacturer's Literature and Data	1.4.B	A/E
449	23 25 00	HVAC Water Treatment	Water Analysis Verification	Report	1.4.C	A/E
450	23 25 00	HVAC Water Treatment	MSDS	w/Product Data Submittal	1.4.D	A/E
451	23 25 00	HVAC Water Treatment	Closeout Submittals	IO&M information	1.4.E	A/E
452	23 31 00	HVAC Ducts and Casings	Product Data	Manufacturer's Literature and Data	1.4.B	A/E
453	23 31 00	HVAC Ducts and Casings	Shop Drawings	Coordination Drawings	1.4.C	A/E
454	23 31 00	HVAC Ducts and Casings	Duct Leakage Tests	Leak and Repair reports	3.2	GOVT
455	23 34 00	HVAC Fans	Product Data	Submittal	1.4B	A/E
456	23 34 00	HVAC Fans	Sound Data	Submittal	1.4C	A/E
457	23 34 00	HVAC Fans	Motor Data	Submittal	1.4D	A/E
458	23 34 00	HVAC Fans	Roof Curbs	Submittal	1.4E	A/E
459	23 34 00	HVAC Fans	Belt Guards	Submittal	1.4F	A/E
460	23 34 00	HVAC Fans	Closeout Submittals	IO&M information	1.4G	A/E

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461	23 34 00	HVAC Fans	Certified curves	Submittal	1.4H	A/E
462	23 36 00	Air Terminal Units	Product Data	Submittal	1.4.B	A/E
463	23 36 00	Air Terminal Units	Samples	Sample	1.4.C	GOVT
464	23 36 00	Air Terminal Units	Certificates	Product Qualifications	1.4.D	A/E
465	23 36 00	Air Terminal Units	Closeout Submittals	O&M information	1.4.E	A/E
466	23 37 00	Air Outlets and Inlets	Product Data	Manufacturer's Literature and Data	1.4.B	A/E
467	23 37 00	Air Outlets and Inlets	Shop Drawings	Coordination Drawings	1.4.C	A/E
468	23 40 00	HVAC Air Cleaning Devices	Product Data	Submittal	1.4.B	A/E
469	23 40 00	HVAC Air Cleaning Devices	Performance Reports	Submittal	1.4.C; 1.3.A	A/E
470	23 40 00	HVAC Air Cleaning Devices	Certificates	Warranty	1.4.D; 1.3.B	A/E
471	23 40 00	HVAC Air Cleaning Devices	HEPA Filter Test Reports	Field Test Reports	1.4.E	A/E
472	23 51 00	Breechings, Chimneys, & Stacks	Manufacturer's Literature and Data	As specified in 1.4.C	1.4	A/E
473	23 51 00	Breechings, Chimneys, & Stacks	Data - Design	As specified in 1.4.D	1.4	A/E
474	23 51 00	Breechings, Chimneys, & Stacks	Drawings	As specified in 1.4.E	1.4	A/E
475	23 51 00	Breechings, Chimneys, & Stacks	Data - Design	As specified in 1.4.F	1.4	A/E
476	23 51 00	Breechings, Chimneys, & Stacks	Data - Design	As specified in 1.4.G	1.4	A/E
477	23 51 00	Breechings, Chimneys, & Stacks	Data - Design	As specified in 1.4.H	1.4	A/E
478	23 51 00	Breechings, Chimneys, & Stacks	Written Statement	As specified in 1.4.I	1.4	A/E
479	23 51 00	Breechings, Chimneys, & Stacks	Maintenance & Operating Manuals	As specified in 1.4.J	1.4	A/E
480	23 51 00	Breechings, Chimneys, & Stacks	Signed Checklist	Completed System Readiness Checklist	1.4	A/E
481	23 51 00	Breechings, Chimneys, & Stacks	Plans / Qualifications	Training Plans; Instructor Qualifications	1.4	A/E
472	23 52 25	Low-Pressure Water Heating Boilers	Manufacturer's Literature and Data	Full item descriptions	1.4.C	A/E
473	23 52 25	Low-Pressure Water Heating Boilers	Boiler	As outlined in 1.4.D	1.4.D	A/E

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474	23 52 25	Low-Pressure Water Heating Boilers	Boiler Trim	As outlined in 1.4.E	1.4.E	A/E
475	23 52 25	Low-Pressure Water Heating Boilers	Burner and Fuel Valve and Piping Trains	As outlined in 1.4.F	1.4.F	A/E
476	23 52 25	Low-Pressure Water Heating Boilers	Burner Management and Flame Monitor and Safeguard Systems	As outlined in 230911	1.4.G	A/E
477	23 52 25	Low-Pressure Water Heating Boilers	Data	Instruments	1.4.H	A/E
478	23 52 25	Low-Pressure Water Heating Boilers	Diagram	Schematic Wiring diagram of boiler system	1.4.I	A/E
479	23 52 25	Low-Pressure Water Heating Boilers	Certification	Water Test Report	1.4.J	A/E
480	23 52 25	Low-Pressure Water Heating Boilers	O&M Data	As outlined in 1.4.K	1.4.K	A/E
481	23 52 25	Low-Pressure Water Heating Boilers	Checklist	Completed System Readiness Checklist	1.4.L	A/E
482	23 52 25	Low-Pressure Water Heating Boilers	Data	Instrumentation calibration	1.4.M	A/E
483	23 52 25	Low-Pressure Water Heating Boilers	Training Plans/Qualifications	Instructor Traing Plans/Qualifications	1.4.N	A/E
484	23 64 00	Packaged Water Chillers	Product Data	Manufacturer's Literature and Data	1.6	A/E

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485	23 64 00	Packaged Water Chillers	O&M Data	Manuals	1.6	A/E
486	23 64 00	Packaged Water Chillers	Tests	Chillers test report	1.6	A/E
487	23 64 00	Packaged Water Chillers	Certificates	Chiller Mfg compliance certification	1.6	A/E
488	23 64 00	Packaged Water Chillers	Seismic	Restraints for equipment	1.6	A/E
489	23 73 00	Indoor Central-Station Air-Handling Units	Commissioning	System Readiness Checklist	3.3.A	GOVT
490	23 73 00	Indoor Central-Station Air-Handling Units	Shipping Information	As requested in 1.4	1.4.E	A/E
491	23 81 00	Decentralized Unitary HVAC Equipment	Manufacturer's Literature and Data	As specified in 1.4	1.4	A/E
492	23 81 00	Decentralized Unitary HVAC Equipment	Certification	As specified in 1.4	1.4	A/E
493	23 81 00	Decentralized Unitary HVAC Equipment	Performance Rating	As specified in 1.4	1.4	A/E
494	23 81 00	Decentralized Unitary HVAC Equipment	O&M Manual	As specified in 1.4	1.4	A/E
495	23 81 00	Decentralized Unitary HVAC Equipment	System Readiness Checklist	As specified in 1.4	1.4	A/E
491	23 82 00	Heating and Cooling Units	Certificates	Compliance certification	1.4	A/E
492	23 82 00	Heating and Cooling Units	O&M Data	Manuals	1.4	A/E
493	23 82 00	Heating and Cooling Units	Checklist	Completed System Readiness Checklist	1.4	A/E
491	23 82 16	Air Coils	Product Data	Manufacturer's Literature and Data	1.4.B	A/E
492	23 82 16	Air Coils	Instructions	Installation, Operation and Maintenance Manuals	1.4.C	A/E
493	23 82 16	Air Coils	Certificates	Certification Compliance	1.4.D	A/E
494	23 82 16	Air Coils	Commissioning	System Readiness Checklist	1.4.F	GOVT
495	26 05 11	Requirements for Electrical Installations	Qualifications	Manufacturer, Products, and Services	1.4.A, B, C	A/E
496	26 05 11	Requirements for Electrical Installations	Submittals	Procedures	1.12	A/E
497	26 05 11	Requirements for Electrical Installations	O&M Manuals	O&M Manuals	1.12.F	A/E
498	26 05 11	Requirements for Electrical Installations	Acceptance Checks	Test Data and Report of Results,	1.14	A/E
499	26 05 11	Requirements for Electrical Installations	Warranty	Letter	1.15	A/E

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500	26 05 11	Requirements for Electrical Installations	Instruction	Qualifications, Agendas, Schedules	1.16	A/E
501	26 05 13	Medium-Voltage Cables	Various Submittals	As specified in 1.5	1.5	A/E

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502	26 05 19	Low Voltage Electrical Power Conductors and Cables	Product Data	Manufacturer's Literature and Data	1.5.A.1	A/E
503	26 05 19	Low Voltage Electrical Power Conductors and Cables	Certificates	Certifications	1.5.A.2; 1.4	A/E
504	26 05 26	Grounding and Bonding for Electrical Systems	Product Data - Shop Drawings	Manufacturer's Literature and Data	1.4.A.1	A/E
505	26 05 26	Grounding and Bonding for Electrical Systems	Test Reports	Ground Resistance Test	1.4.A.2	A/E
506	26 05 26	Grounding and Bonding for Electrical Systems	Certificates	Certification of Installation	1.4.A.3	A/E
507	26 05 33	Raceway and Boxes for Electrical Systems	Product Data	Manufacturer's Literature and Data	1.4.A	A/E
508	26 05 33	Raceway and Boxes for Electrical Systems	Shop Drawings	Shop Drawings	1.4.A	A/E
509	26 05 33	Raceway and Boxes for Electrical Systems	Certificates	Certifications of Materials and Installation	1.4.A.2	A/E
510	26 05 41	Underground Electrical Construction	Various Submittals	As specified in 1.4	1.4	A/E
511	26 05 73	Overcurrent Protective Device Coordination Study	Product Data	Software program to be used for study.	1.4.A.1	A/E
512	26 05 73	Overcurrent Protective Device Coordination Study	Results	Complete study results	1.4.A.2	A/E
513	26 05 73	Overcurrent Protective Device Coordination Study	Certifications	Certification of Installation	1.4.A.3	A/E
514	26 08 00	Commissioning of Electrical Systems	Pre-Functional Checklists	Pre-Functional Checklists	3.2	A/E
515	26 08 00	Commissioning of Electrical Systems	Contractors Tests	As required by other sections	3.3	A/E
516	26 08 00	Commissioning of Electrical Systems	Functional Tests	Signing of CA produced and witnessed test	3.4	A/E
517	26 08 00	Commissioning of Electrical Systems	Training	Training Plans	3.5	A/E
518	26 09 23	Lighting Controls	Shop Drawings	Shop Drawings	1.4	A/E

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519	26 09 23	Lighting Controls	O&M Data	Manuals	1.4	A/E
520	26 09 23	Lighting Controls	Certifications	Lighting Control Systems	1.4	A/E
521	26 09 23	Lighting Controls	Instructions	Instructions	3.4	A/E
522	26 12 19	Pad-Mounted, Liquid-Filled, Medium Voltage Transformers	Shop Drawings	As specified in 1.5.A.1	1.5	A/E
523	26 12 19	Pad-Mounted, Liquid-Filled, Medium Voltage Transformers	Maintenance & Operating Manuals	As specified in 1.5.A.2	1.5	A/E
524	26 12 19	Pad-Mounted, Liquid-Filled, Medium Voltage Transformers	Certifications	As specified in 1.5.B	1.5	A/E
525	26 13 16	Medium-Voltage Fusable Interrupter Switches	Various Submittals	As specified in 1.5	1.5	A/E
526	26 22 00	Low-Voltage Transformers	Shop Drawings	Shop Drawings	1.4	A/E
527	26 22 00	Low-Voltage Transformers	O&M Data	Manuals	1.4	A/E
528	26 22 00	Low-Voltage Transformers	Certifications	Lighting Control Systems	1.4	A/E
529	26 24 13	Distribution Switchboards	Shop Drawings	Shop Drawings	1.5	A/E
530	26 24 13	Distribution Switchboards	O&M Manuals	O&M Manuals	1.5	A/E
531	26 24 13	Distribution Switchboards	Certifications	Certifications of Installation	1.5	A/E
532	26 24 16	Panelboards	Shop Drawings	Shop Drawings	1.4.A.1	A/E
533	26 24 16	Panelboards	Closeout Submittals	Operation and Maintenance Manuals	1.4.A.2	A/E
534	26 27 26	Wiring Devices	Shop Drawings	Shop Drawings	1.4.A.1	A/E
535	26 27 26	Wiring Devices	Closeout Submittals	Operation and Maintenance Manuals	1.4.A.2	A/E

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536	26 27 26	Wiring Devices	Certificates	Certifications of Materials and Installation	1.4.A.3	A/E
537	26 29 11	Motor Controllers	Shop Drawings	Shop Drawings	1.4.A.1	A/E
538	26 29 11	Motor Controllers	Closeout Submittals	Operation and Maintenance Manuals	1.4.A.2	A/E
539	26 29 11	Motor Controllers	Certificates	Certifications of Materials and Installation	1.4.A.3	A/E
540	26 29 21	Enclosed Switches and Circuit Breakers	Shop Drawings	Shop Drawings	1.4.A.1	A/E
541	26 29 21	Enclosed Switches and Circuit Breakers	Closeout Submittals	Operation and Maintenance Manuals	1.4.A.2	A/E
542	26 29 21	Enclosed Switches and Circuit Breakers	Certificates	Certifications of Materials and Installation	1.4.A.3	A/E
543	26 32 13	Engine Generators	Various Items	Drawings, Technical Data, Cals, Manuals, Reports, Certifications	1.5	A/E
544	26 36 23	Automatic Transfer Switches	Shop Drawings	Drawings, Manuals, Certifications	1.5	A/E
545	26 41 00	Facility Lightning Protection	Shop Drawings	Shop Drawings	1.4	A/E
546	26 41 00	Facility Lightning Protection	Certifications	Lightening Protection System	1.4	A/E
547	26 41 00	Facility Lightning Protection	Tests	Acceptance Checks and Tests	3.2	A/E
548	26 43 13	Surge Protective Devices	Shop Drawings	Shop Drawings	1.4	A/E
549	26 43 13	Surge Protective Devices	Closeout Submittals	Operation and Maintenance Manuals	1.4	A/E
550	26 43 13	Surge Protective Devices	Certificates	Certifications of Materials and Installation	1.4	A/E
551	26 43 13	Surge Protective Devices	Tests	Acceptance Checks and Tests	3.2	A/E
552	26 43 13	Surge Protective Devices	Instructions	Instructions	3.4	A/E

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553	26 51 00	Interior Lighting	Shop Drawings	Shop Drawings	1.3.A.1	A/E
554	26 51 00	Interior Lighting	Closeout Submittals	Operation and Maintenance Manuals	1.3.A.2	A/E
555	26 51 00	Interior Lighting	Certificates	Certifications of Materials and Installation	1.3.A.3	A/E
556	26 56 00	Exterior Lighting	Shop Drawings	Shop Drawings	1.4	A/E
557	26 56 00	Exterior Lighting	O&M Data	Manuals	1.4	A/E
558	26 56 00	Exterior Lighting	Certifications	Lighting Control Systems	1.4	A/E
559	27 05 11	Requirements for Communications Installations	List	List of Parts	1.7	A/E
560	27 05 11	Requirements for Communications Installations	Information	Product Information	1.7	A/E
561	27 05 11	Requirements for Communications Installations	Source Quality Control Submittal	As required in 1.7.D	1.7	A/E
562	27 05 11	Requirements for Communications Installations	Qualifications	Installer	1.7	A/E
563	27 05 11	Requirements for Communications Installations	Submittals	Delagated Design submittals - seismic	1.7	A/E
564	27 05 11	Requirements for Communications Installations	Submittals	Anchors and supports	1.7	A/E
565	27 05 11	Requirements for Communications Installations	Test Equipment List	As required in 1.7.H	1.7	A/E
566	27 05 11	Requirements for Communications Installations	Drawings	As required in 1.7.I	1.7	A/E
567	27 05 11	Requirements for Communications Installations	Submittals	Sustainable Design	1.7	A/E
568	27 05 11	Requirements for Communications Installations	Test Reports	Certified Test Reports	1.7	A/E
569	27 05 26	Grounding and Bonding for Communications Systems	Plans & Qualifications	Location /Routing	1.3	A/E

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570	27 05 26	Grounding and Bonding for Communications Systems	Submittals	Closeout Submittals	1.3	A/E
571	27 05 33	Raceways and Boxes for Communications Systems	Submittals	As required in 1.3.A	1.3	A/E
572	27 05 33	Raceways and Boxes for Communications Systems	Certification	Material certification	1.3	A/E
573	27 08 00	Commissioning of Communications Systems	Pre-Functional Checklists	Pre-Functional Checklists	1.4	A/E
574	27 08 00	Commissioning of Communications Systems	Traing Agendas and Resumes	Traing Agendas and Resumes	1.4	A/E
575	27 10 00	Control, Communication and Signal Wiring	Certification	As required in 1.3.B	1.3	A/E
576	27 10 00	Control, Communication and Signal Wiring	Installation Requirements	As required in 1.3.C	1.3	A/E
577	27 10 00	Control, Communication and Signal Wiring	Data	Power Data	1.3	A/E
578	27 10 00	Control, Communication and Signal Wiring	Data	Conduit Sizes	1.3	A/E
579	27 10 00	Control, Communication and Signal Wiring	Submittals	Closeout Submittals	1.3	A/E
580	27 11 00	Communications Equipment Room Fittings	Submittals	Pictorial layouts, Literature	1.3	A/E
581	27 11 00	Communications Equipment Room Fittings	Environmental Requirements	As required in 1.3.C	1.3	A/E
582	27 15 00	Communications Structured Cabling	Data	Telecommunications	1.3	A/E
583	27 15 00	Communications Structured Cabling	Certifications	As required in 1.3.B	1.3	A/E
584	27 15 00	Communications Structured Cabling	Submittals	Closeout Submittals	1.3	A/E
585	27 31 31	Voice Communications Switching and Routing Equipment - Extension	Survey	As required in 1.4.A	1.4	A/E
586	27 31 31	Voice Communications Switching and Routing Equipment - Extension	Submittals	As required in 1.4.B	1.4	A/E

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587	27 31 31	Voice Communications Switching and Routing Equipment - Extension	Environmental Requirements	As required in 1.4.C	1.4	A/E
588	27 31 31	Voice Communications Switching and Routing Equipment - Extension	Report	System Data Base Survey Report	1.4	A/E
589	27 31 31	Voice Communications Switching and Routing Equipment - Extension	Report	Facility Needs Analysis Report	1.4	A/E
590	27 31 31	Voice Communications Switching and Routing Equipment - Extension	Submittals	Voice Traffic Management System	1.4	A/E
591	27 31 31	Voice Communications Switching and Routing Equipment - Extension	Performance Test Plan	As required in 1.4.G	1.4	A/E
592	27 31 31	Voice Communications Switching and Routing Equipment - Extension	Certificates	OEM Training Certificates	1.4	A/E
593	27 31 31	Voice Communications Switching and Routing Equipment - Extension	Closeout Submittals	As required in 1.4.I	1.4	A/E
594	27 31 31	Voice Communications Switching and Routing Equipment - Extension	Submittals	Maintenance Materials	1.4	A/E
595	27 41 31	Master Antenna Television Equipment and Systems	Submittals	As required in 1.4.A	1.4	A/E
596	27 41 31	Master Antenna Television Equipment and Systems	Certifications	Pre-Acceptance	1.4	A/E
597	27 41 31	Master Antenna Television Equipment and Systems	Report	Needs Assessment Report	1.4	A/E
598	27 41 31	Master Antenna Television Equipment and Systems	Sample	Sample Report	1.4	A/E
599	27 51 16	Public Address and Mass Notification Systems	Qualifications	As required in 1.5	1.5	A/E
600	27 51 16	Public Address and Mass Notification Systems	Record Documents	As required in 1.8	1.8	A/E
601	27 51 16	Public Address and Mass Notification Systems	Project Close-Out	As required in 1.12	1.12	A/E
602	27 51 16	Public Address and Mass Notification Systems	Performance Testing	As required in 4.2	4.2	A/E
603	27 51 23	Intercommunications and Program Systems	Data	As required in 1.3.A	1.3.A	A/E

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604	27 51 23	Intercommunications and Program Systems	Certifications	As required in 1.3.B	1.3.B	A/E
605	27 51 23	Intercommunications and Program Systems	Warranty	OEM Warranty	1.3.C	A/E
606	27 51 23	Intercommunications and Program Systems	Report	Needs Assessment	1.3.D	A/E
607	27 51 23	Intercommunications and Program Systems	Material	Maintenance Materials	1.3.E	A/E
608	27 52 23	Nurse Call and Code Blue Systems	Various submittals	As specified in 1.8	1.8	A/E
609	28 05 00	Common Work Results for Electronic Safety and Security	Submittals	as required in 1.6.D	1.6	A/E
610	28 05 13	Conductors and Cables for Electronic Safety and Security	Product Data	Manufacturer's Literature and Data	1.4	A/E
611	28 05 13	Conductors and Cables for Electronic Safety and Security	Certificates	Certifications	1.4	A/E
612	28 05 13	Conductors and Cables for Electronic Safety and Security	Wiring Diagrams	Wiring Diagrams	1.4	A/E
613	28 05 13	Conductors and Cables for Electronic Safety and Security	Cable Administration Drawings	Cable Administration Drawings	1.4	A/E
614	28 05 13	Conductors and Cables for Electronic Safety and Security	Project Planning Documents	Project Planning Documents	1.4	A/E
615	28 05 13	Conductors and Cables for Electronic Safety and Security	Maintenance Data	Maintenance Data	1.4	A/E
616	28 05 26	Grounding and Bonding for Electronic Safety & Security	Mfg Data, Certificates, Shop Drawings	As requested in 1.3	1.3	A/E
617	28 05 28.33	Conduits and Backboxes for Electronic Safety and Security	Shop Drawings	Shop Drawings	1.5	A/E
618	28 05 28.33	Conduits and Backboxes for Electronic Safety and Security	Certificates	Certifications	1.5	A/E
619	28 05 28.33	Conduits and Backboxes for Electronic Safety and Security	Product Data	Manufacturer's Literature and Data	1.5	A/E
620	28 05 28.33	Conduits and Backboxes for Electronic Safety and Security	Coordination Drawings	Coordination Drawings	1.5	A/E

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621	28 05 28.33	Conduits and Backboxes for Electronic Safety and Security	Closeout Submittals	Quality Control Test Reports	1.5	A/E
622	28 08 00	Commissioning of Electronic Safety and Security Systems	Submittals	as required in 1.6.D	1.6	A/E
623	28 13 00	Physical Access Control System	Certificates	Quality Assurance compliance	1.4	A/E
624	28 13 00	Physical Access Control System	Drawings	Pre-Installation and AsBuilts	1.4	A/E
625	28 13 00	Physical Access Control System	Shop Drawings	As Required in 1.4.E	1.4	A/E
626	28 13 00	Physical Access Control System	Pre-Installation Design Package	As Required in 1.4.F	1.4	A/E
627	28 13 00	Physical Access Control System	Data	Security System Cut sheets	1.4	A/E
628	28 13 00	Physical Access Control System	Data / Certification	Mfg Certification of UL Listing	1.4	A/E
629	28 13 00	Physical Access Control System	Submittals	As Required in 1.4.J	1.4	A/E
630	28 13 00	Physical Access Control System	Submittals	As Required in 1.4.K	1.4	A/E
631	28 13 00	Physical Access Control System	Group II Technical Data Package	As Required in 1.4.L	1.4	A/E
632	28 13 00	Physical Access Control System	Group III Technical Data Package	As Required in 1.4.M	1.4	A/E
633	28 13 00	Physical Access Control System	Group IV Technical Data Package	As Required in 1.4.N	1.4	A/E
634	28 13 00	Physical Access Control System	Group V Technical Data Package	As Required in 1.4.O	1.4	A/E
635	28 13 00	Physical Access Control System	Certificates	FIPS 201 Compliance Certificates	1.4	A/E
636	28 13 00	Physical Access Control System	Checklist	System Readiness Checklist	1.4	A/E
637	28 23 00	Video Surveillance	Certificates	Quality Assurance Compliance	1.5	A/E

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638	28 23 00	Video Surveillance	Pre-Installation	As-Built Package	1.5	A/E
639	28 23 00	Video Surveillance	Pre-Installation	Design Package	1.5	A/E
640	28 23 00	Video Surveillance	Data	Security System Cut sheets	1.5	A/E
641	28 23 00	Video Surveillance	Data / Certification	Mfg Certification of UL Listing	1.5	A/E
642	28 23 00	Video Surveillance	Checklist	System Readiness Checklist	1.5	A/E
643	28 31 00	Fire Detection and Alarm	Drawings	Drawings	1.4	A/E
644	28 31 00	Fire Detection and Alarm	Manuals	Operation and Maintenance Manuals	1.4	A/E
645	28 31 00	Fire Detection and Alarm	Certificates	Certifications	1.4	A/E
646	28 31 00	Fire Detection and Alarm	Shop Drawings	Shop Drawings	1.2	A/E
647	28 31 00	Fire Detection and Alarm	Closeout Submittals	Operation and Maintenance Manuals	1.2	A/E
648	28 31 00	Fire Detection and Alarm	Certificates	Certifications of Materials and Installation	1.2	A/E
649	28 31 00	Fire Detection and Alarm	Warranty	Warranty	1.2	A/E
650	28 31 00	Fire Detection and Alarm	Data	Instructions	3.5	A/E
651	28 52 31	Emergency Call System	Data	As required in 1.3.A.1, 1.3.A.2	1.3.A	A/E
652	28 52 31	Emergency Call System	Certifications	Equipment provider/installer	1.3.B	A/E
653	28 52 31	Emergency Call System	Closeout submittals	As required in 1.3.C	1.3.C	A/E
654	31 20 00	Earthwork	Report	Rock Excavation	1.7	A/E

OWNER: Department of Veterans Affairs	<h1>SUBMITTAL REGISTER</h1>
PROJECT TITLE: Construct New CLC	
LOCATION: Lebanon VA Medical Center	
CONTRACT NO: 595-601	
CONTRACTOR: TBD	

Line	Specification Section	Specification Name	Description	Item Submitted	Paragraph #	Classification: GOVT or A/E Reviewer
655	31 20 00	Earthwork	Data	As required in 1.7.C	1.7	A/E
656	31 23 19	Dewatering	Procedure / Location	for Disposal of unused materials	1.5	A/E
657	32 05 23	Cement and Concrete for Exterior Improvements	Drawings	Submittal Drawings	1.5	A/E
658	32 05 23	Cement and Concrete for Exterior Improvements	Manufacturer's Literature & Data	Each Product and Installation instructions	1.5	A/E
659	32 05 23	Cement and Concrete for Exterior Improvements	Reports	Test Reports	1.5	A/E
660	32 05 23	Cement and Concrete for Exterior Improvements	Certificates	Product Compliance	1.5	A/E
661	32 05 23	Cement and Concrete for Exterior Improvements	Qualifications	Installer / Land Surveyor	1.5	A/E
662	32 05 23	Cement and Concrete for Exterior Improvements	Data	Concrete Mix Design	1.5	A/E
663	32 05 23	Cement and Concrete for Exterior Improvements	Data	Subbase job-mix design	1.5	A/E
664	32 05 23	Cement and Concrete for Exterior Improvements	Data	Proposed concreting methods	1.5	A/E
665	32 05 23	Cement and Concrete for Exterior Improvements	Data	Land Surveyor's Staking Notes	1.5	A/E
666	32 12 16	Asphalt Paving	Data	Aggregate Base, Asphalt, Job-Mix	1.5	A/E
667	32 12 16	Asphalt Paving	Certifications	As required in 1.5.C	1.5	A/E
668	32 12 16	Asphalt Paving	Specs	State Highway Dept specifications	1.5	A/E
669	32 12 16	Asphalt Paving	Data	Material Safety Data Sheets	1.5	A/E
670	32 17 23	Pavement Markings	Drawings	Pavement details	1.4.B	A/E
671	32 17 23	Pavement Markings	Manufacturer's Literature & Data	Product description, Application instructions	1.4.C	A/E

OWNER: Department of Veterans Affairs	<h1>SUBMITTAL REGISTER</h1>
PROJECT TITLE: Construct New CLC	
LOCATION: Lebanon VA Medical Center	
CONTRACT NO: 595-601	
CONTRACTOR: TBD	

Line	Specification Section	Specification Name	Description	Item Submitted	Paragraph #	Classification: GOVT or A/E Reviewer
672	32 17 23	Pavement Markings	Samples	Paint	1.4.D	A/E
673	32 17 23	Pavement Markings	Certificates	Product compliance	1.4.E	A/E
674	32 17 23	Pavement Markings	Qualifications	Installer	1.4.F	A/E
675	32 31 13	Vinyl Fences and Gates	Drawings	Submittal Drawings	1.3.B	A/E
676	32 31 13	Vinyl Fences and Gates	Manufacturer's Literature & Data	Each Product / Installation instructions	1.3.C	A/E
677	32 90 00	Planting	Manufacturer's Literature & Data	As requested in 1.6.B	1.6	A/E
678	32 90 00	Planting	Samples	As requested in 1.6.C	1.6	A/E
679	32 90 00	Planting	Reports	Test Reports	1.6	A/E
680	32 90 00	Planting	Certificates	Product Compliance	1.6	A/E
681	32 90 00	Planting	Qualifications	Installer	1.6	A/E
682	32 90 00	Planting	Data	O&M Manuals	1.6	A/E
683	33 08 00	Commissioning of Site Utility Systems	Data	as required in 1.6	1.6	A/E
684	33 30 00	Sanitary Sewer Utilities	Manufacturer's Literature & Data	As requested in 1.7.A	1.7.A	A/E
685	33 40 00	Storm Sewer Utilities	Manufacturer's Literature & Data	One submittal including: pipes, fittings and appurtenances, including jointing materials, hydrants, valves and other miscellaneous items	1.8.A	A/E
686	34 75 13.13	Active Vehicle Barriers	Drawings	Submittal Drawings	1.4.B	A/E
687	34 75 13.13	Active Vehicle Barriers	Manufacturer's Literature & Data	Each Product/Installation instructions/Warranty	1.4.C	A/E
688	34 75 13.13	Active Vehicle Barriers	Samples	Bollard	1.4.D	A/E
689	34 75 13.13	Active Vehicle Barriers	Reports	Test Reports	1.4.E	A/E

OWNER: Department of Veterans Affairs	SUBMITTAL REGISTER
PROJECT TITLE: Construct New CLC	
LOCATION: Lebanon VA Medical Center	
CONTRACT NO: 595-601	
CONTRACTOR: TBD	

Line	Specification Section	Specification Name	Description	Item Submitted	Paragraph #	Classification: GOVT or A/E Reviewer
690	34 75 13.13	Active Vehicle Barriers	Certificates	Product/Installation	1.4.F	A/E
691	34 75 13.13	Active Vehicle Barriers	Qualifications	Manufacturer/Installer/Welder	1.4.G	A/E
692	34 75 13.13	Active Vehicle Barriers	O&M Data	Manuals	1.4.H	A/E

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SECTION 01 35 26
SAFETY REQUIREMENTS

1.1 APPLICABLE PUBLICATIONS

A. Latest publications listed below form part of this Article to extent referenced. Publications are referenced in text by basic designations only.

B. American Society of Safety Engineers (ASSE):

A10.1-2011.....Pre-Project & Pre-Task Safety and Health
Planning

A10.34-2012.....Protection of the Public on or Adjacent to
Construction Sites

A10.38-2013.....Basic Elements of an Employer's Program to
Provide a Safe and Healthful Work Environment
American National Standard Construction and
Demolition Operations

C. American Society for Testing and Materials (ASTM):

E84-2013.....Surface Burning Characteristics of Building
Materials

D. The Facilities Guidelines Institute (FGI):

FGI Guidelines-2010Guidelines for Design and Construction of
Healthcare Facilities

E. National Fire Protection Association (NFPA):

10-2018.....Standard for Portable Fire Extinguishers

30-2018.....Flammable and Combustible Liquids Code

51B-2019.....Standard for Fire Prevention During Welding,
Cutting and Other Hot Work

70-2020.....National Electrical Code

70B-2019.....Recommended Practice for Electrical Equipment
Maintenance

70E-2018Standard for Electrical Safety in the Workplace

99-2018.....Health Care Facilities Code

241-2019.....Standard for Safeguarding Construction,
Alteration, and Demolition Operations

F. The Joint Commission (TJC)

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TJC ManualComprehensive Accreditation and Certification
Manual

G. U.S. Nuclear Regulatory Commission

10 CFR 20Standards for Protection Against Radiation

H. U.S. Occupational Safety and Health Administration (OSHA):

29 CFR 1910Safety and Health Regulations for General
Industry

29 CFR 1926Safety and Health Regulations for Construction
Industry

I. VHA Directive 2005-007

1.2 DEFINITIONS

- A. Critical Lift. A lift with the hoisted load exceeding 75% of the crane's maximum capacity; lifts made out of the view of the operator (blind picks); lifts involving two or more cranes; personnel being hoisted; and special hazards such as lifts over occupied facilities, loads lifted close to power-lines, and lifts in high winds or where other adverse environmental conditions exist; and any lift which the crane operator believes is critical.
- B. OSHA "Competent Person" (CP). One who is capable of identifying existing and predictable hazards in the surroundings and working conditions which are unsanitary, hazardous or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them (see 29 CFR 1926.32(f)).
- C. "Qualified Person" means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.
- D. High Visibility Accident. Any mishap which may generate publicity or high visibility.
- E. Accident/Incident Criticality Categories:
1. No impact - near miss incidents that should be investigated but are not required to be reported to the VA;

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2. Minor incident/impact - incidents that require first aid or result in minor equipment damage (less than \$5000). These incidents must be investigated but are not required to be reported to the VA;
 3. Moderate incident/impact - Any work-related injury or illness that results in:
 - a. Days away from work (any time lost after day of injury/illness onset);
 - b. Restricted work;
 - c. Transfer to another job;
 - d. Medical treatment beyond first aid;
 - e. Loss of consciousness;
 4. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (5) above or,
 5. Any incident that leads to major equipment damage (greater than \$5000).
- F. These incidents must be investigated and are required to be reported to the VA;
- 1 Major incident/impact - Any mishap that leads to fatalities, hospitalizations, amputations, and losses of an eye as a result of contractors' activities. Or any incident which leads to major property damage (greater than \$20,000) and/or may generate publicity or high visibility. These incidents must be investigated and are required to be reported to the VA as soon as practical, but not later than 2 hours after the incident.
- G. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.

1.3 REGULATORY REQUIREMENTS

- A. In addition to the detailed requirements included in the provisions of this contract, comply with 29 CFR 1926, comply with 29 CFR 1910 as incorporated by reference within 29 CFR 1926, comply with ASSE A10.34, and all applicable [federal, state, and local] laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of

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standards for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern except with specific approval and acceptance by the Contracting Officer Representative (COR).

1.4 ACCIDENT PREVENTION PLAN (APP)

- A. The APP (aka Construction Safety & Health Plan) shall interface with the Contractor's overall safety and health program. Include any portions of the Contractor's overall safety and health program referenced in the APP in the applicable APP element and ensure it is site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all worksite safety and health of each subcontractor(s). Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out.
- B. The APP shall be prepared as follows:
 1. Written in English by a qualified person who is employed by the Prime Contractor articulating the specific work and hazards pertaining to the contract (model language can be found in ASSE A10.33). Specifically articulating the safety requirements found within these VA contract safety specifications.
 2. Address both the Prime Contractors and the subcontractors work operations.
 3. State measures to be taken to control hazards associated with materials, services, or equipment provided by suppliers.
 4. Address all the elements/sub-elements and in order as follows:
 - a. **SIGNATURE SHEET.** Title, signature, and phone number of the following:
 - 1) Plan preparer (Qualified Person such as corporate safety staff person or contracted Certified Safety Professional with construction safety experience);

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- 2) Plan approver (company/corporate officers authorized to obligate the company);
 - 3) Plan concurrence (e.g., Chief of Operations, Corporate Chief of Safety, Corporate Industrial Hygienist, project manager or superintendent, project safety professional). Provide concurrence of other applicable corporate and project personnel (Contractor).
- b. **BACKGROUND INFORMATION.** List the following:
- 1) Contractor;
 - 2) Contract number;
 - 3) Project name;
 - 4) Brief project description, description of work to be performed, and location; phases of work anticipated (these will require an AHA).
- c. **STATEMENT OF SAFETY AND HEALTH POLICY.** Provide a copy of current corporate/company Safety and Health Policy Statement, detailing commitment to providing a safe and healthful workplace for all employees. The Contractor's written safety program goals, objectives, and accident experience goals for this contract should be provided.
- d. **RESPONSIBILITIES AND LINES OF AUTHORITIES.** Provide the following:
- 1) A statement of the employer's ultimate responsibility for the implementation of his SOH program;
 - 2) Identification and accountability of personnel responsible for safety at both corporate and project level. Contracts specifically requiring safety or industrial hygiene personnel shall include a copy of their resumes.
 - 3) The names of Competent and/or Qualified Person(s) and proof of competency/qualification to meet specific OSHA Competent/Qualified Person(s) requirements must be attached.;
 - 4) Requirements that no work shall be performed unless a designated competent person is present on the job site;
 - 5) Requirements for pre-task Activity Hazard Analysis (AHAs);
 - 6) Lines of authority;

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- 7) Policies and procedures regarding noncompliance with safety requirements (to include disciplinary actions for violation of safety requirements) should be identified;
- e. SUBCONTRACTORS AND SUPPLIERS.** If applicable, provide procedures for coordinating SOH activities with other employers on the job site:
- 1) Identification of subcontractors and suppliers (if known);
 - 2) Safety responsibilities of subcontractors and suppliers.
- f. TRAINING.**
- 1) Site-specific SOH orientation training at the time of initial hire or assignment to the project for every employee before working on the project site is required.
 - 2) Mandatory training and certifications that are applicable to this project (e.g., explosive actuated tools, crane operator, rigger, crane signal person, fall protection, electrical lockout/NFPA 70E, machine/equipment lockout, confined space, etc...) and any requirements for periodic retraining/recertification are required.
 - 3) Procedures for ongoing safety and health training for supervisors and employees shall be established to address changes in site hazards/conditions.
 - 4) OSHA 10-hour training is required for all workers on site and the OSHA 30-hour training is required for Trade Competent Persons (CPs)
- g. SAFETY AND HEALTH INSPECTIONS.**
- 1) Specific assignment of responsibilities for a minimum daily job site safety and health inspection during periods of work activity: Who will conduct (e.g., "Site Safety and Health CP"), proof of inspector's training/qualifications, when inspections will be conducted, procedures for documentation, deficiency tracking system, and follow-up procedures.
 - 2) Any external inspections/certifications that may be required (e.g., contracted CSP or CSHT)
- h. ACCIDENT/INCIDENT INVESTIGATION & REPORTING.** The Contractor shall conduct mishap investigations of all Moderate and Major as well

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as all High Visibility Incidents. The APP shall include accident/incident investigation procedure and identify person(s) responsible to provide the following to the COR:

- 1) Exposure data (man-hours worked);
- 2) Accident investigation reports;
- 3) Project site injury and illness logs.

i. PLANS (PROGRAMS, PROCEDURES) REQUIRED. Based on a risk assessment of contracted activities and on mandatory OSHA compliance programs, the Contractor shall address all applicable occupational, patient, and public safety risks in site-specific compliance and accident prevention plans. These Plans shall include but are not be limited to procedures for addressing the risks associates with the following:

- 1) Emergency response;
- 2) Contingency for severe weather;
- 3) Fire Prevention;
- 4) Medical Support;
- 5) Posting of emergency telephone numbers;
- 6) Prevention of alcohol and drug abuse;
- 7) Site sanitation (housekeeping, drinking water, toilets);
- 8) Night operations and lighting;
- 9) Hazard communication program;
- 10) Welding/Cutting "Hot" work;
- 11) Electrical Safe Work Practices (Electrical LOTO/NFPA 70E);
- 12) General Electrical Safety;
- 13) Hazardous energy control (Machine LOTO);
- 14) Site-Specific Fall Protection & Prevention;
- 15) Excavation/trenching;
- 16) Asbestos abatement;
- 17) Lead abatement;
- 18) Crane Critical lift;
- 19) Respiratory protection;
- 20) Health hazard control program;
- 21) Radiation Safety Program;
- 22) Abrasive blasting;

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- 23) Heat/Cold Stress Monitoring;
 - 24) Crystalline Silica Monitoring (Assessment);
 - 25) Demolition plan (to include engineering survey);
 - 26) Formwork and shoring erection and removal;
 - 27) PreCast Concrete;
 - 28) Public (Mandatory compliance with ANSI/ASSE A10.34-2012).
- C. Submit the APP to the COR for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.
- D. Once accepted by the COR, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer in accordance with FAR Clause 52.236-13, *Accident Prevention*, until the matter has been rectified.
- E. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the COR. Should any severe hazard exposure, i.e. imminent danger, become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate/remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public and the environment.

1.5 ACTIVITY HAZARD ANALYSES (AHAS)

- A. AHAs are also known as Job Hazard Analyses, Job Safety Analyses, and Activity Safety Analyses. Before beginning each work activity involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or sub-contractor is to perform the work, the Contractor(s) performing that work activity shall prepare an AHA (Example electronic AHA forms can be found on the US Army Corps of Engineers web site)
- B. AHAs shall define the activities being performed and identify the work sequences, the specific anticipated hazards, site conditions,

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equipment, materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk.

- C. Work shall not begin until the AHA for the work activity has been accepted by the COR and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.
1. The names of the Competent/Qualified Person(s) required for a particular activity (for example, excavations, scaffolding, fall protection, other activities as specified by OSHA and/or other State and Local agencies) shall be identified and included in the AHA. Certification of their competency/qualification shall be submitted to the Government Designated Authority (GDA) for acceptance prior to the start of that work activity.
 2. The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or change of competent/qualified person(s).
 - a. If more than one Competent/Qualified Person is used on the AHA activity, a list of names shall be submitted as an attachment to the AHA. Those listed must be Competent/Qualified for the type of work involved in the AHA and familiar with current site safety issues.
 - b. If a new Competent/Qualified Person (not on the original list) is added, the list shall be updated (an administrative action not requiring an updated AHA). The new person shall acknowledge in writing that he or she has reviewed the AHA and is familiar with current site safety issues.
 3. Submit AHAs to the COR for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for review at least 15 calendar days prior to the start of each phase. Subsequent AHAs as shall be formatted as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.

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4. The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.
5. Develop the activity hazard analyses using the project schedule as the basis for the activities performed. All activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier, or subcontractor and provided to the prime contractor for review and approval and then submitted to the COR.

1.6 PRECONSTRUCTION CONFERENCE

- A. Contractor representatives who have a responsibility or significant role in implementation of the accident prevention program, as required by 29 CFR 1926.20(b)(1), on the project shall attend the preconstruction conference to gain a mutual understanding of its implementation. This includes the project superintendent, subcontractor superintendents, and any other assigned safety and health professionals.
- B. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, review, and acceptance of AHAs to preclude project delays.
- C. Deficiencies in the submitted APP will be brought to the attention of the Contractor within 14 days of submittal, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Do not begin work until there is an accepted APP.

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1.7 "SITE SAFETY AND HEALTH OFFICER" (SSHO) AND "COMPETENT PERSON" (CP)

- A. The Prime Contractor shall designate a minimum of one SSHO at each project site that will be identified as the SSHO to administer the Contractor's safety program and government-accepted Accident Prevention Plan. Each subcontractor shall designate a minimum of one CP in compliance with 29 CFR 1926.20 (b) (2) that will be identified as a CP to administer their individual safety programs.
- B. Further, all specialized Competent Persons for the work crews will be supplied by the respective contractor as required by 29 CFR 1926 (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations).
- C. These Competent Persons can have collateral duties as the subcontractor's superintendent and/or work crew lead persons as well as fill more than one specialized CP role (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations). However, the SSHO has be a separate qualified individual from the Prime Contractor's Superintendent and/or Quality Control Manager with duties only as the SSHO.
- D. The SSHO or an equally-qualified Designated Representative/alternate will maintain a presence on the site during construction operations in accordance with FAR Clause 52.236-6: *Superintendence by the Contractor*. CPs will maintain presence during their construction activities in accordance with above mentioned clause. A listing of the designated SSHO and all known CPs shall be submitted prior to the start of work as part of the APP with the training documentation and/or AHA as listed in Section 1.8 below.
- E. The repeated presence of uncontrolled hazards during a contractor's work operations will result in the designated CP as being deemed incompetent and result in the required removal of the employee in accordance with FAR Clause 52.236-5: *Material and Workmanship*, Paragraph (c).

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1.8 TRAINING

- A. The designated Prime Contractor SSHO must meet the requirements of all applicable OSHA standards and be capable (through training, experience, and qualifications) of ensuring that the requirements of 29 CFR 1926.16 and other appropriate Federal, State and local requirements are met for the project. As a minimum the SSHO must have completed the OSHA 30-hour Construction Safety class and have five (5) years of construction industry safety experience or three (3) years if he/she possesses a Certified Safety Professional (CSP) or certified Construction Safety and Health Technician (CSHT) certification or have a safety and health degree from an accredited university or college.
- B. All designated CPs shall have completed the OSHA 30-hour Construction Safety course within the past 5 years.
- C. In addition to the OSHA 30 Hour Construction Safety Course, all CPs with high hazard work operations such as operations involving asbestos, electrical, cranes, demolition, work at heights/fall protection, fire safety/life safety, ladder, rigging, scaffolds, and trenches/excavations shall have a specialized formal course in the hazard recognition & control associated with those high hazard work operations. Documented "repeat" deficiencies in the execution of safety requirements will require retaking the requisite formal course.
- D. All other construction workers shall have the OSHA 10-hour Construction Safety Outreach course and any necessary safety training to be able to identify hazards within their work environment.
- E. Submit training records associated with the above training requirements to the COR for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES 15 calendar days prior to the date of the preconstruction conference for acceptance.
- F. Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the SSHO or his/her designated representative. As a minimum, this briefing shall include information on the site-specific hazards, construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, emergency procedures,

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accident reporting etc... Documentation shall be provided to the COR that individuals have undergone contractor's safety briefing.

- G. Ongoing safety training will be accomplished in the form of weekly documented safety meeting.

1.9 INSPECTIONS

- A. The SSHO shall conduct frequent and regular safety inspections (daily) of the site and each of the subcontractors CPs shall conduct frequent and regular safety inspections (daily) of the work operations as required by 29 CFR 1926.20(b)(2). Each week, the SSHO shall conduct a formal documented inspection of the entire construction areas with the subcontractors' "Trade Safety and Health CPs" present in their work areas. Coordinate with, and report findings and corrective actions weekly to COR.
- B. A Certified Safety Professional (CSP) with specialized knowledge in construction safety or a certified Construction Safety and Health Technician (CSHT) shall randomly conduct a monthly site safety inspection. The CSP or CSHT can be a corporate safety professional or independently contracted. The CSP or CSHT will provide their certificate number on the required report for verification as necessary.
1. Results of the inspection will be documented with tracking of the identified hazards to abatement.
 2. The COR will be notified immediately prior to start of the inspection and invited to accompany the inspection.
 3. Identified hazard and controls will be discussed to come to a mutual understanding to ensure abatement and prevent future reoccurrence.
 4. A report of the inspection findings with status of abatement will be provided to the COR within one week of the onsite inspection.

1.10 ACCIDENTS, OSHA 300 LOGS, AND MAN-HOURS

- A. The prime contractor shall establish and maintain an accident reporting, recordkeeping, and analysis system to track and analyze all injuries and illnesses, high visibility incidents, and accidental property damage (both government and contractor) that occur on site. Notify the COR as soon as practical, but no more than four hours after any accident meeting the definition of a Moderate or Major incidents,

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High Visibility Incidents, or any weight handling and hoisting equipment accident. Within notification include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the COR determines whether a government investigation will be conducted.

- B. Conduct an accident investigation for all Minor, Moderate and Major incidents as defined in paragraph DEFINITIONS, and property damage accidents resulting in at least \$20,000 in damages, to establish the root cause(s) of the accident. Complete the VA Form 2162 (or equivalent) , and provide the report to the COR within 5 calendar days of the accident. The COR will provide copies of any required or special forms.
- C. A summation of all man-hours worked by the contractor and associated sub-contractors for each month will be reported to the COR monthly.
- D. A summation of all Minor, Moderate, and Major incidents experienced on site by the contractor and associated sub-contractors for each month will be provided to the COR monthly. The contractor and associated sub-contractors' OSHA 300 logs will be made available to the COR as requested.

1.11 PERSONAL PROTECTIVE EQUIPMENT (PPE)

- A. PPE is governed in all areas by the nature of the work the employee is performing. For example, specific PPE required for performing work on electrical equipment is identified in NFPA 70E, Standard for Electrical Safety in the Workplace.
- B. Mandatory PPE includes:
 - 1. Hard Hats - unless written authorization is given by the COR in circumstances of work operations that have limited potential for falling object hazards such as during finishing work or minor remodeling. With authorization to relax the requirement of hard hats, if a worker becomes exposed to an overhead falling object

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- hazard, then hard hats would be required in accordance with the OSHA regulations.
2. Safety glasses - unless written authorization is given by the COR in circumstances of no eye hazards, appropriate safety glasses meeting the ANSI Z.87.1 standard must be worn by each person on site.
 3. Appropriate Safety Shoes - based on the hazards present, safety shoes meeting the requirements of ASTM F2413-11 shall be worn by each person on site unless written authorization is given by the COR in circumstances of no foot hazards.
 4. Hearing protection - Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks.

1.12 INFECTION CONTROL

- A. Infection Control is critical in all medical center facilities. Interior construction activities causing disturbance of existing dust, or creating new dust, must be conducted within ventilation-controlled areas that minimize the flow of airborne particles into patient areas. Exterior construction activities causing disturbance of soil or creates dust in some other manner must be controlled.
- B. An AHA associated with infection control will be performed by VA personnel in accordance with FGI Guidelines (i.e., Infection Control Risk Assessment (ICRA)). The ICRA procedure found on the American Society for Healthcare Engineering (ASHE) website will be utilized. Risk classifications of Class II or lower will require approval by the COR before beginning any construction work. Risk classifications of Class III or higher will require a permit before beginning any construction work. Infection Control permits will be issued by the COR. The Infection Control Permits will be posted outside the appropriate construction area. More than one permit may be issued for a construction project if the work is located in separate areas requiring separate classes. The primary project scope area for this project is: **Class IV**, however, work outside the primary project scope area may vary. The required infection control precautions with each class are as follows:
 1. Class I requirements:

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- a. During Construction Work:
 - 1) Notify the COR.
 - 2) Execute work by methods to minimize raising dust from construction operations.
 - 3) Ceiling tiles: Immediately replace a ceiling tiles displaced for visual inspection.
 - b. Upon Completion:
 - 1) Clean work area upon completion of task
 - 2) Notify the COR.
2. Class II requirements:
- a. During Construction Work:
 - 1) Notify the COR.
 - 2) Provide active means to prevent airborne dust from dispersing into atmosphere such as wet methods or tool mounted dust collectors where possible.
 - 3) Water mist work surfaces to control dust while cutting.
 - 4) Seal unused doors with duct tape.
 - 5) Block off and seal air vents.
 - 6) Remove or isolate HVAC system in areas where work is being performed.
 - b. Upon Completion:
 - 1) Wipe work surfaces with cleaner/disinfectant.
 - 2) Contain construction waste before transport in tightly covered containers.
 - 3) Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area.
 - 4) Upon completion, restore HVAC system where work was performed
 - 5) Notify the COR.
3. Class III requirements:
- a. During Construction Work:
 - 1) Obtain permit from the COR.
 - 2) Remove or Isolate HVAC system in area where work is being done to prevent contamination of duct system.
 - 3) Complete all critical barriers i.e. sheetrock, plywood, plastic, to seal area from non-work area or implement control

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cube method (cart with plastic covering and sealed connection to work site with HEPA vacuum for vacuuming prior to exit) before construction begins. Install construction barriers and ceiling protection carefully, outside of normal work hours.

- 4) Maintain negative air pressure, 0.01 inches of water gauge, within work site utilizing HEPA equipped air filtration units and continuously monitored with a digital display, recording and alarm instrument, which must be calibrated on installation, maintained with periodic calibration and monitored by the contractor.
- 5) Contain construction waste before transport in tightly covered containers.
- 6) Cover transport receptacles or carts. Tape covering unless solid lid.

b. Upon Completion:

- 1) Do not remove barriers from work area until completed project is inspected by the COR and thoroughly cleaned by the VA Environmental Services Department.
- 2) Remove construction barriers and ceiling protection carefully to minimize spreading of dirt and debris associated with construction, outside of normal work hours.
- 3) Vacuum work area with HEPA filtered vacuums.
- 4) Wet mop area with cleaner/disinfectant.
- 5) Upon completion, restore HVAC system where work was performed.
- 6) Return permit to the COR.

4. Class IV requirements:

a. During Construction Work:

- 1) Obtain permit from the COR.
- 2) Isolate HVAC system in area where work is being done to prevent contamination of duct system.
- 3) Complete all critical barriers i.e., sheetrock, plywood, plastic, to seal area from non-work area or implement control cube method (cart with plastic covering and sealed connection to work site with HEPA vacuum for vacuuming prior to exit)

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before construction begins. Install construction barriers and ceiling protection carefully, outside of normal work hours.

- 4) Maintain negative air pressure, 0.01 inches of water gauge, within work site utilizing HEPA equipped air filtration units and continuously monitored with a digital display, recording and alarm instrument, which must be calibrated on installation, maintained with periodic calibration and monitored by the contractor.
- 5) Seal holes, pipes, conduits, and punctures.
- 6) Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA vacuum cleaner before leaving work site or they can wear cloth or paper coveralls that are removed each time they leave work site.
- 7) All personnel entering work site are required to wear shoe covers. Shoe covers must be changed each time the worker exits the work area.

b. Upon Completion:

- 1) Do not remove barriers from work area until completed project is inspected by the COR with thorough cleaning by the VA Environmental Services Dept.
- 2) Remove construction barriers and ceiling protection carefully to minimize spreading of dirt and debris associated with construction, outside of normal work hours.
- 3) Contain construction waste before transport in tightly covered containers.
- 4) Cover transport receptacles or carts. Tape covering unless solid lid.
- 5) Vacuum work area with HEPA filtered vacuums.
- 6) Wet mop area with cleaner/disinfectant.
- 7) Upon completion, restore HVAC system where work was performed.
- 8) Return permit to the COR.

C. Barriers shall be erected as required based upon classification (Class III & IV requires barriers) and shall be constructed as follows:

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1. Class III and IV - closed door with masking tape applied over the frame and door is acceptable for projects that can be contained in a single room.
 2. Construction, demolition or reconstruction not capable of containment within a single room must have the following barriers erected and made presentable on hospital occupied side:
 - a. Class III & IV (where dust control is the only hazard, and an agreement is reached with the COR and Medical Center) - Airtight plastic barrier that extends from the floor to ceiling. Seams must be sealed with duct tape to prevent dust and debris from escaping
 - b. Class III & IV - Drywall barrier erected with joints covered or sealed to prevent dust and debris from escaping.
 - c. Class III & IV - Seal all penetrations in existing barrier airtight
 - d. Class III & IV - Barriers at penetration of ceiling envelopes, chases and ceiling spaces to stop movement air and debris
 - e. Class IV only - Anteroom or double entrance openings that allow workers to remove protective clothing or vacuum off existing clothing
 - f. Class III & IV - At elevators shafts or stairways within the field of construction, overlapping flap minimum of two feet wide of polyethylene enclosures for personnel access.
- D. Products and Materials:
1. Sheet Plastic: Fire retardant polystyrene, 6-mil thickness meeting local fire codes
 2. Barrier Doors: Self Closing One-hour fire-rated solid core wood in steel frame, painted
 3. Dust proof one-hour fire-rated drywall
 4. High Efficiency Particulate Air-Equipped filtration machine rated at 95% capture of 0.3 microns including pollen, mold spores and dust particles. HEPA filters should have ASHRAE 85 or other prefilter to extend the useful life of the HEPA. Provide both primary and secondary filtrations units. Maintenance of equipment and

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- replacement of the HEPA filters and other filters will be in accordance with manufacturer's instructions.
5. Exhaust Hoses: Heavy duty, flexible steel reinforced; Ventilation Blower Hose
 6. Adhesive Walk-off Mats: Provide minimum size mats of 24 inches x 36 inches
 7. Disinfectant: Hospital-approved disinfectant or equivalent product
 8. Portable Ceiling Access Module
- E. Before any construction on site begins, all contractor personnel involved in the construction or renovation activity shall be educated and trained in infection prevention measures established by the medical center.
- F. A dust control program will be established and maintained as part of the contractor's infection preventive measures in accordance with the FGI Guidelines for Design and Construction of Healthcare Facilities. Prior to start of work, prepare a plan detailing project-specific dust protection measures with associated product data, including periodic status reports, and submit to the COR for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- G. Medical center Infection Control personnel will monitor for airborne disease (e.g., aspergillosis) during construction. A baseline of conditions will be established by the medical center prior to the start of work and periodically during the construction stage to determine impact of construction activities on indoor air quality with safe thresholds established.
- H. In general, the following preventive measures shall be adopted during construction to keep down dust and prevent mold.
1. Contractor shall verify that construction exhaust to exterior is not reintroduced to the medical center through intake vents or building openings. HEPA filtration is required where the exhaust dust may reenter the medical center.
 2. Exhaust hoses shall be exhausted so that dust is not reintroduced to the medical center.

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3. Adhesive Walk-off/Carpet Walk-off Mats shall be used at all interior transitions from the construction area to occupied medical center area. These mats shall be changed as often as required to maintain clean work areas directly outside construction area at all times.
4. Vacuum and wet mop all transition areas from construction to the occupied medical center at the end of each workday. Vacuum shall utilize HEPA filtration. Maintain surrounding area frequently. Remove debris as it is created. Transport these outside the construction area in containers with tightly fitting lids.
5. The contractor shall not haul debris through patient-care areas without prior approval of the COR and the Medical Center. When, approved, debris shall be hauled in enclosed dust proof containers or wrapped in plastic and sealed with duct tape. No sharp objects should be allowed to cut through the plastic. Wipe down the exterior of the containers with a damp rag to remove dust. All equipment, tools, material, etc. transported through occupied areas shall be made free from dust and moisture by vacuuming and wipe down.
6. There shall be no standing water during construction. This includes water in equipment drip pans and open containers within the construction areas. All accidental spills must be cleaned up and dried within 12 hours. Remove and dispose of porous materials that remain damp for more than 72 hours.
7. At completion, remove construction barriers and ceiling protection carefully, outside of normal work hours. Vacuum and clean all surfaces free of dust after the removal.

I. Final Cleanup:

1. Upon completion of project, or as work progresses, remove all construction debris from above ceiling, vertical shafts and utility chases that have been part of the construction.
2. Perform HEPA vacuum cleaning of all surfaces in the construction area. This includes walls, ceilings, cabinets, furniture (built-in or free standing), partitions, flooring, etc.
3. All new air ducts shall be cleaned prior to final inspection.

J. Exterior Construction

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1. Contractor shall verify that dust will not be introduced into the medical center through intake vents or building openings. HEPA filtration on intake vents is required where dust may be introduced.
2. Dust created from disturbance of soil such as from vehicle movement will be wetted with use of a water truck as necessary
3. All cutting, drilling, grinding, sanding, or disturbance of materials shall be accomplished with tools equipped with either local exhaust ventilation (i.e., vacuum systems) or wet suppression controls.

1.13 TUBERCULOSIS SCREENING

- A. Contractor shall provide written certification that all contract employees assigned to the work site have had a pre-placement tuberculin screening within 90 days prior to assignment to the worksite and been found have negative TB screening reactions. Contractors shall be required to show documentation of negative TB screening reactions for any additional workers who are added after the 90-day requirement before they will be allowed to work on the work site. NOTE: This can be the Center for Disease Control (CDC) and Prevention and two-step skin testing or a Food and Drug Administration (FDA)-approved blood test.
 1. Contract employees manifesting positive screening reactions to the tuberculin shall be examined according to current CDC guidelines prior to working on VHA property.
 2. Subsequently, if the employee is found without evidence of active (infectious) pulmonary TB, a statement documenting examination by a physician shall be on file with the employer (construction contractor), noting that the employee with a positive tuberculin screening test is without evidence of active (infectious) pulmonary TB.
 3. If the employee is found with evidence of active (infectious) pulmonary TB, the employee shall require treatment with a subsequent statement to the fact on file with the employer before being allowed to return to work on VHA property.

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1.14 FIRE SAFETY

- A. Fire Safety Plan: Establish and maintain a site-specific fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submit to the COR for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. This plan may be an element of the Accident Prevention Plan.
- B. Site and Building Access: Maintain free and unobstructed access to facility emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.
- C. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposing overall length, separate by 3m (10 feet).
- D. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.
- E. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with the COR.
- F. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to the COR.
- G. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.
- H. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.
- I. Standpipes: Install and extend standpipes up with each floor in accordance with 29 CFR 1926 and NFPA 241. Do not charge wet standpipes subject to freezing until weather protected.
- J. Existing Fire Protection: Do not impair automatic sprinklers, smoke and heat detection, and fire alarm systems, except for portions immediately under construction, and temporarily for connections. Provide fire watch for impairments more than 4 hours in a 24-hour period. Request

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interruptions in accordance with Article, OPERATIONS AND STORAGE AREAS, and coordinate with the COR. All existing or temporary fire protection systems (fire alarms, sprinklers) located in construction areas shall be tested as coordinated with the medical center. Parameters for the testing and results of any tests performed shall be recorded by the medical center and copies provided to the COR.

- K. Smoke Detectors: Prevent accidental operation. Remove temporary covers at end of work operations each day. Coordinate with the COR.
- L. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with the COR. Obtain permits from the COR at least 48 hours in advance. Designate contractor's responsible project-site fire prevention program manager to permit hot work.
- M. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to the COR.
- N. Smoking: Smoking is prohibited in and adjacent to construction areas inside existing buildings and additions under construction. In separate and detached buildings under construction, smoking is prohibited except in designated smoking rest areas.
- O. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily.

1.15 ELECTRICAL

- A. All electrical work shall comply with NFPA 70 (NEC), NFPA 70B, NFPA 70E, 29 CFR Part 1910 Subpart J - General Environmental Controls, 29 CFR Part 1910 Subpart S - Electrical, and 29 CFR 1926 Subpart K in addition to other references required by contract.
- B. All qualified persons performing electrical work under this contract shall be licensed journeyman or master electricians. All apprentice electricians performing under this contract shall be deemed unqualified persons unless they are working under the immediate supervision of a licensed electrician or master electrician.
- C. All electrical work will be accomplished de-energized and in the Electrically Safe Work Condition (refer to NFPA 70E for Work Involving Electrical Hazards, including Exemptions to Work Permit). Any Contractor, subcontractor or temporary worker who fails to fully comply

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with this requirement is subject to immediate termination in accordance with FAR clause 52.236-5(c). Only in rare circumstance where achieving an electrically safe work condition prior to beginning work would increase or cause additional hazards or is infeasible due to equipment design or operational limitations is energized work permitted. The COR with approval of the Medical Center Director will make the determination if the circumstances would meet the exception outlined above. An AHA and permit specific to energized work activities will be developed, reviewed, and accepted by the VA prior to the start of that activity.

1. Development of a Hazardous Electrical Energy Control Procedure is required prior to de-energization. A single Simple Lockout/Tagout Procedure for multiple work operations can only be used for work involving qualified person(s) de-energizing one set of conductors or circuit part source. Task specific Complex Lockout/Tagout Procedures are required at all other times.
 2. Verification of the absence of voltage after de-energization and lockout/tagout is considered "energized electrical work" (live work) under NFPA 70E, and shall only be performed by qualified persons wearing appropriate shock protective (voltage rated) gloves and arc rate personal protective clothing and equipment, using Underwriters Laboratories (UL) tested and appropriately rated contact electrical testing instruments or equipment appropriate for the environment in which they will be used.
 3. Personal Protective Equipment (PPE) and electrical testing instruments will be readily available for inspection by the the COR.
- D. Before beginning any electrical work, an Activity Hazard Analysis (AHA) will be conducted to include Shock Hazard and Arc Flash Hazard analyses (NFPA Tables can be used only as a last alternative and it is strongly suggested a full Arc Flash Hazard Analyses be conducted). Work shall not begin until the AHA for the work activity and permit for energized work has been reviewed and accepted by the COR and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.

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E. Ground-fault circuit interrupters. GFCI protection shall be provided where an employee is operating or using cord- and plug-connected tools related to construction activity supplied by 125-volt, 15-, 20-, or 30-ampere circuits. Where employees operate or use equipment supplied by greater than 125-volt, 15-, 20-, or 30- ampere circuits, GFCI protection or an assured equipment grounding conductor program shall be implemented in accordance with NFPA 70E - 2015, Chapter 1, Article 110.4(C) (2)..

1.16 FALL PROTECTION

- A. The fall protection (FP) threshold height requirement is 6 ft (1.8 m) for ALL WORK, unless specified differently or the OSHA 29 CFR 1926 requirements are more stringent, to include steel erection activities, systems-engineered activities (prefabricated) metal buildings, residential (wood) construction and scaffolding work.
1. The use of a Safety Monitoring System (SMS) as a fall protection method is prohibited.
 2. The use of Controlled Access Zone (CAZ) as a fall protection method is prohibited.
 3. A Warning Line System (WLS) may ONLY be used on floors or flat or low-sloped roofs (between 0 - 18.4 degrees or 4:12 slope) and shall be erected around all sides of the work area (See 29 CFR 1926.502(f) for construction of WLS requirements). Working within the WLS does not require FP. No worker shall be allowed in the area between the roof or floor edge and the WLS without FP. FP is required when working outside the WLS.
 4. Fall protection while using a ladder will be governed by the OSHA requirements.

1.17 SCAFFOLDS AND OTHER WORK PLATFORMS

- A. All scaffolds and other work platforms construction activities shall comply with 29 CFR 1926 Subpart L.
- B. The fall protection (FP) threshold height requirement is 6 ft (1.8 m) as stated in Section 1.16.
- C. The following hierarchy and prohibitions shall be followed in selecting appropriate work platforms.

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1. Scaffolds, platforms, or temporary floors shall be provided for all work except that can be performed safely from the ground or similar footing.
 2. Ladders less than 20 feet may be used as work platforms only when use of small hand tools or handling of light material is involved.
 3. Ladder jacks, lean-to, and prop-scaffolds are prohibited.
 4. Emergency descent devices shall not be used as working platforms.
- D. Contractors shall use a scaffold tagging system in which all scaffolds are tagged by the Competent Person. Tags shall be color-coded: green indicates the scaffold has been inspected and is safe to use; red indicates the scaffold is unsafe to use. Tags shall be readily visible, made of materials that will withstand the environment in which they are used, be legible and shall include:
1. The Competent Person's name and signature;
 2. Dates of initial and last inspections.
- E. Mast Climbing work platforms: When access ladders, including masts designed as ladders, exceed 20 ft (6 m) in height, positive fall protection shall be used.

1.18 EXCAVATION AND TRENCHES

- A. All excavation and trenching work shall comply with 29 CFR 1926 Subpart P. Excavations less than 5 feet in depth require evaluation by the contractor's "Competent Person" (CP) for determination of the necessity of an excavation protective system where kneeling, laying in, or stooping within the excavation is required.
- B. All excavations and trenches 24 inches in depth or greater shall require a written trenching and excavation permit (NOTE - some States and other local jurisdictions require separate state/jurisdiction-issued excavation permits). The permit shall have two sections, one section will be completed prior to digging or drilling and the other will be completed prior to personnel entering the excavations greater than 5 feet in depth. Each section of the permit shall be provided to the COR prior to proceeding with digging or drilling and prior to proceeding with entering the excavation. After completion of the work and prior to opening a new section of an excavation, the permit shall

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be closed out and provided to the COR. The permit shall be maintained onsite and the first section of the permit shall include the following:

1. Estimated start time & stop time.
 2. Specific location and nature of the work.
 2. Indication of the contractor's "Competent Person" (CP) in excavation safety with qualifications and signature. Formal course in excavation safety is required by the contractor's CP.
 3. Indication of whether soil or concrete removal to an offsite location is necessary.
 4. Indication of whether soil samples are required to determined soil contamination.
 5. Indication of coordination with local authority (i.e. "One Call") or contractor's effort to determine utility location with search and survey equipment.
 6. Indication of review of site drawings for proximity of utilities to digging/drilling.
- C. The second section of the permit for excavations greater than five feet in depth shall include the following:
1. Determination of OSHA classification of soil. Soil samples will be from freshly dug soil with samples taken from different soil type layers as necessary and placed at a safe distance from the excavation by the excavating equipment. A pocket penetrometer will be utilized in determination of the unconfined compression strength of the soil for comparison against OSHA table (Less than 0.5 Tons/FT² - Type C, 0.5 Tons/FT² to 1.5 Tons/FT² - Type B, greater than 1.5 Tons/FT² - Type A without condition to reduce to Type B).
 2. Indication of selected protective system (sloping/benching, shoring, shielding). When soil classification is identified as "Type A" or "Solid Rock", only shoring or shielding or Professional Engineer designed systems can be used for protection. A Sloping/Benching system may only be used when classifying the soil as Type B or Type C. Refer to Appendix B of 29 CFR 1926, Subpart P for further information on protective systems designs.

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3. Indication of the spoil pile being stored at least 2 feet from the edge of the excavation and safe access being provided within 25 feet of the workers.
 4. Indication of assessment for a potential toxic, explosive, or oxygen deficient atmosphere where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist. Internal combustion engine equipment is not allowed in an excavation without providing force air ventilation to lower the concentration to below OSHA PELs, providing sufficient oxygen levels, and atmospheric testing as necessary to ensure safe levels are maintained.
- D. As required by OSHA 29 CFR 1926.651(b) (1), the estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation.
1. The planned dig site will be outlined/marked in white prior to locating the utilities.
 2. Used of the American Public Works Association Uniform Color Code is required for the marking of the proposed excavation and located utilities.
 3. 811 will be called two business days before digging on all local or State lands and public Right-of Ways.
 4. Digging will not commence until all known utilities are marked.
 5. Utility markings will be maintained
- E. Excavations will be hand dug or excavated by other similar safe and acceptable means as excavation operations approach within 3 to 5 feet of identified underground utilities. Exploratory bar or other detection equipment will be utilized as necessary to further identify the location of underground utilities.
- F. Excavations greater than 20 feet in depth require a Professional Engineer designed excavation protective system.

1.19 CRANES

- A. All crane work shall comply with 29 CFR 1926 Subpart CC.

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- B. Prior to operating a crane, the operator must be licensed, qualified or certified to operate the crane. Thus, all the provisions contained with Subpart CC are effective and there is no "Phase In" date.
- C. A detailed lift plan for all lifts shall be submitted to the COR 14 days prior to the scheduled lift complete with route for truck carrying load, crane load analysis, siting of crane and path of swing and all other elements of a critical lift plan where the lift meets the definition of a critical lift. Critical lifts require a more comprehensive lift plan to minimize the potential of crane failure and/or catastrophic loss. The plan must be reviewed and accepted by the General Contractor before being submitted to the VA for review. The lift will not be allowed to proceed without prior acceptance of this document.
- D. Crane operators shall not carry loads
 - 1. over the general public or VAMC personnel
 - 2. over any occupied building unless
 - a. the top two floors are vacated
 - b. or overhead protection with a design live load of 300 psf is provided

1.20 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

- A. All installation, maintenance, and servicing of equipment or machinery shall comply with 29 CFR 1910.147 except for specifically referenced operations in 29 CFR 1926 such as concrete & masonry equipment [1926.702(j)], heavy machinery & equipment [1926.600(a)(3)(i)], and process safety management of highly hazardous chemicals (1926.64). Control of hazardous electrical energy during the installation, maintenance, or servicing of electrical equipment shall comply with Section 1.15 to include NFPA 70E and other VA specific requirements discussed in the section.

1.21 CONFINED SPACE ENTRY

- A. All confined space entry shall comply with 29 CFR 1926, Subpart AA except for specifically referenced operations in 29 CFR 1926 such as excavations/trenches [1926.651(g)].
- B. A site-specific Confined Space Entry Plan (including permitting process) shall be developed and submitted to the COR.

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1.22 WELDING AND CUTTING

- A. As specified in section 1.14, Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with the COR. Obtain permits from the COR at least 48 hours in advance. Designate contractor's responsible project-site fire prevention program manager to permit hot work.

1.23 LADDERS

- A. All Ladder use shall comply with 29 CFR 1926 Subpart X.
- B. All portable ladders shall be of sufficient length and shall be placed so that workers will not stretch or assume a hazardous position.
- C. Manufacturer safety labels shall be in place on ladders
- D. Step Ladders shall not be used in the closed position
- E. Top steps or cap of step ladders shall not be used as a step
- F. Portable ladders, used as temporary access, shall extend at least 3 ft (0.9 m) above the upper landing surface.
 - 1. When a 3 ft (0.9-m) extension is not possible, a grasping device (such as a grab rail) shall be provided to assist workers in mounting and dismounting the ladder.
 - 2. In no case shall the length of the ladder be such that ladder deflection under a load would, by itself, cause the ladder to slip from its support.
- G. Ladders shall be inspected for visible defects on a daily basis and after any occurrence that could affect their safe use. Broken or damaged ladders shall be immediately tagged "DO NOT USE," or with similar wording, and withdrawn from service until restored to a condition meeting their original design.

1.24 FLOOR & WALL OPENINGS

- A. All floor and wall openings shall comply with 29 CFR 1926 Subpart M.
- B. Floor and roof holes/openings are any that measure over 2 in (51 mm) in any direction of a walking/working surface which persons may trip or fall into or where objects may fall to the level below. Skylights located in floors or roofs are considered floor or roof hole/openings.
- C. All floor, roof openings or hole into which a person can accidentally walk or fall through shall be guarded either by a railing system with toeboards along all exposed sides or a load-bearing cover. When the

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cover is not in place, the opening or hole shall be protected by a removable guardrail system or shall be attended when the guarding system has been removed, or other fall protection system.

1. Covers shall be capable of supporting, without failure, at least twice the weight of the worker, equipment and material combined.
2. Covers shall be secured when installed, clearly marked with the word "HOLE", "COVER" or "Danger, Roof Opening-Do Not Remove" or color-coded or equivalent methods (e.g., red or orange "X"). Workers must be made aware of the meaning for color coding and equivalent methods.
3. Roofing material, such as roofing membrane, insulation or felts, covering or partly covering openings or holes, shall be immediately cut out. No hole or opening shall be left unattended unless covered.
4. Non-load-bearing skylights shall be guarded by a load-bearing skylight screen, cover, or railing system along all exposed sides.
5. Workers are prohibited from standing/walking on skylights.

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SECTION 01 42 19
REFERENCE STANDARDS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies the availability and source of references and standards specified in the project manual under paragraphs APPLICABLE PUBLICATIONS and/or shown on the drawings.

1.2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS FPMR PART 101-29 (FAR 52.211-1) (AUG 1998)

- A. The GSA Index of Federal Specifications, Standards and Commercial Item Descriptions, FPMR Part 101-29 and copies of specifications, standards, and commercial item descriptions cited in the solicitation may be obtained for a fee by submitting a request to - GSA Federal Supply Service, Specifications Section, Suite 8100, 470 East L'Enfant Plaza, SW, Washington, DC 20407, Telephone (202) 619-8925, Facsimile (202) 619-8978.
- B. If the General Services Administration, Department of Agriculture, or Department of Veterans Affairs issued this solicitation, a single copy of specifications, standards, and commercial item descriptions cited in this solicitation may be obtained free of charge by submitting a request to the addressee in paragraph (a) of this provision. Additional copies will be issued for a fee.

1.3 AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (FAR 52.211-4) (JUN 1988)

The specifications and standards cited in this solicitation can be examined at the following location:

DEPARTMENT OF VETERANS AFFAIRS
Office of Construction & Facilities Management
Facilities Quality Service (00CFM1A)
425 Eye Street N.W, (sixth floor)
Washington, DC 20001
Telephone Numbers: (202) 632-5249 or (202) 632-5178
Between 9:00 AM - 3:00 PM

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1.4 AVAILABILITY OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (FAR 52.211-3) (JUN 1988)

The specifications cited in this solicitation may be obtained from the associations or organizations listed below.

- AA Aluminum Association Inc.
<http://www.aluminum.org>
- AABC Associated Air Balance Council
<https://www.aabc.com>
- AAMA American Architectural Manufacturer's Association
<http://www.aamanet.org>
- AASHTO American Association of State Highway and Transportation
Officials
<http://www.aashto.org>
- AATCC American Association of Textile Chemists and Colorists
<http://www.aatcc.org>
- ACGIH American Conference of Governmental Industrial Hygienists
<http://www.acgih.org>
- ACI American Concrete Institute
<http://www.aci-int.net>
- ACPA American Concrete Pipe Association
<http://www.concrete-pipe.org>
- ACPPA American Concrete Pressure Pipe Association
<http://www.acppa.org>
- ADC Air Diffusion Council
<http://flexibleduct.org>
- AGA American Gas Association
<http://www.aga.org>
- AGC Associated General Contractors of America
<http://www.agc.org>

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AGMA American Gear Manufacturers Association, Inc.
<http://www.agma.org>

AH American Hort
<https://www.americanhort.org>

AHAM Association of Home Appliance Manufacturers
<http://www.aham.org>

AIA American Institute of Architects
<http://www.aia.org>

AISC American Institute of Steel Construction
<http://www.aisc.org>

AISI American Iron and Steel Institute
<http://www.steel.org>

AITC American Institute of Timber Construction
<https://aitc-glulam.org>

AMCA Air Movement and Control Association, Inc.
<http://www.amca.org>

ANSI American National Standards Institute, Inc.
<http://www.ansi.org>

APA The Engineered Wood Association
<http://www.apawood.org>

ARI Air-Conditioning and Refrigeration Institute
<http://www.ari.org>

ARPM Association for Rubber Product Manufacturers
<https://arpm.com>

ASABE American Society of Agricultural and Biological Engineers
<https://www.asabe.org>

ASCE American Society of Civil Engineers
<http://www.asce.org>

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ASHRAE American Society of Heating, Refrigerating, and
Air-Conditioning Engineers
<http://www.ashrae.org>

ASME American Society of Mechanical Engineers
<http://www.asme.org>

ASSE American Society of Sanitary Engineering International
<http://www.asse-plumbing.org>

ASTM American Society for Testing and Materials International
<http://www.astm.org>

AWI Architectural Woodwork Institute
<https://www.awinet.org>

AWS American Welding Society
<https://www.aws.org>

AWWA American Water Works Association
<https://www.awwa.org>

BHMA Builders Hardware Manufacturers Association
<https://www.buildershardware.com>

BIA The Brick Industry Association
<http://www.gobrick.com>

CAGI Compressed Air and Gas Institute
<https://www.cagi.org>

CGA Compressed Gas Association, Inc.
<https://www.cganet.com>

CI The Chlorine Institute, Inc.
<https://www.chlorineinstitute.org>

CISCA Ceilings and Interior Systems Construction Association
<https://www.cisca.org>

CISPI Cast Iron Soil Pipe Institute
<https://www.cispi.org>

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CLFMI Chain Link Fence Manufacturers Institute
<https://www.chainlinkinfo.org>

CPA Composite Panel Association
<https://www.compositepanel.org>

CPMB Concrete Plant Manufacturers Bureau
<https://www.cpm.org>

CRA California Redwood Association
<http://www.calredwood.org>

CRSI Concrete Reinforcing Steel Institute
<https://www.crsi.org>

CTI Cooling Technology Institute
<https://www.cti.org>

DHA Decorative Hardwoods Association
<https://www.decorativehardwoods.org>

DHI Door and Hardware Institute
<https://www.dhi.org>

EGSA Electrical Generating Systems Association
<http://www.egsa.org>

EEI Edison Electric Institute
<https://www.eei.org>

EPA United States Environmental Protection Agency
<https://www.epa.gov>

ETL ETL Testing Services
<http://www.intertek.com>

FAA Federal Aviation Administration
<https://www.faa.gov>

FCC Federal Communications Commission
<https://www.fcc.gov>

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FPS Forest Products Society
<http://www.forestprod.org>

GANNA Glass Association of North America
<http://www.glasswebsite.com>

FM Factory Mutual Global Insurance
<https://www.fmglobal.com>

GA Gypsum Association
<https://gypsum.org>

GSA General Services Administration
<https://www.gsa.gov>

HI Hydraulic Institute
<http://www.pumps.org>

ICC International Code Council
<https://shop.iccsafe.org>

ICEA Insulated Cable Engineers Association
<https://www.icea.net>

ICAC Institute of Clean Air Companies
<http://www.icac.com>

IEEE Institute of Electrical and Electronics Engineers
<https://www.ieee.org/>

IGMA Insulating Glass Manufacturers Alliance
<https://www.igmaonline.org>

IMSA International Municipal Signal Association
<http://www.imsasafety.org>

MBMA Metal Building Manufacturers Association
<https://www.mbma.com>

MSS Manufacturers Standardization Society of the Valve and Fittings Industry
<http://msshq.org>

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NAAMM National Association of Architectural Metal Manufacturers
<https://www.naamm.org>

PHCC Plumbing-Heating-Cooling Contractors Association
<https://www.phccweb.org>

NBS National Bureau of Standards
See - NIST

NBBI The National Board of Boiler and Pressure Vessel Inspectors
<https://www.nationalboard.org>

NEC National Electric Code
See - NFPA National Fire Protection Association

NEMA National Electrical Manufacturers Association
<https://www.nema.org>

NFPA National Fire Protection Association
<https://www.nfpa.org>

NHLA National Hardwood Lumber Association
<https://www.nhla.com>

NIH National Institute of Health
<https://www.nih.gov>

NIST National Institute of Standards and Technology
<https://www.nist.gov>

NELMA Northeastern Lumber Manufacturers Association, Inc.
<http://www.nelma.org>

NPA National Particleboard Association
(See CPA, Composite Panel Association)

NSF National Sanitation Foundation
<http://www.nsf.org>

OSHA Occupational Safety and Health Administration
Department of Labor
<https://www.osha.gov>

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PCA Portland Cement Association
<https://www.cement.org>

PCI Precast Prestressed Concrete Institute
<https://www.pci.org>

PPI Plastics Pipe Institute
<https://www.plasticpipe.org>

PEI Porcelain Enamel Institute
<http://www.porcelainenamel.com>

PTI Post-Tensioning Institute
<http://www.post-tensioning.org>

RFCI Resilient Floor Covering Institute
<https://www.rfci.com>

RIS Redwood Inspection Service
(See Western Wood Products Association)
<https://www.wwpa.org>

SCMA Southern Cypress Manufacturers Association
<http://www.cypressinfo.org>

SDI Steel Door Institute
<http://www.steeldoor.org>

SJI Steel Joist Institute
<https://www.steeljoist.org>

SMACNA Sheet Metal & Air-Conditioning Contractors'
National Association
<https://www.smacna.org>

SSPC The Society for Protective Coatings
<https://www.sspc.org>

STI Steel Tank Institute
<https://www.steeltank.com>

SWI Steel Window Institute
<https://www.steelwindows.com>

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TCNA Tile Council of North America

<https://www.tcnatile.com>

TEMA Tubular Exchanger Manufacturers Association

<http://www.tema.org>

TPI Truss Plate Institute

<https://www.tpinst.org>

UBC The Uniform Building Code
(See ICC)

UL Underwriters' Laboratories Incorporated

<https://www.ul.com>

ULC Underwriters' Laboratories of Canada

<https://www.ulc.ca>

WCLB West Coast Lumber Inspection Bureau

<http://www.wclib.org>

WDMA Window and Door Manufacturers Association

<https://www.wdma.com>

WRCLA Western Red Cedar Lumber Association

<https://www.realcedar.com>

WWPA Western Wood Products Association

<http://www.wwpa.org>

- - - E N D - - -

Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/23

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SECTION 01 45 29
TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies materials testing activities and inspection services required during project construction to be provided by a Testing Laboratory retained by the General Contractor.

1.2 APPLICABLE PUBLICATIONS:

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.
- B. American Association of State Highway and Transportation Officials (AASHTO):
 - T27-11.....Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates
 - T96-02 (R2006).....Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
 - T99-10.....Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5 Kg (5.5 lb.) Rammer and a 305 mm (12 in.) Drop
 - T104-99 (R2007).....Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
 - T180-10.....Standard Method of Test for Moisture-Density Relations of Soils using a 4.54 kg (10 lb.) Rammer and a 457 mm (18 in.) Drop
 - T191-02 (R2006).....Standard Method of Test for Density of Soil In-Place by the Sand-Cone Method
 - T310-13.....Standard Method of Test for In-place Density and Moisture Content of Soil and Soil-aggregate by Nuclear Methods (Shallow Depth)
- C. American Concrete Institute (ACI):
 - 506.4R-94 (R2004).....Guide for the Evaluation of Shotcrete

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D. American Society for Testing and Materials (ASTM):

- A370-12.....Standard Test Methods and Definitions for
Mechanical Testing of Steel Products
- A416/A416M-10.....Standard Specification for Steel Strand,
Uncoated Seven-Wire for Prestressed Concrete
- C31/C31M-10.....Standard Practice for Making and Curing
Concrete Test Specimens in the Field
- C33/C33M-11a.....Standard Specification for Concrete Aggregates
- C39/C39M-12.....Standard Test Method for Compressive Strength
of Cylindrical Concrete Specimens
- C109/C109M-11b.....Standard Test Method for Compressive Strength
of Hydraulic Cement Mortars
- C136-06.....Standard Test Method for Sieve Analysis of Fine
and Coarse Aggregates
- C138/C138M-10b.....Standard Test Method for Density (Unit Weight),
Yield, and Air Content (Gravimetric) of
Concrete
- C140-12.....Standard Test Methods for Sampling and Testing
Concrete Masonry Units and Related Units
- C143/C143M-10a.....Standard Test Method for Slump of Hydraulic
Cement Concrete
- C172/C172M-10.....Standard Practice for Sampling Freshly Mixed
Concrete
- C173/C173M-10b.....Standard Test Method for Air Content of freshly
Mixed Concrete by the Volumetric Method
- C330/C330M-09.....Standard Specification for Lightweight
Aggregates for Structural Concrete
- C567/C567M-11.....Standard Test Method for Density Structural
Lightweight Concrete
- C780-11.....Standard Test Method for Pre-construction and
Construction Evaluation of Mortars for Plain
and Reinforced Unit Masonry
- C1019-11.....Standard Test Method for Sampling and Testing
Grout

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C1064/C1064M-11.....Standard Test Method for Temperature of Freshly
Mixed Portland Cement Concrete

C1077-11c.....Standard Practice for Agencies Testing Concrete
and Concrete Aggregates for Use in Construction
and Criteria for Testing Agency Evaluation

C1314-11a.....Standard Test Method for Compressive Strength
of Masonry Prisms

D422-63(2007).....Standard Test Method for Particle-Size Analysis
of Soils

D698-07e1.....Standard Test Methods for Laboratory Compaction
Characteristics of Soil Using Standard Effort

D1140-00(2006).....Standard Test Methods for Amount of Material in
Soils Finer than No. 200 Sieve

D1143/D1143M-07e1.....Standard Test Methods for Deep Foundations
Under Static Axial Compressive Load

D1188-07e1.....Standard Test Method for Bulk Specific Gravity
and Density of Compacted Bituminous Mixtures
Using Coated Samples

D1556-07.....Standard Test Method for Density and Unit
Weight of Soil in Place by the Sand-Cone Method

D1557-09.....Standard Test Methods for Laboratory Compaction
Characteristics of Soil Using Modified Effort
(56,000ft lbf/ft³ (2,700 KNm/m³))

D2166-06.....Standard Test Method for Unconfined Compressive
Strength of Cohesive Soil

D2167-08).....Standard Test Method for Density and Unit
Weight of Soil in Place by the Rubber Balloon
Method

D2216-10.....Standard Test Methods for Laboratory
Determination of Water (Moisture) Content of
Soil and Rock by Mass

D2974-07a.....Standard Test Methods for Moisture, Ash, and
Organic Matter of Peat and Other Organic Soils

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- D3666-11.....Standard Specification for Minimum Requirements
for Agencies Testing and Inspecting Road and
Paving Materials
- D3740-11.....Standard Practice for Minimum Requirements for
Agencies Engaged in Testing and/or Inspection
of Soil and Rock as used in Engineering Design
and Construction
- D6938-10.....Standard Test Method for In-Place Density and
Water Content of Soil and Soil-Aggregate by
Nuclear Methods (Shallow Depth)
- E94-04 (2010).....Standard Guide for Radiographic Examination
- E164-08.....Standard Practice for Contact Ultrasonic
Testing of Weldments
- E329-11c.....Standard Specification for Agencies Engaged in
Construction Inspection, Testing, or Special
Inspection
- E543-09.....Standard Specification for Agencies Performing
Non-Destructive Testing
- E605-93 (R2011).....Standard Test Methods for Thickness and Density
of Sprayed Fire Resistive Material (SFRM)
Applied to Structural Members
- E709-08.....Standard Guide for Magnetic Particle
Examination
- E1155-96 (R2008).....Determining FF Floor Flatness and FL Floor
Levelness Numbers
- F3125/F3125M-15.....Standard Specification for High Strength
Structural Bolts, Steel and Alloy Steel, Heat
Treated, 120 ksi (830 MPa) and 150 ksi (1040
MPa) Minimum Tensile Strength, Inch and Metric
Dimensions

E. American Welding Society (AWS):

- D1.D1.1M-10.....Structural Welding Code-Steel

1.3 REQUIREMENTS:

- A. Accreditation Requirements: Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be

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required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (i.e., E329, C1077, D3666, D3740, A880, E543) listed in the technical sections of the specifications.

Laboratories engaged in Hazardous Materials Testing shall meet the requirements of OSHA and EPA. The policy applies to the specific laboratory performing the actual testing, not just the "Corporate Office."

- B. Inspection and Testing: Testing laboratory shall inspect materials and workmanship and perform tests described herein and additional tests requested by COR. When it appears materials furnished, or work performed by Contractor fail to meet construction contract requirements, Testing Laboratory shall direct attention of COR to such failure.
- C. Written Reports: Testing laboratory shall submit test reports to COR, Contractor, unless other arrangements are agreed to in writing by the COR. Submit reports of tests that fail to meet construction contract requirements on colored paper.
- D. Verbal Reports: Give verbal notification to COR immediately of any irregularity.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EARTHWORK:

- A. General: The Testing Laboratory shall provide qualified personnel, materials, equipment, and transportation as required to perform the services identified/required herein, within the agreed to schedule and/or time frame. The work to be performed shall be as identified herein and shall include but not be limited to the following:
 - 1. Observe fill and subgrades during proof-rolling to evaluate suitability of surface material to receive fill or base course. Provide recommendations to the COR regarding suitability or unsuitability of areas where proof-rolling was observed. Where unsuitable results are observed, witness excavation of unsuitable material and recommend to COR extent of removal and replacement of

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unsuitable materials and observe proof-rolling of replaced areas until satisfactory results are obtained.

2. Provide part time observation of fill placement and compaction and field density testing in building areas and provide part time observation of fill placement and compaction and field density testing in pavement areas to verify that earthwork compaction obtained is in accordance with contract documents.
3. Provide supervised geotechnical technician to inspect excavation, subsurface preparation, and backfill for structural fill.

B. Testing Compaction:

1. Determine maximum density and optimum moisture content for each type of fill, backfill and subgrade material used, in compliance with ASTM D1557.
2. Make field density tests in accordance with the primary testing method following ASTM D6938 wherever possible. Field density tests utilizing ASTM D1556, or ASTM D2167 shall be utilized on a case by case basis only if there are problems with the validity of the results from the primary method due to specific site field conditions. Should the testing laboratory propose these alternative methods, they should provide satisfactory explanation to the COR before the tests are conducted.
 - a. Building Slab Subgrade: At least one test of subgrade for every 185 m² (2000 square feet) of building slab, but in no case fewer than three tests. In each compacted fill layer, perform one test for every 185 m² (2000 square feet) of overlaying building slab, but in no case fewer than three tests.
 - b. Foundation Wall Backfill: One test per 30 m (100 feet) of each layer of compacted fill but in no case fewer than two tests.
 - c. Pavement Subgrade: One test for each 335 m² (400 square yards), but in no case fewer than two tests.
 - d. Curb, Gutter, and Sidewalk: One test for each 90 m (300 feet), but in no case fewer than two tests.
 - e. Trenches: One test at maximum 30 m (100 foot) intervals per 1200 mm (4 foot) of vertical lift and at changes in required density, but in no case fewer than two tests.

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- f. Footing Subgrade: At least one test for each layer of soil on which footings will be placed. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested subgrade when acceptable to COR. In each compacted fill layer below wall footings, perform one field density test for every 30 m (100 feet) of wall. Verify subgrade is level, all loose or disturbed soils have been removed, and correlate actual soil conditions observed with those indicated by test borings.
- C. Fill and Backfill Material Gradation: One test per 50 cubic yards stockpiled or in-place source material. Gradation of fill and backfill material shall be determined in accordance with ASTM D1140.
- D. Testing for Footing Bearing Capacity: Evaluate if suitable bearing capacity material is encountered in footing subgrade.
- E. Testing Materials: Test suitability of on-site and off-site borrow as directed by COR.

3.2 SITE WORK CONCRETE:

- A. Test site work concrete including materials for concrete as required in Article CONCRETE of this section.

3.3 CONCRETE:

- A. Batch Plant Inspection and Materials Testing:
 - 1. Perform continuous batch plant inspection until concrete quality is established to satisfaction of COR with concurrence of Contracting Officer and perform periodic inspections thereafter as determined by COR.
 - 2. Periodically inspect and test batch proportioning equipment for accuracy and report deficiencies to COR.
 - 3. Sample and test mix ingredients as necessary to ensure compliance with specifications.
 - 4. Sample and test aggregates daily and as necessary for moisture content. Test the dry rodded weight of the coarse aggregate whenever a sieve analysis is made, and when it appears there has been a change in the aggregate.
 - 5. Certify, in duplicate, ingredients and proportions and amounts of ingredients in concrete conform to approved trial mixes. When

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concrete is batched or mixed off immediate building site, certify (by signing, initialing or stamping thereon) on delivery slips (duplicate) that ingredients in truck-load mixes conform to proportions of aggregate weight, cement factor, and water-cement ratio of approved trial mixes.

B. Field Inspection and Materials Testing:

1. Provide a technician at site of placement at all times to perform concrete sampling and testing.
2. Review the delivery tickets of the ready-mix concrete trucks arriving on-site. Notify the Contractor if the concrete cannot be placed within the specified time limits or if the type of concrete delivered is incorrect. Reject any loads that do not comply with the Specification requirements. Rejected loads are to be removed from the site at the Contractor's expense. Any rejected concrete that is placed will be subject to removal.
3. Take concrete samples at point of placement in accordance with ASTM C172. Mold and cure compression test cylinders in accordance with ASTM C31. Make at least three cylinders for each 40 m³ (50 cubic yards) or less of each concrete type, and at least three cylinders for any one day's pour for each concrete type. Label each cylinder with an identification number. COR may require additional cylinders to be molded and cured under job conditions.
4. Perform slump tests in accordance with ASTM C143. Test the first truck each day, and every time test cylinders are made. Test pumped concrete at the hopper and at the discharge end of the hose at the beginning of each day's pumping operations to determine change in slump.
5. Determine the air content of concrete per ASTM C173. For concrete required to be air-entrained, test the first truck and every 20 m³ (25 cubic yards) thereafter each day. For concrete not required to be air-entrained, test every 80 m³ (100 cubic yards) at random. For pumped concrete, initially test concrete at both the hopper and the discharge end of the hose to determine change in air content.
6. If slump or air content fall outside specified limits, make another test immediately from another portion of same batch.

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7. Perform unit weight tests in compliance with ASTM C138 for normal weight concrete and ASTM C567 for lightweight concrete. Test the first truck and each time cylinders are made.
8. Notify laboratory technician at batch plant of mix irregularities and request materials and proportioning check.
9. Verify that specified mixing has been accomplished.
10. Environmental Conditions: Determine the temperature per ASTM C1064 for each truckload of concrete during hot weather and cold weather concreting operations:
 - a. When ambient air temperature falls below 4.4 degrees C (40 degrees F), record maximum and minimum air temperatures in each 24-hour period; record air temperature inside protective enclosure; record minimum temperature of surface of hardened concrete.
 - b. When ambient air temperature rises above 29.4 degrees C (85 degrees F), record maximum and minimum air temperature in each 24 hour period; record minimum relative humidity; record maximum wind velocity; record maximum temperature of surface of hardened concrete.
11. Inspect the reinforcing steel placement, including bar size, bar spacing, top and bottom concrete cover, proper tie into the chairs, and grade of steel prior to concrete placement. Submit detailed report of observations.
12. Observe conveying, placement, and consolidation of concrete for conformance to specifications.
13. Observe condition of formed surfaces upon removal of formwork prior to repair of surface defects and observe repair of surface defects.
14. Observe curing procedures for conformance with specifications, record dates of concrete placement, start of preliminary curing, start of final curing, end of curing period.
15. Observe preparations for placement of concrete:
 - a. Inspect handling, conveying, and placing equipment, inspect vibrating and compaction equipment.
 - b. Inspect preparation of construction, expansion, and isolation joints.

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16. Observe preparations for protection from hot weather, cold weather, sun, and rain, and preparations for curing.
 17. Observe concrete mixing:
 - a. Monitor and record amount of water added at project site.
 - b. Observe minimum and maximum mixing times.
 18. Measure concrete flatwork for levelness and flatness as follows:
 - a. Perform Floor Tolerance Measurements F_F and F_L in accordance with ASTM E1155. Calculate the actual overall F- numbers using the inferior/superior area method.
 - b. Perform all floor tolerance measurements within 48 hours after slab installation and prior to removal of shoring and formwork.
 - c. Provide the Contractor and the COR with the results of all profile tests, including a running tabulation of the overall F_F and F_L values for all slabs installed to date, within 72 hours after each slab installation.
 19. Other inspections:
 - a. Grouting under base plates.
 - b. Grouting anchor bolts and reinforcing steel in hardened concrete.
- C. Laboratory Tests of Field Samples:
1. Test compression test cylinders for strength in accordance with ASTM C39. For each test series, test one cylinder at 7 days and one cylinder at 28 days. Use remaining cylinder as a spare tested as directed by COR. Compile laboratory test reports as follows:
Compressive strength test shall be result of one cylinder, except when one cylinder shows evidence of improper sampling, molding or testing, in which case it shall be discarded and strength of spare cylinder shall be used.
 2. Make weight tests of hardened lightweight structural concrete in accordance with ASTM C567.
 3. Furnish certified compression test reports (duplicate) to COR. In test report, indicate the following information:
 - a. Cylinder identification number and date cast.
 - b. Specific location at which test samples were taken.
 - c. Type of concrete, slump, and percent air.
 - d. Compressive strength of concrete in MPa (psi).

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- e. Weight of lightweight structural concrete in kg/m³ (pounds per cubic feet).
- f. Weather conditions during placing.
- g. Temperature of concrete in each test cylinder when test cylinder was molded.
- h. Maximum and minimum ambient temperature during placing.
- i. Ambient temperature when concrete sample in test cylinder was taken.
- j. Date delivered to laboratory and date tested.

3.4 REINFORCEMENT:

- A. Review mill test reports furnished by Contractor.

3.5 STRUCTURAL STEEL:

- A. General: Provide shop and field inspection and testing services to certify structural steel work is done in accordance with contract documents. Welding shall conform to AWS D1.1 Structural Welding Code.
- B. Prefabrication Inspection:
 - 1. Review design and shop detail drawings for size, length, type and location of all welds to be made.
 - 2. Approve welding procedure qualifications either by pre-qualification or by witnessing qualifications tests.
 - 3. Approve welder qualifications by certification or retesting.
 - 4. Approve procedure for control of distortion and shrinkage stresses.
 - 5. Approve procedures for welding in accordance with applicable sections of AWS D1.1.
- C. Fabrication and Erection:
 - 1. Weld Inspection:
 - a. Inspect welding equipment for capacity, maintenance and working condition.
 - b. Verify specified electrodes and handling and storage of electrodes in accordance with AWS D1.1.
 - c. Inspect preparation and assembly of materials to be welded for conformance with AWS D1.1.
 - d. Inspect preheating and interpass temperatures for conformance with AWS D1.1.
 - e. Measure 25 percent of fillet welds.

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- f. Welding Magnetic Particle Testing: Test in accordance with ASTM E709 for a minimum of:
 - 1) 20 percent of all shear plate fillet welds at random, final pass only.
 - 2) 20 percent of all continuity plate and bracing gusset plate fillet welds, at random, final pass only.
 - 3) 100 percent of tension member fillet welds (i.e., hanger connection plates and other similar connections) for root and final passes.
 - 4) 20 percent of length of built-up column member partial penetration and fillet welds at random for root and final passes.
 - 5) 100 percent of length of built-up girder member partial penetration and fillet welds for root and final passes.
 - g. Welding Ultrasonic Testing: Test in accordance with ASTM E164 and AWS D1.1 for 100 percent of all full penetration welds, braced and moment frame column splices, and a minimum of 20 percent of all other partial penetration column splices, at random.
 - h. Welding Radiographic Testing: Test in accordance with ASTM E94, and AWS D1.1 for 5 percent of all full penetration welds at random.
 - i. Verify that correction of rejected welds are made in accordance with AWS D1.1.
 - j. Testing and inspection do not relieve the Contractor of the responsibility for providing materials and fabrication procedures in compliance with the specified requirements.
2. Bolt Inspection:
- a. Inspect high-strength bolted connections in accordance AISC Specifications for Structural Joints Using ASTM F3125 Bolts.
 - b. Slip-Critical Connections: Inspect 10 percent of bolts, but not less than 2 bolts, selected at random in each connection in accordance with AISC Specifications for Structural Joints Using ASTM F3125 Bolts. Inspect all bolts in connection when one or more are rejected.

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- c. Fully Pre-tensioned Connections: Inspect 10 percent of bolts, but not less than 2 bolts, selected at random in 25 percent of connections in accordance with AISC Specification for Structural Joints Using ASTM F3125 Bolts. Inspect all bolts in connection when one or more are rejected.
 - d. Bolts installed by turn-of-nut tightening may be inspected with calibrated wrench when visual inspection was not performed during tightening.
 - e. Snug Tight Connections: Inspect 10 percent of connections verifying that plies of connected elements have been brought into snug contact.
 - f. Inspect field erected assemblies; verify locations of structural steel for plumbness, level, and alignment.
- D. Submit inspection reports, record of welders and their certification, and identification, and instances of noncompliance to COR.

3.6 STEEL DECKING:

- A. Provide field inspection of welds of metal deck to the supporting steel, and testing services to ensure steel decking has been installed in accordance with contract documents and manufacturer's requirements.
- B. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS D1.1. Refer to the "Plug Weld Qualification Procedure" in Part 3 "Field Quality Control."
- C. Submit inspection reports, certification, and instances of noncompliance to COR.

3.7 SHEAR CONNECTOR STUDS:

- A. Provide field inspection and testing services required by AWS D.1 to ensure shear connector studs have been installed in accordance with contract documents.
- B. Tests: Test 20 percent of headed studs for fastening strength in accordance with AWS D1.1.
- C. Submit inspection reports, certification, and instances of noncompliance to COR.

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3.8 SPRAYED-ON FIREPROOFING:

- A. Provide field inspection and testing services to certify sprayed-on fireproofing has been applied in accordance with contract documents.
- B. Obtain a copy of approved submittals from COR.
- C. Use approved installation in test areas as criteria for inspection of work.
- D. Test sprayed-on fireproofing for thickness and density in accordance with ASTM E605.
 - 1. Thickness gauge specified in ASTM E605 may be modified for pole extension so that overhead sprayed material can be reached from floor.
- E. Location of test areas for field tests as follows:
 - 1. Thickness: Select one bay per floor, or one bay for each 930 m² (10,000 square feet) of floor area, whichever provides for greater number of tests. Take thickness determinations from each of following locations: Metal deck, beam, and column.
 - 2. Density: Take density determinations from each floor, or one test from each 930 m² (10,000 square feet) of floor area, whichever provides for greater number of tests, from each of the following areas: Underside of metal deck, beam flanges, and beam web.
- F. Submit inspection reports, certification, and instances of noncompliance to COR.

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SECTION 01 57 19
TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies the control of environmental pollution and damage that the Contractor must consider for air, water, and land resources. It includes management of visual aesthetics, noise, solid waste, radiant energy, and radioactive materials, as well as other pollutants and resources encountered or generated by the Contractor. The Contractor is obligated to consider specified control measures with the costs included within the various contract items of work.
- B. Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which:
1. Adversely effect human health or welfare,
 2. Unfavorably alter ecological balances of importance to human life,
 3. Effect other species of importance to humankind, or;
 4. Degrade the utility of the environment for aesthetic, cultural, and historical purposes.
- C. Definitions of Pollutants:
1. Chemical Waste: Petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.
 2. Debris: Combustible and noncombustible wastes, such as leaves, tree trimmings, ashes, and waste materials resulting from construction or maintenance and repair work.
 3. Sediment: Soil and other debris that has been eroded and transported by runoff water.
 4. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from industrial, commercial, and agricultural operations and from community activities.
 5. Surface Discharge: The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "water

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of the United States" and would require a permit to discharge water from the governing agency.

6. Rubbish: Combustible and noncombustible wastes such as paper, boxes, glass and crockery, metal and lumber scrap, tin cans, and bones.
7. Sanitary Wastes:
 - a. Sewage: Domestic sanitary sewage and human and animal waste.
 - b. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

1.2 QUALITY CONTROL

- A. Establish and maintain quality control for the environmental protection of all items set forth herein.
- B. Record on daily reports any problems in complying with laws, regulations, and ordinances. Note any corrective action taken.

1.3 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. U.S. National Archives and Records Administration (NARA):
33 CFR 328.....Definitions

1.4 SUBMITTALS

- A. In accordance with Section, 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
 1. Environmental Protection Plan: After the contract is awarded and prior to the commencement of the work, the Contractor shall meet with the COR to discuss the proposed Environmental Protection Plan and to develop mutual understanding relative to details of environmental protection. Not more than 20 days after the meeting, the Contractor shall prepare and submit to the COR for approval, a written and/or graphic Environmental Protection Plan including, but not limited to, the following:
 - a. Name(s) of person(s) within the Contractor's organization who is (are) responsible for ensuring adherence to the Environmental Protection Plan.
 - b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site.

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- c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.
 - d. Description of the Contractor's environmental protection personnel training program.
 - e. A list of Federal, State, and local laws, regulations, and permits concerning environmental protection, pollution control, noise control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.
 - f. Methods for protection of features to be preserved within authorized work areas including trees, shrubs, vines, grasses, ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, and archeological and cultural resources.
 - g. Procedures to provide the environmental protection that comply with the applicable laws and regulations. Describe the procedures to correct pollution of the environment due to accident, natural causes, or failure to follow the procedures as described in the Environmental Protection Plan.
 - h. Permits, licenses, and the location of the solid waste disposal area.
 - i. Drawings showing locations of any proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials. Include as part of an Erosion Control Plan approved by the District Office of the U.S. Soil Conservation Service and the Department of Veterans Affairs.
 - j. Environmental Monitoring Plans for the job site including land, water, air, and noise.
 - k. Work Area Plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas. This plan may be incorporated within the Erosion Control Plan.
- B. Approval of the Contractor's Environmental Protection Plan will not relieve the Contractor of responsibility for adequate and continued control of pollutants and other environmental protection measures.

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1.5 PROTECTION OF ENVIRONMENTAL RESOURCES

- A. Protect environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire period of this contract. Confine activities to areas defined by the specifications and drawings.
- B. Protection of Land Resources: Prior to construction, identify all land resources to be preserved within the work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without permission from the COR. Do not fasten or attach ropes, cables, or guys to trees for anchorage unless specifically authorized, or where special emergency use is permitted.
 - 1. Work Area Limits: Prior to any construction, mark the areas that require work to be performed under this contract. Mark or fence isolated areas within the general work area that are to be saved and protected. Protect monuments, works of art, and markers before construction operations begin. Convey to all personnel the purpose of marking and protecting all necessary objects.
 - 2. Protection of Landscape: Protect trees, shrubs, vines, grasses, land forms, and other landscape features shown on the drawings to be preserved by marking, fencing, or using any other approved techniques.
 - a. Box and protect from damage existing trees and shrubs to remain on the construction site.
 - b. Immediately repair all damage to existing trees and shrubs by trimming, cleaning, and painting with antiseptic tree paint.
 - c. Do not store building materials or perform construction activities closer to existing trees or shrubs than the farthest extension of their limbs.
 - 3. Reduction of Exposure of Unprotected Erodible Soils: Plan and conduct earthwork to minimize the duration of exposure of unprotected soils. Clear areas in reasonably sized increments only as needed to use. Form earthwork to final grade as shown. Immediately protect side slopes and back slopes upon completion of rough grading.

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4. Temporary Protection of Disturbed Areas: Construct diversion ditches, benches, and berms to retard and divert runoff from the construction site to protected drainage areas approved under paragraph 208 of the Clean Water Act.
 - a. Sediment Basins: Trap sediment from construction areas in temporary or permanent sediment basins that accommodate the runoff of a local 25-year, 24-hour storm event. After each storm, pump the basins dry and remove the accumulated sediment. Control overflow/drainage with paved weirs or by vertical overflow pipes, draining from the surface.
 - b. Reuse or conserve the collected topsoil sediment as directed by the COR. Topsoil use and requirements are specified in Section 31 20 00, EARTH MOVING.
 - c. Institute effluent quality monitoring programs as required by Federal, State, and local environmental agencies.
5. Erosion and Sedimentation Control Devices: The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's activities. Construct or install all temporary and permanent erosion and sedimentation control features shown. Maintain temporary erosion and sediment control measures such as berms, dikes, drains, sedimentation basins, grassing, and mulching, until permanent drainage and erosion control facilities are completed and operative.
6. Manage borrow areas on and off Government property to minimize erosion and to prevent sediment from entering nearby water courses or lakes.
7. Manage and control spoil areas on and off Government property to limit spoil to areas shown and prevent erosion of soil or sediment from entering nearby water courses or lakes.
8. Protect adjacent areas from despoilment by temporary excavations and embankments.
9. Handle and dispose of solid wastes in such a manner that will prevent contamination of the environment. Place solid wastes (excluding clearing debris) in containers that are emptied on a regular schedule. Transport all solid waste off Government property

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- and dispose of waste in compliance with Federal, State, and local requirements.
10. Store chemical waste away from the work areas in corrosion resistant containers and dispose of waste in accordance with Federal, State, and local regulations.
 11. Handle discarded materials other than those included in the solid waste category as directed by the COR.
- C. Protection of Water Resources: Keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters and sewer systems. Implement management techniques to control water pollution by the listed construction activities that are included in this contract.
1. Washing and Curing Water: Do not allow wastewater directly derived from construction activities to enter water areas. Collect and place wastewater in retention ponds allowing the suspended material to settle, the pollutants to separate, or the water to evaporate.
 2. Control movement of materials and equipment at stream crossings during construction to prevent violation of water pollution control standards of the Federal, State, or local government.
 3. Monitor water areas affected by construction.
- D. Protection of Fish and Wildlife Resources: Keep construction activities under surveillance, management, and control to minimize interference with, disturbance of, or damage to fish and wildlife. Prior to beginning construction operations, list species that require specific attention along with measures for their protection.
- E. Protection of Air Resources: Keep construction activities under surveillance, management, and control to minimize pollution of air resources. Burning is not permitted on the job site. Keep activities, equipment, processes, and work operated or performed, in strict accordance with the State of Pennsylvania Air Pollution Control Act and Federal emission and performance laws and standards. Maintain ambient air quality standards set by the Environmental Protection Agency, for those construction operations and activities specified.
1. Particulates: Control dust particles, aerosols, and gaseous by-products from all construction activities, processing, and preparation of materials (such as from asphaltic batch plants) at

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all times, including weekends, holidays, and hours when work is not in progress.

2. Particulates Control: Maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause a hazard or a nuisance. Sprinklering, chemical treatment of an approved type, light bituminous treatment, baghouse, scrubbers, electrostatic precipitators, or other methods are permitted to control particulates in the work area.
 3. Hydrocarbons and Carbon Monoxide: Control monoxide emissions from equipment to Federal and State allowable limits.
 4. Odors: Control odors of construction activities and prevent obnoxious odors from occurring.
- F. Reduction of Noise: Minimize noise using every action possible. Perform noise-producing work in less sensitive hours of the day or week as directed by the COR. Maintain noise-produced work at or below the decibel levels and within the time periods specified.
1. Perform construction activities involving repetitive, high-level impact noise only between 8:00 a.m. and 6:00 p.m unless otherwise permitted by local ordinance or the COR. Repetitive impact noise on the property shall not exceed the following dB limitations:

Time Duration of Impact Noise	Sound Level in dB
More than 12 minutes in any hour	70
Less than 30 seconds of any hour	85
Less than three minutes of any hour	80
Less than 12 minutes of any hour	75

2. Provide sound-deadening devices on equipment and take noise abatement measures that are necessary to comply with the requirements of this contract, consisting of, but not limited to, the following:
 - a. Maintain maximum permissible construction equipment noise levels at 15 m (50 feet) (dBA):

EARTHMOVING		MATERIALS HANDLING	
FRONT LOADERS	75	CONCRETE MIXERS	75

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BACKHOES	75	CONCRETE PUMPS	75
DOZERS	75	CRANES	75
TRACTORS	75	DERRICKS IMPACT	75
SCAPERS	80	PILE DRIVERS	95
GRADERS	75	JACK HAMMERS	75
TRUCKS	75	ROCK DRILLS	80
PAVERS, STATIONARY	80	PNEUMATIC TOOLS	80
PUMPS	75	BLASTING	94
GENERATORS	75	SAWS	75
COMPRESSORS	75	VIBRATORS	75

- b. Use shields or other physical barriers to restrict noise transmission.
 - c. Provide soundproof housings or enclosures for noise-producing machinery.
 - d. Use efficient silencers on equipment air intakes.
 - e. Use efficient intake and exhaust mufflers on internal combustion engines that are maintained so equipment performs below noise levels specified.
 - f. Line hoppers and storage bins with sound deadening material.
 - g. Conduct truck loading, unloading, and hauling operations so that noise is kept to a minimum.
3. Measure sound level for noise exposure due to the construction at least once every five successive working days while work is being performed above 55 dB(A) noise level. Measure noise exposure at the property line or 15 m (50 feet) from the noise source, whichever is greater. Measure the sound levels on the A weighing network of a General Purpose sound level meter at slow response. To minimize the effect of reflective sound waves at buildings, take measurements at 900 to 1800 mm (three to six feet) in front of any building face. Submit the recorded information to the COR noting any problems and the alternatives for mitigating actions.
- G. Restoration of Damaged Property: If any direct or indirect damage is done to public or private property resulting from any act, omission, neglect, or misconduct, the Contractor shall restore the damaged

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property to a condition equal to that existing before the damage at no additional cost to the Government. Repair, rebuild, or restore property as directed or make good such damage in an acceptable manner.

- H. Final Clean-up: On completion of project and after removal of all debris, rubbish, and temporary construction, Contractor shall leave the construction area in a clean condition satisfactory to the COR. Cleaning shall include off the station disposal of all items and materials not required to be salvaged, as well as all debris and rubbish resulting from demolition and new work operations.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
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SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies the requirements for the management of non-hazardous building construction and demolition waste.
- B. Waste disposal in landfills shall be minimized to the greatest extent possible. Of the inevitable waste that is generated, as much material as economically feasible shall be salvaged, recycled or reused.
- C. Contractor shall use all reasonable means to divert construction and demolition waste from landfills and incinerators, and facilitate their salvage and recycle not limited to the following:
 - 1. Waste Management Plan development and implementation.
 - 2. Techniques to minimize waste generation.
 - 3. Sorting and separating of waste materials.
 - 4. Salvage of existing materials and items for reuse or resale.
 - 5. Recycling of materials that cannot be reused or sold.
- D. At a minimum the following waste categories shall be diverted from landfills:
 - 1. Soil.
 - 2. Inerts (e.g., concrete, masonry and asphalt).
 - 3. Clean dimensional wood and palette wood.
 - 4. Green waste (biodegradable landscaping materials).
 - 5. Engineered wood products (plywood, particle board, I-joists, etc).
 - 6. Metal products (eg, steel, wire, beverage containers, copper, etc).
 - 7. Cardboard, paper and packaging.
 - 8. Bitumen roofing materials.
 - 9. Plastics (eg, ABS, PVC).
 - 10. Carpet and/or pad.
 - 11. Gypsum board.
 - 12. Insulation.
 - 13. Paint.
 - 14. Fluorescent lamps.

1.2 RELATED WORK

- A. Section 01 00 00, GENERAL REQUIREMENTS.

1.3 QUALITY ASSURANCE

- A. Contractor shall practice efficient waste management when sizing, cutting and installing building products. Processes shall be employed to ensure the generation of as little waste as possible. Construction /Demolition waste includes products of the following:
1. Excess or unusable construction materials.
 2. Packaging used for construction products.
 3. Poor planning and/or layout.
 4. Construction error.
 5. Over ordering.
 6. Weather damage.
 7. Contamination.
 8. Mishandling.
 9. Breakage.
- B. Establish and maintain the management of non-hazardous building construction and demolition waste set forth herein. Conduct a site assessment to estimate the types of materials that will be generated by demolition and construction.
- C. Contractor shall develop and implement procedures to recycle construction and demolition waste to a minimum of 50 percent.
- D. Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to recycling. Any revenues or savings obtained from salvage or recycling shall accrue to the contractor.
- E. Contractor shall provide all demolition, removal and legal disposal of materials. Contractor shall ensure that facilities used for recycling, reuse and disposal shall be permitted for the intended use to the extent required by local, state, federal regulations. The Whole Building Design Guide website <http://www.wbdg.org/tools/cwm.php> provides a Construction Waste Management Database that contains information on companies that haul, collect, and process recyclable debris from construction projects.
- F. Contractor shall assign a specific area to facilitate separation of materials for reuse, salvage, recycling, and return. Such areas are to be kept neat and clean and clearly marked in order to avoid contamination or mixing of materials.

- G. Contractor shall provide on-site instructions and supervision of separation, handling, salvaging, recycling, reuse and return methods to be used by all parties during waste generating stages.
- H. Record on daily reports any problems in complying with laws, regulations and ordinances with corrective action taken.

1.4 TERMINOLOGY

- A. Class III Landfill: A landfill that accepts non-hazardous resources such as household, commercial and industrial waste resulting from construction, remodeling, repair and demolition operations.
- B. Clean: Untreated and unpainted; uncontaminated with adhesives, oils, solvents, mastics and like products.
- C. Construction and Demolition Waste: Includes all non-hazardous resources resulting from construction, remodeling, alterations, repair and demolition operations.
- D. Dismantle: The process of parting out a building in such a way as to preserve the usefulness of its materials and components.
- E. Disposal: Acceptance of solid wastes at a legally operating facility for the purpose of land filling (includes Class III landfills and inert fills).
- F. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert materials are taken for the purpose of filling an excavation, shoring or other soil engineering operation.
- G. Inert Fill: A facility that can legally accept inert waste, such as asphalt and concrete exclusively for the purpose of disposal.
- H. Inert Solids/Inert Waste: Non-liquid solid resources including, but not limited to, soil and concrete that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional water board, and does not contain significant quantities of decomposable solid resources.
- I. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.
- J. Mixed Debris Recycling Facility: A solid resource processing facility that accepts loads of mixed construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing non-recyclable materials.

- K. Permitted Waste Hauler: A company that holds a valid permit to collect and transport solid wastes from individuals or businesses for the purpose of recycling or disposal.
- L. Recycling: The process of sorting, cleansing, treating, and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.
 - 1. On-site Recycling - Materials that are sorted and processed on site for use in an altered state in the work, i.e. concrete crushed for use as a sub-base in paving.
 - 2. Off-site Recycling - Materials hauled to a location and used in an altered form in the manufacture of new products.
- M. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of new products. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a solid waste facilities permit or be regulated by the local enforcement agency.
- N. Reuse: Materials that are recovered for use in the same form, on-site or off-site.
- O. Return: To give back reusable items or unused products to vendors for credit.
- P. Salvage: To remove waste materials from the site for resale or re-use by a third party.
- Q. Source-Separated Materials: Materials that are sorted by type at the site for the purpose of reuse and recycling.
- R. Solid Waste: Materials that have been designated as non-recyclable and are discarded for the purposes of disposal.
- S. Transfer Station: A facility that can legally accept solid waste for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting them to a landfill for disposal, or recovering some materials for re-use or recycling.

1.5 SUBMITTALS

- A. Submittal shall be submitted in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES, furnish the following:

- B. Prepare and submit to the Contracting Officers Representative (COR) a written demolition debris management plan. The plan shall include, but not be limited to, the following information:
1. Procedures to be used for debris management.
 2. Techniques to be used to minimize waste generation.
 3. Analysis of the estimated job site waste to be generated:
 - a. List of each material and quantity to be salvaged, reused, recycled.
 - b. List of each material and quantity proposed to be taken to a landfill.
 4. Detailed description of the Means/Methods to be used for material handling.
 - a. On site: Material separation, storage, protection where applicable.
 - b. Off site: Transportation means and destination. Include list of materials.
 - 1) Description of materials to be site-separated and self-hauled to designated facilities.
 - 2) Description of mixed materials to be collected by designated waste haulers and removed from the site.
 - c. The names and locations of mixed debris reuse and recycling facilities or sites.
 - d. The names and locations of trash disposal landfill facilities or sites.
 - e. Documentation that the facilities or sites are approved to receive the materials.
- C. Designated Manager responsible for instructing personnel, supervising, documenting and administer over meetings relevant to the Waste Management Plan.
- D. Monthly summary of construction and demolition debris diversion and disposal, quantifying all materials generated at the work site and disposed of or diverted from disposal through recycling.

1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced by the basic designation only. In the event that criteria requirements conflict, the most stringent requirements shall be met.

- B. U.S. Green Building Council (USGBC): LEED Green Building Rating System for New Construction

1.7 RECORDS

- A. Maintain records to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Records shall be kept in accordance with the LEED Reference Guide and LEED Template.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. List of each material and quantity to be salvaged, recycled, reused.
- B. List of each material and quantity proposed to be taken to a landfill.
- C. Material tracking data: Receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices, net total costs or savings.

PART 3 - EXECUTION

3.1 COLLECTION

- A. Provide all necessary containers, bins and storage areas to facilitate effective waste management.
- B. Clearly identify containers, bins and storage areas so that recyclable materials are separated from trash and can be transported to respective recycling facility for processing.
- C. Hazardous wastes shall be separated, stored, disposed of according to local, state, federal regulations.

3.2 DISPOSAL

- A. Contractor shall be responsible for transporting and disposing of materials that cannot be delivered to a source-separated or mixed materials recycling facility to a transfer station or disposal facility that can accept the materials in accordance with state and federal regulations.
- B. Construction or demolition materials with no practical reuse or that cannot be salvaged or recycled shall be disposed of at a landfill or incinerator.

3.3 REPORT

- A. With each application for progress payment, submit a summary of construction and demolition debris diversion and disposal including beginning and ending dates of period covered.

- B. Quantify all materials diverted from landfill disposal through salvage or recycling during the period with the receiving parties, dates removed, transportation costs, weight tickets, manifests, invoices. Include net total costs or savings for each salvaged or recycled material.
- C. Quantify all materials disposed of during the period with receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices. Include net total costs for each disposal.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

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SECTION 01 91 00

GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 COMMISSIONING DESCRIPTION

- A. This Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS shall form the basis of the construction phase commissioning process and procedures. The Commissioning Agent shall add, modify, and refine the commissioning procedures, as approved by the Department of Veterans Affairs (VA), to suit field conditions and actual manufacturer's equipment, incorporate test data and procedure results, and provide detailed scheduling for all commissioning tasks.
- B. Various sections of the project specifications require equipment startup, testing, and adjusting services. Requirements for startup, testing, and adjusting services specified in the Division 7, Division 21, Division 22, Division 23, Division 26, Division 27, Division 28, and Division 31 series sections of these specifications are intended to be provided in coordination with the commissioning services and are not intended to duplicate services. The Contractor shall coordinate the work required by individual specification sections with the commissioning services requirements specified herein.
- C. Where individual testing, adjusting, or related services are required in the project specifications and not specifically required by this commissioning requirements specification, the specified services shall be provided and copies of documentation, as required by those specifications shall be submitted to the VA and the Commissioning Agent to be indexed for future reference.
- D. Where training or educational services for VA are required and specified in other sections of the specifications, including but not limited to Division 7, Division 8, Division 21, Division 22, Division 23, Division 26, Division 27, Division 28, and Division 31 series sections of the specification, these services are intended to be provided in addition to the training and educational services specified herein.
- E. Commissioning is a systematic process of verifying that the building systems perform interactively according to the construction documents and the VA's operational needs. The commissioning process shall

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encompass and coordinate the system documentation, equipment startup, control system calibration, testing and balancing, performance testing and training. Commissioning during the construction and post-occupancy phases is intended to achieve the following specific objectives according to the contract documents:

1. Verify that the applicable equipment and systems are installed in accordance with the contact documents and according to the manufacturer's recommendations.
 2. Verify and document proper integrated performance of equipment and systems.
 3. Verify that Operations & Maintenance documentation is complete.
 4. Verify that all components requiring servicing can be accessed, serviced and removed without disturbing nearby components including ducts, piping, cabling or wiring.
 5. Verify that the VA's operating personnel are adequately trained to enable them to operate, monitor, adjust, maintain, and repair building systems in an effective and energy-efficient manner.
 6. Document the successful achievement of the commissioning objectives listed above.
- F. The commissioning process does not take away from or reduce the responsibility of the Contractor to provide a finished and fully functioning product.

1.2 CONTRACTUAL RELATIONSHIPS

- A. For this construction project, the Department of Veterans Affairs contracts with a Contractor to provide construction services. The contracts are administered by the VA Contracting Officer and the Contracting Officer's Representative (COR) as the designated representative of the Contracting Officer. On this project, the authority to modify the contract in any way is strictly limited to the authority of the Contracting Officer.
- B. In this project, only two contract parties are recognized and communications on contractual issues are strictly limited to VA COR and the Contractor. It is the practice of the VA to require that communications between other parties to the contracts (Subcontractors and Vendors) be conducted through the COR and Contractor. It is also the practice of the VA that communications between other parties of the

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project (Commissioning Agent and Architect/Engineer) be conducted through the COR.

- C. Whole Building Commissioning is a process that relies upon frequent and direct communications, as well as collaboration between all parties to the construction process. By its nature, a high level of communication and cooperation between the Commissioning Agent and all other parties (Architects, Engineers, Subcontractors, Vendors, third party testing agencies, etc.) is essential to the success of the Commissioning effort.
- D. With these fundamental practices in mind, the commissioning process described herein has been developed to recognize that, in the execution of the Commissioning Process, the Commissioning Agent must develop effective methods to communicate with every member of the construction team involved in delivering commissioned systems while simultaneously respecting the exclusive contract authority of the Contracting Officer and COR. Thus, the procedures outlined in this specification must be executed within the following limitations:
1. No communications (verbal or written) from the Commissioning Agent shall be deemed to constitute direction that modifies the terms of any contract between the Department of Veterans Affairs and the Contractor.
 2. Commissioning Issues identified by the Commissioning Agent will be delivered to the COR and copied to the designated Commissioning Representatives for the Contractor and subcontractors on the Commissioning Team for information only in order to expedite the communication process. These issues must be understood as the professional opinion of the Commissioning Agent and as suggestions for resolution.
 3. In the event that any Commissioning Issues and suggested resolutions are deemed by the COR to require either an official interpretation of the construction documents or require a modification of the contract documents, the Contracting Officer or COR will issue an official directive to this effect.
 4. All parties to the Commissioning Process shall be individually responsible for alerting the COR of any issues that they deem to constitute a potential contract change prior to acting on these issues.

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5. Authority for resolution or modification of design and construction issues rests solely with the Contracting Officer or COR, with appropriate technical guidance from the Architect/Engineer and/or Commissioning Agent.

1.3 RELATED WORK

- A. Section 01 00 00 GENERAL REQUIREMENTS.
- B. Section 01 32.16.15 PROJECT SCHEDULES (SMALL PROJECTS - DESIGN/BID/BUILD)
- C. Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES
- D. Section 21 08 00 COMMISSIONING OF FIRE PROTECTION SYSTEMS.
- E. Section 22 08 00 COMMISSIONING OF PLUMBING SYSTEMS.
- F. Section 23 08 00 COMMISSIONING OF HVAC SYSTEMS.
- G. Section 26 08 00 COMMISSIONING OF ELECTRICAL SYSTEMS.
- H. Section 27 08 00 COMMISSIONING OF COMMUNICATIONS SYSTEMS.
- I. Section 28 08 00 COMMISSIONING OF ELECTRONIC SAFETY AND SECURITY SYSTEMS.
- J. Section 33 08 00 COMMISSIONING OF SITE UTILITIES.

1.4 SUMMARY

- A. This Section includes general requirements that apply to implementation of commissioning without regard to systems, subsystems, and equipment being commissioned.
- B. The commissioning activities have been developed to support the VA requirements to meet guidelines for Federal Leadership in Environmental, Energy, and Economic Performance.

1.5 ACRONYMS

List of Acronyms	
Acronym	Meaning
A/E	Architect / Engineer Design Team
AHJ	Authority Having Jurisdiction
ASHRAE	Association Society for Heating Air Condition and Refrigeration Engineers
BOD	Basis of Design
BSC	Building Systems Commissioning
CCTV	Closed Circuit Television
CD	Construction Documents
CMMS	Computerized Maintenance Management System

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List of Acronyms	
Acronym	Meaning
CO	Contracting Officer (VA)
COR	Contracting Officer's Representative
COBie	Construction Operations Building Information Exchange
CPC	Construction Phase Commissioning
Cx	Commissioning
CxA	Commissioning Agent
CxM	Commissioning Manager
CxR	Commissioning Representative
DPC	Design Phase Commissioning
FPT	Functional Performance Test
GBI-GG	Green Building Initiative - Green Globes
HVAC	Heating, Ventilation, and Air Conditioning
LEED	Leadership in Energy and Environmental Design
NC	Department of Veterans Affairs National Cemetery
NCA	Department of Veterans Affairs National Cemetery Administration
NEBB	National Environmental Balancing Bureau
O&M	Operations & Maintenance
OPR	Owner's Project Requirements
PFC	Pre-Functional Checklist
PFT	Pre-Functional Test
SD	Schematic Design
SO	Site Observation
TAB	Test Adjust and Balance
VA	Department of Veterans Affairs
VAMC	VA Medical Center
VA CFM	VA Office of Construction and Facilities Management
VACO	VA Central Office
VA PM	VA Project Manager
USGBC	United States Green Building Council

1.6 DEFINITIONS

Acceptance Phase Commissioning: Commissioning tasks executed after most construction has been completed, most Site Observations and Static

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Tests have been completed and Pre-Functional Testing has been completed and accepted. The main commissioning activities performed during this phase are verification that the installed systems are functional by conducting Systems Functional Performance tests and Owner Training.

Accuracy: The capability of an instrument to indicate the true value of a measured quantity.

Back Check: A back check is a verification that an agreed upon solution to a design comment has been adequately addressed in a subsequent design review

Basis of Design (BOD): The Engineer's Basis of Design is comprised of two components: the Design Criteria and the Design Narrative, these documents record the concepts, calculations, decisions, and product selections used to meet the Owner's Project Requirements (OPR) and to satisfy applicable regulatory requirements, standards, and guidelines.

Benchmarks: Benchmarks are the comparison of a building's energy usage to other similar buildings and to the building itself.. For example, ENERGY STAR Portfolio Manager is a frequently used and nationally recognized building energy benchmarking tool.

Building Information Modeling (BIM): Building Information Modeling is a parametric database which allows a building to be designed and constructed virtually in 3D, and provides reports both in 2D views and as schedules. This electronic information can be extracted and reused for pre-populating facility management CMMS systems. Building Systems Commissioning (BSC): NEBB acronym used to designate its commissioning program.

Calibrate: The act of comparing an instrument of unknown accuracy with a standard of known accuracy to detect, correlate, report, or eliminate by adjustment any variation in the accuracy of the tested instrument.

CCTV: Closed circuit Television. Normally used for security surveillance and alarm detections as part of a special electrical security system.

COBie: Construction Operations Building Information Exchange (COBie) is an electronic industry data format used to transfer information developed during design, construction, and commissioning into the Computer Maintenance Management Systems (CMMS) used to operate facilities. See the Whole Building Design Guide website for further information (<http://www.wbdg.org/resources/cobie.php>)

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Commissionability: Defines a design component or construction process that has the necessary elements that will allow a system or component to be effectively measured, tested, operated and commissioned

Commissioning Agent (CxA): The qualified Commissioning Professional who administers the Cx process by managing the Cx team and overseeing the Commissioning Process. Where CxA is used in this specification it means the Commissioning Agent, members of his staff or appointed members of the commissioning team. Note that LEED uses the term Commissioning Authority in lieu of Commissioning Agent.

Commissioning Checklists: Lists of data or inspections to be verified to ensure proper system or component installation, operation, and function. Verification checklists are developed and used during all phases of the commissioning process to verify that the Owner's Project Requirements (OPR) is being achieved.

Commissioning Design Review: The commissioning design review is a collaborative review of the design professionals design documents for items pertaining to the following: owner's project requirements; basis of design; operability and maintainability (O&M) including documentation; functionality; training; energy efficiency, control systems' sequence of operations including building automation system features; commissioning specifications and the ability to functionally test the systems.

Commissioning Issue: A condition identified by the Commissioning Agent or other member of the Commissioning Team that adversely affects the commissionability, operability, maintainability, or functionality of a system, equipment, or component. A condition that is in conflict with the Contract Documents and/or performance requirements of the installed systems and components. (See also - Commissioning Observation).

Commissioning Manager (CxM): A qualified individual appointed by the Contractor to manage the commissioning process on behalf of the Contractor.

Commissioning Observation: An issue identified by the Commissioning Agent or other member of the Commissioning Team that does not conform to the project OPR, contract documents or standard industry best practices. (See also Commissioning Issue)

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Commissioning Plan: A document that outlines the commissioning process, commissioning scope and defines responsibilities, processes, schedules, and the documentation requirements of the Commissioning Process.

Commissioning Process: A quality focused process for enhancing the delivery of a project. The process focuses upon verifying and documenting that the facility and all of its systems, components, and assemblies are planned, designed, installed, tested, can be operated, and maintained to meet the Owner's Project Requirements.

Commissioning Report: The final commissioning document which presents the commissioning process results for the project. Cx reports include an executive summary, the commissioning plan, issue log, correspondence, and all appropriate check sheets and test forms.

Commissioning Representative (CxR): An individual appointed by a sub-contractor to manage the commissioning process on behalf of the sub-contractor.

Commissioning Specifications: The contract documents that detail the objective, scope and implementation of the commissioning process as developed in the Commissioning Plan.

Commissioning Team: Individual team members whose coordinated actions are responsible for implementing the Commissioning Process.

Construction Phase Commissioning: All commissioning efforts executed during the construction process after the design phase and prior to the Acceptance Phase Commissioning.

Contract Documents (CD): Contract documents include design and construction contracts, price agreements and procedure agreements. Contract Documents also include all final and complete drawings, specifications and all applicable contract modifications or supplements.

Construction Phase Commissioning (CPC): All commissioning efforts executed during the construction process after the design phase and prior to the Acceptance Phase Commissioning.

Coordination Drawings: Drawings showing the work of all trades that are used to illustrate that equipment can be installed in the space allocated without compromising equipment function or access for maintenance and replacement. These drawings graphically illustrate and dimension manufacturers' recommended maintenance clearances. On mechanical projects, coordination drawings include structural steel,

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ductwork, major piping and electrical conduit and show the elevations and locations of the above components.

Data Logging: The monitoring and recording of temperature, flow, current, status, pressure, etc. of equipment using stand-alone data recorders.

Deferred System Test: Tests that cannot be completed at the end of the acceptance phase due to ambient conditions, schedule issues or other conditions preventing testing during the normal acceptance testing period.

Deficiency: See "Commissioning Issue".

Design Criteria: A listing of the VA Design Criteria outlining the project design requirements, including its source. These are used during the design process to show the design elements meet the OPR.

Design Intent: The overall term that includes the OPR and the BOD. It is a detailed explanation of the ideas, concepts, and criteria that are defined by the owner to be important. The design intent documents are utilized to provide a written record of these ideas, concepts and criteria.

Design Narrative: A written description of the proposed design solutions that satisfy the requirements of the OPR.

Design Phase Commissioning (DPC): All commissioning tasks executed during the design phase of the project.

Environmental Systems: Systems that use a combination of mechanical equipment, airflow, water flow and electrical energy to provide heating, ventilating, air conditioning, humidification, and dehumidification for the purpose of human comfort or process control of temperature and humidity.

Executive Summary: A section of the Commissioning report that reviews the general outcome of the project. It also includes any unresolved issues, recommendations for the resolution of unresolved issues and all deferred testing requirements.

Functionality: This defines a design component or construction process which will allow a system or component to operate or be constructed in a manner that will produce the required outcome of the OPR.

Functional Test Procedure (FTP): A written protocol that defines methods, steps, personnel, and acceptance criteria for tests conducted

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on components, equipment, assemblies, systems, and interfaces among systems.

Industry Accepted Best Practice: A design component or construction process that has achieved industry consensus for quality performance and functionality. Refer to the current edition of the NEBB Design Phase Commissioning Handbook for examples.

Installation Verification: Observations or inspections that confirm the system or component has been installed in accordance with the contract documents and to industry accepted best practices.

Integrated System Testing: Integrated Systems Testing procedures entail testing of multiple integrated systems performance to verify proper functional interface between systems. Typical Integrated Systems Testing includes verifying that building systems respond properly to loss of utility, transfer to emergency power sources, re-transfer from emergency power source to normal utility source; interface between HVAC controls and Fire Alarm systems for equipment shutdown, interface between Fire Alarm system and elevator control systems for elevator recall and shutdown; interface between Fire Alarm System and Security Access Control Systems to control access to spaces during fire alarm conditions; and other similar tests as determined for each specific project.

Issues Log: A formal and ongoing record of problems or concerns - and their resolution - that have been raised by members of the Commissioning Team during the course of the Commissioning Process.

Lessons Learned Workshop: A workshop conducted to discuss and document project successes and identify opportunities for improvements for future projects.

Maintainability: A design component or construction process that will allow a system or component to be effectively maintained. This includes adequate room for access to adjust and repair the equipment.

Maintainability also includes components that have readily obtainable repair parts or service.

Manual Test: Testing using hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the 'observation').

Owner's Project Requirements (OPR): A written document that details the project requirements and the expectations of how the building and its

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systems will be used and operated. These include project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

Peer Review: A formal in-depth review separate from the commissioning review processes. The level of effort and intensity is much greater than a typical commissioning facilitation or extended commissioning review. The VA usually hires an independent third-party (called the IDIQ A/E) to conduct peer reviews.

Precision: The ability of an instrument to produce repeatable readings of the same quantity under the same conditions. The precision of an instrument refers to its ability to produce a tightly grouped set of values around the mean value of the measured quantity.

Pre-Design Phase Commissioning: Commissioning tasks performed prior to the commencement of design activities that includes project programming and the development of the commissioning process for the project

Pre-Functional Checklist (PFC): A form used by the contractor to verify that appropriate components are onsite, correctly installed, set up, calibrated, functional and ready for functional testing.

Pre-Functional Test (PFT): An inspection or test that is done before functional testing. PFT's include installation verification and system and component start up tests.

Procedure or Protocol: A defined approach that outlines the execution of a sequence of work or operations. Procedures are used to produce repeatable and defined results.

Range: The upper and lower limits of an instrument's ability to measure the value of a quantity for which the instrument is calibrated.

Resolution: This word has two meanings in the Cx Process. The first refers to the smallest change in a measured variable that an instrument can detect. The second refers to the implementation of actions that correct a tested or observed deficiency.

Site Observation Visit: On-site inspections and observations made by the Commissioning Agent for the purpose of verifying component, equipment, and system installation, to observe contractor testing, equipment start-up procedures, or other purposes.

Site Observation Reports (SO): Reports of site inspections and observations made by the Commissioning Agent. Observation reports are

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intended to provide early indication of an installation issue which will need correction or analysis.

Special System Inspections: Inspections required by a local code authority prior to occupancy and are not normally a part of the commissioning process.

Static Tests: Tests or inspections that validate a specified static condition such as pressure testing. Static tests may be specification or code initiated.

Start Up Tests: Tests that validate the component or system is ready for automatic operation in accordance with the manufactures requirements.

Systems Manual: A system-focused composite document that includes all information required for the owners operators to operate the systems.

Test Procedure: A written protocol that defines methods, personnel, and expectations for tests conducted on components, equipment, assemblies, systems, and interfaces among systems.

Testing: The use of specialized and calibrated instruments to measure parameters such as: temperature, pressure, vapor flow, air flow, fluid flow, rotational speed, electrical characteristics, velocity, and other data in order to determine performance, operation, or function.

Testing, Adjusting, and Balancing (TAB): A systematic process or service applied to heating, ventilating and air-conditioning (HVAC) systems and other environmental systems to achieve and document air and hydronic flow rates. The standards and procedures for providing these services are referred to as "Testing, Adjusting, and Balancing" and are described in the Procedural Standards for the Testing, Adjusting and Balancing of Environmental Systems, published by NEBB or AABC.

Thermal Scans: Thermographic pictures taken with an Infrared Thermographic Camera. Thermographic pictures show the relative temperatures of objects and surfaces and are used to identify leaks, thermal bridging, thermal intrusion, electrical overload conditions, moisture containment, and insulation failure.

Training Plan: A written document that details, in outline form the expectations of the operator training. Training agendas should include instruction on how to obtain service, operate, startup, shutdown and maintain all systems and components of the project.

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Trending: Monitoring over a period of time with the building automation system.

Unresolved Commissioning Issue: Any Commissioning Issue that, at the time that the Final Report or the Amended Final Report is issued that has not been either resolved by the construction team or accepted by the VA. Validation: The process by which work is verified as complete and operating correctly:

1. First party validation occurs when a firm or individual verifying the task is the same firm or individual performing the task.
2. Second party validation occurs when the firm or individual verifying the task is under the control of the firm performing the task or has other possibilities of financial conflicts of interest in the resolution (Architects, Designers, General Contractors and Third Tier Subcontractors or Vendors).
3. Third party validation occurs when the firm verifying the task is not associated with or under control of the firm performing or designing the task.

Verification: The process by which specific documents, components, equipment, assemblies, systems, and interfaces among systems are confirmed to comply with the criteria described in the Owner's Project Requirements.

Warranty Phase Commissioning: Commissioning efforts executed after a project has been completed and accepted by the Owner. Warranty Phase Commissioning includes follow-up on verification of system performance, measurement and verification tasks and assistance in identifying warranty issues and enforcing warranty provisions of the construction contract.

Warranty Visit: A commissioning meeting and site review where all outstanding warranty issues and deferred testing is reviewed and discussed.

Whole Building Commissioning: Commissioning of building systems such as Building Envelope, HVAC, Electrical, Special Electrical (Fire Alarm, Security & Communications), Plumbing and Fire Protection as described in this specification.

1.7 SYSTEMS TO BE COMMISSIONED

- A. Commissioning of a system or systems specified for this project is part of the construction process. Documentation and testing of these

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systems, as well as training of the VA's Operation and Maintenance personnel, is required in cooperation with the VA and the Commissioning Agent.

B. The following systems will be commissioned as part of this project:

Systems To Be Commissioned	
System	Description
Fire Suppression	
Fire Pump	Fire Pump, jockey pump, fire pump controller/ATS
Fire Sprinkler Systems	Wet pipe system, dry pipe system, pre-action system, special agent systems
Plumbing	
Domestic Water Distribution	Booster pumps, backflow preventers, water softeners, potable water storage tanks

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Systems To Be Commissioned	
System	Description
Domestic Hot Water Systems	Water heaters**, heat exchangers, circulation pumps, point-of-use water heaters*
Sewerage Pump Systems	Sewage ejectors
Wastewater Pump Systems	Sump pumps
Sanitary Waste Interceptors	Grease interceptors, acid neutralizers
General Service Air Systems	Packaged compressor systems, air dryers, filtration
Medical Air Systems	Packaged medical air compressor units. Outlet certification, cross-connection verification
Medical Vacuum Systems	Packaged medical vacuum units, outlet certification, cross-connection verification
Dental Air Systems	Packaged dental air compressor units, outlet certification, cross-connect verification
Dental Evacuation and Vacuum Systems	Packaged Dental Evacuation units, packaged dental vacuum units, outlet certification, cross-connection verification
Waste Anesthesia Gas Systems	Packaged Waste Anesthesia Gas units, outlet certification, cross-connection verification
Medical Gas Systems (other than Medical Air Systems)	Medical gas (oxygen, nitrogen, nitrous oxide, etc.) tank/manifold systems, outlet certification, cross-connection verification
Chemical Waste Systems	Chemical storage tanks, neutralization systems, ventilation, process control
Reverse-Osmosis Systems	Packaged Reverse-Osmosis systems
Water De-Alkalizing Systems	Package Water De-Alkalizing systems
HVAC	

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Systems To Be Commissioned	
System	Description
Noise and Vibration Control	Noise and vibration levels for critical equipment such as Air Handlers, Chillers, Cooling Towers, Boilers, Generators, etc. will be commissioned as part of the system commissioning
Direct Digital Control System**	Operator Interface Computer, Operator Work Station (including graphics, point mapping, trends, alarms), Network Communications Modules and Wiring, Integration Panels. [DDC Control panels will be commissioned with the systems controlled by the panel]
Chilled Water System**	Chillers (centrifugal, rotary screw, air-cooled), pumps (primary, secondary, variable primary), VFDs associated with chilled water system components, DDC Control Panels (including integration with Building Control System)
Condenser Water System**	Cooling Towers, Fluid Coolers, heat exchangers/economizers, pumps, VFDs associated with condenser water system components, DDC control panels.
Steam/Heating Hot Water System**	Boilers, boiler feed water system, economizers/heat recovery equipment, condensate recovery, water treatment, boiler fuel system, controls, interface with facility DDC system.
HVAC Air Handling Systems**	Air handling Units, packaged rooftop AHU, Outdoor Air conditioning units, humidifiers, DDC control panels
HVAC Ventilation/Exhaust Systems	General exhaust, toilet exhaust, laboratory exhaust, isolation exhaust, room pressurization control systems
HVAC Energy Recovery Systems**	Heat Wheels, Heat Recovery Loops, AHU Integrated Heat Recovery

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Systems To Be Commissioned	
System	Description
HVAC Terminal Unit Systems**	VAV Terminal Units, CAV terminal units, fan coil units, fin-tube radiation, unit heaters
Decentralized Unitary HVAC Systems*	Split-system HVAC systems, controls, interface with facility DDC
Unitary Heat Pump Systems**	Water-source heat pumps, controls, interface with facility DDC
Humidity Control Systems	Humidifiers, de-humidifiers, controls, interface with facility DDC
Hydronic Distribution Systems	Pumps, DDC control panels, heat exchangers,
Facility Fuel Systems	Boiler fuel system, generator fuel system
Geothermal Energy Direct Use Heating **	Geothermal well, ground heat exchanger, geothermal pumps, heat exchanger, valves, instrumentation
Solar Energy Heating Systems **	Solar collectors, heat exchangers, storage tanks, solar-boosted domestic hot water heater, pumps, valves, instrumentation
Facility Fuel Gas Systems	Witness Natural gas piping pressure testing, natural gas compressors and storage, propane storage
Smoke Evacuation System	Atrium smoke evacuation, other smoke evacuation and smoke management systems, controls, interface with other systems (fire alarm), emergency operation.
Electrical	
Medium-Voltage Electrical Distribution Systems	Medium-Voltage Switchgear, Medium-Voltage Switches, Underground ductbank and distribution, Pad-Mount Transformers, Medium-Voltage Load Interrupter Switches,
Grounding & Bonding Systems	Witness 3rd party testing, review reports
Electric Power Monitoring Systems	Metering, sub-metering, power monitoring systems, PLC control systems

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Systems To Be Commissioned	
System	Description
Electrical System Protective Device Study	Review reports, verify field settings consistent with Study
Secondary Unit Substations	Medium-voltage components, transformers, low- voltage distribution, verify breaker testing results (injection current, etc)
Low-Voltage Distribution System	Normal power distribution system, Life-safety power distribution system, critical power distribution system, equipment power distribution system, switchboards, distribution panels, panelboards, verify breaker testing results (injection current, etc)
Emergency Power Generation Systems	Generators, Generator paralleling switchgear, automatic transfer switches, PLC and other control systems
Lighting & Lighting Control** Systems	Emergency lighting, occupancy sensors, lighting control systems, architectural dimming systems, theatrical dimming systems, exterior lighting and controls
Cathodic Protection Systems	Review 3rd party testing results.
Lightning Protection System	Witness 3rd party testing, review reports
Communications	
Grounding & Bonding System	Witness 3rd party testing, review reports
Structured Cabling System	Witness 3rd party testing, review reports
Master Antenna Television System	Witness 3rd party testing, review reports
Public Address & Mass Notification Systems	Witness 3rd party testing, review reports

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Systems To Be Commissioned	
System	Description
Intercom & Program Systems	Witness 3rd party testing, review reports
Nurse Call & Code Blue Systems	Witness 3rd party testing, review reports
Security Emergency Call Systems	Witness 3rd party testing, review reports
Duress Alarm Systems	Witness 3rd party testing, review reports
Electronic Safety and Security	
Grounding & Bonding	Witness 3rd party testing, review reports
Physical Access Control Systems	Witness 3rd party testing, review reports
Access Control Systems	Witness 3rd party testing, review reports
Security Access Detection Systems	Witness 3rd party testing, review reports
Video Surveillance System	Witness 3rd party testing, review reports
Electronic Personal Protection System	Witness 3rd party testing, review reports
Fire Detection and Alarm System	100% device acceptance testing, battery draw-down test, verify system monitoring, verify interface with other systems.
Site Utilities	
Water Utilities	City Water Service Entrance, Backflow Prevention, Pressure Control, Booster Pumps, Irrigation Systems
Sanitary Sewerage Utilities	City Sanitary Connection, Waste Treatment Systems

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Systems To Be Commissioned	
System	Description
Storm Drainage Utilities	City Storm Water Connection, Site Storm Water Distribution
Energy Distribution Utilities	Connection to Third Party Energy (Steam, High Temp Hot Water, Chilled Water) Supply Systems, Metering, Pressure Control
Transportation	
Active Traffic Barrier Systems	Witness 3rd party testing
Integrated Systems Tests	
Loss of Power Response	Loss of power to building, loss of power to campus, restoration of power to building, restoration of power to campus.
Fire Alarm Response	Integrated System Response to Fire Alarm Condition and Return to Normal
Table Notes	
** Denotes systems that LEED requires to be commissioned to comply with the LEED Fundamental Commissioning pre-requisite.	

1.8 COMMISSIONING TEAM

- A. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project Superintendent and subcontractors, installers, schedulers, suppliers, and specialists deemed appropriate by the Department of Veterans Affairs (VA) and Commissioning Agent.
- B. Members Appointed by Contractor:
 - 1. Contractor' Commissioning Manager: The designated person, company, or entity that plans, schedules and coordinates the commissioning activities for the construction team.
 - 2. Contractor's Commissioning Representative(s): Individual(s), each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions.
- C. Members Appointed by VA:

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1. Commissioning Agent: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. The VA will engage the CxA under a separate contract.
2. User: Representatives of the facility user and operation and maintenance personnel.
3. A/E: Representative of the Architect and engineering design professionals.

1.9 VA'S COMMISSIONING RESPONSIBILITIES

- A. Appoint an individual, company or firm to act as the Commissioning Agent.
- B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to, the following:
 1. Coordination meetings.
 2. Training in operation and maintenance of systems, subsystems, and equipment.
 3. Testing meetings.
 4. Witness and assist in Systems Functional Performance Testing.
 5. Demonstration of operation of systems, subsystems, and equipment.
- C. Provide the Construction Documents, prepared by Architect and approved by VA, to the Commissioning Agent and for use in managing the commissioning process, developing the commissioning plan, systems manuals, and reviewing the operation and maintenance training plan.

1.10 CONTRACTOR'S COMMISSIONING RESPONSIBILITIES

- A. The Contractor shall assign a Commissioning Manager to manage commissioning activities of the Contractor, and subcontractors.
- B. The Contractor shall ensure that the commissioning responsibilities outlined in these specifications are included in all subcontracts and that subcontractors comply with the requirements of these specifications.
- C. The Contractor shall ensure that each installing subcontractor shall assign representatives with expertise and authority to act on behalf of the subcontractor and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
 1. Participate in commissioning coordination meetings.

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2. Conduct operation and maintenance training sessions in accordance with approved training plans.
3. Verify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
4. Evaluate commissioning issues and commissioning observations identified in the Commissioning Issues Log, field reports, test reports or other commissioning documents. In collaboration with entity responsible for system and equipment installation, recommend corrective action.
5. Review and comment on commissioning documentation.
6. Participate in meetings to coordinate Systems Functional Performance Testing.
7. Provide schedule for operation and maintenance data submittals, equipment startup, and testing to Commissioning Agent for incorporation into the commissioning plan.
8. Provide information to the Commissioning Agent for developing commissioning plan.
9. Participate in training sessions for VA's operation and maintenance personnel.
10. Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures to conduct Systems Functional Performance Testing of installed systems.

1.11 COMMISSIONING AGENT'S RESPONSIBILITIES

- A. Organize and lead the commissioning team.
- B. Prepare the commissioning plan. See Paragraph 1.11-A of this specification Section for further information.
- C. Review and comment on selected submittals from the Contractor for general conformance with the Construction Documents. Review and comment on the ability to test and operate the system and/or equipment, including providing gages, controls and other components required to operate, maintain, and test the system. Review and comment on performance expectations of systems and equipment and interfaces between systems relating to the Construction Documents.
- D. At the beginning of the construction phase, conduct an initial construction phase coordination meeting for the purpose of reviewing

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the commissioning activities and establishing tentative schedules for operation and maintenance submittals; operation and maintenance training sessions; TAB Work; Pre-Functional Checklists, Systems Functional Performance Testing; and project completion.

- E. Convene commissioning team meetings for the purpose of coordination, communication, and conflict resolution; discuss status of the commissioning processes. Responsibilities include arranging for facilities, preparing agenda and attendance lists, and notifying participants. The Commissioning Agent shall prepare and distribute minutes to commissioning team members and attendees within five workdays of the commissioning meeting.
- F. Observe construction and report progress, observations and issues. Observe systems and equipment installation for adequate accessibility for maintenance and component replacement or repair, and for general conformance with the Construction Documents.
- G. Prepare Project specific Pre-Functional Checklists and Systems Functional Performance Test procedures.
- H. Coordinate Systems Functional Performance Testing schedule with the Contractor.
- I. Witness selected systems startups.
- J. Verify selected Pre-Functional Checklists completed and submitted by the Contractor.
- K. Witness and document Systems Functional Performance Testing.
- L. Compile test data, inspection reports, and certificates and include them in the systems manual and commissioning report.
- M. Review and comment on operation and maintenance (O&M) documentation and systems manual outline for compliance with the Contract Documents. Operation and maintenance documentation requirements are specified in Paragraph 1.25, Section 01 00 00 GENERAL REQUIREMENTS.
- N. Review operation and maintenance training program developed by the Contractor. Verify training plans provide qualified instructors to conduct operation and maintenance training.
- O. Prepare commissioning Field Observation Reports.
- P. Prepare the Final Commissioning Report.
- Q. Return to the site at 10 months into the 12-month warranty period and review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal

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Systems Functional Performance Testing. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the O&M manuals. Identify areas that may come under warranty or under the original construction contract. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.

- R. Assemble the final commissioning documentation, including the Final Commissioning Report and Addendum to the Final Commissioning Report.

1.12 COMMISSIONING DOCUMENTATION

- A. Commissioning Plan: A document, prepared by Commissioning Agent, that outlines the schedule, allocation of resources, and documentation requirements of the commissioning process, and shall include, but is not limited, to the following:
1. Plan for delivery and review of submittals, systems manuals, and other documents and reports. Identification of the relationship of these documents to other functions and a detailed description of submittals that are required to support the commissioning processes. Submittal dates shall include the latest date approved submittals must be received without adversely affecting commissioning plan.
 2. Description of the organization, layout, and content of commissioning documentation (including systems manual) and a detailed description of documents to be provided along with identification of responsible parties.
 3. Identification of systems and equipment to be commissioned.
 4. Schedule of Commissioning Coordination meetings.
 5. Identification of items that must be completed before the next operation can proceed.
 6. Description of responsibilities of commissioning team members.
 7. Description of observations to be made.
 8. Description of requirements for operation and maintenance training.
 9. Schedule for commissioning activities with dates coordinated with overall construction schedule.
 10. Process and schedule for documenting changes on a continuous basis to appear in Project Record Documents.
 11. Process and schedule for completing prestart and startup checklists for systems, subsystems, and equipment to be verified and tested.

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12. Preliminary Systems Functional Performance Test procedures.

- B. Systems Functional Performance Test Procedures: The Commissioning Agent will develop Systems Functional Performance Test Procedures for each system to be commissioned, including subsystems, or equipment and interfaces or interlocks with other systems. Systems Functional Performance Test Procedures will include a separate entry, with space for comments, for each item to be tested. Preliminary Systems Functional Performance Test Procedures will be provided to the VA, Architect/Engineer, and Contractor for review and comment. The Systems Performance Test Procedure will include test procedures for each mode of operation and provide space to indicate whether the mode under test responded as required. Each System Functional Performance Test procedure, regardless of system, subsystem, or equipment being tested, shall include, but not be limited to, the following:
1. Name and identification code of tested system.
 2. Test number.
 3. Time and date of test.
 4. Indication of whether the record is for a first test or retest following correction of a problem or issue.
 5. Dated signatures of the person performing test and of the witness, if applicable.
 6. Individuals present for test.
 7. Observations and Issues.
 8. Issue number, if any, generated as the result of test.
- C. Pre-Functional Checklists: The Commissioning Agent will prepare Pre-Functional Checklists. Pre-Functional Checklists shall be completed and signed by the Contractor, verifying that systems, subsystems, equipment, and associated controls are ready for testing. The Commissioning Agent will spot check Pre-Functional Checklists to verify accuracy and readiness for testing. Inaccurate or incomplete Pre-Functional Checklists shall be returned to the Contractor for correction and resubmission.
- D. Test and Inspection Reports: The Commissioning Agent will record test data, observations, and measurements on Systems Functional Performance Test Procedure. The report will also include recommendation for system acceptance or non-acceptance. Photographs, forms, and other means appropriate for the application shall be included with data.

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Commissioning Agent Will compile test and inspection reports and test and inspection certificates and include them in systems manual and commissioning report.

- E. Corrective Action Documents: The Commissioning Agent will document corrective action taken for systems and equipment that fail tests. The documentation will include any required modifications to systems and equipment and/or revisions to test procedures, if any. The Commissioning Agent will witness and document any retesting of systems and/or equipment requiring corrective action and document retest results.
- F. Commissioning Issues Log: The Commissioning Agent will prepare and maintain Commissioning Issues Log that describes Commissioning Issues and Commissioning Observations that are identified during the Commissioning process. These observations and issues include, but are not limited to, those that are at variance with the Contract Documents. The Commissioning Issues Log will identify and track issues as they are encountered, the party responsible for resolution, progress toward resolution, and document how the issue was resolved. The Master Commissioning Issues Log will also track the status of unresolved issues.
1. Creating a Commissioning Issues Log Entry:
- a. Identify the issue with unique numeric or alphanumeric identifier by which the issue may be tracked.
 - b. Assign a descriptive title for the issue.
 - c. Identify date and time of the issue.
 - d. Identify test number of test being performed at the time of the observation, if applicable, for cross reference.
 - e. Identify system, subsystem, and equipment to which the issue applies.
 - f. Identify location of system, subsystem, and equipment.
 - g. Include information that may be helpful in diagnosing or evaluating the issue.
 - h. Note recommended corrective action.
 - i. Identify commissioning team member responsible for corrective action.
 - j. Identify expected date of correction.
 - k. Identify person that identified the issue.

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2. Documenting Issue Resolution:
 - a. Log date correction is completed or the issue is resolved.
 - b. Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue, if any.
 - c. Identify changes to the Contract Documents that may require action.
 - d. State that correction was completed and system, subsystem, and equipment are ready for retest, if applicable.
 - e. Identify person(s) who corrected or resolved the issue.
 - f. Identify person(s) verifying the issue resolution.
- G. Final Commissioning Report: The Commissioning Agent will document results of the commissioning process, including unresolved issues, and performance of systems, subsystems, and equipment. The Commissioning Report will indicate whether systems, subsystems, and equipment have been properly installed and are performing according to the Contract Documents. This report will be used by the Department of Veterans Affairs when determining that systems will be accepted. This report will be used to evaluate systems, subsystems, and equipment and will serve as a future reference document during VA occupancy and operation. It shall describe components and performance that exceed requirements of the Contract Documents and those that do not meet requirements of the Contract Documents. The commissioning report will include, but is not limited to, the following:
 1. Lists and explanations of substitutions; compromises; variances with the Contract Documents; record of conditions; and, if appropriate, recommendations for resolution. Design Narrative documentation maintained by the Commissioning Agent.
 2. Commissioning plan.
 3. Pre-Functional Checklists completed by the Contractor, with annotation of the Commissioning Agent review and spot check.
 4. Systems Functional Performance Test Procedures, with annotation of test results and test completion.
 5. Commissioning Issues Log.
 6. Listing of deferred and off-season test(s) not performed, including the schedule for their completion.

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H. Addendum to Final Commissioning Report: The Commissioning Agent will prepare an Addendum to the Final Commissioning Report near the end of the Warranty Period. The Addendum will indicate whether systems, subsystems, and equipment are complete and continue to perform according to the Contract Documents. The Addendum to the Final Commissioning Report shall include, but is not limited to, the following:

1. Documentation of deferred and off-season test(s) results.
2. Completed Systems Functional Performance Test Procedures for off season test(s).
3. Documentation that unresolved system performance issues have been resolved.
4. Updated Commissioning Issues Log, including status of unresolved issues.
5. Identification of potential Warranty Claims to be corrected by the Contractor.

I. Systems Manual: The Commissioning Agent will gather required information and compile the Systems Manual. The Systems Manual will include, but is not limited to, the following:

1. Design Narrative, including system narratives, schematics, single-line diagrams, flow diagrams, equipment schedules, and changes made throughout the Project.
2. Reference to Final Commissioning Plan.
3. Reference to Final Commissioning Report.
4. Approved Operation and Maintenance Data as submitted by the Contractor.

1.13 SUBMITTALS

A. Preliminary Commissioning Plan Submittal: The Commissioning Agent shall prepare a Preliminary Commissioning Plan based on the final Construction Documents, and shall contain preliminary information about the following commissioning activities:

1. The Commissioning Team: A list of commissioning team members by organization.
2. Systems to be commissioned. A detailed list of systems to be commissioned for the project. This list also provides preliminary information on systems/equipment submittals to be reviewed by the Commissioning Agent; preliminary information on Pre-Functional

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- Checklists that are to be completed; preliminary information on Systems Performance Testing, including information on testing sample size (where authorized by the VA).
3. Commissioning Team Roles and Responsibilities: Preliminary roles and responsibilities for each Commissioning Team member.
 4. Commissioning Documents: A preliminary list of commissioning-related documents, include identification of the parties responsible for preparation, review, approval, and action on each document.
 5. Commissioning Activities Schedule: Identification of Commissioning Activities, including Systems Functional Testing, the expected duration and predecessors for the activity.
 6. Pre-Functional Checklists: Preliminary Pre-Functional Checklists for equipment, components, subsystems, and systems to be commissioned. These Preliminary Pre-Functional Checklists provide guidance on the level of detailed information the Contractor shall include on the final submission.
 7. Systems Functional Performance Test Procedures: Preliminary step-by-step System Functional Performance Test Procedures to be used during Systems Functional Performance Testing. These Preliminary Systems Functional Performance procedures provide information on the level of testing rigor, and the level of Contractor support required during performance of system's testing.
- B. Final Commissioning Plan Submittal: Based on the Final Construction Documents and the Contractor's project team, the Commissioning Agent will prepare the Final Commissioning Plan as described in this section. The Commissioning Agent will submit three hard copies and three sets of electronic files of Final Commissioning Plan. The Contractor shall review the Commissioning Plan and provide any comments to the VA. The Commissioning Agent will incorporate review comments into the Final Commissioning Plan as directed by the VA.
- C. Systems Functional Performance Test Procedure: The Commissioning Agent will submit preliminary Systems Functional Performance Test Procedures to the Contractor, and the VA for review and comment. The Contractor shall return review comments to the VA and the Commissioning Agent. The VA will also return review comments to the Commissioning Agent. The Commissioning Agent will incorporate review comments into the Final

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Systems Functional Test Procedures to be used in Systems Functional Performance Testing.

- D. Pre-Functional Checklists: The Commissioning Agent will submit Pre-Functional Checklists to be completed by the Contractor.
- E. Test and Inspection Reports: The Commissioning Agent will submit test and inspection reports to the VA with copies to the Contractor and the Architect/Engineer.
- F. Corrective Action Documents: The Commissioning Agent will submit corrective action documents to the VA COR with copies to the Contractor and Architect.
- G. Preliminary Commissioning Report Submittal: The Commissioning Agent will submit three electronic copies of the preliminary commissioning report. One electronic copy, with review comments, will be returned to the Commissioning Agent for preparation of the final submittal.
- H. Final Commissioning Report Submittal: The Commissioning Agent will submit four sets of electronically formatted information of the final commissioning report to the VA. The final submittal will incorporate comments as directed by the VA.
- I. Data for Commissioning:
 - 1. The Commissioning Agent will request in writing from the Contractor specific information needed about each piece of commissioned equipment or system to fulfill requirements of the Commissioning Plan.
 - 2. The Commissioning Agent may request further documentation as is necessary for the commissioning process or to support other VA data collection requirements, including Construction Operations Building Information Exchange (COBIE), Building Information Modeling (BIM), etc.

1.14 COMMISSIONING PROCESS

- A. The Commissioning Agent will be responsible for the overall management of the commissioning process as well as coordinating scheduling of commissioning tasks with the VA and the Contractor. As directed by the VA, the Contractor shall incorporate Commissioning tasks, including, but not limited to, Systems Functional Performance Testing (including predecessors) with the Master Construction Schedule.
- B. Within 14 days of contract award, the Contractor shall designate a specific individual as the Commissioning Manager (CxM) to manage and

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lead the commissioning effort on behalf of the Contractor. The Commissioning Manager shall be the single point of contact and communications for all commissioning related services by the Contractor.

- C. Within 14 days of contract award, the Contractor shall ensure that each subcontractor designates specific individuals as Commissioning Representatives (CXR) to be responsible for commissioning related tasks. The Contractor shall ensure the designated Commissioning Representatives participate in the commissioning process as team members providing commissioning testing services, equipment operation, adjustments, and corrections if necessary. The Contractor shall ensure that all Commissioning Representatives shall have sufficient authority to direct their respective staff to provide the services required, and to speak on behalf of their organizations in all commissioning related contractual matters.

1.15 QUALITY ASSURANCE

- A. Instructor Qualifications: Factory authorized service representatives shall be experienced in training, operation, and maintenance procedures for installed systems, subsystems, and equipment.
- B. Test Equipment Calibration: The Contractor shall comply with test equipment manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately whenever instruments have been repaired following damage or dropping. Affix calibration tags to test instruments. Instruments shall have been calibrated within six months prior to use.

1.16 COORDINATION

- A. Management: The Commissioning Agent will coordinate the commissioning activities with the VA and Contractor. The Commissioning Agent will submit commissioning documents and information to the VA. All commissioning team members shall work together to fulfill their contracted responsibilities and meet the objectives of the contract documents.
- B. Scheduling: The Contractor shall work with the Commissioning Agent and the VA to incorporate the commissioning activities into the construction schedule. The Commissioning Agent will provide sufficient information (including, but not limited to, tasks, durations and predecessors) on commissioning activities to allow the Contractor and

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the VA to schedule commissioning activities. All parties shall address scheduling issues and make necessary notifications in a timely manner in order to expedite the project and the commissioning process. The Contractor shall update the Master Construction as directed by the VA.

- C. Initial Schedule of Commissioning Events: The Commissioning Agent will provide the initial schedule of primary commissioning events in the Commissioning Plan and at the commissioning coordination meetings. The Commissioning Plan will provide a format for this schedule. As construction progresses, more detailed schedules will be developed by the Contractor with information from the Commissioning Agent.
- D. Commissioning Coordinating Meetings: The Commissioning Agent will conduct periodic Commissioning Coordination Meetings of the commissioning team to review status of commissioning activities, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities.
- E. Pretesting Meetings: The Commissioning Agent will conduct pretest meetings of the commissioning team to review startup reports, Pre-Functional Checklist results, Systems Functional Performance Testing procedures, testing personnel and instrumentation requirements.
- F. Systems Functional Performance Testing Coordination: The Contractor shall coordinate testing activities to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting. The Contractor shall coordinate the schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. The Contractor shall provide all standard and specialized testing equipment required to perform Systems Functional Performance Testing. Test equipment required for Systems Functional Performance Testing will be identified in the detailed System Functional Performance Test Procedure prepared by the Commissioning Agent.
- B. Data logging equipment and software required to test equipment shall be provided by the Contractor.
- C. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum

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requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5 °C (1.0 °F) and a resolution of + or - 0.1 °C (0.2 °F). Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer's recommended intervals and following any repairs to the equipment. Calibration tags shall be affixed or certificates readily available.

PART 3 - EXECUTION

3.1 COMMISSIONING PROCESS ROLES AND RESPONSIBILITIES

A. The following table outlines the roles and responsibilities for the Commissioning Team members during the Construction Phase:

Construction Phase		CxA = Commissioning Agent RE = COR A/E = Design Arch/Engineer PC = Prime Contractor O&M = Gov't Facility O&M					L = Lead P = Participate A = Approve R = Review O = Optional
Category	Task Description	CxA	RE	A/E	PC	O&M	Notes
Commissioning Roles & Responsibilities							
Meetings	Construction Commissioning Kick Off meeting	L	A	P	P	O	
	Commissioning Meetings	L	A	P	P	O	
	Project Progress Meetings	P	A	P	L	O	
	Controls Meeting	L	A	P	P	O	
Coordination	Coordinate with [OGC's, AHJ, Vendors, etc.] to ensure that Cx interacts properly with other systems as needed to support the OPR and BOD.	L	A	P	P	N/A	
Cx Plan & Spec	Final Commissioning Plan	L	A	R	R	O	
Schedules	Duration Schedule for Commissioning Activities	L	A	R	R	N/A	

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Construction Phase		CxA = Commissioning Agent RE = COR A/E = Design Arch/Engineer PC = Prime Contractor O&M = Gov't Facility O&M					L = Lead P = Participate A = Approve R = Review O = Optional
Commissioning Roles & Responsibilities							
Category	Task Description	CxA	RE	A/E	PC	O&M	Notes
OPR and BOD	Maintain OPR on behalf of Owner	L	A	R	R	O	
	Maintain BOD/DID on behalf of Owner	L	A	R	R	O	
Document Reviews	TAB Plan Review	L	A	R	R	O	
	Submittal and Shop Drawing Review	R	A	R	L	O	
	Review Contractor Equipment Startup Checklists	L	A	R	R	N/A	
	Review Change Orders, ASI, and RFI	L	A	R	R	N/A	
Site Observations	Witness Factory Testing	P	A	P	L	O	
	Construction Observation Site Visits	L	A	R	R	O	
Functional Test Protocols	Final Pre-Functional Checklists	L	A	R	R	O	
	Final Functional Performance Test Protocols	L	A	R	R	O	
Technical Activities	Issues Resolution Meetings	P	A	P	L	O	

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Construction Phase		CxA = Commissioning Agent RE = COR A/E = Design Arch/Engineer PC = Prime Contractor O&M = Gov't Facility O&M					L = Lead P = Participate A = Approve R = Review O = Optional
Category	Task Description	CxA	RE	A/E	PC	O&M	Notes
Commissioning Roles & Responsibilities							
Reports and Logs	Status Reports	L	A	R	R	O	
	Maintain Commissioning Issues Log	L	A	R	R	O	

B. The following table outlines the roles and responsibilities for the Commissioning Team members during the Acceptance Phase:

Acceptance Phase		CxA = Commissioning Agent RE = COR A/E = Design Arch/Engineer PC = Prime Contractor O&M = Gov't Facility O&M					L = Lead P = Participate A = Approve R = Review O = Optional
Category	Task Description	CxA	RE	A/E	PC	O&M	Notes
Commissioning Roles & Responsibilities							
Meetings	Commissioning Meetings	L	A	P	P	O	
	Project Progress Meetings	P	A	P	L	O	
	Pre-Test Coordination Meeting	L	A	P	P	O	
	Lessons Learned and Commissioning Report Review Meeting	L	A	P	P	O	

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Acceptance Phase		CxA = Commissioning Agent RE = COR A/E = Design Arch/Engineer PC = Prime Contractor O&M = Gov't Facility O&M					L = Lead P = Participate A = Approve R = Review O = Optional	
Commissioning Roles & Responsibilities								
Category	Task Description	CxA	RE	A/E	PC	O&M	Notes	
Coordination	Coordinate with [OGC's, AHJ, Vendors, etc.] to ensure that Cx interacts properly with other systems as needed to support OPR and BOD	L	P	P	P	O		
Cx Plan & Spec	Maintain/Update Commissioning Plan	L	A	R	R	O		
Schedules	Prepare Functional Test Schedule	L	A	R	R	O		
OPR and BOD	Maintain OPR on behalf of Owner	L	A	R	R	O		
	Maintain BOD/DID on behalf of Owner	L	A	R	R	O		
Document Reviews	Review Completed Pre-Functional Checklists	L	A	R	R	O		
	Pre-Functional Checklist Verification	L	A	R	R	O		
	Review Operations & Maintenance Manuals	L	A	R	R	R		
	Training Plan Review	L	A	R	R	R		
	Warranty Review	L	A	R	R	O		
	Review TAB Report	L	A	R	R	O		
Site Observations	Construction Observation Site Visits	L	A	R	R	O		
	Witness Selected Equipment Startup	L	A	R	R	O		

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Acceptance Phase		CxA = Commissioning Agent RE = COR A/E = Design Arch/Engineer PC = Prime Contractor O&M = Gov't Facility O&M					L = Lead P = Participate A = Approve R = Review O = Optional
Commissioning Roles & Responsibilities							
Category	Task Description	CxA	RE	A/E	PC	O&M	Notes
Functional Test Protocols	TAB Verification	L	A	R	R	O	
	Systems Functional Performance Testing	L	A	P	P	P	
	Retesting	L	A	P	P	P	
Technical Activities	Issues Resolution Meetings	P	A	P	L	O	
	Systems Training	L	S	R	P	P	
Reports and Logs	Status Reports	L	A	R	R	O	
	Maintain Commissioning Issues Log	L	A	R	R	O	
	Final Commissioning Report	L	A	R	R	R	
	Prepare Systems Manuals	L	A	R	R	R	

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C. The following table outlines the roles and responsibilities for the Commissioning Team members during the Warranty Phase:

Warranty Phase		CxA = Commissioning Agent RE = COR A/E = Design Arch/Engineer PC = Prime Contractor O&M = Gov't Facility O&M					L = Lead P = Participate A = Approve R = Review O = Optional
Commissioning Roles & Responsibilities							
Category	Task Description	CxA	RE	A/E	PC	O&M	Notes
Meetings	Post-Occupancy User Review Meeting	L	A	O	P	P	
Site Observations	Periodic Site Visits	L	A	O	O	P	
Functional Test Protocols	Deferred and/or seasonal Testing	L	A	O	P	P	
Technical Activities	Issues Resolution Meetings	L	S	O	O	P	
	Post-Occupancy Warranty Checkup and review of Significant Outstanding Issues	L	A		R	P	
Reports and Logs	Final Commissioning Report Amendment	L	A		R	R	
	Status Reports	L	A		R	R	

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3.2 STARTUP, INITIAL CHECKOUT, AND PRE-FUNCTIONAL CHECKLISTS

- A. The following procedures shall apply to all equipment and systems to be commissioned, according to Part 1, Systems to Be Commissioned.
1. Pre-Functional Checklists are important to ensure that the equipment and systems are hooked up and operational. These ensure that Systems Functional Performance Testing may proceed without unnecessary delays. Each system to be commissioned shall have a full Pre-Functional Checklist completed by the Contractor prior to Systems Functional Performance Testing. No sampling strategies are used.
 - a. The Pre-Functional Checklist will identify the trades responsible for completing the checklist. The Contractor shall ensure the appropriate trades complete the checklists.
 - b. The Commissioning Agent will review completed Pre-Functional Checklists and field-verify the accuracy of the completed checklist using sampling techniques.
 2. Startup and Initial Checkout Plan: The Contractor shall develop detailed startup plans for all equipment. The primary role of the Contractor in this process is to ensure that there is written documentation that each of the manufacturer recommended procedures have been completed. Parties responsible for startup shall be identified in the Startup Plan and in the checklist forms.
 - a. The Contractor shall develop the full startup plan by combining (or adding to) the checklists with the manufacturer's detailed startup and checkout procedures from the O&M manual data and the field checkout sheets normally used by the Contractor. The plan shall include checklists and procedures with specific boxes or lines for recording and documenting the checking and inspections of each procedure and a summary statement with a signature block at the end of the plan.
 - b. The full startup plan shall at a minimum consist of the following items:
 - 1) The Pre-Functional Checklists.
 - 2) The manufacturer's standard written startup procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.

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- 3) The manufacturer's normally used field checkout sheets.
 - c. The Commissioning Agent will submit the full startup plan to the VA and Contractor for review. Final approval will be by the VA.
 - d. The Contractor shall review and evaluate the procedures and the format for documenting them, noting any procedures that need to be revised or added.
3. Sensor and Actuator Calibration
- a. All field installed temperature, relative humidity, CO2 and pressure sensors and gages, and all actuators (dampers and valves) on all equipment shall be calibrated using the methods described in Division 21, Division 22, Division 23, Division 26, Division 27, and Division 28 specifications.
 - b. All procedures used shall be fully documented on the Pre-Functional Checklists or other suitable forms, clearly referencing the procedures followed and written documentation of initial, intermediate and final results.
4. Execution of Equipment Startup
- a. Four weeks prior to equipment startup, the Contractor shall schedule startup and checkout with the VA and Commissioning Agent. The performance of the startup and checkout shall be directed and executed by the Contractor.
 - b. The Commissioning Agent will observe the startup procedures for selected pieces of primary equipment.
 - c. The Contractor shall execute startup and provide the VA and Commissioning Agent with a signed and dated copy of the completed startup checklists, and contractor tests.
 - d. Only individuals that have direct knowledge and witnessed that a line item task on the Startup Checklist was actually performed shall initial or check that item off. It is not acceptable for witnessing supervisors to fill out these forms.

3.3 DEFICIENCIES, NONCONFORMANCE, AND APPROVAL IN CHECKLISTS AND STARTUP

- A. The Contractor shall clearly list any outstanding items of the initial startup and Pre-Functional Checklist procedures that were not completed successfully, at the bottom of the procedures form or on an attached sheet. The procedures form and any outstanding deficiencies shall be

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provided to the VA and the Commissioning Agent within two days of completion.

- B. The Commissioning Agent will review the report and submit comments to the VA. The Commissioning Agent will work with the Contractor to correct and verify deficiencies or uncompleted items. The Commissioning Agent will involve the VA and others as necessary. The Contractor shall correct all areas that are noncompliant or incomplete in the checklists in a timely manner, and shall notify the VA and Commissioning Agent as soon as outstanding items have been corrected. The Contractor shall submit an updated startup report and a Statement of Correction on the original noncompliance report. When satisfactorily completed, the Commissioning Agent will recommend approval of the checklists and startup of each system to the VA.
- C. The Contractor shall be responsible for resolution of deficiencies as directed the VA.

3.4 PHASED COMMISSIONING

- A. The project may require startup and initial checkout to be executed in phases. This phasing shall be planned and scheduled in a coordination meeting of the VA, Commissioning Agent, and the Contractor. Results will be added to the master construction schedule and the commissioning schedule.

3.5 DDC SYSTEM TRENDING FOR COMMISSIONING

- A. Trending is a method of testing as a standalone method or to augment manual testing. The Contractor shall trend any and all points of the system or systems at intervals specified below.
- B. Alarms are a means to notify the system operator that abnormal conditions are present in the system. Alarms shall be structured into three tiers - Critical, Priority, and Maintenance.
 - 1. Critical alarms are intended to be alarms that require the immediate attention of and action by the Operator. These alarms shall be displayed on the Operator Workstation in a popup style window that is graphically linked to the associated unit's graphical display. The popup style window shall be displayed on top of any active window within the screen, including non DDC system software.

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2. Priority level alarms are to be printed to a printer which is connected to the Operator's Work Station located within the engineer's office. Additionally Priority level alarms shall be able to be monitored and viewed through an active alarm application. Priority level alarms are alarms which shall require reaction from the operator or maintenance personnel within a normal work shift, and not immediate action.
 3. Maintenance alarms are intended to be minor issues which would require examination by maintenance personnel within the following shift. These alarms shall be generated in a scheduled report automatically by the DDC system at the start of each shift. The generated maintenance report will be printed to a printer located within the engineer's office.
- C. The Contractor shall provide a wireless internet network in the building for use during controls programming, checkout, and commissioning. This network will allow project team members to more effectively program, view, manipulate and test control devices while being in the same room as the controlled device.
- D. The Contractor shall provide graphical trending through the DDC control system of systems being commissioned. Trending requirements are indicated below and included with the Systems Functional Performance Test Procedures. Trending shall occur before, during and after Systems Functional Performance Testing. The Contractor shall be responsible for producing graphical representations of the trended DDC points that show each system operating properly during steady state conditions as well as during the System Functional Testing. These graphical reports shall be submitted to the COR and Commissioning Agent for review and analysis before, during dynamic operation, and after Systems Functional Performance Testing. The Contractor shall provide, but not limited to, the following trend requirements and trend submissions:
1. Pre-testing, Testing, and Post-testing - Trend reports of trend logs and graphical trend plots are required as defined by the Commissioning Agent. The trend log points, sampling rate, graphical plot configuration, and duration will be dictated by the Commissioning Agent. At any time during the Commissioning Process

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- the Commissioning Agent may recommend changes to aspects of trending as deemed necessary for proper system analysis. The Contractor shall implement any changes as directed by the COR. Any pre-test trend analysis comments generated by the Commissioning Team should be addressed and resolved by the Contractor, as directed by the COR, prior to the execution of Systems Functional Performance Testing.
2. Dynamic plotting - The Contractor shall also provide dynamic plotting during Systems Functional Performance testing at frequent intervals for points determined by the Systems Functional Performance Test Procedure. The graphical plots will be formatted and plotted at durations listed in the Systems Functional Performance Test Procedure.
 3. Graphical plotting - The graphical plots shall be provided with a dual y-axis allowing 15 or more trend points (series) plotted simultaneously on the graph with each series in distinct color. The plots will further require title, axis naming, legend etc. all described by the Systems Functional Performance Test Procedure. If this cannot be sufficiently accomplished directly in the Direct Digital Control System then it is the responsibility of the Contractor to plot these trend logs in Microsoft Excel.
 4. The following tables indicate the points to be trended and alarmed by system. The Operational Trend Duration column indicates the trend duration for normal operations. The Testing Trend Duration column indicates the trend duration prior to Systems Functional Performance Testing and again after Systems Functional Performance Testing. The Type column indicates point type: AI = Analog Input, AO = Analog Output, DI = Digital Input, DO = Digital Output, Calc = Calculated Point. In the Trend Interval Column, COV = Change of Value. The Alarm Type indicates the alarm priority; C = Critical, P = Priority, and M = Maintenance. The Alarm Range column indicates when the point is considered in the alarm state. The Alarm Delay column indicates the length of time the point must remain in an alarm state before the alarm is recorded in the DDC. The intent is to allow minor, short-duration events to be corrected by the DDC system prior to recording an alarm.

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Dual-Path Air Handling Unit Trending and Alarms							
Point	Type	Trend Interval	Operationa l Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
OA Temperature	AI	15 Min	24 hours	3 days	N/A		
RA Temperature	AI	15 Min	24 hours	3 days	N/A		
RA Humidity	AI	15 Min	24 hours	3 days	P	>60% RH	10 min
Mixed Air Temp	AI	None	None	None	N/A		
SA Temp	AI	15 Min	24 hours	3 days	C	±5°F from SP	10 min
Supply Fan Speed	AI	15 Min	24 hours	3 days	N/A		
Return Fan Speed	AI	15 Min	24 hours	3 days	N/A		
RA Pre-Filter Status	AI	None	None	None	N/A		
OA Pre-Filter Status	AI	None	None	None	N/A		
After Filter Status	AI	None	None	None	N/A		
SA Flow	AI	15 Min	24 hours	3 days	C	±10% from SP	10 min
OA Supply Temp	AI	15 Min	24 hours	3 days	P	±5°F from SP	10 min
RA Supply Temp	AI	15 Min	24 hours	3 days	N/A		
RA CHW Valve Position	AI	15 Min	24 hours	3 days	N/A		
OA CHW Valve Position	AI	15 Min	24 hours	3 days	N/A		
OA HW Valve Position	AI	15 Min	24 hours	3 days	N/A		
OA Flow	AI	15 Min	24 hours	3 days	P	±10% from SP	5 min
RA Flow	AI	15 Min	24 hours	3 days	P	±10% from SP	5 min
Initial UVC Intensity (%)	AI	None	None	None	N/A		
Duct Pressure	AI	15 Min	24 hours	3 days	C	±25% from SP	6 min
CO2 Level	AI	15 Min	24 hours	3 days	P	±10% from SP	10 min

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Dual-Path Air Handling Unit Trending and Alarms							
Point	Type	Trend Interval	Operationa l Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Supply Fan Status	DI	COV	24 hours	3 days	C	Status <> Command	10 min
Return Fan Status	DI	COV	24 hours	3 days	C	Status <> Command	10 Min
High Static Status	DI	COV	24 hours	3 days	P	True	1 min
Fire Alarm Status	DI	COV	24 hours	3 days	C	True	5 min
Freeze Stat Level 1	DI	COV	24 hours	3 days	C	True	10 min
Freeze Stat Level 2	DI	COV	24 hours	3 days	C	True	5 min
Freeze Stat Level 3	DI	COV	24 hours	3 days	P	True	1 min
Fire/Smoke Damper Status	DI	COV	24 hours	3 days	P	Closed	1 min
Emergency AHU Shutdown	DI	COV	24 hours	3 days	P	True	1 min
Exhaust Fan #1 Status	DI	COV	24 hours	3 days	C	Status <> Command	10 min
Exhaust Fan #2 Status	DI	COV	24 hours	3 days	C	Status <> Command	10 min
Exhaust Fan #3 Status	DI	COV	24 hours	3 days	C	Status <> Command	10 min
OA Alarm	DI	COV	24 hours	3 days	C	True	10 min
High Static Alarm	DI	COV	24 hours	3 days	C	True	10 min
UVC Emitter Alarm	DI	COV	24 hours	3 days	P	True	10 min
CO2 Alarm	DI	COV	24 hours	3 days	P	True	10 min
Power Failure	DI	COV	24 hours	3 days	P	True	1 min
Supply Fan Speed	AO	15 Min	24 hours	3 days	N/A		
Return Fan Speed	AO	15 Min	24 hours	3 days	N/A		

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Dual-Path Air Handling Unit Trending and Alarms							
Point	Type	Trend Interval	Operationa l Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
RA CHW Valve Position	AO	15 Min	24 hours	3 days	N/A		
OA CHW Valve Position	AO	15 Min	24 hours	3 days	N/A		
OA HW Valve Position	AO	15 Min	24 hours	3 days	N/A		
Supply Fan S/S	DO	COV	24 hours	3 days	N/A		
Return Fan S/S	DO	COV	24 hours	3 days	N/A		
Fire/Smoke Dampers	DO	COV	24 hours	3 days	N/A		
Exhaust Fan S/S	DO	COV	24 hours	3 days	N/A		
Exhaust Fan S/S	DO	COV	24 hours	3 days	N/A		
Exhaust Fan S/S	DO	COV	24 hours	3 days	N/A		
AHU Energy	Calc	1 Hour	30 day	N/A	N/A		

Terminal Unit (VAV, CAV, etc.) Trending and Alarms							
Point	Type	Trend Interval	Operationa l Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Space Temperature	AI	15 Min	12 hours	3 days	P	±5°F from SP	10 min
Air Flow	AI	15 Min	12 hours	3 days	P	±5°F from SP	10 min
SA Temperature	AI	15 Min	12 hours	3 days	P	±5°F from SP	10 min
Local Setpoint	AI	15 Min	12 hours	3 days	M	±10°F from SP	60 min
Space Humidity	AI	15 Min	12 hours	3 days	P	> 60% RH	5 min
Unoccupied Override	DI	COV	12 hours	3 days	M	N/A	12 Hours

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Terminal Unit (VAV, CAV, etc.) Trending and Alarms							
Point	Type	Trend Interval	Operationa l Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Refrigerator Alarm	DI	COV	12 hours	3 days	C	N/A	10 min
Damper Position	AO	15 Minutes	12 hours	3 days	N/A		
Heating coil Valve Position	AO	15 Minutes	12 hours	3 days	N/A		

4-Pipe Fan Coil Trending and Alarms							
Point	Type	Trend Interval	Operationa l Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Space Temperature	AI	15 Minutes	12 hours	3 days	P	±5°F from SP	10 min
SA Temperature	AI	15 Minutes	12 hours	3 days	P	±5°F from SP	10 min
Pre-Filter Status	AI	None	None	None	M	> SP	1 hour
Water Sensor	DI	COV	12 hours	3 days	M	N/A	30 Min
Cooling Coil Valve Position	AO	15 Minutes	12 hours	3 days	N/A		
Heating coil Valve Position	AO	15 Minutes	12 hours	3 days	N/A		
Fan Coil ON/OFF	DO	COV	12 hours	3 days	M	Status <> Command	30 min

2-Pipe Fan Coil Unit Trending and Alarms							
Point	Type	Trend Interval	Operationa l Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Space Temperature	AI	15 Minutes	12 hours	3 days	P	±5°F from SP	10 min

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2-Pipe Fan Coil Unit Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
SA Temperature	AI	15 Minutes	12 hours	3 days	P	±5°F from SP	10 min
Pre-Filter Status	AI	None	None	None	M	> SP	1 hour
Water Sensor	DI	COV	12 hours	3 days	M	N/A	30 Min
Cooling Coil Valve Position	AO	15 Minutes	12 hours	3 days	N/A		
Fan Coil ON/OFF	DO	COV	12 hours	3 days	M	Status <> Command	30 min

Unit Heater Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Space Temperature	AI	15 Minutes	12 hours	3 days	P	±5°F from SP	10 min
Heating Valve Position	AO	15 Minutes	12 hours	3 days	N/A		
Unit Heater ON/OFF	DO	COV	12 hours	3 days	M	Status <> Command	30 min

Steam and Condensate Pumps Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Steam Flow (LB/HR)	AI	15 Minutes	12 hours	3 days	N/A		
Condensate Pump Run Hours	AI	15 Minutes	12 hours	3 days	N/A		

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Steam and Condensate Pumps Trending and Alarms							
Point	Type	Trend Interval	Operationa l Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Water Meter (GPM)	AI	15 Minutes	12 hours	3 days	N/A		
Electric Meter (KW/H)	AI	15 Minutes	12 hours	3 days	N/A		
Irrigation Meter (GPM)	AI	15 Minutes	12 hours	3 days	N/A		
Chilled Water Flow (TONS)	AI	15 Minutes	12 hours	3 days	N/A		
Condensate Flow (GPM)	AI	15 Minutes	12 hours	3 days	N/A		
High Water Level Alarm	DI	COV	12 hours	3 days	C	True	5 Min
Condensate Pump Start/Stop	DO	COV	12 hours	3 days	P	Status <> Command	10 min

Domestic Hot Water Trending and Alarms							
Point	Type	Trend Interval	Operationa l Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Domestic HW Setpoint WH-1	AI	15 Minute	12 Hours	3 days	N/A		
Domestic HW Setpoint WH-2	AI	15 Minute	12 Hours	3 days	N/A		
Domestic HW Temperature	AI	15 Minute	12 Hours	3 days	C	> 135 oF	10 Min
Domestic HW Temperature	AI	15 Minute	12 Hours	3 days	P	±5°F from SP	10 Min
Dom. Circ. Pump #1 Status	DI	COV	12 Hours	3 days	M	Status <> Command	30 min
Dom. Circ. Pump #2 Status	DI	COV	12 Hours	3 days	M	Status <> Command	30 min
Dom. Circ. Pump #1 Start/Stop	DO	COV	12 Hours	3 days	N/A		

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Domestic Hot Water Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Dom. Circ. Pump #2 Start/Stop	DO	COV	12 Hours	3 days	N/A		
Domestic HW Start/Stop	DO	COV	12 Hours	3 days	N/A		

Hydronic Hot Water Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
System HWS Temperature	AI	15 min	12 hours	3 days	C	±5°F from SP	10 Min
System HWR Temperature	AI	15 min	12 hours	3 days	M	±15°F from SP	300 Min
HX-1 Entering Temperature	AI	15 min	12 hours	3 days	P	±5°F from SP	10 Min
HX-2 Entering Temperature	AI	15 min	12 hours	3 days	P	±5°F from SP	10 Min
HX-2 Leaving Temperature	AI	15 min	12 hours	3 days	P	±5°F from SP	10 Min
System Flow (GPM)	AI	15 min	12 hours	3 days	N/A		
System Differential Pressure	AI	15 min	12 hours	3 days	P	±10% from SP	8 Min
				3 days			
HW Pump 1 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min
HW Pump 2 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min
HW Pump 1 VFD Speed	AO	15 Min	12 Hours	3 days	N/A		
HW Pump 2 VFD Speed	AO	15 Min	12 Hours	3 days	N/A		
Steam Station #1 1/3 Control Valve Position	AO	15 Min	12 Hours	3 days	N/A		

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Hydronic Hot Water Trending and Alarms							
Point	Type	Trend Interval	Operationa 1 Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Steam Station #1 2/3 Control Valve Position	AO	15 Min	12 Hours	3 days	N/A		
Steam Station #2 1/3 Control Valve Position	AO	15 Min	12 Hours	3 days	N/A		
Steam Station #2 2/3 Control Valve Position	AO	15 Min	12 Hours	3 days	N/A		
Steam Station Bypass Valve Position	AO	15 Min	12 Hours	3 days	N/A		
HW Pump 1 Start/Stop	DO	COV	12 Hours	3 days	N/A		
HW Pump 2 Start/Stop	DO	COV	12 Hours	3 days	N/A		
HWR #1 Valve	DO	COV	12 Hours	3 days	N/A		
HWR #2 Valve	DO	COV	12 Hours	3 days	N/A		

Chilled Water System Trending and Alarms							
Point	Type	Trend Interval	Operationa 1 Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Chiller 1 Entering Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 1 Leaving Temperature	AI	15 Minutes	12 Hours	3 days	P	±5°F from SP	10 Min
Chiller 1 Flow	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 1 Percent Load	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 1 KW Consumption	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 1 Tonnage	AI	15 Minutes	12 Hours	3 days	N/A		

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Chilled Water System Trending and Alarms							
Point	Type	Trend Interval	Operationa 1 Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Chiller 2 Entering Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 2 Leaving Temperature	AI	15 Minutes	12 Hours	3 days	P	±5°F from SP	10 Min
Chiller 2 Flow	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 2 Percent Load	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 2 KW Consumption	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 2 Tonnage	AI	15 Minutes	12 Hours	3 days	N/A		
Primary Loop Decoupler Flow	AI	15 Minutes	12 Hours	3 days	N/A		
Primary Loop Flow	AI	15 Minutes	12 Hours	3 days	N/A		
Primary Loop Supply Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Secondary Loop Differential Pressure	AI	15 Minutes	12 Hours	3 days	P	±5% from SP	10 Min
Secondary Loop Flow	AI	15 Minutes	12 Hours	3 days	N/A		
Secondary Loop Supply Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Secondary Loop Return Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Secondary Loop Tonnage	AI	15 Minutes	12 Hours	3 days	N/A		
Primary Loop Pump 1 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min
Primary Loop Pump 2 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min

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Chilled Water System Trending and Alarms							
Point	Type	Trend Interval	Operationa 1 Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Secondary Loop Pump 1 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min
Secondary Loop Pump 2 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min
Chiller 1 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min
Chiller 1 Evaporator Iso-Valve	DI	COV	12 Hours	3 days	N/A		
Chiller 1 Evaporator Flow Switch	DI	COV	12 Hours	3 days	N/A		
Chiller 1 Unit Alarm	DI	COV	12 Hours	3 days	C	True	10 Min
Chiller 2 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min
Chiller 2 Evaporator Iso-Valve	DI	COV	12 Hours	3 days	N/A		
Chiller 2 Evaporator Flow Switch	DI	COV	12 Hours	3 days	N/A		
Chiller 2 Unit Alarm	DI	COV	12 Hours	3 days	C	True	10 Min
Refrigerant Detector	DI	COV	12 Hours	3 days	C	True	10 Min
Refrigerant Exhaust Fan Status	DI	COV	12 Hours	3 days	M	Status <> Command	30 min
Emergency Shutdown	DI	COV	12 Hours	3 days	P	True	1 Min
Primary Loop Pump 1 VFD Speed	AO	15 Minutes	12 Hours	3 days	N/A		
Primary Loop Pump 2 VFD Speed	AO	15 Minutes	12 Hours	3 days	N/A		
Secondary Loop Pump 1 VFD Speed	AO	15 Minutes	12 Hours	3 days	N/A		

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Chilled Water System Trending and Alarms							
Point	Type	Trend Interval	Operationa 1 Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Secondary Loop Pump 2 VFD Speed	AO	15 Minutes	12 Hours	3 days	N/A		
Primary Pump 1 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Primary Pump 2 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Secondary Pump 1 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Secondary Pump 2 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Chiller 1 Enable	DO	COV	12 Hours	3 days	N/A		
Chiller 1 Iso-Valve Command	DO	COV	12 Hours	3 days	N/A		
Chiller 2 Enable	DO	COV	12 Hours	3 days	N/A		
Chiller 2 Iso-Valve Command	DO	COV	12 Hours	3 days	N/A		
Refrigerant Exhaust Fan Start / Stop	DO	COV	12 Hours	3 days	N/A		

Condenser Water System Trending and Alarms							
Point	Type	Trend Interval	Operationa 1 Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Chiller 1 Condenser Entering Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 1 Condenser Leaving Temp	AI	15 Minutes	12 Hours	3 days	N/A		

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Condenser Water System Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Chiller 2 Condenser Entering Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 2 Condenser Leaving Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 1 Supply Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 1 Return Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 1 Basin Temp	AI	15 Minutes	12 Hours	3 days	P	< 45 oF	10 Min
Cooling Tower 2 Supply Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 2 Return Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 2 Basin Temp	AI	15 Minutes	12 Hours	3 days	P	< 45 oF	10 Min
Condenser Water Supply Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Condenser Water Return Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Outdoor Air Wet Bulb	AI	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 1 Fan Status	DI	COV	12 Hours	3 days	P	Status <> Command	1 min
Cooling Tower 1 Basin Heat	DI	COV	12 Hours	3 days	N/A		
Cooling Tower 1 Heat Trace	DI	COV	12 Hours	3 days	N/A		
Cooling Tower 2 Fan Status	DI	COV	12 Hours	3 days	P	Status <> Command	1 min
Cooling Tower 2 Basin Heat	DI	COV	12 Hours	3 days	N/A		
Cooling Tower 2 Heat Trace	DI	COV	12 Hours	3 days	N/A		
Chiller 1 Isolation Valve	DI	COV	12 Hours	3 days	P	Status <> Command	1 min

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Condenser Water System Trending and Alarms							
Point	Type	Trend Interval	Operationa 1 Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Chiller 2 Isolation Valve	DI	COV	12 Hours	3 days	P	Status <> Command	1 min
Condenser Water Pump 1 Status	DI	COV	12 Hours	3 days	P	Status <> Command	1 min
Condenser Water Pump 2 Status	DI	COV	12 Hours	3 days	P	Status <> Command	1 min
Chiller 1 Condenser Bypass Valve	AO	15 Minutes	12 Hours	3 days	N/A		
Chiller 2 Condenser By-Pass Valve	AO	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 1 Bypass Valve	AO	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 1 Fan Speed	AO	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 2 Bypass Valve	AO	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 2 Fan Speed	AO	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 1 Fan Start / Stop	DO	COV	12 Hours	3 days	N/A		
Cooling Tower 2 Fan Start / Stop	DO	COV	12 Hours	3 days	N/A		
Condenser Water Pump 1 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Condenser Water Pump 2 Start / Stop	DO	COV	12 Hours	3 days	N/A		

Steam Boiler System Trending and Alarms

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Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Boiler 1 Steam Pressure	AI	15 Minutes	12 Hours	3 days	P	±5% from SP	10 Min
Boiler 1 Steam Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 1 Fire Signal	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 2 Steam Pressure	AI	15 Minutes	12 Hours	3 days	P	±5% from SP	10 Min
Boiler 2 Steam Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 2 Fire Signal	AI	15 Minutes	12 Hours	3 days	N/A		
System Steam Pressure	AI	15 Minutes	12 Hours	3 days	P	±5% from SP	10 Min
Boiler 1 Enable	DI	COV	12 Hours	3 days	N/A		
Boiler 1 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Boiler 1 Alarm	DI	COV	12 Hours	3 days	C	True	1 Min
Boiler 1 on Fuel Oil	DI	COV	12 Hours	3 days	N/A		
Boiler 1 Low Water Alarm	DI	COV	12 Hours	3 days	C	True	5 Min
Boiler 1 High Water Alarm	DI	COV	12 Hours	3 days	C	True	5 Min
Boiler 1 Feed Pump	DI	COV	12 Hours	3 days	N/A		
Boiler 2 Enable	DI	COV	12 Hours	3 days	N/A		
Boiler 2 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Boiler 2 Alarm	DI	COV	12 Hours	3 days	C	True	1 Min
Boiler 2 on Fuel Oil	DI	COV	12 Hours	3 days	N/A		
Boiler 2 Low Water Alarm	DI	COV	12 Hours	3 days	C	True	5 Min
Boiler 2 High Water Alarm	DI	COV	12 Hours	3 days	C	True	5 Min

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Steam Boiler System Trending and Alarms							
Point	Type	Trend Interval	Operationa 1 Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Boiler 2 Feed Pump	DI	COV	12 Hours	3 days	N/A		
Combustion Damper Status	DI	COV	12 Hours	3 days	P	Status <> Command	5 min
Condensate Recovery Pump Status	DI	COV	12 Hours	3 days	P	Status <> Command	5 min
Boiler 1 Feed Pump Start / Stop	DO	COV	12 Hours	3 days	N/A		
Boiler 2 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Combustion Damper Command	DO	COV	12 Hours	3 days	N/A		
Condensate Recovery Pump Start / Stop	DO	COV	12 Hours	3 days	N/A		

Hot Water Boiler System Trending and Alarms							
Point	Type	Trend Interval	Operationa 1 Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Outside Air Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 1 Fire Signal	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 1 Entering Water Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 1 Leaving Water Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 2 Fire Signal	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 2 Entering Water Temperature	AI	15 Minutes	12 Hours	3 days	N/A		

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Hot Water Boiler System Trending and Alarms							
Point	Type	Trend Interval	Operationa 1 Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Boiler 2 Leaving Water Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Hot Water Supply Temperature	AI	15 Minutes	12 Hours	3 days	P	±5 oF from SP	10 Min
Hot Water Return Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Secondary Loop Differential Pressure	AI	15 Minutes	12 Hours	3 days	C	±5% from SP	10 Min
Lead Boiler	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 1 Enable	DI	COV	12 Hours	3 days	N/A		
Boiler 1 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Boiler 1 Isolation Valve	DI	COV	12 Hours	3 days	N/A		
Boiler 1 on Fuel Oil	DI	COV	12 Hours	3 days	N/A		
Boiler 1 Alarm	DI	COV	12 Hours	3 days	C	True	1 Min
Boiler 2 Enable	DI	COV	12 Hours	3 days	N/A		
Boiler 2 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Boiler 2 Isolation Valve	DI	COV	12 Hours	3 days	N/A		
Boiler 2 on Fuel Oil	DI	COV	12 Hours	3 days	N/A		
Boiler 2 Alarm	DI	COV	12 Hours	3 days	C	True	1 Min
Combustion Dampers Open	DI	COV	12 Hours	3 days	P	Status <> Command	10 min

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Hot Water Boiler System Trending and Alarms							
Point	Type	Trend Interval	Operationa 1 Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Primary Pump 1 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Primary Pump 2 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Secondary Pump 1 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Secondary Pump 2 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Primary Pump 1 VFD Speed	AO	COV	12 Hours	3 days	N/A		
Primary Pump 2 VFD Speed	AO	COV	12 Hours	3 days	N/A		
Secondary Pump 1 VFD Speed	AO	COV	12 Hours	3 days	N/A		
Secondary Pump 2 VFD Speed	AO	COV	12 Hours	3 days	N/A		
Hot Water System Enable	DO	COV	12 Hours	3 days	N/A		
Combustion Dampers Command	DO	COV	12 Hours	3 days	N/A		
Primary Pump 1 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Primary Pump 2 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Secondary Pump 1 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Secondary Pump 2 Start / Stop	DO	COV	12 Hours	3 days	N/A		

E. The Contractor shall provide the following information prior to Systems Functional Performance Testing. Any documentation that is modified

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after submission shall be recorded and resubmitted to the COR and Commissioning Agent.

1. Point-to-Point checkout documentation;
2. Sensor field calibration documentation including system name, sensor/point name, measured value, DDC value, and Correction Factor.
3. A sensor calibration table listing the referencing the location of procedures to following in the O&M manuals, and the frequency at which calibration should be performed for all sensors, separated by system, subsystem, and type. The calibration requirements shall be submitted both in the O&M manuals and separately in a standalone document containing all sensors for inclusion in the commissioning documentation. The following table is a sample that can be used as a template for submission.

SYSTEM		
Sensor	Calibration Frequency	O&M Calibration Procedure Reference
Discharge air temperature	Once a year	Volume I Section D.3.aa
Discharge static pressure	Every 6 months	Volume II Section A.1.c

4. Loop tuning documentation and constants for each loop of the building systems. The documentation shall be submitted in outline or table separated by system, control type (e.g. heating valve temperature control); proportional, integral and derivative constants, interval (and bias if used) for each loop. The following table is a sample that can be used as a template for submission.

AIR HANDLING UNIT AHU-1				
Control Reference	Proportional Constant	Integral Constant	Derivative Constant	Interval
Heating Valve Output	1000	20	10	2 sec.

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3.6 SYSTEMS FUNCTIONAL PERFORMANCE TESTING

- A. This paragraph applies to Systems Functional Performance Testing of systems for all referenced specification Divisions.
- B. Objectives and Scope: The objective of Systems Functional Performance Testing is to demonstrate that each system is operating according to the Contract Documents. Systems Functional Performance Testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of noncompliant performance are identified and corrected, thereby improving the operation and functioning of the systems. In general, each system shall be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load, fire alarm and emergency power) where there is a specified system response. The Contractor shall verify each sequence in the sequences of operation. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc. shall also be tested.
- C. Development of Systems Functional Performance Test Procedures: Before Systems Functional Performance Test procedures are written, the Contractor shall submit all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences and parameters. Using the testing parameters and requirements found in the Contract Documents and approved submittals and shop drawings, the Commissioning Agent will develop specific Systems Functional Test Procedures to verify and document proper operation of each piece of equipment and system to be commissioned. The Contractor shall assist the Commissioning Agent in developing the Systems Functional Performance Test procedures as requested by the Commissioning Agent i.e. by answering questions about equipment, operation, sequences, etc. Prior to execution, the Commissioning Agent will provide a copy of the Systems Functional Performance Test procedures to the VA, the Architect/Engineer, and the Contractor, who shall review the tests for feasibility, safety, equipment and warranty protection.

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- D. Purpose of Test Procedures: The purpose of each specific Systems Functional Performance Test is to verify and document compliance with the stated criteria of acceptance given on the test form. Representative test formats and examples are found in the Commissioning Plan for this project. (The Commissioning Plan is issued as a separate document and is available for review.) The test procedure forms developed by the Commissioning Agent will include, but not be limited to, the following information:
1. System and equipment or component name(s)
 2. Equipment location and ID number
 3. Unique test ID number, and reference to unique Pre-Functional Checklists and startup documentation, and ID numbers for the piece of equipment
 4. Date
 5. Project name
 6. Participating parties
 7. A copy of the specification section describing the test requirements
 8. A copy of the specific sequence of operations or other specified parameters being verified
 9. Formulas used in any calculations
 10. Required pretest field measurements
 11. Instructions for setting up the test.
 12. Special cautions, alarm limits, etc.
 13. Specific step-by-step procedures to execute the test, in a clear, sequential and repeatable format
 14. Acceptance criteria of proper performance with a Yes / No check box to allow for clearly marking whether or not proper performance of each part of the test was achieved.
 15. A section for comments.
 16. Signatures and date block for the Commissioning Agent. A place for the Contractor to initial to signify attendance at the test.
- E. Test Methods: Systems Functional Performance Testing shall be achieved by manual testing (i.e., persons manipulate the equipment and observe performance) and/or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by

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standalone data loggers. The Contractor and Commissioning Agent shall determine which method is most appropriate for tests that do not have a method specified.

1. Simulated Conditions: Simulating conditions (not by an overwritten value) shall be allowed, although timing the testing to experience actual conditions is encouraged wherever practical.
2. Overwritten Values: Overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system to be something other than it really is, shall be allowed, but shall be used with caution and avoided when possible. Such testing methods often can only test a part of a system, as the interactions and responses of other systems will be erroneous or not applicable. Simulating a condition is preferable. e.g., for the above case, by heating the outside air sensor with a hair blower rather than overwriting the value or by altering the appropriate setpoint to see the desired response. Before simulating conditions or overwriting values, sensors, transducers and devices shall have been calibrated.
3. Simulated Signals: Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overwritten values.
4. Altering Setpoints: Rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints to test a sequence is acceptable. For example, to see the Air Conditioning compressor lockout initiate at an outside air temperature below 12 C (54 F), when the outside air temperature is above 12 C (54 F), temporarily change the lockout setpoint to be 2 C (4 F) above the current outside air temperature.
5. Indirect Indicators: Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses. Much of this verification shall be completed during systems startup and initial checkout.

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- F. Setup: Each function and test shall be performed under conditions that simulate actual conditions as closely as is practically possible. The Contractor shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At completion of the test, the Contractor shall return all affected building equipment and systems, due to these temporary modifications, to their pretest condition.
- G. Sampling: No sampling is allowed in completing Pre-Functional Checklists. Sampling is allowed for Systems Functional Performance Test Procedures execution. The Commissioning Agent will determine the sampling rate. If at any point, frequent failures are occurring and testing is becoming more troubleshooting than verification, the Commissioning Agent may stop the testing and require the Contractor to perform and document a checkout of the remaining units, prior to continuing with Systems Functional Performance Testing of the remaining units.
- H. Cost of Retesting: The cost associated with expanded sample System Functional Performance Tests shall be solely the responsibility of the Contractor. Any required retesting by the Contractor shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.
- I. Coordination and Scheduling: The Contractor shall provide a minimum of 7 days' notice to the Commissioning Agent and the VA regarding the completion schedule for the Pre-Functional Checklists and startup of all equipment and systems. The Commissioning Agent will schedule Systems Functional Performance Tests with the Contractor and VA. The Commissioning Agent will witness and document the Systems Functional Performance Testing of systems. The Contractor shall execute the tests in accordance with the Systems Functional Performance Test Procedure.
- J. Testing Prerequisites: In general, Systems Functional Performance Testing will be conducted only after Pre-Functional Checklists have been satisfactorily completed. The control system shall be sufficiently tested and approved by the Commissioning Agent and the VA before it is used to verify performance of other components or systems. The air

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balancing and water balancing shall be completed before Systems Functional Performance Testing of air-related or water-related equipment or systems are scheduled. Systems Functional Performance Testing will proceed from components to subsystems to systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems will be checked.

- K. Problem Solving: The Commissioning Agent will recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems is with the Contractor.

3.7 DOCUMENTATION, NONCONFORMANCE AND APPROVAL OF TESTS

- A. Documentation: The Commissioning Agent will witness, and document the results of all Systems Functional Performance Tests using the specific procedural forms developed by the Commissioning Agent for that purpose. Prior to testing, the Commissioning Agent will provide these forms to the VA and the Contractor for review and approval. The Contractor shall include the filled out forms with the O&M manual data.
- B. Nonconformance: The Commissioning Agent will record the results of the Systems Functional Performance Tests on the procedure or test form. All items of nonconformance issues will be noted and reported to the VA on Commissioning Field Reports and/or the Commissioning Master Issues Log.
1. Corrections of minor items of noncompliance identified may be made during the tests. In such cases, the item of noncompliance and resolution shall be documented on the Systems Functional Test Procedure.
 2. Every effort shall be made to expedite the systems functional Performance Testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the Commissioning Agent shall not be pressured into overlooking noncompliant work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so by direction from the VA.
 3. As the Systems Functional Performance Tests progresses and an item of noncompliance is identified, the Commissioning Agent shall discuss the issue with the Contractor and the VA.

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4. When there is no dispute on an item of noncompliance, and the Contractor accepts responsibility to correct it:
 - a. The Commissioning Agent will document the item of noncompliance and the Contractor's response and/or intentions. The Systems Functional Performance Test then continues or proceeds to another test or sequence. After the day's work is complete, the Commissioning Agent will submit a Commissioning Field Report to the VA. The Commissioning Agent will also note items of noncompliance and the Contractor's response in the Master Commissioning Issues Log. The Contractor shall correct the item of noncompliance and report completion to the VA and the Commissioning Agent.
 - b. The need for retesting will be determined by the Commissioning Agent. If retesting is required, the Commissioning Agent and the Contractor shall reschedule the test and the test shall be repeated.
5. If there is a dispute about item of noncompliance, regarding whether it is an item of noncompliance, or who is responsible:
 - a. The item of noncompliance shall be documented on the test form with the Contractor's response. The item of noncompliance with the Contractor's response shall also be reported on a Commissioning Field Report and on the Master Commissioning Issues Log.
 - b. Resolutions shall be made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive and acceptance authority is with the Department of Veterans Affairs.
 - c. The Commissioning Agent will document the resolution process.
 - d. Once the interpretation and resolution have been decided, the Contractor shall correct the item of noncompliance, report it to the Commissioning Agent. The requirement for retesting will be determined by the Commissioning Agent. If retesting is required, the Commissioning Agent and the Contractor shall reschedule the test. Retesting shall be repeated until satisfactory performance is achieved.

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- C. Cost of Retesting: The cost to retest a System Functional Performance Test shall be solely the responsibility of the Contractor. Any required retesting by the Contractor shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.
- D. Failure Due to Manufacturer Defect: If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform in compliance with the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance specifications, all identical units may be considered unacceptable by the VA. In such case, the Contractor shall provide the VA with the following:
1. Within one week of notification from the VA, the Contractor shall examine all other identical units making a record of the findings. The findings shall be provided to the VA within two weeks of the original notice.
 2. Within two weeks of the original notification, the Contractor shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
 3. The VA shall determine whether a replacement of all identical units or a repair is acceptable.
 4. Two examples of the proposed solution shall be installed by the Contractor and the VA shall be allowed to test the installations for up to one week, upon which the VA will decide whether to accept the solution.
 5. Upon acceptance, the Contractor shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

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E. Approval: The Commissioning Agent will note each satisfactorily demonstrated function on the test form. Formal approval of the Systems Functional Performance Test shall be made later after review by the Commissioning Agent and by the VA. The Commissioning Agent will evaluate each test and report to the VA using a standard form. The VA will give final approval on each test using the same form, and provide signed copies to the Commissioning Agent and the Contractor.

3.8 DEFERRED TESTING

- A. Unforeseen Deferred Systems Functional Performance Tests: If any Systems Functional Performance Test cannot be completed due to the building structure, required occupancy condition or other conditions, execution of the Systems Functional Performance Testing may be delayed upon approval of the VA. These Systems Functional Performance Tests shall be conducted in the same manner as the seasonal tests as soon as possible. Services of the Contractor to conduct these unforeseen Deferred Systems Functional Performance Tests shall be negotiated between the VA and the Contractor.
- B. Deferred Seasonal Testing: Deferred Seasonal Systems Functional Performance Tests are those that must be deferred until weather conditions are closer to the systems design parameters. The Commissioning Agent will review systems parameters and recommend which Systems Functional Performance Tests should be deferred until weather conditions more closely match systems parameters. The Contractor shall review and comment on the proposed schedule for Deferred Seasonal Testing. The VA will review and approve the schedule for Deferred Seasonal Testing. Deferred Seasonal Systems Functional Performances Tests shall be witnessed and documented by the Commissioning Agent. Deferred Seasonal Systems Functional Performance Tests shall be executed by the Contractor in accordance with these specifications.

3.9 OPERATION AND MAINTENANCE TRAINING REQUIREMENTS

- A. Training Preparation Conference: Before operation and maintenance training, the Commissioning Agent will convene a training preparation conference to include VA's COR, VA's Operations and Maintenance personnel, and the Contractor. The purpose of this conference will be

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to discuss and plan for Training and Demonstration of VA Operations and Maintenance personnel.

- B. The Contractor shall provide training and demonstration as required by other Division 21, Division 22, Division 23, Division 26, Division 27, Division 28, and Division 31 sections. The Training and Demonstration shall include, but is not limited to, the following:
1. Review the Contract Documents.
 2. Review installed systems, subsystems, and equipment.
 3. Review instructor qualifications.
 4. Review instructional methods and procedures.
 5. Review training module outlines and contents.
 6. Review course materials (including operation and maintenance manuals).
 7. Review and discuss locations and other facilities required for instruction.
 8. Review and finalize training schedule and verify availability of educational materials, instructors, audiovisual equipment, and facilities needed to avoid delays.
 9. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.
- C. Training Module Submittals: The Contractor shall submit the following information to the VA and the Commissioning Agent:
1. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module. At completion of training, submit two complete training manuals for VA's use.
 2. Qualification Data: Submit qualifications for facilitator and/or instructor.
 3. Attendance Record: For each training module, submit list of participants and length of instruction time.
 4. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

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5. Demonstration and Training Recording:

- a. General: Engage a qualified commercial photographer to record demonstration and training. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice. At beginning of each training module, record each chart containing learning objective and lesson outline.
- b. Video Format: Provide high quality color DVD color on standard size DVD disks.
- c. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.
- d. Narration: Describe scenes on video recording by audio narration by microphone while demonstration and training is recorded. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.
- e. Submit two copies within seven days of end of each training module.

6. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy-duty, 3-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding videotape. Include name of Project and date of videotape on each page.

D. Quality Assurance:

1. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
2. Instructor Qualifications: A factory authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

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3. Photographer Qualifications: A professional photographer who is experienced photographing construction projects.

E. Training Coordination:

1. Coordinate instruction schedule with VA's operations. Adjust schedule as required to minimize disrupting VA's operations.
2. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
3. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by the VA.

F. Instruction Program:

1. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:
 - a. Fire protection systems, including fire alarm, fire pumps, and fire suppression systems.
 - b. Intrusion detection systems.
 - c. Conveying systems, including elevators, wheelchair lifts, escalators, and automated materials handling systems.
 - d. Medical equipment, including medical gas equipment and piping.
 - e. Laboratory equipment, including laboratory air and vacuum equipment and piping.
 - f. Heat generation, including boilers, feedwater equipment, pumps, steam distribution piping, condensate return systems, heating hot water heat exchangers, and heating hot water distribution piping.
 - g. Refrigeration systems, including chillers, cooling towers, condensers, pumps, and distribution piping.
 - h. HVAC systems, including air handling equipment, air distribution systems, and terminal equipment and devices.
 - i. HVAC instrumentation and controls.
 - j. Electrical service and distribution, including switchgear, transformers, switchboards, panelboards, uninterruptible power supplies, and motor controls.

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- k. Packaged engine generators, including synchronizing switchgear/switchboards, and transfer switches.
 - l. Lighting equipment and controls.
 - m. Communication systems, including intercommunication, surveillance, nurse call systems, public address, mass evacuation, voice and data, and entertainment television equipment.
 - n. Site utilities including lift stations, condensate pumping and return systems, and storm water pumping systems.
- G. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participants are expected to master. For each module, include instruction for the following:
- 1. Basis of System Design, Operational Requirements, and Criteria:
Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - H, Performance curves.
 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project Record Documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
 - 3. Emergencies: Include the following, as applicable:

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- a. Instructions on meaning of warnings, trouble indications, and error messages.
- b. Instructions on stopping.
- c. Shutdown instructions for each type of emergency.
- d. Operating instructions for conditions outside of normal operating limits.
- e. Sequences for electric or electronic systems.
- f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.

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- d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.
- H. Training Execution:
- 1. Preparation: Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual. Set up instructional equipment at instruction location.
 - 2. Instruction:
 - a. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Department of Veterans Affairs for number of participants, instruction times, and location.
 - b. Instructor: Engage qualified instructors to instruct VA's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1) The Commissioning Agent will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 - 2) The VA will furnish an instructor to describe VA's operational philosophy.
 - 3) The VA will furnish the Contractor with names and positions of participants.
 - 3. Scheduling: Provide instruction at mutually agreed times. For equipment that requires seasonal operation, provide similar instruction at start of each season. Schedule training with the VA

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and the Commissioning Agent with at least seven days' advance notice.

4. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral, or a written, performance-based test.
5. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

I. Demonstration and Training Recording:

1. General: Engage a qualified commercial photographer to record demonstration and training. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice. At beginning of each training module, record each chart containing learning objective and lesson outline.
2. Video Format: Provide high quality color DVD color on standard size DVD disks.
3. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.
4. Narration: Describe scenes on videotape by audio narration by microphone while demonstration and training is recorded. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.

- - - END - - -

Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 03 30 53
(SHORT-FORM) CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place structural concrete.
2. Slab on grade infill.
3. Suspended slab infill on metal deck.
4. Foundation wall infill.
5. Concrete for metal pan stair fill.
6. Footings.
7. Equipment pads.

1.2 RELATED REQUIREMENTS

- A. Materials Testing and Inspection During Construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Bituminous Dampproofing: Section 07 11 13, BITUMINOUS DAMPPROOFING.
- C. Concrete Roads, Walks, and Similar Exterior Site Work: Section 32 05 23, CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with the most recent editions of references to extent specified in this Section.
- B. American Concrete Institute (ACI):
 1. 117 - Tolerances for Concrete Construction, Materials and Commentary.
 2. 117M - Tolerances for Concrete Construction, Materials and Commentary.
 3. 211.1 - Proportions for Normal, Heavyweight, and Mass Concrete.
 4. 211.2 - Selecting Proportions for Structural Lightweight Concrete.
 5. 301/310M - Structural Concrete.
 6. 305.1 - Hot Weather Concreting.
 7. 306.1 - Cold Weather Concreting.
 8. 318/318M - Building Code Requirements for Structural Concrete and SP-66 - ACI Detailing Manual.
 9. 347 - Guide to Formwork for Concrete.
- C. ASTM International (ASTM):
 1. A615/A615M-15ae1 - Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

2. A996/A996M - Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.
 3. A1064/A1064M - Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 4. C33/C33M - Concrete Aggregates.
 5. C39/C39M - Compressive Strength of Cylindrical Concrete Specimens.
 6. C94/C94M - Ready-Mixed Concrete.
 7. C143/C143M - Slump of Hydraulic Cement Concrete.
 8. C150/C150M - Portland Cement.
 9. C171 - Sheet Material for Curing Concrete.
 10. C192/C192M - Making and Curing Concrete Test Specimens in the Laboratory.
 11. C219 - Terminology Relating to Hydraulic Cement.
 12. C260/C260M - Air-Entraining Admixtures for Concrete.
 13. C330/C330M - Lightweight Aggregates for Structural Concrete.
 14. C494/C494M - Chemical Admixtures for Concrete.
 15. C618 - Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 16. C881/C881M - Epoxy-Resin-Base Bonding Systems for Concrete.
 17. C989/C989M - Slag Cement for Use in Concrete and Mortars.
 18. C1240 - Silica Fume Used in Cementitious Mixtures.
 19. D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
 20. E1155 - Determining FF Floor Flatness and FL Floor Levelness Numbers.
 21. E1745 - Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
- D. International Concrete Repair Institute:
1. 310.2 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

1.4 SUBMITTALS

- A. Submittal shall be submitted in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings:
 1. Large scale drawings of reinforcing steel.

2. Plans and details indicating construction, control, and/or other cold joints including waterstops.
3. Plans and details indicating cast-in and embedded items.
- C. Manufacturer's Literature and Data:
 1. Concrete Mix Design.
 2. Air-entraining admixture, chemical admixtures, and curing compounds.
 3. Indicate manufacturer's recommendation for each application.
- D. Certificates: Certify products comply with specifications.
 - a. Each ready-mix concrete batch delivered to site.

1.5 DELIVERY

- A. Deliver each ready-mixed concrete batch with mix certification in duplicate according to ASTM C94/C94M.

1.6 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or II.
- B. Pozzolans:
 1. Fly Ash: ASTM C618, Class C or F including supplementary optional physical requirements.
 2. Slag: ASTM C989/C989M; Grade 120.
- C. Coarse Aggregate: ASTM C33/C33M.
 1. Size 467 for footings and walls over 300 mm (12 inches) thick.
 2. Size 7 for coarse aggregate for applied topping and metal pan stair fill.
 3. Size 67 for other applications.
- D. Fine Aggregate: ASTM C33/C33M.
- E. Lightweight Aggregate for Structural Concrete: ASTM C330/C330M, Table 1.
- F. Mixing Water: Fresh, clean, and potable.
- G. Air-Entraining Admixture: ASTM C260/C260M.
- H. Chemical Admixtures: ASTM C494/C494M.
- I. Vapor Barrier: ASTM E1745, Class A with a minimum puncture resistance of 2200 g (3000 lbs.); minimum 0.38 mm (15 mil) thick.
- J. Reinforcing Steel: ASTM A615/A615M or ASTM A996/A996M, deformed. See Structural Drawings for grade.

- K. Forms: Wood, plywood, metal, or other materials, approved by Contracting Officer, of grade or type suitable to obtain type of finish specified.
1. Plywood: Exterior grade, free of defects and patches on contact surface.
 2. Lumber: Sound, grade-marked, S4S stress graded softwood.
 3. Form coating: As recommended by Contractor.
- L. Welded Wire Fabric: ASTM A1064/A1064M, plain; Grade 65; sized as indicated.
- M. Expansion Joint Filler: ASTM D1751.
- N. Sheet Materials for Curing Concrete: ASTM C171.
- O. Abrasive Aggregates: Aluminum oxide grains or emery grits.
- P. Liquid Densifier/Sealer: 100 percent active colorless aqueous silicate solution.
- Q. Grout, Non-Shrinking: Premixed ferrous or non-ferrous. Grout to show no settlement or vertical drying shrinkage at 3 days. Compressive strength for grout, at least 18 MPa (2500 psi) at 3 days and 35 MPa (5000 psi) at 28 days.

2.2 ACCESSORIES

- A. Bonding Agent: ASTM C 1059/C 1059M, Type II.
- B. Structural Adhesive: ASTM C881, 2-component material suitable for use on dry or damp surfaces. Provide material Type, Grade, and Class to suit Project requirements.
- C. Water Stops: Rubber base with self-healing properties. Expanding clay-based products not acceptable.
- D. Weeps: Geotextile type as recommended by Contractor and approved by Contracting Officer.

2.3 CONCRETE MIXES

- A. Design concrete mixes according to ASTM C94/C94M, Option C.
- B. Compressive strength at 28 days: as noted on drawings.
- C. Submit mix design and results of compression tests to the Contracting Officer for his evaluation. Identify all materials, including admixtures, making-up the concrete.
- D. Maximum Slump for Vibrated Concrete: 100 mm (4 inches) tested according to ASTM C143.
- E. Cement and Water Factor (See Table I):

TABLE I - CEMENT AND WATER FACTORS FOR CONCRETE				
Concrete: Strength	Non-Air-Entrained		Air-Entrained	
Min. 28 Day Comp. Str. MPa (psi)	Min. Cement kg/cu. m (lbs./cu. yd.)	Max. Water Cement Ratio	Min. Cement kg/cu. m (lbs./cu. yd.)	Max. Water Cement Ratio
35 (5000)1,3	375 (630)	0.45	385 (650)	0.40
30 (4000)1,3	325 (550)	0.55	340 (570)	0.50
Footnotes:				
1. If trial mixes are used, achieve a compressive strength 8.3 MPa (1 200 psi) in excess of f'c. For concrete strengths greater than 35 MPa (5,000 psi), achieve a compressive strength 9.7 MPa (1,400 psi) in excess of f'c.				
2. Lightweight Structural Concrete: Pump mixes may require higher cement values as specified in ACI 318/318M.				
3. For Concrete Exposed to High Sulfate Content Soils: Maximum water cement ratio is 0.44.				
* Laboratory Determined according to ACI 211.1 for normal weight concrete or ACI 211.2 for lightweight structural concrete.				

F. Air-entrainment as specified, and conform with the following for air content table:

TABLE II - TOTAL AIR CONTENT FOR VARIOUS SIZES OF COARSE AGGREGATES	
Nominal Maximum Size of Coarse Aggregate	Total Air Content, percent
10 mm (3/8 inches)	6 Moderate exposure; 7.5 severe exposure
13 mm (1/2 inches)	5.5 Moderate exposure; 7 severe exposure
19 mm (3/4 inches)	5 Moderate exposure; 6 severe exposure
25 mm (1 inches)	4.5 Moderate exposure; 6 severe exposure
40 mm (1 1/2 inches)	4.5 Moderate exposure; 5.5 severe exposure

2.4 BATCHING AND MIXING

- A. Store, batch, and mix materials according to ASTM C94/C94M.
 - 1. Job-Mixed: Batch mix concrete in stationary mixers as specified in ASTM C94/C94M.
 - 2. Ready-Mixed Concrete: Comply with ASTM C94/C94M, except use of non-agitating equipment for transporting concrete to Site is not acceptable.
 - 3. Mixing Structural Lightweight Concrete: Charge mixer with 2/3 of total mixing water and total aggregate for each batch. Mix ingredients minimum 30 seconds in stationary mixer or minimum 10 revolutions at mixing speed in truck mixer. Add remaining mixing water and other ingredients and continue mixing. Above procedure may be modified as recommended by aggregate producer.
 - 4. When aggregate producer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Installation: Conform to ACI 347. Construct forms to obtain concrete of the shapes, dimensions and profiles indicated, with tight joints.
- B. Design and construct forms to prevent bowing-out of forms between supports and to be removable without prying against or otherwise damaging fresh concrete.
- C. When patching formed concrete, seal form edges against existing surface to prevent leakage; set forms so that patch is flush with adjacent surfaces.
- D. Treating and Wetting: Treat or wet concrete contact surfaces:
 - 1. Coat plywood and lumber forms with non-staining form sealer.
 - 2. Wet wood forms thoroughly when they are not treated with form release agent.
 - 3. Prevent water from accumulating and remaining within forms.
 - 4. Clean and coat removable metal forms with light form oil before reinforcement is placed.
 - 5. In hot weather, cool metal forms by thoroughly wetting with water just before placing concrete.
 - 6. Prevent water from accumulating and remaining within forms.

- E. Inserts, Sleeves, and Similar Items: Install flashing reglets, masonry ties, anchors, inserts, wires, hangers, sleeves, boxes for floor hinges, and other cast-in items specified in other Sections. Place where indicated, square, flush and secured to formwork.
- F. Construction Tolerances - General: Install and maintain concrete formwork to assure completion of work within specified tolerances.
- G. Adjust or replace completed work exceeding specified tolerances before placing concrete.

3.2 REINFORCEMENT

- A. Install concrete reinforcement according to ACI 318 and ACI SP-66.
- B. Support and securely tie reinforcing steel to prevent displacement during placing of concrete.
- C. Drilling for Dowels in Existing Concrete: Use sharp bits, drill hole slightly oversize, fill with epoxy grout, inset the dowel, and remove excess epoxy.

3.3 VAPOR BARRIER

- A. Except where membrane waterproofing is required, place interior concrete slabs on a continuous vapor barrier.
- B. Lap joints 150 mm (6 inches) and seal with a compatible pressure-sensitive tape.
- C. Patch punctures and tears.

3.4 PLACING CONCRETE

- A. Remove water from excavations before concrete is placed. Remove hardened concrete, debris and other foreign materials from interior of forms, and from inside of mixing and conveying equipment. Obtain approval from Contracting Officer's Representative before placing concrete.
- B. Install screeds at required elevations for concrete slabs.
- C. Roughen and clean free from laitance, foreign matter, and loose particles before placing new concrete on existing concrete.
 - 1. Blow-out areas with compressed air and immediately coat contact areas with adhesive in compliance with manufacturer's instructions.
- D. Place structural concrete according to ACI 301 and ACI 318.
- E. Convey concrete from mixer to final place of deposit by method that will prevent segregation or loss of ingredients. Do not deposit, in Work, concrete that has attained its initial set or has contained its water or cement more than 1 1/2 hours. Do not allow concrete to drop

freely more than 1500 mm (5 feet) in unexposed work nor more than 900 mm (3 feet) in exposed work.

- F. Place and consolidate concrete in horizontal layers not exceeding 300 mm (12 inches) in thickness. Consolidate concrete by spading, rodding, and mechanical vibrator. Do not secure vibrator to forms or reinforcement. Continuously vibrate during placement of concrete.
- G. Concrete Fill in Stair Tread and Landing Pans: Coat steel with bonding agent and fill pans with concrete. Reinforce with 2 inch by 2 inch by 1.6 mm (0.06 inch) welded wire mesh at midpoint.
- H. Hot Weather Concrete Placement: As recommended by ACI 305.1 to prevent adversely affecting properties and serviceability of hardened concrete.
- I. Cold Weather Concrete Placement: As recommended by ACI 306.1, to prevent freezing of thin sections less than 300 mm (12 inches) and to permit concrete to gain strength properly.
 - 1. Do not use calcium chloride without written approval from Contracting Officer's Representative.

3.5 TOLERANCES

- A. Slab on Grade Finish Tolerance: Comply with ACI 117, FF-number and FL-number method.
 - 1. Paragraph 4.8.3, Class A 3 mm (1/8 inches) for offset in form-work.
 - 2. Table R4.8.4, "Flat" 6 mm (1/4 inch) in 3 m (10 feet) for slabs.

3.6 PROTECTION AND CURING

- A. Protect exposed surfaces of concrete from premature drying, wash by rain or running water, wind, mechanical damage, and excessive hot or cold temperatures.
- B. Curing Methods: Cure concrete with curing compound using wet method with sheets.
- C. Formed Concrete Curing: Wet the tops and exposed portions of formed concrete and keep moist until forms are removed.
 - 1. If forms are removed before 14 days after concrete is cast, install sheet curing materials as specified above.
- D. Concrete Flatwork Curing:
 - 1. Install sheet materials according to the manufacturer's instructions.
 - a. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

3.7 FORM REMOVAL

- A. Maintain forms in place until concrete is self-supporting, with construction operation loads.
- B. Remove fins, laitance and loose material from concrete surfaces when forms are removed. Repair honeycombs, rock pockets, sand runs, spalls, or otherwise damaged surfaces by patching with the same mix as concrete minus the coarse aggregates.
- C. Finish to match adjacent surfaces.

3.8 FINISHES

- A. Vertical and Overhead Surface Finishes:
 - 1. Surfaces Concealed in Completed Construction: As-cast; no additional finishing required.
 - 2. Surfaces Exposed in Unfinished Areas: As-cast; no additional finishing required.
 - a. Mechanical rooms.
 - b. Electrical rooms.
 - 3. Surfaces Exposed to View Scheduled for Paint Finish: Remove fins, burrs and similar projections by mechanical means approved by Contracting Officer's Representative flush with adjacent surface. Lightly rub with fine abrasive stone or hone. Use ample amount of water during rubbing without working up a lather of mortar or changing texture of concrete.
 - 4. Surfaces Exposed to View in Finished Areas: Grout finish, unless otherwise shown, for uniform color and smooth finish treated.
 - a. Remove laitance, fins and burrs.
 - b. Scrub concrete with wire brushes. Clean stained concrete surfaces with hone or stone.
 - c. Apply grout composed of 1 part Portland cement and 1 part clean, fine sand (smaller than 600 micro-m (No. 30) sieve). Work grout into surface of concrete with cork floats or fiber brushes until pits and honeycomb are filled.
 - d. After grout has hardened, but is still plastic, remove surplus grout with sponge rubber float and by rubbing with clean burlap.
 - e. In hot, dry weather fog spray surfaces with water to keep grout wet during setting period. Complete finished areas in same day. Confine limits of finished areas to natural breaks in wall surface. Do not leave grout on concrete surface overnight.

B. Slab Finishes:

1. Allow bleed water to evaporate before surface is finished. Do not sprinkle dry cement on surface to absorb water.
2. Scratch Finish: Rake or wire broom after partial setting slab surfaces to received bonded applied cementitious application, within 2 hours after placing, to roughen surface and provide permanent bond between base slab and applied cementitious materials.
3. Float Finish: Interior ramps, interior stair treads, and platforms, both equipment pads, and slabs to receive non-cementitious materials, except as specified.
 - a. Screen and float to smooth dense finish.
 - b. After first floating, while surface is still soft, check surfaces for alignment using straightedge or template. Correct high spots by cutting down with trowel or similar tool. Correct low spots by filling in with material same composition as floor finish. Remove any surface projections on floated finish by rubbing or dry grinding. Refloat slab to uniform sandy texture.
4. Steel Trowel Finish: Applied toppings, concrete surfaces to receive resilient floor covering or carpet, future floor roof and other monolithic concrete floor slabs exposed to view without other finish indicated or specified.
 - a. Delay final steel troweling to secure smooth, dense surface, usually when surface can no longer be dented by fingers. During final troweling, tilt steel trowel at slight angle and exert heavy pressure on trowel to compact cement paste and form dense, smooth surface.
 - b. Finished surface: Free from trowel marks. Uniform in texture and appearance.
5. Broom Finish: Finish exterior slabs, ramps, and stair treads with bristle brush moistened with clear water after surfaces have been floated.
6. Finished Slab Flatness (FF) and Levelness (FL):
 - a. Slab on Grade: Specified overall value FF 25/FL 20. Minimum local value FF 17/FL 15.
 - b. Test flatness and levelness according to ASTM E1155.

3.9 SURFACE TREATMENTS

- A. Mix and apply the following surface treatments according to manufacturer's instructions.
 - 1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.
- B. Liquid Densifier/Sealer: Use for exposed concrete floors and concrete floors to receive carpeting.
- C. Slip Resistant Finish:
 - 1. Except where safety nosing and tread coverings are shown, apply abrasive aggregate to treads and platforms of concrete steps and stairs, and to surfaces of exterior concrete ramps and platforms.
 - a. Broadcast aggregate uniformly over concrete surface. Trowel concrete surface to smooth dense finish. After curing, rub treated surface with abrasive brick and water sufficiently to slightly expose abrasive aggregate.

3.10 FOUNDATION WALL INFILL

- A. Install air-entrained concrete at foundation wall infill, as indicated.
- B. Install expansion and contraction joints, waterstops, weep holes, reinforcement and railing sleeves, as indicated.
- C. Finish exposed surfaces to match adjacent concrete surfaces, new or existing.
- D. Place porous backfill, as indicated on Drawings.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 04 05 13
MASONRY MORTARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Masonry mortar installed by other concrete and masonry sections.

1.2 RELATED REQUIREMENTS

A. Mortar used in Section:

1. Section 04 40 00, ADHERED STONE MASONRY VENEER.
2. Section 04 72 00, CAST STONE MASONRY.

B. Mortar Color: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. ASTM International (ASTM):

1. C40/C40M-11 - Organic Impurities in Fine Aggregates for Concrete.
2. C91/C91M-12 - Masonry Cement.
3. C144-11 -Aggregate for Masonry Mortar.
4. C150/C150M-15 - Portland Cement.
5. C207-06(2011) - Hydrated Lime for Masonry Purposes.
6. C270-14a - Mortar of Unit Masonry.
7. C595/C595M-15e1 - Blended Hydraulic Cements.
8. C780-15 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
9. C979/C979M-10 - Pigments for Integrally Colored Concrete.
10. C1329/C1329M-15 - Mortar Cement.

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:

1. Description of each product.

C. Test Reports: Certify each product complies with specifications.

1. Mortar.
2. Admixtures.

D. Certificates: Certify each product complies with specifications.

1. Portland cement.
2. Masonry cement.

3. Mortar cement.
4. Hydrated lime.
5. Fine aggregate.
6. Color admixture.

- E. Qualifications: Substantiate qualifications comply with specifications.
1. Testing laboratory.

1.5 QUALITY ASSURANCE

A. Preconstruction Testing:

1. Engage independent testing laboratory to tests and submit reports.
 - a. Deliver samples to laboratory in number and quantity required for testing.
2. Test mortar and materials specified.
3. Mortar:
 - a. Test for compressive strength and water retention according to ASTM C270.
 - b. Minimum Mortar compressive strengths 28 days:
 - 1) Type M: 17.2 MPa (2,500 psi).
 - 2) Type S: 12.4 MPa (1,800 psi).
 - 3) Type N: 5.1 MPa (750 psi).
4. Non Staining Cement: Test for water soluble alkali.
 - a. Water Soluble Alkali: Maximum 0.03 percent.
5. Sand: Test for deleterious substances, organic impurities, soundness and grading.

1.6 DELIVERY

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.7 STORAGE AND HANDLING

- A. Store masonry materials under waterproof covers on planking clear of ground.
 1. Protect loose, bulk materials from contamination.
- B. Protect products from damage during handling and construction operations.

1.8 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Hydrated Lime: ASTM C207, Type S.
- B. Aggregate for Masonry Mortar: ASTM C144 and as follows:
 - 1. Light colored sand for mortar for laying face brick.
 - 2. White plastering sand meeting sieve analysis for mortar joints for pointing and laying of structural facing tile units except that 100 percent passes No. 8 sieve, and maximum 5 percent retained on No. 16 sieve.
 - 3. Test sand for color value according to ASTM C40/C40M. Sand producing color darker than specified standard is unacceptable.
- C. Blended Hydraulic Cement: ASTM C595/C595M, Type IS, IP.
- D. Masonry Cement: ASTM C91/C91M. Type N, S, Or M.
 - 1. Use white masonry cement whenever white mortar is specified.
- E. Mortar Cement: ASTM C1329/C1329M, Type N, S or M.
- F. Portland Cement: ASTM C150/C150M, Type I.
 - 1. Use white Portland cement wherever white mortar is specified.
- G. Pigments: ASTM C979/C979M; inorganic, inert, mineral pigments only, unaffected by atmospheric conditions, nonfading, alkali resistant, and water insoluble.
- H. Water: Potable, free of substances that are detrimental to mortar, masonry, and metal.

2.2 PRODUCTS - GENERAL

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Provide each product from one manufacturer and from one production run.

2.3 MIXES

- A. Masonry Mortar: ASTM C270.
 - 1. Admixtures:
 - a. Do not use mortar admixtures, and color admixtures unless approved by Contracting Officer's Representative.
 - b. Do not use antifreeze compounds.
- B. Colored Mortar:
 - 1. Maintain uniform mortar color for exposed work, throughout.
 - 2. Match mortar color in approved sample.
- C. Color Admixtures:
 - 1. Proportion as specified by manufacturer.

2. For color, see Section 09 06 00, SCHEDULE FOR FINISHES.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.

3.2 MIXING

- A. Measure ingredients by volume using known capacity container.
- B. Mix for 3 to 5 minutes in a mechanically operated mortar mixer.
- C. Mix water with dry ingredients in sufficient amount to provide a workable mixture which will adhere to vertical surfaces of masonry units.
- D. Mortar Stiffened Because of Water Loss Through Evaporation:
 1. Re-temper by adding water to restore to proper consistency and workability.
 2. Discard mortar reaching initial set or unused within two hours of mixing.
- E. Pointing Mortar:
 1. Mix dry ingredients with enough water to produce damp mixture of workable consistency retaining shape when formed into ball.
 2. Allow mortar to stand in dampened condition for 60 to 90 minutes.
 3. Add water to bring mortar to a workable consistency before use.

3.3 MORTARING

- A. Type S Mortar: Use for setting cast stone.
- B. Stone Veneer Over Frame Back Up Walls: Use Type S Portland cement-lime mortar.

3.4 FIELD QUALITY CONTROL

- A. Field Tests: Performed by testing laboratory specified in Section 01 45 29, TESTING LABORATORY SERVICES.
 1. Take and test samples during progress of work according to ASTM C780.

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SECTION 04 40 00

ADHERED STONE MASONRY VENEER

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Section includes the application of natural thin veneer stone system for exterior and interior vertical surfaces.
 - 1. Exterior Application: Natural thin veneer stone system adhered to exterior gypsum sheathing, cold formed metal framing, air barrier, vent system and exterior metal lath.
 - 2. Interior Application: Natural thin veneer stone system adhered to gypsum sheathing, cold formed metal framing, and metal lath.
- B. Special decorative sawn thin veneer stone shapes.

1.2 RELATED SECTIONS:

- A. Section 04 05 13, MASONRY MORTARING.
- B. Section 05 40 00, COLD-FORMED METAL FRAMING.
- C. Section 07 60 00, FLASHING AND SHEET METAL.
- D. Section 07 92 00, JOINT SEALANTS.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. For stone varieties proposed for use on Project, include test data indicating compliance with physical properties specified and required by referenced ASTM standards.
 - 2. Surface preparation and installation instructions.
- B. Samples:
 - 1. For each stone type indicated. Include at least three samples in each set for each type of stone, exhibiting extremes of the full range of color and other visual characteristics expected in completed Work. Samples will establish the standard by which stone provided will be judged.
 - 2. For each color of mortar required. Label Samples to indicate types and amounts of pigments used.
- C. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, sources of supply, and other information as required to identify materials used. Include mix proportions for mortar and source of aggregates.

1. Submittal is for information only. Neither receipt of list nor approval of mockups constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

D. Qualification Data: For qualified Installer.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs experienced stonemasons and stone fitters.
- B. Source Limitations for Stone: Obtain each variety of stone, regardless of finish, from one quarry with resources to provide materials of consistent quality in appearance and physical properties.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- D. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Build mockup of typical wall area as shown on Drawings.
 - a. Include stone coping at top of mockup.
 - b. Include a sealant-filled joint at least 16 inches long in mockup.
 - c. Include through-wall flashing installed for a 24-inch length in corner of mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit stone masonry above half of flashing).
 - d. Include all stone unit types and sizes to be used including a typical corner condition, special shapes and mortar joint treatment, wall framing, veneer anchors, flashing, rain screen and weep holes in exterior wall.
 2. Protect accepted mockups from the elements with weather-resistant membrane.
 3. Approval of mockups is for color, texture, and blending of stone; relationship of mortar and sealant colors to stone colors; tooling of joints; and aesthetic qualities of workmanship.

- a. Approval of mockups is also for other material and construction qualities the COR specifically approves in writing.
- b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless the COR specifically approves such deviations in writing.

E. Pre-installation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- B. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- C. Deliver pre-blended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store pre-blended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.6 PROJECT CONDITIONS

- A. Protection of Stone: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed stone masonry when construction is not in progress.
 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- B. Stain Prevention: Immediately remove mortar and soil to prevent them from staining the face of stone masonry.
 1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on the ground and over the wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 4. Turn scaffold boards near the wall on edge at end of each day to prevent rain from splashing mortar and dirt on completed stone masonry.

- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace stone damaged by frost or freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- D. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until stone has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1.7 COORDINATION

- A. Advise installers of other work about specific requirements for placement of reinforcement, veneer anchors, flashing, and similar items to be built into stone masonry.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Stone: Obtain each variety of stone, regardless of finish, from single quarry with resources to provide materials of consistent quality in appearance and physical properties.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of uniform quality for each cementitious component from single manufacturer and each aggregate from single source or producer.

2.2 QUARTZ-BASED STONE

- A. Material Standard: Comply with ASTM C616/C616M, Classification I Sandstone.
- B. Basis of Design Product: Subject to compliance with requirements, provide the following or comparable approved equal:
 - 1. Scranto Materials; Pheasant Ridge LedgeStone.
 - 2. Product Rep: George Kragh, Beth-Hanover Supply, 610-248-0900
- C. Match Architect's samples for color, finish, edge detail, texture and other stone characteristics relating to aesthetic effects.
- D. Properties:
 - 1. Face Dimensions:
 - a. Height: 1-inch to 4-inch
 - b. Length: 3-inch to 12-inch

- c. Depth: 1-1/4 inch to 1-3/4 inch
- 2. Weight: 11-13 psf

2.3 MORTAR MATERIALS

- A. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or III, and hydrated lime complying with ASTM C 207.
- B. Colored Cement Product: Packaged blend made from portland cement and lime and mortar pigments, shall complying with specified requirements, and containing no other ingredients.
 - 1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
 - 2. Pigments shall not exceed 10 percent of portland cement by weight.
- C. Aggregate: ASTM C 144 and as follows:
 - 1. For pointing mortar, use aggregate graded with 100 percent passing No.16 (1.18-mm) sieve.
 - 2. White Aggregates: Natural white sand or ground white stone.
 - 3. Colored Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.
- D. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent by same manufacturer.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. ACM Chemistries; RainBloc for Mortar.
 - b. BASF Aktiengesellschaft; Rheopel Mortar Admixture.
 - c. Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.
- E. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- F. Water: Potable.

2.4 MISCELLANEOUS ACCESSORIES

- A. Expanded Metal Lath: 3.4 lb/sq. yd., self-furring, diamond-mesh lath complying with ASTM C 847. Fabricate from structural-quality, zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G60.

- B. Lath Attachment Devices: Material and type required by ASTM C 1063 for installation indicated.
- C. Rainscreen drainage plane: 0.024" (0.6 mm) thick high impact polystyrene sheets. Formed with corrugations and a spunbond polypropylene fabric on one side with a 4" (102 mm) skirt on one edge.
- D. Window sub-sill drainage planes: 0.024" (0.6 mm) thick high-impact polystyrene strip formed with .120" (3 mm) deep corrugations, bent into L-shape, 5" (127 mm) wide by 9" (229 mm) high, to fit on top of sub-sill region of a window rough opening prior to window installation to facilitate drainage.
- E. Vent Strip: 0.024" (0.6 mm) thick high impact polystyrene strip formed with 3/16" (4.8 mm) deep corrugations; 4.6" (116.84 mm) wide, 50'-0" (15 m) long continuous belt.
- F. Moisture Diverter, floor edging: 26-gauge galvanized steel bent into 70° V shape. Vertical attachment flange - 3.5" (89 mm), ground - 0.5" (13 mm), bonding slots 1" (25 mm) punched 1.75" (44 mm) apart, 8 ft long.

2.5 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar and grout stains, efflorescence, and other new construction stains from stone masonry surfaces without discoloring or damaging masonry surfaces; expressly approved for intended use by cleaner manufacturer and stone producer.

2.6 MORTAR MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride.
 - 2. Limit cementitious materials in mortar to portland cement and lime.
 - 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

4. **Mixing Pointing Mortar:** Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again, adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within 30 minutes of final mixing; do not re-temper or use partially hardened material.
- B. **Pre-blended, Dry Mortar Mix:** Furnish dry mortar ingredients in the form of a pre-blended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. **Mortar for Stone Masonry:** Comply with ASTM C 270, Proportion or Property Specification.
 1. **Mortar for Setting Stone:** Type N.
- D. **Mortar for Scratch Coat over Metal Lath:** 1 part portland cement, 1/2 part lime, 5 parts loose damp sand, and enough water to produce a workable consistency.
- E. **Pigmented Mortar:** Use colored cement product.
 1. Pigments shall not exceed 10 percent of portland cement by weight.
- F. **Colored-Aggregate Mortar:** Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

2.7 FABRICATION

- A. Fabricate stone to comply with sizes, shapes, and tolerances recommended by applicable stone association or, if none, by stone source, for faces, edges, beds, and backs.
- B. Cut and select stone to produce pieces of thickness, size, and shape indicated, including details on Drawings. Dress joints (bed and vertical) straight and at right angle to face unless otherwise indicated.
- C. Carefully inspect stone at quarry or fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units before shipment.
 1. Clean sawed backs of stone to remove rust stains and iron particles.
- D. Gage backs of stones for adhered veneer if more than 81 sq. in. in area.

- E. Thickness of Stone: Provide thickness indicated, but not less than the following:
 - 1. Thickness: 1 inch plus or minus 1/8 inch.
- F. Shape stone for type of masonry (pattern) as follows:
 - 1. Sawed-bed, with uniform course heights as indicated on Drawings and with random lengths.
- G. Finish exposed faces and edges of stone to comply with requirements indicated for finish and to match approved samples and mockups.
 - 1. Finish: As indicated and as selected by the COR.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces indicated to receive stone masonry, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine substrate to verify that dovetail slots, inserts, reinforcement, veneer anchors, flashing, and other items installed in substrates and required for or extending into stone masonry are correctly installed.
- C. Examine cold-formed wall framing and water resistant and vapor permeable self-adhering air barrier membrane to verify that installation will result in a weatherproof covering.
- D. Notify Architect of conditions that would adversely affect installation.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.
- B. Coordinate placement of flashings and other moisture control products supplied by other sections.

3.3 SETTING OF STONE MASONRY, GENERAL

- A. Perform necessary field cutting and trimming as stone is set.

1. Use power saws to cut stone that is fabricated with saw-cut surfaces. Cut lines straight and true, with edges eased slightly to prevent snipping.
 2. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.
 3. Pitch face at field-split edges as needed to match stones that are not field split.
- B. Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.
- C. Arrange stones in pattern with course heights as indicated, random lengths, and uniform joint widths, with offset between vertical joints as indicated.
- D. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.
- E. Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than 3/8 inch (10 mm) at narrowest points or more than 1/2 inch (13 mm) at widest points.
- F. Provide sealant joints of widths and at locations indicated.
1. Keep sealant joints free of mortar and other rigid materials.
- G. Install metal expansion strips in sealant joints at locations indicated. Build flanges of expansion strips into masonry by embedding in mortar between stone masonry and backup wythe. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
- H. Install embedded flashing at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
1. At cold-formed exterior wall, extend flashing through stone masonry, up the face of sheathing at least 8 inches, and behind Water resistant and vapor permeable self-adhering air barrier membrane.
 2. At lintels and shelf angles, extend flashing full length of angles but not less than 6 inches into masonry at each end.
 3. At sills, extend flashing not less than 4 inches at ends.

4. At ends of head and sill flashing turn up not less than 2 inches to form end dams.
5. Extend sheet metal flashing 1/2 inch beyond face of masonry at exterior and turn flashing down to form a drip.
6. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.

3.4 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed
 1. 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet (6 mm in 6 m) or 1/2 inch in 40 feet (13 mm in 12 m) or more.
- C. Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet or 3/4 inch in 40 feet or more.
- D. Measure variation from level, plumb, and position shown in plan as variation of the average plane of the face of each stone from level, plumb, or dimensioned plane.
- E. Variation in Mortar-Joint Thickness: Do not vary from joint size range indicated.
- F. Variation in Plane between Adjacent Stones: Do not exceed one-half of tolerance specified for thickness of stone.

3.5 INSTALLATION OF ADHERED STONE MASONRY VENEER

- A. Install flashing over sheathing and behind weather Water resistant and vapor permeable self-adhering air barrier membrane by fastening through sheathing into framing.
- B. Install lath over water resistant and vapor permeable self-adhering air barrier membrane by fastening through sheathing into framing to comply with ASTM C 1063.

- C. Install scratch coat over metal lath 3/8 inch thick to comply with ASTM C 926.
- D. Coat backs of stone units and face of scratch coat with cement-paste bond coat, then butter both surfaces with setting mortar. Use sufficient setting mortar so a slight excess will be forced out the edges of stone units as they are set. Tap units into place, completely filling space between units and scratch coat.
- E. Rake out joints for pointing with mortar to depth of not less than 3/4 inch before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.

3.6 POINTING

- A. Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply pointing mortar in layers not more than 3/8 inch deep until a uniform depth is formed.
- B. Point stone joints by placing and compacting pointing mortar in layers not more than 3/8 inch deep. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
- C. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:
 - 1. Joint Profile: As indicated.

3.7 ADJUSTING AND CLEANING

- A. Remove and replace stone of the following description:
 - 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
 - 2. Defective joints.
 - 3. Stone not matching approved samples and mockups.
 - 4. Stone not complying with other requirements indicated.
- B. Replace in a manner that results in stone matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean stone as work progresses. Remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean stone as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before cleaning stone.
3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
4. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.
5. Clean stone by bucket and brush hand-cleaning method described in BIA Technical Note No. 20 Revised II, using job-mixed detergent solution.
6. Clean stone with acidic cleaner recommended by manufacturer and applied according to manufacturer's written instructions.

3.8 EXCESS MATERIALS AND WASTE

A. Excess Stone: Stack excess stone where directed by the COR.

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SECTION 047200
CAST STONE MASONRY

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This sections specifies manufactured concrete units to simulate a natural stone.
- B. Installation of cast stone units.

1.2 RELATED WORK

- A. Setting and pointing mortar: Section 04 05 13, MASONRY MORTARING / Section 040516, MASONRY GROUTING.
- B. Joint sealant and application: Section 07 92 00, JOINT SEALANTS.
- C. Color and texture specified in Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
 - 1. Cast stone, sample panel, size 100 by 300 by 300 mm (4 by 12 by 12 inches) each color and finish.
 - 2. Show finish on two 100 mm (4-inch) edges and 300 by 300 mm (12 by 12 inch) surface.
- C. Shop Drawings:
 - 1. Cast stone showing exposed faces, profiles, cross sections, anchorage, reinforcing, jointing and sizes.
 - 2. Setting drawings with setting mark.
- D. Certificates: Test results indicating that the cast stone meets specification requirements and proof of plant certification.
- E. Submit manufacturers test results of cast stone previously made by manufacturer.
- F. Laboratory Data: Description of testing laboratories facilities and qualifications of its principals and key personnel.
- G. List of jobs furnished by the manufacturer, which were similar in scope and at least three (3) years of age.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Store cast stone under waterproof covers on planking clear of ground.
- B. Protect from handling, dirt, stain, and water damage.
- C. Mark production units with the identification marks as shown on the shop drawings.

D. Package units and protect them from staining or damage during shipping and storage.

E. Provide an itemized list of product to support the bill of lading.

1.5 WARRANTY

A. Warranty exterior masonry walls against moisture leaks, any defects and subject to terms of "Warranty of Construction", FAR clause 52.246-21, except that warranty period shall be two years.

1.6 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

B. Cast Stone Institute Technical Manual and Cast Stone Institute standard specifications.

C. American Society for Testing and Materials (ASTM):

A167-99(R2009)....Stainless and Heat Resisting Chromium-Nickel
Steel Plate, Sheet, and Strip

A185-07.....Steel, Welded Wire Fabric, Plain for Concrete

A615/A615M-09.....Deformed and Plain Billet-Steel Bars for
Concrete Reinforcement

C33-11.....Concrete Aggregates

C150-09.....Portland Cement

C503-10.....Marble Dimension Stone (Exterior)

C568-10.....Limestone Dimension Stone

C615-11.....Granite Dimension Stone

C616-10.....Quartz-Based Dimension Stone

C979-10.....Pigments for Integrally Colored Concrete

C1194-03.....Compressive Strength of Architectural Cast Stone

C1195-03.....Absorption of Architectural Cast Stone

C1364-10.....Architectural Cast Stone.

D2244-09.....Calculation of Color Differences from
Instrumentally Measured Color Coordinates.

1.7 QUALITY ASSURANCE

A. The Manufacturer:

1. Must have 5 years minimum continuous operating experience and have facilities for manufacturing cast stone as described herein.
Manufacturer shall have sufficient plant facilities to produce the shapes, quantities and size of cast stone required in accordance with the project schedule.
2. Must be a member of the Cast Stone Institute.
3. Must have a certified plant (certification by the Cast Stone Institute).
- B. Stone setter: Must have 5 years experience setting cast or natural building stone.
- C. Testing: One (1) sample from production units may be selected at random from the field for each 500 cubic feet (14 m³) delivered to the job:
 1. Three (3) field cut cube specimens from each of these sample shall have an average minimum compressive strength of not less than 85% with no single specimen testing less than 75% of design strength as specified.
 2. Three (3) field cut cube specimens from each of these samples shall have an average maximum cold-water absorption of 6%.
 3. Field specimens shall be tested in accordance with ASTM C 1194 and C 1195.
- D. Manufacturer shall submit a written list of projects similar and at least three (3) years of age, along with owner, architect and contractor references.

1.8 MANUFACTURING TOLERANCES

- A. Cross section dimensions shall not deviate by more than + 1/8 in. from approved dimension.
- B. Length of units shall not deviate by more than length /360 or + 1/8 in., whichever is greater, not to exceed + 1/4 in (6 mm). Maximum length of any unit shall not exceed 15 times the average thickness of such unit unless otherwise agreed by the manufacturer.
- C. Warp bow or twist of units shall not exceed length/360 or + 1/8 in., whichever is greater.
- D. Location of dowel holes, anchor slots, flashing grooves, false joints and similar features - On formed sides of unit, 1/8 in (3 mm), on unformed sides of unit, 3/8 in (9 mm) maximum deviation.

1.9 MOCK-UP

- A. Provide full size unit(s) for use in construction of sample wall. The mock-up becomes the standard of workmanship for the project.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL CAST STONE

- A. Comply with ASTM C 1364
- B. Physical properties: Provide the following:
 - 1. Compressive Strength - ASTM C 1194: 6,500 psi (45 Mpa) minimum for products at 28 days.
 - 2. Absorption - ASTM C 1195: 6% maximum by the cold water method, or 10% maximum by the boiling method for products as 28 days.
 - 3. Air Content - ASTM C173 or C231, for wet cast product shall be 4-8% for units exposed to freeze-thaw environments. Air entrainment is not required for vibrant dry tamp (VDT) products.
 - 4. Freeze thaw - ASTM C 1364L The cumulative percent weight loss (CPWL) shall be less than 5% after 300 cycles of freezing and thawing.
 - 5. Linear Shrinkage - ASTM C 426L Shrinkage shall not exceed 0.065%.
- C. Job site testing - One (1) sample from production units may be selected at random from the field for each 500 cubic feet (14m³) delivered to the job site:
 - 1. Three (3) field cut cube specimens from each of these samples shall have an average minimum compressive strength of not less than 85% with no single specimen testing less than 75% of design strength as allowed by ACI 318.
 - 2. Three (3) field cut cube specimens from each of these samples shall have an average maximum cold-water absorption of 6%.
 - 3. Field specimens shall be tested in accordance with ASTM C 1194 and C 1195.

2.2 RAW MATERIALS

- A. Portland cement - Type I or Type III, white and/or grey, ASTM C 150.
- B. Coarse aggregates - Granite, quartz or limestone, ASTM C 33, except for gradation, and are optional for the vibrant dry tamp (VDT) casting method.
- C. Fine aggregates - Manufactured or natural sands, ASTM C 33, except for gradation.
- D. Colors - Inorganic iron oxide pigments, ASTM C 979 except that carbon black pigments shall not be used.
- E. Admixtures- Comply with the following:
 - 1. ASTM C 260 for air-entraining admixtures.
 - 2. ASTM C 494/C 495 M Types A-G for water reducing, retarding, accelerating and high range admixtures.

3. Other admixtures: integral water repellents and other chemicals, for which no ASTM Standard exists, shall be previously established as suitable for use in concrete by proven field performance or through laboratory testing.
 4. ASTM C 618 mineral admixtures of dark and variable colors shall not be used in surfaces intended to be exposed to view.
 5. ASTM C 989 granulated blast furnace slag may be used to improve physical properties. Tests are required to verify these features.
- F. Water: Potable
- G. Reinforcing bars:
1. ASTM A 615/A 615M. Grade 40 or 60 steel galvanized or epoxy coated when cover is less than 1.5 in. (37 mm).
 2. Welded Wire Fabric: ASTM A 185 where applicable for wet cast units.
- H. All anchors, dowels and other anchoring devices and shims shall be standard building stone anchors commercially available in a non-corrosive material such as zinc plated, galvanized steel, brass, or stainless steel Type 302 or 304.

2.3 COLOR AND FINISH

- A. Match sample on file.
- B. All surfaces intended to be exposed to view shall have a fine-grained texture similar to natural stone, with no air voids in excess of 1/32 in. (0.8 mm) and the density of such voids shall be less than 3 occurrences per any 1 in² (25mm²) and not obvious under direct daylight illumination at a 5 ft. (1.5m) distance.
- C. Units shall exhibit a texture approximately equal to the approved sample when viewed under direct daylight illumination at a 10 ft (3m) distance.
- D. ASTM D 2244 permissible variation in color between units of comparable age subjected to similar weathering exposure.
1. Total color difference - not greater than 6 units.
 2. Total hue difference-not greater than 2 units.

2.4 REINFORCING

- A. Reinforce the units as required by the drawings and for safe handling and structural stress.
1. Minimum reinforcing shall be 0.25 percent of the cross-section area.
- B. Reinforcement shall be non-corrosive where faces exposed to weather are covered with less than 1.5in. (38 mm) of concrete material. All reinforcement shall have minimum coverage of twice the diameter of the bars.

- C. Minor chipping resulting from shipment and delivery shall not be grounds for rejection. Minor chips shall not be obvious under direct daylight illumination from a 20-ft (6m) distance.
- D. The occurrence of crazing or efflorescence shall not constitute a cause for rejection.
- E. Remove cement film, if required, from exposed surface prior to packaging for shipment.

2.5 CURING

- A. Cure units in a warm curing chamber 100 F (37.8 C) at 95 percent relative humidity for approximately 12 hours, or cure in a 95 percent moist environment at a minimum 70F (21.1 C) for 16 hours after casting. Additional yard curing at 95 percent relative humidity shall be 350-degree-days (i.e. 7 days @ 50F (10.0 C) or 5 days @ 70F (21.0 C) prior to shipping. Form cured units shall be protected from moisture evaporation with curing blankets or curing compounds after casting.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Installing contractor shall check cast stone materials for fit and finish prior to installation. Do not set unacceptable units.

3.2 SETTING TOLERANCES

- A. Comply with Cast Stone Institute SM Technical Manual.
- B. Set stones 1/8 in. (3 mm) or less, within the plane of adjacent units.
- C. Joints, plus - 1/6 in. (1.5 mm), minus - 1/8 in. (3 mm).

3.3 JOINTING

- A. Joint size:
 - 1. At stone/brick joints 3/8 in. (9.5 cm).
 - 2. At stone/stone joints in vertical position 1/4 in. (6 mm) (3/8 in. (9.5 mm) optional).
 - 3. Stone/stone joint exposed on top 3/8 in. (.5 mm).
- B. Joint Materials:
 - 1. Mortar, Type N, ASTM C 270.
 - 2. Use a full bed of mortar at all bed joints.
 - 3. Flush vertical joints full with mortar.
 - 4. Leave all joints with exposed tops or under relieving angles open for sealant.
 - 5. Leave head joints in coping and projecting components open for sealant.
- C. Location of joints:

1. As shown on shop drawings.
2. At control and expansion joints unless otherwise shown.

3.4 SETTING

- A. Drench units with clean water prior to setting.
- B. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
- C. Set units in full bed of mortar, unless otherwise detailed.
- D. Rake mortar joints 3/4 in. (18 mm) in. for pointing.
- E. Remove excess mortar from unit faces immediately after setting.
- F. Tuck point unit joints to a slight concave profile.

3.5 JOINT PROTECTION

- A. Comply with requirements of Section 07 92 00, JOINT SEALANTS.
- B. Prime ends of units, insert properly sized backing rod and install required sealant.

3.6 REPAIR AND CLEANING

- A. Repair chips with touchup materials furnished by manufacturer.
- B. Saturate units to be cleaned prior to applying an approved masonry cleaner.
- C. Consult with manufacturer for appropriate cleaners.

3.7 INSPECTION AND ACCEPTANCE

- A. Inspect finished installation according to Bulletin #36 published by the Cast Stone Institute.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Structural steel shapes, plates, and bars.
 2. Structural pipe.
 3. Bolts, nuts, and washers.

1.2 RELATED REQUIREMENTS

- A. Materials Testing And Inspection During Construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Steel Decking: Section 05 31 00, STEEL DECKING.
- C. Composite Steel Deck: Section 05 36 00, COMPOSITE METAL DECKING.
- D. Steel Finishes: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.
- B. American Institute of Steel Construction (AISC):
1. AISC Manual - Steel Construction Manual, 14th Ed.
 2. 303-10 - Code of Structural Steel Buildings and Bridges.
 3. 360-10: Specification for Structural Steel Buildings.
- C. The American Society of Mechanical Engineers (ASME):
1. B18.22.1-09 - Washers: Helical Spring-Lock, Tooth Lock, and Plain Washers.
- D. American Welding Society (AWS):
1. D1.1/D1.1M-15 - Structural Welding Code - Steel.
- E. ASTM International (ASTM):
1. A6/A6M-14 - General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
 2. A36/A36M-14 - Carbon Structural Steel.
 3. A53/A53M-12 - Pipe, Steel, Black and Hot-Dip, Zinc-Coated, Welded and Seamless.
 4. A123/A123M-15 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 5. A242/A242M-13 - High-Strength Low-Alloy Structural Steel.
 6. A283/A283M-13 - Low and Intermediate Tensile Strength Carbon Steel Plates.

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7. A307-14 - Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
 8. A500/A500M-13 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing and Rounds and Shapes.
 9. A501/A501M-14 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing and Rounds and Shapes.
 10. A572/A572M-15 - High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
 11. A992/A992M-15 - Structural Shapes.
 12. F2329/F2329M-15 - Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy steel Bolts, Screws, washers, Nuts, and Special Threaded Fasteners.
 13. F3125/F3125M-15 - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions
- F. Master Painters Institute (MPI):
1. No. 18 - Primer, Zinc Rich, Organic.
- G. Military Specifications (Mil. Spec.):
1. MIL-P-21035 - Paint, High Zinc Dust Content, Galvanizing, Repair.
- H. Occupational Safety and Health Administration (OSHA):
1. 29 CFR 1926.752(e) - Guidelines For Establishing The Components Of A Site-Specific Erection Plan.
 2. 29 CFR 1926-2001 - Safety Standards for Steel Erection.
- I. Research Council on Structural Connections (RCSC) of The Engineering Foundation:
1. Specification for Structural Joints Using ASTM F3125 Bolts.

1.4 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings:
 1. Show size, configuration, and fabrication and installation details.
- C. Test Reports: Certify products comply with specifications.
 1. Welders' qualifying tests.
- D. Certificates: Certify each product complies with specifications.
 1. Structural steel.

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2. Steel connections.
 3. Welding materials.
 4. Shop coat primer paint.
- E. Qualifications: Substantiate qualifications comply with specifications.
1. Fabricator.
 2. Installer.
 3. Welders and welding procedures.
- F. Delegated Design Drawings and Calculations: Signed and sealed by responsible Architect/Engineer.
1. Connection calculations.
- G. Record Surveys: Signed and sealed by responsible surveyor or engineer.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: AISC Quality Certification participant designated as AISC Certified Plant, Category STD.
1. Regularly fabricates specified products.
 2. Fabricated specified products with satisfactory service on five similar installations for minimum five years.
- B. Installer Qualifications: AISC Quality Certification Program participant designated as AISC-Certified Erector, Category ACSE.
1. Regularly installs specified products.
 2. Installed specified products with satisfactory service on five similar installations for minimum five years.
- C. Before commencement of Work, ensure steel erector provides written notification required by OSHA 29 CFR 1926.752(e). Submit a copy of the notification to Contracting Officer's Representative.
- D. Welders and Welding Procedures Qualifications: AWS D1.1/D1.1M.

1.6 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

- A. Delegated Design: Prepare submittal documents including design calculations and drawings signed and sealed by registered design professional, licensed in state where project is located.
- B. Design structural steel framing connections complying with specified performance:

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1. Load Capacity: Resist full capacity of supported framing member. Account for connection and member loads and eccentricities.
 - a. Request additional design criteria when necessary to complete connection design.
2. Configuration: Design and detail all connections for each member size, steel grade and connection type to resist the loads and reactions indicated on the drawings or specified herein. Use details consistent with details shown on drawings, supplementing where necessary. The details shown on drawings are conceptual and do not indicate the required weld sizes or number of bolts unless specifically noted. Use rational engineering design and standard practice in detailing, accounting for all loads and eccentricities in both the connection and the members. Promptly notify the Contracting Officer Representative of any location where the connection design criteria is not clearly indicated. The design of all connections is subject to the review and acceptance of the Contracting Officer's Representative. Submit structural calculations prepared and sealed by a qualified engineer registered in the state where the project is located. Submit calculations for review before preparation of detail drawings.

2.2 MATERIALS

A. W-Shapes:

1. ASTM A992/A992M.

B. Channel and Angles:

1. ASTM A36/A36M.

C. Plates and Bars:

1. ASTM A36/A36M.

D. Hollow Structural Sections:

1. ASTM A500/A500M.

E. Structural Pipe: ASTM A53/A53M, Grade B.

F. Bolts, Nuts and Washers: Galvanized for galvanized framing and plain finish for other framing.

1. High-strength bolts, including nuts and washers: ASTM F3125.
2. Bolts and nuts, other than high-strength: ASTM A307, Grade A.
3. Plain washers, other than those in contact with high-strength bolt heads and nuts: ASME B18.22.1.

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G. Welding Materials: AWS D1.1, type to suit application.

2.3 PRODUCTS - GENERAL

A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.

2.4 FABRICATION

A. Fabricate structural steel according to Chapter M, AISC 360.

B. Shop and Field Connections:

1. Weld connections according to AWS D1.1/D1.1M. Welds shall be made only by welders and welding operators who have been previously qualified by tests as prescribed in AWS D1.1 to perform type of work required.
2. High-Strength Bolts: High-strength bolts tightened to a bolt tension minimum 70 percent of their minimum tensile strength. Tightening done with properly calibrated wrenches, by turn-of-nut method or by use of direct tension indicators (bolts or washers). Tighten bolts in connections identified as slip-critical using Direct Tension Indicators. Twist-off torque bolts are not an acceptable alternate fastener for slip critical connections.

2.5 FINISHES

A. Shop Priming:

1. Prime paint structural steel according to AISC 303, Section 6.

B. Do not paint:

1. Surfaces within 50 mm (2 inches) of field welded joints.
2. Surfaces indicated to be encased in concrete.
3. Surfaces receiving sprayed on fireproofing.
4. Beam top flanges receiving shear connector studs applied.

C. Structural Steel Galvanizing: ASTM A123/A123M, hot dipped, after fabrication. Touch-up after erection: Clean and wire brush any abraded and other spots worn through zinc coating, including threaded portions of bolts and welds and touch-up with galvanizing repair paint.

1. Galvanize structural steel framing installed at exterior locations.

D. Bolts, Nuts, and Washers Galvanizing: ASTM F2329, hot-dipped.

2.6 ACCESSORIES

A. General: Shop paint steel according to AISC 303, Section 6.

B. Galvanizing Repair Paint: MPI No. 18.

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PART 3 - EXECUTION

3.1 ERECTION

- A. Erect structural steel according to AISC 303 and AISC 360.
- B. Set structural steel accurately at locations and elevations indicated on drawings.
- C. Maintain erection tolerances of structural steel within AISC 303 requirements.
 - 1. Pour Stop Elevation Tolerance: 6 mm (1/4 inch), maximum, before concrete placement.
- D. Weld and bolt connections as specified for shop connections.

3.2 FIELD PAINTING

- A. After welding, clean and prime weld areas to match adjacent finish.
- B. Touch-up primer damaged by construction operations.
- C. Apply galvanizing repair paint to galvanized coatings damaged by construction operations.

3.3 FIELD QUALITY CONTROL

- A. Record Survey:
 - 1. Engage registered land surveyor or registered civil engineer as specified in Section 01 00 00, GENERAL REQUIREMENTS to perform survey.
 - 2. Measure and record structural steel framing plumbness, level, and alignment after completing bolting and welding and before installation of work supported by structural steel.
 - 3. Identify deviations from allowable tolerances specified in AISC Manual.

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SECTION 05 21 00
STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 DESCRIPTION:

A. This section specifies open web steel joists.

1.2 RELATED WORK:

A. Structural Steel: Section 05 12 00, STRUCTURAL STEEL FRAMING.

1.3 DESIGN REQUIREMENTS:

A. Design all elements with the latest published version of applicable Codes.

1.4 TOLERANCES:

A. Deviation from a straight line between ends of any installed joist shall not exceed 10 mm in 3 m (3/8 inch in 10 feet).

1.5 REGULATORY REQUIREMENTS:

A. STEEL JOIST INSTITUTE: Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders, (Latest Edition).

1.6 SUBMITTALS:

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Shop and Erection Drawings: Complete.

1. Fabrication drawings including details and schedules for the fabrication and assembly of each joist.

2. Erection drawings showing the size and location of each joist, bridging, cross bracing, bearing details, connections, welds, bolts and bearing plates.

C. Certificates: STEEL JOIST INSTITUTE compliance.

D. Design Calculations: If requested by the COR, submit complete calculations covering the design of all members and connections. Calculations must be specifically applicable to the joists supplied.

1.7 QUALITY ASSURANCE:

A. Provide documentation that the joist manufacturer is a member of the Steel Joist Institute and has satisfactorily completed work of a similar scope and nature.

1.8 APPLICABLE PUBLICATIONS:

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

- B. American Institute of Steel Construction (AISC):
 - 1. Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design (Latest Edition).
 - 2. Load and Resistance Factor Design Specification for Structural Steel Buildings (Latest Edition).
- C. American Society for Testing and Materials (ASTM):
 - A307-07.....Carbon Steel Bolts and Studs, 400 MPa (60,000 psi) Tensile Strength
 - F3125/F3125M-15.....Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions
- D. American Welding Society (AWS):
 - D1.1-08.....Structural Welding Code - Steel
- E. SSPC: The Society for Protective Coatings:
 - Steel Structures Painting Manual, Volumes 1 and 2
- F. Steel Joist Institute (STEEL JOIST INSTITUTE):
 - Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders (Latest Edition).
- G. U.S. Army Corps of Engineers:
 - CRD-C-621.....Specification for Non-Shrink Grout

PART 2 - PRODUCTS

2.1 OPEN WEB STEEL JOISTS:

- A. K-Series conforming to STEEL JOIST INSTITUTE standard specifications.

2.2 ACCESSORIES - FITTINGS:

- A. Accessories and fittings, including end supports and bridging, in accordance with standard STEEL JOIST INSTITUTE specification under which joists were designed.
- B. Unfinished Threaded Fasteners: ASTM A307, Grade A, regular hexagon type, low carbon steel.
- C. High-strength bolts, including nuts and washers: ASTM F3125 heavy hexagon structural bolts.

PART 3 - EXECUTION

3.1 FABRICATION:

- A. Fabrication and assembly in accordance with applicable standard STEEL JOIST INSTITUTE specification:

1. Make chord splices with full penetration welds capable of developing the ultimate strength in tension of the parent material. Make no allowance for the strength of back-up bars or other material incidental to welding.
2. Provide shop-welded connection plates at panel points to receive supplemental framing.
3. Holes in Chord Members: Provide holes in chord members where shown for securing other work to steel joists; however, deduct area of holes from the area of chord when calculating strength of member.
4. Extended Ends: Provide extended ends on joists where shown, complying with manufacturer's standards and requirements of applicable STEEL JOIST INSTITUTE specifications.
5. Ceiling Extensions: Provide ceiling extension in areas having ceilings attached directly to joist bottom chord. Provide either an extended bottom chord element or a separate unit, to suit manufacturer's standards, of sufficient strength to support ceiling construction. Extend ends to within 12 mm (1/2 inch) of finished wall surface unless otherwise indicated.
6. Bridging: Provide horizontal or diagonal type bridging for joists complying with STEEL JOIST INSTITUTE specifications. Provide bridging anchors for ends of bridging lines terminating at walls or beams. Provide bridging adequate to resist the loads indicated on the Contract Documents.
7. End Anchorage: Provide end anchorages, including bearing plates, to secure joists to adjacent construction, complying with STEEL JOIST INSTITUTE specifications, unless otherwise indicated. Design all end anchorages to resist a minimum net uplift of 1.6 kPa (35 pounds per square foot) of supported area.
8. Header Units: Provide header units to support all joists at openings in floor or roof system not framed with steel shapes.
9. Provide supplemental steel support framing for metal deck where normal deck bearing is precluded by other framing members and minor openings.

3.2 SHOP PAINTING:

- A. Shop painting in accordance with applicable STEEL JOIST INSTITUTE standard specification.
- B. Shop paint joists and accessories with a rust-inhibiting primer paint. For joists which will be finish painted, limit paint to a primer which

is compatible with specified finish paint. In high humidity areas, shop paint joists with a zinc-rich primer to receive top coats per the paint system manufacturer's recommendations.

3.3 ERECTION:

- A. Installation of joists in accordance with applicable STEEL JOIST INSTITUTE standard specification.
- B. Handle joists in a manner to avoid damaging of joists. Remove damaged joists from site, except when field repair is approved, and such repairs are satisfactorily made in accordance with manufacturer's recommendations.
- C. Accurately set joists and end anchorage in accordance with the applicable STEEL JOIST INSTITUTE standard specification. Secure joists resting on masonry or concrete bearing surfaces by welding or bolting to the steel bearing plates as indicated on the Contract Documents. Secure bridging and anchoring in place prior to application of any construction loads. Distribute any temporary loads so that carrying capacity of any joist is not exceeded. Loads shall not be applied to bridging where joist lengths are 12 m (40 feet) and longer. Where joist lengths are 12 m (40 feet) and longer, install a center row of bolted diagonal bridging to provide lateral stability before slackening of hoisting lines.

3.4 FIELD PAINTING:

- A. Clean abraded, corroded, and field welded areas and touch up with same type of paint used in shop painting.

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SECTION 05 31 00

STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Single pan fluted metal roof deck as roof substrate.

1.2 RELATED REQUIREMENTS

- A. Materials Testing and Inspection During Construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Structural Steel Shapes: Section 05 21 00, STRUCTURAL STEEL FRAMING.
- C. Color: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.
- B. AISI - American Iron and Steel Institute.
1. S100-12 - Specification for the Design of Cold-formed Steel Structural Members.
- C. American Welding Society (AWS):
1. D1.1/D1.1M-15 - Structural Welding Code - Steel.
 2. D1.3/D1.3M-08 - Structural Welding Code - Sheet Steel.
- D. ASTM International (ASTM):
1. A36/A36M-14 - Carbon Structural Steel.
 2. A653/A653M-15 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 3. A1008/A1008M-15 - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Baked Hardenable.
 4. C423-09a - Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 5. E119-15 - Fire Tests of Building Construction and Materials.
- E. FM Global (FM):
1. 1-28-15 - Wind Design.
 2. Factory Mutual Research Approval Guide.
- F. Master Painters Institute (MPI):
1. No. 18 - Primer, Zinc Rich, Organic.
- G. Military Specifications (Mil. Spec.):

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1. MIL-P-21035B - Paint, High Zinc Dust Content, Galvanizing Repair.
- H. Steel Deck Institute (SDI):
 1. No. 31-07 - Design Manual for Composite Deck, Form Decks, and Roof Decks.
- I. UL LLC (UL):
 1. Listed - Online Certifications Directory.
 2. 580-13 - Tests for Uplift Resistance of Roof Assemblies.

1.4 SUBMITTALS

- A. Submittal shall be submitted in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings:
 1. Show layout, connections to supporting members, anchorage, sump pans, accessories, deck openings and reinforcements.
 2. Show similar information necessary for completing installation as shown and specified, including supplementary framing, ridge and valley plates, cant strips, cut openings, special jointing or other accessories.
 3. Show welding, side lap, closure, deck reinforcing and closure reinforcing details.
 4. Show openings required for work of other trades, including openings not shown on structural drawings. Indicate where temporary shoring is required to satisfy design criteria.
- C. Manufacturer's Literature and Data:
 1. Description of each product.
 2. Show steel decking section properties and structural characteristics.
- D. Certificates: Certify each product complies with specifications.
 1. Fire Resistance Product Listing: For each metal deck type and thickness supporting concrete slab or fill.
 2. Show steel decking is UL Listed for specified application.
- E. Qualifications: Substantiate qualifications comply with specifications.
 1. Welders and welding procedures.
- F. Insurance Certification: Assist the Government in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance.

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1.5 QUALITY ASSURANCE

- A. FM Listing: Provide metal roof deck units which have been evaluated by Factory Mutual Global and are listed in "Factory Mutual Research Approval Guide" for "Class 1" fire rated construction.
- B. Welders and Welding Procedures Qualifications: AWS D1.3/D1.3M.

1.6 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

- A. Design steel decking and accessories according to AISI S100.
 - 1. Wind Uplift Resistance and Corner Conditions:
 - a. Eave Overhang: 58 psf, minimum.
 - b. Other Roof Areas: 49 psf, minimum.
 - 2. Wind Uplift Resistance and Corner Conditions: UL 580, Class 90.
 - 3. Wind Uplift Resistance and Corner Conditions: FM 1-28; Class 1-90.
 - 4. Design side and end closures and attachment to supporting steel to safely support wet weight of concrete and construction loads.
 - a. Cantilever Closure Deflection: 3 mm (1/8 inch), maximum.

2.2 MATERIALS

- A. Galvanized Steel Sheet: ASTM A653/A653M; G90 coating.
- B. Steel Shapes: ASTM A36/A36M.

2.3 PRODUCTS - GENERAL

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.

2.4 METAL ROOF DECK

- A. Metal Roof Deck: UL Listed and FM Global approved as metal roof deck panels.
 - 1. Steel decking of the type, depth, thickness, and section properties as shown.
- B. Metal Roof Deck: Single pan fluted units with flat horizontal top surfaces as permanent support for superimposed loads.
 - 1. Deck Style:
 - a. Wide Rib (Type B) deck.
 - 2. Depth and Thickness: As indicated on drawings.
 - 3. Material: Galvanized sheet steel.

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- C. Do not use steel deck for hanging supports of building components including suspended ceilings, electrical light fixtures, plumbing, heating, or air conditioning pipes or ducts or electrical conduits.

2.5 FABRICATION

- A. Fabricate steel decking in sufficient lengths to extend over 3 or more supports, except for interstitial levels.
1. Cut metal deck units to proper length in shop.
- B. Fabricate accessories required to complete installation of steel decking.
1. Exposed to View: Fabricate from sheet steel matching metal decking.
 2. Concealed from View: Fabricate from galvanized sheet steel.
- C. Sheet Metal Accessories:
1. Metal Cover Plates: For end-abutting decking, to close gaps at changes in deck direction, columns, walls and openings.
 - a. Sheet Steel: Minimum 1.0 mm (0.04 inch) thick.
 2. Continuous Sheet Metal Edging: At openings, concrete slab edges and roof deck edges.
 - a. Sheet Steel: Minimum 1.0 mm (0.04 inch) thick.
 3. Metal Closure Strips: For openings between decking and other construction. Form to configurations required to provide tight-fitting closures at open ends of flutes and sides of decking.
 - a. Sheet Steel: Minimum 1.0 mm (0.04 inch) thick.
 4. Ridge and Valley Plates: Minimum 100 mm (4 inch) wide ridge and valley plates where roof slope exceeds 1/24 (1/2 inch per foot).
 - a. Sheet Steel: Minimum 1.0 mm (0.04 inch) thick.
 5. Cant Strips: Provide bent metal 45 degree leg cant strips where indicated on the drawings. Fabricate cant strips with minimum 125 mm (5 inch) face width.
 - a. Sheet Steel: Minimum 0.8 mm (0.03 inch) thick.
 6. Seat Angles for Deck: Provide where beam does not frame into column.
 7. Sump Pans for Roof Drains: Fabricated from single piece galvanized sheet steel with level bottoms and sloping sides to direct water flow to drain. Provide sump pans of adequate size to receive roof drains and with bearing flanges minimum 75 mm (3 inches) wide. Recess pans minimum 38 mm (1-1/2 inches) below roof deck surface,

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unless otherwise shown or required by deck configuration. Drain holes will be field cut.

- a. Sheet Steel: Minimum 1.7 mm (0.06 inch) thick.

2.6 FINISHES

- A. Shop prime painted sheet steel with two coats of primer.

2.7 ACCESSORIES

- A. Welding Materials: AWS D1.1, type to suit application.
- B. Galvanizing Repair Paint: MPI No. 18.
- C. Touch-Up Paint: Match shop finish.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.
- C. Remove contaminants from structural steel surfaces where steel decking will be welded.
- D. Verify structural steel framing installation is completed, plumbed, and aligned with temporary bracing installed where required.
- E. Coordinate with structural steel erector to prevent overloading of structural members when placing steel decking for installation.

3.2 ERECTION

- A. Do not use floor deck units for storage or working platforms until permanently secured. Do not overload deck units once placed. Replace deck units that become damaged after erection and before casting concrete at no cost additional to the Government.
- B. Place steel decking at right angles to supporting members with ends located over supports.
- C. Lap end joints 50 mm (2 inches), minimum.
- D. Roof Deck Fastening:
 1. Fasten decking to steel supporting members by welding.
 - a. Welds: 16 mm (5/8 inch) diameter puddle welds or elongated welds of equal strength.
 - b. Weld Spacing: Maximum 300 mm (12 inches) on center at every support. Use closer spacing where required for lateral force resistance by diaphragm action.
 2. Fasten split or partial decking panels to structure in every valley.

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3. Fasten decking to each supporting member at ribs where side laps occur.
 - a. Power driven fasteners is acceptable in lieu of welding if strength equivalent to welding specified above is provided. Submit test data and design calculations verifying equivalent design strength.
 4. Mechanically fasten decking side laps with self-tapping No. 8 or larger machine screws.
 - a. Fastener Locations: Mid-span and maximum 900 mm (3 feet) on center.
 5. Provide additional fastening necessary to comply with UL Listing and FM Approval for specified performance.
- E. Cutting and Fitting:
1. Field cut steel decking to accommodate columns and other penetrating items.
 2. Cut openings located and dimensioned on Structural Drawings.
 3. Coordinate openings for other penetrations shown on approved submittal drawings but not shown on Structural Drawings.
 - a. Cut and reinforce required opening.
 4. Make cuts neat and trim using metal saw, drill or punch-out device. Cutting with torches is prohibited.
 5. Do not make cuts in the metal deck that are not shown on the approved metal decking submittal drawings.
 - a. When additional openings are required, submit scaled drawing, locating required opening and other openings and supports in immediate area.
 - b. Do not cut the opening until drawing is approved by Contracting Officer's Representative.
 - c. Provide additional reinforcing and framing required for opening.
 - d. Failure to comply with these requirements is cause for rejection of the work and removal and replacement of the affected steel decking.
 6. Opening Reinforcement: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking, and support of other work.

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F. Touch up damaged factory finishes.

1. Apply galvanizing repair paint to damaged galvanized surfaces.
2. Apply touch up paint to damaged shop painted surfaces.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 05 36 00
COMPOSITE METAL DECKING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies material and services required for installation of composite steel decking including shear connector studs and miscellaneous closures required to prepare deck for concrete placement as shown and specified.

1.2 RELATED WORK

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.

1.3 DESIGN REQUIREMENT

- A. Design steel decking in accordance with AISI S-100, except as otherwise shown or specified.

1.4 SUBMITTALS

- A. Submittal shall be submitted in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Shop and erection drawings showing decking unit layout, connections to supporting members, and information necessary to complete the installation as shown and specified, including supplementary framing, cant strips, cut openings, special jointing or other accessories.
1. Show welding, side lap, closure, deck reinforcing and closure reinforcing details.
 2. Show openings required for work of other trades, including openings not shown on structural drawings.
 3. Indicate where temporary shoring is required to satisfy design criteria.
- C. Manufacturer's Literature and Data: Showing steel decking section properties and specifying required structural characteristics.
- D. Manufacturer's written recommendations for:
1. Shape of decking section.
 2. Cleaning of steel decking prior to concrete placement.
- E. Test Report - Establishing structural characteristics of composite concrete and steel decking system.
- F. Test Report - Stud base qualification.
- G. Welding power setting recommendation by shear stud manufacturer.

- H. Shear Stud Layouts: Submit drawings showing the quantity, pattern, spacing and configuration of shear studs for each beam and girder.
- I. Certification: For each type and gauge of metal deck supporting concrete slab or fill, submit certification of specified fire ratings. Certify that units supplied are UL listed as a "Steel Floor and Form Unit".
- J. Manufacturers Certificates for deck units attesting compliance with specified requirements.
- K. Submit manufacturer's catalog data for Welding Equipment and Welding Rods and Accessories intended use.
- L. Power Actuated Tool Operator Certificates.
- M. Welders qualifications.

1.5 QUALITY ASSURANCE

- A. Fire Safety
 - 1. Underwriters' Label: Provide composite metal floor deck units listed in Underwriters' Laboratories "Building Materials Directory", with each deck unit bearing the UL label and marking for specific system detailed.
 - 2. FM Listing: Provide composite metal roof deck units which have been evaluated by Factory Mutual Global and are listed in "Factory Mutual Research Approval Guide" for "Class 1" fire rated construction.
 - 3. Insurance Certification: Assist the Government in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance.
- B. Deck Units: Provide deck units and accessory products from a manufacturer engaged in the manufacture of steel decking for more than three (3) years. Submit manufacturer's certificates attesting that the decking material complies with the specified requirements.
- C. Certification of Powder-Actuated Tool Operator: Manufacturer's certificate attesting that the operators are authorized to use the low velocity powder-actuated tool.
- D. Qualifications for Welding Work: Submit qualified welder qualifications in accordance with AWS D1.1/D1.1M or under an approved qualification test.

1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only. Refer to the latest edition of referenced Standards and codes.

- B. American Iron and Steel Institute (AISI):
 - S-100-12.....North American Specification for the Design of Cold-Formed Steel Structural Members
- C. ASTM International (ASTM):
 - A36/A36M-14.....Carbon Structural Steel
 - A108-13.....Steel Bars, Carbon, Cold Finished, Standard Quality
 - A653/A653M-13.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process
- D. American Institute of Steel Construction (AISC):
 - 1. Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design (Latest Edition)
 - 2. Load and Resistance Factor Design Specification for Structural Steel Buildings (Latest Edition)
- E. American Welding Society (AWS):
 - D1.1/D1.1M-11.....Structural Welding Code - Steel
 - D1.3/D1.3M-05(R2008)....Structural Welding Code - Sheet Steel
- F. FM Global (FM):
 - APP Guide.....Approval Guide
 - DS 1-28-2012.....Design Wind Loads
- G. Military Specifications (Mil. Spec.):
 - MIL-P-21035B.....Paint, High Zinc Dust Content, Galvanizing Repair
- H. Underwriters Laboratories (UL):
 - Bld Mat Dir (Annually)..Building Materials Directory

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel Decking and Flashings: ASTM A653/A653M, Structural Quality suitable for shear stud weld-through techniques.
- B. Galvanizing: ASTM A653/A653M, G60. Thickness not less than indicated on drawings.
- C. Shear connector studs: ASTM A108, Grades 1015-1020, yield 350 Mpa (50,000 psi) minimum, tensile strength - 400 Mpa (60,000 psi) minimum, reduction of area 50 percent minimum.
 - 1. Provide studs of uniform diameter, with heads concentric and on same axis to shaft.

2. Provide studs, after welding, free from substance or defect which would interfere with its function as a shear connector.
3. Do not paint or galvanize studs.
4. Provide size of studs as shown on drawings.
5. Provide studs manufactured by a company normally engaged in the manufacturer of shear studs and can furnish equipment suitable for weld-through installation of shear studs.

D. Galvanizing Repair Paint: Mil. Spec. MIL-P-21035B.

E. Miscellaneous Steel Shapes: ASTM A36/A36M.

F. Welding Electrode: E60XX minimum.

G. Sheet Metal Accessories: ASTM A653/A653M, galvanized, unless noted otherwise. Provide accessories of every kind required to complete the installation of metal decking in the system shown. Finish sheet metal items to match deck including, but not limited to, the following items:

1. Metal Cover Plates: For end-abutting deck units, to close gaps at changes in deck direction, columns, walls and openings. Same quality as deck units but not less than 1.3 mm (18 gauge) sheet steel.
2. Continuous sheet metal edging: at openings and concrete slab edges. Same quality as deck units but not less than 1.3 mm (18 gauge) steel. Side and end closures supporting concrete and their attachment to supporting steel to be designed by the manufacturer to safely support the wet weight of concrete and construction loads. The deflection of cantilever closures to be limited to a total of 3 mm (1/8 inch) maximum.
3. Metal Closure Strips: For openings between decking and other construction, of not less than 1.3 mm (18 gauge) sheet steel of the same quality as the deck units. Form to the configuration required to provide tight-fitting closures at open ends of flutes and sides of decking.
4. Seat angles for deck: Where a beam does not frame into a column.

2.2 REQUIREMENTS

- A. Steel decking depth, gage, and section properties to be as shown on contract documents. Provide edges of deck with vertical interlocking male and female lip providing for a positive mechanical connection.
- B. Fabricate deck units with integral embossments to provide mechanical bond with concrete slab. Deck units combined with concrete slab to be capable of supporting total design loads.

- C. Provide integral system with single point of attachment for light duty hanger devices for flexibility for attaching hangers for support of acoustical, lathing, plumbing, heating, air conditioning electrical and similar items.
 - 1. Provide a minimum spacing pattern of 305 mm (12 inches) on centers longitudinally and 610 mm or 914 mm (24 or 36 inches) on centers transversely.
 - 2. Provide suspension system capable of safely supporting a maximum allowable load of 45 kg (100 pounds) concentrated at one hanger attachment point.
 - 3. System may consist of fold-down type hanger tabs or a lip hanger.

PART 3 - EXECUTION

3.1 ERECTION

- A. Do not start installation of metal decking until corresponding steel framework has been plumbed, aligned and completed, and until temporary shoring, where required, has been installed.
 - 1. Remove oil, dirt, paint, ice, water and rust from steel surfaces to which metal decking will be welded.
- B. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
- C. Do not use floor deck units for storage or working platforms until permanently secured.
 - 1. Do not overload deck units once placed.
 - 2. Replace deck units that become damaged after erection and prior to casting concrete at no additional cost to the Government.
- D. Erect steel deck in accordance with manufacturer's printed instructions.
- E. Ship steel deck units in standard widths and fabricated to proper length.
- F. Provide steel decking in sufficient lengths to extend over 3 or more spans, except where structural steel layout does not permit.
- G. Place steel decking units on supporting steel framework and adjust to final position before being permanently fastened.
 - 1. Bring each unit to proper bearing on supporting beams.
 - 2. Place deck units in straight alignment for entire length of run of flutes and with close registration of flutes of one unit with those of abutting unit.

3. Maximum space between ends of abutting units is 13 mm (1/2 inch). If space exceeds 13 mm (1/2 inch), install closure plates.
- H. Ceiling hanger loops, if provided, must be flattened, or removed to obtain bearing of units on structural steel.
- I. Fastening Deck Units:
1. Fasten floor deck units to steel supporting members by not less than 16 mm (5/8 inch) diameter puddle welds or elongated welds of equal strength, spaced not more than 305 mm (12 inches) on center with a minimum of two welds per unit at each support. Where two units abut, fasten each unit individually to the supporting steel framework.
 2. Tack weld or use self-tapping No. 8 or larger machine screws at 914 mm (3 feet) on center for fastening end closures. Only use welds to attach longitudinal end closures.
 3. Weld side laps of adjacent floor deck units that span more than 1524 mm (5 feet). Fasten at midspan or 914 mm (3 feet) on center, whichever is smaller.
- J. Weld in conformance to AWS D1.3/D1.3M and done by qualified experienced welding mechanics.
- K. Clean and touch-up area and welds scarred during erection, and repair with zinc rich galvanizing repair paint.
1. Paint touch-up is not required for welds or scars that are to be in direct contact with concrete.
- L. Provide metal concrete stops at edges of deck.
- M. Cutting and Fitting:
1. Fabricate metal deck units to proper length prior to shipping.
 2. Field cutting by the metal deck erector is restricted to bevel cuts, notching to fit around columns and similar items, and cutting openings that are located and dimensioned on the structural drawings.
 3. Other penetrations shown on the approved metal deck shop drawings but not shown on the structural drawings are to be located, cut and reinforced.
 4. Make cuts and penetrations neat and trim using a metal saw, drill or punchout device; cutting with torches is prohibited.
 5. Do not make cuts in the metal deck that are not shown on the approved metal deck drawings.
 6. If an additional opening not shown on the approved shop drawings is required, submit a sketch, to scale, locating the required new

opening and other openings and supports in the immediate area. Do not cut the opening until the sketch has been reviewed and accepted by the Contracting Officer Representative (COR). Provide additional reinforcing or framing required for the opening at no additional cost to the Government.

7. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking and support of other work shown.
- N. Install shear connector studs through previously installed metal deck in conformance to AWS D1.1/D1.1M, Section 7.

Exception: Install studs with automatically timed welding equipment and as specified below:

1. Do not place welded wire reinforcing or other materials and equipment which will interfere with stud installation on steel deck until shear connector studs are installed.
2. Clean steel deck sheets free of oil, rust, dirt, and paint. Release water in deck's valley so that it does not become entrapped between deck and beam. Clean and dry surface to which stud is to be welded.
3. Rest metal deck tightly upon top flange of structural member with bottom of deck rib in full contact with top of beam flange.
4. Weld studs only through a single thickness of deck. Place decking so that a butt joint is obtained. Place studs directly over beam web, where one row of studs are required.
5. Provide ferrules specially developed for the weld-through technique, and appropriate for size of studs installed. Remove ferrules after welding.
6. Submit report of successful test program for stud base qualification as required by AWS D1.1/D1.1M, Appendix K.

3.2 CLEANING

- A. Clean deck in accordance with manufacturer's recommendation before concrete placement.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 054000

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 DESCRIPTION:

A. This section specifies materials and services required for installation of cold-formed steel, including tracks and required accessories as shown and specified. This Section includes the following:

1. Exterior load-bearing steel stud walls.

1.2 RELATED WORK:

- A. Section 05 12 00, STRUCTURAL STEEL FRAMING: Structural steel framing.
- B. Section 09 22 16, NON-STRUCTURAL METAL FRAMING: Non-load-bearing metal stud framing assemblies.
- C. Section 09 29 00, GYPSUM BOARD: Gypsum board assemblies.

1.3 DESIGN REQUIREMENTS:

- A. Design steel in accordance with American Iron and Steel Institute Publication "Specification for the Design of Cold-Formed Steel Structural Members", except as otherwise shown or specified.
- B. Structural Performance: Engineer, fabricate and erect cold-formed metal framing with the minimum physical and structural properties indicated.
- C. Structural Performance: Engineer, fabricate, and erect cold-formed metal framing to withstand design loads within limits and under conditions required.

1. Design Loads:

- a. Gravity, wind and seismic loading as indicated on the drawings or in this specification.
- b. Blast Loads: will be made available to the Design Engineer.
 - 1) Blast loads are anticipated based on building envelop system framing shown on drawings.

2. Design framing systems to withstand design loads without deflections greater than the following:

- a. Exterior Load-Bearing Walls: Lateral deflection of 1/360 of the wall height.

3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change (range) of 67 degrees C (120 degrees F).

4. Design framing system to accommodate deflection of primary building structure and construction tolerances, and to maintain clearances at openings.
5. Engineering Responsibility: Engage a fabricator who assumes undivided responsibility for engineering cold-formed metal framing by employing a qualified professional engineer to prepare design calculations, shop drawings, and other structural data.

1.4 SUBMITTALS:

- A. Submit in accordance with Section 013323, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. All items indicated below are required submittals requiring Contracting Officer's Representative (COR) review and approval.
- B. Shop Drawings: Shop and erection drawings showing steel unit layout, connections to supporting members, and information necessary to complete installation as shown and specified.
- C. Manufacturer's Literature and Data: Showing steel component sections and specifying structural characteristics.
- D. Design of the light gauge for this project shall be provided by the contractor's structural engineer for the loads shown on the construction documents. Submit signed and sealed calculations performed by a structural engineer with at least 5 years experience in the design of light gauge metal and registered in the state of the project. Calculations shall be submitted with plans elevations and details for review and approval.
- E. Blast Design Calculations: Light Gauge Members and Connections.
 1. Submit calculations for review and approval prepared by qualified blast consultant, with a minimum of 5 years experience in design of blast resistant window systems when delegated designer of the light gauge responsible for design of light gauge members for gravity, wind and seismic loadings varies from minimum sizes required for blast loading shown on the drawings. The magnitudes of the design threats W1 and GP1 are defined in the Physical Security and Resiliency Design Standards Data Definitions which is a document separate from the referenced VA Security and Resiliency Design Manual. The Physical Security and Resiliency Design Standards Data Definitions are provided on a need-to-know basis by the structural blast specialist performing the blast design on VA projects. It is the responsibility of the delegated engineer responsible for the design of blast resistant cold formed framing to request and obtain the Physical Security Design and Resiliency Data Standard Data

Definitions from the VA Office of Construction and Facilities Management (CFM). Any associated delays or increased costs due to failure to obtain this information will be borne by the contractor.

1.5 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Iron and Steel Institute (AISI):
- C. Specification and Commentary for the Design of Cold-Formed Steel Structural Members (1996)
- D. American Society of Testing and Materials (ASTM):
 - A36/A36M-19 Standard Specification for Carbon Structural Steel
 - A123/A123M-17 Standard Specifications for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - A153/A153M-16a Standard Specifications for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - A307-14e1 Standard Specifications for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength
 - A653/A653M-20 Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process
 - C955-18e1 Standard Specification for Cold Formed Steel Structural Framing Members
 - C1107/1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)
 - E488/E488M-18 Standard Test Methods for Strength of Anchors in Concrete Elements
 - E1190-11 (2018) Standard Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members
- E. American Welding Society (AWS):
 - 1. D1.3/D1.3M-18 Structural Welding Code-Sheet Steel
- F. Military Specifications (Mil. Spec.):
 - 1. MIL-P-21035B Paint, High Zinc Dust Content, Galvanizing Repair
- G. VA Physical Security and Resiliency Design Manual October 1, 2020.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Sheet Steel for joists, studs and accessories 16 gage and heavier: ASTM A653, structural steel, zinc coated CP60 G90, with a yield of 340 MPa (50 ksi) minimum.
- B. Sheet Steel for joists, studs and accessories 18 gage and lighter: ASTM A653, structural steel, zinc coated G60 G90, with a yield of 230 MPa (33 ksi) minimum.
- C. Galvanizing Repair Paint: MIL-P-21035B.
- D. Nonmetallic, Non-shrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, Portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C1107, with fluid consistency and a 30 minute working time.

2.2 WALL FRAMING:

- A. Steel Studs: Complying with ASTM C 955. Manufacturer's standard C-shaped steel studs of web depth indicated, with lipped flanges, and complying with the following:
 - 1. Minimum Base-Steel Thickness (uncoated): 1.37 mm (0.0538 inch)
 - 2. Flange Width: (1-5/8 inches)
- B. Web: Unpunched.
- C. Steel Track: Manufacturer's standard U-shaped steel track, unpunched, of web depths indicated, with straight flanges, and complying with the following:
 - 1. Design Uncoated-Steel Thickness: Matching steel studs.
 - 2. Flange Width: Manufacturer's standard deep flange where indicated, standard flange elsewhere.

2.3 FRAMING ACCESSORIES:

- A. Fabricate steel framing accessories of the same material and finish used for framing members, with a minimum yield strength of 230 MPa (33 ksi).
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 - 1. Supplementary framing.
 - 2. Bracing, bridging, and solid blocking.
 - 3. Web stiffeners.
 - 4. Gusset plates.
 - 5. Deflection track and vertical slide clips.

6. Stud kickers and girts.
7. Reinforcement plates.

2.4 ANCHORS, CLIPS, AND FASTENERS:

- A. Steel Shapes and Clips: ASTM A36, zinc coated by the hot-dip process according to ASTM A123.
- B. Cast-in-Place Anchor Bolts and Studs: ASTM A307, Grade A, zinc coated by the hot-dip process according to ASTM A153.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times the design load, as determined by testing per ASTM E488 conducted by a qualified independent testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times the design load, as determined by testing per ASTM E1190 conducted by a qualified independent testing agency.
- E. Mechanical Fasteners: Corrosion-resistant coated, self-drilling, self-threading steel drill screws. Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.5 REQUIREMENTS:

- A. Welding in accordance with AWS D1.3
- B. Furnish members and accessories by one manufacturer only.

PART 3 - EXECUTION

3.1 FABRICATION:

- A. Framing components may be preassembled into panels. Panels shall be square with components attached.
- B. Cut framing components squarely or as required for attachment. Cut framing members by sawing or shearing; do not torch cut.
- C. Hold members in place until fastened.
- D. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
 1. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 2. Locate mechanical fasteners and install according to cold-formed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.

- E. Where required, provide specified insulation in double header members and double jamb studs which will not be accessible after erection.

3.2 ERECTION:

- A. Handle and lift prefabricated panels in a manner as to not distort any member.
- B. Securely anchor tracks to supports as shown.
- C. At butt joints, securely anchor two pieces of track to same supporting member or butt-weld or splice together.
- D. Plumb, align, and securely attach studs to flanges or webs of both upper and lower tracks.
- E. All axially loaded members shall be aligned vertically to allow for full transfer of the loads down to the foundation. Vertical alignment shall be maintained at floor/wall intersections.
- F. Install jack studs above and below openings and as required to furnish support. Securely attach jack studs to supporting members.
- G. Install headers in all openings that are larger than the stud spacing in that wall.
- H. Attach bridging for studs in a manner to prevent stud rotation. Space bridging rows as shown.
- I. Studs in one piece for their entire length, splices will not be permitted.
- J. Provide temporary bracing and leave in place until framing is permanently stabilized.
- K. Do not bridge building expansion joints with cold-formed metal framing. Independently frame both sides of joints.
- L. Fasten reinforcement plate over web penetrations that exceed size of manufacturer's standard punched openings.

3.3 TOLERANCES:

- A. Vertical alignment (plumbness) of studs shall be within 1/960th of the span.
- B. Horizontal alignment (levelness) of walls shall be within 1/960th of their respective lengths.
- C. Spacing of studs shall not be more than 3 mm (1/8 inch) +/- from the designed spacing providing that the cumulative error does not exceed the requirements of the finishing materials.
- D. Prefabricated panels shall be not more than 3 mm (1/8 inch) +/- out of square within the length of that panel.

3.4 FIELD REPAIR:

- A. Touch-up damaged galvanizing with galvanizing repair paint.

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SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies items and assemblies fabricated from structural steel shapes and other materials as shown and specified.
- B. Items specified.
 - 1. Support for Wall and Ceiling Mounted Items: (SD055000-01,SD055000-02, SD102113-01, SD102600-01, SD123100-01 & SD123100-02)
 - 2. Guards
 - 3. Loose Lintels
 - 4. Shelf Angles
 - 5. Plate Door Sill
 - 6. Safety Nosings
 - 7. Ladders
 - 8. Railings:
 - 9. Steel Counter or Bench Top Frame and Leg
 - 10. Steel Pipe Bollards

1.2 RELATED WORK

- A. Railings attached to steel stairs: Section 05 51 00, METAL STAIRS.
- B. Colors, finishes, and textures: Section 09 06 00, SCHEDULE FOR FINISHES.
- C. Prime and finish painting: Section 09 91 00, PAINTING.
- D. Stainless steel corner guards: Section 10 26 00, WALL AND DOOR PROTECTION.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:

Grating, each type	Floor plate
Trap door	Wheel guards
Ceiling hatch	Sidewalk Access door
Manhole Covers	Safety nosing

- C. Shop Drawings:

1. Each item specified, showing complete detail, location in the project, material and size of components, method of joining various components and assemblies, finish, and location, size and type of anchors.
 2. Mark items requiring field assembly for erection identification and furnish erection drawings and instructions.
 3. Provide templates and rough-in measurements as required.
- D. Manufacturer's Certificates:
1. Anodized finish as specified.
 2. Live load designs as specified.
- E. Design Calculations for specified live loads including dead loads.
- F. Furnish setting drawings and instructions for installation of anchors to be preset into concrete and masonry work, and for the positioning of items having anchors to be built into concrete or masonry construction.

1.4 QUALITY ASSURANCE

- A. Each manufactured product shall meet, as a minimum, the requirements specified, and shall be a standard commercial product of a manufacturer regularly presently manufacturing items of type specified.
- B. Each product type shall be the same and be made by the same manufacturer.
- C. Assembled product to the greatest extent possible before delivery to the site.
- D. Include additional features, which are not specifically prohibited by this specification, but which are a part of the manufacturer's standard commercial product.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society of Mechanical Engineers (ASME):
 1. B18.6.1-97 Wood Screws
 2. B18.2.2-87(R2010) Square and Hex Nuts
- C. American Society for Testing and Materials (ASTM):
 1. A36/A36M-14 Structural Steel
 2. A47-99(R2014) Malleable Iron Castings
 3. A48-03(R2012) Gray Iron Castings
 4. A53-12 Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless

5. A123-15 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 6. A240/A240M-15 Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications.
 7. A269-15 Seamless and Welded Austenitic Stainless Steel Tubing for General Service
 8. A307-14 Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
 9. A391/A391M-07(R2015) Grade 80 Alloy Steel Chain
 10. A786/A786M-15 Rolled Steel Floor Plate
 11. B221-14 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
 12. B456-11 Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
 13. B632-08 Aluminum-Alloy Rolled Tread Plate
 14. C1107-13 Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
 15. D3656-13 Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns
 16. F436-16 Hardened Steel Washers
 17. F468-06(R2015) Nonferrous Bolts, Hex Cap Screws, Socket Head Cap Screws and Studs for General Use
 18. F593-13 Stainless Steel Bolts, Hex Cap Screws, and Studs
 19. F1667-15 Driven Fasteners: Nails, Spikes and Staples
- D. American Welding Society (AWS):
1. D1.1-15 Structural Welding Code Steel
 2. D1.2-14 Structural Welding Code Aluminum
 3. D1.3-18 Structural Welding Code Sheet Steel
- E. National Association of Architectural Metal Manufacturers (NAAMM)
1. AMP 521-01(R2012) Pipe Railing Manual
 2. AMP 500-06 Metal Finishes Manual
 3. MBG 531-09(R2017) Metal Bar Grating Manual
 4. MBG 532-09 Heavy Duty Metal Bar Grating Manual
- F. Structural Steel Painting Council (SSPC) Society of Protective Coatings:
1. SP 1-15 No. 1, Solvent Cleaning
 2. SP 2-04 No. 2, Hand Tool Cleaning
 3. SP 3-04 No. 3, Power Tool Cleaning
- G. Federal Specifications (Fed. Spec):

1. RR-T-650E Treads, Metallic and Nonmetallic, Nonskid

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

- A. In addition to the dead loads, design fabrications to support the following live loads unless otherwise specified.
- B. Railings and Handrails: 900 N (200 pounds) in any direction at any point.
- C. Manhole Covers: 1200 kg/m² (250 pounds per square foot).

2.2 MATERIALS

- A. Structural Steel: ASTM A36.
- B. Stainless Steel: ASTM A240, Type 302 or 304.
- C. Aluminum, Extruded: ASTM B221, Alloy 6063-T5 unless otherwise specified. For structural shapes use alloy 6061-T6 and alloy 6061-T4511.
- D. Floor Plate:
 1. Steel ASTM A786.
 2. Aluminum: ASTM B632.
- E. Steel Pipe (Bollard): ASTM A53.
 1. Galvanized for exterior locations.
 2. Type S, Grade A unless specified otherwise.
 3. NPS (inside diameter) as shown.
- F. Cast-Iron: ASTM A48, Class 30, commercial pattern.
- G. Malleable Iron Castings: A47.
- H. Primer Paint: As specified in Section 09 91 00, PAINTING.
- I. Stainless Steel Tubing: ASTM A269, type 302 or 304.
- J. Modular Channel Units:
 1. Factory fabricated, channel shaped, cold formed sheet steel shapes, complete with fittings bolts and nuts required for assembly.
 2. Form channel within turned pyramid shaped clamping ridges on each side.
 3. Provide case hardened steel nuts with serrated grooves in the top edges designed to be inserted in the channel at any point and be given a quarter turn so as to engage the channel clamping ridges. Provide each nut with a spring designed to hold the nut in place.
 4. Factory finish channels and parts with oven baked primer when exposed to view. Channels fabricated of ASTM A525, G90 galvanized steel may have primer omitted in concealed locations. Finish screws and nuts with zinc coating.

5. Fabricate snap-in closure plates to fit and close exposed channel openings of not more than 0.3 mm (0.0125 inch) thick stainless steel.

K. Grout: ASTM C1107, pourable type.

L. Insect Screening: ASTM D3656.

2.3 HARDWARE

A. Rough Hardware:

1. Furnish rough hardware with a standard plating, applied after punching, forming and assembly of parts; galvanized, cadmium plated, or zinc-coated by electro-galvanizing process. Galvanized G-90 where specified.
2. Use G90 galvanized coating on ferrous metal for exterior work unless non-ferrous metal or stainless is used.

B. Fasteners:

1. Bolts with Nuts:
 - a. ASME B18.2.2.
 - b. ASTM A307 for 415 MPa (60,000 psi) tensile strength bolts.
 - c. ASTM F468 for nonferrous bolts.
 - d. ASTM F593 for stainless steel.
2. Screws: ASME B18.6.1.
3. Washers: ASTM F436, type to suit material and anchorage.
4. Nails: ASTM F1667, Type I, style 6 or 14 for finish work.

2.4 FABRICATION GENERAL

A. Material

1. Use material as specified. Use material of commercial quality and suitable for intended purpose for material that is not named or its standard of quality not specified.
2. Use material free of defects which could affect the appearance or service ability of the finished product.

B. Size:

1. Size and thickness of members as shown.
2. When size and thickness is not specified or shown for an individual part, use size and thickness not less than that used for the same component on similar standard commercial items or in accordance with established shop methods.

C. Connections

1. Except as otherwise specified, connections may be made by welding, riveting or bolting.
2. Field riveting will not be approved.
3. Design size, number and placement of fasteners, to develop a joint strength of not less than the design value.
4. Holes, for rivets and bolts: Accurately punched or drilled and burrs removed.
5. Size and shape welds to develop the full design strength of the parts connected by welds and to transmit imposed stresses without permanent deformation or failure when subject to service loadings.
6. Use Rivets and bolts of material selected to prevent corrosion (electrolysis) at bimetallic contacts. Plated or coated material will not be approved.
7. Use stainless steel connectors for removable members machine screws or bolts.

D. Fasteners and Anchors

1. Use methods for fastening or anchoring metal fabrications to building construction as shown or specified.
2. Where fasteners and anchors are not shown, design the type, size, location and spacing to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and suit the sequence of installation.
3. Use material and finish of the fasteners compatible with the kinds of materials which are fastened together and their location in the finished work.
4. Fasteners for securing metal fabrications to new construction only, may be by use of threaded or wedge type inserts or by anchors for welding to the metal fabrication for installation before the concrete is placed or as masonry is laid.
5. Fasteners for securing metal fabrication to existing construction or new construction may be expansion bolts, toggle bolts, power actuated drive pins, welding, self-drilling and tapping screws or bolts.

E. Workmanship

1. General:
 - a. Fabricate items to design shown.

- b. Furnish members in longest lengths commercially available within the limits shown and specified.
 - c. Fabricate straight, true, free from warp and twist, and where applicable square and in same plane.
 - d. Provide holes, sinkages and reinforcement shown and required for fasteners and anchorage items.
 - e. Provide openings, cut-outs, and tapped holes for attachment and clearances required for work of other trades.
 - f. Prepare members for the installation and fitting of hardware.
 - g. Cut openings in gratings and floor plates for the passage of ducts, sumps, pipes, conduits and similar items. Provide reinforcement to support cut edges.
 - h. Fabricate surfaces and edges free from sharp edges, burrs and projections which may cause injury.
2. Welding:
- a. Weld in accordance with AWS.
 - b. Welds shall show good fusion, be free from cracks and porosity and accomplish secure and rigid joints in proper alignment.
 - c. Where exposed in the finished work, continuous weld for the full length of the members joined and have depressed areas filled and protruding welds finished smooth and flush with adjacent surfaces.
 - d. Finish welded joints to match finish of adjacent surface.
3. Joining:
- a. Miter or butt members at corners.
 - b. Where frames members are butted at corners, cut leg of frame member perpendicular to surface, as required for clearance.
4. Anchors:
- a. Where metal fabrications are shown to be preset in concrete, weld 32 x 3 mm (1-1/4 by 1/8 inch) steel strap anchors, 150 mm (6 inches) long with 25 mm (one inch) hooked end, to back of member at 600 mm (2 feet) on center, unless otherwise shown.
 - b. Where metal fabrications are shown to be built into masonry use 32 x 3 mm (1-1/4 by 1/8 inch) steel strap anchors, 250 mm (10 inches) long with 50 mm (2 inch) hooked end, welded to back of member at 600 mm (2 feet) on center, unless otherwise shown.
5. Cutting and Fitting:

- a. Accurately cut, machine and fit joints, corners, copes, and miters.
- b. Fit removable members to be easily removed.
- c. Design and construct field connections in the most practical place for appearance and ease of installation.
- d. Fit pieces together as required.
- e. Fabricate connections for ease of assembly and disassembly without use of special tools.
- f. Joints firm when assembled.
- g. Conceal joining, fitting and welding on exposed work as far as practical.
- h. Do not show rivets and screws prominently on the exposed face.
- i. The fit of components and the alignment of holes shall eliminate the need to modify component or to use exceptional force in the assembly of item and eliminate the need to use other than common tools.

F. Finish:

1. Finish exposed surfaces in accordance with NAAMM AMP 500 Metal Finishes Manual.
2. Aluminum: NAAMM AMP 501.
 - a. Mill finish, AA-M10, as fabricated, use unless specified otherwise.
 - b. Clear anodic coating, AA-C22A41, chemically etched medium matte, with Architectural Class 1, 0.7 mils or thicker.
 - c. Colored anodic coating, AA-C22A42, chemically etched medium matte with Architectural Class 1, 0.7 mils or thicker.
 - d. Painted: AA-C22R10.
3. Steel and Iron: NAAMM AMP 504.
 - a. Zinc coated (Galvanized): ASTM A123, G90 unless noted otherwise.
 - b. Surfaces exposed in the finished work:
 - 1) Finish smooth rough surfaces and remove projections.
 - 2) Fill holes, dents and similar voids and depressions with epoxy type patching compound.
 - c. Shop Prime Painting:
 - 1) Surfaces of Ferrous metal:
 - a) Items not specified to have other coatings.
 - b) Galvanized surfaces specified to have prime paint.
 - c) Remove all loose mill scale, rust, and paint, by hand or power tool cleaning as defined in SSPC-SP2 and SP3.

- d) Clean of oil, grease, soil and other detrimental matter by use of solvents or cleaning compounds as defined in SSPC-SP1.
- e) After cleaning and finishing apply one coat of primer as specified in Section 09 91 00, PAINTING.

2) Non ferrous metals: Comply with MAAMM-500 series.

- 4. Stainless Steel: NAAMM AMP-504 Finish No. 4.
- 5. Chromium Plating: ASTM B456, satin or bright as specified, Service Condition No. SC2.

G. Protection:

- 1. Insulate aluminum surfaces that will come in contact with concrete, masonry, plaster, or metals other than stainless steel, zinc or white bronze by giving a coat of heavy-bodied alkali resisting bituminous paint or other approved paint in shop.
- 2. Spot prime all abraded and damaged areas of zinc coating which expose the bare metal, using zinc rich paint on hot-dip zinc coat items and zinc dust primer on all other zinc coated items.

2.5 SUPPORTS

A. General:

- 1. Fabricate ASTM A36 structural steel shapes as shown.
- 2. Use clip angles or make provisions for welding hangers and braces to overhead construction.
- 3. Field connections may be welded or bolted.

B. For Wall Mounted Items:

- 1. For items supported by metal stud partitions.
- 2. Steel strip or hat channel minimum of 1.5 mm (0.0598 inch) thick.
- 3. Steel strip minimum of 150 mm (6 inches) wide, length extending one stud space beyond end of item supported.
- 4. Steel hat channels where shown. Flange cut and flatted for anchorage to stud.
- 5. Structural steel tube or channel for grab bar at water closets floor to structure above with clip angles or end plates formed for anchors.
- 6. Use steel angles for thru wall counters. Drill angle for fasteners at ends and not over 100 mm (4 inches) on center between ends.

C. For Trapeze Bars:

- 1. Construct assembly above ceilings as shown and design to support not less than a 340 kg (750 pound) working load at any point.

2. Fabricate trapeze supports as shown, with all exposed members, including screws, nuts, bolts and washers, fabricated of stainless steel.
 3. Fabricate concealed components of structural steel shapes unless shown otherwise.
 4. Stainless steel ceiling plate drilled for eye bolt.
 5. Continuously weld connections where welds shown.
 6. Use modular channel where shown with manufacturers bolts and fittings.
 - a. Weld ends of steel angle braces to steel plates and secure to modular channel units as shown. Drill plates for anchor bolts.
 - b. Fabricate eye bolt, special clamp bolt, and plate closure full length of modular channel at ceiling line and secure to modular channel unit with manufacturers standard fittings.
- D. For Cubical Curtain Track:
1. Fabricate assembly of steel angle as shown.
 2. Drill angle bent ends for anchor screws to acoustical suspension system and angle for hanger wires.
 3. Provide pipe sleeve welded to angle.
- E. Supports for Ceiling Mounted Patient Lift Systems:
1. Fabricate hangers braces, and track of modular channel units assembly as shown.
 2. Fabricate steel plates for anchor to structure above.
 3. Drill bent plates for bolting at mid height at concrete beams.

2.6 GUARDS

- A. Guard Angles for Overhead Doors:
1. Cut away top portion of outstanding leg of angle and extend remaining portion of angle up wall.
 2. Weld filler piece across head of opening to jamb angles.
 3. Make provisions for fasteners and anchorage.

2.7 LOOSE LINTELS

- A. Furnish lintels of sizes shown. Where size of lintels is not shown, provide the sizes specified.
- B. Fabricate lintels with not less than 150 mm (6 inch) bearing at each end for nonbearing masonry walls, and 200 mm (8 inch) bearing at each end for bearing walls.
- C. Provide one angle lintel for each 100 mm (4 inches) of masonry thickness as follows except as otherwise specified or shown.

1. Openings 750 mm to 1800 mm (2-1/2 feet to 6 feet) - 100 x 90 x 8 mm (4 x 3-1/2 x 5/16 inch).
 2. Openings 1800 mm to 3000 mm (6 feet to 10 feet) - 150 x 90 x 9 mm (6 x 3-1/2 x 3/8 inch).
- D. For 150 mm (6 inch) thick masonry openings 750 mm to 3000 mm (2-1/2 feet to 10 feet) use one angle 150 x 90 x 9 mm (6 x 3-1/2 x 3/8 inch).
- E. Provide bearing plates for lintels where shown.
- F. Weld or bolt upstanding legs of double angle lintels together with 19 mm (3/4-inch bolts) spaced at 300 mm (12 inches) on centers.
- G. Insert spreaders at bolt points to separate the angles for insertion of metal windows, louver, and other anchorage.
- H. Where shown or specified, punch upstanding legs of single lintels to suit size and spacing of anchor bolts.
- I. Elevator Entrance:
1. Fabricate lintel from plate bent to channel shape and provide a minimum of 100 mm (4 inch) bearing each end.
 2. Cut away the front leg of the channel at each end to allow for concealment behind elevator hoistway entrance frame.

2.8 SHELF ANGLES

- A. Fabricate from steel angles of size shown.
- B. Fabricate angles with horizontal slotted holes for 19 mm (3/4 inch) bolts spaced at not over 900 mm (3 feet) on centers and within 300 mm (12 inches) of ends.
- C. Provide adjustable malleable iron inserts for embedded in concrete framing.

2.9 PLATE DOOR SILL

- A. Fabricate of checkered plate as detailed.
1. Aluminum Plate: ASTM B632, 3 mm (0.125 inch) thick.
 2. Steel Plate: ASTM A786, 3 mm (0.125 inch thick), galvanized G90.
- B. Fabricate for anchorage with flat head countersunk bolts at each end and not over 300 mm (12 inches), o.c.

2.10 SAFETY NOSINGS

- A. Fed. Spec. RR-T-650, Type C.
1. Aluminum: Class 2, Style 2.
 2. Cast iron: Class 4.

- B. Fabricate nosings for exterior use from cast aluminum, and nosings for interior use from either cast aluminum or cast iron. Use one Class throughout.
- C. Fabricate nosings approximately 100 mm (4 inches) wide with not more than 9 mm (3/8 inch) nose.
- D. Provide nosings with integral type anchors spaced not more than 100 mm (4 inches) from each end and intermediate anchors spaced approximately 375 mm (15 inches) on center.
- E. Fabricate nosings to extend within 100 mm (4 inches) of ends of concrete stair treads except where shown to extend full width.
- F. Fabricate nosings to extend full width between stringers of metal stairs and full width of door openings.
- G. On curved steps fabricate to terminate at point of curvature of steps having short radius curved ends.

2.11 LADDERS

- A. Aluminum Ships' Ladders:
 - 1. Fixed-rail type, constructed of structural aluminum, with mill finish.
 - 2. Fabricate side rails and rungs of size and design shown, with the rungs shouldered and headed into and welded to the rails.
 - 3. Space siderails 20 inches (406 mm) (457 mm) apart unless otherwise indicated.
 - 4. Siderails: Continuous extruded-aluminum channels or tubes, not less than 2-1/2 inches (64 mm) deep, 3/4 inch (19 mm) wide, and 1/8 inch (3.2 mm) thick.
 - 5. Rungs: Extruded-aluminum tubes, not less than 3/4 inch (19 mm) deep and not less than 1/8 inch (3.2 mm) thick, with ribbed tread surfaces.
 - 6. Fit rungs in centerline of siderails; fasten by welding or with stainless steel fasteners or brackets and aluminum rivets.
 - 7. Where shown fabrication side rails curved, twisted and formed into gooseneck.
 - 8. Fabricate angle brackets at top and bottom and intermediate brackets not more than 60 inches o.c. Drill for bolting.

2.12 RAILINGS

- A. In addition to the dead load design railing assembly to support live load specified.
- B. Fabrication General:

1. Provide continuous welded joints, dressed smooth and flush.
 2. Standard flush fittings, designed to be welded, may be used.
 3. Exposed threads will not be approved.
 4. Form handrail brackets to size and design shown.
 5. Exterior Post Anchors.
 - a. Fabricate tube or pipe sleeves with closed ends or plates as shown.
 - b. Where inserts interfere with reinforcing bars, provide flanged fittings welded or threaded to posts for securing to concrete with expansion bolts.
 - c. Provide heavy pattern sliding flange base plate with set screws at base of pipe or tube posts. [Base plates are not required on pipe sleeves where ornamental railings occur.]
 6. Interior Post Anchors:
 - a. Provide flanged fittings for securing fixed posts to floor with expansion bolts, unless shown otherwise.
 - b. Weld or thread flanged fitting to posts at base.
 - c. For securing removable posts to floor, provide close fitting sleeve insert or inverted flange base plate with stud bolts or rivets concrete anchor welded to the base plate.
 - d. Provide sliding flange base plate on posts secured with set screws.
 - e. Weld flange base plate to removable posts set in sleeves.
- C. Handrails:
1. Close free ends of rail with flush metal caps welded in place except where flanges for securing to walls with bolts are shown.
 2. Make provisions for attaching handrail brackets to wall, posts, and handrail as shown.
- D. Steel Pipe Railings:
1. Fabricate of steel pipe with welded joints.
 2. Number and space of rails as shown.
 3. Space posts for railings not over 1800 mm (6 feet) on centers between end posts.
 4. Form handrail brackets from malleable iron.
 5. Fabricate removable sections with posts at end of section.
 6. Removable Rails:

- a. Provide "U" shape brackets at each end to hold removable rail as shown. Use for top and bottom horizontal rail when rails are joined together with vertical members.
 - b. Secure rail to brackets with 9 mm (3/8 inch) stainless steel through bolts and nuts at top rail only when rails joined with vertical members.
 - c. Continuously weld brackets to post.
 - d. Provide slotted bolt holes in rail bracket.
 - e. Weld bolt heads flush with top of rail.
 - f. Weld flanged fitting to post where posts are installed in sleeves.
7. Opening Guard Rails:
- a. Fabricate rails with flanged fitting at each end to fit between wall opening jambs.
 - b. Design flange fittings for fastening with machine screws to steel plate anchored to jambs.
 - c. Fabricate rails for floor openings for anchorage in sleeves.
8. Gates:
- a. Fabricate from steel pipe as specified for railings.
 - b. Fabricate gate fittings from either malleable iron or wrought steel.
 - c. Hang each gate on suitable spring hinges of clamp on or through bolted type. Use bronze hinges for exterior gates.
 - d. Provide suitable stops, so that gate will swing as shown.
 - e. Provide padlock eyes where shown.
9. Chains:
- a. Chains: ASTM A391, Grade 63, straight link style, normal size chain bar 8 mm (5/16 inch) diameter, eight links per 25 mm (foot) and with boat type snap hook on one end, and through type eye bolt on other end.
 - b. Fabricate eye bolt for attaching chain to pipe posts, size not less than 9 mm (3/8 inch) diameter.
 - c. Fabricate anchor at walls, for engagement of snap hook of either a 9 mm (3/8 inch) diameter eye bolt or punched angle.
 - d. Galvanize chain and bolts after fabrication.
- E. Aluminum Railings:
1. Fabricate from extruded aluminum.

2. Use tubular posts not less than 3 mm (0.125 inch) wall thickness for exterior railings.
3. Punch intermediate rails and bottom of top rails for passage of posts and machine to a close fit.
4. Where shown use extruded channel sections for top rail with 13 mm (1/2 inch) thick top cover plates and closed ends.
5. Fabricate brackets of extruded or wrought aluminum as shown.
6. Fabricate stainless pipe sleeves with closed bottom at least six inches deep having internal dimensions at least 13 mm (1/2 inch) greater than external dimensions of posts where set in concrete.

2.13 STEEL COUNTER OR BENCH TOP FRAME AND LEGS

- A. Fabricate channel or angle frame with mitered and welded corners as shown.
- B. Drill top of frame with 6 mm (1/4inch) holes spaced 200 mm (8 inches) on center for securing countertop.
- C. Fabricate legs of angle or pipe shapes and continuously weld to frame.
- D. Finish frame with backed on enamel prime coat.

2.14 STEEL PIPE BOLLARD

- A. Provide bollard in accordance with ASTM A53 with dimensions as shown in
- B. Standard detail SD320523-04. Anchor posts in concrete and fill solidly
- C. With concrete with a minimum compressive strength of 17 MPa 2500psi.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set work accurately, in alignment and where shown, plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.
- B. Items set into concrete or masonry.
 1. Provide temporary bracing for such items until concrete or masonry is set.
 2. Place in accordance with setting drawings and instructions.
 3. Build strap anchors, into masonry as work progresses.
- C. Set frames of gratings, covers, corner guards, trap doors and similar items flush with finish floor or wall surface and, where applicable, flush with side of opening.
- D. Field weld in accordance with AWS.
 1. Design and finish as specified for shop welding.
 2. Use continuous weld unless specified otherwise.

- E. Install anchoring devices and fasteners as shown and as necessary for securing metal fabrications to building construction as specified. Power actuated drive pins may be used except for removable items and where members would be deformed or substrate damaged by their use.
- F. Spot prime all abraded and damaged areas of zinc coating as specified and all abraded and damaged areas of shop prime coat with same kind of paint used for shop priming.
- G. Isolate aluminum from dissimilar metals and from contact with concrete and masonry materials as required to prevent electrolysis and corrosion.
- H. Secure escutcheon plate with set screw.

3.2 INSTALLATION OF SUPPORTS

- A. Anchorage to structure.
 - 1. Secure angles or channels and clips to overhead structural steel by continuous welding unless bolting is shown.
 - 2. Secure supports to concrete inserts by bolting or continuous welding as shown.
 - 3. Secure supports to mid height of concrete beams when inserts do not exist with expansion bolts and to slabs, with expansion bolts. Unless shown otherwise.
 - 4. Secure steel plate or hat channels to studs as detailed.
- B. Supports for Wall Mounted items:
 - 1. Locate center of support at anchorage point of supported item.
 - 2. Locate support at top and bottom of wall hung cabinets.
 - 3. Locate support at top of floor cabinets and shelving installed against walls.
 - 4. Locate supports where required for items shown.
- C. Support at Ceiling for Patient Lift System:
 - 1. Bolt modular steel channel frames to hangers as shown, anchored to structure above.
 - 2. Fasten frames with modular channel manufacturers fittings, bolts, and nuts. Space modular channel supports and hangers as shown and as required to suit equipment furnished.
 - 3. Install closure plates in channels at ceiling where channel opening is visible. Coordinate and cut plates to fit tight against equipment anchors after equipment anchors are installed.
- D. Supports for Cubicle Curtain Track:

1. Install assembly where shown after ceiling suspension grid is installed.
 2. Drill angle for bolt and weld nut to angle prior to installation of tile.
- E. Support for cantilever grab bars:
1. Locate channels or tube in partition for support as shown, and extend full height from floor to underside of structural slab above.
 2. Anchor at top and bottom with angle clips bolted to channels or tube with two, 9 mm (3/8 inch) diameter bolts.
 3. Anchor to floors and overhead construction with two 9 mm (3/8 inch) diameter bolts.
 4. Fasten clips to concrete with expansion bolts, and to steel with machine bolts or welds.
- F. Supports for Trapeze Bars:
1. Secure plates to overhead construction with fasteners as shown.
 2. Secure angle brace assembly to overhead construction with fasteners as shown and bolt plate to braces.
 3. Fit modular channel unit flush with finish ceiling, and secure to plate with modular channel unit manufacturer's standard fittings through steel shims or spreaders as shown.
 - a. Install closure plates in channel between eye bolts.
 - b. Install eyebolts in channel.

3.3 STEEL LINTELS

- A. Use lintel sizes and combinations shown or specified.
- B. Install lintels with longest leg upstanding, except for openings in 150 mm (6 inch) masonry walls install lintels with longest leg horizontal.
- C. Install lintels to have not less than 150 mm (6 inch) bearing at each end for nonbearing walls, and 200 mm (8 inch) bearing at each end for bearing walls.

3.4 SHELF ANGLES

- A. Anchor shelf angles with 19 mm (3/4 inch) bolts unless shown otherwise in adjustable malleable iron inserts, set level at elevation shown.
- B. Provide expansion space at end of members.

3.5 PLATE DOOR SILL

- A. Set in sealant and bolt to curb.

3.6 SAFETY NOSINGS

- A. Except as specified and where preformed rubber treads are shown or specified install safety nosings at the following:

1. Exterior concrete steps.
 2. Door sills of areaway entrances curbs.
 3. Exposed edges of curbs of door sills at transformer and service rooms.
 4. Interior concrete steps, including concrete filled treads of metal stairs of service stairs.
- B. Install flush with horizontal and vertical surfaces.
- C. Install nosing to within 100 mm (4 inches) of ends of concrete stair treads, except where shown to extend full width.
- D. Extend nosings full width of door openings.
- E. Extend nosings, full width between stringers of metal stairs, and terminate at point of curvature of steps having short radius curved ends.

3.7 RAILINGS

- A. Steel Posts:
1. Secure fixed posts to concrete with expansion bolts through flanged fittings except where sleeves are shown with pourable grout.
 2. Install sleeves in concrete formwork.
 3. Set post in sleeve and pour grout to surface. Apply beveled bead of urethane sealant at perimeter of post or under flange fitting as specified in Section 07 92 00, JOINT SEALANTS on exterior posts.
 4. Secure removable posts to concrete with either machine screws through flanged fittings which are secured to inverted flanges embedded in and set flush with finished floor, or set posts in close fitting pipe sleeves without grout.
 5. Secure sliding flanged fittings to posts at base with set screws.
 6. Secure fixed flanged fittings to concrete with expansion bolts.
 7. Secure posts to steel with welds.
- B. Anchor to Walls:
1. Anchor rails to concrete or solid masonry with machine screws through flanged fitting to steel plate.
 - a. Anchor steel plate to concrete or solid masonry with expansion bolts.
 - b. Anchor steel plate to hollow masonry with toggle bolts.
 2. Anchor flanged fitting with toggle bolt to steel support in frame walls.
- C. Removable Rails:
1. Rest rails in brackets at each end and secure to bracket with stainless steel bolts and nuts where part of a continuous railing.

2. Rest rail posts in sleeves where not part of a continuous railing. Do not grout posts.

D. Gates:

1. Hang gate to swing as shown.
2. Bolt gate hinges to jamb post with clamp on or through bolts.

E. Chains:

1. Eye bolt chains to pipe posts.
2. Eye bolt anchoring at walls.
 - a. Expansion bolt to concrete or solid masonry.
 - b. Toggle bolt to hollow masonry of frame wall installed support.

F. Handrails:

1. Anchor brackets for metal handrails as detailed.
2. Install brackets within 300 mm (12 inches) of return of walls, and at evenly spaced intermediate points not exceeding 1200 mm (4 feet) on centers unless shown otherwise.
3. Expansion bolt to concrete or solid masonry.
4. Toggle bolt to installed supporting frame wall and to hollow masonry unless shown otherwise.

3.8 STEEL COMPONENTS FOR MILLWORK ITEMS

- A. Coordinate and deliver to Millwork fabricator for assembly where millwork items are secured to metal fabrications.

3.9 INSTALLATION OF STEEL PIPE BOLLARD

- A. Set bollards vertically in concrete piers. Compressive strength of
- B. Concrete piers shall be 21MPa 3000psi. For dimensions of concrete piers
- C. See standard detail SD320523-04.

3.10 CLEAN AND ADJUSTING

- A. Adjust movable parts including hardware to operate as designed without binding or deformation of the members centered in the opening or frame and, where applicable, contact surfaces fit tight and even without forcing or warping the components.
- B. Clean after installation exposed prefinished and plated items and items fabricated from stainless steel, aluminum and copper alloys, as recommended by the metal manufacture and protected from damage until completion of the project.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies wood blocking, framing, furring, nailers, rough hardware, light wood construction and plywood backing panels.

1.2 RELATED WORK:

- A. Gypsum sheathing: Section 09 29 00, GYPSUM BOARD.

1.3 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Sustainable Design Submittals, as described below:
1. Postconsumer and preconsumer recycled content as specified in PART 2 - PRODUCTS.
 2. Volatile organic compounds per volume as specified in PART 2 - PRODUCTS.
 3. For composite wood products, submit documentation indicating that product contains no added urea formaldehyde.
- C. Shop Drawings showing framing connection details, fasteners, connections and dimensions.
- D. Manufacturer's Literature and Data:
1. Submit data for lumber, panels, hardware and adhesives.
 2. Submit data for wood-preserved treatment from chemical treatment manufacturer and certification from treating plants that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 3. Submit data for fire retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 4. For products receiving a waterborne treatment, submit a statement that moisture content of treated materials was reduced to levels specified before shipment to project site.
- E. Manufacturers certificate for unmarked lumber.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Protect lumber and other products from dampness both during and after delivery at site.

- B. Pile lumber in stacks in such manner as to provide air circulation around surfaces of each piece.
- C. Stack plywood and other board products so as to prevent warping.
- D. Locate stacks on well drained areas, supported at least 152 mm (6 inches) above grade and cover with well-ventilated sheds having firmly constructed over hanging roof with sufficient end wall to protect lumber from driving rain.

1.5 QUALITY ASSURANCE:

- A. Installer: A firm with a minimum of three (3) years' experience in the type of work required by this section.

1.6 GRADING AND MARKINGS:

- A. Any unmarked lumber or plywood panel for its grade and species will not be allowed on VA Construction sites for lumber and material not normally grade marked, provide manufacturers' certificates (approved by an American Lumber Standards approved agency) attesting that lumber and material meet the specified the specified requirements.

1.7 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in the text by basic designation only.
- B. American Forest and Paper Association (AFPA):
 - 1. NDS-15 National Design Specification for Wood Construction
 - 2. WCD1-01 Details for Conventional Wood Frame Construction
- C. American Institute of Timber Construction (AITC):
 - 1. A190.1-07 Structural Glued Laminated Timber
- D. American Society of Mechanical Engineers (ASME):
 - 1. B18.2.1-12(R2013) Square and Hex Bolts and Screws
 - 2. B18.2.2-10 Square and Hex Nuts
 - 3. B18.6.1-81(R2008) Wood Screws
- E. American Plywood Association (APA):
 - 1. E30-11 Engineered Wood Construction Guide
- F. ASTM International (ASTM):
 - 1. A653/A653M-13 Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process
 - 2. C954-11 Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs from 0.033 inch (2.24 mm) to 0.112-inch (2.84 mm) in thickness

3. C1002-14 Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Metal Studs
 4. D198-14 Test Methods of Static Tests of Lumber in Structural Sizes
 5. D2344/D2344M-13 Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates
 6. D2559-12a Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions
 7. D3498-03(R2011) Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems
 8. D6108-13 Test Method for Compressive Properties of Plastic Lumber and Shapes
 9. D6109-13 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber and Related Products
 10. D6111-13a Test Method for Bulk Density and Specific Gravity of Plastic Lumber and Shapes by Displacement
 11. D6112-13 Test Methods for Compressive and Flexural Creep and Creep-Rupture of Plastic Lumber and Shapes
 12. F844-07a(R2013) Washers, Steel, Plan (Flat) Unhardened for General Use
 13. F1667-13 Nails, Spikes, and Staples
- G. American Wood Protection Association (AWPA):
1. AWPA Book of Standards
- H. Commercial Item Description (CID):
1. A-A-55615 Shield, Expansion (Wood Screw and Lag Bolt Self Threading Anchors)
- I. Forest Stewardship Council (FSC):
1. FSC-STD-01-001(Ver. 4-0)FSC Principles and Criteria for Forest Stewardship
- J. Military Specification (Mil. Spec.):
1. MIL-L-19140E Lumber and Plywood, Fire-Retardant Treated
- K. Environmental Protection Agency (EPA):
1. 40 CFR 59(2014) National Volatile Organic Compound Emission Standards for Consumer and Commercial Products
- L. Truss Plate Institute (TPI):
1. TPI-85 Metal Plate Connected Wood Trusses
- M. U.S. Department of Commerce Product Standard (PS)
1. PS 1-95 Construction and Industrial Plywood
 2. PS 20-10 American Softwood Lumber Standard

N. ICC Evaluation Service (ICC ES):

1. AC09 Quality Control of Wood Shakes and Shingles
2. AC174 Deck Board Span Ratings and Guardrail Systems (Guards and Handrails)

PART 2 - PRODUCTS

2.1 LUMBER:

- A. Unless otherwise specified, each piece of lumber must bear grade mark, stamp, or other identifying marks indicating grades of material, and rules or standards under which produced.
1. Identifying marks are to be in accordance with rule or standard under which material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification.
 2. Inspection agency for lumber approved by the Board of Review, American Lumber Standards Committee, to grade species used.
- B. Structural Members: Species and grade as listed in the AFPA NDS having design stresses as shown.
- C. Lumber Other Than Structural:
1. Unless otherwise specified, species graded under the grading rules of an inspection agency approved by Board of Review, American Lumber Standards Committee.
 2. Framing lumber: Minimum extreme fiber stress in bending of 7584 kPa (1100 PSI).
 3. Furring, blocking, nailers and similar items 101 mm (4 inches) and narrower Standard Grade; and, members 152 mm (6 inches) and wider, Number 2 Grade.
 4. Board Sub-flooring: Shiplap edge, 25 mm (1 inch) thick, not less than 203 mm (8 inches) wide.
- D. Sizes:
1. Conforming to PS 20.
 2. Size references are nominal sizes, unless otherwise specified, actual sizes within manufacturing tolerances allowed by standard under which produced.
- E. Moisture Content:
1. Maximum moisture content of wood products is to be as follows at the time of delivery to site.

- a. Boards and lumber 50 mm (2 inches) and less in thickness: 19 percent or less.
 - b. Lumber over 50 mm (2 inches) thick: 25 percent or less.
- F. Fire Retardant Treatment:
1. Comply with Mil Spec. MIL-L-19140.
 2. Treatment and performance inspection, by an independent and qualified testing agency that establishes performance ratings.
- G. Preservative Treatment:
1. Do not treat Heart Redwood and Western Red Cedar.
 2. Treat wood members and plywood exposed to weather or in contact with plaster, masonry or concrete, including framing of open roofed structures; sills, sole plates, furring, and sleepers that are less than 610 mm (24 inches) from ground; nailers, edge strips, blocking, crickets, curbs, cant, vent strips and other members provided in connection with roofing and flashing materials.
 3. Treat other members specified as preservative treated (PT).
 4. Preservative treat by the pressure method complying with AWPA Book use category system standards U1 and T1, except any process involving the use of Chromated Copper Arsenate (CCA) or other agents classified as carcinogenic for pressure treating wood is not permitted.

2.2 PLYWOOD:

- A. Comply with PS 1.
- B. Bear the mark of a recognized association or independent inspection agency that maintains continuing control over quality of plywood which identifies compliance by veneer grade, group number, span rating where applicable, and glue type.
- C. Equipment Backing Panels:
 1. Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.3 ROUGH HARDWARE AND ADHESIVES:

- A. Anchor Bolts:
 1. ASME B18.2.1 and ASME B18.2.2 galvanized, 13 mm (1/2 inch) unless shown otherwise.
 2. Extend at least 203 mm (8 inches) into masonry or concrete with ends bent 50 mm (2 inches).

- B. Miscellaneous Bolts: Expansion Bolts: C1D A-A-55615; lag bolt, long enough to extend at least 65 mm (2-1/2 inches) into masonry or concrete. Provide 13 mm (1/2 inch) bolt unless shown otherwise.
- C. Washers
 - 1. ASTM F844.
 - 2. Provide zinc or cadmium coated steel or cast iron for washers exposed to weather.
- D. Screws:
 - 1. Wood to Wood: ASME B18.6.1 or ASTM C1002.
 - 2. Wood to Steel: ASTM C954, or ASTM C1002.
- E. Nails:
 - 1. Size and type best suited for purpose unless noted otherwise. Provide aluminum-alloy nails, plated nails, or zinc-coated nails, for nailing wood work exposed to weather and on roof blocking.
 - 2. ASTM F1667:
 - a. Common: Type I, Style 10.
 - b. Concrete: Type I, Style 11.
 - c. Barbed: Type I, Style 26.
 - d. Underlayment: Type I, Style 25.
 - e. Masonry: Type I, Style 27.
 - f. Provide special nails designed for use with ties, strap anchors, framing connectors, joists hangers, and similar items. Nails not less than 32 mm (1-1/4 inches) long, 8d and deformed or annular ring shank.
- F. Adhesives:
 - 1. For field-gluing plywood to lumber framing floor or roof systems: ASTM D3498.
 - 2. Adhesives to have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, (EPA Method 24).

PART 3 - EXECUTION

3.1 INSTALLATION OF MISCELLANEOUS WOOD MEMBERS:

- A. Conform to applicable requirements of the following:
 - 1. AFPA NDS for timber connectors.
 - 2. AITC A190.1 Timber Construction Manual for heavy timber construction.
 - 3. AFPA WCD1 for nailing and framing unless specified otherwise.
 - 4. APA for installation of plywood or structural use panels.
 - 5. TPI for metal plate connected wood trusses.
- B. Fasteners:

1. Nails.
 - a. Nail in accordance with the Recommended Nailing Schedule as specified in AFPA WCD1 where detailed nailing requirements are not specified in nailing schedule. Select nail size and nail spacing sufficient to develop adequate strength for the connection without splitting the members.
 - b. Use 8d or larger nails for nailing through 25 mm (1 inch) thick lumber and for toe nailing 50 mm (2 inch) thick lumber.
 - c. Use 16d or larger nails for nailing through 50 mm (2 inch) thick lumber.
2. Power actuated drive pins may be provided where practical to anchor to solid masonry, concrete, or steel.
- C. Cut notch, or bore in accordance with AFPA WCD1 passage of ducts wires, bolts, pipes, conduits and to accommodate other work. Repair or replace miscut, misfit or damaged work.
- D. Blocking Nailers, and Furring:
 1. Install furring, blocking, nailers, and grounds where shown.
 2. Provide longest lengths practicable.
 3. Provide fire retardant treated wood blocking where shown at openings and where shown or specified.
 4. Layers of Blocking or Plates:
 - a. Stagger end joints between upper and lower pieces.
 - b. Nail at ends and not over 610 mm (24 inches) between ends.
 - c. Stagger nails from side to side of wood member over 127 mm (5 inches) in width.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 06 15 16
WOOD ROOF DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes glued-laminated wood roof decking
- B. Related Requirements:
 - 1. Section 06 10 00 "Rough Carpentry" for dimension lumber items associated with wood roof decking.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For glued-laminated wood roof decking, include installation instructions and data on lumber, adhesives, and fabrication.
 - 2. For preservative-treated wood products, chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
- B. Samples: 24 inches (600 mm) long, showing the range of variation to be expected in appearance of wood roof decking.

1.4 INFORMATIONAL SUBMITTALS

- A. Research/Evaluation Reports: For glued-laminated wood roof decking indicated to be of diaphragm design and construction, from ICC-ES.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Schedule delivery of wood roof decking to avoid extended on-site storage and to avoid delaying the Work.
- B. Store materials under cover and protected from weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary coverings. Stack wood roof decking with surfaces that are to be exposed in the final Work protected from exposure to sunlight.

PART 2 - PRODUCTS

2.1 WOOD ROOF DECKING, GENERAL

- A. General: Comply with DOC PS 20 and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.

2.2 GLUED-LAMINATED WOOD ROOF DECKING

- A. Basis of Design: Lock-Deck
- B. Face Species: Douglas fir-larch or Douglas fir-larch (North).
- C. Roof Decking Nominal Size: 3 by 6.
- D. Roof Decking Configuration: For glued-laminated wood roof decking indicated to be of diaphragm design and construction, provide tongue-and-groove configuration that complies with research/evaluation report.
- E. Face Grade: Custom or Supreme: Clear face is required. Occasional pieces may contain a small knot or minor characteristic that does not detract from the overall appearance.
- F. Moisture Content: Provide wood roof decking with 15 percent maximum moisture content at time of dressing.
- G. Face Surface: Smooth.
- H. Edge Pattern: Square edge.
- I. Laminating Adhesive: Wet-use type complying with ASTM D2559.

2.3 PRESERVATIVE TREATMENT

- A. Pressure treat wood roof decking according to AWPA U1; Use Category UC2.
 - 1. For laminated roof decking, treat lumber before gluing.
- B. Preservative Chemicals:
 - 1. For exposed items indicated to receive a stained or natural finish, use products that do not contain colorants, bleed through, or otherwise adversely affect finishes.
- C. Use process that includes water-repellent treatment.
- D. Use process that does not include water repellents or other substances that might interfere with application of indicated finishes.
- E. After treatment, redry materials to 15 percent maximum moisture content.
- F. After dressing and fabricating roof decking, apply copper naphthenate according to AWPA M4 to surfaces cut to a depth of more than 1/16 inch (1.5 mm).

2.4 ACCESSORY MATERIALS

- A. Fasteners for Glued-Laminated Roof Decking: Provide fastener size and type complying with requirements in "Installation" Article for installing laminated roof decking.
- B. Nails: Common; complying with ASTM F1667, Type I, Style 10.
- C. Spikes: Round; complying with ASTM F1667, Type III, Style 3.

- D. Fastener Material: Hot-dip galvanized steel.
- E. Bolts for Anchoring Roof Decking to Walls: Carbon steel; complying with ASTM A307 (ASTM F568M) with ASTM A563 (ASTM A563M) hex nuts and, where indicated, flat washers.
- F. Installation Adhesive: For glued-laminated wood roof decking indicated to be of diaphragm design and construction, provide adhesive that complies with research/evaluation report.
- G. Sealants: Latex, complying with applicable requirements in Section 079200 "Joint Sealants" and recommended by sealant manufacturer and manufacturer of substrates for intended application.

2.5 FABRICATION

- A. Shop Fabrication: Where preservative-treated roof decking is indicated, complete cutting, trimming, surfacing, and sanding before treating.
- B. Predrill roof decking for lateral spiking to adjacent units to comply with AITC 112.
- C. Seal Coat: After fabricating and surfacing roof decking, apply a saturation coat of penetrating sealer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and support framing in areas to receive wood roof decking for compliance with installation tolerances and other conditions affecting performance of wood roof decking.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install laminated wood roof decking to comply with manufacturer's written instructions.
 - 1. Locate end joints for controlled random lay-up.
 - 2. Nail each course of glued-laminated wood roof decking at each support with one nail slant nailed above the tongue and one nail straight nailed through the face.
 - a. Use 30d nails for 3-by-6 and 3-by-8 roof decking.
 - 3. Decrease nail spacing in first subparagraph below if required for diaphragm action.
 - 4. Slant nail each course of glued-laminated wood roof decking to the tongue of the adjacent course at 30 inches (750 mm) o.c. and within

12 inches (300 mm) of the end of each unit. Stagger nailing 15 inches (380 mm) in adjacent courses.

- a. Use 8d nails for 3-by-6 and 3-by-8 roof decking.
5. Glue adjoining roof decking courses together by applying a 3/8-inch (10-mm) bead of adhesive to the top of tongues, according to research/evaluation report.
- B. Anchor wood roof decking, where supported on walls, with bolts as indicated.
- C. Where preservative-treated roof decking must be cut during erection, apply a field-treatment preservative to comply with AWPA M4.
 1. For laminated roof decking, use copper naphthenate.
- D. Apply joint sealant to seal roof decking at exterior walls at the following locations:
 1. Between roof decking and supports located at exterior walls.
 2. Between roof decking and exterior walls that butt against underside of roof decking.
 3. Between tongues and grooves of roof decking over exterior walls and supports at exterior walls.

3.3 ADJUSTING

- A. Repair damaged surfaces and finishes after completing erection. Replace damaged roof decking if repairs are not approved by Architect.

3.4 PROTECTION

- A. Provide water-resistive barrier over roof decking as the Work progresses to protect roof decking until roofing is applied.
- B. If, despite protection, roof decking becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 06 18 00
GLUED-LAMINATED CONSTRUCTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes framing using structural glued-laminated timber.
- B. Related Sections:
 - 1. Section 06 10 00, ROUGH CARPENTRY for dimension lumber items associated with structural glued-laminated timber and tongue and groove sheathing.

1.3 DEFINITIONS

- A. Structural Glued-Laminated (Glulam) Timber: An engineered, stress-rated timber product assembled from selected and prepared wood laminations bonded together with adhesives and with the grain of the laminations approximately parallel longitudinally.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design structural glued-laminated timber and connectors, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Structural glued-laminated timber and connectors shall withstand the effects of structural loads shown on Drawings without exceeding allowable design working stresses listed in AITC 117 or determined according to ASTM D 3737 and acceptable to authorities having jurisdiction.
- C. Seismic Performance: Structural glued-laminated timber and connectors shall withstand the effects of earthquake motions determined according to ASCE 7 and as indicated on the drawings.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated:
 - 1. Include data on lumber, adhesives, fabrication, and protection.
 - 2. For preservative-treated wood products, include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.

3. For connectors, include installation instructions.
- B. Shop Drawings:
1. Show layout of structural glued-laminated timber system and full dimensions of each member.
 2. Indicate species and laminating combination, adhesive type, and other variables in required work.
 3. Include large-scale details of connections.
- C. Samples: Full width and depth, 24 inches (600 mm) long, showing the range of variation to be expected in appearance of structural glued-laminated timber, including variations due to specified treatment.
1. Apply specified factory finish to three sides of half-length of each Sample.
- D. Delegated-Design Submittal: For structural glued-laminated timber and timber connectors indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATION SUBMITTALS

- A. Certificates of Conformance: Issued by a qualified testing and inspecting agency indicating that structural glued-laminated timber complies with requirements in AITC A190.1.
- B. Material Certificates: For preservative-treated wood products, from manufacturer. Indicate type of preservative used and net amount of preservative retained.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide factory-glued structural units produced by an AITC- or APA-licensed firm that is certified for chain of custody by an FSC-accredited certification body.
1. Factory mark each piece of structural glued-laminated timber with AITC Quality Mark or APA-EWS trademark. Place mark on surfaces that will not be exposed in the completed Work.
- B. Quality Standard: Comply with AITC A190.1.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with provisions in AITC 111.
- B. Individually wrap members using plastic-coated paper covering with water-resistant seams.

PART 2 - PRODUCTS

2.1 STRUCTURAL GLUED-LAMINATED TIMBER

- A. General: Provide structural glued-laminated timber that complies with AITC 117 or research/evaluation reports acceptable to authorities having jurisdiction.
1. Provide structural glued-laminated timber made from single species.
 2. Provide structural glued-laminated timber made from solid lumber laminations; do not use laminated veneer lumber.
 3. Provide structural glued-laminated timber made with wet-use adhesive complying with AITC A190.1.
 4. Adhesive shall not contain urea-formaldehyde resins.
 5. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Certified Wood: Glulam shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- C. Species and Grades for Structural Glued-Laminated Timber: Douglas fir-larch that complies with structural properties indicated on the drawings.
1. Lay-up: Balanced.
 2. Species and Combination Symbol: Douglas fir-larch.
- D. Appearance Grade: Architectural, complying with AITC 110.
1. For Premium and Architectural appearance grades, fill voids as required by AITC 110. For Premium appearance grade, use clear wood inserts, of matching grain and color, for filling voids and knot holes more than 1/4 inch (6 mm) wide.
- E. Preservative Treatment after Fabrication: Where preservative-treated structural glued-laminated timber is indicated, pressure treat after fabrication according to AWWA C28.
1. Use oxine copper (copper-8-quinolinolate) in a light petroleum solvent.
 2. Use copper naphthenate in a light petroleum solvent.
 3. Use pentachlorophenol in light petroleum solvent.
 4. Use preservative solution without substances that might interfere with application of indicated finishes.
 5. Do not incise structural glued-laminated timber.

- F. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.
- G. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated finish.
- H. Sealers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 TIMBER CONNECTORS

- A. General: Unless otherwise indicated, fabricate from the following materials in dimensions and configurations needed to comply with "Performance Requirements" Article.:
 - 1. Structural-steel shapes, plates, and flat bars complying with ASTM A 36/A 36M.
 - 2. Round steel bars complying with ASTM A 575, Grade M 1020.
 - 3. Hot-rolled steel sheet complying with ASTM A 1011/A 1011M, Structural Steel, Type SS, Grade 33.
- B. Provide bolts, 3/4 inch (19 mm) unless otherwise indicated, complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); nuts complying with ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
- C. Finish steel assemblies and fasteners with rust-inhibitive primer, 2-mil (0.05-mm) dry film thickness.

2.3 FABRICATION

- A. Shop fabricate for connections to greatest extent possible, including cutting to length and drilling bolt holes.
 - 1. Dress exposed surfaces as needed to remove planning and surfacing marks.
- B. Camber: Fabricate horizontal and inclined members of less than 1:1 slope with either circular or parabolic camber equal to 1/500 of span.
- C. End-Cut Sealing: Immediately after end cutting each member to final length and after preservative treatment, apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood coated for not less than 10 minutes.
- D. Seal Coat: After fabricating, sanding, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit, except for preservative-treated wood where treatment included a water repellent.

2.4 FACTORY FINISHING

- A. Wiped Stain Finish: Manufacturer's standard, dry-appearance, penetrating acrylic stain and sealer; oven dried and resistant to mildew and fungus.
 - 1. Color: To match interior window sill stain color.
- B. Clear Finish: Manufacturer's standard, two-coat, clear varnish finish; resistant to mildew and fungus.
- C. Finishing materials shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates in areas to receive structural glued-laminated timber, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of structural glued-laminated timber.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Erect structural glued-laminated timber true and plumb, and with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.
 - 1. Lift with padded slings and protect corners with wood blocking.
 - 2. Install structural glued-laminated timber to comply with Shop Drawings.
 - 3. Install timber connectors as indicated.
- B. Cutting: Avoid cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.
 - 1. Where preservative-treated members must be cut during erection, apply a field-treatment preservative to comply with AWPA M4.
 - a. Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.
 - b. Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.

3.3 ADJUSTING

- A. Repair damaged surfaces and finishes after completing erection. Replace damaged structural glued-laminated timber if repairs are not approved by Architect.

3.4 PROTECTION

- A. Do not remove wrappings on individually wrapped members until they no longer serve a useful purpose including protection from weather, sunlight, soiling, and damage from work of other trades.
 - 1. Slit underside of wrapping to prevent accumulation of moisture inside the wrapping.

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SECTION 06 20 00

FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior millwork.
- B. Items specified:
 - 1. Seats and benches.
 - 2. Communication Center Counter.
 - 3. Counter Shelf.
 - 4. Counter or Work Tops.
 - 5. Wall Paneling.
 - 6. Mounting Strips, Shelves, and Rods.
 - 7. Chair Rail.
 - 8. Moldings and Staff Beads.
 - 9. Base.
 - 10. Wood Bumpers.
 - 11. Memory Box.
 - 12. Fireplace Surround and Mantle.
 - 13. Patient Headwall.
 - 14. Transaction Window Sill.

1.2 RELATED REQUIREMENTS

- A. Woodwork Finish and Color: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Fabricated Metal brackets, bench supports and countertop legs: Section 05 50 00, METAL FABRICATIONS.
- C. Framing, furring and blocking: Section 06 10 00, ROUGH CARPENTRY.
- D. Color and texture of finish: Section 09 06 00, SCHEDULE FOR FINISHES.
- E. Stock Casework: Section 12 32 00, MANUFACTURED WOOD CASEWORK.
- F. Other Countertops: Division 11, EQUIPMENT and Division 12, FURNISHINGS.
- G. Electrical light fixtures and duplex outlets: Division 26, ELECTRICAL.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.
- B. ASTM International:

A36/A36M-19.....Carbon Structural Steel.

A53/A53M-20.....Pipe, Steel, Black and Hot-Dipped Zinc Coated,
Welded and Seamless.

- A240/A240M-20.....Chromium and Chromium-Nickel Stainless Steel
Plate, Sheet, and Strip for Pressure Vessels and
for General Applications.
- B26/B26M-18e1.....Aluminum-Alloy Sand Castings.
- B221-14.....Aluminum and Aluminum-Alloy Extruded Bars, Rods,
Wire, Profiles, and Tubes.
- E84-20.....Surface Burning Characteristics of Building
Materials.
- C. American Hardboard Association (AHA):
 - A135.4-12.....Basic Hardboard.
- D. Architectural Woodwork Institute (AWI):
 - AWI-14.....Architectural Woodwork Standards, 2nd ed.
- E. Builders Hardware Manufacturers Association (BHMA):
 - A156.9-15.....Cabinet Hardware.
 - A156.11-14.....Cabinet Locks.
 - A156.16-18.....Auxiliary Hardware.
- F. Federal Specifications (Fed. Spec.):
 - A-A-1922A.....Shield Expansion (Calking Anchors, Single Lead).
 - A-A-1936A.....Adhesive, Contact, Neoprene Rubber.
 - FF-N-836E.....Nut: Square, Hexagon, Cap, Slotted, Castle,
Knurled, Welding.
 - FF-S-111D(1).....Screw, Wood (Notice 1 inactive for new design).
 - MM-L-736C(1).....Lumber, Hardwood.
- G. Hardwood Plywood and Veneer Association (HPVA):
 - HP1-16.....Hardwood and Decorative Plywood.
- H. Military Specification (Mil. Spec):
 - MIL-L-19140E.....Lumber and Plywood, Fire-Retardant Treated.
- I. National Particleboard Association (NPA):
 - A208.1-09.....Wood Particleboard.
- J. National Electrical Manufacturers Association (NEMA):

LD 3-05.....High-Pressure Decorative Laminates.

K. U.S. Department of Commerce, Product Standard (PS):

PS1-07.....Construction and Industrial Plywood.

PS20-10.....American Softwood Lumber Standard.

1.4 PREINSTALLATION MEETINGS

A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.

1. Required Participants:

- a. Contracting Officer's Representative.
- b. Architect/Engineer and Interior Designer.
- c. VA Interior Designer.
- d. Contractor.
- e. Installer.

2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.

- a. Installation schedule.
- b. Installation sequence.
- c. Preparatory work.
- d. Protection before, during, and after installation.
- e. Installation.
- f. Terminations.
- g. Transitions and connections to other work.
- h. Other items affecting successful completion.

3. Document and distribute meeting minutes to participants to record decisions affecting installation.

1.5 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:

1. Show size, configuration, fabrication and installation details.
2. Millwork items - Half full-size scale for sections and details 1:50 (1/4 inch) for elevations and plans.

C. Manufacturer's Literature and Data:

1. Description of each product.
 - a. Finish hardware.

- b. Sinks with fittings.
- c. Electrical components.
- 2. List of acceptable sealers for fire retardant materials.
- 3. Installation instructions.
- D. Samples:
 - 1. Plastic Laminate Finished Plywood and Particleboard: 150 mm by 300 mm (6 by 12 inches) long, each type and color.
 - 2. Solid Surface Material: 6 inches (150 mm) square.
 - 3. Submit quantity required to show full color and texture range.
 - 4. Approved samples may be incorporated into work.
- E. Certify each composite wood and agrifiber product contains no added urea formaldehyde.
 - 1. Certificates: Certify each product complies with specifications.
 - 2. Fire retardant treatment of materials.
 - 3. Moisture content of materials.
- F. Qualifications: Substantiate qualifications comply with specifications.
 - 1. Fabricator with project experience list.
 - 2. Installer with project experience list.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications:
 - 1. Regularly fabricates specified products.
 - 2. Fabricated specified products with satisfactory service on five similar installations for minimum five years.
- B. Project Experience List: Provide contact names and addresses for completed projects.
- C. Installer Qualifications:
 - 1. Regularly install specified products.
 - 2. Installed specified products with satisfactory service on five similar installations for a minimum of five years.
 - a. Project Experience List: Provide contact names and addresses for completed projects.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, [color,] production run number, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

- D. Store products indoors in dry, weathertight [**conditioned**] facility.
- E. Protect products from damage during handling and construction operations.

1.8 FIELD CONDITIONS

A. Environment:

- 1. Product Temperature: Minimum 21 degrees C (70 degrees F) for minimum 48 hours before installation.
- 2. Work Area Ambient Conditions: HVAC systems are complete, operational, and maintaining facility design operating conditions continuously, beginning 48 hours before installation until Government occupancy.
- 3. Install products when building is permanently enclosed and when wet construction is completed, dried, and cured.
- 4. Do not install finish lumber or millwork in any room or space where wet process systems such as concrete, masonry, or plaster work is not complete and dry.
- 5. Field Measurements: Verify field conditions affecting all fabrications and installations. Show field measurements on Submittal Drawings.
- 6. Coordinate field measurement and fabrication schedule to avoid delay.

1.9 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Grading and Marking: Factory mark with grade stamp lumber and plywood of inspection agency approved by the Board of Review, American Lumber Standard Committee.
- B. Lumber:
 - 1. Sizes:
 - a. Lumber Size references, unless otherwise specified, are nominal sizes, and actual sizes within manufacturing tolerances allowed by the standard under which product is produced.
 - b. Millwork, standing and running trim, and rails: Actual size as shown or specified.
 - 2. Hardwood: MM-L-736, species as specified for each item.
 - 3. Softwood: PS-20, exposed to view appearance grades:
 - a. Use C select or D select, vertical grain for transparent finish including stain transparent finish.
 - b. Use Prime for painted or opaque finish.
 - 4. Use edge grain Wood members exposed to weather.

5. Moisture Content:
 - a. 32 mm (1-1/4 inches) or less nominal thickness: 12 percent on 85 percent of the pieces and 15 percent on the remainder.
 - b. Other materials: According to standards under which the products are produced.
6. Fire Retardant Treatment: Mil. Spec. MIL-L-19140E.
 - a. Treatment and performance inspection by an independent and qualified testing agency that establishes performance ratings.
 - b. Each piece of treated material bear identification of the testing agency and indicate performance according to such rating of flame spread and smoke developed.
 - c. Treat wood for maximum flame spread of 25 and smoke developed of 25.
 - d. Fire Resistant Softwood Plywood:
 - 1) Grade A, Exterior, plywood for treatment.
 - 2) Surface Burning Characteristics: When tested according to ASTM E84.
 - a) Flame spread: 0 to 25.
 - b) Smoke developed: 100 maximum.
 - e. Fire Resistant Hardwood Plywood:
 - 1) Core: Fire retardant treated softwood plywood.
 - 2) Hardwood face and back veneers untreated.
 - 3) Factory seal panel edges.
- C. Plywood:
 1. Softwood Plywood: DOC PS1.
 - a. Plywood, 13 mm (1/2 inch) and thicker; minimum five ply construction, except 32 mm (1-1/4 inch) thick plywood minimum seven ply.
 - b. Plastic Laminate Plywood Cores:
 - 1) Exterior Type, and species group.
 - 2) Veneer Grade: A-C.
 - c. Shelving Plywood:
 - 1) Interior Type, any species group.
 - 2) Veneer Grade: A-B or B-C.
 - d. Other: As specified for item.
- D. Building Board (Hardboard):
 1. ANSI/AHA A135.4, 6 mm (1/4 inch) thick unless specified otherwise.
- E. Wall paneling at gas chain rack: Type 1, tempered, Fire Retardant treated, smooth surface on side.

F. Plastic Laminate: NEMA LD-3.

1. Exposed Laminate Surfaces including Countertops, and Sides of Cabinet Doors: Grade HGL.
2. Cabinet Interiors including Shelving: NEMA, CLS as a minimum, with the following:
 - a. Plastic laminate clad plywood or particle board.
 - b. Resin impregnated decorative paper thermally fused to particle board.
3. Plastic Laminate Covered Wood Tops Backing: Grade HGP.
4. Postformed Surfaces: Grade HGP.

G. Stainless Steel: ASTM A240, Type 302 or 304.

H. Cast Aluminum: ASTM B26.

I. Extruded Aluminum: ASTM B221.

J. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.

2.2 PRODUCTS - GENERAL

A. Basis of Design: Section 090600, SCHEDULE FOR FINISHES.

B. Provide each product from one manufacturer and from one production run.

C. Acoustical Panel: Fabric-covered glass fiber panel.

1. NRC 19 mm (3/4 inch) adhesive mounting direct to substrate.
2. Glass Fiber Panel: 25 mm (1 inch) thick minimum, self-supporting of density required for minimum NRC.
3. Fabric: Bonded directly to glass fiber panel face, flat wrinkle-free surface, stain and soil resistant.
4. Adhesive: As recommended by panel manufacturers.

2.3 FABRICATION

A. General:

1. AWI Custom Grade for interior millwork.
2. Finish woodwork, free from pitch pockets.
3. Trim, standard stock molding and members of same species, except where special profiles are shown.
4. Plywood, minimum 13 mm (1/2 inch), unless otherwise shown on Drawings or specified.
5. Edges of members in contact with concrete or masonry having a square corner caulking rebate.
6. Fabricate members less than 4 m (14 feet) in length from one piece of lumber, back channeled and molded as shown.

7. Fabricate interior trim and items of millwork to be painted from jointed, built-up, or laminated members, unless otherwise shown on Drawings or specified.
8. Plastic Laminate Work:
 - a. Factory glued to either a plywood or a particle board core, thickness as shown on Drawings or specified.
 - b. Cover exposed edges with plastic laminate, except where aluminum, stainless steel, or plastic molded edge strips are shown on drawings or specified. Use plastic molded edge strips on 19 mm (3/4 inch) thick or thinner core material.
 - c. Provide plastic backing sheet on underside of countertops, vanity tops, thru-wall counter[**and sills**] including back splashes and end splashes of countertops.
 - d. Use backing sheet on concealed large panel surface when decorative face does not occur.
- B. Seats and Benches:
 1. Fabricate from plastic laminate on 3/4-inch plywood in dimensions and details shown on the drawings.
 2. Round top edges and corners where exposed.
- C. Mounting Strips, Shelves and Rods:
 1. Cut mounting strips from softwood stocks, 25 mm by 100 mm (1 by 4 inches), exposed edge slightly rounded.
 2. Cut wood shelf from softwood 1 inch stock, of width shown, exposed edge slightly rounded.
 - a. Option: Provide 19 mm (3/4 inch) thick plywood with 19 mm (3/4 inch) softwood edge nosing on exposed edge, slightly rounded.
 3. Plastic laminate cover, 19 mm (3/4 inch) thick plywood or particle board core with plastic molded edge and end strips. Size, finish and number as shown on Drawings.
 4. Rod or Closet Bar: L03131.
 5. Combination Garment and Shelf Support, Intermediate Support for Closet Bar: B04051 for rods over 1800 mm (6 feet) long.
- D. Communications Center Counter (Concierge):
 1. Fabricate to AWI premium grade construction Section 400, CASEWORK.
 2. Structural Framing Members: Softwood, standard sizes, space maximum 400 mm (16 inches) on center.
 3. Species: Maple for exposed hardwood trim and edging.

4. Cabinet Exposed Surfaces: Decorative plastic laminate including interior of cupboard cabinet.
 5. Frame: Overlay frame of apron with drawer and door face.
 6. Hardware:
 - a. Drawer guides on drawers with pulls.
 - b. Pulls and concealed hinges on doors.
 - c. Adjustable shelf standards with shelf rests.
 7. Provide cut outs for electrical devices and outlets.
- E. Desk in Credit Union:
1. Fabricate to AWI premium grade construction top with compartment as shown on Drawings.
- F. Wall Paneling and Fireplace Surround:
1. Fabricate to AWI premium grade and as shown on Drawings.
 2. Fire-Retardant Moisture-Resistant Fiberboard: MDF panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E84, and moisture resistant MR30 or better.
- G. Fireplace Mantle:
1. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
 - a. Species and Grade: Plain sliced white oak; NHLA FAS, grade clear.
 - b. Maximum Moisture Content: 10 percent.
 - c. Finger Jointing: Not allowed.
 - d. Gluing for Width: Not allowed.
 - e. Face Surface: Surfaced (smooth)
 - f. Matching: Selected for compatible grain and color.
- H. Transaction Window Sill:
1. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
 - a. Grade: Premium
 - b. Configuration: As indicated on the Drawings.
 2. Fabricate sill with shop-applied edges. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
 3. Fabricate sill without joints.

2.4 ACCESSORIES

A. Hardware:

1. Rough Hardware:
 - a. Provide rough hardware with a standard plating, applied after punching, forming and assembly of parts; galvanized, cadmium plated, or zinc-coated by electric-galvanizing process. Galvanized where specified.
 - b. Fasteners:
 - 1) Bolts with Nuts: FF-N-836.
 - 2) Expansion Bolts: A-A-1922A.
 - 3) Screws: Fed. Spec. FF-S-111.
2. Finish Hardware:
 - a. Cabinet Hardware: ANSI A156.9.
 - 1) Door/Drawer Pulls: B02011. Door in seismic zones: B03182.
 - 2) Drawer Slides: B05051 for drawers over 150 mm (6 inches) deep, B05052 for drawers 75 mm to 150 mm (3 to 6 inches) deep, and B05053 for drawers less than 75 mm (3 inches) deep.
 - 3) Sliding Door Tracks: B07063.
 - 4) Adjustable Shelf Standards: B4061 with shelf rest B04083.
 - 5) Concealed Hinges: B1601, minimum 110 degree opening.
 - 6) Butt Hinges: B01361, for flush doors, B01381 for inset lipped doors, and B01521 for overlay doors.
 - 7) Cabinet Door Catch: B0371 or B03172.
 - 8) Vertical Slotted Shelf Standard: B04103 with shelf brackets B04113, sized for shelf depth.
 - b. Cabinet Locks: ANSI A156.11.
 - 1) Drawers and Hinged Door: E07262.
 - 2) Sliding Door: E07162.
 - c. Auxiliary Hardware: ANSI A156.16.
 - 1) Shelf Bracket: B04041, japanned or enameled finish.
 - 2) Combination Garment rod and Shelf Support: B04051 japanned or enamel finish.
 - 3) Closet Bar: L03131 chrome finish of required length.
 - 4) Handrail Brackets: L03081 or L03101.
 - a) Cast Aluminum, satin polished finish.
 - b) Cast Malleable Iron, japanned or enamel finish.

- d. Steel Channel Frame and Leg supports for Countertop. Fabricated under Section 055000, METAL FABRICATIONS.
- e. Pipe Bench Supports:
 - 1) Pipe: ASTM A53.
- f. Fabricated Wall Bench Supports:
 - 1) Steel Angles: ASTM A36 steel with chrome finish, or ASTM A167, stainless steel with countersunk wood screws, holes at 64 mm (2-1/2 inches) on center on horizontal member.
 - 2) Use 38 mm by 38 mm by 5 mm (1-1/2 by 1-1/2 by 3/16 inch) angle thick drilled for screw and bolt holes unless shown otherwise. Drill 6 mm (1/4 inch) holes for anchors on vertical member, maximum 200 mm (8 inches) on center between ends or corners.
 - 3) Stainless Steel Bars Brackets: ASTM A167, fabricated to shapes shown on Drawings, Number 4 finish. Provide 50 mm by 5 mm (2 inch by 3/16 inch) bars unless shown otherwise. Drill for anchors and screws. Drill countersunk wood screw holes at 64 mm (2-1/2 inches) on center on horizontal members and minimum two 13 mm (1/4 inch) hole for anchors on vertical member.
- g. Thru-Wall Counter Brackets:
 - 1) Steel angles drilled for fasteners on 100 mm (4 inches) centers.
 - 2) Baked enamel prime coat finish.
- h. Edge Strips Moldings:
 - 1) Driven type "T" shape with serrated retaining stem; vinyl plastic to match plastic laminate color, stainless steel, or 3 mm (1/8 inch) thick extruded aluminum.
 - 2) Stainless steel or extruded aluminum channels.
 - 3) Stainless steel, number 4 finish; aluminum, mechanical applied medium satin finish, clear anodized 0.1 mm (0.4 mils) thick.
- i. Rubber or Vinyl molding:
 - 1) Rubber or vinyl standard stock and in longest lengths practicable.
 - 2) Design for closures at joints with walls and adhesive anchorage.
 - 3) Adhesive as recommended by molding manufacturer.
- j. Primers: Manufacturer's standard primer for steel providing baked enamel finish.

B. Adhesive:

- 1. Plastic Laminate: Fed. Spec. A-A-1936.

2. Interior Millwork: Unextended urea resin, unextended melamine resin, phenol resin, or resorcinol resin.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.
- C. Dispose of other removed materials.
- D. Clean substrates. Remove contaminants capable of affecting subsequently installed product's performance.

3.2 INSTALLATION

- A. Installation:
 1. Prime millwork receiving transparent finish and back-paint concealed surfaces.
 2. Fasten trim with fine finishing nails, screws, or glue as required.
 3. Set nails for putty stopping. Provide washers under bolt heads where no other bearing plate occurs.
 4. Seal cut edges of fire retardant treated wood materials with a certified acceptable sealer.
 5. Coordinate with plumbing and electrical work for installation of fixtures and service connections in millwork items.
 6. Plumb and level items unless shown otherwise.
 7. Nail finish at each blocking, lookout, or other nailer and intermediate points; toggle or expansion bolt in place where nails are not suitable.
- B. Apply adhesive uniformly for full contact between plastic laminate and substrate.
- C. Seats and Benches:
 1. Provide stainless steel countersunk screws to secure wood seats to brackets, angle, or pipe supports.
 2. Provide stainless steel or chrome plated steel bolts for anchorage to walls. Use 6 mm (1/4 inch) toggle bolts in steel stud walls and hollow masonry. Use 6 mm (1/4 inch) expansion bolts in solid masonry or concrete.
- D. Communication Center Counters:
 1. Secure framing to floor with expansion bolts.
 2. Secure countertop to support with wood cleats or metal angles screwed on 150 mm (6 inch) centers.
 3. Conceal fasteners on corridor side. Exposed fasteners permitted under countertop and in knee spaces on staff side.

E. Shelves:

1. Install mounting strip at back wall and end wall for shelves in closets where shown secured with toggle bolts at each end, not over 600 mm (24 inch) centers between ends.
 - a. Nail Shelf to mounting strip at ends and to back wall strip at not over 900 mm (36 inches) on center.
 - b. Install metal bracket, ANSI A156.16, B04041, not over 1200 mm (4 feet) centers when shelves exceed 1800 mm (6 feet) in length.
 - c. Install metal bracket, ANSI A156.16, B04051, not over 1200 mm (4 feet) on centers where shelf length exceeds 1800 mm (6 feet) in length with metal rods, clothes hanger bars ANSI A156.16, L03131, of required length, full length of shelf.
2. Install vertical slotted shelf standards to studs with toggle bolts through each fastener opening. Double slotted shelf standards are acceptable where adjacent shelves terminate.
 - a. Install brackets providing supports for shelf not over 900 mm (36 inches) on center and within 13 mm (1/2 inch) of shelf end unless shown otherwise.
 - b. Install shelves on brackets so front edge is restrained by bracket.

F. Install with butt joints in straight runs and miter at corners.

3.3 CLEANING

- A. Remove excess adhesive before adhesive sets.
- B. Clean exposed surfaces. Remove contaminants and stains.
- C. Touch up damaged factory finishes.
 1. Repair painted surfaces with touch up primer.

3.4 PROTECTION

- A. Protect finished carpentry from [**traffic and**] construction operations.
- B. Cover finish carpentry with reinforced kraft paper, and plywood or hardboard.
- C. Remove protective materials immediately before acceptance.
- D. Repair damage.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 06 61 00
FIBERGLASS COLUMN COVERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Architectural Fiberglass Reinforced Polymer (FRP) Column Covers.

1.2 RELATED SECTIONS

- A. Section 05 12 00 - Structural Steel: Support framing for architectural fiberglass column cover.
- B. Section 07 92 00 - Joint sealants and field applied sealants.

1.3 DESIGN REQUIREMENTS

- A. Installed architectural fiberglass column covers and fastening systems shall be designed, engineered, fabricated, and installed to conform to the state codes, local codes, and the Architect's design.

1.4 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submit manufacturer's current valid certification with The Certified Composites Technician (CCT) program created by the American Composites Manufacturers Association (ACMA).
- C. Submit manufacturer's internal Quality Control & Assurance Procedures based upon provisions published in the "Guidelines and Recommended Practices for Fiberglass Reinforced Plastic Architectural Products" upon request.
- D. Product Data: Submit manufacturer's product data and installation instructions.
- E. Product Samples: Submit minimum 3-inch x 5-inch samples in specified color, texture and finish when applicable.

1.5 QUALITY ASSURANCE

- A. Obtain architectural fiberglass column covers from a single source manufacturer that has the ability and resources to comply with the requirements and schedule of the project.

- B. Manufacturer's ICC-sanctioned Listing and Labeling Program shall include site visits to manufacturing facility by third party testing authority witnessing compliance with manufacturing procedures and Listing and Labeling Program.
- C. Manufacturer to comply with Quality Control & Assurance Procedures, and fabricate architectural fiberglass based upon provisions published in the "Guidelines and Recommended Practices for Fiberglass Reinforced Plastic Architectural Products".
- D. Inspect each molded piece to ensure that it complies with specified requirements, including nominal dimensions.

1.6 MANUFACTURER'S QUALIFICATIONS

- A. Manufacturer: Provide products manufactured by a firm specializing in the manufacture of fiberglass architectural ornamentation, in the United States with a minimum of ten (10) years experience.
- B. All products manufactured shall carry ICC-sanctioned Listing and Labeling per 2009 IBC.
- C. Manufacturer shall demonstrate current valid certification and participation in the CCT program and fabricate material based upon provisions published in the "Guidelines and Recommended Practices for Fiberglass Reinforced Plastic Architectural Products".
- D. Provide a list of projects comparable in size, scope, and complexity as indicated, upon request.
- E. Provide verification that architectural fiberglass column cover meets or exceeds products specified.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Handle, store and transport architectural fiberglass column covers according to manufacturer's recommendations and in a manner that prevents damage.
- B. Protect architectural fiberglass column covers from damage by retaining shipping protection in place until installation.

- C. **Damage Responsibility:** Except for damage caused by others, the installer is responsible for chipping, cracking, or other damage to fiberglass fabrications, after delivery to the jobsite and until installation is completed and inspected and approved by the Architect or owner's representative.

1.8 WARRANTY

- A. **Construction Warranty:** FAR clause 52.246-21, "Warranty of Construction."

PART 2 --PRODUCTS

2.1 GENERAL

- A. **Basis of Design:** Section 09 06 00, SCHEDULE FOR FINISHES.

2.2 PATTERNS/MOLDS

- A. **Custom Pattern/Mockups:** Patterns and mockups shall be hand carved and/or CNC machined by skilled pattern makers with minimum of ten (10) years experience with architectural elements. Patterns & mockups shall be available at manufacturing facility for architect's inspection and approval before molds are produced.
- B. **Custom Molds:** Molds shall be produced with ample layers of tooling resin, tooling gel-coat, glass fibers and/or flexible rubber by skilled mold makers with minimum of ten (10) years experience with architectural elements. Produced molds shall have rigidity and thickness to prevent distortion and deflection of molded architectural fiberglass.

2.3 MATERIALS CHARACTERISTICS

- A. **MOLDED EXTERIOR SURFACE:**, NPG-ISO polyester gel coat, 15 to 25 mils thick. Gel coat shall be sandable grade for acceptance of finish paint.
- B. **BARRIER COAT:** Specifically formulated backup polyester surface veil 18-20 mils thick to prevent glass print through and ultimate Class A finish.
- C. **BACK UP LAMINATE:**
1. **Resin:** Polyester resin shall be fire retardant, and meet Class 1 flame spread rating of 25 or less and smoke density under 450 without the use of antimony trioxide as characterized by the ASTM E-84 tunnel test at typical 1/8" glass mat laminate. General Purpose resin will not be permitted.

2. Filler: Functional filler to be added to resin matrix to minimize shrinkage, add stiffness, control opacity, add fire retardance, improve surface finish, minimize crazing, and control dimensional stability from weather extremes.
3. Fiberglass Reinforcement: Type "E" fiberglass, glass cloth, matt and/or random chopped glass fibers. Glass content approximately 20% to 30%.
4. Laminate Thickness: Nominal laminate shall be minimum 3/16" thickness. Additional core reinforcements and/or sandwich structure added as required for rigidity and structural integrity.

2.4 FABRICATION

- A. Column cover halves shall be manufactured with sufficient butt joints to provide structural integrity and shall be manufactured to accommodate construction adhesive, and align with adjoining half section.
- B. Column vertical joint shall be designed to accept polyester body filler for monolithic finish and field painting.
- C. Column cover shaft half sections shall be manufactured as a single unit spanning entire height from base to top of capital.
- D. Column base shall be manufactured as a separate unit for column shaft height adjustment.

2.5 AVERAGE MECHANICAL PROPERTIES:

PROPERTY	VALUE	TEST METHOD
Tensile strength	12,000 PSI	ASTM D638
Flexural strength	20,000 PSI	ASTM D790
Flexural modulus	0.9 x 10 ⁶ PSI	ASTM D790
Compressive strength	17,000 PSI	ASTM D695
Bearing strength	9,000 PSI	ASTM D638
Thermal expansion	10 x 10 ⁻⁶ (°F)	
Specific gravity	1.5	

2.6 FINISH

- A. Color as selected by Architect for field painting unless otherwise specified.

- B. Surface Texture/Exposed side shall be smooth ready for light sanding and painting.

2.7 TOLERANCES

- A. Part Thickness: + or - 1/8 inch.
- B. Length: + or - 1/8 inch
- C. Variation from Square: 1/8 inch.

2.8 IDENTIFICATION

- A. Identify each column cover unit with a permanent serial number.
- B. Number parts to coordinate with shop drawings.

2.9 CURING AND CLEANING

- A. Cure and clean components prior to shipment and remove material which may be:
 - 1. Toxic to plant or animal life.
 - 2. Incompatible with adjacent building material.

2.10 ANCHORS AND FASTENERS

- A. Contractor to provide anchors and fasteners and other accessories for proper installation of architectural fiberglass column covers as recommended and approved by fiberglass fabrication manufacturer.

PART 3 --EXECUTION

3.1 PRE-INSTALLATION EXAMINATION

- A. Carefully observe and verify field conditions that substrates are ready for installation of architectural fiberglass column covers. Contractor shall verify on site dimensions with shop drawings and assume full responsibility for fitting the components to the structure.
- B. Verify that bearing surfaces are true and level.
- C. Verify that support framing has been constructed to allow accurate placement, alignment and connection of architectural column covers to structure.
- D. Report discrepancies between design dimensions and field dimensions, which could adversely affect installation, to the Architect and/or Owner's Representative.
- E. Do not proceed with installation until discrepancies are corrected, or until installation requirements are modified and approved by the Architect and/or Owner's Representative.

F. Beginning of installation means acceptance of existing conditions and fiberglass materials.

3.2 INSTALLATION

- A. Install architectural fiberglass column covers in accordance with manufacturer's instructions and approved shop drawings.
- B. Fiberglass column cover vertical joint shall be field finished and painted per manufacturer's instructions for monolithic appearance.

3.3 ALLOWABLE TOLERANCES FOR INSTALLED UNITS

- A. Maximum offset from True Alignment: 1/4 inch in 20 feet.
- B. Maximum Variation from True Position: 1/2 inch in 20 feet.

3.4 CLEANING

- A. Clean installed architectural fiberglass column covers using cleaning methods and material approved by manufacturer.

3.5 PROTECTION OF INSTALLED FABRICATIONS

- A. Comply with manufacturer's recommendations and instructions for protecting installed column covers during construction activities.

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SECTION 07 11 13
BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Bituminous dampproofing on concrete surfaces.

1.2 RELATED REQUIREMENTS

- A. Concrete: Section 03 00 53, (SHORT FORM) CAST-IN-PLACE CONCRETE.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.

B. ASTM International (ASTM):

1. C578-15 - Rigid, Cellular Polystyrene Thermal insulation.
2. D226/D226M-09 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
3. D449/D449M-03(2014)e1 - Asphalt Used in Dampproofing and Waterproofing.
4. D1227-13 - Emulsified Asphalt Used as a Protective Coating for Roofing.
5. D6380/D6380M-03(2013)e1 - Asphalt Roll Roofing (Organic Felt).
6. D6506-01(2009) - Asphalt Based Protection Board for Below-Grade Waterproofing.

1.4 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:

1. Description of each product.
2. Application instructions.

1.5 DELIVERY

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.6 STORAGE AND HANDLING

- A. Store products indoors in dry, weathertight conditioned facility.

- B. Protect products from damage during handling and construction operations.

1.7 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

- A. Control moisture migration through concrete or masonry exterior walls where no hydrostatic head occurs or is anticipated.

2.2 PRODUCTS - GENERAL

- A. Provide each product from one manufacturer and from one production run.
- B. Hot Applied Bituminous Dampproofing:
 - 1. Asphalt: ASTM D449/D449M, Type I.
- C. Cold Applied Bituminous Dampproofing:
 - 1. Asphalt: ASTM D1227, Type III (spray grade).

2.3 ACCESSORIES

- A. Asphalt Saturated Felt: ASTM D226/D226M, Type I, 7 kg (15 pound).
- B. Protection Course: Extruded-polystyrene board insulation, unfaced, ASTM C 578, Type X, 13 mm (1/2 inch) thick.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.
- C. Clean substrates. Remove contaminants capable of affecting subsequently installed product's performance.
- D. Remove free water; surfaces may remain damp.

3.2 INSTALLATION - GENERAL

- A. Install products according to manufacturer's instructions and approved submittal drawings.
 - 1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

3.3 DAMPPROOFING INSTALLATION

- A. Applications:
 - 1. Apply to surfaces where indicated on drawings.

B. Apply dampproofing at 1 L/sq. m (2-1/2 gal. per 100 sq. ft.), minimum, each coat.

1. Allow 24 hours drying time between coats.

C. Adhere protection course to conceal foundation dampproofing before backfilling.

3.4 PROTECTION

A. Protect dampproofing and protection course from construction operations.

B. Repair damage.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 07 21 13
THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Thermal insulation.
 - a. Board or block insulation at foundation perimeter.
 - b. Batt or blanket insulation at exterior framed walls.
2. Acoustical insulation.
 - a. Semi-rigid insulation at interior framed partitions.

1.2 RELATED REQUIREMENTS

- A. Insulation for Insulated Wall Panels: Section 07 40 00 , ROOFING AND SIDING PANELS.
- B. Safing Insulation: Section 07 84 00, FIRESTOPPING.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.
- B. ASTM International (ASTM):
 1. C516-08(2013)e1 - Vermiculite Loose Fill Thermal Insulation.
 2. C549-06(2012) - Perlite Loose Fill Insulation.
 3. C552-15 - Cellular Glass Thermal Insulation.
 4. C553-13 - Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 5. C578-15 - Rigid, Cellular Polystyrene Thermal Insulation.
 6. C591-15 - Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.
 7. C612-14 - Mineral Fiber Block and Board Thermal Insulation.
 8. C665-12 - Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 9. C728-15 - Perlite Thermal Insulation Board.
 10. C954-15 - Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Base to Steel Studs From 0.033 (0.84 mm) inch to 0.112 inch in thickness.
 11. C1002-14 - Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

12. D312/D312M-15 - Asphalt Used in Roofing.
13. E84-15a - Surface Burning Characteristics of Building Materials.
14. F1667-15 - Driven Fasteners: Nails, Spikes, and Staples.

1.4 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23 , SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings:
 1. Show insulation type, thickness, and R-value for each location.
- C. Manufacturer's Literature and Data:
 1. Description of each product.
 2. Adhesive indicating manufacturer recommendation for each application.

1.5 DELIVERY

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, production run number, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.6 STORAGE AND HANDLING

- A. Store products indoors in dry, weathertight facility.
- B. Protect products from damage during handling and construction operations.
- C. Protect foam plastic insulation from UV exposure.

1.7 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 INSULATION - GENERAL

- A. Insulation Thickness:
 1. Provide thickness required by R-value shown on drawings.
 2. Provide thickness indicated when R-value is not shown on drawings.
- B. Insulation Types:
 1. Provide one insulation type for each application.

2.2 THERMAL INSULATION

- A. Perimeter Insulation In Contact with Soil:
 1. Polystyrene Board: ASTM C578, Type IV, V, VI, VII, or IX.
- B. Exterior Framing or Furring Insulation:

1. Mineral Fiber Blanket Insulation, Unfaced: ASTM C665, Type IA (blankets without membrane facing); consisting of fibers; passing ASTM E136 for combustion characteristics.

C. Continuous Insulation of Exterior Wall Insulation:

1. Mineral Fiber Board: ASTM C612, Type IB or II (boards without membrane facing); consisting of fibers; passing ASTM E136 for combustion characteristics.

2.3 ACOUSTICAL INSULATION

A. Semi Rigid, Batts and Blankets:

1. Widths and lengths to fit tight against framing.
2. Mineral Fiber Batt or Blankets: ASTM C665 unfaced.
3. Maximum Surface Burning Characteristics: ASTM E84.
 - a. Flame Spread Rating: 25.
 - b. Smoke Developed Rating: 450.

2.4 ACCESSORIES

A. Fasteners:

1. Staples or Nails: ASTM F1667, zinc-coated, size and type to suit application.
2. Screws: ASTM C954 or ASTM C1002, size and length to suit application with washer minimum 50 mm (2 inches) diameter.
3. Impaling Pins: Steel pins with head minimum 50 mm (2 inches) diameter.
 - a. Length: As required to extend beyond insulation and retain cap washer when washer is placed on pin.
 - b. Adhesive: Type recommended by manufacturer to suit application.

B. Insulation Adhesive:

1. Nonflammable type recommended by insulation manufacturer to suit application.

C. Tape:

1. Pressure sensitive adhesive on one face.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.

- C. Clean substrates. Remove contaminants capable of affecting subsequently installed product's performance.

3.2 INSTALLATION - GENERAL

- A. Install products according to manufacturer's instructions and approved submittal drawings.
 - 1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.
- B. Install board insulation with joints close and flush, in regular courses, and with end joints staggered.
- C. Install batt and blanket insulation with joints tight. Fill framing voids completely. Seal penetrations, terminations, facing joints, facing cuts, tears, and unlapped joints with tape.
- D. Fit insulation tight against adjoining construction and penetrations, unless indicated otherwise.

3.3 THERMAL INSULATION

- A. Perimeter Insulation In Contact with Soil:
 - 1. Vertical insulation:
 - a. Fill joints of insulation with same material used for bonding.
 - b. Bond polystyrene board to surfaces with adhesive.
 - 2. Horizontal insulation under concrete floor slab:
 - a. Lay insulation boards and blocks horizontally on level, compacted and drained fill.
 - b. Extend insulation from foundation walls towards center of building minimum 600 mm (24 inches).
- B. Exterior Framing or Furring Insulation:
 - 1. General:
 - a. Open voids are not acceptable.
 - b. Pack insulation around door frames and windows, in building expansion joints, door soffits, and other voids.
 - c. Pack behind outlets, around pipes, ducts, and services encased in walls.
 - d. Hold insulation in place with pressure sensitive tape.

- e. Lap facing flanges together over framing for continuous surface. Seal penetrations through insulation and facings.
- 2. Metal Studs:
 - a. Fasten insulation between metal studs, framing, and furring with pressure sensitive tape continuous along flanged edges.
- C. Continuous Insulation of Exterior Wall Insulation:
 - 1. Friction fit insulation between girt system.
 - 2. Bond insulation to solid vertical surfaces with adhesive. Fill joints with adhesive cement.

3.4 ACOUSTICAL INSULATION

- A. General:
 - 1. Install insulation without voids.
 - 2. Pack insulation around door frames and windows, in building expansion joints, door soffits, and other voids.
 - 3. Pack behind outlets, around pipes, ducts, and services encased in walls.
 - 4. Hold insulation in place with pressure sensitive tape.
 - 5. Lap facer flanges together over framing for continuous surface. Seal all penetrations through the insulation and facers.
 - 6. Do not compress insulation below required thickness except where embedded items prevent required thickness.
- B. Semi Rigid, Batts and Blankets:
 - 1. When insulation is not full thickness of cavity, adhere insulation to one side of cavity, maintaining continuity of insulation and covering penetrations or embedments.
 - a. Wood Framing:
 - 1) Fasten blanket insulation between wood framing and joists with nails or staples through flanged edges of insulation.
 - 2) Space fastenings maximum 150 mm (6 inches) on center.
 - b. Metal Framing:
 - 1) Fasten insulation between metal framing with pressure sensitive tape continuous along flanged edges.
 - 2) At metal framing or ceilings suspension systems, install blanket insulation above suspended ceilings or metal framing at right angles to the main runners or framing.

- 3) Tape insulation tightly together so no gaps occur and metal framing members are covered by insulation.

C. Sound Deadening Board:

1. Secure with adhesive to masonry and concrete walls and with screws to metal and wood framing. Secure sufficiently in place until subsequent cover is installed. Seal all cracks with caulking.

3.5 CLEANING

- A. Remove excess adhesive before adhesive sets.

3.6 PROTECTION

- A. Protect insulation from construction operations.
- B. Repair damage.

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SECTION 07 22 00
ROOF AND DECK INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Ventilated roof insulation panels, substrate board and vapor retarder on metal deck substrates ready to receive roofing or waterproofing membrane.

1.2 RELATED REQUIREMENTS

- A. Wood Cants, Blocking, and Edge Strips: Section 061000, ROUGH CARPENTRY.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.
- B. American Society of Heating, Refrigeration and Air Conditioning (ASHRAE):
1. Standard 90.1-13 - Energy Standard for Buildings Except Low-Rise Residential Buildings.
- C. ASTM International (ASTM):
1. C208-12 - Cellulosic Fiber Insulating Board.
 2. C552-15 - Cellular Glass Thermal Insulation.
 3. C726-05 - Mineral Fiber Roof Insulation Board.
 4. C728-15 - Perlite Thermal Insulation Board.
 5. C1177/C1177M-13 - Glass Mat Gypsum Substrate for Use as Sheathing.
 6. C1278/C1278M-07a(2015) - Fiber-Reinforced Gypsum Panel.
 7. C1289-15 - Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
 8. C1396/C1396M-14a - Gypsum Board.
 9. D41/D41M-11 - Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 10. D312-06 - Asphalt Used in Roofing.
 11. D1970/D1970M-15 - Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 12. D2178/D2178M-15 - Asphalt Glass Felt Used in Roofing and Waterproofing.
 13. D2822/D2822M-11 - Asphalt Roof Cement, Asbestos Containing.
 14. D4586/D4586M-07(2012)e1 - Asphalt Roof Cement, Asbestos-Free.
 15. E84-15a - Surface Burning Characteristics of Building Materials.
 16. F1667-15 - Driven Fasteners: Nails, Spikes, and Staples.
- D. National Roofing Contractors Association (NRCA):
- E. Manual-15 - The NRCA Roofing Manual: Membrane Roof Systems.

- F. U.S. Department of Agriculture (USDA):
- G. USDA BioPreferred Program Catalog.
- H. UL LLC (UL):
- I. Listed - Online Certifications Directory.
- J. U.S. Department of Commerce National Institute of Standards and Technology (NIST):
 - 1. DOC PS 1-09 - Structural Plywood.
 - 2. DOC PS 2-04 - Performance Standard for Wood-Based Structural-Use Panels.

1.4 SUBMITTALS

- A. Submittal Procedures: Section 013323, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings:
 - 1. Show size, configuration, and installation details.
 - 2. Nailers, cants, and terminations.
 - a. Layout of insulation showing slopes, tapers, penetrations, and edge conditions.
- C. Manufacturer's Literature and Data:
 - 1. Description of each product.
- D. Samples:
 - 1. Roof insulation panels, each type.
 - 2. Fasteners, each type.
- E. Qualifications: Substantiate qualifications meet specifications.
 - 1. Installer.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Same installer as Division 07 roofing section installer.

1.6 DELIVERY

- A. Comply with recommendations of NRCA Manual.
- B. Deliver products in manufacturer's original sealed packaging.
- C. Mark packaging, legibly. Indicate manufacturer's name or brand, type, and manufacture date.
- D. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.7 STORAGE AND HANDLING

- A. Comply with recommendations of NRCA Manual.
- B. Store products indoors in dry, weathertight facility.
- C. Protect products from damage during handling and construction operations.

1.8 FIELD CONDITIONS

A. Environment:

1. Install products when existing and forecasted weather permit installation according to manufacturer's instructions.

1.9 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."
- B. Manufacturer's Warranty: Warrant substrate board, vapor retarder, insulation, and cover board against material and manufacturing defects as part of Division 07 roofing system warranty.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Insulation Thermal Performance:

1. Overall Average R-Value: RSI-57 (R-33), minimum.
- B. Any Location R-Value: RSI-17 (R-10), minimum.
- C. Fire and Wind Uplift Resistance: Provide roof insulation complying with requirements specified in Division 07 roofing section.
- D. Insulation on Metal Decking: UL labeled indicating compliance with one of the following:
 1. UL Listed.
 2. Insulation Surface Burning Characteristics: When tested according to ASTM E84.
 - a. Flame Spread Rating: 75 maximum.
 - b. Smoke Developed Rating: 150 maximum.

2.2 PRODUCTS - GENERAL

- A. Provide each product from one manufacturer.

2.3 ADHESIVES

- A. Roof Cement: Asbestos free, ASTM D2822/D2822M, Type I or Type II; or, ASTM D4586/D4586M, Type I or Type II.

2.4 ROOF AND DECK INSULATION

A. Composite Nail Base Insulated Roof Sheathing:

1. Basis of Design: Section 090600, SCHEDULE FOR FINISHES.
2. Oriented-Strand-Board-Surfaced, Polyisocyanurate-Foam Sheathing: Polyisocyanurate thermal insulation ASTM C1289, Type V, insulation thickness as shown, with oriented strand board laminated to top surface.
3. Oriented Strand Board: NIST DOC PS 1, Exposure 1, 16 mm (5/8 inch) thick.
4. Bottom surface faced with felt facers.

2.5 INSULATION ACCESSORIES

- A. Glass (Felt): ASTM D2178/D2178M, Type VI, heavy duty ply sheet.
- B. Vapor Retarder:
 - 1. Self-Adhering Sheet Vapor Retarder: ASTM D1970/D1970M, minimum 1.0 mm (40 mils) thick membrane of HDPE film fully coated with asphalt adhesive, or 0.76 to 1.0 mm (30 to 40 mils) thick membrane of butyl rubber based adhesive backed by a layer of high density cross-laminated polyethylene; maximum permeance rating of 6 ng/Pa/s/sq. m (0.1 perms).
- C. Substrate Board:
 - 1. Glass-Mat, Water-Resistant Gypsum Roof Board: ASTM C1177/C1177M, Type X, 16 mm (5/8 inch) thick, factory primed.

2.6 ACCESSORIES

- A. Fasteners: Corrosion-resistant carbon steel fasteners and galvalume-coated steel or plastic round plates for fastening substrate board and insulation to roof deck.
- B. Nails: ASTM F1667; type to suit application.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Comply with requirements of Division 07 roofing section.

3.2 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.

3.3 INSTALLATION - GENERAL

- A. Install products according to manufacturer's instructions.
 - 1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.
- B. Comply with requirements of UL for insulated steel roof deck.
- C. Attach substrate board and other products to meet requirements of Division 07 roofing section.

3.4 VAPOR RETARDER INSTALLATION

- A. Vapor Retarder Installation, General:
 - 1. Install continuous vapor retarder on insulated roof sheathing where indicated.
 - 2. At vertical surfaces, turn up vapor retarder to top of insulation or base flashing.

3. Seal penetrations through vapor retarder with roof cement to prevent moisture entry from below.

3.5 INSULATED ROOF DECK INSTALLATION

- A. Insulation Thickness:
 1. Thickness of roof insulation shown on drawings is nominal. Provide thickness required to comply with specified thermal performance.
 2. Insulation on Metal Decks: Provide insulation in minimum thickness recommended by insulation manufacturer to span deck flutes. Support edges of insulation on metal deck ribs.
- B. Lay insulating units with close joints, in regular courses and with end joints staggered.
- C. Stagger joints between layers minimum 150 mm (6 inches).
- D. Lay units with long dimension perpendicular to the rolled (longitudinal) direction of the roofing felt.
- E. Seal cut edges at penetrations and at edges against blocking with bitumen or roof cement.
- F. Cut to fit tightly against blocking or penetrations.
- G. Cover all insulation installed on the same day; comply with temporary protection requirements of Division 07 roofing section.
- H. Installation Method:
 1. Mechanically Fastened Insulation:
 - a. Fasten insulation according to requirements in Division 07 roofing section.
 - b. Fasten insulation to resist uplift pressures specified in Division 07 roofing section.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 07 26 00

VAPOR RETARDERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Reinforced-polyethylene vapor retarders.
- B. Related Requirements:
 - 1. Section 03 30 53 "(SHORT FORM) Cast-in-Place Concrete" for under-slab vapor retarders.
 - 2. Section 07 22 00 "Roof and Deck Insulation" for vapor retarders part of a roofing system.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 REINFORCED-POLYETHYLENE VAPOR RETARDERS

- A. Reinforced-Polyethylene Vapor Retarders: Sheet with outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 40 lb/1000 sq. ft., with maximum permeance rating of 0.04 perm.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Insulation Solutions, Inc.
 - b. Raven Industries Inc.
 - c. Reef Industries, Inc.

2.2 ACCESSORIES

- A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- B. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.

- C. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to vapor retarders, including removing projections capable of puncturing vapor retarders.

3.2 INSTALLATION OF VAPOR RETARDERS ON FRAMING

- A. Place vapor retarders on side of construction indicated on Drawings.
- B. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives, vapor retarder fasteners, or other anchorage system as recommended by manufacturer. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- C. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs and sealing with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Locate all joints over framing members or other solid substrates.
- D. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.
- E. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.3 PROTECTION

- A. Protect vapor retarders from damage until concealed by permanent construction.

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SECTION 07 27 15

SELF-ADHERING SHEET AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Self-adhering, vapor-permeable, nonbituminous sheet air barriers.

1.2 DEFINITIONS

- A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air-Barrier Assembly: The collection of air-barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; and tested physical and performance properties of products.

B. Shop Drawings: For air-barrier assemblies.

1. Show locations and extent of air-barrier materials, accessories, and assemblies specific to Project conditions.
2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
3. Include details of interfaces with other materials that form part of air barrier.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer. Include list of ABAA-certified installers and supervisors employed by Installer, who work on Project.

- B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with air barrier.
- C. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.
- D. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
 - 1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.
- B. Mockups: Build mockups to set quality standards for materials and execution.
 - 1. Build integrated mockups of exterior wall assembly, incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
 - a. Coordinate construction of mockups to permit inspection and testing of air barrier before external insulation and cladding are installed.
 - b. Include junction with roofing membrane and building corner condition, .
 - c. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- B. Protect stored materials from direct sunlight.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by air-barrier manufacturer.
1. Protect substrates from environmental conditions that affect air-barrier performance.
 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. W.R. Grace & Co.; Perm-A-Barrier VPS
 2. Henry Company; Blueskin VP160
 3. VaproShield; Wrapshield SA

2.2 PERFORMANCE REQUIREMENTS

- A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E 2357.

ONBITUMINOUS SHEET AIR BARRIER

- A. Vapor-Permeable Nonbituminous Sheet: Minimum 20-mil- thick, self-adhering sheet consisting of a breathable carrier film or fabric and an adhesive with release liner on adhesive side and formulated for application with primer that complies with VOC limits.
1. Physical and Performance Properties:
 - a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.

- b. Puncture Resistance: Minimum 40 lbf; ASTM E 154/E 154M.
- c. Vapor Permeance: Minimum 15 perms; ASTM E 96/E 96M, Desiccant Method, Procedure A.
- d. Adhesion to Substrate: Minimum 15 lbf/sq. in. when tested according to ASTM D 4541 as modified by ABAA.
- e. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- f. UV Resistance: Can be exposed to sunlight for 150 days according to manufacturer's written instructions.

2.4 ACCESSORY MATERIALS

- A. Requirement: Provide primers, transition strips, termination strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.
- B. Primer: Liquid primer recommended for substrate by air-barrier material manufacturer.
- C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0250 inch thick, and Series 300 stainless-steel fasteners.
- D. Preformed Silicone Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 - 2. Verify that substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.
 - 3. Verify that substrates are visibly dry and free of moisture. Test concrete substrates for capillary moisture by plastic sheet method according to ASTM D 4263.

4. Verify that masonry joints are flush and completely filled with mortar.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.
- H. Bridge isolation joints, expansion joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.3 INSTALLATION

- A. Install materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.
 1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
- B. Prepare, treat, and seal inside and outside corners and vertical and horizontal surfaces at terminations and penetrations with termination mastic.

- C. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier sheet on same day. Reprime areas exposed for more than 24 hours.
- D. Apply and firmly adhere air-barrier sheets over area to receive air barrier. Accurately align sheets and maintain uniform 2-1/2-inch- minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure airtight installation.
 - 1. Apply sheets in a shingled manner to shed water.
 - 2. Roll sheets firmly to enhance adhesion to substrate.
- E. Apply continuous air-barrier sheets over accessory strips bridging substrate cracks, construction, and contraction joints.
- F. CMU: Install air-barrier sheet horizontally against the CMU beginning at base of wall. Align top edge of air-barrier sheet immediately below protruding masonry ties or joint reinforcement or ties, and firmly adhere in place.
 - 1. Overlap horizontally adjacent sheets a minimum of 2 inches and roll seams.
 - 2. Apply overlapping sheets with bottom edge slit to fit around masonry reinforcing or ties. Roll firmly into place.
 - 3. Seal around masonry reinforcing or ties and penetrations with termination mastic.
 - 4. Continue the sheet into all openings in the wall, such as doors and windows, and terminate at points to maintain an airtight barrier that is not visible from interior.
- G. Seal top of through-wall flashings to air-barrier sheet with an additional 6-inch- wide, transition strip.
- H. Seal exposed edges of sheet at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- I. Install air-barrier sheet and accessory materials to form a seal with adjacent construction and to maintain a continuous air barrier.
 - 1. Coordinate air-barrier installation with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
 - 2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.

- J. Connect and seal exterior wall air-barrier sheet continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- K. At end of each working day, seal top edge of air-barrier material to substrate with termination mastic.
- L. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- M. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
 - 1. Transition Strip: Roll firmly to enhance adhesion.
 - 2. Preformed Silicone Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.
- N. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of air-barrier material with foam sealant.
- O. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air-barrier sheet extending 6 inches beyond repaired areas in all directions.
- P. Do not cover air barrier until it has been tested and inspected by testing agency.
- Q. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.4 FIELD QUALITY CONTROL

- A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

- C. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
 2. Continuous structural support of air-barrier system has been provided.
 3. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
 4. Site conditions for application temperature and dryness of substrates have been maintained.
 5. Maximum exposure time of materials to UV deterioration has not been exceeded.
 6. Surfaces have been primed.
 7. Laps in sheet materials have complied with the minimum requirements and have been shingled in the correct direction (or mastic applied on exposed edges), with no fishmouths.
 8. Termination mastic has been applied on cut edges.
 9. Air barrier has been firmly adhered to substrate.
 10. Compatible materials have been used.
 11. Transitions at changes in direction and structural support at gaps have been provided.
 12. Connections between assemblies (air barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
 13. All penetrations have been sealed.
- D. Tests: As determined by testing agency from among the following tests:
1. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate according to ASTM D 4541 for each 600 sq. ft. of installed air barrier or part thereof.
- E. Air barriers will be considered defective if they do not pass tests and inspections.
1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
 2. Remove and replace deficient air-barrier components for retesting as specified above.

- F. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- G. Prepare test and inspection reports.

3.5 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
 - 1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed materials according to air-barrier manufacturer's written instructions.
 - 2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
- B. Clean spills, stains, and soiling from construction that would be exposed in the completed Work, using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 07 31 13
ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fiberglass asphalt shingles over underlayment nailed to roof sheathing.

1.2 RELATED REQUIREMENTS

A. Counterflashing and Flashing of Roof Projections: Section 076000, FLASHING AND SHEET METAL.

B. Shingle Color: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. ASTM International (ASTM):

1. D226/D226M-09 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
2. D1970/D1970M-15a - Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
3. D3018/D3018M-11 - Class A Asphalt Shingles Surfaced with Mineral Granules.
4. D3161/D3161M-15 - Wind-Resistance of Steep Slope Roofing Products (Fan-Induced Method).
5. D3462/D3462M-10a - Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.
6. F1667-05(2011) - Driven Fasteners: Nails, Spikes, and Staples.

C. UL LLC (UL):

1. 790-14 - Fire Tests of Roof Coverings.

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:

1. Description of each product.
2. Installation instructions.
3. Warranty.

C. Samples:

1. Shingles: Full size each type, color and texture.

1.5 DELIVERY

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, manufacture date, and the label of Underwriters Laboratories.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.6 STORAGE AND HANDLING

- A. Store shingles according to manufacturer's instructions. Store roll goods on end in upright position.
- B. Protect products from damage during handling and construction operations.
- C. Keep materials dry, covered completely and protected from weather.

1.7 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."
- B. Manufacturer's Warranty: Warrant asphalt shingles against material and manufacturing defects.
 - 1. Material Warranty Period: 40 years.
 - 2. Wind-Speed Warranty Period: Resist wind speeds up to 130 km/h (80 mph) for 15 years.
 - 3. Algae-Resistance Warranty Period: No discoloration for 10 years.

PART 2 - PRODUCTS

2.1 PRODUCTS - GENERAL

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Provide each product from one manufacturer.
 - 1. Provide each product exposed to view from one production run.

2.2 ASPHALT SHINGLES

- A. Asphalt Shingles: Fiberglass reinforced, laminated type, square butt.
 - 1. ASTM D3462/D3462M and ASTM D3018/D3018M, Type I, self-sealing.
 - 2. ASTM D3161/D3161M, Class D or F wind-resistant.
 - 3. UL 790 Class A fire resistance.
- B. Minimum Weight: 10.3 kg/sq. m (210 lbs./100 sq. ft.).
- C. Weather Exposure: 5-5/8".

2.3 ROOFING NAILS

- A. ASTM F1667, Type I, Style 20, galvanized steel, deformed shanks, heads 10 mm to 11 mm (3/8 inch to 7/16 inch) diameter.
 - 1. Nails for Shingles: 32 mm (1-1/4 inches) long.

- B. Nails for Felt: 19 mm (3/4 inch) long.

2.4 ROOFING UNDERLAYMENT

- A. Organic Felt: ASTM D226/D226M, Type 1.
- B. Eaves Protection: ASTM D 1970 sheet barrier of self-adhering rubberized asphalt membrane shingle underlayment having internal reinforcement, and "split" back plastic release film; provide material with warranty equal in duration to that of shingles being applied.

2.5 METAL FLASHING

- A. Provide metal roof flashings, including apron flashings, step flashings, valley flashings, drip edges, and vent pipe flashings specified in Section 076000, FLASHING AND SHEET METAL.

2.6 RIDGE VENTS

- A. Ridge Vents: Manufacturer's standard ridge vent for use under asphalt shingles.
 - 1. Provide ridge vents with internal filters, internal baffles, or external baffles, for weather protection.
 - 2. Free Area: Minimum 25400 sq. mm per m (12 sq. inches per foot).

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for roofing installation.
- B. Verify roof substrates are sound, within manufacturer's tolerances, and free from defects which would interfere with roofing installation.
- C. Verify roof accessories, vent pipes and other projections through roof are in place and roof flashing is installed, or ready for installation, before installing shingles.
- D. Protect existing construction and completed work from damage.

3.2 INSTALLATION - GENERAL

- A. Install products according to manufacturer's instructions and approved submittal drawings.
 - 1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

3.3 METAL DRIP EDGE INSTALLATION

- A. At eaves and rakes, install stainless steel drip edges specified in Section 07 60 00, FLASHING AND SHEET METAL.
 - 1. Eaves: Install metal drip edge before underlayment.

- B. Rakes: Install metal drip edge after underlayment.
- C. Secure metal drip edges with compatible nails spaced maximum 250 mm (10 inches) on center along inner edges.

3.4 FLASHING INSTALLATION

- A. Install metal flashings specified in Section 076000, FLASHING AND SHEET METAL at intersections of roofs, adjoining walls, or projections through deck such as chimneys and vent stacks.
- B. Install metal valley flashing shown and as specified under Section 076000, FLASHING AND SHEET METAL.
- C. Secure valley flashing according to shingle manufacturer's instructions.
 - 1. Expose flashing in open portion of valley 125 mm (5 inches) minimum, and lap shingles over flashing 125 mm (5 inches) minimum.

3.5 UNDERLAYMENT INSTALLATION

- A. Install self-adhering sheet underlayment, working from low point to high point. Lap sides 90 mm (3-1/2 inches) minimum, and lap ends 150 mm (6 inches) minimum. Install at the following locations:
 - 1. Eaves and Rakes: From edge of eave and rake to 600 mm (24 inches) minimum beyond inside face of exterior wall.
 - a. Lap underlayment over eave metal drip edge.
 - 2. Valleys, Hips and Roof Slope Transitions: Centered over change in slope and extended 450 mm (18 inches) minimum on both sides.
 - 3. Ridges: Centered on ridge and extended 900 mm (36 inches) minimum on both sides. Do not cover ridge vent opening.
 - 4. Sidewalls and Projections through Roof: Extended 450 mm (18 inches) from projection and extended up projection 100 mm (4 inches) minimum.
 - 5. Firmly roll underlayment to ensure adhesion to roof deck and metal flashings.
- B. Install organic felt underlayment on roof deck not covered by self-adhering sheet underlayment, with 100 mm (4 inches) minimum end laps, 50 mm (2 inches) minimum head laps, and 300 mm (12 inches) minimum ridge laps. Nail felt 125 mm (5 inches) on centers along laps.

3.6 ROOF ACCESSORY INSTALLATION

- A. Lap underlayment and asphalt shingles over upslope base flanges of roof accessory flashings.
- B. Install underlayment and asphalt shingles over side slope base flanges of roof accessory flashings.

- C. Install downslope base flanges of roof accessories over asphalt shingles.

3.7 ASPHALT SHINGLE INSTALLATION

- A. Install shingles aligned parallel to roof eave, nailed to roof sheathing.
 - 1. Exposure: 143 mm (5-5/8 inches) maximum.
 - 2. Headlap: As recommended by manufacturer, but no less than 50 mm (2 inches) minimum.
- B. Install asphalt-shingle starter strip with tabs removed and overhanging lower edge of roof 13 mm (1/2 inch).

3.8 RIDGE VENT INSTALLATION

- A. Install ridge vents over shingles.
 - 1. Extent: Continuous along ridges extending to within 24-inches of rakes.

3.9 RIDGE SHINGLE INSTALLATION

- A. Bend each shingle lengthwise down center to provide equal exposure on both sides of ridge.
 - 1. Begin ridge installation at leeward end of ridge. Cover ridge vents with shingles. Do not cover ridge vent openings with ridge shingles.
- B. Install shingles with maximum 125 mm (5 inches) exposure.
- C. Secure each shingle with one nail on both sides of ridge, 215 mm (8-1/2 inches) back from exposed end and one inch up from edge.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

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SECTION 07 41 13

STANDING-SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies trapezoidal-rib, seamed joint, standing seam metal roof panels, with related metal trim and accessories.

1.2 RELATED REQUIREMENTS

- A. Roof insulation and sheathing: Section 07 22 00, ROOF AND DECK INSULATION.
B. Counterflashing and Flashing of Roof Projections: Section 07 60 00, FLASHING AND SHEET METAL.
C. Metal Roof Panel Color: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 REFERENCES

- A. American Architectural Manufacturer's Association (AAMA):
www.aamanet.org:
1. AAMA 621 - Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) & Zinc-Aluminum Coated Steel Substrates.
2. AAMA 809.2 - Voluntary Specification Non-Drying Sealants.
- B. American Society of Civil Engineers (ASCE): www.asce.org/codes-standards:
1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International (ASTM): www.astm.org:
1. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A 755 - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
3. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
4. ASTM A 980 - Standard Specification for Steel, Sheet, Carbon, Ultra High Strength Cold Rolled.
5. ASTM C 645 - Specification for Nonstructural Steel Framing Members.
6. ASTM C 920 - Specification for Elastomeric Joint Sealants.
7. ASTM D 1003 - Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics.
8. ASTM D 2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.

9. ASTM D 4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
 10. ASTM E 1514 - Standard Specification for Structural Standing Seam Steel Roof Panel Systems.
 11. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
 12. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
 13. ASTM E 1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.
 14. ASTM E 1980 - Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.
- D. Underwriters Laboratories, Inc. (UL): www.ul.com:
1. UL 580 - Tests for Uplift Resistance of Roof Assemblies

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Prior to erection of framing, conduct preinstallation meeting at site attended by Owner, Architect, manufacturer's technical representative, inspection agency and related trade contractors.
1. Coordinate building framing in relation to metal panel system.
 2. Coordinate openings and penetrations of metal panel system.
 3. Coordinate work of Division 07 Sections "Roof Specialties" and "Roof Accessories" and openings and penetrations and manufacturer's accessories with installation of metal panels.
 4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 5. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
 6. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
 7. Review structural loading limitations of deck during and after roofing.
 8. Review flashings, special details, drainage, penetrations, equipment curbs, and condition of other construction that affect metal panels.
 9. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.

10. Review temporary protection requirements for metal panel systems during and after installation.
11. Review procedures for repair of metal panels damaged after installation.
12. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.5 QUALITY ASSURANCE

- A. Fabricator's Qualifications: Company specializing in metal roofing work with three (3) years' experience in similar size and type of installations. Submit qualifications.
- B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer with three (3) years of successful experience with installation of metal roofing of type and scope equivalent to Work of this Section. Submit qualifications.

1.6 ACTION SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data: Manufacturer's data sheets for specified products.
- C. Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, roof accessories, lightning arresting equipment, and special details. Make distinctions between factory and field assembled work.
 1. Indicate points of supporting structure that must coordinate with metal panel system installation.
 2. Include data indicating compliance with performance requirements.
 3. Include structural data indicating compliance with requirements of authorities having jurisdiction.
- D. Samples for Verification: Provide 12-inch- long section of each metal panel profile. Provide color chip verifying color selection.

1.7 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Indicating compliance of products with requirements, witnessed by a professional engineer.
- B. Qualification Information: For Installer firm and Installer's field supervisor.
- C. Manufacturer's Warranty: Sample copy of manufacturer's standard warranty.

1.8 CLOSEOUT SUBMITTALS

- A. Maintenance data.
- B. Manufacturer's Warranty: Executed copy of manufacturer's standard warranty.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping.
 - 1. Deliver, unload, store, and erect metal panel system and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
 - 2. Store in accordance with Manufacturer's written instructions. Provide wood collars for stacking and handling in the field.

1.10 COORDINATION

- A. Coordinate sizes, profiles, and locations of roof curbs and other roof-mounted equipment and roof penetrations, based upon sizes of actual selected equipment.

1.11 WARRANTY

- A. Construction Warranty: FAR clause 52.246 21, "Warranty of Construction."
- B. Special Manufacturer's Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal panel assemblies that fail in materials and workmanship within one year from date of Substantial Completion.
- C. **Special Weathertightness Warranty:** On manufacturer's standard form, in which manufacturer agrees to repair or replace metal panel assemblies that fail to remain weathertight, including leaks, without monetary limitation within 20 years from date of Substantial Completion.
- D. Special Panel Finish Warranty: On Manufacturer's standard form, in which Manufacturer agrees to repair or replace metal panels that evidence deterioration of factory-applied finish within [25] years from date of Substantial Completion, including:
 - 1. Fluoropolymer Two-Coat System:
 - a. Color fading in excess of 5 Hunter units per ASTM D 2244.
 - b. Chalking in excess of No. 8 rating per ASTM D 4214.
 - c. Failure of adhesion, peeling, checking, or cracking.

PART 2 - PRODUCTS

2.1 PRODUCTS - GENERAL

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Provide each product from one manufacturer.
 - 1. Provide each product exposed to view from one production run.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Provide metal roof panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.
- B. System Performance: Comply with ASTM E 1514 and requirements of this Section.
- C. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated:
 - 1. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings.
 - a. Wind Uplift Testing: Certify capacity of metal panels by actual testing of proposed assembly per ASTM E 1592.
 - 2. Snow Loads: As indicated.
 - 3. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of 1/180 of the span with no evidence of failure.
 - 4. Seismic Performance: Comply with ASCE 7, Section 9, "Earthquake Loads."
- D. Wind Uplift Resistance: Comply with UL 580 for wind-uplift class UL-90.
- E. Air Infiltration, ASTM E 1680: Maximum 0.07 cfm/sq. ft. at static-air-pressure difference of 6.24 lbf/sq. ft..
- F. Water Penetration Static Pressure, ASTM E 1646: No uncontrolled water penetration at a static pressure of 12 lbf/sq. ft..
- G. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.

2.3 METAL ROOF PANELS

- A. Mechanically Seamed, Concealed Fastener, Trapezoidal Seam Metal Roof Panels: Structural metal roof panel consisting of formed metal sheet with raised trapezoidal ribs at panel edges, installed by lapping and mechanically interconnecting edges of adjacent panels, and attaching panels to supports using concealed clips and fasteners in a weathertight installation.
1. **Aluminum-Zinc Alloy-Coated Steel Sheet:** ASTM A 792/A 792M, structural quality, Grade 50, Coating Class AZ50 prepainted by the coil-coating process per ASTM A 755/A 755M.
 2. **Aluminum-Zinc Alloy-Coated Steel Sheet:** ASTM A 792/A 792M, structural quality, Grade 50, Coating Class AZ55 .
 - a. Nominal Thickness: 24 gage coated thickness.
 - b. Panel Surface: Smooth with minor ribs in pan.
 - c. Exterior Finish: Fluoropolymer two-coat system.
 - d. Color: As indicated in Section 09 06 00, SCHEDULE FOR FINISHES.
 3. Panel Width: 24 inches.
 4. Panel Seam Height: 3 inch.
 5. Joint Type: Double folded.

2.4 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: Stable after testing at 240 deg F; ASTM D 1970.
 2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.
- B. Felt Underlayment: ASTM D 226/D 22M, Type II (No. 30), asphalt-saturated organic felts.
- C. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

2.5 METAL ROOF PANEL ACCESSORIES

- A. General: Provide complete metal roof panel assembly incorporating trim, copings, fasciae, gutters and downspouts, and miscellaneous flashings, in manufacturer's standard profiles. Provide required fasteners, closure strips, splice plates, support plates, and sealants as indicated in manufacturer's written instructions.
- B. Flashing and Trim: Match material, thickness, and finish of metal panel face sheet.
- C. Two Piece Floating Clips: ASTM C 645, with ASTM A 653/A 653M, G90 hot-dip galvanized zinc coating, configured for concealment in panel joints, and identical to clips utilized in tests demonstrating compliance with performance requirements.
- D. Panel Fasteners: Self-tapping screws and other acceptable corrosion-resistant fasteners recommended by roof panel manufacturer. Where exposed fasteners cannot be avoided, supply fasteners with EPDM or neoprene gaskets, and heads matching color of metal panels by means of factory-applied coating.
- E. Joint Sealers: Manufacturer's standard or recommended liquid and preformed sealers and tapes, and as follows:
 - 1. Factory-Applied Seam Sealant: Manufacturer's standard hot-melt type.
 - 2. Tape Sealers: Manufacturer's standard non-curing butyl tape, AAMA 809.2.
- F. **Steel Sheet Miscellaneous Framing Components:** ASTM C 645, with ASTM A 653/A 653M, G60 hot-dip galvanized zinc coating.
- G. **Gutters and Downspouts:** Approved by metal roof panel manufacturer. Refer to Section 07 60 00 "Flashing and Sheet Metal for requirements for gutters and downspouts.
- H. **Snow Guards:** Approved by metal roof panel manufacturer. Refer to Section 077253 "Snow Guards" for requirements for snow guards attached to metal roof panels.

2.6 FABRICATION

- A. General: Provide factory fabricated and finished metal panels and accessories meeting performance requirements, indicated profiles, and structural requirements.

- B. Fabricate metal panel joints configured to accept factory-applied sealant providing weathertight seal and preventing metal-to-metal contact and minimizing noise resulting from thermal movement.
- C. Form panels in continuous lengths for full length of detailed runs, except where otherwise indicated on approved shop drawings.
- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings. Form from materials matching metal panel substrate and finish.

2.7 FINISHES

- A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- B. Fluoropolymer Two-Coat System: 0.2 - 0.3 mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat, AAMA 621.
- C. Interior Finish: 0.5 mil manufacturer's standard light-colored acrylic or polyester backer finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine metal panel system substrate and supports with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panel installation.
 - 1. Inspect metal panel support substrate to determine if support components are installed as indicated on approved shop drawings. Confirm presence of acceptable supports at recommended spacing to match installation requirements of metal panels.
 - 2. Panel Support Tolerances: Confirm that panel supports are within tolerances acceptable to metal panel system manufacturer but not greater than the following:
 - a. 1/4 inch in 20 foot in any direction.
 - b. 3/8 inch over any single roof plane.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal roof panel system installation.

3.2 PREPARATION

- A. **Miscellaneous Supports:** Install subframing, girts, furring, and other miscellaneous panel support members according to ASTM C 754 and manufacturer's written instructions.
- B. **Flashings:** Provide flashings as required to complete metal roof panel system. Install in accordance with Section 07 62 00 "Sheet Metal Flashing and Trim" and approved shop drawings.

3.3 UNDERLAYMENT INSTALLATION

- A. **Self-Adhering Sheet Underlayment:** Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Extend underlayment into gutter trough. Roll laps with roller. Cover underlayment within 14 days.
 - 1. Apply over the entire roof surface where indicated on Drawings.
 - 2. Apply over the roof area indicated below:
 - a. Roof perimeter for a distance up from eaves of 24 inches beyond interior wall line.
 - b. Valleys, from lowest point to highest point, for a distance on each side of 18 inches. Overlap ends of sheets not less than 6 inches.
 - c. Rake edges for a distance of 18 inches.
 - d. Hips and ridges for a distance on each side of 12 inches.
 - e. Roof-to-wall intersections for a distance from wall of 18 inches.
 - f. Around dormers, chimneys, skylights, and other penetrating elements for a distance from element of 18 inches.
- B. **Felt Underlayment:** Apply at locations indicated below, in shingle fashion to shed water, and with lapped joints of not less than 2 inches.
 - 1. Apply on roof not covered by self-adhering sheet underlayment. Lap over edges of self-adhering sheet underlayment not less than 3 inches, in shingle fashion to shed water.
- C. **Slip Sheet:** Apply slip sheet over underlayment before installing metal roof panels.
- D. **Flashings:** Install flashings to cover underlayment to comply with requirements specified in Section 07 62 00 "Sheet Metal Flashing and Trim."

3.4 METAL PANEL INSTALLATION

- A. Mechanically-Seamed, Trapezoidal Standing Seam Metal Roof Panels: Install weathertight metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal roof panels in orientation, sizes, and locations indicated, free of waves, warps, buckles, fastening stresses, and distortions. Anchor panels and other components securely in place. Provide for thermal and structural movement.
- B. Attach panels to supports using clips, screws, fasteners, and sealants recommended by manufacturer and indicated on approved shop drawings.
1. Fasten metal panels to supports with concealed clips at each location indicated on approved shop drawings, with spacing and fasteners recommended by manufacturer.
 2. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
 3. Provide weatherproof jacks for pipe and conduit penetrating metal panels of types recommended by manufacturer.
 4. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

3.5 ACCESSORY INSTALLATION

- A. General: Install metal panel trim, flashing, and accessories using recommended fasteners and joint sealers, with positive anchorage to building, and with weather tight mounting. Provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
 2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
 3. Provide concealed fasteners except where noted on approved shop drawings.
 4. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

5. Provide additional seamed metal layer for any downspouts for a splash panel, where downspouts above meet roof.
- B. Joint Sealers: Install joint sealers where indicated and where required for weathertight performance of metal panel assemblies, in accordance with manufacturer's written instructions.
 1. Prepare joints and apply sealants per requirements of Division 07 Section "Joint Sealants."
- C. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal metal roof panels as recommended by manufacturer.

3.6 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.7 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect metal roof panel installation, including accessories. Report results in writing.
- B. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.
- C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

3.8 CLEANING AND PROTECTION

- A. Remove temporary protective films immediately in accordance with metal roof panel manufacturer's instructions. Clean finished surfaces as recommended by metal roof panel manufacturer.
- B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

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Department of Veterans Affairs
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Lebanon, PA

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SECTION 07 42 10.21

COMPOSITE FRAMING SUPPORT (CFS) SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Continuous insulation (CI) composite framing support (CFS) system integrated with fiber cement panels exterior wall cladding.

1.2 RELATED REQUIREMENTS

- A. Section 072113 "Thermal Insulation" for continuous insulation within the composite framing support system.

1.3 REFERENCE STANDARDS

- A. ASCE American Society of Civil Engineers (www.asce.org)
 - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010 with Supplements and Errata
 - 2. ASCE - Structural Plastics Design Manual
- B. ASHRAE American Society of Heating, Refrigerating, and Air-Conditioning Engineers (www.ashrae.org)
 - 1. ASHRAE 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings; 2013
 - 2. ASHRAE 189.1 - Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings; 2014
- C. ASTM International (American Society for Testing and Materials; www.astm.org)
 - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015
 - 2. ASTM C209 - Standard Test Methods for Cellulosic Fiber Insulating Board; 2015
 - 3. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2015
 - 4. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015
 - 5. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013
 - 6. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2015

7. ASTM C1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus; 2011
 8. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014a
 9. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010e1
 10. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2010e1
 11. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2014
 12. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2014
 13. ASTM D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between minus 30 degrees C and 30 degrees C with a Vitreous Silica Dilatometer; 2008e1
 14. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2015
 15. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2010
 16. ASTM D792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement; 2013
 17. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2010
 18. ASTM D2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging; 2015
 19. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor; 2013a
 20. ASTM D4385 - Standard Practice for Classifying Visual Defects in Thermosetting Reinforced Plastic Pultruded Products; 2013
 21. ASTM E72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
 22. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a
 23. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2015
- D. IBC - International Building Code (International Code Council); 2012
- E. IECC - International Energy Conservation Code; 2015
- F. IgCC - International Green Construction Code; 2012
- G. NFPA - National Fire Protection Association (www.nfpa.org)

1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2012

H. Voluntary Product Standard; National Institute of Standards and Technology (NIST)

1. PS 1 - Structural Plywood; 2009

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate construction of wall cladding support system over substrate indicated for proper drainage, flashing, trim, back-up support, soffits, and other related Work.

1. Review and finalize construction schedule.
2. Verify availability of materials, installer's personnel, equipment, and facilities needed to maintain schedule.
3. Review means and methods related to installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment and attachment to structural support system.
5. Review flashings, wall cladding details, wall penetrations, openings, and condition of other construction that affects this Work.
6. Review temporary protection requirements for during and after installation of this Work.

1.5 SUBMITTALS

- A. Product Data: Submit for each type of product indicated; include construction details, material descriptions, dimensions of individual components and profiles, and accessories as necessary for complete fully functioning and assembled system.
- B. Test and Inspection Reports: Submit test and inspection reports on each type of wall cladding/veneer system based on evaluation of comprehensive tests performed by nationally recognized testing agency.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least three years of documented experience.

- B. Installer: Company specializing in performing work of this section and the following:
 - 1. Install system in strict compliance with manufacturer's installation instructions.
 - 2. Have not less than three years of documented experience.
- C. Source Limitations: Obtain CI and CFS system from single source and single manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original unopened containers and packaging with labels clearly identifying product name and manufacturer.
- B. Deliver components and other manufactured items or accessories without damage or deformation.
- C. Storage: Store materials in clean, dry, and level interior areas or outdoor areas for limited duration in accordance with manufacturer's written instructions.
- D. Protect components and auxiliary accessories during transportation, handling, and installation from moisture, excessive temperatures and other construction operations in accordance with manufacturer's written instructions.
- E. Handle components in strict compliance with manufacturer's written instructions and recommendations, and in a manner to prevent bending, warping, twisting, and surface, edge or corner damage.

1.8 SITE CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of this Work in accordance with manufacturer's written installation instructions and warranty requirements.

1.9 WARRANTY

- A. Construction Warranty: FAR clause 52.246 21, "Warranty of Construction."
- B. CI and CFS System Warranty: Provide written warranty by manufacturer and installer agreeing to correct defects in manufacturing within five-year period after Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design: Advanced Architectural Products (A2P); SMARTci 2-in-1 System

1. Address: 959 Industrial Drive, Allegan, Michigan 49010.
2. Phone: (269) 355-1818
3. Website: www.smartcisystems.com
4. Other products shall be pre-submitted and approved products that meet materials and performance requirements with specified and validated third party testing.

2.2 DESCRIPTION

- A. CFS system components anchored to exterior sheathing over metal stud framing.
 1. Refer to Section 05 40 00 for metal stud framing.
- B. Install CI panels and CFS system components horizontally on substrate system as indicated on drawings in compliance with specified requirements.

2.3 PERFORMANCE REQUIREMENTS

- A. Structural: Measure the performance of the factory formed joints using a minimum of 30 psf (ASTM E72)
- B. System Thermal Design: Ensure installed CI and CFS system, sub-framing, clips and cladding attachment does not have thermal bridging of fasteners or framing that creates a continuous metal path from exterior surface of insulation to interior face of insulation.
 1. System thermal design shall meet or exceed thermal design requirements in compliance with IECC energy code.
 2. Thermal Resistance: Wall assembly R Value as indicated on the Drawings.
 3. Thermal Performance Test: Provide thermal resistance (R-value) indicated, in compliance with ASTM C1363, corrected to 15 mph outside and still air inside, with installed condition including fastening and joints.
 - a. Provide efficiency of no less than 93 to 98 percent with a maximum temperature differential of 18 degrees F from interior wall surface to interior wall cavity and node locations with a 70 degrees F exterior to interior wall temperature delta.
 - b. Provide test unit with at least one insulation panel horizontal and vertical joint length and height of test chamber area.
 - c. Provide finite element analysis of three-dimensional simulation of described wall assembly sealed by professional engineer in compliance with performance requirements and exceeding it by at least 3 percent.

- C. Temperature: Comply with structural loading requirements within temperature range of minus 55 degrees F to 180 degrees F.
- D. Fire-Test-Response Characteristics: Provide composite framing support system with fire-test results indicated as determined by test standard indicated and applied by UL or other testing and inspection agency acceptable to authorities having jurisdiction.
 - 1. Surface Burning Characteristics: In compliance with ASTM E84, for foam insulation, fiber reinforced polymer (FRP) and interior surfaces as follows:
 - a. Flame Spread Index (FSI): 25 or less.
 - b. Smoke Developed Index (SDI): 450 or less.
 - 2. Intermediate Scale Multistory Fire Test: Comply with NFPA 285 and/or IBC acceptance criteria for wall height above grade and fire separation distances, when wall type and other noted conditions require such testing or compliance with requirements as indicated.

2.4 COMPOSITE FRAMING SUPPORT (CFS) SYSTEM

- A. CFS System: Provide CFS system consisting of polyester and vinyl ester bioresin matrix (FRP) with recycled materials, fire retardant additives and integral continuous metal inserts the length of profile. Reinforce CFS system with glass strand rovings used internally for longitudinal (lengthwise) strength and continuous strand glass mats or stitched reinforcements used internally for transverse (crosswise) strength.
 - 1. Depth of Green Girt: 2-1/2 inch high.
 - 2. On Center Spacing: 16 inch.
 - 3. Provide continuous non-corrosive steel insert for engagement of fasteners, 16 gage, minimum thickness, with G90 galvanized coating designation in compliance with ASTM A653/A653M.
 - a. Fully engage steel insert with adjacent CFS at ends.
 - b. Anchor sub-girts and other wall cladding support accessories to steel insert set into and part of CFS.
 - c. Provide screw pullout testing that meets or exceeds 1,151 lbs.
 - 4. Provide integral 3-point compression seal in CFS sections to ensure insulation panel will not dislodge.
 - 5. Provide integral anti-siphon grooves on exterior and interior flanges of CFS.

6. Provide force distribution zones integrally designed into profile of CFS.
7. Provide spline seals for adjacent insulation units into profile of CFS.
8. Surface Burning Characteristics:
 - a. Flame Spread Index (FSI): 25 or less, when tested in accordance with ASTM E84.
 - b. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
9. Flammability: Comply with ASTM E84.
10. Self-Extinguishing: Comply with ASTM D635.
11. Profile Visual Requirements: Comply with ASTM D4385.
12. Tensile Stress: Provide engineered lengthwise and crosswise tensile stress in compliance with performance loading criteria and specified safety factors, in accordance with ASTM D638.
13. Compressive Stress: Provide engineered lengthwise and crosswise compressive stress in compliance with performance loading criteria and specified safety factors, in accordance with ASTM D695.
14. Flexural Stress: Provide engineered lengthwise and crosswise flexural stress in compliance with performance loading criteria and specified safety factors, in accordance with ASTM D790.
15. Modulus of Elasticity: Engineered to meet performance loading criteria and specified safety factors.
16. Barcol Hardness: 45, in accordance with ASTM D2583.
17. Water Absorption: Less than 0.46 percent by weight, within 24 hours, tested in accordance with ASTM D570.
18. Density: Within range of 0.062 to 0.070 lbs/cubic inch, in accordance with ASTM D792.
19. Lengthwise Coefficient of Thermal Expansion: 7.0×10^{-6} inch/inch/degrees F, in accordance with ASTM D696.
20. Notched Izod Impact, Lengthwise: 24 ft lbs/inch, in accordance with ASTM D256 within temperature range indicated.
21. Notched Izod Impact, Crosswise: 4 ft lbs/inch, in accordance with ASTM D256 within temperature range indicated.

2.5 INSULATION

- A. Insulation Panel Edges: Provide factory formed edges on insulation panels that interlock with CFS system components.

B. Mineral-Wool Board as specified in Section 07 21 13 "Thermal Insulation".

2.6 ASSEMBLY

A. Assemble CI with CFS system using manufacturer's standard procedures and processes identical to tested units and as necessary to comply with performance requirements indicated.

1. Comply with CFS system and dimensional and structural requirements as indicated on drawings.
2. Erect CFS system in sequence in accordance with manufacturer's standard installation procedures.
3. CFS and CI panels shall create an air/water/vapor barrier system compliant with requirements for project.
4. Provide spray foam sealant on backside of cantilevered fasteners that completely puncture the insulation layer.

2.7 ACCESSORIES

A. Provide accessories necessary for complete CFS system including metal closure trim, transition angle, strapping, tie-in brackets and similar items.

B. Fasteners: Corrosion-resistant, self-tapping and self-drilling screws, bolts, nuts, and other fasteners as recommended by CFS system manufacturer for project application.

1. Cladding to CFS System: Use standard self-tapping metal screws.
2. CFS System to Metal Stud Wall Framing: Use standard self-tapping metal screws.
3. CFS System to Concrete/CMU: Use standard masonry or concrete screw anchors in predrilled hole.
4. CFS System to Wood Framing: Use standard wood screw anchors.
5. DO NOT USE powder, air, or gas actuated fasteners or actuated fastener tools. DO NOT USE impact wrenches when fastening to or from the CFS.

C. Tape: Pressure sensitive adhesive coated polypropylene woven fabric. Must be mold, water, tear and UV resistant. Must be applicable in a wide temperature range (-20 degrees F).

D. Wall Sheathing: Glass mat faced gypsum, ASTM C1177/C1177M, square long edges, Type X fire-resistant.

1. Refer to Drawings for thickness and Section 06 10 00 for additional requirements.

E. Sealants: Provide sealants as recommended by CFS manufacturer for openings within CFS system and perimeter conditions.

1. Refer to Section 07 92 00 for sealant information.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas of this work, and project conditions with installer present for compliance with requirements for installation tolerances, substrates, CFS system conditions, and other conditions affecting performance of this Work.
- B. Examine structural wall framing to ensure that angles, channels, studs, and other structural support members have been installed within alignment tolerances required by CFS system manufacturer.
- C. Examine rough-in for components and systems penetrating CFS system to coordinate actual locations of penetrations relative to CFS systems joint locations prior to installation.
- D. Verify that mechanical and electrical services for exterior walls have been installed and tested and, if appropriate, verify that adjacent materials and finishes are dry and ready to receive insulation.
- E. Proceed with installation only after wall substrate surfaces have been properly prepared and unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by CFS manufacturer for achieving best result for substrate under project conditions.
- C. Prepare sub-framing, base angles, sills, furring, and other CFS system members and provide anchorage in accordance with ASTM C754 for substrate type and wall cladding type in accordance with manufacturer's installation instructions.

3.3 INSTALLATION

- A. Install CFS system in accordance with manufacturer's installation instructions.
- B. Install system to fill-in exterior spaces without gaps or voids, and do not compress insulation panels.
- C. Trim insulation neatly to fit spaces, and insulate miscellaneous gaps and voids.

- D. Fit insulation tight in spaces and tight to exterior side of Mechanical/Electrical services within plane of insulation.
- E. Seal gaps, voids or penetrations completely with approved expandable foam sealant on exterior and interior (if visible) before enclosing wall.
- F. Provide spray foam to seal metal penetrations, including cantilevered fasteners, to prevent interstitial space condensation.
- G. Exposed insulation must be protected from open flame and kept dry at all times.
- H. Exterior wall insulation panels are not intended to be left exposed for periods of time in excess of 60 days without adequate protection.
 - 1. When extended exposure is anticipated, protect exposed insulation surfaces including corners, window and door openings with a compatible waterproof tape.
- I. Install CFS system in compliance with system orientation, sizes, and locations as indicated on drawings.

3.4 TOLERANCES

- A. Shim and align CFS system within installed tolerances of 1/4 inch in 20 feet, non-cumulative, level, plumb, and on location lines as indicated.

3.5 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.
- B. Ensure that insulation panels are not exposed to moisture.
 - 1. Remove wet insulation panels or allow them to completely dry prior to installation of CFS system.
- C. Replace damaged insulation panels prior to Date of Substantial Completion.

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SECTION 07 46 46
FIBER-CEMENT SIDING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Section includes fiber-cement siding, soffit, door and window trim, fascia and battens.

1.2 RELATED SECTIONS

- A. Section 07 60 00, FLASHING AND SHEET METAL.
- B. Section 07 92 00, JOINT SEALANTS.

1.3 COORDINATION

- A. Coordinate siding installation with flashings and other adjoining construction to ensure proper sequencing.

1.4 SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples for Initial Selection: For fiber-cement siding soffit including related accessories.
- C. Samples for Verification: For each type, color, texture, and pattern required.
 - 1. 12-inch- long-by-actual-width Sample of each siding.
 - 2. 12-inch- long-by-actual-width Sample of soffit.
 - 3. 12-inch- long-by-actual-width Samples of trim and accessories.
- D. Sample Warranty: For special warranty.
- E. Maintenance Data: For each type of siding and soffit and related accessories to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for fabrication and installation.
 - 1. Build mockup of typical wall area as shown on Drawings.
 - 2. Build mockups for fiber-cement siding including accessories.
 - a. Size: As shown on Drawings, approximately 96 inches long by 96 inches high.
 - b. Include outside corner on one end of mockup and inside corner on other end.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with labels intact until time of use.
- B. Store materials on elevated platforms, under cover, and in a dry location. Store siding on edge or lay flat on a smooth level surface. Protect edges and corners from chipping.

1.7 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."
- B. Special Warranty: Manufacturer agrees to repair or replace products that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including cracking and deforming.
 - b. Deterioration of materials beyond normal weathering.
 - c. <Insert failure modes>.
 2. Warranty Period: 30 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Source Limitations: Obtain products, including related accessories, from single source from single manufacturer.

2.2 FIBER-CEMENT SIDING

- A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.
- B. Labeling: Provide fiber-cement siding that is tested and labeled according to ASTM C 1186 by a qualified testing agency acceptable to authorities having jurisdiction.
- C. Nominal Thickness: Not less than 5/16 inch.

- D. Tongue and Groove Vertical Siding: V-Groove 8-1/4 inches (210 mm) with 7 inches (178 mm) exposure. 5/8 inch thick. Smooth texture. Factory primed. Shop finish.
- E. Shingle Siding: Straight-Edge Notched Panel 48 inches (1219 mm) wide by 16 inches (406mm) high with 7 inches (178 mm) exposure. Factory finish.
- F. Factory Priming: Manufacturer's standard acrylic primer.
- G. Factory Finish: Factory applied ColorPlus Technology
 - 1. Color: As selected by Architect from Manufacturer's standard colors.
- H. Shop Finish: For those products that are not available factory finished, finish in shop using products and techniques in accordance with manufacturer's written instructions and recommendations.
 - 1. Color: As selected by Architect from Manufacturer's standard colors.

2.3 FIBER-CEMENT SOFFIT

- A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.
- B. Nominal Thickness: Not less than 0.25 inch.
- C. Pattern: 12-inch- sheets with smooth wood-grain.
- D. Ventilation: Provide perforated soffit.
- E. Factory Priming: Manufacturer's standard acrylic primer.
- F. Shop Finish: For those products that are not available factory finished, finish in shop using products and techniques in accordance with manufacturer's written instructions and recommendations.
 - 1. Color: As selected by Architect from Manufacturer's standard colors.

2.4 ACCESSORIES

- A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.
 - 1. Provide accessories matching color and texture of adjacent siding unless otherwise indicated.
- B. Decorative Accessories: Provide the following fiber-cement decorative accessories as indicated:
 - 1. Corner posts.

2. Door and window casings.
 3. Fasciae.
 4. Moldings and trim.
- C. Fasteners:
1. For fastening to wood, use siding nails ribbed bugle-head screws of sufficient length to penetrate a minimum of 1 inch into substrate.
 2. For fastening to metal, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 1/4 inch, or three screw-threads, into substrate.
 3. For fastening fiber cement, use hot-dip galvanized stainless-steel fasteners.
- D. Insect Screening for Soffit Vents: 18-by-14 or 18-by-16 mesh Stainless steel.
- E. Continuous Soffit Vents: Aluminum, hat-channel shape, with perforations; 2 inches wide and not less than 96 inches long.
1. Net-Free Area: 4 sq. in./linear ft. 6 sq. in./linear ft. 8 sq. in./linear ft. Insert dimension.
 2. Finish: Mill finish White paint Brown paint Insert requirement.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of fiber-cement siding soffit and related accessories.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
 1. Do not install damaged components.
 2. Install fasteners no more than 24 inches o.c.
- B. Install joint sealants as specified in Section 07 92 00 "Joint Sealants" and to produce a weathertight installation.

3.4 ADJUSTING AND CLEANING

- A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.
- B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 076000

FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Formed sheet metal work for wall and roof flashing, roof edge metal, and drainage specialties are specified in this section.

1.2 RELATED WORK

- A. Flashing components of factory finished roofing and wall systems: Division 07 roofing and wall system sections.
- B. Joint Sealants: Section 07 92 00, JOINT SEALANTS.
- C. Color of factory coated exterior architectural metal and anodized aluminum items: Section 09 06 00, SCHEDULE FOR FINISHES.
- D. Integral flashing components of manufactured roof specialties and accessories or equipment: Division 22, PLUMBING sections and Division 23 HVAC sections.
- E. Paint materials and application: Section 09 91 00, PAINTING.

1.3 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only. Editions of applicable publications current on date of issue of bidding documents apply unless otherwise indicated.
- B. Aluminum Association (AA):
 - AA-C22A41...Aluminum Chemically etched medium matte, with clear anodic coating, Class I Architectural, 0.7-mil thick
 - AA-C22A42...Chemically etched medium matte, with integrally colored anodic coating, Class I Architectural, 0.7 mils thick
 - AA-C22A44...Chemically etched medium matte with electrolytically deposited metallic compound, integrally colored coating Class I Architectural, 0.7-mil thick finish
- C. American National Standards Institute/Single-Ply Roofing Institute/Factory Mutual (ANSI/SPRI/FM):
 - 4435/ES-1-11.....Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems
- D. American Architectural Manufacturers Association (AAMA):

AAMA 620-02.....Voluntary Specification for High Performance
Organic Coatings on Coil Coated Architectural
Aluminum

AAMA 621-02.....Voluntary Specification for High Performance
Organic Coatings on Coil Coated Architectural
Hot Dipped Galvanized (HDG) and Zinc-Aluminum
Coated Steel Substrates

E. ASTM International (ASTM):

A240/A240M-15.....Standard Specification for Chromium and
Chromium-Nickel Stainless Steel Plate, Sheet and
Strip for Pressure Vessels and for General
Applications.

A653/A653M-15.....Steel Sheet Zinc-Coated (Galvanized) or Zinc
Alloy Coated (Galvanized) by the Hot- Dip
Process

B32-14.....Solder Metal

B209-14.....Aluminum and Aluminum-Alloy Sheet and Plate

B370-12.....Copper Sheet and Strip for Building Construction

D173-03.....(R2011)Bitumen-Saturated Cotton Fabrics Used in
Roofing and Waterproofing

D412-15.....Vulcanized Rubber and Thermoplastic Elastomers-
Tension

D1187-97.....(R2011)Asphalt Base Emulsions for Use as
Protective Coatings for Metal

D1784-11.....Rigid Poly (Vinyl Chloride) (PVC) Compounds and
Chlorinated Poly (Vinyl Chloride) (CPVC)
Compounds

D3656-13.....Insect Screening and Louver Cloth Woven from
Vinyl-Coated Glass Yarns

D4586-12.....Asphalt Roof Cement, Asbestos Free

F. Sheet Metal and Air Conditioning Contractors National Association

G. (SMACNA): Architectural Sheet Metal Manual.

H. National Association of Architectural Metal Manufacturers (NAAMM):

AMP 500-06 Metal Finishes Manual

I. Federal Specification (Fed. Spec):

A-A-1925A.....Shield, Expansion; (Nail Anchors)

UU-B-790A.....Building Paper, Vegetable Fiber

J. International Code Commission (ICC): International Building Code, Current Edition

1.4 PERFORMANCE REQUIREMENTS

- A. Wind Uplift Forces: Resist the following forces per FM Approvals 1-49:
1. Wind Zone 3: 2.20 to 4.98 kPa (46 to 104 lbf/sq. ft.): 9.96-kPa (208-lbf/sq. ft.) perimeter uplift force, 14.94-kPa (312-lbf/sq. ft.) corner uplift force, and 4.98-kPa (104-lbf/sq. ft.) outward force.
- B. Wind Design Standard: Fabricate and install roof-edge flashings tested per ANSI/SPRI/FM ES-1 to resist design pressure indicated on Drawings.

1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: For all specified items, including:
1. Flashings
 2. Gutter and Conductors
- C. Manufacturer's Literature and Data: For all specified items, including:
1. Two-piece counterflashing
 2. Thru wall flashing
 3. Expansion joint cover, each type
 4. Nonreinforced, elastomeric sheeting
 5. Copper clad stainless steel
 6. Polyethylene coated copper
 7. Bituminous coated copper
 8. Copper covered paper
- D. Certificates: Indicating compliance with specified finishing requirements, from applicator and contractor.

PART 2 - PRODUCTS

2.1 FLASHING AND SHEET METAL MATERIALS

- A. Stainless Steel: ASTM A240, Type 302B, dead soft temper.
- B. Copper ASTM B370, cold-rolled temper.

- C. Bituminous Coated Copper: Minimum copper ASTM B370, weight not less than 1 kg/m² (3 oz/sf). Bituminous coating shall weigh not less than 2 kg/m² (6 oz/sf); or, copper sheets may be bonded between two layers of coarsely woven bitumen-saturated cotton fabric ASTM D173. Exposed fabric surface shall be crimped.
- D. Copper Covered Paper: Fabricated of electro-deposit pure copper sheets ASTM B 370, bonded with special asphalt compound to both sides of creped, reinforced building paper, UU-B-790, Type I, style 5, or to a three-ply sheet of asphalt impregnated creped paper. Grooves running along the width of sheet.
- E. Polyethylene Coated Copper: Copper sheet ASTM B370, weighing 1 Kg/m² (3 oz/sf) bonded between two layers of (two mil) thick polyethylene sheet.
- F. Aluminum Sheet: ASTM B209, alloy 3003-H14 except alloy used for color anodized aluminum shall be as required to produce specified color. Alloy required to produce specified color shall have the same structural properties as alloy 3003-H14.
- G. Galvanized Sheet: ASTM, A653.
- H. Nonreinforced, Elastomeric Sheeting: Elastomeric substances reduced to thermoplastic state and extruded into continuous homogenous sheet (0.056 inch) thick. Sheeting shall have not less than 7 MPa (1,000 psi) tensile strength and not more than seven percent tension-set at 50 percent elongation when tested in accordance with ASTM D412. Sheeting shall show no cracking or flaking when bent through 180 degrees over a 1 mm (1/32 inch) diameter mandrel and then bent at same point over same size mandrel in opposite direction through 360 degrees at temperature of -30°C (-20 °F).

2.2 FLASHING ACCESSORIES

- A. Solder: ASTM B32; flux type and alloy composition as required for use with metals to be soldered.
- B. Rosin Paper: Fed-Spec. UU-B-790, Type I, Grade D, Style 1b, Rosin-sized sheathing paper, weighing approximately 3 Kg/10 m² (6 lbs/100 sf).
- C. Bituminous Paint: ASTM D1187, Type I.
- D. Fasteners:
 - 1. Use copper, copper alloy, bronze, brass, or stainless steel for copper and copper clad stainless steel, and stainless steel for stainless steel and aluminum alloy. Use galvanized steel or stainless steel for galvanized steel.
 - 2. Nails:

- a. Minimum diameter for copper nails: 3 mm (0.109 inch).
 - b. Minimum diameter for aluminum nails 3 mm (0.105 inch).
 - c. Minimum diameter for stainless steel nails: 2 mm (0.095 inch) and annular threaded.
 - d. Length to provide not less than 22 mm (7/8 inch) penetration into anchorage.
3. Rivets: Not less than 3 mm (1/8 inch) diameter.
 4. Expansion Shields: Fed Spec A-A-1925A.
- E. Sealant: As specified in Section 07 92 00, JOINT SEALANTS for exterior locations.
- F. Insect Screening: ASTM D3656, 18 by 18 regular mesh.
- G. Roof Cement: ASTM D4586.

2.3 SHEET METAL THICKNESS

- A. Except as otherwise shown or specified use thickness or weight of sheet metal as follows:
- B. Concealed Locations (Built into Construction):
1. Copper: 30g (10 oz) minimum 0.33 mm (0.013 inch thick).
 2. Stainless steel: 0.25 mm (0.010 inch) thick.
 3. Copper clad stainless steel: 0.25 mm (0.010 inch) thick.
 4. Galvanized steel: 0.5 mm (0.021 inch) thick.
- C. Exposed Locations:
1. Copper: 0.4 Kg (16 oz).
 2. Stainless steel: 0.4 mm (0.015 inch).
 3. Copper clad stainless steel: 0.4 mm (0.015 inch).
- D. Thickness of aluminum or galvanized steel is specified with each item.

2.4 FABRICATION, GENERAL

- A. Jointing:
1. In general, copper, stainless steel and copper clad stainless steel joints, except expansion and contraction joints, shall be locked and soldered.
 2. Jointing of copper over 0.5 Kg (20 oz) weight or stainless steel over 0.45 mm (0.018 inch) thick shall be done by lapping, riveting and soldering.
 3. Joints shall conform to following requirements:
 - a. Flat-lock joints shall finish not less than 19 mm (3/4 inch) wide.
 - b. Lap joints subject to stress shall finish not less than 25 mm (one inch) wide and shall be soldered and riveted.

- c. Unsoldered lap joints shall finish not less than 100 mm (4 inches) wide.
 4. Flat and lap joints shall be made in direction of flow.
 5. Edges of bituminous coated copper, copper covered paper, nonreinforced elastomeric sheeting and polyethylene coated copper shall be jointed by lapping not less than 100 mm (4 inches) in the direction of flow and cementing with asphalt roof cement or sealant as required by the manufacturer's printed instructions.
 6. Soldering:
 - a. Pre tin both mating surfaces with solder for a width not less than 38 mm (1 1/2 inches) of uncoated copper, stainless steel, and copper clad stainless steel.
 - b. Wire brush to produce a bright surface before soldering lead coated copper.
 - c. Treat in accordance with metal producers recommendations other sheet metal required to be soldered.
 - d. Completely remove acid and flux after soldering is completed.
- B. Expansion and Contraction Joints:
 1. Fabricate in accordance with the Architectural Sheet Metal Manual recommendations for expansion and contraction of sheet metal work in continuous runs.
 2. Space joints as shown or as specified.
 3. Space expansion and contraction joints for copper, stainless steel, and copper clad stainless steel at intervals not exceeding 7200 mm (24 feet).
 4. Space expansion and contraction joints for aluminum at intervals not exceeding 5400 mm (18 feet), except do not exceed 3000 mm (10 feet) for gravel stops and fascia-cant systems.
 5. Fabricate slip-type or loose locked joints and fill with sealant unless otherwise specified.
 6. Fabricate joint covers of same thickness material as sheet metal served.
- C. Cleats:
 1. Fabricate cleats to secure flashings and sheet metal work over 300 mm (12 inches) wide and where specified.
 2. Provide cleats for maximum spacing of 300 mm (12 inch) centers unless specified otherwise.
 3. Form cleats of same metal and weights or thickness as the sheet metal being installed unless specified otherwise.

4. Fabricate cleats from 50 mm (2 inch) wide strip. Form end with not less than 19 mm (3/4 inch) wide loose lock to item for anchorage. Form other end of length to receive nails free of item to be anchored and end edge to be folded over and cover nail heads.

D. Edge Strips or Continuous Cleats:

1. Fabricate continuous edge strips where shown and specified to secure loose edges of the sheet metal work.
2. Except as otherwise specified, fabricate edge strips of minimum 0.6 mm (0.024 inch) thick stainless steel or 1.25 mm (0.050 inch) thick aluminum.
3. Use material compatible with sheet metal to be secured by the edge strip.
4. Fabricate in 3000 mm (10 feet) maximum lengths with not less than 19 mm (3/4 inch) loose lock into metal secured by edge strip.
5. Fabricate Strips for fascia anchorage to extend below the supporting wood construction to form a drip and to allow the flashing to be hooked over the lower edge at least 19 mm (3/4-inch).
6. Fabricate anchor edge maximum width of 75 mm (3 inches) or of sufficient width to provide adequate bearing area to insure a rigid installation using 0.8 mm (0.031 inch) thick stainless steel or 1.6 mm (0.0625 inch) thick aluminum.

E. Drips:

1. Form drips at lower edge of sheet metal counter-flashings (cap flashings), fascias, gravel stops, wall copings, by folding edge back 13 mm (1/2 inch) and bending out 45 degrees from vertical to carry water away from the wall.
2. Form drip to provide hook to engage cleat or edge strip for fastening for not less than 19 mm (3/4 inch) loose lock where shown.

F. Edges:

1. Edges of flashings concealed in masonry joints opposite drain side shall be turned up 6 mm (1/4 inch) to form dam, unless otherwise specified or shown otherwise.
2. Finish exposed edges of flashing with a 6 mm (1/4 inch) hem formed by folding edge of flashing back on itself when not hooked to edge strip or cleat. Use 6 mm (1/4 inch) minimum penetration beyond wall face with drip for through-wall flashing exposed edge.
3. All metal roof edges shall meet the requirements of IBC, current edition.

G. Metal Options:

1. Where options are permitted for different metals use only one metal throughout.
2. Stainless steel may be used in concealed locations for fasteners of other metals exposed to view.
3. Where copper gravel stops, copings and flashings will carry water onto cast stone, stone, or architectural concrete, or stainless steel.

2.5 FINISHES

- A. Use same finish on adjacent metal or components and exposed metal surfaces unless specified or shown otherwise.
- B. In accordance with NAAMM Metal Finishes Manual AMP 500, unless otherwise specified.
- C. Finish exposed metal surfaces as follows, unless specified otherwise:
 1. Copper: Mill finish.
 2. Stainless Steel: Finish No. 2B or 2D.
 3. Aluminum:
 - a. Fluorocarbon Finish: AAMA 620, high performance organic coating.
 4. Steel and Galvanized Steel:
 - a. Manufacturer's finish:
 - 1) Fluorocarbon Finish: AAMA 621, high performance organic coating.

2.6 THROUGH-WALL FLASHINGS

- A. Form through-wall flashing to provide a mechanical bond or key against lateral movement in all directions. Install a sheet having 2 mm (1/16 inch) deep transverse channels spaced four to every 25 mm (one inch), or ribbed diagonal pattern, or having other deformation unless specified otherwise.
 1. Fabricate in not less than 2400 mm (8 feet) lengths; 3000 mm (10 feet) maximum lengths.
 2. Fabricate so keying nests at overlaps.
- B. For Masonry Work When Concealed Except for Drip:
 1. Either copper, stainless steel, or copper clad stainless steel.
 2. Form an integral dam at least 5 mm (3/16 inch) high at back edge.
 3. Form exposed portions of flashing with drip, approximately 6 mm (1/4 inch) projection beyond wall face.
- C. For Masonry Work When Exposed Edge Forms a Receiver for Counter Flashing:
 1. Use same metal and thickness as counter flashing.
 2. Form an integral dam at least 5 mm (3/16 inch) high at back edge.
 3. Form exposed portion as snap lock receiver for counter flashing upper edge.

- D. For Flashing at Architectural Precast Concrete Panels or Stone Panels.
 - 1. Use plan flat sheet of stainless steel.
 - 2. Form exposed portions with drip as specified or receiver.
- E. Window Sill Flashing and Lintel Flashing:
 - 1. Use either copper, stainless steel, copper clad stainless steel plane flat sheet, or nonreinforced elastomeric sheeting, bituminous coated copper, copper covered paper, or polyethylene coated copper.
 - 2. Fabricate flashing at ends with folded corners to turn up 5 mm (3/16 inch) in first vertical masonry joint beyond masonry opening.
 - 3. Turn up back edge as shown.
 - 4. Form exposed portion with drip as specified or receiver.
- F. Door Sill Flashing:
 - 1. Where concealed, use either 0.5 Kg (20 oz) copper, 0.5 mm (0.018 inch) thick stainless steel, or 0.5 mm (0.018 inch) thick copper clad stainless steel.
 - 2. Where shown on drawings as combined counter flashing under threshold, sill plate, door sill, or where subject to foot traffic, use either 0.6 Kg (24 ounce) copper, 0.6 mm (0.024 inch) stainless steel, or 0.6 mm (0.024 inch) thick stainless steel.
 - 3. Fabricate flashing at ends to turn up 5 mm (3/16 inch) in first vertical masonry joint beyond masonry opening with folded corners.

2.7 BASE FLASHING

- A. Use metal base flashing at vertical surfaces intersecting built-up roofing without cant strips or where shown.
 - 1. Use either copper, or stainless steel, thickness specified unless specified otherwise.
 - 2. When flashing is over 250 mm (10 inches) in vertical height or horizontal width use either 0.5 Kg (20 oz) copper or 0.5 mm (0.018 inch) stainless steel.
 - 3. Use stainless steel at aluminum roof curbs where flashing contacts the aluminum.
 - 4. Use either copper, or stainless steel at pipe flashings.
- B. Fabricate metal base flashing up vertical surfaces not less than 200 mm (8 inch) nor more than 400 mm (16 inch).
- C. Fabricate roof flange not less than 100 mm (4 inches) wide unless shown otherwise. When base flashing length exceeds 2400 mm (8 feet) form flange edge with 13 mm (1/2 inch) hem to receive cleats.

- D. Form base flashing bent from strip except pipe flashing. Fabricate ends for riveted soldered lap seam joints. Fabricate expansion joint ends as specified.
- E. Pipe Flashing: (Other than engine exhaust or flue stack)
 - 1. Fabricate roof flange not less than 100 mm (4 inches) beyond sleeve on all sides.
 - 2. Extend sleeve up and around pipe and flange out at bottom not less than 13 mm (1/2 inch) and solder to flange and sleeve seam to make watertight.
 - 3. At low pipes 200 mm (8 inch) to 450 mm (18 inch) above roof:
 - a. Form top of sleeve to turn down into the pipe at least 25 mm (one inch).
 - b. Allow for loose fit around and into the pipe.
 - 4. At high pipes and pipes with goosenecks or other obstructions which would prevent turning the flashing down into the pipe:
 - a. Extend sleeve up not less than 300 mm (12 inch) above roofing.
 - b. Allow for loose fit around pipe.

2.8 COUNTERFLASHING (CAP FLASHING OR HOODS)

- A. Either copper or stainless steel, unless specified otherwise.
- B. Fabricate lap base flashing a minimum of 100 mm (4 inches) with drip:
 - 1. Form lock seams for outside corners. Allow for lap joints at ends and inside corners.
 - 2. In general, form flashing in lengths not less than 2400 mm (8 feet) and not more than 3000 mm (10 feet).
 - 3. Two-piece, lock in type flashing may be used in-lieu-of one-piece counter-flashing.
 - 4. Manufactured assemblies may be used.
 - 5. Where counterflashing is installed at new work use an integral flange at the top designed to be extended into the masonry joint or reglet in concrete.
 - 6. Where counterflashing is installed at existing work use surface applied type, formed to provide a space for the application of sealant at the top edge.
- C. One-piece Counterflashing:
 - 1. Back edge turned up and fabricate to lock into reglet in concrete.
 - 2. Upper edge formed to extend full depth of masonry unit in mortar joint with back edge turned up 6 mm (1/4 inch).
- D. Two-Piece Counterflashing:

1. Receiver to extend into masonry wall depth of masonry unit with back edge turned up 6 mm (1/4 inch) and exposed edge designed to receive and lock counterflashing upper edge when inserted.
 2. Counterflashing upper edge designed to snap lock into receiver.
- E. Surface Mounted Counterflashing; one or two piece:
1. Use at existing or new surfaces where flashing cannot be inserted in vertical surface.
 2. One piece fabricates upper edge folded double for 65 mm (2 1/2 inches) with top 19 mm (3/4 inch) bent out to form "V" joint sealant pocket with vertical surface. Perforate flat double area against vertical surface with horizontally slotted fastener holes at 400 mm (16 inch) centers between end holes. Option: One piece surface mounted counter-flashing (cap flashing) may be used. Fabricate as detailed on Plate 51 of SMACNA Architectural Sheet Metal Manual.
 3. Two pieces: Fabricate upper edge to lock into surface mounted receiver. Fabricate receiver joint sealant pocket on upper edge and lower edge to receive counterflashing, with slotted fastener holes at 400 mm (16 inch) centers between upper and lower edge.
- F. Pipe Counterflashing:
1. Form flashing for water-tight umbrella with upper portion against pipe to receive a draw band and upper edge to form a "V" joint sealant receiver approximately 19 mm (3/4 inch) deep.
 2. Fabricate 100 mm (4 inch) overlap at end.
 3. Fabricate draw band of same metal as counter flashing. Use 0.6 Kg (24 oz) copper or 0.33 mm (0.013 inch) thick stainless steel or copper coated stainless steel.
 4. Use stainless steel bolt on draw band tightening assembly.
 5. Vent pipe counter flashing may be fabricated to omit draw band and turn down 25 mm (one inch) inside vent pipe.
- G. Where vented edge decks intersect vertical surfaces, form in one piece, shape to slope down to a point level with and in front of edge-set notched plank; then, down vertically, overlapping base flashing.

2.9 HANGING GUTTERS

- A. Fabricate gutters of not less than the following:
1. 0.8mm (0.032inch) thick aluminum.
- B. Fabricate hanging gutters in sections not less than 2400 mm (8 feet) long, except at ends of runs where shorter lengths are required.

- C. Building side of gutter shall be not less than 38 mm (1 1/2 inches) higher than exterior side.
- D. Gutter Bead: Stiffen outer edge of gutter by folding edge over approximately 19 mm (3/4 inch) toward roof and down approximately 19 mm (3/4 inch) unless shown otherwise.
- E. Gutter Spacers:
 - 1. Fabricate of same material and thickness as gutter.
 - 2. Fabricate 25 mm (one inch) wide strap and fasten to gutters not over 900 mm (36 inches) on center.
 - 3. Turn back edge up 25 mm (one inch) and lap front edge over gutter bead.
 - 4. Rivet and solder to gutter except rivet and seal to aluminum.
- F. Outlet Tubes:
 - 1. Form outlet tubes to connect gutters to conductors of same metal and thickness as gutters extend into the conductor 75 mm (3 inch). Flange upper end of outlet tube 13 mm (1/2 inch).
 - 2. Lock and solder longitudinal seam except use sealant in lieu of solder with aluminum.
 - 3. Solder tube to gutter. Seal aluminum tube to gutter and rivet to gutter.
 - 4. Fabricate basket strainers of same material as gutters.
- G. Gutter Brackets:
 - 1. Fabricate of same metal as gutter. Use the following:
 - a. 5 by 25 mm (3/16 by 1 inch) aluminum.
 - 2. Fabricate gutter profile.
 - 3. Gutter Profile: Style K in accordance with cited sheet metal standard.
 - 4. Drill two 5 mm (3/16 inch) diameter holes in anchor leg for countersunk flat head screws.

2.10 CONDUCTORS (DOWNSPOUTS)

- A. Fabricate conductors of same metal and thickness as gutters in sections approximately 3000 mm (10 feet) long with 19 mm (3/4 inch) wide flat locked seams.
 - 1. Fabricate open face channel shape with hemmed longitudinal edges.
- B. Fabricate elbows by mitering, riveting, and soldering except seal aluminum in lieu of solder. Lap upper section to the inside of the lower piece.

- C. Fabricate conductor brackets or hangers of same material as conductor, 2 mm (1/16 inch) thick by 25 mm (one inch) minimum width. Form to support conductors 25 mm (one inch) from wall surface in accordance with Architectural Sheet Metal Manual Plate 34, Design C for rectangular shapes and E for round shapes.
- D. Conductor Heads:
 - 1. Fabricate of same material as conductor.
 - 2. Fabricate conductor heads to not less than 250 mm (10 inch) wide by 200 mm (8 inch) deep by 200 mm (8 inches) from front to back.
 - 3. Form front and side edges channel shape not less than 13 mm (1/2 inch) wide flanges with edge hemmed.
 - 4. Slope bottom to sleeve to conductor or downspout at not less than 60 degree angle.
 - 5. Extend wall edge not less than 25 mm (one inch) above front edge.
 - 6. Solder joints for water tight assembly.
 - 7. Fabricate outlet tube or sleeve at bottom not less than 50 mm (2 inches) long to insert into conductor.

2.11 SPLASH BLOCKS

- A. Fabricate from precast concrete.
- B. Dimensions: 24(l) x 12(w) x 3 inches
- C. Locations: Where indicated on the drawings.

2.12 ENGINE EXHAUST PIPE OR FLUE OR STACK FLASHING

- A. Flashing at penetrations through roofing shall consist of a metal collar, sheet metal flashing sleeve and hood.
- B. Fabricate collar with roof flange of 1.2 mm (0.047 inch) minimum thick black iron or galvanized steel sheet.
 - 1. Fabricate inside diameter of collar 100 mm (4 inches) larger than the outside diameter of the item penetration the roofing.
 - 2. Extend collar height from structural roof deck to not less than 350 mm (14 inches) above roof surface.
 - 3. Fabricate collar roof flange not less than 100 mm (4 inches) wide.
 - 4. Option: Collar may be of steel tubing 3 mm (0.125 inch) minimum wall thickness, with not less than four, 50 mm x 100 mm x 3 mm (2 inch by 4 inch by 0.125 inch) thick tabs bottom edge evenly spaced around tube in lieu of continuous roof flange. Full butt weld joints of collar.
- C. Fabricate sleeve base flashing with roof flange of either copper, stainless steel, or copper clad stainless steel.

1. Fabricate sleeve roof flange not less than 100 mm (4 inches) wide.
 2. Extend sleeve around collar up to top of collar.
 3. Flange bottom of sleeve out not less than 13 mm (1/24 inch) and soldered to 100 mm (4 inch) wide flange to make watertight.
 4. Fabricate interior diameter 50 mm (2 inch) greater than collar.
- D. Fabricate hood counter flashing from same material and thickness as sleeve.
1. Fabricate the same as pipe counter flashing except allow not less than 100 mm (4 inch) lap below top of sleeve and to form vent space minimum of 100 mm (4 inch) wide.
 2. Hem bottom edge of hood 13 mm (1/2 inch).
 3. Provide a 50 mm (2 inch) deep drawband.
- E. Fabricate insect screen closure between sleeve and hood. Secure screen to sleeve with sheet metal screws.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
1. Install flashing and sheet metal items as shown in Sheet Metal and Air Conditioning Contractors National Association, Inc., publication, ARCHITECTURAL SHEET METAL MANUAL, except as otherwise shown or specified.
 2. Apply Sealant as specified in Section 07 92 00, JOINT SEALANTS.
 3. Apply sheet metal and other flashing material to surfaces which are smooth, sound, clean, dry and free from defects that might affect the application.
 4. Remove projections which would puncture the materials and fill holes and depressions with material compatible with the substrate. Cover holes or cracks in wood wider than 6 mm (1/4 inch) with sheet metal compatible with the roofing and flashing material used.
 5. Coordinate with masonry work for the application of a skim coat of mortar to surfaces of unit masonry to receive flashing material before the application of flashing.
 6. Apply a layer of 7 Kg (15 pound) saturated felt followed by a layer of rosin paper to wood surfaces to be covered with copper. Lap each ply 50 mm (2 inch) with the slope and nail with large headed copper nails.
 7. Confine direct nailing of sheet metal to strips 300 mm (12 inch) or less wide. Nail flashing along one edge only. Space nail not over 100 mm (4 inches) on center unless specified otherwise.

8. Install bolts, rivets, and screws where indicated, specified, or required in accordance with the SMACNA Sheet Metal Manual. Space rivets at 75 mm (3 inch) on centers in two rows in a staggered position. Use neoprene washers under fastener heads when fastener head is exposed.
9. Coordinate with roofing work for the installation of metal base flashings and other metal items having roof flanges for anchorage and watertight installation.
10. Nail continuous cleats on 75 mm (3 inch) on centers in two rows in a staggered position.
11. Nail individual cleats with two nails and bend end tab over nail heads. Lock other end of cleat into hemmed edge.
12. Install flashings in conjunction with other trades so that flashings are inserted in other materials and joined together to provide a water tight installation.
13. Where required to prevent galvanic action between dissimilar metal isolate the contact areas of dissimilar metal with sheet lead, waterproof building paper, or a coat of bituminous paint.
14. Isolate aluminum in contact with dissimilar metals others than stainless steel, white bronze or other metal compatible with aluminum by:
 - a. Paint dissimilar metal with a prime coat of zinc-chromate or other suitable primer, followed by two coats of aluminum paint.
 - b. Paint dissimilar metal with a coat of bituminous paint.
 - c. Apply an approved caulking material between aluminum and dissimilar metal.
15. Paint aluminum in contact with or built into mortar, concrete, plaster, or other masonry materials with a coat of bituminous paint.
16. Paint aluminum in contact with absorptive materials that may become repeatedly wet with two coats of bituminous paint or two coats of aluminum paint.

3.2 THROUGH-WALL FLASHING

A. General:

1. Install continuous through-wall flashing between top of concrete foundation walls and bottom of masonry building walls; at top of concrete floors; under masonry, concrete, or stone copings and elsewhere as shown.
2. Where exposed portions are used as a counter flashing, lap base flashings at least 100 mm (4 inches) and use thickness of metal as specified for exposed locations.

3. Exposed edge of flashing may be formed as a receiver for two-piece counter flashing as specified.
 4. Terminate exterior edge beyond face of wall approximately 6 mm (1/4 inch) with drip edge where not part of counter flashing.
 5. Turn back edge up 6 mm (1/4 inch) unless noted otherwise where flashing terminates in mortar joint or hollow masonry unit joint.
 6. Terminate interior raised edge in masonry backup unit approximately 38 mm (1 1/2 inch) into unit unless shown otherwise.
 7. Under copings terminate both edges beyond face of wall approximately 6 mm (1/4 inch) with drip edge.
 8. Lap end joints at least two corrugations, but not less than 100 mm (4 inches). Seal laps with sealant.
 9. Where dowels, reinforcing bars and fastening devices penetrate flashing, seal penetration with sealing compound. Sealing compound is specified in Section 07 92 00, JOINT SEALANTS.
 10. Coordinate with other work to set in a bed of mortar above and below flashing so that total thickness of the two layers of mortar and flashing are same as regular mortar joint.
 11. Where ends of flashing terminate turn ends up 25 mm (1 inch) and fold corners to form dam extending to wall face in vertical mortar or veneer joint.
 12. Turn flashing up not less than 200 mm (8 inch) between masonry or behind exterior veneer.
 13. When flashing terminates in reglet extend flashing full depth into reglet and secure with lead or plastic wedges spaced 150 mm (6 inch) on center.
 14. Continue flashing around columns:
 - a. Where flashing cannot be inserted in column reglet hold flashing vertical leg against column.
 - b. Counterflash top edge with 75 mm (3 inch) wide strip of saturated cotton unless shown otherwise. Secure cotton strip with roof cement to column. Lap base flashing with cotton strip 38 mm (1 1/2 inch).
- B. Flashing at Top of Concrete Foundation Walls Where concrete is exposed. Turn up not less than 200 mm (8 inch) high and into masonry backup mortar joint or reglet in concrete backup as specified.

- C. Flashing at Top of Concrete Floors (except where shelf angles occur): Place flashing in horizontal masonry joint not less than 200 mm (8 inch) below floor slab and extend into backup masonry joint at floor slab 38 mm (1 1/2 inch).
- D. Flashing at Veneer Walls:
1. Install near line of finish floors over shelf angles or where shown.
 2. Turn up against sheathing.
 3. At stud framing, hem top edge 19 mm (3/4 inch) and secure to each stud with stainless steel fasteners through sheathing.
 4. At concrete backing, extend flashing into reglet as specified.
 5. Coordinate with installation of waterproofing or asphalt felt for lap over top of flashing.
- E. Lintel Flashing when not part of shelf angle flashing:
1. Install flashing full length of lintel to nearest vertical joint in masonry over veneer.
 2. Turn ends up 25 mm (one inch) and fold corners to form dam and extend end to face of wall.
 3. Turn back edge up to top of lintel; terminate back edge as specified for back-up wall.
- F. Window Sill Flashing:
1. Install flashing to extend not less than 100 mm (4 inch) beyond ends of sill into vertical joint of masonry or veneer.
 2. Turn back edge up to terminate under window frame.
 3. Turn ends up 25 mm (one inch) and fold corners to form dam and extend to face of wall.
- G. Door Sill Flashing:
1. Install flashing under bottom of plate sills of doors over curbs opening onto roofs. Extend flashing out to form counter flashing or receiver for counter flashing over base flashing. Set in sealant.
 2. Extend sill flashing 200 mm (8 inch) beyond jamb opening. Turn ends up one inch in vertical masonry joint, extend end to face of wall. Join to counter flashing for water tight joint.
 3. Where doors thresholds cover over waterproof membranes install sill flashing over water proof membrane under thresholds. Extend beyond opening to cover exposed portion of waterproof membrane and not less than 150 mm (6 inch) beyond door jamb opening at ends. Turn up approximately 6 mm (1/4 inch) under threshold.

H. Flashing at Masonry, Stone, or Precast Concrete Copings:

1. Install flashing with drips on both wall faces unless shown otherwise.
2. Form penetration openings to fit tight against dowel or other item with edge turned up. Seal penetrations with sealant.

3.3 BASE FLASHING

- A. Install where roof membrane type base flashing is not used and where shown.
1. Install flashing at intersections of roofs with vertical surfaces or at penetrations through roofs, to provide watertight construction.
 2. Install metal flashings and accessories having flanges extending out on top of the built-up roofing before final bituminous coat and roof aggregate is applied.
 3. Set flanges in heavy trowel coat of roof cement and nail through flanges into wood nailers over bituminous roofing.
 4. Secure flange by nailing through roofing into wood blocking with nails spaced 75 mm (3 inch) on centers or, when flange over 100 mm (4 inch) wide terminate in a 13 mm (1/2 inch) folded edge anchored with cleats spaced 200 mm (8 inch) on center. Secure one end of cleat over nail heads. Lock other end into the seam.
- B. For long runs of base flashings install in lengths of not less than 2400 mm (8 feet) nor more than 3000 mm (ten feet). Install a 75 mm (3 inch) wide slip type, loose lock expansion joint filled with sealant in joints of base flashing sections over 2400 mm (8 feet) in length. Lock and solder corner joints at corners.
- C. Extend base flashing up under counter flashing of roof specialties and accessories or equipment not less than 75 mm (3 inch).

3.4 COUNTERFLASHING (CAP FLASHING OR HOODS)

- A. General:
1. Install counterflashing over and in conjunction with installation of base flashings, except as otherwise specified or shown.
 2. Install counterflashing to lap base flashings not less than 100 mm (4 inch).
 3. Install upper edge or top of counterflashing not less than 225 mm (9 inch) above top of the roofing.
 4. Lap joints not less than 100 mm (4 inch). Stagger joints with relation to metal base flashing joints.
 5. Use surface applied counterflashing on existing surfaces and new work where not possible to integrate into item.

6. When fastening to concrete or masonry, use screws driven in expansion shields set in concrete or masonry. Use screws to wood and sheet metal. Set fasteners in mortar joints of masonry work.

B. One Piece Counterflashing:

1. Where flashing is installed at new masonry, coordinate to ensure proper height, embed in mortar, and end lap.
2. Where flashing is installed in reglet in concrete insert upper edge into reglet. Hold flashing in place with lead wedges spaced not more than 200 mm (8 inch) apart. Fill joint with sealant.
3. Where flashing is surface mounted on flat surfaces.
 - a. When top edge is double folded anchor flat portion below sealant "V" joint with fasteners spaced not over 400 mm (16 inch) on center:
 - 1) Locate fasteners in masonry mortar joints.
 - 2) Use screws to sheet metal or wood.
 - b. Fill joint at top with sealant.
4. Where flashing or hood is mounted on pipe.
 - a. Secure with draw band tight against pipe.
 - b. Set hood and secure to pipe with a one by 25 mm x 3 mm (1 x 1/8 inch) bolt on stainless steel draw band type clamp, or a stainless worm gear type clamp.
 - c. Completely fill joint at top with sealant.

C. Two-Piece Counterflashing:

1. Where receiver is installed at new masonry coordinate to insure proper height, embed in mortar, and lap.
2. Surface applied type receiver:
 - a. Secure to face construction in accordance, with manufacturers instructions.
 - b. Completely fill space at the top edge of receiver with sealant.
3. Insert counter flashing in receiver in accordance with fabricator or manufacturer's instructions and to fit tight against base flashing.

- D. Where vented edge occur install so lower edge of counterflashing is against base flashing.

- E. When counter flashing is a component of other flashing install as shown.

3.5 ENGINE EXHAUST PIPE OR STACK FLASHING

- A. Set collar where shown and secure roof tabs or flange of collar to structural deck with 13 mm (1/2 inch) diameter bolts.

- B. Set flange of sleeve base flashing not less than 100 mm (4 inch) beyond collar on all sides as specified for base flashing.
- C. Install hood to above the top of the sleeve 50 mm (2 inch) and to extend from sleeve same distance as space between collar and sleeve beyond edge not sleeve:
 - 1. Install insect screen to fit between bottom edge of hood and side of sleeve.
 - 2. Set collar of hood in high temperature sealant and secure with one by 3 mm (1/8 inch) bolt on stainless steel draw band type, or stainless steel worm gear type clamp. Install sealant at top of head.

3.6 HANGING GUTTERS

- A. Hang gutters with high points equidistant from downspouts. Slope at not less than 1:200 (1/16 inch per foot).
- B. Lap joints, except for expansion joints, at least 25 mm (one inch) in the direction of flow. Rivet and seal or solder lapped joints.
- C. Support gutters in brackets spaced not more than 600 mm (24 inch) on centers, brackets attached to facial or wood nailer by at least two screws or nails.
 - 1. For copper or copper clad stainless steel gutters use brass or bronze brackets.
 - 2. For stainless steel gutters use stainless steel brackets.
 - 3. For aluminum gutters use aluminum brackets or stainless steel brackets.
 - 4. Use brass or stainless steel screws.
- D. Secure brackets to gutters in such a manner as to allow free movement of gutter due to expansion and contraction.
- E. Gutter Expansion Joint:
 - 1. Locate expansion joints midway between outlet tubes.
 - 2. Provide at least a 25 mm (one inch) expansion joint space between end baffles of gutters.
 - 3. Install a cover plate over the space at expansion joint.
 - 4. Fasten cover plates to gutter section on one side of expansion joint only.
 - 5. Secure loose end of cover plate to gutter section on other side of expansion joint by a loose-locked slip joint.
- F. Outlet Tubes: Set bracket strainers loosely into gutter outlet tubes.

3.7 CONDUCTORS (DOWNSPOUTS)

- A. Where scuppers discharge into downspouts install conductor head to receive discharge with back edge up behind drip edge of scupper. Fasten and seal joint. Sleeve conductors to gutter outlet tubes and fasten joint and joints between sections.
- B. Set conductors plumb and clear of wall, and anchor to wall with two anchor straps, located near top and bottom of each section of conductor. Strap at top shall be fixed to downspout, intermediate straps and strap at bottom shall be slotted to allow not less than 13 mm (1/2 inch) movement for each 3000 mm (10 feet) of downspout.
- C. Install elbows, offsets and shoes where shown and required. Slope not less than 45 degrees.

3.8 SPLASH BLOCKS

- A. Install concrete splash blocks (2"h x 12"w x 24"l) where downspout discharges at grade.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
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SECTION 07 72 53

SNOW GUARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Rail-type, seam-mounted snow guards.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Include roof plans showing layouts and attachment details of snow guards.
1. Include details of rail-type snow guards.
- C. Samples:
1. Rail-Type Snow Guards: Bracket and 12-inch- long rail.
 - a. For units with factory-applied finishes, submit specified color.
- D. Delegated-Design Submittal: For snow guards, include analysis reports signed and sealed by the qualified professional engineer responsible for their preparation.
1. Include calculation of number and location of snow guards.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer's experience with providing delegated design engineering services of the kind indicated, including documentation that the engineer is licensed in the jurisdiction in which the Project is located.
- B. Product Test Reports: For each type of snow guard, for tests performed by a qualified testing agency, indicating point of failure of attachment to roof system identical as that used on this Project.

1.4 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit adhesive-mounted snow guards to be installed according to adhesive manufacturer's written instructions.

1.5 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."
- B. Manufacturer's Warranty: Warrant snow guards against material and manufacturing defects.
1. Material Warranty Period: Twenty (20) years.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design snow guards, including attachment to building, based on the following:
1. Roof snow load.
 2. Snow drifting
 3. Roof slope.
 4. Roof type.
 5. Roof dimensions.
 6. Roofing substrate type and thickness.
 7. Snow guard type.
 8. Snow guard fastening method and strength.
 9. Snow guard spacing.
 10. Coefficient of Friction Between Snow and Roof Surface: 0.
 11. Factor of Safety: 3.
- B. Performance Requirements: Provide snow guards that withstand exposure to weather and resist thermally induced movement without failure, rattling, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- C. Structural Performance: Snow guards shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
1. Snow Loads: As indicated on Drawings.

2.2 RAIL-TYPE SNOW GUARDS

- A. Seam-Mounted, Rail-Type Snow Guards:
1. Description: Snow guard rails fabricated from metal pipes, bars, or extrusions, anchored to brackets and equipped with three rails.
 2. Finish: Fluoropolymer two-coat system.
 3. Color: As selected by Architect from manufacturer's full range to match roof.
 4. Seam clamps: ASTM B 221 aluminum extrusion or ASTM B 85/B 85M aluminum casting with stainless-steel set screws incorporating round nonpenetrating point; designed for use with applicable roofing system to which clamp is attached.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, snow guard attachment, and other conditions affecting performance of the Work.
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and prepare substrates for bonding snow guards.
- B. Prime substrates according to snow guard manufacturer's written instructions.

3.3 INSTALLATION

- A. Install snow guards according to manufacturer's written instructions.
 - 1. Space rows as indicated on Shop Drawings.
- B. Attachment for Standing-Seam Metal Roofing:
 - 1. Do not use fasteners that will penetrate metal roofing or fastening methods that void metal roofing finish warranty.
 - 2. Seam-Mounted, Rail-Type Snow Guards:
 - a. Install brackets to vertical ribs in straight rows.
 - b. Secure with stainless-steel set screws, incorporating round nonpenetrating point, on same side of standing seam.
 - c. Torque set screw according to manufacturer's instructions.
 - d. Install cross members to brackets.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 07 84 00

FIRESTOPPING

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. Provide UL or equivalent approved firestopping system for the closures of openings in walls, floors, and roof decks against penetration of flame, heat, and smoke or gases in fire resistant rated construction.
- B. Provide UL or equivalent approved firestopping system for the closure of openings in walls against penetration of gases or smoke in smoke partitions.

1.2 RELATED WORK:

- A. Sealants and application: Section 07 92 00, JOINT SEALANTS.
- B. Fire and smoke damper assemblies in ductwork: Section 23 31 00, HVAC DUCTS AND CASINGS Section 23 37 00, AIR OUTLETS AND INLETS.

1.3 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Installer qualifications.
- C. Inspector qualifications.
- D. Manufacturers literature, data, and installation instructions for types of firestopping and smoke stopping used.
- E. List of FM, UL, or WH classification number of systems installed.
- F. Certified laboratory test reports for ASTM E814 tests for systems not listed by FM, UL, or WH proposed for use.
- G. Submit certificates from manufacturer attesting that firestopping materials comply with the specified requirements.

1.4 DELIVERY AND STORAGE:

- A. Deliver materials in their original unopened containers with manufacturer's name and product identification.
- B. Store in a location providing protection from damage and exposure to the elements.

1.5 QUALITY ASSURANCE:

- A. FM, UL, or WH or other approved laboratory tested products will be acceptable.
- B. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991 or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements." Submit qualification data.

- C. **Inspector Qualifications:** Contractor to engage a qualified inspector to perform inspections and final reports. The inspector to meet the criteria contained in ASTM E699 for agencies involved in quality assurance and to have a minimum of two years' experience in construction field inspections of firestopping systems, products, and assemblies. The inspector to be completely independent of, and divested from, the Contractor, the installer, the manufacturer, and the supplier of material or item being inspected. Submit inspector qualifications.

1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. ASTM International (ASTM):
1. E84-14 Surface Burning Characteristics of Building Materials
 2. E699-09 Standard Practice for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating of Building Components
 3. E814-13a Fire Tests of Through-Penetration Fire Stops
 4. E2174-14 Standard Practice for On-Site Inspection of Installed Firestops
 5. E2393-10a Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers
- C. FM Global (FM):
1. Annual Issue Approval Guide Building Materials 4991-13 Approval of Firestop Contractors
- D. Underwriters Laboratories, Inc. (UL):
1. Annual Issue Building Materials Directory
 2. Annual Issue Fire Resistance Directory
 3. 723-10(2008) Standard for Test for Surface Burning Characteristics of Building Materials
 4. 1479-04(R2014) Fire Tests of Through-Penetration Firestops
- E. Intertek Testing Services - Warnock Hersey (ITS-WH):
1. Annual Issue Certification Listings
- F. Environmental Protection Agency (EPA):
1. 40 CFR 59(2014) National Volatile Organic Compound Emission Standards for Consumer and Commercial Products

PART 2 - PRODUCTS

2.1 FIRESTOP SYSTEMS:

- A. Provide either factory built (Firestop Devices) or field erected (through-Penetration Firestop Systems) to form a specific building system maintaining required integrity of the fire barrier and stop the passage of gases or smoke. Firestop systems to accommodate building movements without impairing their integrity.
- B. Through-penetration firestop systems and firestop devices tested in accordance with ASTM E814 or UL 1479 using the "F" or "T" rating to maintain the same rating and integrity as the fire barrier being sealed. "T" ratings are not required for penetrations smaller than or equal to 101 mm (4 in.) nominal pipe or 0.01 sq. m (16 sq. in.) in overall cross-sectional area.
- C. Firestop sealants used for firestopping or smoke sealing to have the following properties:
 1. Contain no flammable or toxic solvents.
 2. Release no dangerous or flammable out gassing during the drying or curing of products.
 3. Water-resistant after drying or curing and unaffected by high humidity, condensation or transient water exposure.
 4. When installed in exposed areas, capable of being sanded and finished with similar surface treatments as used on the surrounding wall or floor surface.
 5. VOC Content: Firestopping sealants and sealant primers to comply with the following limits for VOC content when calculated according to 40 CFR 59, (EPA Method 24):
 - a. Sealants: 250 g/L.
 - b. Sealant Primers for Nonporous Substrates: 250 g/L.
 - c. Sealant Primers for Porous Substrates: 775 g/L.
- D. Firestopping system or devices used for penetrations by glass pipe, plastic pipe or conduits, unenclosed cables, or other non-metallic materials to have following properties:
 1. Classified for use with the particular type of penetrating material used.
 2. Penetrations containing loose electrical cables, computer data cables, and communications cables protected using firestopping systems that allow unrestricted cable changes without damage to the seal.

- E. Maximum flame spread of 25 and smoke development of 50 when tested in accordance with ASTM E84 or UL 723. Material to be an approved firestopping material as listed in UL Fire Resistance Directory or by a nationally recognized testing laboratory.
- F. FM, UL, or WH rated or tested by an approved laboratory in accordance with ASTM E814.
- G. Materials to be nontoxic and noncarcinogen at all stages of application or during fire conditions and to not contain hazardous chemicals. Provide firestop material that is free from Ethylene Glycol, PCB, MEK, and asbestos.
- H. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 101 mm (4 in.) or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means acceptable to the firestop manufacturer.
 - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

2.2 SMOKE STOPPING IN SMOKE PARTITIONS:

- A. Provide silicone sealant in smoke partitions as specified in Section 07 92 00, JOINT SEALANTS.
- B. Provide mineral fiber filler and bond breaker behind sealant.
- C. Sealants to have a maximum flame spread of 25 and smoke developed of 50 when tested in accordance with ASTM E84.
- D. When used in exposed areas capable of being sanded and finished with similar surface treatments as used on the surrounding wall or floor surface.

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Submit product data and installation instructions, as required by article, submittals, after an on-site examination of areas to receive firestopping.
- B. Examine substrates and conditions with installer present for compliance with requirements for opening configuration, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

- A. Remove dirt, grease, oil, laitance and form-release agents from concrete, loose materials, or other substances that prevent adherence and bonding or application of the firestopping or smoke stopping materials.
- B. Remove insulation on insulated pipe for a distance of 150 mm (6 inches) on each side of the fire rated assembly prior to applying the firestopping materials unless the firestopping materials are tested and approved for use on insulated pipes.
- C. Prime substrates where required by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- D. Masking Tape: Apply masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing seal of firestopping with substrates.

3.3 INSTALLATION:

- A. Do not begin firestopping work until the specified material data and installation instructions of the proposed firestopping systems have been submitted and approved.
- B. Install firestopping systems with smoke stopping in accordance with FM, UL, WH, or other approved system details and installation instructions.
- C. Install smoke stopping seals in smoke partitions.

3.4 CLEAN-UP:

- A. As work on each floor is completed, remove materials, litter, and debris.
- B. Clean up spills of liquid type materials.
- C. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.

- D. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to provide firestopping complying with specified requirements.

3.5 INSPECTIONS AND ACCEPTANCE OF WORK:

- A. Do not conceal or enclose firestop assemblies until inspection is complete and approved by the Contracting Officer Representative (COR).
- B. Furnish service of approved inspector to inspect firestopping in accordance with ASTM E2393 and ASTM E2174 for firestop inspection, and document inspection results. Submit written reports indicating locations of and types of penetrations and type of firestopping used at each location; type is to be recorded by UL listed printed numbers.

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SECTION 07 84 43
JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
1. Joints in or between fire-resistance-rated constructions.
 2. Joints in smoke barriers.
- B. Related Requirements:
1. Section 07 84 00 "Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers.
 2. Section 09 22 16 "Non-Structural Metal Framing" for firestop tracks for metal-framed partition heads.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.
1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products subject to compliance with through penetration firestop systems (XHEZ) listed in Volume II of the UL Fire Resistance Directory as indicated in the schedule by Hilti, Inc. or comparable product by one of the following:
 - 1. A/D Fire Protection Systems Inc.
 - 2. Grace Construction Products.
 - 3. Tremco, Inc.; Tremco Fire Protection Systems Group

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.

2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."

2.3 JOINT FIRESTOPPING SYSTEMS

- A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.
 1. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
- C. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg.
 1. L-Rating: Not exceeding 5.0 cfm/ft. of joint at both ambient and elevated temperatures.
- D. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- E. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing fire-resistive joint systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install elastomeric fill materials for fire-resistive joint systems by proven techniques to produce the following results:
1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
 2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
 3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.
- B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.
- C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.7 JOINT FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN or Category XHDG.
- B. SCHEDULE

FIRE RESISTIVE JOINTS FIRESTOP SYSTEMS SCHEDULE			
JOINT TYPE	ASSEMBLY RATING	UL-CLASSIFIED SYSTEM	
		JOINT WIDTH LESS THAN OR EQUAL TO 2"	JOINT WIDTH GREATER THAN 2", LESS THAN OR EQUAL TO 6"
CONCRETE FLOOR-TO-FLOOR	1	FF-D-1012, FF-D-1013 ¹	FF-D-1012, FF-D-1013
	2	FF-D-1012, FF-D-1013 ¹	FF-D-1012, FF-D-1013
	3	FF-D-1011, FF-D-1026 ¹	FF-D-1011, FF-D-1026
	4	FF-D-1047	N/A**
EDGE OF CONCRETE FLOOR SLAB-TO-WALL	1	FW-D-1011, FW-D-1012, FW-D-1013, FW-D-1021 ¹	FW-D-1011, FW-D-1012, FW-D-1013, FW-D-1021
	2	FW-D-1011, FW-D-1012, FW-D-1013, FW-D-1021 ¹	FW-D-1011, FW-D-1012, FW-D-1013, FW-D-1021
	3	FW-D-1011, FW-D-1021 ¹	FW-D-1011, FW-D-1021
	4	FW-D-1047	N/A**
CONCRETE OR BLOCK WALL TO METAL DECK (TOP-OF-WALL)	1	HW-D-0286, HWD 1069	HW-D-1037
	2	HW-D-0286, HWD 1069, HW-D-0154, HW-D-0155	HW-D-1037
	3	N/A**	N/A**
	4	N/A**	N/A**
GYPSUM WALL TO CONCRETE OVER METAL DECK (BOTTOM-OF-WALL)	1		
	2	BW-S-0023, BW-S-0001, BW-S-0039	
	3		
GYPSUM WALL TO CONCRETE OVER METAL DECK (TOP- OF-WALL)	1	HW-D-0564, HW-D-0264, HW-D-0286	N/A**
	2	HW-D-0190, HW-D-0541, HW-D-0542	HW-D-1020
	3	HW-D-1011	N/A**
GYPSUM SHAFT WALL TO FLAT CONCRETE	2	HW-D-0342	N/A**

SLAB (TOP-OF- WALL)			
CONCRETE	1	WW-D-0017, WW-D-0032	WW-D-1011, WW-D-1012
WALL-TO-WALL	2	WW-D-0017, WW-D-0032	WW-D-1011, WW-D-1012
	3	WW-D-1011 ¹	WW-D-1011
	4	WW-D-1047	N/A**
GYPSUM	1	WW-D-0040	N/A**
WALL-TO-CONCRETE WALL	2	WW-S-0074b, WW-S-0075b,	N/A**
		WW-D-0040	

Notes:

1. Contact Hilti for current UL-classified system or engineer judgment drawing: 203.921.6603, or contact the manufacturer representative of the product selected to be installed on the jobsite
2. Classified systems for 2"-6" wide joints may be used for joints 2" wide and less.
3. Confirm that movement capabilities of the selected UL system meets or exceeds the specified movement range of the particular joint.
4. Systems marked with asterik (*) are suitable for top-of-wall joints where the fluted metal deck has spray-on monokote mk-6/hy fireproofing.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section covers interior and exterior sealant and their application, wherever required for complete installation of building materials or systems.

1.2 RELATED WORK (Including but not limited to the following):

- A. Sealing of Site Work Concrete Paving: Section 32 05 23, CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS.
- B. Masonry Control and Expansion Joint: Section 04 20 00, UNIT MASONRY.
- C. Firestopping Penetrations: Section 07 84 00, FIRESTOPPING.
- D. Glazing: Section 08 80 00, GLAZING.
- E. Glazed Aluminum Curtain Wall: Section 08 44 13, GLAZED ALUMINUM CURTAIN WALLS.
- F. Sound Rated Gypsum Partitions/Sound Sealants: Section 09 29 00, GYPSUM BOARD.
- G. Mechanical Work: Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

1.3 QUALITY ASSURANCE:

- A. Installer Qualifications: An experienced installer with a minimum of three (3) years' experience and who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance. Submit qualification.
- B. Source Limitations: Obtain each type of joint sealant through one (1) source from a single manufacturer.
- C. Product Testing: Obtain test results from a qualified testing agency based on testing current sealant formulations within a 12-month period.
 - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021.
 - 2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C920, and where applicable, to other standard test methods.

3. Test elastomeric joint sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C920 for adhesion and cohesion under cyclic movement, adhesion-in peel, and indentation hardness.
 4. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.
- D. Lab Tests: Submit samples of materials that will be in contact or affect joint sealants to joint sealant manufacturers for tests as follows:
1. Adhesion Testing: Before installing elastomeric sealants, test their adhesion to protect joint substrates according to the method in ASTM C794 to determine if primer or other specific joint preparation techniques are required.
 2. Compatibility Testing: Before installing elastomeric sealants, determine compatibility when in contact with glazing and gasket materials.
- E. Stain Testing: Perform testing per ASTM C1248 on interior and exterior sealants to determine if sealants or primers will stain adjacent surfaces. No sealant work is to start until results of these tests have been submitted to the Contracting Officer Representative (COR) and the COR has given written approval to proceed with the work.
- F. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
1. Locate test joints where indicated in construction documents or, if not indicated, as directed by COR.
 2. Conduct field tests for each application indicated below:
 - a. Each type of elastomeric sealant and joint substrate indicated.
 - b. Each type of non-elastomeric sealant and joint substrate indicated.
 3. Notify COR seven (7) days in advance of dates and times when test joints will be erected.
 4. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
- G. Mockups: Before installing joint sealants, apply elastomeric sealants as follows to verify selections and to demonstrate aesthetic effects and qualities of materials and execution:

1. Joints in mockups of assemblies that are indicated to receive elastomeric joint sealants.

1.4 CERTIFICATION:

- A. Contractor is to submit to the COR written certification that joints are of the proper size and design, that the materials supplied are compatible with adjacent materials and backing, that the materials will properly perform to provide permanent watertight, airtight or vapor tight seals (as applicable), and that materials supplied meet specified performance requirements.

1.5 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Installer qualifications.
- C. Contractor certification.
- D. Manufacturer's installation instructions for each product used.
- E. Cured samples of exposed sealants for each color.
- F. Manufacturer's Literature and Data:
 1. Primers
 2. Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- G. Manufacturer warranty.

1.6 PROJECT CONDITIONS:

- A. Environmental Limitations:
 1. Do not proceed with installation of joint sealants under following conditions:
 - a. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C (40 degrees F).
 - b. When joint substrates are wet.
- B. Joint-Width Conditions:
 1. Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- C. Joint-Substrate Conditions:
 1. Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.7 DELIVERY, HANDLING, AND STORAGE:

- A. Deliver materials in manufacturers' original unopened containers, with brand names, date of manufacture, shelf life, and material designation clearly marked thereon.
- B. Carefully handle and store to prevent inclusion of foreign materials.
- C. Do not subject to sustained temperatures exceeding 32 degrees C (90 degrees F) or less than 5 degrees C (40 degrees F).

1.8 DEFINITIONS:

- A. Definitions of terms in accordance with ASTM C717 and as specified.
- B. Backing Rod: A type of sealant backing.
- C. Bond Breakers: A type of sealant backing.
- D. Filler: A sealant backing used behind a back-up rod.

1.9 WARRANTY:

- A. Construction Warranty: Comply with FAR clause 52.246-21 "Warranty of Construction".
- B. Manufacturer Warranty: Manufacturer shall warranty their sealant for a minimum of five (5) years from the date of installation and final acceptance by the Government. Submit manufacturer warranty.

1.10 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. ASTM International (ASTM):
 - 1. C509-06 Elastomeric Cellular Preformed Gasket and Sealing Material
 - 2. C612-14 Mineral Fiber Block and Board Thermal Insulation
 - 3. C717-14a Standard Terminology of Building Seals and Sealants
 - 4. C734-06(R2012) Test Method for Low-Temperature Flexibility of Latex Sealants after Artificial Weathering
 - 5. C794-10 Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
 - 6. C919-12. Use of Sealants in Acoustical Applications.
 - 7. C920-14a Elastomeric Joint Sealants.
 - 8. C1021-08(R2014) Laboratories Engaged in Testing of Building Sealants
 - 9. C1193-13 Standard Guide for Use of Joint Sealants.
 - 10. C1248-08(R2012) Test Method for Staining of Porous Substrate by Joint Sealants

11. C1330-02(R2013) Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants
 12. C1521-13 Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints
 13. D217-10 Test Methods for Cone Penetration of Lubricating Grease
 14. D1056-14 Specification for Flexible Cellular Materials—Sponge or Expanded Rubber
 15. E84-09 Surface Burning Characteristics of Building Materials
- C. Sealant, Waterproofing and Restoration Institute (SWRI).
1. The Professionals' Guide
- D. Environmental Protection Agency (EPA):
1. 40 CFR 59(2014) National Volatile Organic Compound Emission Standards for Consumer and Commercial Products

PART 2 - PRODUCTS

2.1 SEALANTS:

- A. Exterior Sealants:
1. S-1 Vertical surfaces, provide non-staining ASTM C920, Type S or M, Grade NS, Class 25, Use NT.
 2. S-2 Horizontal surfaces, provide ASTM C920, Type S or M, Grade P, Class 25, Use T.
 3. Provide location(s) of exterior sealant as follows:
 - a. Joints formed where frames and subsills of windows, doors, louvers, and vents adjoin masonry, concrete, or metal frames. Provide sealant at exterior surfaces of exterior wall penetrations.
 - b. Metal to metal.
 - c. Masonry to masonry or stone.
 - d. Stone to stone.
 - e. Cast stone to cast stone.
 - f. Masonry expansion and control joints.
 - g. Wood to masonry.
 - h. Masonry joints where shelf angles occur.
 - i. Voids where items penetrate exterior walls.
 - j. Metal reglets, where flashing is inserted into masonry joints, and where flashing is penetrated by coping dowels.
- B. Floor Joint Sealant:
1. ASTM C920, Type S or M, Grade P, Class 25, Use T. S-3

2. S-4 Provide location(s) of floor joint sealant as follows.
 - a. Seats of metal thresholds exterior doors.
 - b. Control and expansion joints in floors, slabs, ceramic tile, and walkways.
- C. Interior Sealants:
1. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system are to comply with the following limits for VOC content when calculated according to 40 CFR 59, (EPA Method 24):
 - a. Architectural Sealants: 250 g/L.
 - b. Sealant Primers for Nonporous Substrates: 250 g/L.
 - c. Sealant Primers for Porous Substrates: 775 g/L.
 2. S-5 Vertical and Horizontal Surfaces: ASTM C920, Type S or M, Grade NS, Class 25, Use NT.
 3. S-6 Food Service: Use a Vinyl Acetate Homopolymer, or other low VOC, non-toxic sealant approved for use in food preparation areas.
 4. Provide location(s) of interior sealant as follows:
 - a. Typical narrow joint 6 mm, (1/4 inch) or less at walls and adjacent components.
 - b. Perimeter of doors, windows, access panels which adjoin concrete or masonry surfaces.
 - c. Interior surfaces of exterior wall penetrations.
 - d. Joints at masonry walls and columns, piers, concrete walls or exterior walls.
 - e. Perimeter of lead faced control windows and plaster or gypsum wallboard walls.
 - f. Exposed isolation joints at top of full height walls.
 - g. Joints between bathtubs and ceramic tile; joints between shower receptors and ceramic tile; joints formed where nonplanar tile surfaces meet.
 - h. Joints formed between tile floors and tile base cove; joints between tile and dissimilar materials; joints occurring where substrates change.
 - i. Behind escutcheon plates at valve pipe penetrations and showerheads in showers.
- D. Acoustical Sealant:

1. Conforming to ASTM C919; flame spread of 25 or less; and a smoke developed rating of 50 or less when tested in accordance with ASTM E84. Acoustical sealant have a consistency of 250 to 310 when tested in accordance with ASTM D217; remain flexible and adhesive after 500 hours of accelerated weathering as specified in ASTM C734; and be non-staining.
2. Provide location(s) of acoustical sealant as follows:
 - a. Exposed acoustical joint at sound rated partitions.
 - b. Concealed acoustic joints at sound rated partitions.
 - c. Joints where item pass-through sound rated partitions.

2.2 COLOR:

- A. Sealants used with exposed stone are to match color of mortar joints.
- B. Sealants used with unpainted concrete are to match color of adjacent concrete.
- C. Color of sealants for other locations to be light gray or aluminum, unless otherwise indicated in construction documents.

2.3 JOINT SEALANT BACKING:

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
 - B. Cylindrical Sealant Backings: ASTM C1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
 1. Type C: Closed-cell material with a surface skin.
 - C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D1056 or synthetic rubber (ASTM C509), nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 32 degrees C (minus 26 degrees F). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
 - D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.
- 2.4 WEEPS:

E. Weep/Vent Products: Provide the following unless otherwise indicated or approved.

1. Round Plastic Tubing: Medium-density polyethylene, 10 mm (3/8-inch) OD by thickness of stone or masonry veneer.

2.4 FILLER:

- A. Mineral fiberboard: ASTM C612, Class 1.
- B. Thickness same as joint width.
- C. Depth to fill void completely behind back-up rod.

2.5 PRIMER:

- A. As recommended by manufacturer of caulking or sealant material.
- B. Stain free type.

2.6 CLEANERS-NON POROUS SURFACES:

- A. Chemical cleaners compatible with sealant and acceptable to manufacturer of sealants and sealant backing material. Cleaners to be free of oily residues and other substances capable of staining or harming joint substrates and adjacent non-porous surfaces and formulated to promote adhesion of sealant and substrates.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Inspect substrate surface for bond breaker contamination and unsound materials at adherent faces of sealant.
- B. Coordinate for repair and resolution of unsound substrate materials.
- C. Inspect for uniform joint widths and that dimensions are within tolerance established by sealant manufacturer.

3.2 PREPARATIONS:

- A. Prepare joints in accordance with manufacturer's instructions and SWRI (The Professionals' Guide).
- B. Clean surfaces of joint to receive caulking or sealants leaving joint dry to the touch, free from frost, moisture, grease, oil, wax, lacquer paint, or other foreign matter that would tend to destroy or impair adhesion.
 1. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants.

2. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include but are not limited to the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous surfaces include but are not limited to the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- C. Do not cut or damage joint edges.
- D. Apply non-staining masking tape to face surfaces adjacent to joints before applying primers, caulking, or sealing compounds.
1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- E. Apply primer to sides of joints wherever required by compound manufacturer's printed instructions or as indicated by pre-construction joint sealant substrate test.
1. Apply primer prior to installation of back-up rod or bond breaker tape.
 2. Use brush or other approved means that will reach all parts of joints. Avoid application to or spillage onto adjacent substrate surfaces.

3.3 BACKING INSTALLATION:

- A. Install backing material, to form joints enclosed on three sides as required for specified depth of sealant.
- B. Where deep joints occur, install filler to fill space behind the backing rod and position the rod at proper depth.
- C. Cut fillers installed by others to proper depth for installation of backing rod and sealants.

- D. Install backing rod, without puncturing the material, to a uniform depth, within plus or minus 3 mm (1/8 inch) for sealant depths specified.
- E. Where space for backing rod does not exist, install bond breaker tape strip at bottom (or back) of joint so sealant bonds only to two opposing surfaces.

3.4 SEALANT DEPTHS AND GEOMETRY:

- A. At widths up to 6 mm (1/4 inch), sealant depth equal to width.
- B. At widths over 6 mm (1/4 inch), sealant depth 1/2 of width up to 13 mm (1/2 inch) maximum depth at center of joint with sealant thickness at center of joint approximately 1/2 of depth at adhesion surface.

3.5 INSTALLATION:

- A. General:
 - 1. Apply sealants and caulking only when ambient temperature is between 5 degrees C and 38 degrees C (40 degrees and 100 degrees F).
 - 2. Do not install polysulfide base sealants where sealant may be exposed to fumes from bituminous materials, or where water vapor in continuous contact with cementitious materials may be present.
 - 3. Do not install sealant type listed by manufacture as not suitable for use in locations specified.
 - 4. Apply caulking and sealing compound in accordance with manufacturer's printed instructions.
 - 5. Avoid dropping or smearing compound on adjacent surfaces.
 - 6. Fill joints solidly with compound and finish compound smooth.
 - 7. Tool exposed joints to form smooth and uniform beds, with slightly concave surface conforming to joint configuration per Figure 5A in ASTM C1193 unless shown or specified otherwise in construction documents. Remove masking tape immediately after tooling of sealant and before sealant face starts to "skin" over. Remove any excess sealant from adjacent surfaces of joint, leaving the working in a clean finished condition.
 - 8. Finish paving or floor joints flush unless joint is otherwise detailed.
 - 9. Apply compounds with nozzle size to fit joint width.
 - 10. Test sealants for compatibility with each other and substrate. Use only compatible sealant. Submit test reports.
 - 11. Replace sealant which is damaged during construction process.

- B. Weeps: Place weep holes and vents in joints where moisture may accumulate, including at base of cavity walls, above shelf angles, at all flashing, and as indicated on construction documents.
1. Use round plastic tubing to form weep holes.
 2. Space weep holes formed from plastic tubing not more than 406 mm (16 inches) o.c.
 3. Trim tubing material used in weep holes flush with exterior wall face after sealant has set.
- C. For application of sealants, follow requirements of ASTM C1193 unless specified otherwise. Take all necessary steps to prevent three-sided adhesion of sealants.
- D. Interior Sealants: Where gypsum board partitions are of sound rated, fire rated, or smoke barrier construction, follow requirements of ASTM C919 only to seal all cut-outs and intersections with the adjoining construction unless specified otherwise.
1. Apply a 6 mm (1/4 inch) minimum bead of sealant each side of runners (tracks), including those used at partition intersections with dissimilar wall construction.
 2. Coordinate with application of gypsum board to install sealant immediately prior to application of gypsum board.
 3. Partition intersections: Seal edges of face layer of gypsum board abutting intersecting partitions, before taping and finishing or application of veneer plaster-joint reinforcing.
 4. Openings: Apply a 6 mm (1/4 inch) bead of sealant around all cutouts to seal openings of electrical boxes, ducts, pipes and similar penetrations. To seal electrical boxes, seal sides and backs.
 5. Control Joints: Before control joints are installed, apply sealant in back of control joint to reduce flanking path for sound through control joint.

3.6 FIELD QUALITY CONTROL:

- A. Field-Adhesion Testing: Field-test joint-sealant adhesion to joint substrates according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
1. Extent of Testing: Test completed elastomeric sealant joints as follows:
 - a. Perform 10 tests for first 305 m (1000 feet) of joint length for each type of elastomeric sealant and joint substrate.

- b. Perform one test for each 305 m (1000 feet) of joint length thereafter or one test per each floor per elevation.
 - B. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field adhesion test log.
 - C. Inspect tested joints and report on following:
 - 1. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.
 - 2. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 - 3. Whether sealants filled joint cavities and are free from voids.
 - 4. Whether sealant dimensions and configurations comply with specified requirements.
 - D. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
 - E. Repair sealants pulled from test area by applying new sealants following same procedures used to originally seal joints. Ensure that original sealant surfaces are clean and new sealant contacts original sealant.
 - F.** Evaluation of Field-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements, will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.
- 3.7 CLEANING:**
- A. Fresh compound accidentally smeared on adjoining surfaces: Scrape off immediately and rub clean with a solvent as recommended by manufacturer of the adjacent material or if not otherwise indicated by the caulking or sealant manufacturer.
 - B. Leave adjacent surfaces in a clean and unstained condition.

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SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hollow metal doors hung in hollow metal frames at exterior locations.
2. Hollow metal door frames for impact resistant wood doors at interior locations.
3. Glazed openings in hollow metal doors.

1.2 RELATED REQUIREMENTS

- A. Door Hardware: Section 08 71 00, DOOR HARDWARE.
- B. Glazing: Section 08 80 00, GLAZING.
- C. Card Readers and Biometric Devices: Section 28 13 00, PHYSICAL ACCESS CONTROL SYSTEM.
- D. Security Monitors: Section 28 23 00, VIDEO SURVEILLANCE.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to the extent specified in this section.
- B. American National Standard Institute (ANSI):
 1. A250.8-2014 - Standard Steel Doors and Frames.
- C. ASTM International (ASTM):
 1. A240/A240M-15b - Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 2. A653/A653M-15 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip.
 3. A1008/A1008M-15 - Steel, Sheet, Cold-Rolled, Carbon, Structural, High Strength Low Alloy and High Strength Low Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
 4. B209-14 - Aluminum and Aluminum-Alloy Sheet and Plate.
 5. B209M-14 - Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
 6. B221-14 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 7. B221M-13 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
 8. D3656/D3656M-13 - Insect Screening and Louver Cloth Woven from Vinyl Coated Glass Yarns.

- 9. E90-09 - Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- D. Federal Specifications (Fed. Spec.):
 - 1. L-S-125B - Screening, Insect, Nonmetallic.
- E. Master Painters Institute (MPI):
 - 1. 18 - Primer, Zinc Rich, Organic.
- F. National Association of Architectural Metal Manufacturers (NAAMM):
 - 1. AMP 500-06 - Metal Finishes Manual.
- G. National Fire Protection Association (NFPA):
 - 1. 80-16 - Fire Doors and Other Opening Protectives.
- H. UL LLC (UL):
 - 1. 10C-09 - Positive Pressure Fire Tests of Door Assemblies.
 - 2. 1784-15 - Air Leakage Tests of Door Assemblies and Other Opening Protectives.

1.4 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings:
 - 1. Show size, configuration, and fabrication and installation details.
- C. Manufacturer's Literature and Data:
 - 1. Description of each product.
 - 2. Include schedule showing each door and frame requirements fire label and smoke control label for openings.
 - 3. Installation instructions.
- D. Sustainable Construction Submittals:
 - 1. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.
- E. Qualifications: Substantiate qualifications comply with specifications.
 - 1. Manufacturer with project experience list.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Regularly manufactures specified products.
 - 2. Manufactured specified products with satisfactory service on five similar installations for minimum five years.
 - a. Project Experience List: Provide contact names and addresses for completed projects.

1.6 DELIVERY

- A. Fasten temporary steel spreaders across the bottom of each door frame before shipment.
- B. Deliver products in manufacturer's original sealed packaging.
- C. Mark packaging, legibly. Indicate manufacturer's name or brand, type, production run number, and manufacture date.
- D. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.7 STORAGE AND HANDLING

- A. Store products indoors in dry, weathertight facility.
- B. Protect products from damage during handling and construction operations.

1.8 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

- A. Design hollow metal doors and frames complying with specified performance:
 - 1. Fire Doors and Frames: UL 10C; NFPA 80 labeled.
 - a. Fire Ratings: See drawings.
 - 2. Smoke Control Doors and Frames: UL 1784; NFPA 80 labeled, maximum 0.15424 cu. m/s/sq. m (3.0 cfm/sf) at 24.9 Pa (0.10 inches water gage) pressure differential.
 - 3. Thermal Transmittance: 0.37 U-value, maximum at exterior doors.

2.2 MATERIALS

- A. Sheet Steel: ASTM A1008/A1008M, cold-rolled.
- B. Galvanized Sheet Steel: ASTM A653.

2.3 PRODUCTS - GENERAL

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Provide hollow metal doors and frames from one manufacturer.

2.4 HOLLOW METAL DOORS

- A. Hollow Metal Doors: ANSI A250.8; 44 mm (1-3/4 inches) thick. See drawings for sizes and designs.
 - 1. Exterior Doors: Level 3 and Physical Performance Level A, extra-heavy duty; Model 2, seamless.
- B. Door Faces:
 - 1. Exterior Doors: Galvanized sheet steel minimum ZF180 coating.
- C. Door Cores:

1. Exterior Doors: Polystyrene or polyurethane.

2.5 HOLLOW METAL FRAMES

- A. Hollow Metal Frames: ANSI A250.8; face welded. See drawings for sizes and designs.
 1. Interior Frames:
 - a. Level 2 Hollow Metal Frames: 1.3 mm (0.053 inch) thick.
- B. Frame Materials:
 1. Interior Frames: Sheet steel.
 2. Exterior Frames: Galvanized sheet steel minimum ZF180 coating.

2.6 FABRICATION

- A. Hardware Preparation: ANSI A250.8; for hardware specified in Section 08 71 00, DOOR HARDWARE.
- B. Hollow Metal Door Fabrication:
 1. Close top edge of exterior doors flush and seal to prevent water intrusion.
 2. Fill spaces between vertical steel stiffeners with insulation.
- C. Fire and Smoke Control Doors:
 1. Close top and vertical edges flush.
 2. Apply steel astragal to active leaf at pair and double egress doors.
 - a. Exception: Where vertical rod exit devices are specified for both leaves swinging in same direction.
 - b. Fire and Smoke Control Door Clearances: NFPA 80.
- D. Hollow Metal Frame Fabrication:
 1. Concealed Closers in Head Frame: Provide 1 mm (0.042 inch) thick steel removable stop sections for access to concealed face plates and control valves, except when cover plates are furnished with closer.
 2. Terminated Stops: ANSI A250.8.
 3. Frame Anchors:
 - a. Floor anchors:
 - 1) Provide extension type floor anchors to compensate for depth of floor fills.
 - 2) Provide 1.3 mm (0.053 inch) thick steel clip angles welded to jamb and drilled to receive floor fasteners.
 - 3) Provide 50 mm by 50 mm by 9 mm (2 inch by 2 inch by 3/8 inch) clip angle for lead lined frames, drilled for floor fasteners.

- 4) Provide mullion 2.3 mm (0.093 inch) thick steel channel anchors, drilled for two floor fasteners and frame anchor screws.
- 5) Provide continuous 1 mm (0.042 inch) thick steel rough bucks drilled for floor fasteners and frame anchor screws for sill sections.
 - a) Space floor bolts 50 mm (2 inches) on center.
- b. Jamb anchors:
 - 1) Place anchors on jambs:
 - a) Near top and bottom of each frame.
 - b) At intermediate points at maximum 600 mm (24 inches) spacing.
 - 2) Form jamb anchors from steel minimum 1 mm (0.042 inch) thick.
 - 3) Anchors for stud partitions: Provide tabs for securing anchor to sides of studs. Provide one of the following:
 - a) Welded type.
 - b) Lock-in snap-in type.
 - 4) Modify frame anchors to fit special frame and wall construction.
 - 5) Provide special anchors where shown on drawings and where required to suit application.

2.7 FINISHES

- A. Steel and Galvanized Steel: ANSI A250.8; shop primed.
- B. Finish exposed surfaces after fabrication.

2.8 ACCESSORIES

- A. Primers: ANSI A250.8.
- B. Barrier Coating: ASTM D1187/D1187M.
- C. Welding Materials: AWS D1.1/D1.1M, type to suit application.
- D. Clips Connecting Members and Sleeves: Match door faces.
- E. Fasteners: stainless steel.
 1. Metal Framing: Steel drill screws.
- F. Anchors: stainless steel.
- G. Galvanizing Repair Paint: MPI No. 18.
- H. Insulation: Unfaced mineral wool.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.

- C. Apply barrier coating to metal surfaces in contact with cementitious materials to minimum 0.7 mm (30 mils) dry film thickness.

3.2 INSTALLATION - GENERAL

- A. Install products according to manufacturer's instructions.
 - 1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.
 - 2. Install fire doors and frames according to NFPA 80.
 - 3. Install smoke control doors and frames according to NFPA 105.

3.3 FRAME INSTALLATION

- A. Apply barrier coating to concealed surfaces of frames built into masonry.
- B. Plumb, align, and brace frames until permanent anchors are set.
 - 1. Use triangular bracing near each corner on both sides of frames with temporary wood spreaders at midpoint.
 - 2. Use wood spreaders at bottom of frame when shipping spreader is removed.
 - 3. Where construction permits concealment, leave shipping spreaders in place after installation, otherwise remove spreaders when frames are set and anchored.
 - 4. Remove wood spreaders and braces when walls are built and jamb anchors are secured.
- C. Floor Anchors:
 - 1. Anchor frame jambs to floor with two expansion bolts.
 - a. Use 6 mm (1/4 inch) diameter bolts.
 - 2. Power actuated drive pins are acceptable to secure frame anchors to concrete floors.
- D. Jamb Anchors:
 - 1. Metal Framed Walls: Secure anchors to sides of studs with two fasteners through anchor tabs.
 - 2. Prepared Masonry and Concrete Openings:
 - a. Direct Securement: 6 mm (1/4 inch) diameter expansion bolts through spacers.
 - b. Subframe or Rough Buck Securement:
 - 1) 6 mm (1/4 inch) diameter expansion bolts on 600 mm (24 inch) centers.
 - 2) Power activated drive pins on 600 mm (24 inches) centers.

- c. Secure two-piece frames to subframe or rough buck with machine screws on both faces.

E. Touch up damaged factory finishes.

- 1. Repair galvanized surfaces with galvanized repair paint.
- 2. Repair painted surfaces with touch up primer.

3.4 DOOR INSTALLATION

A. Install doors plumb and level.

B. Adjust doors for smooth operation.

C. Touch up damaged factory finishes.

- 1. Repair galvanized surfaces with galvanized repair paint.
- 2. Repair painted surfaces with touch up primer.

3.5 CLEANING

A. Clean exposed door and frame surfaces. Remove contaminants and stains.

3.6 PROTECTION

A. Protect doors and frames from traffic and construction operations.

B. Remove protective materials immediately before acceptance.

C. Repair damage.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 08 14 23
IMPACT RESISTANT WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes impact resistant wood doors at interior locations.

1.2 RELATED REQUIREMENTS

A. Door Frames: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES.

B. Door Hardware: Section 08 71 00, DOOR HARDWARE.

C. Glazing: Section 08 80 00, GLAZING.

D. Basis of Design, color and style of door: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 REFERENCE STANDARDS

A. ASTM E152 Methods of Fire Tests and Door Assemblies

B. NFPA 252 Standard methods of fire tests of door assemblies, National Fire Protection Association

C. UL-10C Positive Pressure fire tests of door assemblies, Underwriters Laboratories, Inc.

D. NFPA 80 Fire Doors and Windows

E. NFPA 101 Life Safety Code, National Fire Protection Association

F. MBDC C2C, McDonough Braungart Design Chemistry Cradle to Cradle

G. CARB Emission Standards Section 93120.2 (a), California Air Resources Board

H. Quality Test Standards:

1. WDMA Industry Standard I.S.1A-04

a. WDMA TM-7 Test method to determine the physical endurance of wood doors & associated hardware connections under accelerated operating conditions, Window and Door Manufacturers Association

b. WDMA TM-8 Test methods to determine hinge loading resistance of wood door stiles, Window and Door Manufacturers Association

c. WDMA TM-10 - Test method to determine the screw holding capacity of wood door stiles, Window and Door Manufacturers Association

2. ANSI/BHMA A156.115-W-2006 American National Standard for Hardware Preparation in Wood Doors with Wood or Steel Frames

3. FSC Forest Stewardship Council

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

- B. Product Data: For each type of door, submit manufacturer's data sheets including details of core, panel design and edge construction.
- C. Shop Drawings: Submit complete schedule indicating location, size, hardware sets, swing of each door; elevation of each type of door, details for panels, and construction details not covered in product data and other pertinent information. Indicate dimensions and locations of mortises and holes for hardware, fire ratings, and location of cutouts for glass.
- D. Samples for verification of edge wrapping and edge replaceability. Banded edges will not be approved.
- E. Certification: Submit certification that doors and frames comply with UL10c, Positive Pressure Fire Door Test Method.
- F. Manufacturer's lifetime warranty.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain high impact resistant doors through one source from a single manufacturer.
- B. Quality Standard: Comply with WDMA Industry Standard (I.S. 1A-04 Architectural Wood Flush Doors□).
 - 1. Doors shall meet performance attributes for the following performance duty level: Extra Heavy Duty.
 - 2. Tolerances for warp, telegraphing, squareness and prefitting dimensions as per the latest edition of WDMA I.S.1A-04.
- C. Fire-rated Wood Doors: Doors complying with NFPA80 that are listed and labeled by a fire testing and inspecting agency acceptable to authorities having jurisdiction, for fire-ratings indicated, based on testing according to UBC Standard 7-2, UL10C, Positive pressure and NFPA 252.
- D. Doors or trial doors of the type specified herein should be installed in an existing facility for over 6 months to verify quality and durability performance of product.

1.6 DELIVERY, STORAGE, HANDLING AND SITE CONDITIONS

- A. Deliver, store, protect and handle products under guidelines of WDMA and manufacturer's care and handling instructions.
- B. Package doors individually using foam interleaf and stack on pallet, not exceeding 15 doors per pallet.
- C. Mark each door with opening number used on shop drawings.
- D. Accept doors on site in manufacturer's standard packaging. Inspect for damage.

- E. Do not store doors in damp or wet areas. HVAC systems should be operating and balanced prior to arrival of doors. Acceptable humidity shall be no less than 25% or greater than 55%.
- F. Do not subject doors to extreme conditions or changes in heat, dryness or humidity in accordance with the latest edition of WDMA I.S.1A-04.
- G. Protect doors from exposure to natural and artificial light after delivery.
- H. Doors should be lifted and carried when being moved, not dragged across one another.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver store, or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. HVAC systems should be operating and balanced prior to arrival of doors. Acceptable humidity shall be no less than 25% or greater than 55%. Note: Any claim for warp, bow, twist, or telegraphing may be denied if required humidity requirements are not maintained.

1.8 WARRANTY

- A. Doors are subject to terms of Article titled "Warranty of Construction", FAR clause 52.246-21, except that warranty shall be as follows:
 - 1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors deemed defective in materials or workmanship.
 - a. Solid-Core Interior Doors: provide manufacturer's limited lifetime written warranty guarantee against warp, delamination and defects in materials and workmanship.
 - b. Door Edge Warranty: provide manufacturer's lifetime written warranty that states that if an edge cover is ever damaged, the manufacturer shall supply a replacement cover at no cost to the Owner.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Basis of Design: Section 090600, SCHEDULE FOR FINISHES.

2.2 MATERIALS

- A. Door Construction
 - 1. Non-rated and 20 minute-rated Acrovyn Panel Doors conforming to WDMA I.S.1A-04 and the following:

- a. Thickness: 1-3/4 inch (+/- 1/16 inch)
 - b. Core: SCL. Solid, interior stiles and rails bonded. Tops and bottoms factory sealed with an approved sealer to prevent moisture intrusion.
 - c. Crossbanding: FSC certified
 - d. Replaceable door stiles: 3/4-inch replaceable stiles shall be field replaceable if ever damaged by impact.
 - e. Replaceable edges: Field-replaceable, wrapped and rounded Acrovyn or stainless steel, exclusive of fasteners to improve appearance.
 - f. Panels recessed into face of door to a depth of 5/16"
 - g. WDMA I.S.1A-04 Performance Duty Level: Extra Heavy Duty
 - h. Durability Performance: Cycle Slam WDMA TM-7, 1990 Extra Heavy Duty - 2,000,000 cycles to insure durability of entire door construction.
 - 1) Subject to the terms and conditions of our Limited Warranty for the lifetime of the doors, the manufacturer shall supply replacement Acrovyn edge covers AT NO COST to the Owner.
2. 45 and 60-minute rated Acrovyn Panel Doors conforming to WDMA I.A. 1-A and the following:
- a. Thickness: 1-3/4 inch (+/- 1/16 inch)
 - b. Cores: Solid. Interior stiles and rails bonded. Mineral/SCL hybrid, 25-32 lb/ft³ density- no added urea formaldehyde content. Tops and bottoms factory sealed with an approved sealer to prevent moisture intrusion.
 - c. Crossbanding: FSC certified
 - d. Replaceable door stiles: 3/4-inch replaceable stiles shall be field replaceable if ever damaged by impact.
 - e. Replaceable door edges: Fully wrapped and rounded Acrovyn or stainless steel door edges shall be field replaceable if ever damaged by impact, exclusive of fasteners to improve appearance.
 - 1) Subject to the terms and conditions of our Limited Warranty for the lifetime of the doors, the manufacturer shall supply replacement Acrovyn edge covers AT NO COST to the Owner
 - f. WDMA I.S.1A-04 Performance Duty Level: Extra Heavy Duty
 - g. Durability Performance: Cycle Slam WDMA TM-7, 1990 - 1,000,000 cycles to insure durability of entire door construction
- B. Panel Design: Refer to Section 09 06 00, SCHEDULE FOR FINISHES.
- C. Panel Orientation: both interior and exterior door faces.

D. Door Color (Face)

1. Refer to Section 09 06 00, SCHEDULE FOR FINISHES.
2. Base color must be integral throughout to eliminate discoloration caused by scratching.
3. Face Veneer Wear Index - Abrasion Resistance Testing - ASTM D4060-90: 28,000 cycles to prove out resistant to scuffing and scratching.
4. Face Veneer Impact Resistance - ASTM D-4226: 86 in/lb. to confirm impact resistance of face finish.

E. Door stiles to meet or exceed the following performance testing to ensure hardware fastener holding strength:

1. WDMA TM-8 "Hinge Loading Resistance" Extra Heavy Duty
2. WDMA TM-10 Screw Holding Capacity" Extra Heavy Duty

F. Door Color (Edge):

1. Same as door faces
2. Edges must fully wrap the door's vertical stiles to eliminate banded edges thus improving durability and impact resistance.
3. Door edges shall be exclusive of fasteners to improve appearance.
4. Edges must be flush with face of door thus eliminating raised edges that could be torn off.
5. Edges to include 1/4-inch radius edges to improve impact deflection. Square or banded edges shall not be permitted.
6. Edges to be provided as part of the construction of the door from single source manufacturer.

G. Adhesives

1. Crossbanding to core adhesives shall be urea formaldehyde free Type II to improve structural integrity of door.
2. Door faces are to be applied to the crossbanded core using Type I urea formaldehyde free adhesives to eliminate delamination.

H. Cores

1. Non-rated and 20 Minute-Rated doors
 - a. SCL, 38 lb/ft³ density - no added urea formaldehyde content and 70% Forestry Stewardship Council (FSC)
2. 45-min and 60-min Fire-Rated doors

- a. Solid Interior stiles and rails bonded. Non-combustible mineral composite, 25-32 lb/ft³ density, no added urea formaldehyde content. Tops and bottoms factory sealed with an approved sealer to prevent moisture intrusion.

2.3 FABRICATION, GENERAL

- A. Doors shall be pre-fit and beveled at the factory to fit the openings to reduce handling and onsite labor costs. Pre-fit tolerances shall be in accordance with the requirements of WDMA I.S.1A-04, latest edition.
- B. Coordinate measurements of hardware mortises in metal frames. Contractor or door distributor to verify dimensions and alignment before factory machining.
- C. Factory machine doors for hardware that is not surface applied. Comply with final hardware schedules, door frame shop drawings, and hardware templates.
- D. Light openings must be cut by the manufacturer or by a certified machining distributor.
- E. To ensure proper fit of the doors bevel on both strike and hinge edges to be 1/16 inch in 2 inches.
- F. Blocking: provide blocking approved for use in doors of fire ratings indicated as needed to eliminate through-bolting for surface applied hardware.

2.4 ACCESSORIES

- A. Glazing Stops: Acrovyn Vision Panels
- B. Glass: Refer to Section 08 80 00 for glass types.

PART 3 - INSTALLATION

3.1 EXAMINATION

- A. Inspect all doors prior to hanging. Repair noticeable marks or defects that may have occurred from improper storage or handling. Field repairs and touchups are the responsibility of the installing contractor upon completion of the initial installation. Field touchup shall include repair of job inflicted mars and final cleaning of finished doors.
- B. Examine door frames and verify that they comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
- C. Adjust frames to plumb condition before door installation. Tolerances for warp, squareness and pre-fitting dimensions shall be as per latest edition of WDMA I.S.1A-04.

- D. Do not install doors in frame openings that are not plumb or are out of tolerance for size or alignment.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Handle doors in accordance with recommendations of WDMA I.S.1A-04 "Care and Installation at Job Site".
- B. Condition doors to average temperature and humidity in area of installation for not less than 48 hours prior to installation.
- C. Install doors to comply with manufacturer's written instructions, referenced quality standard and as indicated.
- D. Factory fitted doors: Align in frames for uniform clearance at each edge.
- E. Set doors plumb, level, square and true.
- F. In the field trimming:
 - 1. Trim door height by cutting door bottom edges to a maximum of $\frac{3}{4}$ inch per NFPA 80.
 - 2. Trimming of fire rated doors in width can only be done by the manufacturer or a certified machining distributor under special guidance of the manufacturer.
- G. Drill pilot holes for screws and bolts using templates provided by hardware manufacturer.
- H. Exercise caution when drilling pilot holes and installing hinges so that pilot holes are not over drilled and screws are not over tensioned. Follow manufacturer's installation instructions.
- I. Reseal exposed tops and bottom rails of any doors that required site alteration with an approved wood sealer.
- J. Hardware installation: See Division 8 Section Door Hardware.
- K. Clean prefinished doors as recommended in writing by the manufacturer.

3.3 ADJUSTING

- A. Operating: Re-hang or replace doors that do not swing or operate freely.
- B. Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 08 14 33
ALUMINUM-CLAD WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. This section specifies aluminum-clad hinged wood-framed glass doors.

1.2 RELATED WORK:

A. Lock Cylinders for Cylindrical Locks: Section 087100, DOOR HARDWARE.

B. Door Hardware: Section 08 71 00, DOOR HARDWARE.

C. Power-assisted door hardware: Section 08 71 13.11, **LOW ENERGY POWER ASSIST DOOR OPERATORS.**

D. Field Painting of Factory Primed Doors: Section 09 91 00, PAINTING.

E. Electrical Installation:

1. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

2. Section 27 05 11, REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS.

F. Section 28 05 00, COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to the extent specified in this section.

B. American Architectural Manufacturers Association (AAMA):

1. AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Doors.

2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

3. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

C. American Society for Testing and Materials (ASTM):

1. ASTM B 117 - Operating Salt Spray (Fog) Apparatus.

2. ASTM C 1036 - Flat Glass.

3. ASTM C 1048 - Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.

4. ASTM D 1149 - Rubber Deterioration - Surface Ozone Cracking in a Chamber.

5. ASTM D 2803 - Filiform Corrosion Resistance of Organic Coatings on Metal.

6. ASTM D 3656 - Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns.

7. ASTM D 4060 - Abrasion Resistance of Organic Coatings by the Taber Abraser.
 8. ASTM E 283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Difference Across the Specimen.
 9. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
 10. ASTM E 547 - Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential.
 11. ASTM E 1105 - Standard Test Method for Field Determination of Water Penetration of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
 12. ASTM G 85 - Modified Salt Spray (Fog) Testing.
- D. Screen Manufacturers Association (SMA):
1. SMA 1201 - Specifications for Insect Screens for Windows, Sliding Doors and Swinging Doors.
- E. Window and Door Manufacturers Association (WDMA):
1. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors and skylights
 2. WDMA I.S.4 - Industry Specification for Preservative Treatment for Millwork.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 SUBMITTALS

- A. Product Data: For each type of hinged wood-framed glass door.
1. Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions.
- B. Shop Drawings: For hinged wood-framed glass doors.
1. Include plans, elevations, sections, and details.
 2. Detail attachments to other work, and between units, if any.
 3. Include hardware and required clearances.
- C. Samples: For each type of hinged wood-framed glass door and for each color and texture specified, 12-inch-long section with weather stripping, glazing bead, and factory-applied color finish.
- D. Product Schedule: For hinged wood-framed glass doors. Use same designations indicated on Drawings.

- E. Qualification Data: For Installer and testing agency.
- F. Field quality-control reports.
- G. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes, weather stripping, operable panels, and operating hardware to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An installer acceptable to hinged wood-framed glass door manufacturer for installation of units required for this Project.

1.8 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."
- B. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace hinged wood-framed glass doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection.
 - c. Excessive water leakage or air infiltration.
 - d. Faulty operation of movable panels and hardware.
 - e. Deterioration of wood, metals, vinyl, and other materials and finishes beyond normal weathering.
 - f. Failure of insulating glass and laminated glass.
 - 2. Warranty Period:
 - a. Hinged Door: Two years from date of Substantial Completion.
 - b. Insulating Glass: 10 years from date of Substantial Completion.
 - c. Laminated Glass: Five years from date of Substantial Completion.
 - d. Metal Finish: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Source Limitations: Obtain hinged wood-framed glass doors from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Product Certification: AMMA certified with label attached to each door.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
 1. Minimum Performance Class: Class CW.
 2. Minimum Performance Grade: Grade 70.
- C. Thermal Transmittance: NFRC 100 maximum total fenestration product U-factor of 0.32 Btu/sq. ft. x h x deg F .
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum total fenestration product SHGC of 0.30.
- E. Windborne-Debris Impact Resistance: Passes ASTM E 1886 missile-impact and cyclic-pressure tests in accordance with ASTM E 1996 for Wind Zone 4 for enhanced protection.
 1. Large-Missile Test: For glazing located within 30 feet of grade.
 2. Small-Missile Test: For glazing located between 30 feet and 60 feet above grade.

2.3 ALUMINUM-CLAD HINGED WOOD-FRAMED GLASS DOORS

- A. Exterior Surfaces: Aluminum cladding with manufacturer's standard fluoropolymer two-coat system with fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight and complying with AAMA 2605.
 1. Color: As selected by Architect from manufacturer's full range.
- B. Interior Surfaces: Manufacturer's standard factory-applied primer .
 1. Wood Species: Manufacturer's standard species .
- C. Frames and Door Panels: Fabricate from wood components complying with indicated requirements. Provide factory-assembled door panels with narrow-profile stiles and factory-assembled frames.
 1. True Divided Lites: Provide glazing with true muntins resulting in individually glazed lites, in pattern indicated.
- D. Wood Components: Manufacturer's standard LVL or fine-grained wood lumber complying with AAMA/WDMA/CSA 101/I.S.2/A440; kiln dried to a moisture content of not more than 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch deep by 2 inches wide; water-repellent preservative treated.
- E. Trim and Glazing Stops: Material and finish to match frame members.

- F. Mullions: Provide mullions and mullion casing and cover plates as shown, matching door units, complete with anchors for support to structure and installation of hinged wood-framed glass door units. Allow for erection tolerances and provide for movement of door units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of door units.
- G. Integral Nailing Fin: Aluminum nailing fins for securing frame to structure; provide sufficient strength to withstand design pressure indicated.
- H. Drip Caps: Extruded aluminum, factory fabricated and finished to match door frame; designed to direct water away from building when installed horizontally at head of hinged wood-framed glass doors.
- I. Threshold: Provide extruded aluminum threshold of thickness, dimensions, and profile indicated; designed to comply with performance requirements indicated and to drain to exterior.
 - 1. Color: Manufacturer's standard.
 - 2. Low-Profile Threshold: ADA-ABA compliant.

2.4 GLAZING

- A. Glass and Glazing: Manufacturer's standard glazing system that produces weathertight seal.
 - 1. Glass: ASTM C 1036, Type 1, q3, Category II safety glass complying with testing requirements in 16 CFR 1201.
 - 2. Safety Glazing Labeling: Permanently mark safety glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
 - 3. Tint: Clear.
 - 4. Insulating-Glass Units: ASTM E 2190, certified through IgCC as complying with requirements of IgCC.
 - a. Filling: Fill space between glass lites with argon.
 - b. Lites: Two.
 - c. Low-E Coating: Manufacturer's standard.
- B. Blast-Impact-Resistant Insulating-Glass Units: ASTM E 2190 with two lites and complying with impact-resistance requirements in "Window Performance Requirements" Article.
 - 1. Exterior Lite: ASTM C 1036, Type 1, Class 1, q3.
 - a. Tint: Clear.

- b. Kind: Fully tempered.
- 2. Interior Lite: ASTM C 1172 clear laminated glass with two plies of float glass.
 - a. Float Glass: As required by performance requirements indicated.
 - b. Interlayer Thickness: (2.29 mmAs required by performance requirements indicated.
- 3. Filling: Fill space between glass lites with argon.
- 4. Low-E Coating: Sputtered on second or third surface.

2.5 HARDWARE

- A. Refer to Section 08 71 00, DOOR HARDWARE, for hardware requirements.

2.6 ACCESSORIES

- A. Grilles (False Muntins): Provide grilles in designs indicated, for removable application to inside of each panel lite.
 - 1. Type: Interior, removable with between-glass grille.
 - 2. Material: To match adjacent finish of door panel.
 - 3. Design: Rectangular.
 - 4. Bar Width: Not less than 7/8 inch wide.
 - 5. Bar Profile: Square.
 - 6. Color: As selected by Architect from manufacturer's full range.
- B. Fasteners: Noncorrosive and compatible with door members, trim, hardware, anchors, and other components.
 - 1. Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For applications of hardware, use fasteners that match finish hardware being fastened.
- C. Anchors, Clips, and Accessories: Provide anchors, clips, and accessories of aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron for hinged wood-framed glass doors, complying with ASTM B 456 or ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
 - 1. Windborne-Debris Resistance: Provide anchors of the same design used in windborne-debris resistance testing.

2.7 FABRICATION

- A. Fabricate hinged wood-framed glass doors in sizes indicated. Include a complete system for assembling components and anchoring doors.
- B. Fabricate hinged wood-framed glass doors that are reglazable without dismantling panel framing.

- C. Weather Stripping: Provide full-perimeter weather stripping for each door panel unless otherwise indicated.
- D. Factory machine hinged wood-framed glass doors for openings and hardware that is not surface applied.
- E. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.
- F. Factory-Glazed Fabrication: Glaze hinged aluminum-framed glass doors in the factory.

2.8 WOOD FINISHES

- A. Factory-Applied Primer: Provide manufacturer's standard factory-applied prime coat complying with WDMA T.M. 11. on exposed interior wood surfaces.

2.9 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of Work.
- B. Verify rough opening dimensions, levelness of threshold substrate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight hinged door installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing hinged doors, hardware, accessories, and other components.

- B. Windborne-Debris Resistance: Anchor hinged wood-framed glass doors that have been tested for windborne debris resistance to structure using anchoring method, fastener type, and fastening frequency identical to that used in windborne-debris resistance testing.
- C. Install hinged wood-framed glass doors level, plumb, square, true to line; without distortion, warp, or rack of frames and panels, and without impeding thermal movement; anchored securely in place to structural support; and in proper relation to wall flashing, vapor retarders, air barriers, water/weather barriers, and other adjacent construction. Comply with ASTM E 2112.
- D. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials according to ASTM E 2112.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Test and inspect installed hinged wood-framed glass doors as follows:
 - 1. Testing Methodology: Test hinged wood-framed glass doors for air infiltration and water resistance according to AAMA 502.
 - 2. Air-Infiltration Testing:
 - a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.
 - b. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
 - 3. Water-Resistance Testing:
 - a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.
 - b. Allowable Water Infiltration: No water penetration.
 - 4. Test Reports: Prepared according to AAMA 502.

- C. Hinged wood-framed glass door will be considered defective if it does not pass tests and inspections.

3.4 ADJUSTING, CLEANING, AND PROTECTION

- A. Lubricate hardware and moving parts.
- B. Adjust operating panels and screens to provide a tight fit at contact points and weather stripping for smooth operation, without binding, and weathertight closure.
- C. Adjust hardware for proper alignment, smooth operation, and proper latching without unnecessary force or excessive clearance.
- D. Clean exposed surfaces immediately after installing hinged wood-framed glass doors. Avoid damaging protective coatings and finishes. Remove nonpermanent labels, excess sealants, glazing materials, dirt, and other substances.
- E. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- F. Protect hinged wood-framed glass door surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances contact hinged wood-framed glass door surfaces, remove contaminants immediately according to manufacturer's written instructions.
- G. Refinish or replace hinged doors with damaged finishes.
- H. Replace damaged components.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 08 17 10
INTEGRATED DOOR ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Integrated door assemblies including metal door frame, door, and hardware, unless specified in another Section, installed at cross-corridor locations.
 2. Smoke and draft control seals, unless specified in another Section.

1.2 RELATED REQUIREMENTS

- A. Lock Cylinders: Section 08 71 00, DOOR HARDWARE.
B. Door and Frame Color: Section 09 06 00, SCHEDULE FOR FINISHES.
C. Electrical Power: DIVISION 26, ELECTRICAL.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.
B. Builders Hardware Manufacturers Association (BHMA):
1. A156.3-14 - Exit Devices.
 2. A156.26-06 - Continuous Hinges.
 3. A156.32-14 - Integrated Door Opening Assemblies.
- C. ASTM International (ASTM):
1. A1011/A1011M-14 - Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
 2. E2180-07(2012) - Determining the Activity of Incorporated Antimicrobial Agents in Polymeric or Hydrophobic Materials.
- D. Door and Hardware Institute (DHI):
1. Recommended Locations for Architectural Hardware for Standard Doors & Frames (2004).
 2. Recommended Locations for Builders' Hardware Custom Steel Doors & Frames (1996).
- E. National Fire Protection Association (NFPA):
1. 105-16 - Smoke Door Assemblies and Other Opening Protectives.
 2. 252-12 - Fire Tests of Door Assemblies.
- F. Steel Door Institute (SDI):
1. A250.3-11 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames.

2. A250.8-14 - Specifications for Standard Steel Doors and Frames.
3. A250.10-11 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

G. UL LLC (UL):

1. 10C-09 - Positive Pressure Fire Tests of Door Assemblies.
2. 1784-15 - Air Leakage Tests of Door Assemblies and Other Opening Protectives.

1.4 PREINSTALLATION MEETINGS

A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.

1. Required Participants:

- a. Contracting Officer's Representative.
- b. Architect/Engineer.
- c. Contractor.
- d. Installer.
- e. Other installers responsible for adjacent and intersecting work, including electrical.

2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.

- a. Installation schedule.
- b. Installation sequence.
- c. Preparatory work.
- d. Protection before, during, and after installation.
- e. Installation.
- f. Transitions and connections to other work.
- g. Other items affecting successful completion.

3. Document and distribute meeting minutes to participants to record decisions affecting installation.

1.5 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:

1. Show size, configuration, and fabrication and installation details.
2. For each opening, list finish hardware items included in assembly, finish, degree of opening, and electrical rough-in requirements according to Door Schedule.

3. Submit templates to door and frame manufacturers to ensure proper size and location of hardware.
- C. Manufacturer's Literature and Data:
 1. Description of each product.
 2. Installation instructions.
- D. Certificates: Indicate integrated door assemblies comply with specifications.
 1. Show fire rated integrated door assembly is UL Listed for specified application.
- E. Qualifications: Substantiate qualifications comply with specifications.
 1. Installer.
- F. Operation and Maintenance Data:
 1. Care instructions for each exposed finish product.
 2. Maintenance and adjustment instructions for integrated door assemblies.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications:
 1. Regularly installs specified products.
 2. Installed specified products with satisfactory service on five similar installations for minimum five years.
 - a. Provide contact names and addresses for completed projects when requested by Contracting Officer's Representative.

1.7 DELIVERY

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.8 STORAGE AND HANDLING

- A. Store products indoors in dry, weathertight facility.
- B. Protect products from damage during handling and construction operations.

1.9 FIELD CONDITIONS

- A. Field Measurements: Verify field conditions affecting integrated door assembly fabrication and installation. Show field measurements on Submittal Drawings.
 1. Coordinate field measurement and fabrication schedule to avoid delay.
 2. Coordinate electrical work for electrified hardware installation.

1.10 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."
- B. Manufacturer's Warranty: Warrant door closers and hinges against material and manufacturing defects.
 - 1. Warranty Periods:
 - 2. Door Closers: 10 years.
 - 3. Steel Pinned Continuous Hinges: 10 years.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

- A. Design integrated door assemblies complying with specified performance:
 - 1. BHMA A156.32: Grade 1: 1,000,000 cycles.
- B. Fire Rated Doors:
 - 1. Fire Resistance Rating: As shown in Door Schedule.
 - 2. Label: Comply with NFPA 252, UL 10C, and labeled by qualified testing and inspection agency showing fire resistance rating.
- C. Smoke Rated Doors:
 - 1. Smoke Resistance Rating: As shown in Door Schedule.
 - 2. Label: Comply with NFPA 105, UL 1784, and labeled by qualified testing and inspection agency showing smoke resistance rating.

2.2 PRODUCTS - GENERAL

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
 - 1. Provide each integrated door assembly from one manufacturer.

2.3 INTEGRATED DOOR ASSEMBLY

- A. Metal Doors: SDI A250.8; Level 2 and Physical Performance Level B, heavy duty; Model 2 seamless.
 - 1. Face: ASTM A1011/A1011M; cold rolled steel, 1.0 mm (0.04 inches) thick, minimum.
 - 2. Core: Kraft paper honeycomb or polystyrene.
 - 3. Thickness: 44 mm (1-3/4 inch).
 - 4. Reinforce door for hardware installation.
- B. Metal Frames: SDI A250.8 Level 2.
 - 1. Metal: ASTM A1011/A1011M; cold rolled steel, 1.3 mm (0.05 inches) thick, minimum.
 - 2. Construction: Continuously welded.
 - 3. Reinforce frame for hardware.
 - a. Continuous Hinges: 2.3 mm (0.09 inches) thick.

- b. Other Hardware: Comply with SDI A250.8.
- 4. Frame Anchors: Provide adjustable type anchors coordinated with wall construction, minimum 4 per jamb.
- C. Integrated Hardware:
 - 1. Exit Device: BHMA A156.3; Grade 1, passage function, inset in door face, clean and unobtrusive in design.
 - a. Push Bar End Caps: Metal, plated satin nickel (BHMA 619) finish.
 - 2. Exit Device Trim: Lever matching door hardware specified in Section 08 71 00, DOOR HARDWARE.
 - 3. Continuous Hinges: BHMA A156.26.
 - a. Plastic Laminate Clad Doors: Wrap-around style hinge guards and provide stainless steel wrap-around edge guards at strike edge of door.
 - 4. Other Hardware: As scheduled in this section.

2.4 FINISHES

A. Hardware Finish Symbols:

Table 1 Hardware Finish Symbols

US	BHMA 156.18	Description
USP	600	Primed for field painting
US15	619	Dull Nickel Plated
US26D	626/652	Satin Chrome Plated
US28	628	Satin Aluminum
US32	629	Bright Stainless
US32D	630	Satin Stainless
N/A	689	Aluminum Painted

B. Finish Requirements:

- 1. Door Faces: Prime painted.
- 2. Frames: Prime painted.
- 3. Door Hardware:
 - a. Continuous Hinges: BHMA 630.
 - b. Push Bar: BHMA 630 clad with BHMA 619 end caps.
 - c. Exit Device Trim: BHMA 630.
 - d. Push/Pull Trim: BHMA 626.
 - e. Door Closers: BHMA 689.
 - f. Miscellaneous: To match other finishes.

4. Anti-Microbial Coating: ASTM E2180; ionic silver coating.
5. Apply coating to hand-operated hardware including levers, pulls, push bars, push plates, and paddles.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.

3.2 INSTALLATION - INTEGRATED DOOR ASSEMBLIES

- A. Install products according to manufacturer's instructions and approved submittal drawings
- B. Install door hardware at locations indicated in DHI Recommended Locations for Architectural Hardware for Standard Steel Doors & Frames and DHI Recommended Locations for Builders' Hardware Custom Steel Doors & Frames, unless otherwise indicated, or to comply with requirements of governing regulations, or if otherwise directed by Contracting Officer's Representative.
- C. Install door hardware in compliance with manufacturers' instructions, and templates. Comply with specified degree of opening for doors with automatic operators and overhead door closers. Securely fasten hardware. Confirm operating parts move freely and smoothly without binding, sticking, and excessive clearance.
- D. Coordinate installation and interface wiring with fire alarm and smoke detection systems. Provide auxiliary contacts, relays, and interface for fire alarm and security systems.
- E. Remove or protect door hardware, before painting and finishing performed after integrated door assembly installation.
- F. Adjust and check door assembly and each operating hardware item to ensure correct operation and function. Replace products which cannot be adjusted to operate as intended.
- G. Final Adjustment: Perform final hardware check and adjustment maximum one month before building acceptance or partial building occupancy.

3.3 CLEANING

- A. Clean exposed surfaces, including hardware. Do not use cleaners that will harm finishes.

3.4 PROTECTION

- A. Protect integrated door assemblies from construction operations.

3.5 SCHEDULES

A. The following is a general listing of the Integrated Door Assembly requirements and is not intended for use as a final door submittal. Provide hardware items required by established standards and practices, and to meet IBC and NFPA 101 whether specified or not in the following listed groups.

HW-12C	
Each [ADO] Pair Integrated Double Egress Doors to Have:	RATED
1 Steel Frame	
1 Integrated Pair Doors w/Exit DEVICES	Q2331 x TYPE 8 EXIT DEVICES (F01)
2 Continuous Hinges	A51031B
1 Overlapping Astragal with Self-Adhesive Seal	R5Y634 x R0E154 x THRU-BOLTS
2 Closers	C02011/C02021 (PT4D, PT4H)
2 Magnetic Holders	C00011 TRI-VOLTAGE
1 Set Self-Adhesive Seals	R0E154

POWER, WIRING, CONDUIT, AND FIRE ALARM CONNECTION BY DIVISION 26.

- - - E N D - - -

Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 08 31 13
ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Access doors and panels installed in walls and ceilings.
 2. Pass-thru linen chute doors.

1.2 RELATED REQUIREMENTS

- A. Lock Cylinders: Section 08 71 00, DOOR HARDWARE.
- B. Field Painting: Section 09 91 00, PAINTING.
- C. Finish Color: Section 09 06 00, SCHEDULE FOR FINISHES.
- D. Locations of Access Doors for Ductwork Cleanouts: Section 23 31 00, HVAC DUCTS AND CASINGS.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.
- B. American Welding Society (AWS):
1. D1.3/D1.3M-08 - Structural Welding Code - Sheet Steel.
- C. ASTM International (ASTM):
1. A653/A653M-15 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Sip Process.
 2. A1008/A1008M-15 - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Baked Hardenable.
 3. A666-15 - Annealed or Cold-Worked Austenitic Stainless Steel sheet, Strip, Plate, and Flat Bar.
 4. E119-15 - Fire Test of Building Construction and Materials.
- D. National Fire Protection Association (NFPA):
1. 80-16 - Fire Doors and Other Opening Protectives.
 2. 251-12 - Fire Tests of Door Assemblies.
- E. National Association of Architectural Metal Manufacturers (NAAMM):
1. AMP 500-06 - Metal Finishes Manual.
- F. UL LLC (UL):
1. Listed - Online Certifications Directory.
 2. 10B-08 - Standard for Fire Tests of Door Assemblies.
 3. 263-11 - Fire Tests of Building Construction and Materials.

1.4 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings:
 - 1. Show size, configuration, and fabrication and installation details.
- C. Manufacturer's Literature and Data:
 - 1. Description of each product.
 - 2. Installation instructions.

1.5 DELIVERY

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.6 STORAGE AND HANDLING

- A. Store products indoors in dry, weathertight facility.
- B. Protect products from damage during handling and construction operations.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify field conditions affecting access door fabrication and installation. Show field measurements on Submittal Drawings.
 - 1. Coordinate field measurement and fabrication schedule to avoid delay.

1.8 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel Sheet: ASTM A1008/A1008M.

2.2 PRODUCTS - GENERAL

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Provide each product from one manufacturer.

2.3 ACCESS DOORS, FIRE-RATED

- A. Door Construction:
 - 1. Ceiling Access Door Construction: ASTM E119 or UL 263.
 - 2. Wall Access Doors: NFPA 252 or UL 10B.

- B. Label: Class B opening according to UL 10B or test by another nationally recognized laboratory 1 hour fire-rated with maximum temperature rise of 120 degrees C (216 degrees F).
- C. Door Panel: Minimum 0.9 mm (0.0359 inch) thick steel sheet, with mineral-fiber insulation core, insulated sandwich type construction.
- D. Frame: Minimum 1.5 mm (0.0598 inch) thick steel sheet, depth and configuration to suit material and construction type where installed.
 - 1. Frame Flange: Provide at units installed in concrete, masonry, or gypsum board.
 - 2. Exposed Joints in Flange: Weld and grind smooth.
 - 3. Provide expanded galvanized metal lath perimeter wings when installed in plaster, except veneer plaster.
- E. Provide automatic closing device.
- F. Hinge: Continuous stainless steel hinge with stainless steel pin.
- G. Lock: Self-latching, mortise type with provision for fitting flush a standard screw-in type lock cylinder.
 - 1. Lock cylinder specified in Section 08 71 00, DOOR HARDWARE.
- H. Anchors for Fire-Rated Access Doors: Comply with requirements of applicable fire test.

2.4 ACCESS DOOR, RECESSED PANEL, NON-RATED

- A. Door Panel:
 - 1. 1.2 mm (0.05 inch) thick steel sheet to form a 25 mm (1 inch) deep recessed pan to accommodate installation of acoustical units and other materials where shown in walls and ceiling.
 - 2. Reinforce to prevent sagging.
- B. Frame:
 - 1. 1.5 mm (0.06 inch) thick steel sheet of depth and configuration to suit installation in suspension system of ceiling or wall framing.
 - 2. Extend sides of frame to protect edge of acoustical units when door panel is in open position.
 - 3. Provide shims, bushings, clips and other devices necessary for installation.
- C. Hinge: Continuous steel hinge with stainless steel pin, or concealed hinge.
- D. Lock:
 - 1. Flush screwdriver-operated cam lock.

2. Plastic sleeve or stainless steel grommet to protect hole made in acoustical unit for screwdriver access to lock.

2.5 PASS-THRU LINEN CHUTE DOOR

- A. Intake-Door Assemblies: ASTM A240/A240M, Type 304, stainless steel self-closing units with positive latch and latch handle, with stainless steel trim; constructed as required for performance requirements indicated; and with frame suitable for the enclosing fire-rated construction.
 1. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing and inspecting agency, for 1-hr fire-resistance rated.
 2. Door Type: Hopper, bottom hinged door.
 3. Size: 18 x 18 inch.
 4. Finish: Manufacturer's standard satin or ASTM A480/A480M No. 3 directional polish.
 5. Latchset: Lever-handle type that unlatches door.

2.6 FABRICATION - GENERAL

- A. Size: Minimum 600 mm (24 inches) square door unless otherwise shown
- B. Component Fabrication: Straight, square, flat and in same plane where required.
 1. Exposed Edges: Slightly rounded, without burrs, snags and sharp edges.
 2. Exposed Welds: Continuous, ground smooth.
 3. Welding: AWS D1.3/D1.3M.
- C. Locks and Non-Continuous Hinges: Provide in numbers required to maintain alignment of door panel with frame. For fire-rated doors, provide hinges and locks as required by fire test.
- D. Anchoring: Make provisions in frame for anchoring to adjacent construction. Provide anchors in size, number and location on four sides to secure access door to substrate. Provide anchors as required by fire test.

2.7 FINISHES

- A. Steel Paint Finish:
 1. Powder-Coat Finish: Manufacturer's standard two-coat finish system consisting of the following:
 - a. One coat primer.
 - b. One coat thermosetting topcoat.
 - c. Dry-film Thickness: 0.05 mm (2 mils) minimum.
 - d. Color: Refer to Section 09 06 00, SCHEDULE FOR FINISHES.

2.8 ACCESSORIES

- A. Fasteners: Type and size recommended by access door manufacturer, to suit application.
 - 1. Stainless steel fasteners.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
 - 1. Verify access door locations and sizes provide required maintenance access to installed building services components.
- B. Protect existing construction and completed work from damage.

3.2 INSTALLATION - GENERAL

- A. Install products according to manufacturer's instructions and approved submittal drawings.
 - 1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.
- B. Install access doors and panels permitting access to service valves, traps, dampers, cleanouts, and other mechanical, electrical and conveyor control items concealed in walls and partitions, and concealed above gypsum board and plaster ceilings.
- C. Install fire rated access door according to NFPA 80.
- D. Install fire-rated doors in fire-rated partitions and ceilings.
- E. Install recessed panel access doors in partitions and in gypsum board and plaster ceilings.

3.3 ACCESS DOOR AND FRAME INSTALLATION

- A. Wall Installations: Install access doors in openings with sides vertical.
- B. Ceiling Installations: Install access doors parallel to ceiling suspension grid or room partitions.
- C. Frames without Flanges: Install frame flush with surrounding finish surfaces.
- D. Frames with Flanges: Overlap opening, with face uniformly spaced from finish surface.
- E. Recessed Panel Access Doors: Install with face of surrounding materials flush with door panel installed finish.
- F. Secure frames to adjacent construction with fasteners.

- G. Install type, size and quantity of anchoring device suitable for material surrounding opening to maintain alignment, and resist displacement, during normal use of access door.
- H. Field Painting Primed Access Doors: Comply with the requirements of Section 09 91 00, PAINTING.

3.4 ADJUSTMENT

- A. Adjust hardware so door panel opens freely.
- B. Adjust door when closed so door panel is centered in frame.

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SECTION 08 34 00

ALUMINUM FRAMED TOP-HUNG SLIDING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
 - 1. Interior Aluminum-Framed Top-Hung Sliding Doors
- B. Related Sections:
 - 1. Section 08 14 23 "Impact Resistant Wood Doors"

1.3 REFERENCES

- A. ANSI - American National Standards Institute
 - 1. ANSI 156.18 Materials and Finishes
 - 2. ANSI A117.1 Specifications for making buildings and facilities usable by physically handicapped people.
- B. BHMA - Builders Hardware Manufacturers Association
- C. DHI - Door and Hardware Institute
- D. NFPA - National Fire Protection Association
 - 1. NFPA 80 - Fire Doors and Windows
 - 2. NFPA 101 - Life Safety code
 - 3. NFPA 105 - Smoke and Draft Control Door Assemblies
 - 4. NFPA 252 - Fire Tests of Doors Assemblies
- E. AWS - Architectural Woodwork Standards

1.4 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittal Procedures
- B. Product Data: Submit manufacturer's product data, including installation instructions.
- C. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating dimensions, tolerances, materials, components, hardware, finish, options, and accessories. Shop Drawings to show required blocking by others.
- D. Samples: Submit manufacturer's samples of the following sliding door components:
 - 1. Door veneer or laminate sample.

2. Aluminum Frame finish sample.

- E. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- F. Warranty Documentation: Submit manufacturer's standard warranty for complete system
- G. Test Reports: Submit acoustical reports or UL1784 as applicable.

1.5 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of interior aluminum frames and doors.
- B. Source: Obtain sliding aluminum framed doors and hardware from single source.
- C. Manufacturer's Qualifications: Manufacturer regularly engaged for past 5 years in manufacture of sliding doors similar to that specified.

1.6 PERFORMANCE

- A. Aluminum perimeter frames with integral acoustic seals at all door/frame interfaces
 - 1. Architect to verify frame thickness suitable for required application
- B. Soft self-closing mechanism at both sides of door integrated with top track. Soft Closers tested to a minimum of 150,000 cycles.
- C. Concealed door guide.
- D. Manufacturer to 3rd party acoustical performance test data
- E. Manufacturer to submit 3rd party test data on air infiltration and/or smoke ratings as applicable

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Notify the manufacturer immediately of any shipping damage.
- C. Storage and Handling Requirements:
 - 1. Store and handle materials in accordance with manufacturer's instructions.
 - 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 - 3. Store materials in clean, dry area indoors.

4. Protect materials and finish during storage, handling, and installation to prevent damage.

1.8 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: AD SYSTEMS 2201 100th St. SW, Everett, WA 98204 | Website: <http://specADsystems.com> | Phone: 425-740-6011 | ADSystems.Estimating@allegion.com

2.2 INTERIOR SLIDING ALUMINUM-FRAMED DOORS AND PARTITIONS

- A. Manufacturer:
 1. Basis of Design: Exam Slide High Performance Barn (Sliding) Door System by AD Systems.
- B. Specified Wall Thickness: as indicated on the Drawings.
- C. Frame Profiles: Extruded aluminum frame "wrap" frame with integral vertical jamb (stile pocket). Frames required to complete seal around door leaf. Gasketing required at all frame to door interfacing. Exposed gaskets at jamb to be silicone.
- D. Finish:
 1. Standard: Painted Hardcoat (Kynar) Finish. Meets AAMA 2604 Standard
Colors: Light Sequin 789G048
- E. Door Leafs. All Doors to be factory machined for hardware including pilot and function holes. Leading edge of door to be fully finished.
 1. 1-3/4" Flush Wood Door as specified in Section 08 14 23 "Impact Resistant Wood Doors".
- F. Door Components:
 1. Single Top Track: Anodized finish aluminum track
 2. Valances: Extruded aluminum with integral end caps
 - a. Standard square valance.
 3. Top Rollers: tandem nylon roller sized to match door weight
 4. Concealed Floor Guide: Integral Jamb floor guide by AD Systems
 5. Soft-Closer: Soft and self-closing damper mechanism at both sides of door leaf. Demonstrate closers as tested to 150k cycles
 6. Door Locks:
 - a. Self-Latching Lock with Single Action Egress. Finish: US32D.

- 1) AD6440 Privacy - Lock with Coin Override/ADA compliant thumb turn
and back-to-back lever trim

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine wall openings to receive sliding doors for plumb, level, and square.
Note: Finish door operation will be affected by out of tolerance framing.
- B. Verify dimensions of wall openings.
- C. Examine surfaces to receive top and bottom guide.
- D. Notify Architect of conditions that would adversely affect installation or subsequent use of sliding doors.
- E. Do not begin installation until unacceptable conditions are corrected.
- F. Base of door side to be flush or minimal. Rubber Base acceptable.

3.2 INSTALLATION

- A. Install sliding doors in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Install sliding doors plumb, level, square, and in proper alignment.
- C. Install sliding doors to close against walls without gaps
- D. Install sliding doors to open and close smoothly.
- E. Anchor sliding doors securely in place to supports. Required: Fire treated 2 x 6 blocking required full length of track.

3.3 ADJUSTING

- A. Adjust sliding doors for proper operation in accordance with manufacturer's instructions.
- B. Adjust sliding doors to operate smoothly without binding.
- C. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

3.4 CLEANING

- A. Clean sliding doors promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that could damage materials or finish.

3.5 PROTECTION

- A. Protect installed sliding doors from damage during construction.

- - - E N D - - -

SECTION 08 36 13

SECTIONAL DOORS

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies electrically operated sectional overhead steel doors.

1.2 RELATED WORK

- A. Lock Cylinders for Cylindrical Locks: Section 08 71 00, DOOR HARDWARE.
- B. Field Painting of Factory Primed Doors: Section 09 91 00, PAINTING.
- C. Electrical Installation:
 - 1. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.
 - 2. Section 27 05 11, REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS.
- D. Section 28 05 00, COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY.

1.3 MANUFACTURER'S AND INSTALLER'S QUALIFICATIONS

- A. Manufacturers with three (3) years' experience in providing items of type specified. Submit manufacturer qualifications.
- B. Installers who are trained and approved by manufacturer for installation of units required. Submit installer qualifications.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings:
 - 1. Details of construction, accessories and hardware, electrical and mechanical items, supporting brackets for motors, location, and ratings of motors, and safety devices.
 - 2. Wiring diagrams for motors and controls, including wiring diagram for door, showing electrical interlock for motor with manually operated dead lock.
- C. Manufacturer's Literature and Data:
 - 1. Brochures or catalog cuts.
 - 2. Manufacturer's installation procedures and instructions.
 - 3. Maintenance instructions, parts list.
- D. Installer's qualifications.
- E. Manufacturer's qualifications.
- F. Certificates:

1. Attesting door, anchors and hardware will withstand the horizontal loads specified.
2. Attesting door complies with thermal performance, air infiltration, and water infiltration requirements.

G. Manufacturer warranty.

1.5 QUALITY ASSURANCE

- A. Source: Obtain sectional doors from single source from single manufacturer. Obtain operators and controls from sectional door manufacturer.

1.6 WARRANTY

- A. Construction Warranty: Comply with FAR clause 52.246-21 "Warranty of Construction".
- B. Manufacturer Warranty: Manufacturer shall warranty their sectional doors for a minimum of two (2) years from the date of installation and final acceptance by the Government. Submit manufacturer warranty.

1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. American Architectural Manufacturers Association (AAMA):
1. 2603-13 Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
- C. American Society of Civil Engineers (ASCE):
1. 7-10 Wind Load Provisions
- D. ASTM International (ASTM):
1. A36/A36M-14 Structural Steel
 2. A227/A227M-06(R2011) Steel Wire, Cold-Drawn for Mechanical Springs
 3. A229/229M-12 Steel Wire, Oil-Tempered for Mechanical Springs
 4. A653/A653M-12(R2013) Steel Sheet, Zinc-Coated (Galvanized) or Zinc Iron Alloy Coated (Galvanized) by the Hot Dip Process
 5. C1036-11(R2012) Flat Glass
 6. C1363-11 Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
 7. E84-14 Surface Burning Characteristics of Building Materials
 8. E283-04(R2012) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Difference Across the Specimen

9. E330/E330M-14 Structural Performance of Exterior Windows, Curtain Walls, and Doors by the Uniform Static Air Pressure Difference.
 10. E331-00 (R2009) Water Penetration of Exterior Windows, Curtain Walls, and Doors by the Uniform Static Air Pressure Difference.
- E. American National Standards Institute and Door and Access Systems Manufacturers Association (ANSI/DASMA):
1. 102-11 Sectional Overhead Type Doors.
- F. National Electrical Manufacturer's Association (NEMA):
1. ICS 6-93 (R2011) Industrial Controls and Systems: Enclosures
 2. MG 1-11 (R2014) Motors and Generators
 3. ST 20-14 Dry Type Transformers for General Applications
- G. National Fire Protection Association (NFPA):
1. 70-14 National Electrical Code
- H. National Association of Architectural Metal Manufacturers (NAAMM):
1. AMP 500-06 Metal Finishes Manual
- I. Underwriters Laboratories, Inc. (UL):
1. 325-06 (R2013) Door, Drapery, Gate, Louver, and Window Operators and Systems

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel: ASTM A653/A653M for forming operations. ASTM A36/A36M for structural sections.
- B. Hard Drawn Spring wire: ASTM A227/A227M.
- C. Oil Tempered Spring wire: ASTM A229/A229M.
- D. Glass: ASTM C1036
 1. Clear Glass: Type 1, Class 1, Quality q5, 6 mm (1/4 inch) thick.
 2. Fabricated into sealed insulating glass 25 mm (1 inch) thick.
- E. Weather-strips, Gaskets, and Thermal Breaks:
 1. Neoprene, EPDM, PVC, silicone rubber, or other low conductance material.
 2. Standard with door manufacturer.

2.2 DESIGN REQUIREMENTS

- A. Wind Load: Design to withstand uniform pressure (velocity pressure) of 960 Pa (20 lbs. per sq. ft.) acting inward and outward when tested in accordance with ASTM E330/E330M. Doors are to remain operable under design wind load.
- B. Thermal Performance for Insulated Doors: Maximum U value of 0.14 for door when tested in accordance with ASTM C1363.

- C. Air Infiltration for Exterior Doors: Maximum of 0.10 cfm at 24 Km (15 miles per hour) wind speed per foot of crack between door sections and door perimeter opening when tested in accordance with ASTM E283.
- D. Water Infiltration for Exterior Doors: No infiltration when tested in accordance with ASTM E331.
- E. Comply with ANSI/DASMA 102. Provide metal doors with horizontal sections hinged together to operate in a system of tracks to completely close the door opening in the closed position and make the full width and height of the door opening available for use in the open position.
- F. Operation-Cycle Requirements: Door components and actuators to operate for not less than 10,000 cycles.

2.3 FABRICATION

- A. Steel Door Sections:
 - 1. Formed of hot-dipped galvanized steel.
 - 2. Meeting rails: Interlocking joints with thermal breaks separating face sheets formed to provide weathertight closure and alignment for full width of door.
 - 3. Height of Each Section: Not to exceed 610 mm (24 inches).
 - 4. Install glazing panels where indicated using rubber thermal break gaskets standard with door manufacturer.
 - 5. Provide foamed in place insulation with flame spread rating of not more than 25 and a smoke development factor of not more than 50 when tested in accordance with ASTM E84.
 - 6. Reinforced for hardware anchorage with not less than 10 gage galvanized steel.
- B. Tracks:
 - 1. Manufacturer's standard, formed of galvanized steel.
 - 2. Track Configuration: Low-headroom track.
 - 3. Minimum of 1.98 mm (14 gage) for 50 mm (2 inch) tracks and 2.78 mm (12 gauge) for 75 mm (3 inch) tracks.
 - 4. Vertical tracks fabricated with adjustable brackets for mounting at incline to continuous steel angle wall bracket.
 - 5. Horizontal Track: Reinforce with continuous steel angle anchored to vertical steel angle wall bracket and to ceiling angle supports. Provide vertical and cross or diagonal braces to obtain rigid installation of horizontal track.

6. Provide not less than 2.38 mm (13 gage) galvanized steel angles.

C. Hardware:

1. Manufacturer's standard hinges, brackets, rollers, locking devices and other hardware required for a complete installation.
2. Hinges and Roller Brackets: Minimum of 2.38 mm (13 gage) galvanized steel.
3. Provide rollers with ball bearings and case-hardened races.
4. Provide positive locking device to receive cylinder lock, specified in Section 08 71 00, DOOR HARDWARE, with interlocking switch to motor actuator.
5. Weatherseals: Manufacturer's standard fitted around entire perimeter of door. Provide combination bottom weatherseal and sensor edge.

D. Manual Operation:

1. Pushup Operation: Provide lifting handles on both sides of door with counterbalance mechanism designed to that required lift or pull for door operation does not exceed 111 newton (N) (25 pound force). Provide pulldown straps or ropes at the bottom of doors over 2134 mm (7 feet) high.
2. Chain Hoist Operation: Provide galvanized, endless chain operating over a sprocket.
 - a. Extend chain to within 1219 mm (4 feet) of the floor and mount on inside of building.
 - b. Obtain reduction by use of roller chain and sprocket drive or gearing.
 - c. Provide chain cleat and pin for securing actuator chain.
 - d. Allow for installation of power actuators to chain hoist operator when indicated in construction documents.
 - e. Do not exceed the maximum lifting force of 111 newton (N) (25-pound force) required to operate the door.

2.4 ELECTRIC MOTOR OPERATORS

- A. Complete with electric motor, machine cut reduction gears, steel chain and sprockets, magnetic brake, overload protection, brackets, wall mount push button controls, limit switches, magnetic reversing contactor, and other accessories necessary for proper operation, including emergency manual actuator.
- B. Design:

1. Design the actuator for motor removal without disturbing the limit-switch adjustment and without affecting the emergency manual actuators.
2. Make provision for emergency manual operation of door by chain-gear mechanism in case of electrical failure.
3. Arrange the emergency manual operating mechanism to immediately be put into and out of operation from the floor with a mechanical device to disconnect the motor from the operating mechanism when the emergency manual operating mechanism is engaged. This operation is not to affect the adjustment of the limit switches.
4. Provide interlock with motor to prevent motor from operating when manual locks are activated.

C. Motors:

1. NEMA MG 1, maximum operation 3600 rpm.
2. Suitable for operation on power current of the characteristics indicated on the electrical construction documents.
3. Use high starting torque, reversible type, of sufficient horsepower and torque output to move the door in either direction from door position, and produce door travel speed range of 0.20 to 0.30 m per second (8 to 12 inches per second), without exceeding the rated capacity.
4. Single-phase motors are not to have commutation or more than one starting contact.
5. Motor Enclosures: Drip proof type or NEMA TENV type.

D. Controls:

1. Control enclosures:
 - a. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
2. Exterior-Mounted Units: Full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.
3. At door actuators, provide an enclosed, across-the-line type, magnetic reversing contactor, thermal overload protection, solenoid operated brake, limit switches, and remote control switches at locations on construction documents.
4. Control switches:
 - a. Three push button type on interior, unless noted to be key activated.

- b. Buttons marked, OPEN, CLOSE and STOP.
 - c. The OPEN and STOP buttons: Momentary pressure or contact type.
 - d. The CLOSE button: Constant pressure type.
 - e. Provide key activated switch on exterior requiring constant pressure to operate.
 - f. Limit switches: Manufacturers standard, position of switches readily adjustable.
5. Operation:
- a. Open door upon activation of OPEN button.
 - b. Close door only when constant key pressure applied to CLOSE button.
 - c. When the door is in motion, and the STOP button is pressed, door is to stop instantly and remain in the stop position; from stop position, door may be operated in either direction by OPEN or CLOSE button.
 - d. Limit switches automatically stop doors at their fully open and closed positions.
6. Provide push buttons with guards to prevent accidental operation.
7. Transformer:
- a. Provide control transformer in power circuits to reduce the voltage on control circuits to 120 volts or less.
 - b. Conform to NEMA ST 20.
8. Electrical Components: Conform to NFPA 70.
9. Safety Device:
- a. Provide bottom door edge weather-strip safety device to immediately stop and reverse the door closing to full open position upon contact with an obstruction in compliance with UL 325. Door is to open upon failure of device, component of device or component of control system.
 - b. The door closing circuit is to be electrically locked out and door to remain capable of manual operation until the failure or damage has been corrected.
 - c. Do not use safety device as a limit switch.
 - d. Safety Device Connecting Cable to Motor: Flexible type SO cable, with spring loaded automatic take up reel or equivalent device, as required for proper operation of the doors.

2.5 FINISHES

- A. Steel:

1. Comply with NAAMM's AMP 500-06 Metal Finishes Manual for recommendations for applying and designating finishes.
2. Clean surfaces free of scale, rust, oil and grease.
3. Baked-Enamel or Powder-Coat Finish: AAMA 2603.
4. Non-galvanized steel: Pretreat steel to assure maximum paint adherence.
5. Galvanized steel: Apply phosphate treatment.
6. Apply shop prime coat of corrosion inhibitive paint on exposed surfaces after fabrication that is compatible with field applied finishes.
7. Apply finish paint of color scheduled when specified in Section 090600, SCHEDULE FOR FINISHES.
8. Do not paint track, rollers, hinges, or locks.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with approved shop drawings and manufacturer's instructions.
- B. For electrical work, see:
 1. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.
 2. Section 27 05 11, REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS.
- C. Section 28 05 00, COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY.
- D. Locate anchors and inserts for tracks, brackets, motors, switches, hardware, and other accessories in accordance with approved shop drawings.
- E. Attach tracks to adjoining construction with not less than 9 mm (3/8 inch) diameter bolts, spaced near each end and not over 610 mm (24 inches) apart.
- F. Locate control switches where indicated in construction documents, not less than 1219 mm (4 feet) or more than 1372 mm (4 feet 6 inches) above finished floor.
- G. Lubricate, adjust and demonstrate door to operate freely.
- H. Upon completion, leave door openings weathertight and doors free from warp, twists, or distortion.

3.2 REPAIR

- A. Repair zinc-coated surfaces both bare and painted, by the application of galvanizing repair compound.
- B. Spot prime and apply finish paint to repairs.

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SECTION 08 41 14
ALUMINUM FOLDING DOOR SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: This Section includes, but shall not be limited to, all necessary materials, labor, and equipment for the complete installation of aluminum storefront framing as shown on the Drawings and specified herein.

1.2 SYSTEM DESCRIPTION

- A. General: Provide the manufacturer's aluminum storefront framing system, adapted to the application indicated, and modified as required to comply with performance requirements and materials specified, as demonstrated by testing the manufacturer's corresponding systems according to test methods indicated.
1. Performance Requirements:
 - a. Structural Performance: Shall be based on a maximum allowable deflection of $L/270$ of the span or 1/4 inch maximum. The system shall perform to those criteria under a wind load indicated on the Drawings.

1.3 SUBMITTALS

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Product Data:
1. Manufacturer's standard details and fabrication methods.
 2. Data on finishing, components, and accessories.
 3. Instructions: Submit descriptive literature, detail specifications, performance test data and instructions for installation, and adjustments.
 4. Recommendations for maintenance and cleaning of exterior surfaces.
- C. Shop Drawings:
1. Show elevations of aluminum folding door system at 1:48 (1/4 inch) scale, metal gages, details of construction, methods of anchorage, flashing and coping details, glazing details, and details of installation. Show interfaces and relationships to work of other trades.
- D. Samples: If colors not pre-selected or scheduled, submit samples for initial color selection. Submit samples for verification purposes.
- E. Glass:
1. Specified in Section 08 80 00, GLAZING.

F. Quality Assurance Submittals:

1. Design Data:

- a. Submit structural and thermal calculations for complete wall assembly. Structural calculations and design shop drawings signed and sealed by a Professional Engineer (PE).

2. Factory Test Reports:

- a. Test Reports: Submit certified test reports, for each of following listed tests, from a qualified independent testing laboratory showing that glazed aluminum curtain wall system assembly has been tested in accordance with specified test procedures and complies with performance characteristics as indicated by manufacturer's testing procedures. Submit factory tests required except that where a curtain wall system or component of similar type, size, and design as specified for this project has been previously tested within last year, under conditions specified herein, resulting test reports may be submitted in lieu of listed testing. Submit appropriate testing reports for specific tests indicated below:

- 1) Deflection and structural tests.
- 2) Water penetration tests.
- 3) Air infiltration tests.
- 4) Delamination tests.
- 5) Thermal conductance tests.
- 6) Sound transmission loss test.

3. Certificates:

- a. Submit designer's certification.
- b. Submit manufacturer's certification that the Installer is approved.

- G. Maintenance Manuals: Furnish complete maintenance manuals describing the materials, devices, and procedures to be followed in cleaning and maintaining the work.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.

- B. Mock-Ups: Prior to installation of the work, fabricate and erect mock-ups for each type of finish and application required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Refer to AAMA CW 10 for care and handling of architectural aluminum from shop to site.
- B. Prior to packaging for shipment from factory, mark wall components to correspond with shop and erection drawings and their placement location and erection sequence.
- C. Prior to shipment from factory, place in cardboard containers and cover finished surfaces of members with protective covering of adhesive paper, waterproof tape, or strippable plastic. Do not cover metal surfaces that will be in contact with sealants after installation.
- D. Inspect materials delivered to site for damage; unload and store with ventilation, free from heavy dust, not subject to combustion products or sources of water, and to permit easy access for inspection and handling. Sealing and caulking compounds, including handling, is to be in accordance with requirements of Section 07 92 00, JOINT SEALANTS.

1.6 PROJECT CONDITIONS:

- A. Field Measurements: Verify dimensions of other construction by field measurements before fabrication and indicate measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying Work.

1.7 WARRANTY:

- A. Construction Warranty: Comply with FAR clause 52.246-21, "Warranty of Construction".
- B. Manufacturer Warranty: Manufacturer shall warranty their aluminum folding door system continuous geared hinges for a lifetime from date of installation and final acceptance by the Government. Submit manufacturer warranty.
- C. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of organic finishes within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Product specified is 4500 Series Flush Glaze, 1-3/4 inches by 4-1/2 inches, as manufactured by Chicago Bifold, Inc. Items specified are to establish a standard of quality for design, function, materials, and appearance. Equivalent products by listed manufacturers are acceptable. The Architect will be the sole judge of the basis of what is equivalent.
1. Product shall be American made.

2.2 MATERIALS

- A. Materials:
1. Extrusions shall be of aluminum alloy 6063-T5 extruded within commercial tolerance and free from defects impairing strength and/or durability. Main framing sections shall be of 0.075 inch minimum wall thickness and glazing stop moldings shall be of 0.060 inch thickness.
 - a. Recycled Content: Provide manufacturer's proprietary product fabricated of aluminum with a recycled content of more than 80 percent.
 2. Screws, bolts, and other accessories shall be compatible with the aluminum under normal service conditions.
 3. Glazing shall be by means of an exterior and interior gasket of high quality extruded elastomeric material.

2.3 FABRICATION

- A. Carefully fit and match work with continuity of line and design. Rigidly secure members with hairline joints, unless otherwise indicated. Reinforce members and joints for rigidity and strength as needed to fulfill performance requirements.
1. Conceal fasteners unless otherwise indicated.

2. Separate dissimilar materials with a heavy coating of epoxy paint or other suitable permanent separation as required to prevent galvanic action.

2.4 FINISHES

- A. General: Comply with NAAMM MFM for recommendations relative to application and designation of finishes. Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.
- B. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 1. Two-coat fluoropolymer finishes complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Color as specified in Section 09 06 00, SCHEDULE FOR FINISHES.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to the Owner and the Architect, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
 1. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Installer.

3.2 PREPARATION

- A. Coordinate and furnish anchors, concrete inserts, sleeves, anchor bolts, etc., that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the Project site.

3.3 INSTALLATION

- A. General: Installation shall be in accordance with reviewed product data, final shop drawings, the manufacturer's specifications and recommendations, and as indicated on the Drawings.
 1. Erection Tolerances: Comply with manufacturer's published instructions.

3.4 ADJUSTING AND CLEANING

- A. Touch-Up Painting: Immediately after installation, touch-up scratched, nicked, abraded, chipped, or otherwise damaged areas of the finish so as to be unnoticeable.

- B. Cleaning: Wash to remove any deleterious material from finished surfaces immediately.

3.5 DEMONSTRATION

- A. Maintenance Instructions: Instruct the Owner's personnel who will be responsible for maintaining the work after the time of final acceptance.

3.6 PROTECTION

- A. Provide final protection and maintain conditions in a manner acceptable to the Installer, that shall ensure that the aluminum storefront framing shall be without damage at time of Substantial Completion.

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SECTION 08 44 13

GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies glazed aluminum curtain wall system.
 - 1. Thermally isolated, pressure equalized on interior.
 - 2. Type: Stick system to include following:
 - a. Glass.
 - b. Closures, trim, subsills and flashings.
 - c. Fasteners, anchors, and related reinforcement.

1.2 RELATED WORK:

- A. Structural Steel: Section 05 12 00, STRUCTURAL STEEL FRAMING.
- B. Miscellaneous Metal Members: Section 05 50 00, METAL FABRICATIONS.
- C. Firestopping between Curtain Wall and Structure: Section 078400, FIRESTOPPING.
- D. Sheet Metal Flashing and Trim: Section 07 60 00, FLASHING AND SHEET METAL.
- E. Joint Sealants: Section 07 92 00, JOINT SEALANTS.
- F. Glazing: Section 08 80 00, GLAZING.
- G. Finish Color: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 QUALITY ASSURANCE:

- A. Qualifications:
 - 1. Approval by Contracting Officer Representative (COR) is required of products or service of proposed manufacturer, suppliers and installers, and will be based upon submission by Contractor of certification that:
 - a. Manufacturers Qualifications: Manufacturer with five (5) years continuous documented experience in design, fabrication, and installation of glazed aluminum curtain wall systems of similar type and for projects of equivalent size.
 - b. Installer: Manufacturer approved in writing who has continuously installed glazed aluminum curtain walls systems of similar type and for projects of equivalent size for previous five (5) years.
 - c. Manufacturer is to provide technical field representation at project site, as a minimum, at start of project, during middle, towards end of project, and during field testing of field mockup panel.

- d. **Manufacturers Professional Engineer Qualifications:** A Professional Engineer who is legally qualified to practice in state where Project is located and who is experienced in providing engineering services of kind indicated. Engineering services are defined as those performed for installations of glazed aluminum curtain walls that are similar to those indicated for this Project in material, design, and extent.
- e. **Testing Laboratory:** Contractor is to retain AAMA accredited commercial testing laboratory to perform tests specified. Submit information regarding testing laboratory's facilities and qualifications of technical personnel to perform testing specified in this section.
- f. **Product Options:** Information on construction documents establishes requirements for aesthetic effects and performance characteristics of glazed aluminum curtain wall system. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, one another, and adjoining construction. Performance characteristics are indicated by criteria subject to verification by one (1) or more methods including preconstruction testing, field testing, or in-service performance.
 - 1) Do not modify intended aesthetic effects. If modifications are proposed, submit comprehensive explanatory data for review.
- g. **Qualification of Welders:**
 - 1) Welding is to be performed by certified welders qualified in accordance with AWS D1.2/D1.2M, using procedures, materials, and equipment of the type required for this work.

B. **Mockup:**

- 1. Construct, at job site, full size typical wall unit which incorporates horizontal and vertical joints, framing, window units, panels, glazing, sealants, and other accessories as detailed and specified. Mock-up wall unit location, size and design are to be as indicated on construction documents. Orient mockup to be facing full sun when constructed.
- 2. Performance Test

- a. Conduct performance test of mockup after approval of visual aspects has been obtained. Testing is to be performed on mockup according to requirements in "Field Quality Control" Article.
 - b. Refer to Performance Requirements and Field Quality Control
3. Approved Mock-up
- a. After completion and approval of performance test results of job site mockup, as directed by COR, approved mock-up panel is to be used as minimum standard of comparison for entire curtain wall system.
- C. Pre-Installation Conference
1. Prior to starting installation of glazed curtain wall system schedule conference with COR to demonstrate the following:
 - a. Clear understanding of construction documents.
 - b. Onsite inspection and acceptance of structural and pertinent structural details relating to curtain wall system.
 - c. Coordination of work of various trades involved. Conference is to be attended by Contractor; personnel directly responsible for installation of curtain wall system, flashing and sheet metal work, firestopping system and curtain wall manufacturer and their technical field representatives. Conflicts are to be resolved and confirmed in writing.

1.4 SUBMITTALS:

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Product Data:
 1. Manufacturer's standard details and fabrication methods.
 2. Data on finishing, components, and accessories.
 3. Instructions: Submit descriptive literature, detail specifications, performance test data and instructions for installation, and adjustments.
 4. Recommendations for maintenance and cleaning of exterior surfaces.
- C. Shop Drawings:

1. Show elevations of glazed curtain wall system at 1:48 (1/4 inch) scale, metal gages, details of construction, methods of anchorage, flashing and coping details, glazing details, firestopping assemblies at edge of slabs and details of installation. Show interfaces and relationships to work of other trades and continuity with adjacent thermal, weather, air and vapor barriers.
 2. Submit for curtain wall system, accessories, and mock-up. Tentative approval of drawings is to be received before fabrication of mock-up. Final approval of drawings is to be deferred pending approval of mock-up and accessories.
 3. Operation and Maintenance Manuals
 - a. Submit cleaning and maintenance instructions.
- D. Samples:
1. Submit pairs of samples of each specified color and finish on 305 mm (12-inch) long section by width of each tubular, or extruded shape section or 305 mm by 305 mm (12-inch by 12-inch) wide sections of sheet shapes.
 2. Submit corner section of framing members showing fasteners, panels, glazing methods, glazing materials, and weather-stripping. Submit one (1) sample minimum 305 mm by 305 mm (12 inches by 12 inches). In lieu of submitting separate samples for corner section, intermediate section, and panel, one (1) composite sample incorporating all components and features listed may be submitted.
 3. Where normal color variations are anticipated, include two (2) or more units of each sample indicating extreme limits of color variations.
- E. Glass:
1. Specified in Section 08 80 00, GLAZING.
- F. Quality Assurance Submittals:
1. Design Data:
 - a. Submit structural and thermal calculations for complete wall assembly. Structural calculations and design shop drawings signed and sealed by a Professional Engineer (PE).
 2. Factory Test Reports:

- a. Test Reports: Submit certified test reports, for each of following listed tests, from a qualified independent testing laboratory showing that glazed aluminum curtain wall system assembly has been tested in accordance with specified test procedures and complies with performance characteristics as indicated by manufacturer's testing procedures. Submit factory tests required except that where a curtain wall system or component of similar type, size, and design as specified for this project has been previously tested within last year, under conditions specified herein, resulting test reports may be submitted in lieu of listed testing. Submit appropriate testing reports for specific tests indicated below:
 - 1) Deflection and structural tests.
 - 2) Water penetration tests.
 - 3) Air infiltration tests.
 - 4) Delamination tests.
 - 5) Thermal conductance tests.
 - 6) Sound transmission loss test.
- G. Manufacturer's Certificates:
1. Submit Certificates of Compliance, with specification requirements, for the following:
 - a. Metal extrusions.
 - b. Metal accessories.
 - c. Statement(s) that aluminum has been given specified thickness of anodizing or organic coating finish.
 - d. Statement(s) indicating manufacturers and installers conform with qualifications as specified.
 - e. Submit list (minimum of five (5)) of equivalent project size installations for both manufacturer and installer.
- H. Manufacturer's Field Reports:
1. Submit field reports of manufacturer's field representative observations of curtain wall installation indicating observations made during inspection at beginning of project, during middle of installation and at conclusion of project.
- I. Welders: Submit welders qualifications as specified.
- J. Testing Laboratory: Submit Testing Laboratory qualifications.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Refer to AAMA CW 10 for care and handling of architectural aluminum from shop to site.
- B. Prior to packaging for shipment from factory, mark wall components to correspond with shop and erection drawings and their placement location and erection sequence.
- C. Prior to shipment from factory, place knocked-down lineal curtain wall members in cardboard containers and cover finished surfaces of members with protective covering of adhesive paper, waterproof tape, or strippable plastic. Do not cover metal surfaces that will be in contact with sealants after installation.
- D. Inspect materials delivered to site for damage; unload and store with ventilation, free from heavy dust, not subject to combustion products or sources of water, and to permit easy access for inspection and handling. Sealing and caulking compounds, including handling, is to be in accordance with requirements of Section 07 92 00, JOINT SEALANTS.

1.6 PROJECT CONDITIONS:

- A. Field Measurements: Where glazed aluminum curtain wall systems are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying Work.

1.7 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to extent referenced. Publications are referred to in text by basic designation only.
- B. American Architectural Manufacturers Association (AAMA):
 - 1. 501.8-14 Test Method for Determination of Resistance of Human Impact of Window Systems Intended for Use in Psychiatric Applications
 - 2. MCWM-1-89 Metal Curtain Wall Manual
 - 3. CW 10-12 Care and Handling of Architectural Aluminum from Shop to Site
 - 4. CW 11-85 Design Windloads for Buildings and Boundary Layer Wind Tunnel Testing
 - 5. CW 13-85 Structural Sealant Glazing Systems (A Design Guide)
 - 6. TIR A11-04 Maximum Allowable Deflection of Framing Systems for Building Cladding Components of Design Wind Loads
 - 7. 501-05 Methods of Test for Exterior Walls

8. 503-08 Field Testing of Metal Storefronts, Curtain walls and Sloped Glazing Systems
 9. 2605-13 High Performance Organic Coatings on Architectural Extrusions and Panels
- C. American Society of Civil Engineers (ASCE):
1. ASCE 7-10 Minimum Design Loads for Buildings and Other Structures
- D. ASTM International (ASTM):
1. A36/A36M-12 Structural Steel
 2. A123/A123M-13 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 3. A193/A193M-14a Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Service
 4. A307-14 Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
 5. B209-14 Aluminum and Aluminum Alloy Sheet and Plate
 6. B209M-14 Aluminum and Aluminum Alloy Sheet and Plate (Metric)
 7. B211-12 Aluminum and Aluminum Alloy Bar, Rod, Wire
 8. B211M-12 Aluminum and Aluminum Alloy Bar, Rod, Wire (Metric)
 9. B221-14 Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes and Tubes
 10. B221M-13 Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes and Tubes (Metric)
 11. B316/B316M-10 Aluminum and Aluminum Alloy Rivet and Cold-Heading, Wire, and Rods
 12. C578-14a Rigid Cellular Polystyrene Thermal Insulation
 13. C612-14 Mineral Fiber Block and Board Thermal Insulation
 14. C920-14a Elastomeric Joint Sealants
 15. C794-10 Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants.
 16. C1193-13 Guide for Use of Joint Sealants
 17. C1363-11 Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
 18. C1521-13 Practice for Evaluating Adhesion of Installed Weatherproofing
 19. D1037-12 Evaluating the Properties of Wood-Base Fibers and Particle Panel Materials
 20. E84-14 Surface Burning Characteristics of Building Materials

21. E330/E330M-14 Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
 22. E331-00 (R2009) Water Penetration of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference
 23. E413-10 Classification for Rating Sound Insulation
 24. E783-02 (R2010) Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
 25. E1105-00 (R2008) Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors By Uniform or Cyclic Static Air Pressure Differences
- E. American Welding Society, Inc. (AWS):
1. D1.2/D.1.2M-06 (R2014) Structural Welding Code-Aluminum
- F. Military Specifications (MIL):
1. MIL-C-18480 (Rev. B) Coating Compound, Bituminous Solvent, Coal Tar Base
- G. National Association of Architectural Metal Manufacturers (NAAMM):
1. 500 Series (2006) Metal Finishes Manual
- H. Society for Protective Coatings (SSPC)
1. Paint 25-97 (2004) Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel Type I and Type II
 2. Paint 20-82 (2019) Zinc-Rich Coating, Type I-Inorganic, and Type II-Organic.
- I. U.S. Veterans Administration:
1. Physical Security Design Manual for VA Facilities (VAPSDG); Life Safety Protected
 2. Physical Security Design Manual for VA Facilities (VAPSDG); Mission Critical Facilities
 3. Architectural Design Manual for VA Facilities (VASDM)
- J. Environmental Protection Agency (EPA):
1. 40 CFR 59 (2014) National Volatile Organic Compound Emission Standards for Consumer and Commercial Products
- 1.8 WARRANTY:**
- A. Construction Warranty: Comply with FAR clause 52.246-21, "Warranty of Construction".

- B. **Manufacturer Warranty:** Manufacturer shall warranty their glazed aluminum curtain wall system for a minimum of five (5) years from date of installation and final acceptance by the Government. Submit manufacturer warranty.
- C. **Special Finish Warranty, Factory-Applied Finishes:** Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of organic finishes within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION:

- A. **Design Requirements:**
 - 1. **Curtain Wall System:** Tubular aluminum sections with thermal break condition framing, factory prefinished, vision glass, glass; related flashings, anchorage and attachment devices.
 - 2. **System Assembly:** Site assembled.
 - 3. **Maximum wall framing member deflection, in a direction normal to plane of wall:** 1/175 of its clear span or 20 mm (3/4 inch), whichever is less, when designed in accordance with requirements of AAMA TIR A11 and tested in accordance with ASTM E330/E330M.
 - 4. **Maximum wall framing member deflection when a gypsum wallboard surface is affected:** 1/360 of span.
 - 5. **Maximum Framing Member Permanent Deformation:** 0.2 percent of its clear span when tested in accordance with ASTM E330/E330M for a minimum test period of 10 seconds at 1.5 times design wind pressures indicated as part of structural drawing wind load requirements.
- B. No glass breakage, or damage to fasteners, hardware or accessories is permitted due to deformation design requirements indicated.

- a. Provide system complete with framing, mullions, trim, fasteners, anchors, accessories, concealed auxiliary members, and attachment devices for securing wall to structure as specified or indicated. Unless noted otherwise, comply with AAMA MCWM-1.
 - b. Obtain all components of curtain wall system, including framing from single manufacturer.
 - c. Fully coordinate system accessories directly incorporated and adjacent to contiguous related work and ensure materials compatibility, deflection limitations, thermal movements, and clearances and tolerances as indicated or specified. Coordinate continuity with adjacent thermal, weather, air and vapor barriers.
 - d. Provide system with adequate allowances for expansion and contraction of components and fastenings to prevent buckling damage, joint seal failure, glass breakage, undue stress on fastenings or other detrimental effects. For design purposes, base provisions for thermal movement on assumed ambient temperature range of from -18 degrees C to 49 degrees C (0 degrees F to 120 degrees F).
 - e. Provide wall system to accommodate tolerances in building frame and other contiguous work as indicated or specified.
- C. Calculations: Submit professionally prepared calculations to indicate how design requirements for structural loading, thermal, and other performance criteria have been satisfied.

2.2 PERFORMANCE REQUIREMENTS:

- A. Delegated Design: Engage a qualified Professional Engineer, to design glazed aluminum curtain walls.
- B. Conform with system performance requirements specified.
- C. Provide curtain wall components tested in accordance with requirements below and meeting performance requirements specified:
 1. System Design: Design and size components to withstand dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall as calculated in accordance with code.
 2. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with 2018 International Building Code. Provide with the following tolerances.
 - a. Phase I: 3 stroke cycles using .005 x the story height - no damage or failure.

- b. Phase II: 3 stroke cycles using .010 x the story height - no damage or failure.
3. Water Penetration:
 - a. No water penetration is to occur when wall is tested in accordance with ASTM E331 at a differential static test pressure of 20 percent of inward acting design wind pressure as indicated on structural drawings, but not less than 479 Pa (10 psf).
 - b. Make provision in wall construction for adequate drainage to outside of water leakage or condensation that occurs within outer face of wall. Leave drainage and weep openings in members and wall open during test.
4. Air Infiltration: Test glazed aluminum curtain wall system according to AAMA 503, which requires testing according to ASTM E783.
 - a. Static-Air-Differential: 75 Pa (1.57 lbf/sq. ft.) minimum.
 - b. Air Leakage: 0.03 L/s per sq. m (0.06 cfm/sq. ft.) of surface maximum.
5. Deflections Test: ASTM E330/E330M, Procedure B:
 - a. No member is to deflect in a direction parallel to plane of wall, when carrying its full design load, more than an amount which will reduce edge cover or glass bite below 75 percent of design dimension. No member after deflection under full design load, is to have a clearance between itself and top of panel, glass, sash, or other part immediately below it less than 3 mm (1/8 inch); clearance between member and an operable window or door is to be minimum 1.5 mm (1/16 inch).
6. Delamination Test:
 - a. Adhesively bonded metal-faced panels are to show no evidence of delamination, warpage or other deterioration or damage when subjected to the six "Accelerated Aging Cycles" specified in ASTM D1037.
7. Thermal Conductance Tests: ASTM C1363.
 - a. The thermal transmittance of opaque panels are not to exceed a U-value, Btu/hr./sq. ft./ degree F, as required and indicated on construction documents for exterior wall system, when tested in accordance with ASTM C1363. Average calculated thermal transmittance of complete wall assembly including panels, windows, and all other components are not to exceed a U-value of 0.38.

8. Sound Attenuation Through Wall System (Interior to Interior):
 - a. STC 40, measured in accordance with ASTM E413.

2.3 MATERIALS:

- A. Extruded Aluminum Framing Members: ASTM B221M (B221); 6063-T5 extruded aluminum for non-structural components or 6063-T6 extruded aluminum for structural members; temper and alloy as recommended by manufacturer.
- B. Sheet Aluminum: ASTM B209M (B209); 6065-T5 temper and alloy as recommended by manufacturer.
 1. Formed flashing and closures: Minimum 1.58 mm (0.062 inch) thick aluminum, in finish as selected.
 2. Extruded sill members: Minimum 1.58 mm (0.062 inch) thick aluminum, in finish as selected.
- C. Steel Sections: ASTM A36/A36M.
- D. Primer: TS TT-P-645; red, for shop application and field touch-up.
- E. Fasteners:
 1. For Exterior Cap Retainers: ASTM A193/A193M B8 300 series, stainless steel screws.
 2. For Framework Connections: ASTM B211M (B211) 2024-T4 aluminum, ASTM A193/A193M B8 300 series, stainless steel, and ASTM B316 aluminum rivets, as required by connection.
 3. For Anchoring Glazed Aluminum Curtain Wall to Support Structure: ASTM A307 zinc plated steel fasteners.
- F. Shims: Metal or plastic.
- G. Joint Sealants and Accessories:
 1. In accordance with requirements specified in Section 07 92 00, JOINT SEALANTS.
 2. Structural Flush Glazed Joints: High performance silicone sealant applied in accordance with manufacturer's recommendations.
 3. Non-structural Flush Glazed Joints and Weather Seal Joints: Silicone sealants applied in accordance with manufacturer's recommendations.
 4. Sealants used inside the weatherproofing system are to have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, (EPA Method 24).
 5. Comply with recommendations of sealant manufacturer for specific sealant selections.

6. Provide only sealants that have been tested per ASTM C794 to exhibit adequate adhesion to samples of glass and metal equivalent to those required for project.
7. Exposed Metal to Metal Joints: Silicone sealant selected from manufacturer's standard colors.

H. Glazing Materials:

1. As specified under Section 08 80 00, GLAZING.
2. Glazing Gaskets:
 - a. Exterior: Continuous EPDM gaskets at each glass and spandrel panel.
 - b. Interior: Continuous, closed cell PVC foam sealant tape, sealed at corners.
3. Glass Sizes and Clearances:
 - a. Accommodates up to 25 mm (1 inch) glazing.
 - b. Sizes indicated are nominal. Verify actual sizes required by measuring frames. Coordinate dimensions for glass and glass holding members to meet applicable minimum clearances as recommended by glass manufacturer. Do not nip glass to remove flares or to reduce oversized dimensions. All cutting is to occur in the factory.
4. Glass Setting Materials:
 - a. Provide head bead and drive wedge required for glass installation to suit curtain wall system in accordance with manufacture's recommendations.

I. Firestopping: Refer to Section 07 84 00, FIRESTOPPING for requirements.

2.4 FABRICATION:

- A. Curtain wall components are to be of materials and thickness indicated in construction documents. Details indicated are representative of required design and profiles. Maintain sightlines. Unless specifically indicated or specified otherwise, methods of fabrication and assembly are to be at discretion of curtain wall manufacturer. Perform fitting and assembling of components in shop to maximum extent practicable. Anchorage devices are to permit adjustment in three directions. No exposed fasteners are permitted.
- B. Joints: Joints exceeding +1.5 mm (+1/16") are to be mechanically fastened.
- C. Ventilation and Drainage: Direct water leakage to exterior by means of concealed drainage system and weeps. Flashings and other materials used internally are to be nonstaining, noncorrosive, and nonbleeding.
- D. Protection and Treatment of Metals:

1. Remove from metal surfaces lubricants used in fabrication and clean off other extraneous material before leaving shop.
 2. Provide protection against galvanic action wherever dissimilar metals are in contact, except in case of aluminum in permanent contact with galvanized steel, zinc, stainless steel, or relatively small areas of white bronze. Paint contact surfaces with one coat bituminous paint conforming to MIL-C-18480 or apply appropriate caulking material or non-absorptive, noncorrosive, and nonstaining tape or gasket between contact surfaces.
- E. Metal sills and Closures: Fabricate accessories, spandrel panels, trim closures of sizes and shapes indicated from similar materials and finish as specified for wall system.

2.5 METAL FINISHES:

- A. In accordance with NAAMM AMP500 series.
- B. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 1. Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Color as specified in Section 09 06 00, SCHEDULE FOR FINISHES.
- C. Apply one (1) coat of bituminous paint to concealed aluminum surfaces one (1) in contact with cementitious or dissimilar materials.

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Prior to installation of glazed curtain wall system, arrange for representative(s) of manufacturer to examine structure and substrate to determine that they are properly prepared, and ready to receive glazed curtain wall work included herein.
- B. Verifying Conditions and Adjacent Surfaces: After establishment of lines and grades and prior to system installation examine supporting structural elements. Verify governing dimensions, including floor elevations, floor to floor heights, minimum clearances between curtain wall and structural frames, and other permissible dimensional tolerances in building frame.

3.2 PREPARATION:

- A. Take field dimensions and examine the condition of substrates, supports, and other conditions under which work of this section is to be performed to verify that work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Contact between aluminum and dissimilar metals are to receive a protective coating of bituminous paint for prevention of electrolytic action and corrosion.

3.3 INSTALLATION:

- A. Install and erect glazed curtain wall system and all components in accordance with written directions of curtain wall manufacturer. Match profiles, sizes, and spacing indicated on approved shop drawings.
- B. Bench Marks and Reference Points: Establish and permanently mark bench marks for elevations and building line offsets for alignment at convenient points on each floor level. Should any error or discrepancy be discovered in location of marks, stop erection work in that area until discrepancies have been corrected.
- C. Ensure that drainage system operates properly in accord with AAMA 501 procedures.
- D. Do not proceed with structural silicone work when metal temperature is below 0 degrees C (32 degrees F).
- E. Isolate between aluminum and dissimilar metals with protective coating or plastic strip to prevent electrolytic corrosion.
- F. Install glazed aluminum curtain wall system so as to maintain a virtually flat face cap, with no visible bowing.
- G. Install entire system so that fasteners are not visible.
- H. Tolerances:
 - 1. Maximum variation from plane or location shown on approved shop drawings: 3 mm per 3657 mm (1/8 inch per 12 feet) of length up to not more than 13 mm (1/2 inch) in any total length.
 - 2. Maximum offset from true alignment between two (2) identical members abutting end to end in line: 0.8 mm (1/32 inch).
 - 3. Sealant Space Between Curtain Wall Mullion and Adjacent Construction: Maximum of 19 mm (3/4 inch) and minimum of 6 mm (1/4 inch).
- I. Joint Sealants:

1. Joint Sealants: Are to be in accordance with requirements of Section 07 92 00, JOINT SEALANTS.
2. Surfaces to be primed and sealed are to be clean, dry to touch, free from frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter. Enclose joints on three sides. Clean out grooves to proper depth. Joint dimensions are to conform to approved detail drawings with a tolerance of plus 3 mm (1/8 inch). Do not apply compound unless ambient temperature is between 5 and 35 degrees C (40- and 90-degrees F). Clean out loose particles and mortar just before sealing. Remove protective coatings or coverings from surfaces in contact with sealants before applying sealants or tapes. Solvents used to remove coatings are to be of type that leave no residue on metals.
3. Match approved sample. Force compound into grooves with sufficient pressure to fill grooves solidly. Sealing compound is to be uniformly smooth and free of wrinkles and, unless indicated otherwise, is to be tooled and left sufficiently convex to result in a flush joint when dry. Do not trim edges of sealing material after joints are tooled. Mix only amount of multi-component sealant which can be installed within four (4) hours, but at no time is this amount exceed 19 liters (5 gallons).
4. Apply primer to masonry, concrete, wood, and other surfaces as recommended by sealant manufacturer. Do not apply primer to surfaces which will be exposed after sealant work is completed.
5. Tightly pack backing in bottom of joints which are over 13 mm (1/2 inch) in depth with specified backing material to depth indicated in construction documents. Roll backing material of hose or rod stock into joints to prevent lengthwise stretching.
6. Install bond preventive material at back or bottom of joint cavities in which no backstop material is required, covering full width and length of joint cavities.

7. Remove compound smears from surfaces of materials adjacent to sealed joints as work progresses. Use masking tape on each side of joint where texture of adjacent material will be difficult to clean. Remove masking tape immediately after filling joint. Scrape off fresh compound from adjacent surfaces immediately and rub clean with solvent approved by sealant and curtain wall manufacturers. Upon completion of sealing, remove remaining smears, stains, and other soiling, and leave work in clean neat condition.

J. Glass:

1. Refer to Section 08 80 00, GLAZING, and drawings for glass types. Install in accordance with manufacturer's recommendations as modified herein.
2. Before installing glass, inspect sash and frames to receive glass for defects such as dimensional variations, glass clearances, open joints, or other conditions that will prevent satisfactory glass installation. Do not proceed with installation until defects have been corrected.
3. Clean sealing surfaces at perimeter of glass and sealing surfaces of rebates and stop beads before applying glazing compound, sealing compound, glazing tape, or gaskets.
4. Use only approved solvents and cleaning agents recommended by compound or gasket manufacturer and by curtain wall manufacturer.
5. Provide sashes designed for outside glazing.
6. Provide continuous snap in glazing beads to suit glass as specified.
7. Insulating and tempered glass, and glass of other types that exceed 2540 mm (100 united inches) in size: Provide void space at head and jamb to allow glass to expand or move without exuding sealant. Provide perimeter frames and ventilator sections with glazing rebates for unobstructed glazing surface 19 mm (3/4 inch) in height. Glazing rebate surfaces must be sloped to shed water.
8. Provide adequate means to weep incidental water and condensation away from sealed edges of insulated glass units and out of wall system. Provide weeping of lock-strip gaskets in accordance with recommendation of glass manufacturer.

3.4 ADJUSTING:

- A. Adjust weather-stripping to make even contact with surfaces.
- B. Adjust operating hardware and moving parts.

3.5 CLEANING:

- A. Install curtain wall frame and associated metal to avoid soiling or smudging finish.
- B. Clean metal surfaces promptly after installation, exercising care to avoid damage to coatings.
- C. Remove excess glazing and sealant compounds, dirt, and other substances.
- D. Follow recommendations of manufacturer in selection of cleaning agents. Do not use cleaning agents containing ammonia or other compounds that might damage finished metal surfaces.
- E. Replace cracked, broken, and defective glass with new glass at no additional cost to Government. Just prior to final acceptance of curtain wall system clean glass surfaces on both sides, remove labels, paint spots, compounds, and other defacements, and clean metal fixed panels. Remove and replace components that cannot be cleaned successfully.

3.6 FIELD QUALITY CONTROL:

- A. Testing Agency: Engage an AAMA accredited commercial qualified independent testing and inspecting agency to perform field quality-control tests specified, and to prepare test reports: Submit information regarding testing laboratory's facilities and qualifications of technical personnel to COR for approval.
- B. Conduct field check test for water leakage on designated wall areas after erection to comply with AAMA MCWM-1. Conduct test on two (2) wall areas, two (2) bays wide by two (2) stories high where directed. Conduct test and take necessary remedial action as directed by COR.
- C. Test Specimen:
 - 1. Test specimen is to include curtain wall assembly and construction. Test chamber is to be affixed to exterior side of test specimen and test is to be conducted using positive static air pressure.
 - 2. Test specimens are to be selected by COR after curtain wall system has been installed in accordance with construction documents.
- D. Sealant Adhesion Tests: Test installed sealant, in presence of sealant manufacturer's field representative, in a minimum of two (2) areas and as follows:
 - 1. Test weatherseal sealant adhesion to joint substrates according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.

- E. Air Infiltration: Test glazed aluminum curtain wall system according to AAMA 503, which requires testing according to ASTM E783 and to values indicated below, whichever is more stringent.
1. Field air leakage testing is not required for continuous curtain wall systems.
 2. Static-Air-Pressure Differential: 75 Pa (1.57 lbf/sq. ft.) minimum.
 3. Air Leakage: 0.03 L/s per sq. m (0.06 cfm/sq. ft.) of surface maximum.
- F. Water Penetration: Test glazed aluminum curtain wall system for compliance with requirements according to AAMA 503, which requires testing according to ASTM E1105.
1. Uniform Static-Air-Pressure Difference: 20 percent of positive design wind load, but not less than 479 Pa (10 psf). No uncontrolled water is to be present.
- G. Retesting:
1. Should the system fail field test, system may be modified or repaired, and retested.
 2. Should the system fail second field test, system may be additionally modified or repaired, and retested.
 3. All modifications and repairs made to tested areas are to be recorded, and same modifications and repairs made to all system and adjacent construction on project.
 4. Should the second test fail, COR may require testing of additional areas of the curtain wall.
- H. Rejection:
1. Failure of any of specimens to meet test requirements of third test is cause for rejection of wall system and adjacent construction on project.

3.7 PROTECTION:

- A. After installation, protect windows, and other exposed surfaces from disfiguration, contamination, contact with harmful materials, and from other construction hazards that will interfere with their operation, or damage their appearance or finish. Protection methods are to be in accordance with recommendations of product manufacturers or of respective trade associations. Remove paper or tape factory applied protection immediately after installation. Clean surfaces of mortar, plaster, paint, smears of sealants, and other foreign matter to present neat appearance and prevent fouling of operation. In addition, wash with a stiff fiber brush, soap and water, and thoroughly rinse. Where surfaces become stained or discolored, clean or restore finish in accordance with recommendations of product manufacturer or respective trade association.

- - - END - - -

SECTION 08 52 00
ALUMINUM-CLAD WOOD WINDOWS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Section includes aluminum-clad wood windows for exterior and all wood window for interior.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review, discuss, and coordinate the interrelationship of wood windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.
 - 3. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
 - 4. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.3 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for wood windows.
- C. Shop Drawings: For wood windows.
 - 1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- D. Samples: For each exposed product and for each color specified, 2 by 4 inches in size.
- E. Product Schedule: For wood windows. Use same designations indicated on Drawings.
- F. Qualification Data: For Installer.
- G. Product Test Reports: For each type of wood window, for tests performed by a qualified testing agency.

- H. Field quality-control reports.
- I. Sample Warranties: For manufacturer's warranties.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An installer acceptable to wood window manufacturer for installation of units required for this Project.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockup of typical wall area as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."
- B. Manufacturer's Warranty: Manufacturer agrees to repair or replace wood windows that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, and air infiltration.
 - c. Faulty operation of movable sash and hardware.
 - d. Deterioration of materials and finishes beyond normal weathering.
 - e. Failure of insulating glass.
 - 2. Warranty Period:
 - a. Window: 10 years from date of Substantial Completion.
 - b. Glazing Units, Nonlaminated: 20 years from date of Substantial Completion.
 - c. Glazing Units, Laminated: 10 years from date of Substantial Completion.
 - d. Aluminum-Cladding Finish: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS.

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Source Limitations: Obtain wood windows from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Window Certification: WDMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
 - 1. Minimum Performance Class: CW.
 - 2. Minimum Performance Grade: 50.
- C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.32 Btu/sq. ft. x h x deg F.
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.38.
- E. Windborne-Debris Impact Resistance: Passes ASTM E 1886 missile-impact and cyclic-pressure tests in accordance with ASTM E 1996 for Wind Zone 4 for enhanced protection.
 - 1. Large-Missile Test: For glazing located within 30 feet of grade.
 - 2. Small-Missile Test: For glazing located between 30 feet and 60 feet above grade.
- F. Comply with blast-resistant design requirements of the VA Physical Security and Resiliency Design Manual:
 - 1. Design Blast Load: 4 psi maximum pressure and 28 psi-ms maximum impulse.

2.3 WOOD WINDOWS

- A. Aluminum-Clad Wood Windows:
 - 1. Manufacturers: Subject to compliance with requirements, provide Pella Architect Series or comparable product by one of the following:
 - a. Jeld-Wen, Inc.
 - b. Marvin Windows and Doors.
- B. Wood Windows:
 - 1. Interior location in vestibule to match style of exterior windows.
 - 2. Manufacturers: Subject to compliance with requirements, provide Pella Architect Series or comparable product by one of the following:

- a. Jeld-Wen, Inc.
 - b. Marvin Windows and Doors.
- C. Operating Types: Provide the following operating types in locations indicated on Drawings:
1. Double hung.
 2. Fixed.
- D. Frames and Sashes: Fine-grained wood lumber complying with AAMA/WDMA/CSA 101/I.S.2/A440; kiln dried to a moisture content of not more than 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch deep by 2 inches wide; water-repellent preservative treated.
1. Exterior Finish: Aluminum-clad wood.
 - a. Aluminum Finish: Manufacturer's standard fluoropolymer two-coat system with fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight and complying with AAMA 2605.
 - b. Color: As selected by Architect from manufacturer's full range.
 2. Interior Finish: Manufacturer's standard color-coated finish.
 - a. Color: As selected by Architect from manufacturer's full range.
- E. Glass: Clear annealed glass, ASTM C 1036, Type 1, Class 1, q3.
1. Kind: Fully tempered where indicated on Drawings.
- F. Insulating-Glass Units: ASTM E 2190.
1. Glass: ASTM C 1036, Type 1, Class 1, q3.
 - a. Tint: Clear.
 - b. Kind: Fully tempered where indicated on Drawings.
 2. Lites: Two.
 3. Filling: Fill space between glass lites with argon.
 4. Low-E Coating: Sputtered on second or third surface.
- G. Blast-Impact-Resistant Insulating-Glass Units: ASTM E 2190 with two lites and complying with impact-resistance requirements in "Window Performance Requirements" Article.
1. Exterior Lite: ASTM C 1036, Type 1, Class 1, q3.
 - a. Tint: Clear.
 - b. Kind: Fully tempered.
 2. Interior Lite: ASTM C 1172 clear laminated glass with two plies of float glass.
 - a. Float Glass: As required by performance requirements indicated.

- b. Interlayer Thickness: As required by performance requirements indicated.
- 3. Filling: Fill space between glass lites with argon.
- 4. Low-E Coating: Sputtered on second or third surface.
- H. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- I. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.
 - 1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- J. Hung Window Hardware:
 - 1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
 - 2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only. Provide custodial locks.
 - 3. Tilt Hardware: Releasing tilt latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.
- K. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
- L. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
 - 1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.4 ACCESSORIES

- A. Dividers (False Muntins): Provide divider grilles in designs indicated for each sash lite.
 - 1. Quantity and Type: Three per sash, two permanently located at exterior and interior lites and one permanently located between insulating-glass lites.
 - 2. Material: Manufacturer's standard.
 - 3. Pattern: As indicated on Drawings.

4. Profile: As selected by Architect from manufacturer's full range.
5. Color: As selected by Architect from manufacturer's full range.

2.5 INSECT SCREENS

- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
 1. Type and Location: Full, outside for double-hung sashes.
- B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
 1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
 2. Finish for Exterior Screens: Matching color and finish of cladding.
- C. Glass-Fiber Mesh Fabric: 18-by-14 or 18-by-16 mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D 3656/D 3656M.
 1. Mesh Color: Manufacturer's standard Insert color.

2.6 FABRICATION

- A. Fabricate wood windows in sizes indicated. Include a complete system for installing and anchoring windows.
- B. Glaze wood windows in the factory.
- C. Weather strip each operable sash to provide weathertight installation.
- D. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.
- E. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in the manufacturer's written instructions, comply with installation requirements in ASTM E 2112.
- B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
 - 1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502.
 - 2. Air-Infiltration Testing:
 - a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.
 - b. Allowable Air-Leakage Rate: [1.5] <Insert number> times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.

3. Water-Resistance Testing:

a. Test Pressure: [Two-thirds] <Insert number> times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.

b. Allowable Water Infiltration: No water penetration.

4. Testing Extent: [Three] [Three mockup] <Insert number or description> windows of each type as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested after perimeter sealants have cured.

5. Test Reports: Prepared according to AAMA 502.

C. Windows will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.

1. Keep protective films and coverings in place until final cleaning.

C. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

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SECTION 08 56 59

SERVICE WINDOW DEAL TRAYGENERAL

1.1 SUMMARY

A. Section Includes:

1. Deal tray at location indicated on Drawings.

1.2 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. ASTM International (ASTM):

1. A240/A240M-15b - Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
2. F593-13 - Stainless Steel Bolts, Hex Cap Screws, and Studs.
3. F594-09e1 - Stainless Steel Nuts.
4. F1233-08(2013) - Security Glazing Materials and Systems.

C. National Association of Architectural Metal Manufacturers (NAAMM):

1. AMP 500-06 - Metal Finishes Manual.

1.3 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings: Service windows, showing design, construction and installation.

1. Indicate size, configuration, and fabrication and installation details.
2. Indicate bullet resistant reinforcing for metal components.

C. Manufacturer's Literature and Data: Service windows.

1. Description of each product.

D. Test reports: Report bullet resistance level.

E. Certificates: Certify products comply with specified bullet resistance rating.

1.4 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Service Window Deal Tray Units: Factory fabricated, assembled unit; bullet resistant type.

1. Frame: Stainless steel with integral counter, oversized deal tray, and jamb openings to permit voice communication through window.
2. Other Deal Trays: Manufacturer's standard complying with specified UL 752 bullet resistance level.

2.2 SYSTEM PERFORMANCE

- A. Design service and teller deal tray complying with specified performance:
 1. Forced Entry Resistance: ASTM F1233; Threat Class 3 using basic hand tools.

2.3 MATERIALS

- A. Stainless Steel: ASTM A240/A240M; Type 304, 3 mm (0.12 inch) thick, minimum.

2.4 FABRICATION

- A. Form stainless steel fabrications to sizes, profiles, and configurations indicated on Drawings.
- B. Deal Tray: Stainless steel.
 1. Incorporate deal tray into sill, without visible seams.

2.5 FINISHES

- A. Stainless Steel: NAAMM AMP 500; No. 4 polished finish.
- B. Blend welds to match adjacent finish.

2.6 ACCESSORIES

- A. Fasteners: ASTM F593 and ASTM F594, stainless steel.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.

3.2 INSTALLATION

- A. Install products according to manufacturer's instructions and approved submittal drawings.
- B. Install service and teller window units according to manufacturer's installation instructions.
- C. Set units accurately, plumb, and level.
- D. Securely anchor to partition framing as shown on submittal drawings to withstand ballistic and forced entry forces.

3.3 CLEANING

- A. Clean exposed window unit surfaces. Remove temporary labels, contaminants, and stains.
- B. Polish stainless steel surfaces for uniform appearance.

3.4 PROTECTION

- A. Protect window units from construction operations.
- B. Remove protective materials immediately before acceptance.
- C. Repair damage.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 08 71 00
DOOR HARDWARE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Door hardware and related items necessary for complete installation and operation of doors.

1.2 RELATED WORK

- A. Caulking: Section 07 92 00 JOINT SEALANTS.
- B. Application of Hardware: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES; Section 08 14 23, IMPACT RESISTANT WOOD DOORS; Section 08 14 33, ALUMINUM-CLAD WOOD DOORS; Section 08 17 10, INTEGRATED DOOR ASSEMBLIES; Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS; Section 08 71 13.11, LOW ENERGY DOOR OPERATORS.
- C. Finishes: Section 09 06 00, SCHEDULE FOR FINISHES.
- D. Painting: Section 09 91 00, PAINTING.
- E. Card Readers: Section 28 13 11, PHYSICAL ACCESS CONTROL SYSTEMS.
- F. Electrical: Division 26, ELECTRICAL.
- G. Fire Detection: Section 28 31 00, FIRE DETECTION AND ALARM.

1.3 GENERAL

- A. All hardware shall comply with ABAAS, (Architectural Barriers Act Accessibility Standard) unless specified otherwise.
- B. Provide rated door hardware assemblies where required by most current version of the International Building Code (IBC).
- C. Hardware for Labeled Fire Doors and Exit Doors: Conform to requirements of NFPA 80 for labeled fire doors and to NFPA 101 for exit doors, as well as to other requirements specified. Provide hardware listed by UL, except where heavier materials, large size, or better grades are specified herein under paragraph HARDWARE SETS. In lieu of UL labeling and listing, test reports from a nationally recognized testing agency may be submitted showing that hardware has been tested in accordance with UL test methods and that it conforms to NFPA requirements.
- D. Hardware for application on metal and wood doors and frames shall be made to standard templates. Furnish templates to the fabricator of these items in sufficient time so as not to delay the construction.
- E. The following items shall be of the same manufacturer, except as otherwise specified:

1. Mortise locksets.
2. Hinges for hollow metal and wood doors.
3. Surface applied overhead door closers.
4. Exit devices.
5. Floor closers.

1.4 WARRANTY

- A. Automatic door operators shall be subject to the terms of FAR Clause 52.246-21, except that the Warranty period shall be two years in lieu of one year for all items except as noted below:
1. Locks, latch sets, and panic hardware: 5 years.
 2. Door closers and continuous hinges: 10 years.

1.5 MAINTENANCE MANUALS

- A. In accordance with Section 01 00 00, GENERAL REQUIREMENTS Article titled "INSTRUCTIONS", furnish maintenance manuals and instructions on all door hardware. Provide installation instructions with the submittal documentation.

1.6 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. Submit 6 copies of the schedule per Section 01 33 23. Submit 2 final copies of the final approved schedules to VAMC Locksmith as record copies (VISN Locksmith if the VAMC does not have a locksmith).
- B. Hardware Schedule: AHC certified hardware consultant to prepare and submit hardware schedule in the following form:

Hardware Item	Quantity	Size	Reference Publication Type No.	Finish	Mfr. Name and Catalog No.	Key Control Symbols	UL Mark (if fire rated and listed)	ANSI/BHMA Finish Designation

- C. Samples and Manufacturers' Literature:
1. Samples: All hardware items (proposed for the project) that have not been previously approved by Builders Hardware Manufacturers

- Association shall be submitted for approval. Tag and mark all items with manufacturer's name, catalog number and project number.
2. Samples are not required for hardware listed in the specifications by manufacturer's catalog number, if the contractor proposes to use the manufacturer's product specified.
- D. Certificate of Compliance and Test Reports: Submit certificates that hardware conforms to the requirements specified herein. Certificates shall be accompanied by copies of reports as referenced. The testing shall have been conducted either in the manufacturer's plant and certified by an independent testing laboratory or conducted in an independent laboratory, within four years of submittal of reports for approval.

1.7 DELIVERY AND MARKING

- A. Deliver items of hardware to job site in their original containers, complete with necessary appurtenances including screws, keys, and instructions. Tag one of each different item of hardware and deliver to COR for reference purposes. Tag shall identify items by Project Specification number and manufacturer's catalog number. These items shall remain on file in COR's office until all other similar items have been installed in project, at which time the COR will deliver items on file to Contractor for installation in predetermined locations on the project.

1.8 PREINSTALLATION MEETING

- A. Convene a preinstallation meeting not less than 30 days before start of installation of door hardware. Require attendance of parties directly affecting work of this section, including Contractor and Installer, Architect, Project Engineer and VA Locksmith, Hardware Consultant, and Hardware Manufacturer's Representative. Review the following:
1. Inspection of door hardware.
 2. Job and surface readiness.
 3. Coordination with other work.
 4. Protection of hardware surfaces.
 5. Substrate surface protection.
 6. Installation.
 7. Adjusting.
 8. Repair.
 9. Field quality control.

10. Cleaning.

1.9 INSTRUCTIONS

- A. Hardware Set Symbols on Drawings: Except for protective plates, door stops, mutes, thresholds and the like specified herein, hardware requirements for each door are indicated on drawings by symbols. Symbols for hardware sets consist of letters (e.g., "HW") followed by a number. Each number designates a set of hardware items applicable to a door type.
- B. Keying: All cylinders shall be keyed into existing Grand Master Key System. Provide removable core cylinders that are removable only with a special key or tool without disassembly of knob or lockset. Cylinders shall be 7 pin type. Keying information shall be furnished at a later date by the COR.
- C. Keying: A new Great Grandmaster key shall be established for this project. The key system shall be small format (Best size and profile) removable core type as previously described. The key blanks shall be protected by a utility patent with a minimum seven years remaining on the patent from the start of construction, and protected by contract-controlled distribution. The manufacturer shall furnish code pattern listings in both paper and electronic formats so keys may be reproduced by code.; provide electronic format in file type required by project's key control software. The manufacturer shall design the new key system with the capacity to rekey the existing system and also provide for 25 percent expansion capability beyond this requirement. Submit a keying chart for approval showing proposed keying layout and listing expansion capacity.
1. Keying information will be furnished to the Contractor by the COR.
 2. Supply information regarding key control of cylinder locks to manufacturers of equipment having cylinder type locks. Notify COR immediately when and to whom keys or keying information is supplied. Return all such keys to the COR.

1.10 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. In text, hardware items are referred to by series, types, etc., listed in such specifications and standards, except as otherwise specified.

B. ASTM International (ASTM):

- F883-13.....Padlocks
- E2180-18.....Standard Test Method for Determining the
Activity of Incorporated Antimicrobial Agent(s)
In Polymeric or Hydrophobic Materials

C. American National Standards Institute/Builders Hardware Manufacturers
Association (ANSI/BHMA):

- A156.1-06.....Butts and Hinges
- A156.2-03.....Bored and Pre-assembled Locks and Latches
- A156.3-08.....Exit Devices, Coordinators, and Auto Flush Bolts
- A156.4-08.....Door Controls (Closers)
- A156.5-14.....Cylinders and Input Devices for Locks.
- A156.6-05.....Architectural Door Trim
- A156.8-05.....Door Controls-Overhead Stops and Holders
- A156.11-14.....Cabinet Locks
- A156.12-05Interconnected Locks and Latches
- A156.13-05.....Mortise Locks and Latches Series 1000
- A156.14-07Sliding and Folding Door Hardware
- A156.15-06.....Release Devices-Closer Holder, Electromagnetic
and Electromechanical
- A156.16-08.....Auxiliary Hardware
- A156.17-04Self-Closing Hinges and Pivots
- A156.18-06.....Materials and Finishes
- A156.20-06Strap and Tee Hinges, and Hasps
- A156.21-09.....Thresholds
- A156.22-05.....Door Gasketing and Edge Seal Systems
- A156.23-04.....Electromagnetic Locks
- A156.24-03.....Delayed Egress Locking Systems
- A156.25-07Electrified Locking Devices
- A156.26-06.....Continuous Hinges
- A156.28-07Master Keying Systems
- A156.29-07Exit Locks and Alarms
- A156.30-03High Security Cylinders
- A156.31-07Electric Strikes and Frame Mounted Actuators
- A156.36-10.....Auxiliary Locks
- A250.8-03.....Standard Steel Doors and Frames

D. National Fire Protection Association (NFPA):

80-10.....Fire Doors and Other Opening Protectives

101-09.....Life Safety Code

E. Underwriters Laboratories, Inc. (UL):

Building Materials Directory (2008)

PART 2 - PRODUCTS

2.1 BUTT HINGES

A. ANSI A156.1. Provide only three-knuckle hinges, except five-knuckle where the required hinge type is not available in a three-knuckle version (e.g., some types of swing-clear hinges). The following types of butt hinges shall be used for the types of doors listed, except where otherwise specified:

1. Exterior Doors: Type A2112/A5112 for doors 900 mm (3 feet) wide or less and Type A2111/A5111 for doors over 900 mm (3 feet) wide. Hinges for exterior outswing doors shall have non-removable pins. Hinges for exterior fire-rated doors shall be of stainless steel material.
2. Interior Doors: Type A8112/A5112 for doors 900 mm (3 feet) wide or less and Type A8111/A5111 for doors over 900 mm (3 feet) wide. Hinges for doors exposed to high humidity areas (shower rooms, toilet rooms, kitchens, janitor rooms, etc. shall be of stainless steel material.

B. Provide quantity and size of hinges per door leaf as follows:

1. Doors up to 1210 mm (4 feet) high: 2 hinges.
2. Doors 1210 mm (4 feet) to 2260 mm (7 feet 5 inches) high: 3 hinges minimum.
3. Doors greater than 2260 mm (7 feet 5 inches) high: 4 hinges.
4. Doors up to 900 mm (3 feet) wide, standard weight: 114 mm x 114 mm (4-1/2 inches x 4-1/2 inches) hinges.
5. Doors over 900 mm (3 feet) to 1065 mm (3 feet 6 inches) wide, standard weight: 127 mm x 114 mm (5 inches x 4-1/2 inches).
6. Doors over 1065 mm (3 feet 6 inches) to 1210 mm (4 feet), heavy weight: 127 mm x 114 mm (5 inches x 4-1/2 inches).
7. Provide heavy-weight hinges where specified.
8. At doors weighing 330 kg (150 pounds) or more, furnish 127 mm (5 inch) high hinges.

C. See Articles "MISCELLANEOUS HARDWARE" and "HARDWARE SETS" for pivots and hinges other than butts specified above and continuous hinges specified below.

2.2 CONTINUOUS HINGES

- A. ANSI/BHMA A156.26, Grade 1-600.
 - 1. Listed under Category N in BHMA's "Certified Product Directory."
- B. General: Minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete
- C. Continuous, Barrel-Type Hinges: Hinge with knuckles formed around a Teflon-coated 6.35mm (0.25-inch) minimum diameter pin that extends entire length of hinge.
 - 1. Base Metal for Exterior Hinges: Stainless steel.
 - 2. Base Metal for Interior Hinges: Stainless steel.
 - 3. Base Metal for Hinges for Fire-Rated Assemblies: Stainless steel.
 - 4. Provide with non-removable pin (hospital tip option) at lockable outswing doors.
 - 5. Where required to clear adjacent casing, trim, and wall conditions and allow full door swing, provide wide throw hinges of minimum width required.
 - 6. Provide with manufacturer's cut-outs for separate mortised power transfers and/or mortised automatic door bottoms where they occur.
 - 7. Where thru-wire power transfers are integral to the hinge, provide hinge with easily removable portion to allow easy access to wiring connections.
 - 8. Where models are specified that provide an integral wrap-around edge guard for the hinge edge of the door, provide manufacturer's adjustable threaded stud and machine screw mechanism to allow the door to be adjusted within the wrap-around edge guard.

2.3 DOOR CLOSING DEVICES

- A. Closing devices shall be products of one manufacturer.

2.4 OVERHEAD CLOSERS

- A. Conform to ANSI A156.4, Grade 1.
- B. Closers shall conform to the following:
 - 1. The closer shall have minimum 50 percent adjustable closing force over minimum value for that closer and have adjustable hydraulic back check effective between 60 degrees and 85 degrees of door opening.
 - 2. Where specified, closer shall have hold-open feature.

3. Size Requirements: Provide multi-size closers, sizes 1 through 6, except where multi-size closer is not available for the required application.
4. Material of closer body shall be forged or cast.
5. Arm and brackets for closers shall be steel, malleable iron or high strength ductile cast iron.
6. Where closers are exposed to the exterior or are mounted in rooms that experience high humidity, provide closer body and arm assembly of stainless steel material.
7. Closers shall have full size metal cover; plastic covers will not be accepted.
8. Closers shall have adjustable hydraulic back-check, separate valves for closing and latching speed, adjustable back-check positioning valve, and adjustable delayed action valve.
9. Provide closers with any accessories required for the mounting application, including (but not limited to) drop plates, special soffit plates, spacers for heavy-duty parallel arm fifth screws, bull-nose or other regular arm brackets, longer or shorter arm assemblies, and special factory templating. Provide special arms, drop plates, and templating as needed to allow mounting at doors with overhead stops and/or holders.
10. Closer arms or backcheck valve shall not be used to stop the door from overswing, except in applications where a separate wall, floor, or overhead stop cannot be used.
11. Provide parallel arm closers with heavy duty rigid arm.
12. Where closers are to be installed on the push side of the door, provide parallel arm type except where conditions require use of top jamb arm.
13. Provide all surface closers with the same body attachment screw pattern for ease of replacement and maintenance.
14. All closers shall have a 1 ½" (38mm) minimum piston diameter.

2.5 FLOOR CLOSERS AND FLOOR PIVOT SETS

- A. Comply with ANSI A156.4. Provide stainless steel floor plates for floor closers and floor pivots, except where metal thresholds occur. Provide cement case for all floor closers. Floor closers specified for fire doors shall comply with Underwriters Laboratories, Inc., requirements for concealed type floor closers for classes of fire doors indicated on

drawings. Hold-open mechanism, where required, shall engage when door is opened 105 degrees, except when door swing is limited by building construction or equipment, the hold-open feature shall engage when door is opened approximately 90 degrees. The hold-open mechanism shall be selectable on/off by turning a screw through the floor plate. Floor closers shall have adjustable hydraulic back-check, adjustable close speed, and adjustable latch speed. Provide closers with delayed action where a hold-open mechanism is not required. Floor closers shall be multi-sized. Single acting floor closers shall also have built in dead stop. Where required, provide closers with special cement cases appropriate for shallow deck installation or where concrete joint lines run through the floor blockout. At offset-hung doors installed in deep reveals, provide special closer arm and spindle to allow for installation. Where stone or terrazzo is applied over the floor closer case, provide closer without floor plate and with extended spindle (length as required) and special cover pan (depth as required) to allow closer to be accessed without damaging the material applied over the closer. Pivots for non-labeled doors shall be cast, forged or extruded brass or bronze.

- B. Where floor closer appears in hardware set provide the following as applicable.
1. Double Acting Floor Closers: Type C06012.
 2. Single Acting Floor Closer: Type C06021 (center pivoted).
(Intermediate pivot is not required).
 3. Single Acting Floor Closers: Type C06041 (offset pivoted).
 4. Single Acting Floor Closer for Labeled Fire Doors: Type C06051
(offset pivoted).
 5. Single Acting Floor Closers For Lead Lined Doors: Type C06071 (offset pivoted).

2.6 DOOR STOPS

- A. Conform to ANSI A156.16.
- B. Provide door stops wherever an opened door or any item of hardware thereon would strike a wall, column, equipment or other parts of building construction. For concrete, masonry or quarry tile construction, use expansion shields for mounting door stops.

- C. Where cylindrical locks with turn pieces or pushbuttons occur, equip wall bumpers Type L02251 (rubber pads having concave face) to receive turn piece or button.
- D. Provide floor stops (Type L02141 or L02161) in office areas; Type L02121 x 3 screws into floor elsewhere. Wall bumpers, where used, must be installed to impact the trim or the door within the leading half of its width. Floor stops, where used, must be installed within 4-inches of the wall face and impact the door within the leading half of its width.
- E. Where drywall partitions occur, use floor stops, Type L02141 or L02161 in office areas, Type L02121 elsewhere.
- F. Provide stop Type L02011, as applicable for exterior doors. At outswing doors where stop can be installed in concrete, provide stop mated to concrete anchor set in 76mm (3-inch) core-drilled hole and filled with quick-setting cement.
- G. Omit stops where floor mounted door holders are required and where automatic operated doors occur.
- H. Provide appropriate roller bumper for each set of doors (except where closet doors occur) where two doors would interfere with each other in swinging.
- I. Provide appropriate door mounted stop on doors in individual toilets where floor or wall mounted stops cannot be used.
- J. Provide overhead surface applied stop Type C02541, ANSI A156.8 on patient toilet doors in bedrooms where toilet door could come in contact with the bedroom door.
- K. Provide door stops on doors where combination closer magnetic holders are specified, except where wall stops cannot be used or where floor stops cannot be installed within 4-inches of the wall.
- L. Where the specified wall or floor stop cannot be used, provide concealed overhead stops (surface-mounted where concealed cannot be used).

2.7 OVERHEAD DOOR STOPS AND HOLDERS

- A. Conform to ANSI Standard A156.8. Overhead holders shall be of sizes recommended by holder manufacturer for each width of door. Set overhead holders for 110 degree opening, unless limited by building construction or equipment. Provide Grade 1 overhead concealed slide type: stop-only at rated doors and security doors, hold-open type with exposed hold-open on/off control at all other doors requiring overhead door stops.

2.8 FLOOR DOOR HOLDERS

- A. Conform to ANSI Standard A156.16. Provide extension strikes for Types L01301 and L01311 holders where necessary.

2.9 LOCKS AND LATCHES

- A. Conform to ANSI A156.2. Locks and latches for doors 45 mm (1-3/4 inch) thick or over shall have beveled fronts. Lock cylinders shall have not less than seven pins. Cylinders for all locksets shall be removable core type. Cylinders shall be furnished with construction removable cores and construction master keys. Cylinder shall be removable by special key or tool. Construct all cores so that they will be interchangeable into the core housings of all mortise locks, rim locks, cylindrical locks, and any other type lock included in the Great Grand Master Key System. Disassembly of lever or lockset shall not be required to remove core from lockset. All locksets or latches on double doors with fire label shall have latch bolt with 19 mm (3/4 inch) throw, unless shorter throw allowed by the door manufacturer's fire label. Provide temporary keying device or construction core to allow opening and closing during construction and prior to the installation of final cores.
- B. In addition to above requirements, locks and latches shall comply with following requirements:
 - 1. Mortise Lock and Latch Sets: Conform to ANSI/BHMA A156.13. Mortise locksets shall be series 1000, minimum Grade 2. All locksets and latchsets, except on designated doors in Psychiatric (Mental Health) areas, shall have lever handles fabricated from cast stainless steel. Provide sectional (lever x rose) lever design as selected by Architect from manufacturer's full range. No substitute lever material shall be accepted. All locks and latchsets shall be furnished with 122.55 mm (4-7/8-inch) curved lip strike and wrought box. At outswing pairs with overlapping astragals, provide flat lip strip with 21mm (7/8-inch) lip-to-center dimension. Lock function F02 shall be furnished with emergency tools/keys for emergency entrance. All lock cases installed on lead lined doors shall be lead lined before applying final hardware finish. Furnish armored fronts for all mortise locks. Where mortise locks are installed in high-humidity locations or where exposed to the exterior on both sides of the opening, provide non-ferrous mortise lock case.

2. Cylindrical Lock and Latch Sets: levers shall meet ADA (Americans with Disabilities Act) requirements. Cylindrical locksets shall be series 4000 Grade I. All locks and latchsets shall be furnished with 122.55 mm (4-7/8-inch) curved lip strike and wrought box. At outswing pairs with overlapping astragals, provide flat lip strip with 21mm (7/8-inch) lip-to-center dimension. Provide lever design to match design selected by Architect or to match existing lever design. Where two turn pieces are specified for lock F76, turn piece on inside knob shall lock and unlock inside knob, and turn piece on outside knob shall unlock outside knob when inside knob is in the locked position. (This function is intended to allow emergency entry into these rooms without an emergency key or any special tool.)
3. Auxiliary locks shall be as specified under hardware sets and conform to ANSI A156.36.
4. Locks on designated doors in Psychiatric (Mental Health) areas shall be paddle type with arrow projection covers and be UL Listed. Provide these locks with paddle in the down position on both sides of the door. Locks shall be fabricated of wrought stainless steel.

2.10 PUSH-BUTTON COMBINATION LOCKS

- A. ANSI/BHMA A156.5, Grade 1. Battery operated pushbutton entry.
- B. Construction: Heavy duty mortise lock housing conforming to ANSI/BHMA A156.13, Grade 1. Lever handles and operating components in compliance with the ABAAS and the ADA Accessibility Guidelines. Match lever handles of locks and latch sets on adjacent doors.
- C. Special Features: Key override to permit a master keyed security system and a pushbutton security code activated passage feature to allow access without using the entry code.

2.11 ELECTROMAGNETIC LOCKS

- A. ANSI/BHMA A156.23; electrically powered, of strength and configuration indicated; with electromagnet attached to frame and armature plate attached to door. Listed under Category E in BHMA's "Certified Product Directory."
 1. Type: Full exterior or full interior, as required by application indicated.
 2. Strength Ranking: 1000 pound force (4448 N).
 3. Inductive Kickback Peak Voltage: Not more than 0 V.

4. Residual Magnetism: Not more than 0 pound force (0 N) to separate door from magnet.

B. Delayed-Egress Locks: BHMA A156.24. Listed under Category G in BHMA's "Certified Product Directory".

1. Means of Egress Doors: Lock releases within 15 seconds after applying a force not more than 15-pound force (67 N) for not more than 3 seconds, as required by NFPA 101.

2. Security Grade: Activated from secure side of door by initiating device.

3. Movement Grade: Activated by door movement as initiating device.

4. The lock housing shall not project more than 4-inches (101mm) from the underside of the frame head stop.

2.12 ELECTRIC STRIKES

A. ANSI/ BHMA A156.31 Grade 1.

B. General: Use fail-secure electric strikes at fire-rated doors.

2.13 KEYS

A. Stamp all keys with change number and key set symbol. Furnish keys in quantities as follows:

Locks/Keys	Quantity
Cylinder locks	2 keys each
Cylinder lock change key blanks	100 each different key way
Master-keyed sets	6 keys each
Grand Master sets	6 keys each
Great Grand Master set	5 keys
Control key	2 keys

B. Psychiatric keys shall be cut so that first two bittings closest to the key shoulder are shallow to provide greater strength at point of greatest torque.

2.14 KEY CABINET

A. ANSI Standard A156.11. Provide key cabinet made of cold rolled, 1.2 mm (0.0478 inch) thick furniture steel electro-welded. Doors shall have "no sag" continuous brass-pin piano type hinge and be equipped with chrome plated locking door handles, hook cam and mechanical pushbutton door lock. Key Cabinet and Key Control System shall accommodate all keys for this project plus 25 percent. Provide minimum number of multiple

cabinets where a single cabinet of largest size will not accommodate the required number of keys.

- B. Key tags shall consist of two sets: Permanent self-locking and loan key snaphook type with tag colors as follows: Red fiber marker of the permanent self-locking type approximately 32 mm (1-1/4 inch) in diameter engraved with the legend "FILE KEY MUST NOT BE LOANED." Also furnish for each hook a white cloverleaf key marker with snap-hooks engraved with the legend "LOAN KEY."
- C. The manufacturer of the lock cylinders and locks shall attach a key tag to keys of each lock cylinder and shall mark thereon the respective item number and key change number. Provide each group of keys in a key gathering envelope (supplied by Key Cabinet Manufacturer) in which the lock manufacturer shall include the following information: Item number, key change number and door number. The contractor shall furnish the Key Cabinet Manufacturer the hardware and keying schedules and change keys.
- D. The Key Cabinet Manufacturer shall set up a three-way cross index system, including master keys, listing the keys alphabetically, the hooks numerically and the key changes numerically on different colored index cards. Index cards shall be typewritten and inserted in a durable binder. Attach the keys to the two sets of numbered tags supplied with the cabinet. (The permanent tag and the loan key tag). Instruct the owner in proper use of the system. Install cabinet as directed by the COR.

2.15 ARMOR PLATES, KICK PLATES, MOP PLATES AND DOOR EDGING

- A. Conform to ANSI Standard A156.6.
- B. Provide protective plates as specified below:
 - 1. Kick plates, mop plates and armor plates of metal, Type J100 series.
 - 2. Provide kick plates and mop plates where specified. Kick plates shall be 254 mm (10 inches) or 305 mm (12 inches) high. Mop plates shall be 152 mm (6 inches) high. Both kick and mop plates shall be minimum 1.27 mm (0.050 inches) thick. Provide kick and mop plates beveled on all 4 edges (B4E). On push side of doors where jamb stop extends to floor, make kick plates 38 mm (1-1/2 inches) less than width of door, except pairs of metal doors which shall have plates 25 mm (1 inch) less than width of each door. Extend all other kick and mop plates to within 6 mm (1/4 inch) of each edge of doors. Kick and mop plates

shall butt astragals. For jamb stop requirements, see specification sections pertaining to door frames.

3. Kick plates and/or mop plates are not required on following door sides:
 - a. Armor plate side of doors;
 - b. Exterior side of exterior doors;
 - c. Closet side of closet doors;
 - d. Both sides of aluminum entrance doors.
4. Armor plates for doors are listed under Article "Hardware Sets". Armor plates shall be thickness as noted in the hardware set, 875 mm (35 inches) high and 38 mm (1-1/2 inches) less than width of doors, except on pairs of metal doors. Provide armor plates beveled on all 4 edges (B4E). Plates on pairs of metal doors shall be 25 mm (1 inch) less than width of each door. Where top of intermediate rail of door is less than 875 mm (35 inches) from door bottom, extend armor plates to within 13 mm (1/2 inch) of top of intermediate rail. On doors equipped with panic devices, extend armor plates to within 13 mm (1/2 inch) of panic bolt push bar.
5. Where louver or grille occurs in lower portion of doors, substitute stretcher plate and kick plate in place of armor plate. Size of stretcher plate and kick plate shall be 254 mm (10 inches) high.

2.16 EXIT DEVICES

- A. Conform to ANSI Standard A156.3. Exit devices shall be Grade 1; type and function are specified in hardware sets. Provide flush with finished floor strikes for vertical rod exit devices in interior of building. Trim shall have cast satin stainless steel lever handles of design similar to locksets, unless otherwise specified. Provide key cylinders for keyed operating trim and, where specified, cylinder dogging.
- B. Surface vertical rod panics shall only be provided less bottom rod; provide fire pins as required by exit device and door fire labels. Do not provide surface vertical rod panics at exterior doors.
- C. Concealed vertical rod panics shall be provided less bottom rod at interior doors, unless lockable or otherwise specified; provide fire pins as required by exit device and door fire labels. Where concealed vertical rod panics are specified at exterior doors, provide with both top and bottom rods.

- D. Where removable mullions are specified at pairs with rim panic devices, provide mullion with key-removable feature.
- E. At non-rated openings with panic hardware, provide panic hardware with key cylinder dogging feature.
- F. Exit devices for fire doors shall comply with Underwriters Laboratories, Inc., requirements for Fire Exit Hardware. Submit proof of compliance.

2.17 FLUSH BOLTS (LEVER EXTENSION)

- A. Conform to ANSI A156.16. Flush bolts shall be Type L24081 unless otherwise specified. Furnish proper dustproof strikes conforming to ANSI A156.16, for flush bolts required on lower part of doors.
- B. Lever extension manual flush bolts shall only be used at non-fire-rated pairs for rooms only accessed by maintenance personnel.
- C. Face plates for cylindrical strikes shall be rectangular and not less than 25 mm by 63 mm (1 inch by 2-1/2 inches).
- D. Friction-fit cylindrical dustproof strikes with circular face plate may be used only where metal thresholds occur.
- E. Provide extension rods for top bolt where door height exceeds 2184 mm (7 feet 2 inches).

2.18 FLUSH BOLTS (AUTOMATIC)

- A. Conform to ANSI A156.3. Dimension of flush bolts shall conform to ANSI A115. Bolts shall conform to Underwriters Laboratories, Inc., requirements for fire door hardware. Flush bolts shall automatically latch and unlatch. Furnish dustproof strikes conforming to ANSI A156.16 for bottom flush bolt. Face plates for dustproof strike shall be rectangular and not less than 38 mm by 90 mm (1-1/2 by 3-1/2 inches).
- B. At interior doors, provide auto flush bolts less bottom bolt, unless otherwise specified, except at wood pairs with fire-rating greater than 20 minutes; provide fire pins as required by auto flush bolt and door fire labels.

2.19 DOOR PULLS WITH PLATES

- A. Conform to ANSI A156.6. Pull Type J401, 152 mm CTC (6 inches CTC) length by 19 mm (3/4 inches) diameter minimum with plate Type J302, 90 mm by 381 mm (3-1/2 inches by 15 inches), unless otherwise specified. Provide pull with projection of 57.2 mm (2 1/4 inches) minimum and a clearance of 38.1 mm (1 1/2 inches) minimum. Cut plates of door pull plate for cylinders, or turn pieces where required.

2.20 PUSH PLATES

- A. Conform to ANSI A156.6. Metal, Type J302, 203 mm (8 inches) wide by 406.4 mm (16 inches) high. Provide metal Type J302 plates 102 mm (4 inches) wide by 406.4 mm (16 inches) high where push plates are specified for doors with stiles less than 203 mm (8 inches) wide. Cut plates for cylinders, and turn pieces where required.

2.21 COMBINATION PUSH AND PULL PLATES

- A. Conform to ANSI 156.6. Type J303, stainless steel 3 mm (1/8 inch) thick, 80 mm (3-1/3 inches) wide by 800 mm (16 inches) high), top and bottom edges shall be rounded. Secure plates to wood doors with 38 mm (1-1/2 inch) long No. 12 wood screws. Cut plates for turn pieces, and cylinders where required. Pull shall be mounted down.

2.22 COORDINATORS

- A. Conform to ANSI A156.16. Coordinators, when specified for fire doors, shall comply with Underwriters Laboratories, Inc., requirements for fire door hardware. Coordinator may be omitted on exterior pairs of doors where either door will close independently regardless of the position of the other door. Coordinator may be omitted on interior pairs of non-labeled open where open back strike is used. Open back strike shall not be used on labeled doors. Paint coordinators to match door frames, unless coordinators are plated. Provide bar type coordinators, except where gravity coordinators are required at acoustic pairs. For bar type coordinators, provide filler bars for full width and, as required, brackets for push-side surface mounted closers, overhead stops, and vertical rod panic strikes.

2.23 THRESHOLDS

- A. Conform to ANSI A156.21, mill finish extruded aluminum, except as otherwise specified. In existing construction, thresholds shall be installed in a bed of sealant with ¼-20 stainless steel machine screws and expansion shields. In new construction, embed aluminum anchors coated with epoxy in concrete to secure thresholds. Furnish thresholds for the full width of the openings.
- B. For thresholds at elevators entrances see other sections of specifications.
- C. At exterior doors and any interior doors exposed to moisture, provide threshold with non-slip abrasive finish.

- D. Provide with miter returns where threshold extends more than 12 mm (0.5 inch) beyond face of frame.

2.24 AUTOMATIC DOOR BOTTOM SEAL AND RUBBER GASKET FOR LIGHT PROOF OR SOUND CONTROL DOORS

- A. Conform to ANSI A156.22. Provide mortise or under-door type, except where not practical. For mortise automatic door bottoms, provide type specific for door construction (wood or metal).

2.25 WEATHERSTRIPS (FOR EXTERIOR DOORS)

- A. Conform to ANSI A156.22. Air leakage shall not to exceed 0.50 CFM per foot of crack length (0.000774m³/s/m).

2.26 MISCELLANEOUS HARDWARE

- A. Access Doors (including Sheet Metal, Screen and Woven Wire Mesh Types): Except for fire-rated doors and doors to Temperature Control Cabinets, equip each single or double metal access door with Lock Type E07213, conforming to ANSI A156.11. Key locks as directed. Ship lock prepaid to the door manufacturer. Hinges shall be provided by door manufacturer.
- B. Cylinders for Various Partitions and Doors: Key cylinders same as entrance doors of area in which partitions and door occur, except as otherwise specified. Provide cylinders to operate locking devices where specified for following partitions and doors:
 1. Folding doors and partitions.
 2. Wicket door (in roll-up door assemblies).
 3. Slide-up doors.
 4. Swing-up doors.
 5. Fire-rated access doors-Engineer's key set.
 6. Doors from corridor to electromagnetic shielded room.
 7. Day gate on vault door.
- C. Mutes: Conform to ANSI A156.16. Provide door mutes or door silencers Type L03011 or L03021, depending on frame material, of white or light gray color, on each steel or wood door frame, except at fire-rated frames, lead-lined frames and frames for sound-resistant, lightproof and electromagnetically shielded doors. Furnish 3 mutes for single doors and 2 mutes for each pair of doors, except double-acting doors. Provide 4 mutes or silencers for frames for each Dutch type door. Provide 2 mutes for each edge of sliding door which would contact door frame.

2.27 PADLOCKS FOR VARIOUS DOORS, GATES AND HATCHES

- A. ASTM E883, size 50 mm (2 inch) wide chain; furnish extended shackles as required by job conditions. Provide padlocks, with key cylinders, for each door in following areas as noted.
- B. Key padlocks as follows:
 - 1. Chain Link Fence Gates for Electrical Substation and other Fenced Buildings or Areas: Engineer's set, except as otherwise specified.
 - 2. Chain Link Fence Gates for Oxygen Storage Buildings: Maintenance supply set.
- C. Omit padlocks on communicating refrigerator doors.

2.28 THERMOSTATIC TEMPERATURE CONTROL VALVE CABINETS

- A. Where lock is shown, equip each cabinet door (metal) with lock Type E06213, conforming to ANSI A156.36. Key locks in Key Sets approved by Contracting Officer. See mechanical drawings and specifications for location of cabinets.
- B. Cabinet manufacturer shall supply the hinges, bolts and pulls. Ship locks to cabinet manufacturer for installation.

2.29 HINGED WIRE GUARDS (FOR WINDOWS, DOORS AND TRANSOMS) AND WIRE PARTITION DOORS

- A. Butt hinges, type A8133 (special swaging) 100 mm by 90 mm (4 inches by 3-1/2 inches), Finish US2C.
 - 1. 3 hinges for guards over 1060 mm (3-1/2 feet) high.
 - 2. 2 hinges for guards less than 1060 mm (3-1/2 feet) high.
- B. Conform to ANSI A156.36. Lock Type E06081 for guards and Type E06061 for partitions.
 - 1. Keying: Except as noted otherwise, key locks like entrance door or space wherein guards and partitions are located except as otherwise specified.
 - 2. Key locks for partitions enclosing mechanical and electrical equipment in Engineer's Set. (See detailed drawings for number of locks and butt hinges required for each guard).

2.30 FINISHES

- A. Exposed surfaces of hardware shall have ANSI A156.18, finishes as specified below. Finishes on all hinges, pivots, closers, thresholds, etc., shall be as specified below under "Miscellaneous Finishes." For field painting (final coat) of ferrous hardware, see Section 09 91 00, PAINTING.

B. 626 or 630: All surfaces on exterior and interior of buildings, except where other finishes are specified.

C. Miscellaneous Finishes:

1. Hinges --exterior doors: 626 or 630.
2. Hinges --interior doors: 652 or 630.
3. Pivots: Match door trim.
4. Door Closers: Factory applied paint finish. Dull or Satin Aluminum color.
5. Thresholds: Mill finish aluminum.
6. Cover plates for floor hinges and pivots: 630.
7. Other primed steel hardware: 600.

D. Special Finish: Exposed surfaces of hardware for dark bronze anodized aluminum doors shall have oxidized oil rubbed bronze finish (dark bronze) finish on door closers shall closely match doors.

E. Anti-microbial Coating: All hand-operated hardware (levers, pulls, push bars, push plates, paddles, and panic bars) shall be provided with an anti-microbial/anti-fungal coating that has passed ASTM E2180 tests. Coating to consist of ionic silver (Ag+). Silver ions surround bacterial cells, inhibiting growth of bacteria, mold, and mildew by blockading food and respiration supplies.

2.31 BASE METALS

A. Apply specified U.S. Standard finishes on different base metals as following:

Finish	Base Metal
652	Steel
626	Brass or bronze
630	Stainless steel

PART 3 - EXECUTION

3.1 HARDWARE HEIGHTS

A. For new buildings locate hardware on doors at heights specified below, with all hand-operated hardware centered within 864 mm (34 inches) to 1200 mm (48 inches), unless otherwise noted:

B. Hardware Heights from Finished Floor:

1. Exit devices centerline of strike (where applicable) 1024 mm (40-5/16 inches).

2. Locksets and latch sets centerline of strike 1024 mm (40-5/16 inches).
3. Deadlocks centerline of strike 1219 mm (48 inches).
4. Hospital arm pull 1168 mm (46 inches) to centerline of bottom supporting bracket.
5. Centerline of door pulls to be 1016 mm (40 inches).
6. Push plates and push-pull shall be 1270 mm (50 inches) to top of plate.
7. Push-pull latch to be 1024 mm (40-5/16 inches) to centerline of strike.
8. Locate other hardware at standard commercial heights. Locate push and pull plates to prevent conflict with other hardware.

3.2 INSTALLATION

A. Closer devices, including those with hold-open features, shall be equipped and mounted to provide maximum door opening permitted by building construction or equipment. Closers shall be mounted on side of door inside rooms, inside stairs, and away from corridors. At exterior doors, closers shall be mounted on interior side. Where closers are mounted on doors they shall be mounted with hex nuts and bolts; foot shall be fastened to frame with machine screws.

B. Hinge Size Requirements:

Door Thickness	Door Width	Hinge Height
45 mm (1-3/4 inch)	900 mm (3 feet) and less	113 mm (4-1/2 inches)
45 mm (1-3/4 inch)	Over 900 mm (3 feet) but not more than 1200 mm (4 feet)	125 mm (5 inches)
35 mm (1-3/8 inch) (hollow core wood doors)	Not over 1200 mm (4 feet)	113 mm (4-1/2 inches)

C. Hinge leaves shall be sufficiently wide to allow doors to swing clear of door frame trim and surrounding conditions.

D. Where new hinges are specified for new doors in existing frames or existing doors in new frames, sizes of new hinges shall match sizes of existing hinges; or, contractor may reuse existing hinges provided hinges are restored to satisfactory operating condition as approved by COR. Existing hinges shall not be reused on door openings having new

doors and new frames. Coordinate preparation for hinge cut-outs and screw-hole locations on doors and frames.

E. Hinges Required Per Door:

Door Description	Number butts
Doors 1500 mm (5 ft) or less in height	2 butts
Doors over 1500 mm (5 ft) high and not over 2280 mm (7 ft 6 in) high	3 butts
Doors over 2280 mm (7 feet 6 inches) high	4 butts
Dutch type doors	4 butts
Doors with spring hinges 1370 mm (4 feet 6 inches) high or less	2 butts
Doors with spring hinges over 1370 mm (4 feet 6 inches)	3 butts

F. Fastenings: Suitable size and type and shall harmonize with hardware as to material and finish. Provide machine screws and lead expansion shields to secure hardware to concrete, ceramic or quarry floor tile, or solid masonry. Fiber or rawl plugs and adhesives are not permitted. All fastenings exposed to weather shall be of nonferrous metal.

G. After locks have been installed; show in presence of COR that keys operate their respective locks in accordance with keying requirements. (All keys, Master Key level and above shall be sent Registered Mail to the Medical Center Director along with the bitting list. Also a copy of the invoice shall be sent to the COR for his records.) Installation of locks which do not meet specified keying requirements shall be considered sufficient justification for rejection and replacement of all locks installed on project.

3.3 FINAL INSPECTION

A. Installer to provide letter to VA Resident/Project Engineer that upon completion, installer has visited the Project and has accomplished the following:

1. Re-adjust hardware.
2. Evaluate maintenance procedures and recommend changes or additions, and instruct VA personnel.
3. Identify items that have deteriorated or failed.
4. Submit written report identifying problems.

3.4 DEMONSTRATION

- A. Demonstrate efficacy of mechanical hardware and electrical, and electronic hardware systems, including adjustment and maintenance procedures, to satisfaction of Resident/Project Engineer and VA Locksmith.

3.5 HARDWARE SETS

- A. Following sets of hardware correspond to hardware symbols shown on drawings. Only those hardware sets that are shown on drawings will be required. Disregard hardware sets listed in specifications but not shown on drawings.
- B. Hardware Consultant working on a project will be responsible for providing additional information regarding these hardware sets. The numbers shown in the following sets come from BHMA standards.

ELECTRIC HARDWARE ABBREVIATIONS LEGEND:

ADO = Automatic Door Operator

EMCH = Electro-Mechanical Closer-Holder

MHO = Magnetic Hold-Open (wall- or floor-mounted)

C. INTERIOR SINGLE DOORS

HW-1

<u>Each Door to Have:</u>	<u>NON-RATED</u>
1 Continuous Hinge	-
1 Door Pull w/ Plate	J401 x J302
1 Push Plate	J302
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Closer	C02011/C02021
1 Floor Stop	L02121 x 3 FASTENERS
3 Silencers	L03011

HW-1A

<u>Each Door to Have:</u>	<u>RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED X HOSPITAL TIPS @ INSWING DOORS
1 Latchset	F01
1 Closer	C02011/C02021 x INSTALL OUTSIDE ROOM
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Floor Stop	L02121 x 3 FASTENERS

1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
1 Set Seals	R0Y164

HW-1B

<u>Each Door to Have:</u>	<u>NON-RATED/RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X SWING-CLEAR X ADJUSTA-SCREWS
1 Hospital Latch	F01 x PADDLES POINTING DOWN
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Overhead Stop	C01541-ADJUSTABLE
1 Set Seals	R0Y164

NO CLOSER REQUIRED DUE TO EXEMPTION FOR PATIENT ROOM DOORS.

HW-1C

THIS SET NOT USED.

HW-1D

<u>Each Door to Have:</u>	<u>NON-RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X SWING-CLEAR X ADJUSTA-SCREWS
1 Hospital Latch	F01 x PADDLES POINTING DOWN
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Mop Plate	J103
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Overhead Stop	C01541-ADJUSTABLE
3 Silencers	L03011

HW-1E

<u>Each Door to Have:</u>	<u>RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X SWING-CLEAR X ADJUSTA-SCREWS
1 Hospital Latch	F01 x PADDLES POINTING DOWN
1 Closer	C02011/C02021
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Wall Stop (@ Inswing Doors)	L02101 CONVEX
1 Set Self-Adhesive Seals	ROY154

HW-1F

<u>Each Door to Have:</u>	<u>NON-RATED</u>
1 Continuous Hinge	-
1 Latchset	F04
1 Kick Plate	J102
1 Wall Stop	L02101 CONVEX
3 Silencers	L03011

HW-1G

<u>Each Door to Have:</u>	<u>NON-RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Latchset	F01
1 Kick Plate	J102
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Wall Stop	L02101 CONVEX
3 Silencers	L03011
1 Coat Hook	L03121

HW-1H

<u>Each Dwarf Door to Have:</u>	<u>NON-RATED</u>
1 Gate Spring Pivot Hinge	K13311
1 Door Bolt	L04151
1 Wall Stop	L02101 CONVEX
2 Silencers	L03021

HW-1J

Each [MHO] Door to Have:

RATED

1 Continuous Hinge

x INTEGRAL HINGE GUARD CHANNEL

X ADJUSTA-SCREWS

1 Latch set

F01

1 Closer

C02011/C02021

1 Heavy-Duty Armor Plate

J101 x 3.175 MM (0.125 INCH) THICKNESS

1 Edge Guard (@ Wood Doors)

J208M / J211 (VERIFY), CUT: HARDWARE

1 Magnetic Holder

C00011 TRI-VOLTAGE

1 Set Self-Adhesive Seals

ROY154

POWER, WIRING, CONDUIT, AND FIRE ALARM CONNECTION BY DIVISION 26.

HW-1K

Each Door to Have:

1 Continuous Hinge	<u>NON-RATED</u> x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Hospital Latch	F01 x PADDLES POINTING DOWN
1 Closer	C02011/C02021
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Overhead Stop	C01541-ADJUSTABLE
1 Auto Door Bottom	ROY346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	ROY154

HW-1L

Each Door to Have:

1 Continuous Hinge	<u>NON-RATED</u> -
1 Latchset	F04
1 Kick Plate	J102
1 Wall Stop	L02101 CONVEX
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	ROY346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	ROY154

HW-1M

Each Door to Have:

1 Floor Closer	<u>NON-RATED</u> C06011
2 Push Plates	J302
2 Kick Plates	J102
2 Edge Guard (@ Wood Doors)	J209M / J212 (VERIFY)
1 Overhead Stop	C01541-ADJUSTABLE

HW-1N

<u>Each Door to Have:</u>	<u>NON-RATED</u>
1 Continuous Hinge	-
1 Door Pull w/ Plate	J401 x J302
1 Push Plate	J302
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Closer	C02011/C02021
1 Floor Stop	L02121 x 3 FASTENERS
3 Silencers	L03011

HW-IP

<u>Each Lead-Lined Door to Have:</u>	<u>NON-RATED</u>
1 Floor Closer	C6062
2 Push Plates	J302 8" x 16"
2 Kick Plates	J102
2 Edge Guard (@ Wood Doors)	J209M / J212 (VERIFY)
1 Overhead Stop	C01541-ADJUSTABLE

HW-1Q

<u>Each Door to Have:</u>	<u>RATED/NON-RATED</u>
1 Continuous Hinge	-
1 Latchset	F04
1 Kick Plate	J102
1 Closer (@ rated doors)	C02011/C02021
1 Wall Stop	L02101 CONVEX
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

HW-1R

<u>Each Door to Have:</u>	<u>RATED/NON-RATED</u>
1 Continuous Hinge	-
1 Latchset	F04
1 Kick Plate	J102
1 Closer (@ rated doors)	C02011/C02021
1 Wall Stop	L02101 CONVEX
1 Set Self-Adhesive Seals	R0Y154

HW-2

<u>Each Door to Have:</u>	<u>RATED/NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Keyed Privacy Indicator Lock	F13 x OCCUPANCY INDICATOR
1 Closer	C02011/C02021
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154
STONE THRESHOLD BY OTHER TRADES.	

HW-2A

<u>Each [ADO] Door to Have:</u>	<u>RATED/NON-RATED</u>
1 Continuous Transfer Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 8-THRUWIRE TRANSFER X IN-HINGE ACCESS PANEL
1 Keyed Privacy Indicator Lock	F13 x OCCUPANCY INDICATOR
1 Electric Strike	E09391 (FAIL-SECURE), 24VDC
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Set Self-Adhesive Seals	R0Y154

AUTOMATIC DOOR OPERATOR AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS. STONE THRESHOLD BY OTHER TRADES.

HW-2B

<u>Each Door to Have:</u>	<u>NON-RATED</u>
1 Center Pivot Set	C07042
1 Privacy Lock	F02 X OCCUPANCY INDICATOR
1 Rescue Stop	A1882
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Wall Stop	L02101 CONVEX

STONE THRESHOLD BY OTHER TRADES.

HW-2C

<u>Each Door to Have:</u>	<u>NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Privacy Lock	F02-MOD X OCCUPANCY INDICATOR
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Wall Stop	L02101 CONVEX
3 Silencers	L03011

STONE THRESHOLD BY OTHER TRADES.

HW-2D

Each Door to Have:

Hinges
1 Privacy Lock
1 Closer
1 Kick Plate
1 Mop Plate (@ Inswing Doors)
1 Wall Stop
1 Set Self-Adhesive Seals
STONE THRESHOLD BY OTHER TRADES.

RATED

QUANTITY & TYPE AS REQUIRED
F02-MOD X OCCUPANCY INDICATOR
C02011/C02021
J102
J103
L02101 CONVEX
R0Y154

HW-2E

Each Door to Have:

1 Continuous Hinge

1 Hospital Privacy Latch
1 Closer
1 Armor Plate
1 Mop Plate (@ Inswing Doors)
1 Edge Guard (@ Wood Doors)
1 Overhead Stop
1 Set Self-Adhesive Seals
STONE THRESHOLD BY OTHER TRADES.

RATED

x INTEGRAL HINGE GUARD CHANNEL
X ADJUSTA-SCREWS

F02
C02011/C02021
J101 x 1.275 MM (0.050 INCH) THICKNESS
J103
J208M / J211 (VERIFY), CUT: HARDWARE
C01541-ADJUSTABLE
R0Y154

HW-2F

Each Door to Have:

Hinges
1 Privacy Lock
1 Wall Stop
3 Silencers
1 Coat Hook

NON-RATED

QUANTITY & TYPE AS REQUIRED
F02-MOD X OCCUPANCY INDICATOR
L02101 CONVEX
L03011
L03121

HW-2G

<u>Each Door to Have:</u>	<u>RATED/NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Keyed Privacy Indicator Lock	F13 x OCCUPANCY INDICATOR
1 Closer	C02011/C02021
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Floor Stop	L02121 x 3 FASTENERS
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Set Self-Adhesive Seals	R0Y154
STONE THRESHOLD BY OTHER TRADES.	

HW-2H

<u>Each Door to Have:</u>	<u>NON-RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Hospital Privacy Latch	F02 X OCCUPANCY INDICATOR
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Overhead Stop	C01541-ADJUSTABLE
3 Silencers	L03011
STONE THRESHOLD BY OTHER TRADES.	

HW-2J

<u>Each Door to Have:</u>	<u>NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Privacy Lock	F02-MOD X OCCUPANCY INDICATOR
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Wall Stop	L02101 CONVEX
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Set Self-Adhesive Seals	R0Y154
STONE THRESHOLD BY OTHER TRADES.	

HW-2K

Each Door to Have:

1 Continuous Hinge	<u>NON-RATED</u> x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Hospital Privacy Latch	F02 X OCCUPANCY INDICATOR
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Overhead Stop	C01541-ADJUSTABLE
1 Auto Door Bottom	ROY346 - HEAVY DUTY
2 Set Self-Adhesive Seals	ROY154

STONE THRESHOLD BY OTHER TRADES.

HW-3

Each Door to Have:

Hinges	<u>RATED</u> QUANTITY & TYPE AS REQUIRED
1 Office Lock	F04
1 Closer	C02011/C02021
1 Kick Plate	J102
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	ROY154

HW-3A

THIS SET NOT USED.

HW-3B

Each Door to Have:

Hinges	<u>NON-RATED/RATED</u> QUANTITY & TYPE AS REQUIRED
1 Office Lock	F04
1 Closer	C02011/C02021
1 Floor Stop	L02121 x 3 FASTENERS
1 Door Viewer	L03221 - 190° (VIEW INTO CORRIDOR)
1 Set Self-Adhesive Seals	ROY154

OMIT VIEWER IF DOOR PROVIDED WITH VISION LITE.

HW-3C

THIS SET NOT USED.

HW-3D

Each Door to Have:

	<u>RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Office Lock	F04
1 Closer	C02011/C02021
1 Kick Plate	J102
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

HW-3E

Each Door to Have:

	<u>NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Office Lock	F04
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154
1 Coat Hook	L03121

OMIT COAT HOOK WHERE GLASS LITE PREVENTS INSTALLATION.

HW-3F

<u>Each Door to Have:</u>	<u>RATED/NON-RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Office Lock	F04
1 Closer	CO2011/CO2021 @ RATED
DOOR	
1 Kick Plate	J102
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

HW-3G

<u>Each Door to Have:</u>	<u>NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Office Lock	F04
1 Floor Stop	L02121 x 3 FASTENERS
1 Coat Hook	L03121
1 Door Viewer (Mental Health Only)	L03221 90 degree (VIEW INTO CORRIDOR)
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154
OMIT VIEWER IF DOOR PROVIDED WITH VISION LITE.	
OMIT COAT HOOK WHERE GLASS LITE PREVENTS INSTALLATION.	

HW-3H

Each Door to Have:

1 Continuous Hinge	<u>RATED</u> x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Office Lock	F04
1 Closer	CO2011/CO2021
1 Kick Plate	J102
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Sets Self-Adhesive Seals	R0Y154

HW-3J

Each Door to Have:

1 Continuous Hinge	<u>NON-RATED</u> x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Office Lock	F04
1 Kick Plate	J102
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
1 Set Sound/Light Seals	R0Y264/R0Y255

HW-4

Each Door to Have:

Hinges	<u>NON-RATED</u> QUANTITY & TYPE AS REQUIRED
1 Classroom Lock	F05
1 Overhead Stop	C04541
3 Silencers	L03011

HW-4A

Each [ADO] Door to Have:

RATED

1 Continuous Transfer Hinge	X INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 4-THRUWIRE TRANSFER X IN-HINGE ACCESS PANEL
1 Classroom Lock	F05
1 Electric Strike	E09311 (FAIL-SECURE), 24VDC
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103 @ TOILET ROOMS ONLY
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154

AUTOMATIC DOOR OPERATOR AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.
POWER TRANSFER FOR RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).

HW-4B

<u>Each Door to Have:</u>	<u>NON-RATED/RATED</u>
1 Continuous Hinge	-
1 Public Restroom Lock	F09
1 Closer	C02011/C02021
1 Closer	C02051/C02061
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Floor Stop (@ Outswing Doors)	L02121 x 3 FASTENERS
1 Wall Stop (@ Inswing Doors)	L02101 CONVEX
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	ROY346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	ROY154

PROVIDE NON-HOLD-OPEN CLOSER AT TOILET ROOMS.
STONE THRESHOLD BY OTHER TRADES.

HW-4C

<u>Each Door to Have:</u>	<u>RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Hospital Utility Lock	F09 x PADDLES POINTING DOWN
1 Key Cylinder	TYPE AS REQUIRED
1 Closer	C02011/C02021
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Overhead Stop	C01541-ADJUSTABLE
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	ROY346 - HEAVY DUTY
1 Set Seals	ROY164

HW-4D

Each Door to Have:

1 Continuous Hinge	<u>RATED</u> x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Classroom Lock	F05
1 Closer	C02011/C02021
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Mop Plate (@ Inswing Doors)	J103
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop (@ Outswing Doors)	L02121 x 3 FASTENERS
1 Wall Stop (@ Inswing Doors)	L02101 CONVEX
1 Set Self-Adhesive Seals	R0Y154

HW-4E

Each Door to Have:

Hinges	<u>NON-RATED/RATED</u> QUANTITY & TYPE AS REQUIRED
1 Utility Lock	F09
1 Closer (@ rated doors)	C02011/C02021
1 Closer (@ non-rated doors)	C02051/C02061
1 Kick Plate	J102
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

HW-4F

<u>Each Door to Have:</u>	<u>RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Utility Lock	F09
1 Closer	C02011/C02021
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop (@ Outswing Doors)	L02121 x 3 FASTENERS
1 Wall Stop (@ Inswing Doors)	L02101 CONVEX
1 Set Self-Adhesive Seals	ROY154

HW-4G

<u>Each Door to Have:</u>	<u>RATED/NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Utility Lock	F09
1 Closer (@ Rated Doors)	C02011/C02021
1 Kick Plate	J102
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	ROY154

HW-4H

<u>Each [MHO] Door to Have:</u>	<u>RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Classroom Lock	F05
1 Closer	C02011/C02021
1 Kick Plate	J102
1 Magnetic Holder	C00011 TRI-VOLTAGE
1 Set Self-Adhesive Seals	ROY154

POWER, WIRING, CONDUIT, AND FIRE ALARM CONNECTION BY DIVISION 26.

HW-4J

<u>Each Door to Have:</u>	<u>RATED/NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Utility Lock	F09
1 Closer (@ Rated Doors)	C02011/C02021
1 Kick Plate	J102
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

HW-4K

<u>Each Door to Have:</u>	<u>NON-RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Utility Lock	F09
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154

HW-4L

<u>Each Door to Have:</u>	<u>NON-RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Classroom Lock	F05
1 Kick Plate	J102
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
1 Set Sound/Light Seals	R0Y264/R0Y255

HW-4M

Each Door to Have:

1 Continuous Hinge	<u>NON-RATED</u> x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Classroom Hospital Lock	F05 x PADDLES POINTING DOWN
1 Heavy-Duty Armor Plate	J101 x 3.175 MM (0.125 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154

HW-4N

Each Door to Have:

1 Continuous Hinge	<u>RATED/NON-RATED</u> x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Utility Lock	F09
1 Closer (@ rated doors)	C02011/C02021
1 Kick Plate	J102
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

HW-4P

Each Door to Have:

1 Continuous Hinge	<u>NON-RATED</u> x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Classroom Hospital Lock	F05 x PADDLES POINTING DOWN
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Overhead Stop	C01541-ADJUSTABLE
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

HW-4Q

<u>Each Door to Have:</u>	<u>NON-RATED</u>
1 Pivot Set	C07162 x 454KG (1000 LBS) WEIGHT CAPACITY
1 Intermediate Pivot	C07311
1 Utility Hospital Lock	F09 x LEAD-LINED x PADDLES POINTING DOWN
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Overhead Stop	C01541-ADJUSTABLE
1 Set Self-Adhesive Seal	ROY154

HW-4R

<u>Each [ADO] Door to Have:</u>	<u>RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 4-THRUWIRE TRANSFER X IN-HINGE ACCESS PANEL
1 Classroom Lock	F05
1 Electric Strike	E09311 (FAIL-SECURE), 24VDC
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103 @ TOILET ROOMS ONLY
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	ROY346 - HEAVY DUTY
2 Set Self-Adhesive Seals	ROY154

AT TOILET ROOMS, OMIT METAL THRESHOLD; STONE THRESHOLD BY OTHER TRADES.
AUTOMATIC DOOR OPERATOR AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR
OPERATORS.
OWER TRANSFER FOR RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS
PROVIDED BY SECTION 08 71 13).

HW-4S

Each Door to Have:

1 Continuous Hinge	<u>NON-RATED</u> x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Classroom Lock	F05
1 Heavy-Duty Armor Plate	J101 x 3.175 MM (0.125 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

HW-4T

Each Door to Have:

1 Continuous Hinge	<u>NON-RATED</u> x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Classroom Hospital Lock	F05 x PADDLES POINTING DOWN
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Overhead Stop	C01541-ADJUSTABLE
1 Set Self-Adhesive Seals	R0Y154

HW-4U

Each Door to Have:

1 Continuous Hinge	<u>NON-RATED/RATED</u> -
1 Public Restroom Lock	F09
1 Closer	C02011/C02021
1 Closer	C02051/C02061
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Floor Stop (@ Outswing Doors)	L02121 x 3 FASTENERS
1 Wall Stop (@ Inswing Doors)	L02101 CONVEX
1 Set Self-Adhesive Seals	R0Y154

PROVIDE NON-HOLD-OPEN CLOSER AT TOILET ROOMS.

STONE THRESHOLD BY OTHER TRADES.

HW-4V

Each Lead-Lined Door to Have:

NON-RATED

1 Pivot Set	C07162 x 454KG (1000 LBS) WEIGHT CAPACITY
1 Intermediate Pivot	CO7311
1 Utility Hospital Lock	F09 x LEAD-LINED x PADDLES POINTING DOWN
1 Closer	CO2011/CO2021 x METAL LEAD-LINED COVER
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Overhead Holder-Stop	C01541-ADJUSTABLE
1 Set Self-Adhesive Seal	ROY154

HW-4X

Each [ADO] Lead-Lined Door to Have:

NON-RATED

1 Pivot Set	C07162 x 454KG (1000 LBS) WEIGHT CAPACITY
1 Intermediate Transfer Pivot	CO7311 x 4 WIRE TRANSFER
1 Utility Hospital Lock	F09 x LEAD-LINED x PADDLES POINTING DOWN
1 Electric Unlatch Strike	E09321
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Overhead Stop	C01541-ADJUSTABLE
1 Set Self-Adhesive Seal	ROY154

POWER TRANSFER PIVOT IS FOR RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION
SENSORS PROVIDED BY SECTION 08 71 13).

AUTO DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13.

HW-4Y

Each [ADO] Door to Have:

NON-RATED

1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 4-THRUWIRE TRANSFER X IN-HINGE ACCESS PANEL
1 Utility Hospital Lock	F09 x PADDLES POINTING DOWN
1 Electric Unlatch Strike	E09321
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Overhead Stop	C01541-ADJUSTABLE
1 Set Self-Adhesive Seals	ROY154

POWER TRANSFER PIVOT IS FOR RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).

AUTOMATIC DOOR OPERATOR AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.

HW-5

Each Door to Have:

RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Storeroom Lock	F07
1 Closer	C02011/C02021
1 Kick Plate	J102 (@ STORAGE, EVM, & HAC ROOMS ONLY)
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	ROY154

HW-5A

THIS SET NOT USED.

HW-5B

<u>Each Door to Have:</u>	<u>RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Storeroom Lock	F07
1 Closer	C02011/C02021
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	ROY154

HW-5C

THIS SET NOT USED.

HW-5D

<u>Each Door to Have:</u>	<u>NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Storeroom Lock	F07
1 Kick Plate	J102 (@ STORAGE, EVM, & HAC ROOMS ONLY)
1 Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1 Wall Stop (@ Outswing Doors)	L02101 CONVEX
3 Silencers	L03011

HW-5E

<u>Each Door to Have:</u>	<u>NON-RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Storeroom Lock	F13-MOD x RIGID OUTSIDE LEVER x KEY RETRACTS DEADBOLT AND LATCHBOLT
1 Armor Plate	J101 x 3.125 MM (0.125 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	ROY154

HW-5F

Each Door to Have:

1 Continuous Hinge	<u>RATED/NON-RATED</u> x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Storeroom Lock	F07
1 Closer (@ Rated Doors)	C02011/C02021
1 Heavy-Duty Armor Plate	J101 x 3.175 MM (0.125 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154

HW-5G

Each Door to Have:

Hinges	<u>NON-RATED</u> QUANTITY & TYPE AS REQUIRED
1 Storeroom Lock	F07
1 Kick Plate	J102
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

HW-5H

Each Dutch Door to Have:

Hinges	<u>NON-RATED</u> QUANTITY & TYPE AS REQUIRED
1 Dutch Door Bolt	L04161-4" @ Top Leaf
1 Storeroom Lock	F07 @ Bottom Leaf
1 Kick Plate	J102
1 Floor Stop	L02121 x 3 FASTENERS @ Bottom Leaf
1 Wall Stop	L02101 @ Bottom Leaf
1 Set Self-Adhesive Seals	R0Y154

HW-5J

Each Door to Have:

Hinges

1 Storeroom Lock
1 Closer
1 Kick Plate
1 Floor Stop
1 Threshold
1 Auto Door Bottom
2 Sets Self-Adhesive Seals

RATED

QUANTITY & TYPE AS REQUIRED

F07
C02011/C02021
J102
L02121 x 3 FASTENERS
J32300 x 57 MM WIDTH (2-1/4 INCHES)
R0Y346 - HEAVY DUTY
R0Y154

HW-5K

Each Door to Have:

1 Continuous Hinge

1 Storeroom Lock
1 Closer
1 Armor Plate
1 Edge Guard (@ Wood Doors)
1 Floor Stop
1 Threshold
1 Auto Door Bottom
2 Sets Self-Adhesive Seals

RATED

x INTEGRAL HINGE GUARD CHANNEL
X ADJUSTA-SCREWS

F07
C02011/C02021
J101 x 1.275 MM (0.050 INCH) THICKNESS
J208M / J211 (VERIFY), CUT: HARDWARE
L02121 x 3 FASTENERS
J32300 x 57 MM WIDTH (2-1/4 INCHES)
R0Y346 - HEAVY DUTY
R0Y154

HW-5L

Each Door to Have:

1 Continuous Hinge	<u>NON-RATED</u> x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Security Storeroom Lock	F13-MOD x RIGID OUTSIDE LEVER x KEY RETRACTS DEADBOLT AND LATCHBOLT
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	ROY154

HW-6

Each Door to Have:

Hinges	<u>RATED</u> QUANTITY & TYPE AS REQUIRED
1 Exit Device	TYPE 1 F13 LEVER
1 Key Cylinder	TYPE AS REQUIRED
1 Closer	C02011/C02021
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	ROY154

HW-6A

Each Door to Have:

1 Continuous Hinge	<u>RATED</u> x INTEGRAL HINGE GUARD CHANNEL X HOSPITAL TIP X ADJUSTA-SCREWS
1 Exit Device	TYPE 1 F08 LEVER
1 Key Cylinder	TYPE AS REQUIRED
1 Closer	C02011/C02021
1 Kick Plate	J102
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	ROY154/ROY155

HW-6B

<u>Each [MHO] Door to Have:</u>	<u>RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Exit Device	TYPE 1 F08 LEVER
1 Key Cylinder	TYPE AS REQUIRED
1 Closer	C02011/C02021
1 Kick Plate	J102
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Magnetic Holder	C00011 TRI-VOLTAGE
1 Set Self-Adhesive Seals	R0Y154

POWER, WIRING, CONDUIT, AND FIRE ALARM CONNECTION BY DIVISION 26.

HW-6C

<u>Each Door to Have:</u>	<u>NON-RATED/RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Exit Device	TYPE 1 F08 LEVER
1 Key Cylinder	TYPE AS REQUIRED
1 Closer	02021
1 Kick Plate	J102
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

SPEC WRITER NOTE: Coordinate ADO doors
with section 08 71 13 AUTOMATIC DOOR
OPERATORS

HW-6D

Each [ADO] Integrated Door to Have: RATED
1 Key Cylinder TYPE AS REQUIRED
ALL HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES
AUTO DOOR OPERATOR AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR
OPERATORS.

HW-6E

Each Door to Have: NON-RATED
1 Continuous Hinge x INTEGRAL HINGE GUARD CHANNEL
X ADJUSTA-SCREWS
1 Exit Device TYPE 1 F08 LEVER
1 Key Cylinder TYPE AS REQUIRED
1 Kick Plate J102
1 Edge Guard (@ Wood Doors) J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals R0Y154

HW-6F

Each [ADO] Door to Have: NON-RATED/RATED
1 Continuous Hinge x INTEGRAL HINGE GUARD CHANNEL
X ADJUSTA-SCREWS x 8-THRUWIRE
TRANSFER X IN-HINGE ACCESS PANELS
1 Elec. Exit Device TYPE 1 F08 LEVER (E04)
1 Key Cylinder TYPE AS REQUIRED
1 Power Supply BY EXIT DEVICE MFR. FOR E04 FUNCTION
1 Armor Plate J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors) J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals R0Y154
POWER TRANSFER **SHARED BY ELECTRIC PANIC AND** RE-ACTIVATION SENSOR WIRING
(RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).
AUTO DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13.

HW-6G

<u>Each Door to Have:</u>	<u>NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Exit Device	TYPE 1 F13 LEVER
1 Key Cylinder	TYPE AS REQUIRED
1 Closer	C02011/C02021
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	ROY346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	ROY154

HW-7

Each Motorized Roll-up Door to Have: NON-RATED
1 Key Cylinder (for keyswitch) TYPE AS REQUIRED
BALANCE OF HARDWARE BY SECTION 08 33 00, COILING DOORS AND GRILLES

HW-7A

Each Special Door to Have: NON-RATED
1 Padlock TYPE AS REQUIRED PER 08 71 00 2.27.
BALANCE OF HARDWARE BY DOOR MANUFACTURER.

HW-7B

<u>Each RF Shielded Door to Have:</u>	<u>NON-RATED</u>
1 Pivot Set	C07162 x 454KG (1000 LBS) WEIGHT CAPACITY
1 Intermediate Pivot	C07311
1 Utility Hospital Lock	F09 x LEAD-LINED x PADDLES POINTING DOWN
1 Key Cylinder	TYPE AS REQUIRED
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Overhead Stop	C01541-ADJUSTABLE
1 Set Self-Adhesive Seal	ROY154

D. INTERIOR PAIRS OF DOORS

HW-8

Each [MHO] Pair Integrated Doors to Have: RATED
ALL HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES

HW-8A

<u>Each Aluminum Storefront Pair to Have:</u>	<u>NON-RATED</u>
2 Floor Closers	C06041
2 Intermediate Pivots	C07321
2 Push/Pull Bar Sets	J505 - 305 MM (12 INCH) CENTER-TO-CENTER PULL
2 Overhead Stops	C01541-ADJUSTABLE

HW-8B

<u>Each Pair to Have:</u>	<u>NON-RATED</u>
2 Continuous Hinge	-
2 Push Plate	J304 8" x 16"
2 Hospital Grip	J401
2 Kick Plate	J102
2 Mop Plate (@ Inswing Doors)	J103
2 Closer	C02011/C02021
2 Floor Stop	L02121 x 3 FASTENERS
2 Silencers	L03011

HW-8C

<u>Each Double-Acting Pair to Have:</u>	<u>NON-RATED</u>
2 Double-Acting Floor Closers	C06011
4 Push Plates	J304 8" x 16"
4 Heavy-Duty Armor Plates	J101 x 3.175 MM (0.125 INCH) THICKNESS
4 Edge Guard (@ Wood Doors)	J209P / J212 (VERIFY)
2 Overhead Holders	C01511-ADJUSTABLE

HW-8D

Each [ADO] Aluminum Storefront Pair to Have: NON-RATED

2 Pivot Sets	C07162
2 Intermediate Transfer Pivots	C07321 x 4-WIRES
2 Intermediate Pivots	C07321
2 Push/Pull Bar Sets	J505 - 305 MM (12 INCH) CENTER-TO-CENTER PULL
2 Overhead Stops	C01541-ADJUSTABLE

AUTO DOOR OPERATORS, CONTROLS, AND REACTIVATION SENSORS BY SECTION 08 71 13.11.

POWER TRANSFERS FOR RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.

HW-8E

Each [ADO] Pair to Have: NON-RATED

2 Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 4-THRUWIRE TRANSFERS X IN-HINGE ACCESS PANEL
2 Push Plate	J304 8" x 16"
2 Hospital Grip	J401
2 Kick Plate	J102
2 Mop Plate (@ Inswing Doors)	J103
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Floor Stop	L02121 x 3 FASTENERS
2 Silencers	L03011

AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.

POWER TRANSFERS FOR RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).

HW-8F

Each [ADO] Pair to Have:

NON-RATED

2 Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 4-THRUWIRE TRANSFERS X IN-HINGE ACCESS PANEL
2 Push Plate	J304 8" x 16"
2 Hospital Grip	J401
2 Kick Plate	J102
2 Mop Plate (@ Inswing Doors)	J103
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
2 Auto Door Bottoms	ROY346 - HEAVY DUTY
2 Set Self-Adhesive Seals	ROY154

AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.

POWER TRANSFERS FOR RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).

HW-9

THIS HARDWARE SET LEFT INTENTIONALLY BLANK AT THIS TIME.

HW-10

Each Pair to Have:

RATED

2 Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT
1 Classroom Lock	F05
1 Coordinator	TYPE 21A
1 Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
2 Closers	C02011/C02021
2 Heavy-Duty Armor Plates	J101 x 3.175 MM (0.125 INCH) THICKNESS
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Floor Stops	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
2 Auto Door Bottoms	R0Y346 - HEAVY DUTY
2 Set Self-Adhesive Seals	R0Y154

INSTALL LOCK TRIM PROTECTOR BAR ON PUSH SIDE OF ACTIVE LEAF TO PROTECT
LEVER TRIM.

HW-10A

Each [ADO] Pair to Have:

NON-RATED

1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 8-THRUWIRE TRANSFER X IN-HINGE ACCESS PANEL
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS X 4-THRUWIRE TRANSFER X IN-HINGE ACCESS PANEL
1 Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT
1 Classroom Lock	F05
1 Electric Unlatch Strike	E09321 (FAIL SECURE)
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Coordinator	TYPE 21A
1 Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
2 Armor Plates	J101 x 1.275 MM (0.050 INCH) THICKNESS
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Floor Stops	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
2 Auto Door Bottoms	R0Y346 - HEAVY DUTY
2 Set Self-Adhesive Seals	R0Y154

AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.
POWER TRANSFER **SHARED BY ELECTRIC STRIKE AND** RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).

HW-10B

<u>Each Pair to Have:</u>	<u>NON-RATED/RATED</u>
2 Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT
1 Classroom Hospital Lock	F05 x PADDLES POINTING DOWN
1 Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
1 Closers (@ rated doors)	C02011/C02021
2 Heavy-Duty Armor Plates	J101 x 3.175 MM (0.125 INCH) THICKNESS
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Floor Stops	L02121 x 3 FASTENERS

INSTALL LOCK TRIM PROTECTOR BAR ON PUSH SIDE OF ACTIVE LEAF TO PROTECT
LEVER TRIM.

HW-10C

<u>Each Pair to Have:</u>	<u>NON-RATED</u>
2 Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT
1 Utility Lock	F09
1 Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
2 Kick Plates	J102
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Floor Stops	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154

HW-10D

Each Pair to Have:

Hinges
1 Set Auto Flush Bolts
1 Classroom Lock
1 Overlapping Astragal with
Self-Adhesive Seal
2 Kick Plates
2 Floor Stops
1 Set Self-Adhesive Seals

NON-RATED

QUANTITY & TYPE AS REQUIRED
TYPE 25 LESS BOTTOM BOLT
F05
R0Y634 x R0Y154 x THRU-BOLTS
J102
L02121 x 3 FASTENERS
R0Y154

HW-10E

Each Lead Lined Pair to Have:

2 Pivot Sets

2 Intermediate Pivots
1 Set Auto Flush Bolts
1 Classroom Lock

1 Overlapping Astragal with
Self-Adhesive Seal
2 Armor Plates
4 Edge Guard (@ Wood Doors)
2 Floor Stops
1 Set Self-Adhesive Seals

NON-RATED

C07162 x 454KG (1000 LBS) WEIGHT
CAPACITY
C07311
TYPE 25 LESS BOTTOM BOLT x LEAD-LINED
F05 x LEAD-LINED x PADDLES POINTING
DOWN
R0Y634 x R0Y154 x THRU-BOLTS X
LEAD-LINED
J101 x 1.275 MM (0.050 INCH) THICKNESS
J208M / J211 (VERIFY), CUT: HARDWARE
L02121 x 3 FASTENERS
R0Y154

HW-10F

Each Pair to Have:

2 Continuous Hinges

1 Set Auto Flush Bolts
1 Classroom Hospital Lock
1 Overlapping Astragal with
Self-Adhesive Seal
2 Heavy-Duty Armor Plates
2 Edge Guard (@ Wood Doors)
2 Floor Stops
1 Threshold
2 Auto Door Bottom
2 Sets Self-Adhesive Seals

NON-RATED

x INTEGRAL HINGE GUARD CHANNEL
X ADJUSTA-SCREWS
TYPE 25 LESS BOTTOM BOLT
F05 x PADDLES POINTING DOWN
R0Y634 x R0Y154 x THRU-BOLTS

J101 x 3.175 MM (0.125 INCH) THICKNESS
J208M / J211 (VERIFY), CUT: HARDWARE
L02121 x 3 FASTENERS
J32300 x 57 MM WIDTH (2-1/4 INCHES)
R0Y346 - HEAVY DUTY
R0Y154

INSTALL LOCK TRIM PROTECTOR BAR ON PUSH SIDE OF ACTIVE LEAF TO PROTECT
LEVER TRIM.

HW-10G

Each Pair to Have:

2 Continuous Hinges

1 Set Auto Flush Bolts
1 Classroom Lock
1 Overlapping Astragal with
Self-Adhesive Seal
2 Heavy-Duty Armor Plates
1 Lock Trim Protector Bar
2 Edge Guard (@ Wood Doors)
2 Floor Stops
1 Threshold
2 Auto Door Bottom
2 Sets Self-Adhesive Seals

NON-RATED

x INTEGRAL HINGE GUARD CHANNEL
X ADJUSTA-SCREWS
TYPE 25 LESS BOTTOM BOLT
F05
R0Y634 x R0Y154 x THRU-BOLTS

J101 x 3.175 MM (0.125 INCH) THICKNESS
R111LPB-630 (ROCKWOOD), OR EQUAL
J208M / J211 (VERIFY), CUT: HARDWARE
L02121 x 3 FASTENERS
J32300 x 57 MM WIDTH (2-1/4 INCHES)
R0Y346 - HEAVY DUTY
R0Y154

INSTALL LOCK TRIM PROTECTOR BAR ON PUSH SIDE OF ACTIVE LEAF TO PROTECT
LEVER TRIM.

HW-10H

Each [ADO] Lead-Lined Pair to Have: RATED/NON-RATED

2 Bottom Pivots	C07162 LESS TOP PIVOT x 454KG (1000 LBS) WEIGHT CAPACITY
1 Intermediate Pivot	C07311 (MIDDLE OF ACTIVE LEAF)
1 Intermediate Transfer Pivot	C07311 x 4 WIRE TRANSFER (MIDDLE OF INACTIVE LEAF)
2 Intermediate Transfer Pivot	C07311 x 4 WIRE TRANSFER (NEAR TOP OF EACH LEAF)
1 Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT X LEAD-LINED
1 Hospital Utility Lock	F09 x PADDLES POINTING DOWN X LEAD-LINED
1 Electric Unlatch Strike	E09321 (FAIL SECURE) (LEAD-LINED)
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Coordinator	TYPE 21A
1 Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS X LEAD-LINED
2 Armor Plates	J101 x 1.275 MM (0.050 INCH) THICKNESS
4 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Overhead Stops	C01541-ADJUSTABLE
1 Set Self-Adhesive Seals	R0Y154

AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.

POWER TRANSFER PIVOTS NEAR TOP OF EACH DOOR FOR RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).

HW-10J

<u>Each [ADO] Pair to Have:</u>	<u>RATED/NON-RATED</u>
1 Continuous Transfer Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 8-THRUWIRE TRANSFER X IN-HINGE ACCESS PANEL
1 Continuous Transfer Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 4-THRUWIRE TRANSFER X IN-HINGE ACCESS PANEL
1 Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT
1 Classroom Hospital Lock	F05 x PADDLES POINTING DOWN
1 Electric Unlatch Strike	E09321 (FAIL-SECURE)
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Coordinator	TYPE 21A
1 Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
2 Armor Plates	J101 x 1.275 MM (0.050 INCH) THICKNESS
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Overhead Stops	C01541-ADJUSTABLE
1 Set Self-Adhesive Seals	R0Y154
AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.	
POWER TRANSFERS SHARED BY ELECTRIC STRIKE AND RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).	
*AT WOOD PAIRS RATED 45-MINUTES OR MORE, PROVIDE ELECTRIC STRIKE 310-2- 3/4 (FOLGER ADAM OR EQUAL) IN LIEU OF SPECIFIC UNLATCH STRIKE.	

HW-10K

Each [ADO] Pair to Have:

RATED/NON-RATED

1 Continuous Transfer Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 8-THRUWIRE TRANSFER X IN-HINGE ACCESS PANEL
1 Continuous Transfer Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 4-THRUWIRE TRANSFER X IN-HINGE ACCESS PANEL
1 Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT
1 Classroom Lock	F05
1 Electric Unlatch Strike	E09321 (FAIL-SECURE)
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Coordinator	TYPE 21A
1 Overlapping Astragal with Self-Adhesive Seal	ROY634 x ROY154 x THRU-BOLTS
2 Armor Plates	J101 x 1.275 MM (0.050 INCH) THICKNESS
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Floor Stops	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	ROY154

AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.

POWER TRANSFER **SHARED BY ELECTRIC STRIKE AND** RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).

*AT WOOD PAIRS RATED 45-MINUTES OR MORE, PROVIDE ELECTRIC STRIKE 310-2-3/4 (FOLGER ADAM OR EQUAL) IN LIEU OF SPECIFIC UNLATCH STRIKE.

HW-10L

Each Pair to Have:

Hinges	<u>NON-RATED</u>
	QUANTITY & TYPE AS REQUIRED
1 Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT
1 Classroom Lock	F05
1 Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
2 Kick Plates	J102
2 Floor Stops	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
2 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

HW-10M

Each Pair to Have:

2 Continuous Hinges	<u>NON-RATED</u>
	x INTEGRAL HINGE GUARD CHANNEL
	X ADJUSTA-SCREWS
1 Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT
1 Utility Lock	F09
1 Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
2 Kick Plates	J102
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Floor Stops	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
2 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

HW-11

Each Pair to Have:

Hinges
1 Set Auto Flush Bolts
1 Storeroom Lock
1 Coordinator
1 Overlapping Astragal with
Self-Adhesive Seal
2 Closers
2 Kick Plates
2 Floor Stops
1 Set Self-Adhesive Seals

RATED/NR

QUANTITY & TYPE AS REQUIRED
TYPE 25 LESS BOTTOM BOLT
F07
TYPE 21A
R0Y634 x R0Y154 x THRU-BOLTS

C02011/C02021
J102 (@ STORAGE ROOMS ONLY)
L02121 x 3 FASTENERS
R0Y154

HW-11A

Each Pair to Have:

2 Continuous Hinges

1 Set Auto Flush Bolts
1 Security Storeroom Lock

1 Overlapping Astragal with
Self-Adhesive Seal
2 Armor Plates
2 Edge Guard (@ Wood Doors)
2 Floor Stops

1 Set Self-Adhesive Seals

NON-RATED

x INTEGRAL HINGE GUARD CHANNEL
X ADJUSTA-SCREWS
TYPE 25
F13-MOD x RIGID OUTSIDE LEVER x KEY
RETRACTS DEADBOLT AND LATCHBOLT
R0Y634 x R0Y154 x THRU-BOLTS

101 x 1.275 MM (0.050 INCH) THICKNESS
J208M / J211 (VERIFY), CUT: HARDWARE

L02121 x 3 FASTENERS
R0Y154

HW-11B

Each Pair to Have:

RATED

2 Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Set Auto Flush Bolts	TYPE 25
1 Storeroom Lock	F07
1 Coordinator	TYPE 21A
1 Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
2 Closers	C02011/C02021
2 Armor Plates	J101 x 1.275 MM (0.050 INCH) THICKNESS
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Floor Stops	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154

HW-11C

Each Pair to Have:

RATED/NR

Hinges	QUANTITY & TYPE AS REQUIRED
1 Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT
1 Storeroom Lock	F07
1 Coordinator	TYPE 21A
1 Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS C02011/C02021
2 Kick Plates	J102 (@ STORAGE ROOMS ONLY)
2 Floor Stops	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
2 Auto Door Bottoms	R0Y346 - HEAVY DUTY
2 Set Self-Adhesive Seals	R0Y154

HW-12

<u>Each Pair to Have:</u>	<u>RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Exit Device	TYPE 7 or 8 F01
1 Exit Device	TYPE 7 or 8 F08 LEVER
1 Key Cylinder	TYPE AS REQUIRED
1 Set Meeting Stile Astragals	ROY834
2 Closers	C02011/C02021
2 Floor Stops	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	ROY154

HW-12A

Each [MHO] Pair Integrated Doors to Have: RATED

ALL HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES

HW-12B

Each [ADO] Pair Integrated Doors to Have: RATED

1 Key Cylinder TYPE AS REQUIRED
BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES
AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC
DOOR OPERATORS.

HW-12C

Each [MHO] Pair Integrated Double Egress Doors to Have: RAT

ALL HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES

HW-12D

Each [ADO] Pair Integrated Double Egress Doors to Have: RATED

ALL HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES
AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC
DOOR OPERATORS.

St

HW-12E

Each Pair to Have:

RATED

2 Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X HOSPITAL TIP X ADJUSTA-SCREWS
1 Exit Device	TYPE 7 or 8 F01
1 Exit Device	TYPE 7 or 8 F08 LEVER
1 Key Cylinder	TYPE AS REQUIRED
1 Set Meeting Stile Astragals	ROY834
2 Closers	C02011/C02021
2 Kick Plates	J102
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Floor Stops	L02121 x 3 FASTENERS
2 Door Bottom	ROY434 x NYLON BRUSH INSERT
2 Set Self-Adhesive Seals	ROY154

HW-12F

Each Pair to Have:

RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Exit Device	TYPE 7 or 8 F01
1 Exit Device	TYPE 7 or 8 F08 LEVER
1 Key Cylinder	TYPE AS REQUIRED
1 Set Meeting Stile Astragals	ROY834
2 Closers	C02021
2 Floor Stops	L02121 x 3 FASTENERS
2 Door Bottom	ROY434 x NYLON BRUSH INSERT
2 Sets Self-Adhesive Seals	ROY154

HW-12G

Each Pair to Have:

NON-RATED

2 Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Exit Device	TYPE 7 or 8 F01
1 Exit Device	TYPE 7 or 8 F08 LEVER
1 Key Cylinder	TYPE AS REQUIRED
1 Set Meeting Stile Astragals	ROY834
2 Closers	C02051/C02071
2 Kick Plates	J102
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Floor Stops	L02121 x 3 FASTENERS
2 Auto Door Bottoms	ROY346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	ROY154

HW-12H

Each [ADO] Pair to Have:

NON-RATED

2 Continuous Transfer Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 8-THRUWIRE TRANSFER X IN-HINGE ACCESS PANEL
1 Elec. Exit Device	TYPE 7 or 8 F01 (E04)
1 Elec. Exit Device	TYPE 7 or 8 F08 LEVER (E04)
1 Key Cylinder	TYPE AS REQUIRED
1 Power Supply	BY EXIT DEVICE MFR. FOR E04 FUNCTION
1 Set Meeting Stile Astragals	ROY834
2 Kick Plates	J102
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Floor Stops	L02121 x 3 FASTENERS
2 Auto Door Bottoms	ROY346 -HEAVY DUTY
2 Sets Self-Adhesive Seals	ROY154

POWER TRANSFERS **SHARED BY ELECTRIC PANIC AND** RE-ACTIVATION SENSOR WIRING
(RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).
AUTO DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13.

HW-12J

<u>Each Pair to Have:</u>	<u>RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Exit Device	TYPE 7 or 8 F01
1 Exit Device	TYPE 7 or 8 F13 LEVER
1 Key Cylinder	TYPE AS REQUIRED
1 Set Meeting Stile Astragals	ROY834
2 Closers	C02011/C02021
2 Floor Stops	L02121 x 3 FASTENERS
2 Auto Door Bottoms	ROY346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	ROY154

HW-13

Each [ADO] Bi-Parting Automatic Pair to Have: NON-RATED
ALL HARDWARE BY SECTION 08 71 13.

E. EXTERIOR SINGLE DOORS

HW-E1

<u>Each Door to Have:</u>	<u>NON-RATED</u>
1 Continuous Hinge	
1 Entry Lock	F11
1 Latch Protector (outswing dr)	
1 Closer	C02011/C02021
1 Kick Plate	J102
1 Floor Stop	L02121 x 3 FASTNERS
1 Threshold (outswing door)	J32120 x SILICONE GASKET
1 Threshold (inswing door)	ALUMINUM, PER ARCHITECTURAL DETAIL
1 Door Sweep	ROY416
1 Set Frame Seals	ROY164
1 Drip	ROY976

HW-E2

<u>Each Door to Have:</u>	<u>NON-RATED</u>
1 Continuous Hinge	
1 Classroom Lock	F05
1 Closer	C02011/C02021
1 Kick Plate	J102
1 Floor Stop	L02121 x 3 FASTNERS
1 Threshold (outswing door)	J32120 x SILICONE GASKET
1 Threshold (inswing door)	ALUMINUM, PER ARCHITECTURAL DETAIL
1 Door Sweep	R0Y416
1 Set Frame Seals	R0Y164
1 Drip	R0Y976

HW-E3

<u>Each Door to Have:</u>	<u>NON-RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Storeroom Lock	F13-MOD x RIGID OUTSIDE LEVER x KEY RETRACTS DEADBOLT AND LATCHBOLT
1 Latch Protector (outswing dr)	
1 Closer	C02011/C02021
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Armor Plate	J101 x 3.125 MM (0.125 INCH) THICKNESS
1 Overhead Holder	C01511-ADJUSTABLE
1 Threshold (outswing door)	J32120 x SILICONE GASKET
1 Threshold (inswing door)	ALUMINUM, PER ARCHITECTURAL DETAIL
1 Door Sweep	R0Y416
1 Set Frame Seals	R0Y164
1 Drip	R0Y976

HW-E4

Each Door to Have:

NON-RATED

1 Continuous Hinge	
1 Anti-Vandal Pull	
1 Exit Device	TYPE 1 F03 LESS TRIM
1 Latch Protector	(outswing dr.)
1 Key Cylinder	TYPE AS REQUIRED
1 Closer	C02011
1 Kick Plate	J102
1 Floor Stop	L02121 x 3 FASTNERS
1 Threshold	J32120 x SILICONE GASKET
1 Door Sweep	R0Y416
1 Set Frame Seals	R0Y164
1 Drip	R0Y976

HW-E5

Each Roll-up Door to Have:

NON-RATED

1	Padlock or 2 Cylinders
	TYPE AS REQUIRED

BALANCE OF HARDWARE BY SECTION 08 33 00, COILING DOORS AND GRILLES

F. EXTERIOR PAIRS OF DOORS

HW-E6

Each Pair to Have:

NON-RATED

2 Continuous Hinge	
1 Set Auto Flush Bolts	TYPE 25
1 Dust Proof Strike	L04021
1 Entry Lock	F11
1 Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
1 Coordinator	TYPE 21A
2 Closer	C02011/C02021
2 Kick Plate	J102
2 Floor Stop	L02121 x 3 FASTNERS
1 Threshold (outswing door)	J32120 x SILICONE GASKET
1 Threshold (inswing door)	ALUMINUM, PER ARCHITECTURAL DETAIL
2 Door Sweep	R0Y416
1 Set Frame Seals	R0Y164
1 Drip	R0Y976

HW-E7

<u>Each Pair to Have:</u>	<u>NON-RATED</u>
2 Continuous Hinge	
1 Set Auto Flush Bolts	TYPE 25
1 Dust Proof Strike	L04021
1 Classroom Lock	F05
1 Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
1 Coordinator	TYPE 21A
2 Closer	C02011/C02021
2 Kick Plate	J102
2 Floor Stop	L02121 x 3 FASTNERS
1 Threshold (outswing door)	J32120 x SILICONE GASKET
1 Threshold (inswing door)	ALUMINUM, PER ARCHITECTURAL DETAIL
2 Door Sweep	R0Y416
1 Set Frame Seals	R0Y164
1 Drip	R0Y976

HW-E8

<u>Each Pair to Have:</u>	<u>NON-RATED</u>
2 Continuous Hinge	
1 Set Auto Flush Bolts	TYPE 25
1 Dust Proof Strike	L04021
1 Storeroom Lock	F13-MOD x RIGID OUTSIDE LEVER x KEY RETRACTS DEADBOLT AND LATCHBOLT
1 Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
1 Coordinator	TYPE 21A
2 Closer	C02011/C02021
2 Armor Plate	J101 x 3.125 MM (0.125 INCH) THICKNESS
2 Floor Stop	L02121 x 3 FASTNERS
1 Threshold (outswing door)	J32120 x SILICONE GASKET
1 Threshold (inswing door)	ALUMINUM, PER ARCHITECTURAL DETAIL
2 Door Sweep	R0Y416
1 Set Frame Seals	R0Y164
1 Drip	R0Y976

HW-E9

Each Door to Have:

NON-RATED

2 Continuous Hinge	
1 Exit Device	TYPE 8 F01
1 Exit Device	TYPE 8 F12 LESS PULL
1 Key Cylinder	TYPE AS REQUIRED
2 Latch Protectors	(outswing dr.)
1 Set Meeting Stile Astragals	R0Y834
2 Closer	C02011
2 Kick Plate	J102
2 Floor Stop	L02121 x (3) FASTNERS
1 Threshold	J32120 x SILICONE GASKET
2 Door Sweep	R0416
1 Set Frame Seals	R0Y164
1 Drip	R0Y976

HW-E10

Each Sliding Door to Have:

NON-RATED

1 Set Track Hardware	TYPE REQUIRED FOR DOOR MATERIAL, WEIGHT, AND MOUNTING DETAILS (COMPLETE WITH TRACK, TRACK BRACKETS, HANGERS, GUIDES, BUMPERS, AND INTERNAL TRACK STOPS)
2 Pulls	TYPE AS REQUIRED
1 Sliding Door Lock	E8281/E8291 (SLIDING DOOR LOCK)
2 Cylinder (for sliding dr lock)	TYPE AS REQUIRED

G. EXTERIOR SINGLE GATES

HW-G1

Each Traffic Gate to Have:

NON-RATED

Spring Hinge TYPE REQUIRED X STAINLESS STEEL
BALANCE OF HARDWARE BY SECTION 32 31 53, PERIMETER SECURITY FENCES AND
GATES

HW-G2

Each Gate to Have:

NON-RATED

2 Weldable Gate Hinges A8181 (3 KNUCKLE) X 5 INCHES X WELDED
OR FASTENED X SHEAR HINGE LEAVES TO
FIT GATE MEMBERS

1 Weldable Lock Box
1 Utility Lock F09 X NON-FERROUS LOCK CASE
1 Stainless Steel Closer C52011/C22021
BALANCE OF HARDWARE BY SECTION 32 31 53, PERIMETER SECURITY FENCES AND
GATES

HW-G3

Each Gate to Have:

NON-RATED

2 Weldable Gate Hinges A8181 (3 KNUCKLE) X 5 INCHES X WELDED
OR FASTENED X SHEAR HINGE LEAVES TO
FIT
GATE MEMBERS

1 Weldable Lock Box
1 Storeroom Lock F13-MOD x RIGID OUTSIDE LEVER x KEY
RETRACTS DEADBOLT AND LATCHBOLT
1 Stainless Steel Closer C52011/C22021
BALANCE OF HARDWARE BY SECTION 32 31 53, PERIMETER SECURITY FENCES AND
GATES

HW-G4

Each Gate to Have:

NON-RATED

2 Weldable Gate Hinges

A8181 (3 KNUCKLE) X 5 INCHES X WELDED
OR FASTENED X SHEAR HINGE LEAVES TO
FIT GATE MEMBERS

1 Weldable Panic Box

1 Anti-Vandal Pull

1 Rim Panic Device

TYPE 1 F03 LESS TRIM

1 Cylinder

TYPE AS REQUIRED

1 Stainless Steel Closer

C52011/C22021

BALANCE OF HARDWARE BY SECTION 32 31 53, PERIMETER SECURITY FENCES AND
GATES

HW-G5

Each Rolling or Swing-Up Gate to Have:

NON-RATED

1 Padlock or 2 Cylinders

TYPE AS REQUIRED

BALANCE OF HARDWARE BY SECTION 32 31 53, PERIMETER SECURITY FENCES AND
GATES

H. EXTERIOR PAIRS OF GATES

HW-G6

Each Pair Traffic Gates to Have:

NON-RATED

Spring Hinge

TYPE REQUIRED X STAINLESS STEEL

BALANCE OF HARDWARE BY SECTION 32 31 53, PERIMETER SECURITY FENCES AND
GATES

HW-G7

Each Pair Gates to Have:

NON-RATED

4 Weldable Gate Hinges	A8181 (3 KNUCKLE) X 5 INCHES X WELDED OR FASTENED X SHEAR HINGE LEAVES TO FIT GATE MEMBERS
2 Padlockable Cane Bolts	
2 Padlocks	TYPE AS REQUIRED
1 Weldable Lock Box	
1 Utility Lock	F09 X NON-FERROUS LOCK CASE
2 Stainless Steel Closer	C52011/C22021

BALANCE OF HARDWARE BY SECTION 32 31 53, PERIMETER SECURITY FENCES AND GATES. INSTALL CANE BOLTS ON PULL SIDE OF EACH LEAF. ACTIVE LEAF CANE BOLT TO HAVE STRIKE IN OPEN POSITION ONLY. INACTIVE LEAF CANE BOLT TO HAVE STRIKES IN BOTH OPEN AND CLOSED POSITIONS.

HW-G8

Each Pair Gates to Have:

NON-RATED

4 Weldable Gate Hinges	A8181 (3 KNUCKLE) X 5 INCHES X WELDED OR FASTENED X SHEAR HINGE LEAVES TO FIT GATE MEMBERS
2 Padlockable Cane Bolts	
2 Padlocks	TYPE AS REQUIRED
1 Weldable Lock Box	
1 Storeroom Lock	F13-MOD x RIGID OUTSIDE LEVER x KEY RETRACTS DEADBOLT AND LATCHBOLT
2 Stainless Steel Closer	C52011/C22021

BALANCE OF HARDWARE BY SECTION 32 31 53, PERIMETER SECURITY FENCES AND GATES. INSTALL CANE BOLTS ON PULL SIDE OF EACH LEAF. ACTIVE LEAF CANE BOLT TO HAVE STRIKE IN OPEN POSITION ONLY. INACTIVE LEAF CANE BOLT TO HAVE STRIKES IN BOTH OPEN AND CLOSED POSITIONS.

HW-G9

Each Pair Gates to Have:

NON-RATED

2 Weldable Gate Hinges A8181 (3 KNUCKLE) X 5
INCHES X WELDED OR FASTENED X SHEAR
HINGE LEAVES TO FIT GATE MEMBERS

2 Weldable Panic Boxes

1 Anti-Vandal Pull

1 Rim Panic Device TYPE 1 F01

1 Rim Panic Device TYPE 1 F03 LESS TRIM

1 Cylinder TYPE AS REQUIRED

2 Stainless Steel Closer C52011/C22021

BALANCE OF HARDWARE AND FIXED MULLION BY SECTION 32 31 53, PERIMETER
SECURITY FENCES AND GATES.

HW-G10

Each Rolling or Swing-Up Gate to Have:

NON-RATED

1 Padlock or 2 Cylinders

TYPE AS REQUIRED

BALANCE OF HARDWARE BY SECTION 32 31 53, PERIMETER SECURITY FENCES AND
GATES.

I. RESIDENTIAL UNIT SINGLE DOORS

HW-R1

Each Door to Have:

NON-RATED/RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Guestroom Card Lock	BY OTHER SECTION.
1 Closer (@ Rated Doors)	C02011
1 Floor Stop	L02121 x 3 FASTENERS
2 Door Viewers	L03221 - 190°
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

HW-R1A

Each Door to Have:

NON-RATED

1 Continuous Hinge	
1 Guestroom Card Lock	BY OTHER SECTION.
1 Latch Protector (@ O/S Drs)	
1 Closer	C02011/C02021
1 Kick Plate	J102
1 Floor Stop (@ I/S Doors)	L02121 x 3 FASTENERS
1 Overhead Stop (@ O/S Doors)	C01541-ADJUSTABLE
1 Threshold (outswing door)	J32120 x SILICONE GASKET
1 Threshold (inswing door)	ALUMINUM, PER ARCHITECTURAL DETAIL
1 Door Sweep	R0Y416
1 Set Frame Seals	R0Y164
1 Drip	R0Y976

HW-R2

Each Door to Have:

NON-RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Latchset	F75
1 Base Stop	L02031 x 3 FASTENERS
3 Silencers	L03011

HW-R2A

Each Door to Have:

NON-RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Door Pull w/Plate	J401 x J302
1 Push Plate	J302
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Closer	C02011/C02021
1 Floor Stop	L02121 x 3 FASTENERS
3 Silencers	L03011

HW-R2B

Each Door to Have:

NON-RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Latchset	F75
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

HW-R2C

Each Door to Have:

NON-RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Door Pull w/Plate	J401 x J302
1 Push Plate	J302
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Closer	C02011/C02021
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

HW-R3

<u>Each Door to Have:</u>	<u>NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Privacy	F76B
1 Base Stop	L02031 x 3 FASTENERS
1 Coat Hook	L03121
3 Silencers	L03011

HW-R3A

<u>Each Door to Have:</u>	<u>NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Privacy	F76B
1 Base Stop	L02031 x 3 FASTENERS
1 Coat Hook	L03121
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

AT TOILET ROOMS, OMIT METAL THRESHOLD; STONE THRESHOLD BY OTHER TRADES.

HW-R4

<u>Each Door to Have:</u>	<u>RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Classroom Lock	F84
1 Closer	C02011/C02021
1 Base Stop	L02031 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154

HW-R5

THIS HARDWARE SET LEFT INTENTIONALLY BLANK AT THIS TIME.

J. RESIDENTIAL UNIT PAIRS OF DOORS

HW-R6

THIS HARDWARE SET LEFT INTENTIONALLY BLANK AT THIS TIME.

HW-R7

<u>Each Pair to Have:</u>	<u>NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
2 Dummy Sets	
2 Roller Latches	E09091 x MORTISE STRIKE
2 Base Stops	L02031 x 3 FASTENERS
2 Silencers	L03011

HW-R7A

<u>Each Door to Have:</u>	<u>NON-RATED/RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT
1 Guestroom Card Lock	BY OTHER SECTION.
1 Coordinator	TYPE 21A
1 Overlapping Astragal with Self-Adhesive Seal	ROY634 x ROY154 x THRU-BOLTS
2 Closer (@ Rated Doors)	C02011
2 Floor Stop	L02121 x 3 FASTENERS
2 Door Viewers	L03221 - 190°
1 Threshold	32300 x 57 MM WIDTH (2-1/4 INCHES)
2 Auto Door Bottom	ROY346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	ROY154

SECURITY HARDWARE ABBREVIATIONS LEGEND:

AC = Access Control Device (Card reader, biometric reader, keypad, etc.)
ADO = Automatic Door Operator
DEML = Delayed Egress Magnetic Lock
DEPH = Delayed Egress Panic Exit Device
DPS = Door Position Switch (Door or Alarm Contact)
EL = Electric Lock or Electric Lever Exit Device
PB = Push-button Combination Lock (stand-alone)
RR = Remote Release Button
ELR = Electric Latch Retraction Exit Device
REX = Request-to-Exit Switch in Latching Device Inside Trim

K. INTERIOR SINGLE SECURITY DOORS

HW-SH-1

THIS HARDWARE SET LEFT INTENTIONALLY BLANK AT THIS TIME.

HW-SH-2

Each Door to Have:	<u>NON RATED</u>
1 Continuous Hinge	
1 Door Pull w/ Plate	J401 x J302
1 Lock	DETENTION TYPE LOCK
1 Strike/Keeper	AS REQUIRED
1 Overhead Stop	C01541-ADJUSTABLE X SEC. TORX
1 Door Position Switch	

HW-SH-3

Each [AC, EL, REX, DPS] Door to Have: RATED/NON-RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Transfer Hinge	4-WIRE TYPE AS REQUIRED
1 Electrified Lock	F07 (E01-REX, E06) 24VDC
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Closer	C02011/C02021
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	ROY346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	ROY154
1 Alarm Contact	

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
CARD READER BY DIVISION 28.

HW-SH-3A

THIS SET NOT USED.

HW-SH-3B

Each [PB] Door to Have:

	<u>RATED</u>
1 Continuous Hinge	
1 Push-button Combination Lock	N3 - A156.13 F07 G1 E06
1 Closer	C02011/C02021
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	ROY154

HW-SH-3C

Each [PB] Door to Have:

NON-RATED/RATED

1 Continuous Hinge	X INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Push-button Combination Lock	N3 - A156.13 F07 G1 E06
1 Closer	C02011/C02021
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154

HW-SH-3D

Each [AC, EL, REX, DPS] Door to Have:

RATED

1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS X 4-THRUWIRE TRANSFER X IN-HINGE ACCESS PANEL
1 Electrified Lock	F07 (E01-REX, E06) 24VDC
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE

AS REQUIRED

1 Closer	C02011/C02021
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154
1 Alarm Contact	

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
CARD READER BY DIVISION 28.

HW-SH-3E

Each [AC, EL, REX, DPS] Door to Have:

Hinges

1 Transfer Hinge

1 Electrified Occupancy Indicator Lock

1 Power Supply

1 Closer

1 Floor Stop

1 Threshold

1 Auto Door Bottom

2 Sets Self-Adhesive Seals

1 Alarm Contact

RATED

QUANTITY & TYPE AS

REQUIRED

4-WIRE TYPE AS REQUIRED

F13-MODIFIED (E01-REX,

E06) 24VDC X OCCUPANCY

INDICATOR X KEY RETRACTS

LATCHBOLT AND DEADBOLT

X INTERNAL DEADBOLT

MONITOR SWITCH

REGULATED, FILTERED,

24VDC, AMPERAGE

AS REQUIRED

C02011/C02021

L02121 x 3 FASTENERS

J32300 x 57 mm width (2-

1/4 inches)

R0Y346 - HEAVY DUTY

R0Y154

INTERNAL DEADBOLT MONITOR SWITCH SHUNTS ACCESS CONTROL DEVICE WHEN
DEADBOLT IS THROWN.

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.

CARD READER BY DIVISION 28.

HW-SH-3F

<u>Each [AC, RR, EL, REX, DPS] Door to Have:</u>	<u>RATED</u>
1 Continuous Transfer Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 4-THRUWIRE TRANSFER x IN-HINGE ACCESS PANEL
1 Electrified Lock	F13-MOD x RIGID OUTSIDE LEVER X NO INSIDE TURN X KEY RETRACTS LATCHBOLT AND DEADBOLT (E01-REX, E06) 24VDC
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE
	AS REQUIRED
1 Closer	C02011/C02021
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154
1 Alarm Contact	

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
CARD READER BY DIVISION 28.

HW-SH-3G

<u>Each [AC, RR, EL, REX, DPS] Door to Have:</u>	<u>RATED</u>
1 Continuous Transfer Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 4-THRUWIRE TRANSFER x IN-HINGE ACCESS PANEL
1 Electrified Lock	F13-MOD x RIGID OUTSIDE LEVER X NO INSIDE TURN X KEY RETRACTS LATCHBOLT AND DEADBOLT (E01-REX, E06) 24VDC
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE
	AS REQUIRED
1 Closer	C02011/C02021
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
1 Set Self-Adhesive Seals	R0Y154
1 Alarm Contact	

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
CARD READER BY DIVISION 28.

HW-SH-3H

Each [AC, EL, REX, DPS] Door to Have:

1 Continuous Transfer Hinge

1 Electrified Lock

1 Power Supply

1 Closer

1 Kick Plate

1 Floor Stop

1 Set Self-Adhesive Seals

1 Door Viewer

1 Alarm Contact

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.

CARD READER BY DIVISION 28.

NON-RATED/RATED

x 4-THRUWIRE TRANSFER x

IN-HINGE ACCESS PANEL

F13-MOD x RIGID OUTSIDE

LEVER X KEY RETRACTS

LATCHBOLT AND DEADBOLT

(E01- REX, E06) 24VDC

REGULATED, FILTERED,

24VDC, AMPERAGE

AS REQUIRED

C02011/C02021

J102

L02121 x 3 FASTENERS

R0Y154

L03221 - 190°

HW-SH-4

Each [AC, EL, REX, DPS] Integrated Door to Have: RATED

1 Key Cylinder

TYPE AS REQUIRED

BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES

HW-SH-4A

Each [ADO, AC, ELR, REX, DPS] Integrated Door to Have: RATED

1 Key Cylinder

TYPE AS REQUIRED

BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES

HW-SH-4B

Each [ADO, AC, EL, REX, DPS] Door to Have:

1 Continuous Transfer Hinge

1 Electrified Exit Device

1 Key Cylinder

1 Power Supply

1 Armor Plate

1 Edge Guard (@ Wood Doors)

1 Floor Stop

1 Set Self-Adhesive Seals

POWER TRANSFER **SHARED BY ELECTRIC PANIC AND** RE-ACTIVATION SENSOR WIRING
(RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).

AUTOMATIC DOOR OPERATOR AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR
OPERATORS.

RATED

x INTEGRAL HINGE GUARD
CHANNEL X ADJUSTA-SCREWS

x 12-THRUWIRE TRANSFER X
IN-HINGE ACCESS PANEL

TYPE 1 (E01-REX, E06)

F13 LEVER

TYPE AS REQUIRED

TYPE REQUIRED BY PANIC

MANUFACTURER X ADO BOARD

J101 x 1.275 MM (0.050
INCH) THICKNESS

J208M / J211 (VERIFY),

CUT: HARDWARE

L02121 x 3 FASTENERS

R0Y154

HW-SH-5

THIS HARDWARE SET LEFT INTENTIONALLY BLANK AT THIS TIME.

HW-SH-6

THIS HARDWARE SET LEFT INTENTIONALLY BLANK AT THIS TIME.

I. INTERIOR PAIRS OF SECURITY DOORS

HW-SH-7

THIS HARDWARE SET LEFT INTENTIONALLY BLANK AT THIS TIME.

HW-SH-8

THIS HARDWARE SET LEFT INTENTIONALLY BLANK AT THIS TIME.

HW-SH-9

Each [AC, EL, REX, DPS] Pair to Have:

RATED

Hinges

QUANTITY & TYPE AS REQUIRED

1 Transfer Hinge

4-WIRE TYPE AS REQUIRED

1 Set Auto Flush Bolts

TYPE 25

1 Dust Proof Strike

L04021

1 Electrified Lock

F07 (E01-REX, E06) 24VDC

1 Power Supply

REGULATED, FILTERED, 24VDC,
AMPERAGE AS REQUIRED

1 Coordinator

TYPE 21A

1 Overlapping Astragal with
Self-Adhesive Seal

R0Y634 x R0Y154 x THRU-BOLTS

2 Closers

C02011/C02021

2 Kick Plates

J102 (@ STORAGE ROOMS ONLY)

2 Floor Stops

L02121 x 3 FASTENERS

1 Set Self-Adhesive Seals

R0Y154

2 Alarm Contacts

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.

CARD READER BY DIVISION 28.

HW-SH-9A

Each [PB] Pair to Have:

RATED

2	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Set Auto Flush Bolts	TYPE 25
1	Dust Proof Strike	L04021
1	Push-button Combination Lock	N3 - A156.13 F07 G1 E06
1	Coordinator	TYPE 21A
1	Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
2	Closers	C02011/C02021
2	Armor Plates	J101 x 1.275 MM (0.050 INCH) THICKNESS
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2	Floor Stops	L02121 x 3 FASTENERS
1	Set Self-Adhesive Seals	R0Y154

HW-SH-10

Each [AC, EL, REX, DPS] Pair Integrated Doors to Have: RATED

1 Key Cylinder TYPE AS REQUIRED
BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES

HW-SH-10A

Each [AC, ADO, EL, REX, DPS] Pair Integrated Doors to Have: RATED

1 Key Cylinder TYPE AS REQUIRED
BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES.
AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC
DOOR OPERATORS.

M. EXTERIOR SINGLE SECURITY DOORS

HW-SH-12

Each [AC, ELR, REX, DPS] Integrated Door to Have: NON-RATED

1 Key Cylinder TYPE AS REQUIRED
BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES

N. MENTAL HEALTH AREAS

HW-MH1

Each Door to Have:

1 Continuous Transfer Hinge

NON-RATED/RATED

x INTEGRAL HINGE GUARD

CHANNEL X HOSPITAL TIP X

ADJUSTA-SCREWS

1 Passage Latch

F01 x LESS TRIM

1 Set Anti-Ligature Trim

1 Ligature Resistant Door Alarm

1 Armor Plate

J101 x 1.275 MM (0.050

INCH) THICKNESS

1 Edge Guard (@ Wood Doors)

J208M / J211 (VERIFY),

CUT: HARDWARE

1 Floor Stop

L02121 x 3 FASTENERS

1 Set Seals

R0Y164

PROVIDE SECURITY FASTENERS FOR ALL HARDWARE ITEMS.

NO CLOSER REQUIRED DUE TO EXEMPTION FOR PATIENT ROOM DOORS.

120VAC POWER TO MFR. SUPPLIED TRANSFORMER FOR DOOR ALARM

PROVIDE WIRING AND CONDUIT FOR CONTROL PANEL, AUDIABLE ALARM, STROBES,

KEYPAD, HINGE TRANSFER AND KEY SWITCH AS PROVIDED FOR IN LIGATURE

RESISTANT DOOR ALARM DESIGN. (ADD LIGATURE RESISTANT DOOR ALARM AT

PATIENT BEDROOM DOORS)

HW-MH1A

Each Door to Have:

Hinges

1 Passage Latch

1 Set Anti-Ligature Trim

1 Closer

1 Kick Plate

1 Mop Plate (@ Inswing Doors)

1 Floor Stop

1 Threshold

1 Auto Door Bottom

1 Set Seals

PROVIDE SECURITY FASTENERS FOR ALL HARDWARE ITEMS.

HW-MH1B

Each Door to Have:

1 Continuous Hinge

1 Passage Latch

1 Set Anti-Ligature Trim

1 Kick Plate

1 Closer (@ rated doors)

1 Wall Stop

1 Threshold

1 Auto Door Bottom

2 Sets Self-Adhesive Seals

INSTALL CLOSER OUTSIDE ROOM.

PROVIDE SECURITY FASTENERS FOR ALL HARDWARE ITEMS.

RATED

QUANTITY & TYPE AS

REQUIRED X HOSPITAL TIPS

F01 x LESS TRIM

C02011/C02021

x INSTALL OUTSIDE ROOM

J102

J103

L02121 x 3 FASTENERS

J32300 x 57 MM WIDTH (2-
1/4 INCHES)

R0Y346 - HEAVY DUTY

R0Y164

RATED/NON-RATED

x HOSPITAL TIP

F01 x LESS TRIM

J102

C02011/C02021

L02101 CONVEX

J32300 x 57 MM WIDTH (2-
1/4 INCHES)

R0Y346 - HEAVY DUTY

R0Y154

HW-MH2

Each Door to Have:

	<u>NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED x HOSPITAL TIP
1 Keyed Privacy Lock	F12 x LESS TRIM
1 Set Anti-Ligature Trim	Anti-Ligature Thumbturns
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Floor Stop	L02121 x 3 FASTENERS
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
1 Set Seals	R0Y164

PROVIDE SECURITY FASTENERS FOR ALL HARDWARE ITEMS.
STONE THRESHOLD BY OTHER TRADES.

HW-MH2A

Each Door to Have:

	<u>RATED/NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED x HOSPITAL TIP
1 Keyed Privacy	F13 x OCCUPANCY INDICATOR x LESS TRIM Indicator Lock
1 Set Anti-Ligature Trim	Anti-Ligature Thumbturns
1 Closer	C02011/C02021
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154

INSTALL CLOSER OUTSIDE ROOM
PROVIDE SECURITY FASTENERS FOR ALL HARDWARE ITEMS.
STONE THRESHOLD BY OTHER TRADES.

HW-MH3

Each Door to Have:

1 Continuous Hinge

1 Classroom Lock
1 Set Anti-Ligature Trim

1 Armor Plate

1 Mop Plate
1 Edge Guard (@ Wood Doors)

1 Floor Stop
3 Silencers

PROVIDE SECURITY FASTENERS FOR ALL HARDWARE ITEMS.

NON-RATED

x INTEGRAL HINGE GUARD
CHANNEL X HOSPITAL TIP X
ADJUSTA-SCREWS
F05 x LESS TRIM
CH (Accurate Lock), or
equal
J101 x 1.275 MM (0.050
INCH) THICKNESS
J103
J208M / J211 (VERIFY),
CUT: HARDWARE
L02121 x 3 FASTENERS
L03011

HW-MH3A

Each Door to Have:

1 Continuous Hinge

1 Classroom Lock
1 Set Anti-Ligature Trim

1 Closer
1 Armor Plate

1 Edge Guard (@ Wood Doors)

1 Floor Stop

1 Set Self-Adhesive Seals

INSTALL CLOSER OUTSIDE ROOM.
PROVIDE SECURITY FASTENERS FOR ALL HARDWARE ITEMS.

RATED

x INTEGRAL HINGE GUARD
CHANNEL X HOSPITAL TIP X
ADJUSTA-SCREWS
F05 x LESS TRIM
CH (Accurate Lock), or
equal
C02011/C02021
J101 x 1.275 MM (0.050
INCH) THICKNESS
J208M / J211 (VERIFY),
CUT: HARDWARE

L02121 x 3 FASTENERS
R0Y154

HW-MH4

<u>Each [AC, RR, EL, REX, DPS] Door to Have:</u>	<u>RATED</u>
1 Continuous Transfer Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 4-THRUWIRE TRANSFER x IN-HINGE ACCESS PANEL
1 Electrified Lock	F07 (E01-REX, E06) 24VDC x LESS TRIM
1 Set Anti-Ligature Trim	
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Ligature Resistant Door Alarm	
1 Closer	C02011/C02021
1 Kick Plate	J102
1 Stretcher Plate	J101
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Door Viewer	L03221 - 190° (VIEW INTO WAITING ROOM)
1 Door Viewer	L03221 - 190° (VIEW INTO TREATMENT AREA)
1 Set Self-Adhesive Seals	R0Y154
1 Alarm Contact	1078-G (G.E. SECURITY), OR EQUAL

OMIT DOOR VIEWERS AT DOORS WITH VISION LITES.

INSTALL DOOR CLOSER ON WAITING ROOM SIDE.

120VAC POWER TO MFR. SUPPLIED TRANSFORMER FOR DOOR ALARM

PROVIDE WIRING AND CONDUIT FOR CONTROL PANEL, AUDIBLE ALARM, STROBES,
KEYPAD, HINGE TRANSFER AND KEY SWITCH AS PROVIDED FOR IN LIGATURE
RESISTANT DOOR ALARM DESIGN. (ADD LIGATURE RESISTANT DOOR ALARM AT
PATIENT ROOM ISOLATION)

PROVIDE SECURITY FASTENERS FOR ALL HARDWARE ITEMS.

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.

CARD READER BY DIVISION 28.

HW-MH4A

Each Door to Have:

1 Continuous Hinge

1 Lock

1 Set Anti-Ligature Trim

1 Armor Plate

1 Edge Guard (@ Wood Doors)

1 Floor Stop

1 Threshold

1 Auto Door Bottom

1 Set Seals

RATED

x INTEGRAL HINGE GUARD
CHANNEL X HOSPITAL TIP X
ADJUSTA-SCREWS

F08 x LESS TRIM

J101 x 1.275 MM (0.050
INCH) THICKNESS

J208M / J211 (VERIFY),
CUT: HARDWARE

L02121 x 3 FASTENERS

J32300 x 57 MM WIDTH (2-
1/4 INCHES)

R0Y346 - HEAVY DUTY

R0Y164

PROVIDE SECURITY FASTENERS FOR ALL HARDWARE ITEMS.

NO CLOSER REQUIRED DUE TO EXEMPTION FOR PATIENT ROOM DOORS.

HW-MH5

Each Door to Have:

	<u>RATED/NON-RATED</u>
1 Continuous Transfer Hinge	x INTEGRAL HINGE GUARD CHANNEL X HOSPITAL TIP X ADJUSTA-SCREWS
2 Anti-Ligature Pulls	
1 Deadlatch	F30 LESS TRIM BOTH SIDES
1 Ligature Resistant Door Alarm	
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2- 1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
1 Set Seals	R0Y164

PROVIDE SECURITY FASTENERS FOR ALL HARDWARE ITEMS.

NO CLOSER REQUIRED AT RATED DOORS DUE TO EXEMPTION FOR PATIENT ROOM DOORS.

120VAC POWER TO MFR. SUPPLIED TRANSFORMER FOR DOOR ALARM

PROVIDE WIRING AND CONDUIT FOR CONTROL PANEL, AUDIABLE ALARM, STROBES, KEYPAD, HINGE TRANSFER AND KEY SWITCH AS PROVIDED FOR IN LIGATURE RESISTANT DOOR ALARM DESIGN. (ADD LIGATURE RESISTANT DOOR ALARM AT PATIENT ROOM SECLUSION)

HW-MH5A

Each Door to Have:

1 Continuous Hinge

2 Anti-Ligature Pulls

1 Deadlatch

1 Edge Guard (@ Wood Doors)

1 Armor Plate

1 Floor Stop

3 Silencers

STONE THRESHOLD BY OTHER TRADES.

PROVIDE SECURITY FASTENERS FOR ALL HARDWARE ITEMS.

RATED

x INTEGRAL HINGE GUARD
CHANNEL X HOSPITAL TIP X
ADJUSTA-SCREWS

F30 LESS TRIM BOTH SIDES
J208M / J211 (VERIFY),
CUT: HARDWARE

J101 x 1.275 MM (0.050
INCH) THICKNESS

L02121 x 3 FASTENERS

L03011

HW-MH6

Each Pair to Have:

- 2 Continuous Transfer Hinges

- 2 Anti-Ligature Pulls (act. 1f)
- 2 Manual Flush Bolts
- 1 Ligature Resistant Door Alarm
- 1 Dust Proof Strike
- 1 Deadlatch
- 1 Overlapping Astragal

- 2 Armor Plates

- 2 Edge Guard (@ Wood Doors)

- 2 Floor Stops
- 1 Threshold

- 2 Auto Door Bottom
- 1 Set Seals

RATED/NON-RATED

- x INTEGRAL HINGE GUARD
CHANNEL X HOSPITAL TIP X
ADJUSTA-SCREWS

- L04251/L04261 (VERIFY)

- L04021
- F30 LESS TRIM BOTH SIDES
R0Y634 x R0Y154 x THRU-
BOLTS

- J101 x 1.275 MM (0.050
INCH) THICKNESS
- J208M / J211 (VERIFY),
CUT: HARDWARE

- L02121 x 3 FASTENERS
- J32300 x 57 MM WIDTH (2-
1/4 INCHES)

- R0Y336 - HEAVY DUTY
- R0Y164

PROVIDE SECURITY FASTENERS FOR ALL HARDWARE ITEMS.

120VAC POWER TO MFR. SUPPLIED TRANSFORMER FOR DOOR ALARM

PROVIDE WIRING AND CONDUIT FOR CONTROL PANEL, AUDIABLE ALARM, STROBES,
KEYPAD, HINGE TRANSFER AND KEY SWITCH AS PROVIDED FOR IN LIGATURE
RESISTANT DOOR ALARM DESIGN. (ADD LIGATURE RESISTANT DOOR ALARM AT
PATIENT ROOM DOOR BARIATRIC)

HW-MH6A

Each Pair to Have:

- 2 Continuous Hinge

- 2 Manual Flush Bolts
- 1 Dust Proof Strike
- 1 Passage Latch
- 1 Set Anti-Ligature Trim

NON-RATED/RATED

- x INTEGRAL HINGE GUARD
CHANNEL X HOSPITAL TIP X
ADJUSTA-SCREWS

- L04251/L04261 (VERIFY)

- L04021
- F01 x LESS TRIM

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1 Overlapping Astragal	R0Y634 x R0Y154 x THRU- BOLTS
2 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
2 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2 Floor Stop	L02121 x 3 FASTENERS
1 Set Seals	R0Y164

PROVIDE SECURITY FASTENERS FOR ALL HARDWARE ITEMS.

NO CLOSER REQUIRED DUE TO EXEMPTION FOR PATIENT ROOM DOORS.

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SECTION 08 71 13.11

LOW ENERGY POWER ASSIST DOOR OPERATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Low-energy, power-assisted automatic swing door operators.

1.2 RELATED REQUIREMENTS

- A. Commissioning; Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS.
- B. Steel Doors; Section 08 11 13, HOLLOW METAL DOORS AND FRAMES.
- C. Impact Resistant Wood Doors; Section 08 14 23, IMPACT RESISTANT WOOD DOORS.
- D. Aluminum-Clad Wood Doors; Section 08 14 33, ALUMINUM-CLAD WOOD DOORS.
- E. Door Hardware; Section 08 71 00, DOOR HARDWARE.
- F. Finish Color, Section 09 06 00, SCHEDULE FOR FINISHES.
- G. Electric General Wiring, Connections and Equipment Requirements; Division 26, ELECTRICAL.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.
- B. ASTM International (ASTM):
 1. B209-14 - Aluminum and Aluminum-Alloy Sheet and Plate.
 2. B221-14 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- C. Builders Hardware Manufacturers Association, Inc. (BHMA):
 1. 156.19-07 - Power Assist and Low Energy Power Operated Doors.

1.4 PREINSTALLATION MEETINGS

- A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.
 1. Required Participants:
 - a. Contracting Officer's Representative.
 - b. Architect/Engineer.
 - c. VA Interior Designer.
 - d. Inspection and Testing Agency.
 - e. Contractor.
 - f. Installer.
 - g. Manufacturer's field representative.
 - h. Other installers responsible for adjacent and intersecting work, including electrical wiring installers.

1.5 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings:
 - 1. Show size, configuration, and fabrication and installation details.
- C. Manufacturer's Literature and Data:
 - 1. Description of each product.
 - 2. Maintenance manuals.
 - 3. Installation instructions.
 - 4. Warranty.
- D. Samples:
 - 1. Door Operator: Full sized, complete assembly.
 - 2. Approved samples may be incorporated into work.
- E. Certificates: Certify each product complies with specifications.
 - 1. Show door operator is UL Listed for specified application.
- F. Operation and Maintenance Data:
 - 1. Care instructions for each exposed finish product.
 - 2. Start-up, maintenance, troubleshooting, emergency, and shut-down instructions for each operational product.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Regularly manufactures specified products.
- B. Installer Qualifications:
 - 1. Regularly installs specified products.

1.7 DELIVERY

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, [**color**,] production run number, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.8 STORAGE AND HANDLING

- A. Store products indoors in dry, weathertight [**conditioned**] facility.
- B. Protect products from damage during handling and construction operations.

1.9 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

B. Manufacturer's Warranty: Warrant automatic door operators against material and manufacturing defects.

C. Warranty Period: Two years.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Power assisted automatic door equipment accommodating normal traffic as well as the weight of the doors; UL approved and comply with applicable codes.

2.2 SYSTEM PERFORMANCE

A. Opening Force: Maximum 67 N (15 lbf.).

B. Cycle Tests: 300,000 cycles.

1. Use the widest and heaviest door specified as a test specimen. Narrower or lighter doors of the same configurations will be considered to meet the cycle test requirements.

2.3 MATERIALS

A. Aluminum:

1. Sheet: ASTM B209.
2. Extrusions: ASTM B221.

2.4 PRODUCTS - GENERAL

A. Provide automatic door operators from one manufacturer.

2.5 LOW-ENERGY AUTOMATIC DOOR OPERATORS

A. Conform to BHMA A156.19.

B. Mounting: Concealed, overhead Surface-mounted.

C. Enclosure: Self-contained within an extruded aluminum housing (alloy 6063-T6) to conceal operator mechanism and mounting brackets and with removable access cover with an overall maximum size of 140 mm (5-1/2 inches) wide by 150 mm (6 inches) deep.

D. Safety Features:

1. Adjustable time delay.
2. Adjustable speed for opening and closing operations.
3. Adjustable backcheck.
4. Decals indicating "In" or "Do Not Enter" installed on both faces of each door where shown conforming to the requirements of ANSI/BHMA A156.19.
5. Re-activation sensor mounted on the push-side door face near the top detect any person standing in the door swing path and prevent the door from closing.

6. Motion sensor to detect any person standing in the door swing path and prevent the door from opening.
 - a. Adjustable door sensor system providing complete operation and safety zone coverage.

E. Power Units:

1. Self-contained electric circuits for automatic operators located on each floor of the building.
2. Interruption or failure of power circuits for operators located on one floor of the building shall not interfere with continuous performance of automatic operated doors located on other floors.
3. Power units designed to not interfere with continuous performance of automatic operated doors located on other floors in the case of power interruption or failure.
4. Capacity and size of power circuits according to automatic operator manufacturer's specifications.

2.6 OPERATION

A. Traffic Operation:

1. Single Door: Two way.
2. Double Doors: Two way Double swing.

B. Operator: Electromechanical; surface-mounted.

1. Operators have checking mechanism providing cushioning action at last part of door travel, in both opening and closing cycle.
2. Operators recycle doors instantaneously to full open position from any point in closing cycle when control switch is reactivated.
3. Operators to allow manual door control in event of power failure.

C. Controls: Solid-state type.

D. Activation: Push-plate switch, unless noted otherwise.

2.7 FINISHES

A. Aluminum Anodized Finish: NAAMM AMP 500.

1. Clear Anodized Finish: AA-C22A31; Class II Architectural, 0.01 mm (0.4 mil) thick.

2.8 ACCESSORIES

A. Signage: BHMA standard for operation and door type specified.

B. Fasteners: Corrosion-resistant, compatible with adjoining materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions effecting work, including door and frame preparation and electrical rough-ins.

3.2 INSTALLATION - GENERAL

- A. Install products according to manufacturer's instructions and approved submittal drawings.
 - 1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.
- B. Coordinate installation of equipment with other related work.
- C. Mount manual controls and power disconnect switches recessed or semi-flush in partitions.
- D. Secure operator components to adjacent construction with suitable fastenings. Conceal conduits, piping, and electric equipment in finish work.
- E. Install power units and controls in locations indicated.
 - 1. Where units are to be mounted on walls, provide metal supports or shelves for the units.

3.3 ADJUSTING

- A. All equipment, including time delay switches, to be accessible for maintenance and adjustment.
- B. Adjust operators to function properly for the type of traffic (pedestrians) expected to pass through doors.
- C. Adjust each door leaf of pairs of doors to open and close in synchronization.
- D. On pairs of doors, adjust operators allowing either door to be opened manually without the other door opening.

3.4 DEMONSTRATION AND TRAINING

- A. Instruct VA personnel in proper door operator operation and maintenance.
 - 1. Trainer: Manufacturer approved instructor.
- B. Submit training plan and trainer qualifications. See Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS.
- C. Acceptance Condition: After completing work, operate door operators 15 consecutive calendar days without breakdown.

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.SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.1 DESCRIPTION:

A. This section specifies the following:

1. Glass.
2. Glazing materials and accessories for both factory and field glazed assemblies.

1.2 RELATED WORK:

- A. Section 08 11 13, HOLLOW METAL DOORS AND FRAMES, and Section 08 14 00, WOOD DOORS: Sound resistant doors.
- B. Section 10 28 00, TOILET, BATH, AND LAUNDRY ACCESSORIES: Mirrors.
- C. Section 08 14 23, IMPACT RESISTANT WOOD DOORS: Interior Wood Doors.
- D. Section 08 14 33, ALUMINUM-CLAD WOOD DOORS: Exterior Wood Doors.
- E. Section 08 41 14, ALUMINUM FOLDING DOOR SYSTEM: Aluminum Folding Door.
- F. Section 08 44 13, GLAZED ALUMINUM CURTAIN WALLS Glazed Curtain Walls: Glazed Curtain Walls.
- G. Section 08 52 00, ALUMINUM-CLAD WOOD WINDOWS: Windows.
- H. Section 08 56 59, SERVICE AND TELLER WINDOW UNITS: Service and Teller Windows.

1.3 LABELS:

A. Temporary labels:

1. Provide temporary label on each light of glass identifying manufacturer or brand and glass type, quality and nominal thickness.
2. Label in accordance with NFRC label requirements.
3. Temporary labels are to remain intact until glass is approved by Contracting Officer Representative (COR).

B. Permanent labels:

1. Locate in corner for each pane.
2. Label in accordance with ANSI Z97.1 and SGCC label requirements.
 - a. Tempered glass.
 - b. Laminated glass or have certificate for panes without permanent label.
 - c. Organic coated glass.
3. Bullet resistance glass or plastic assemblies:

- a. Bullet resistance glass or plastic assemblies in accordance with UL 752 requirements for power rating specified.
 - b. Identify each security glazing permanently with glazing manufacturer's name, date of manufacture, product number, and DOS Code number inconspicuously located in lower corner on protective side and visible after glazing is framed.
 - c. The "attack (threat) side" is to be identified in bold lettering on each side of glazing with removable label.
4. Fire rated glazing assemblies: Mark in accordance with IBC.

1.4 PERFORMANCE REQUIREMENTS:

- A. General: Design glazing system consistent with guidance and practices presented in the GANA Glazing Manual, GANA Laminated Glazing Manual, and GANA Sealant Manual, as applicable to project. Installed glazing is to withstand applied loads, thermal stresses, thermal movements, building movements, permitted tolerances, and combinations of these conditions without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; unsafe engagement of the framing system; deflections beyond specified limits; or other defects in construction.
- B. Glazing Unit Design: Design glass, including engineering analysis meeting requirements of authorities having jurisdiction. Thicknesses listed are minimum. Coordinate thicknesses with framing system manufacturers.
1. Design glass in accordance with ASTM E1300, and for conditions beyond the scope of ASTM E1300, by a properly substantiated structural analysis.
 2. Design Wind Pressures: As indicated on construction documents.
 3. Wind Design Data: As indicated on construction documents.
 4. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than the structural capacity of the glazing unit, the threshold at which frame engagement is no longer safely assured, 1/100times the short-side length, or 19 mm (0.75 inch), whichever is less.
- C. Ballistic- and Blast- resistant glass or plastic glazing assemblies:
1. For blast-resistant and ballistic-resistant units comply with requirements in UFC 4-010-01, Physical Security Design Manual for VA Facilities, and project-specific criteria provided by VA.

2. Spall Resistance: Laminated glazing is not permitted to produce spall to interior (protected side) when impacted with scheduled ballistics.
3. Tolerances:
 - a. Outside dimensions: Overall outside dimensions (height and width) of laminated security glazing is to maintain tolerance of ± 3 mm (± 0.12 inch).
 - b. Warpage: Out-of-flat (warpage or bowing) condition of laminates is not to exceed 2.5 mm per lineal meter (0.10 inch per 3.3 lineal foot). The condition, if present, is to be localized to extent not greater than 0.75 mm (0.03 inch) for any 0.3 meter (0.98 feet) section.

D. Building Enclosure Vapor Retarder and Air Barrier:

1. Utilize the inner pane of multiple pane sealed units for the continuity of the air barrier and vapor retarder seal.
2. Maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

1.5 SUBMITTALS:

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Certificates:
 1. Certificate stating that fire-protection and fire-resistive glazing units meet code requirements for fire-resistance-rated assembly and applicable safety glazing requirements.
 2. Certificate on solar heat gain coefficient when value is specified.
 3. Certificate on "R" value when value is specified.
 4. Certificate test reports confirming compliance with specified bullet resistive rating.
 5. Certificate that blast resistant glass meets the specified requirements.
- C. Manufacturer Warranty.
- D. Manufacturer's Literature and Data:
 1. Glass, each kind required.
 2. Insulating glass units.
 3. Transparent (one-way vision glass) mirrors.
 4. Elastic compound for metal sash glazing.
 5. Putty, for wood sash glazing.
 6. Glazing cushion.
 7. Sealing compound.

8. Bullet resistive material.
 9. Plastic glazing material, each type required.
- E. Samples:
1. Size: 305 mm by 305 mm (12 inches by 12 inches).
 2. Tinted glass.
 3. Reflective glass.
 4. Transparent (one-way vision glass) mirrors.
- F. Preconstruction Adhesion and Compatibility Test Report: Submit glazing sealant manufacturer's test report indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

1.6 DELIVERY, STORAGE AND HANDLING:

- A. Delivery: Schedule delivery to coincide with glazing schedules so minimum handling of crates is required. Do not open crates except as required for inspection for shipping damage.
- B. Storage: Store cases according to printed instructions on case, in areas least subject to traffic or falling objects. Keep storage area clean and dry.
- C. Handling: Unpack cases following printed instructions on case. Stack individual windows on edge leaned slightly against upright supports with separators between each.
- D. Protect laminated security glazing units against face and edge damage during entire sequence of fabrication, handling, and delivery to installation location. Provide protective covering on exposed faces of glazing plastics, and mark inside as "INTERIOR FACE" or "PROTECTED FACE":
1. Treat security glazing as fragile merchandise, and packaged and shipped in export wood cases with width end in upright position and blocked together in a mass. Storage and handling to comply with manufacturer's directions and as required to prevent edge damage or other damage to glazing resulting from effects of moisture, condensation, temperature changes, direct exposure to sun, other environmental conditions, and contact with chemical solvents.
 2. Protect sealed-air-space insulating glazing units from exposure to abnormal pressure changes, as could result from substantial changes in altitude during delivery by air freight. Provide temporary breather tubes which do not nullify applicable warranties on hermetic seals.

3. Temporary protections: The glass front and polycarbonate back of glazing are to be temporarily protected with compatible, peelable, heat-resistant film which will be peeled for inspections and re-applied and finally removed after doors and windows are installed at destination. Since many adhesives will attack polycarbonate, the film used on exposed polycarbonate surfaces is to be approved and applied by manufacturer.
4. Edge protection: To cushion and protect glass clad, and polycarbonate edges from contamination or foreign matter, the four (4) edges are to be sealed the depth of glazing with continuous standard-thickness thermoplastic rubber tape. Alternatively, continuous channel shaped extrusion of thermoplastic rubber are to be used, with flanges extending into face sides of glazing.
5. Protect "Constant Temperature" units including every unit where glass sheet is directly laminated to or directly sealed with metal-tube type spacer bar to polycarbonate sheet, from exposures to ambient temperatures outside the range of 16 to 24 degrees C (60 to 75 degrees F), during the fabricating, handling, shipping, storing, installation, and subsequent protection of glazing.

1.7 PROJECT CONDITIONS:

- A. Field Measurements: Field measure openings before ordering tempered glass products to assure for proper fit of field measured products.

1.8 WARRANTY:

- A. Construction Warranty: Comply with the FAR clause 52.246-21 "Warranty of Construction".
- B. Manufacturer Warranty: Manufacturer shall warranty their glazing from the date of installation and final acceptance by the Government as follows. Submit manufacturer warranty.
 1. Bullet resistive plastic material to remain visibly clear without discoloration for 10 years.
 2. Insulating glass units to remain sealed for ten (10) years.
 3. Laminated glass units to remain laminated for five (5) years.
 4. Polycarbonate to remain clear and ultraviolet light stabilized for five (5) years.

1.9 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

- B. American Architectural Manufacturers Association (AAMA):
 - 800.....Test Methods for Sealants
 - 810.1-77.....Expanded Cellular Glazing Tape
- C. American National Standards Institute (ANSI):
 - Z97.1-14.....Safety Glazing Material Used in Building - Safety
Performance Specifications and Methods of Test
- D. American Society of Civil Engineers (ASCE):
 - 7-10.....Wind Load Provisions
- E. ASTM International (ASTM):
 - C542-05(2017).....Lock-Strip Gaskets
 - C716-06(2020).....Installing Lock-Strip Gaskets and Infill Glazing
Materials
 - C794-18.....Adhesion-in-Peel of Elastomeric Joint Sealants
 - C864-05(2019).....Dense Elastomeric Compression Seal Gaskets,
Setting Blocks, and Spacers
 - C920-18.....Elastomeric Joint Sealants
 - C964-20.....Standard Guide for Lock-Strip Gasket Glazing
 - C1036-16.....Flat Glass
 - C1048-18.....Heat-Treated Flat Glass-Kind HS, Kind FT Coated and
Uncoated Glass.
 - C1172-19.....Laminated Architectural Flat Glass
 - C1349-17.....Standard Specification for Architectural Flat
Glass Clad Polycarbonate
 - C1376-15.....Pyrolytic and Vacuum Deposition Coatings on Flat
Glass
 - D635-18.....Rate of Burning and/or Extent and Time of Burning
of Self-Supporting Plastic in a Horizontal
Position
 - D4802-16.....Poly (Methyl Methacrylate) Acrylic Plastic Sheet
 - E84-20.....Surface Burning Characteristics of Building
Materials
 - E119-20.....Standard Test Methods for Fire Test of Building
Construction and Material
 - E1300-16.....Load Resistance of Glass in Buildings
 - E1886-19.....Standard Test Method for Performance of Exterior
Windows, Curtain Walls, Doors, and Impact

- Protective Systems Impacted by Missile(s) and
Exposed to Cyclic Pressure Differentials
- E1996-17.....Standard Specification for Performance of Exterior
Windows, Curtain Walls, Doors, and Impact
Protective Systems Impacted by Windborne Debris in
Hurricanes
- E2141-14.....Test Methods for Assessing the Durability of
Absorptive Electrochromic Coatings on Sealed
Insulating Glass Units
- E2190-19.....Insulating Glass Unit
- E2240-06.....Test Method for Assessing the Current-Voltage
Cycling Stability at 90 Degree C (194 Degree F) of
Absorptive Electrochromic Coatings on Sealed
Insulating Glass Units
- E2241-06.....Test Method for Assessing the Current-Voltage
Cycling Stability at Room Temperature of
Absorptive Electrochromic Coatings on Sealed
Insulating Glass Units
- E2354-10.....Assessing the Durability of Absorptive
Electrochromic Coatings within Sealed Insulating
Glass Units
- E2355-10.....Test Method for Measuring the Visible Light
Transmission Uniformity of an Absorptive
Electrochromic Coating on a Glazing Surface
- F1233-08 (2019).....Standard Test Method for Security Glazing
Materials and Systems
- F1642/F1642M-17.....Test Method for Glazing and Glazing Systems Subject
to Airblast Loadings
- F. Code of Federal Regulations (CFR):
- 16 CFR 1201-10.....Safety Standard for Architectural Glazing
Materials
- G. Glass Association of North America (GANA):
- 2010 Edition.....GANA Glazing Manual
- 2008 Edition.....GANA Sealant Manual
- 2009 Edition.....GANA Laminated Glazing Reference Manual
- 2010 Edition.....GANA Protective Glazing Reference Manual

- H. International Code Council (ICC):
IBC.....International Building Code
- I. Insulating Glass Certification Council (IGCC)
- J. Insulating Glass Manufacturer Alliance (IGMA):
TB-3001-13.....Guidelines for Sloped Glazing
TM-3000.....North American Glazing Guidelines for Sealed
Insulating Glass Units for Commercial and
Residential Use
- K. Intertek Testing Services - Warnock Hersey (ITS-WHI)
- L. National Fire Protection Association (NFPA):
80-16.....Fire Doors and Windows
252-12.....Fire Tests of Door Assemblies
257-12.....Standard on Fire Test for Window and Glass Block
Assemblies
- M. National Fenestration Rating Council (NFRC)
- N. Safety Glazing Certification Council (SGCC) 2012:
Certified Products Directory (Issued Semi-Annually).
- O. Underwriters Laboratories, Inc. (UL):
9-08(R2009).....Fire Tests of Window Assemblies
263-14.....Fire Tests of Building Construction and Materials
752-11.....Bullet-Resisting Equipment.
- P. Department of Veterans Affairs:
- Q. Physical Security Design Manual for VA Mission Critical Protected Facilities
January 2015
- R. Architectural Design Manual for VA Facilities (VASDM)
- S. Environmental Protection Agency (EPA):
40 CFR 59(2014).....National Volatile Organic Compound Emission
Standards for Consumer and Commercial Products

PART 2 - PRODUCTS

2.1 GLASS:

- A. Provide minimum thickness stated and as additionally required to meet performance requirements.
 - 1. Provide minimum 6 mm (1/4 inch) thick glass units unless otherwise indicated.
- B. Obtain glass units from single source from single manufacturer for each glass type.

C. Clear Glass:

1. ASTM C1036, Type I, Class 1, Quality [q3] p q4].

D. Ultra-clear-Low-Iron Float Glass:

1. ASTM C1036, Type I, Class 1, Quality [q3][q4] and with visible light transmission of not less than 90 percent.

E. Tinted Heat reflective and low emissivity coated glass:

1. ASTM C1036, Type I, Class 2, Quality q3.

2.2 HEAT-TREATED GLASS:

A. Roller Wave Limits for Heat-Treated Glass: Orient all roller wave distortion parallel to bottom surface of glazing, and provide units complying with the following limitations:

1. Measurement Parallel to Line: Maximum peak to valley 0.203 mm (0.008 inch).
2. Measurement Perpendicular to Line: Maximum 0.0254 mm (0.001 inch).
3. Bow/Warp: Maximum 50 percent of bow and warp allowed by ASTM C1048.

B. Clear Heat Strengthened Glass:

1. ASTM C1048, Kind HS, Condition A, Type I, Class 1, Quality q3.

C. Tinted Heat Strengthened Glass:

1. ASTM C1048, Kind HS, Condition A, Type I, Class 2, Quality q3.

D. Clear Tempered Glass:

1. ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3.

E. Tinted Tempered Glass.

1. ASTM C1048, Kind FT, Condition A, Type I, Class 2, Quality q3.

Thickness	Long Dimension of Sheet
3 mm (0.125 inch)	610 mm (24 inches or less)
5 mm (0.187 inch)	610 - 915 mm (24 through 36 inches)
6.5 mm (0.250 inch)	915 - 1524 mm (36 through 60 inches)

Thickness	Long Dimension of Sheet	Edge Lap
3 mm (0.125 inch)	610 - 1219 mm (24 through 48 inch)	19 mm (3/4 inch)

inches)
9.5 mm 1219 - 1524 mm 25 mm (3/4
(0.375 (48 through 60 inch)
inch) inches)
13 mm (Over 1524 mm (Over 25 mm (1
0.50 inch) 60 inches) inch)

2.3 LAMINATED GLASS:

- A. Laminated Glass: ASTM C1172. Two or more lites of glass bonded with polyvinyl butyral, ionomeric polymer, or cast-in-place and cured-transparent-resin interlayer complying with interlayer manufacturer's written instructions.
- B. Interlayer: Use min. 0.75 mm (0.030 inch) thick interlayer for vertical glazing unless otherwise scheduled.
- C. Interlayer: Use 1.5 mm (0.060 inch) thick interlayer for:
 - 1. Acoustical glazing.
 - 2. Assemblies requiring heat strengthened or fully tempered glass.
- D. Interlayer: Use 2.28 mm (0.090 inch) thick interlayer where required to meet performance requirements.
- E. Interlayer Color: Clear, unless otherwise scheduled.

2.4 SECURITY GLAZING ASSEMBLY:

- A. Provide ballistic level as scheduled in accordance with UL 752.
- B. Forced Entry Resistance: As scheduled, in accordance with ASTM F1233.
- C. Blast Resistance: Provide exterior glazing units providing protection based upon hazard rating as scheduled, in accordance with ASTM F1642, and peak pressure and positive phase impulse indicated.
- D. Laminated Glass Security Glazing Units: Fabricate from multiple lites of scheduled glass with polyvinyl butyral, ionomeric polymer, or cast-in-place and cured-transparent resin interlayers between the layers of glazing.

2.5 INSULATING GLASS UNITS:

- A. Provide factory fabricated, hermetically sealed glass unit consisting of two panes of glass separated by a dehydrated air space and comply with ASTM E2190.
- B. Assemble units using glass types specified in Insulating Glass Schedule.

2.6 FIRE PROTECTION AND FIRE RESISTANCE GLAZING:

- A. Fire-Protection-Rated Glazing: Glazing units tested for use in fire door assemblies or fire windows, UL, ITS-WHI or equivalent listed and labeled by testing agency in accordance with IBC, for fire-protection ratings as indicated on construction documents, based upon positive-pressure testing per NFPA 257 or UL 9, and complying with NFPA 80.
1. Hose-Stream Test: Units must comply, except units having fire-protection rating of 20 minutes.
 2. Labeling: Permanently label fire-protection-rated glazing units in accordance with IBC.
 3. Safety Glazing: Comply with 16 CFR 1201, Category II.
 4. Fire-Protection-Rated Tempered Glass: For 20-minute fire-protection-rated door assemblies, of thickness scheduled.
 5. Fire-Protection-Rated Laminated Ceramic Glazing: Units made from two lites of clear, ceramic glass, 8 mm (5/16 inch) total thickness, for rating scheduled.
 6. Interlayers: Units made from multiple lites of uncoated, ultra-clear (low-iron) float glass, in intumescent interlayers, of thickness and rating scheduled.

2.7 GLAZING ACCESSORIES:

- A. As required to supplement the accessories provided with the items to be glazed and to provide a complete installation. Ferrous metal accessories exposed in the finished work are to have a finish that will not corrode or stain while in service. Fire rated glazing to be installed with glazing accessories in accordance with the manufacturer's installation instructions.
- B. Setting Blocks: ASTM C864:
1. Silicone type.
 2. Channel shape; having 6 mm (1/4 inch) internal depth.
 3. Shore A hardness of 80 to 90 Durometer.
 4. Block lengths: 50 mm (2 inches) except 100 to 150 mm (4 to 6 inches) for insulating glass.
 5. Block width: Approximately 1.6 mm (1/16 inch) less than the full width of the rabbet.
 6. Block thickness: Minimum 4.8 mm (3/16 inch). Thickness sized for rabbet depth as required.

C. Spacers: ASTM C864:

1. Channel shape having a 6 mm (1/4 inch) internal depth.
2. Flanges not less 2.4 mm (3/32 inch) thick and web 3 mm (1/8 inch) thick.
3. Lengths: 25 to 76 mm (1 to 3 inches).
4. Shore A hardness of 40 to 50 Durometer.

D. Glazing Tapes:

1. Semi-solid polymeric based closed cell material exhibiting pressure-sensitive adhesion and withstanding exposure to sunlight, moisture, heat, cold, and aging.
2. Shape, size and degree of softness and strength suitable for use in glazing application to prevent water infiltration.
3. Complying with AAMA 800 for the following types:
 - a. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 - b. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

E. Spring Steel Spacer: Galvanized steel wire or strip designed to position glazing in channel or rabbeted sash with stops.

F. Glazing Clips: Galvanized steel spring wire designed to hold glass in position in rabbeted sash without stops.

G. Glazing Points (Sprigs): Pure zinc stock, thin, flat, triangular or diamond shaped pieces, 6 mm (1/4 inch) minimum size.

H. Glazing Gaskets: ASTM C864:

1. Firm dense wedge shape for locking in sash.
2. Soft, closed cell with locking key for sash key.
3. Flanges may terminate above the glazing-beads or terminate flush with top of beads.

I. Lock-Strip Glazing Gaskets: ASTM C542, shape, size, and mounting as indicated.

J. Glazing Sealants: ASTM C920, silicone neutral cure:

1. Type S.
2. Class 25 or 50 as recommended by manufacturer for application.
3. Grade NS.
4. Shore A hardness of 25 to 30 Durometer.

5. VOC Content: For sealants used inside the weatherproofing system, not more than [250][] g/L or less when calculating according to 40 CFR 59, (EPA Method 24).
- K. Neoprene, EPDM, or Vinyl Glazing Gasket: ASTM C864.
 1. Channel shape; flanges may terminate above the glazing channel or flush with the top of the channel.
 2. Designed for dry glazing.
- L. Color:
 1. Color of glazing compounds, gaskets, and sealants used for aluminum color frames to match color of the finished aluminum and be nonstaining.
 2. Color of other glazing compounds, gaskets, and sealants which will be exposed in the finished work and unpainted are to be black, gray, or neutral color.
- M. Smoke Removal Unit Targets: Adhesive targets affixed to glass to identify glass units intended for removal for smoke control. Comply with requirements of local Fire Department.

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Verification of Conditions:
 1. Examine openings for glass and glazing units; determine they are proper size; plumb; square; and level before installation is started.
 2. Verify that glazing openings conform with details, dimensions and tolerances indicated on manufacturer is approved shop drawings.
- B. Review for conditions which may adversely affect glass and glazing unit installation, prior to commencement of installation. Do not proceed with installation until unsatisfactory conditions have been corrected.
- C. Verify that wash down of adjacent masonry is completed prior to erection of glass and glazing units.

3.2 PREPARATION:

- A. For sealant glazing, prepare glazing surfaces in accordance with GANA Sealant Manual.
- B. Determine glazing unit size and edge clearances by measuring the actual unit to receive the glazing.
- C. Shop fabricate and cut glass with smooth, straight edges of full size required by openings to provide GANA recommended edge clearances.
- D. Verify that components used are compatible.

- E. Clean and dry glazing surfaces.
- F. Prime surfaces scheduled to receive sealants, as determined by preconstruction sealant-substrate testing.

3.3 INSTALLATION - GENERAL:

- A. Install in accordance with GANA Glazing Manual, GANA Sealant Manual, IGMA TB-3001, and IGMA TM-3000 unless specified otherwise.
- B. Glaze in accordance with recommendations of glazing and framing manufacturers, and as required to meet the Performance Test Requirements specified in other applicable sections of specifications.
- C. Set glazing without bending, twisting, or forcing of units.
- D. Do not allow glass to rest on or contact any framing member.
- E. Glaze doors and operable sash, in a securely fixed or closed and locked position, until sealant, glazing compound, or putty has thoroughly set.
- F. Tempered Glass: Install with roller distortions in horizontal position unless otherwise directed.
- G. Laminated Glass:
 - 1. Tape edges to seal interlayer and protect from glazing sealants.
 - 2. Do not use putty or glazing compounds.
- H. Insulating Glass Units:
 - 1. Glaze in compliance with glass manufacturer's written instructions.
 - 2. When glazing gaskets are used, they are to be of sufficient size and depth to cover glass seal or metal channel frame completely.
 - 3. Do not use putty or glazing compounds.
 - 4. Do not grind, nip, cut, or otherwise alter edges and corners of fused glass units after shipping from factory.
 - 5. Install with tape or gunnable sealant in wood sash.
- I. Fire Protective and Fire Resistance Glass:
 - 1. Wire Glass: Glaze in accordance with NFPA 80.
 - 2. Other fire protective and fire resistant glass: Glaze in accordance with manufacturer's installation instructions and NFPA 80.
- J. Bullet Resisting Material:
 - 1. Glaze as recommended by manufacturer, using glazing material which will permit expansion and contraction of the bullet resistive material in the frame.
 - 2. The polycarbonate surface is not to be cleaned by scraping, razor blade, squeegee, or use of highly alkaline cleaner.

3. At no time is polycarbonate material be exposed to chemical solvents (benzene, gasoline, acetone, paint thinners) or aromatic hydrocarbons (toluene or xylene), nor should any of these solvents or fumes be used or present in confined area such as a security guard booth.
4. Due care is to be exercised (paint formula, ventilation, protection of polycarbonate) when painting becomes necessary to interiors of rooms of hardline glazed units; exposure to chemical solvents could result in irreparable damage to security glazings (delaminations, distortions, cracks, severe stress crazing, air bubbles, etc.).

3.4 INSTALLATION - DRY METHOD (TAPE AND GASKET SPLINE GLAZING) :

- A. Cut glazing tape or spline to length; install on glazing pane. Seal corners by butting and sealing junctions with butyl sealant.
- B. Place setting blocks at 1/4 points with edge block no more than 150 mm (6 inches) from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- D. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Trim protruding tape edge.

3.5 INSTALLATION - WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

- A. Cut glazing tape to length and set against permanent stops, 5 mm (3/16 inch) below sight line. Seal corners by butting tape and dabbing with butyl sealant.
- B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
- C. Place setting blocks at 1/4 points with edge block no more than 152 mm (6 inches) from corners.
- D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to achieve full contact at perimeter of pane or glass unit.
- E. Install removable stops, with spacer strips inserted between glazing and applied stops, 6 mm (1/4 inch) below sight line. Place glazing tape on glazing pane or unit with tape flush with sight line.

- F. Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, but not more than 9 mm (3/8 inch) below sight line. Sealant type is to be compatible with glazing tape.
- G. Apply cap bead of sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.6 INSTALLATION - WET METHOD (SEALANT AND SEALANT):

- A. Place setting blocks at 1/4 points and install glazing pane or unit.
- B. Install removable stops with glazing centered in space by inserting spacer shims both sides at 600 mm (24 inch) intervals, 6 mm (1/4 inch) below sight line.
- C. Fill gaps between glazing and stops with sealant to depth of bite on glazing, but not more than 9 mm (3/8 inch) below sight line to ensure full contact with glazing and continue the air and vapor seal.
- D. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.7 INSTALLATION - INTERIOR WET/DRY METHOD (TAPE AND SEALANT):

- A. Cut glazing tape to length and install against permanent stops, projecting 1.6 mm (1/16 inch) above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 150 mm (6 inches) from corners.
- C. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
- D. Install removable stops, spacer shims inserted between glazing and applied stops at 600 mm (24 inch) intervals, 6 mm (1/4 inch) below sight line.
- E. Fill gaps between pane and applied stop with sealant to depth equal to bite on glazing, to uniform and level line. Sealant type is to be compatible with glazing tape.
- F. Trim protruding tape edge.

3.8 INSTALLATION - INTERIOR WET METHOD (COMPOUND AND COMPOUND):

- A. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 600 mm (24 inch) centers, kept 6 mm (1/4 inch) below sight line.
- B. Locate and secure glazing pane using [glazers'] [spring wire] clips.
- C. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

3.9 REPLACEMENT AND CLEANING:

- A. Clean new glass surfaces removing temporary labels, paint spots, and defacement after approval by COR.
- B. Replace cracked, broken, and imperfect glass, or glass which has been installed improperly.
- C. Leave glass, putty, and other setting material in clean, whole, and acceptable condition.

3.10 PROTECTION:

- A. Protect finished surfaces from damage during erection, and after completion of work. Strippable plastic coatings on colored anodized finish are not acceptable.

3.11 MONOLITHIC GLASS SCHEDULE:

- A. Glass Type **CTG**: Clear fully tempered float glass.
 - 1. Unit Thickness: 6 mm (0.23 inch).
 - 2. Safety glazing label required.

3.12 LAMINATED GLASS SCHEDULE:

- A. Glass Type **LG**: Clear laminated glass with two (2) lites of ultra-clear (low-iron) fully tempered float glass.
 - 1. Unit Thickness: 19 mm (0.75 inch).
 - 2. Minimum Thickness of Each Glass Lite: 8 mm (0.31 inch).
 - 3. Interlayer Thickness: 2.29 mm (0.090 inch).
 - 4. Safety glazing label required.
 - 5. STC Rating: 40 minimum.

3.13 INSULATING GLASS SCHEDULE:

- A. Glass Type **IG**: Low-E-coated, clear insulating glass.
 - 1. Overall Unit Thickness: 25 mm (1 inch).
 - 2. Minimum Thickness of Each Glass Lite: 6 mm (0.23 inch).
 - 3. Outdoor Lite: Annealed float glass, except heat-strengthened float glass where required, and fully tempered float glass where indicated.
 - 4. Interspace Content: Air.
 - 5. Indoor Lite: Fully tempered float glass.
 - 6. Low-E Coating: Sputtered on second surface.
 - 7. Visible Light Transmittance: 68 percent minimum.
 - 8. Solar Heat Gain Coefficient: 0.38 maximum.
 - 9. Safety glazing label required.

3.14 FIRE-PROTECTIVE AND FIRE-RESISTANCE GLAZING SCHEDULE:

- A. Glass Type **FRG**: Fire-protection-rated laminated glass with intumescent interlayers.
1. Rating: As indicated on the Drawings.
 2. Application: Fire-protection-rated door and window assemblies.

3.15 SECURITY GLAZING SCHEDULE:

- A. Glass Type **SG**: Clear Heat Strengthened Glass Clad Polycarbonate Security Glazing Unit:
1. Outer Glass Panes: Heat strengthened; 3 mm (0.12 inch) thick.
 2. Interlayers: Minimum 1.3 mm (0.050 inch) polyurethane sheeting, in thickness required to meet performance requirements.
 3. Core: Clear polycarbonate sheet, minimum 3 mm (0.12 inch) thick, in thickness required to meet performance requirements.
 4. Ballistic-Resistance Rating: 3.
 5. Forced Entry Resistance Rating: 3.

- - - E N D - - -

SECTION 08 90 00
LOUVERS AND VENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies fixed and operable wall louvers, door louvers and wall vents.

1.2 RELATED WORK:

- A. Color of finish: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings:
1. Each type, showing material, finish, size of members, method of assembly, and installation and anchorage details.
- C. Manufacturer's Literature and Data:
1. Each type of louver and vent.
- D. Color samples.

1.4 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. The Master Painters Institute (MPI):
1. Approved Product List - Updated Monthly
- C. ASTM International (ASTM):
1. A240/A240M-14 Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
 2. A653/A653M-13 Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process
 3. A1008/A1008M-13 Steel, Sheet, Carbon, Cold Rolled, Structural, and High Strength Low-Alloy with Improved Formability
 4. B209-14 Aluminum and Aluminum Alloy, Sheet and Plate
 5. B209M-14 Aluminum and Aluminum Alloy, Sheet and Plate (Metric)
 6. B221-14 Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
 7. B221M-13 Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes (Metric)

8. D1187/D1187M-97 (R2011) Asphalt-Base Emulsions for Use as Protective Coatings for Metal
- D. National Association of Architectural Metal Manufacturers (NAAMM):
 1. AMP 500-06 Metal Finishes Manual
- E. National Fire Protection Association (NFPA):
 1. 90A-15 Installation of Air Conditioning and Ventilating Systems
- F. American Architectural Manufacturers Association (AAMA):
 1. 2605-13 High Performance Organic Coatings on Architectural Extrusions and Panels
- G. Air Movement and Control Association, Inc. (AMCA):
 1. 500-L-07 Testing Louvers

1.5 WARRANTY

- A. Construction Warranty: Comply with FAR clause 52.246-21, "Warranty of Construction".
- B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of organic finishes within specified warranty period.
 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum, Extruded: ASTM B221M (B221).
- B. Aluminum, Plate and Sheet: ASTM B209M (B209); alloy 3003 or 5005 with temper as required for forming.
- C. Fasteners: Fasteners for securing louvers and wall vents to adjoining construction, except as otherwise specified or indicated in construction documents, to be toggle or expansion bolts of size and type as required for each specific type of installation and service condition.

1. Where type, size, or spacing of fasteners is not shown or specified, submit shop drawings showing proposed fasteners, and method of installation.
 2. Fasteners for louvers, louver frames, and wire guards to be of stainless steel or aluminum with same finish as louvers.
 3. Fasteners for louvers, louver frames and wire guards within mental health areas to be non-removable/tamper-proof type.
- D. Bituminous Coating: ASTM D1187/D1187M; cold applied asphalt mastic emulsion.

2.2 EXTERIOR WALL LOUVERS

A. General:

1. Provide fixed type louvers of size and design shown.
2. Heads, sills and jamb sections are to have formed caulking slots or be designed to retain caulking. Head sections are to have exterior drip lip, and sill sections an integral water stop.
3. Furnish louvers with sill extension or separate sill as shown.
4. Frame is to be mechanically fastened or welded construction with welds dressed smooth and flush.

B. Performance Characteristics:

1. Weather louvers are to have a minimum of 50 percent free area and to pass 5280 mm/s (1040 fpm) free area velocity at a pressure drop not exceeding 5 mm (0.20 inch) water gage and carry not more than 0.28 g (0.01 ounces) of water per square meter (square foot) of free area for 15 minutes when tested per AMCA Standard 500-L.
2. Louvers are to bear AMCA certified rating seals for air performance and water penetration ratings.

C. Aluminum Louvers:

1. General: Frames, blades, sills and mullions (sliding interlocking type); 2 mm (0.078-inch) thick extruded 6063-T5 or -T52 aluminum. Blades to be drainable type and have reinforcing bosses.
2. Louvers, fixed: Make frame sizes 13 mm (1/2-inch) smaller than openings. Single louvers frames are not to exceed 1676 mm (66 inches) wide. When openings exceed 1676 mm (66 inches), provide twin louvers separated by mullion members.

3. Louvers are to withstand the effects or gravity loads and the following wind loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors.
 - a. Wind load acting inward or outward of not less than 1436 Pa (30 lb. per sq. ft.).

2.3 CLOSURE ANGLES AND CLOSURE PLATES

- A. Fabricate from 2 mm (0.078-inch) thick stainless steel or aluminum.
- B. Provide continuous closure angles and closure plates on inside head, jambs and sill of exterior wall louvers.
- C. Secure angles and plates to louver frames with screws, and to masonry or concrete with fasteners as indicated in construction documents.

2.4 WIRE GUARDS

- A. Provide wire guards on outside of all exterior louvers, except on exhaust air louvers.
- B. Fabricate frames from 2 mm (0.078-inch) thick extruded or sheet aluminum designed to retain wire mesh.
- C. Wire mesh to be woven from not less than 1.6 mm (0.063-inch) diameter aluminum wire in 13 mm (1/2-inch) square mesh.
- D. Miter corners and join by concealed corner clips or locks extending not less than 57 mm (2-1/4 inches) into rails and stiles. Equip wire guards over 1219 mm (4 feet) in height with a mid-rail constructed as specified for frame components.
- E. Fasten frames to outside of louvers with aluminum or stainless steel devices of same finish as louvers designed to allow removal and replacement without damage to the wire guard or the louver.

2.5 BLANK-OFF PANELS

- A. Insulated laminated panels consisting of an insulating core surfaced on back and front with metal sheets and attached to back of louver with clips on screws and gasketed or sealant sealed perimeter. Panel finish is to be same type of finish applied to louvers but black color.
 1. Thickness: 50 mm (2 inches).
 2. Aluminum sheet for aluminum louver 0.81 mm (0.032 inch) minimum.
 3. Insulating Core: Rigid, glass-fiber-board insulation or extruded-polystyrene foam.

2.6 FINISH

- A. In accordance with NAAMM Metal Finishes Manual: AMP 500-505
- B. Aluminum Louvers, Air Intake Vents and Blank Off Panels:
 - 1. Organic Finish: AAMA 2605 (Fluorocarbon coating) with total dry film thickness of not less than 0.03 mm (1.2 mil), color as indicated in Section 09 06 00, SCHEDULE FOR FINISHES.

2.7 PROTECTION

- A. Provide protection for aluminum against galvanic action wherever dissimilar materials are in contact, by painting the contact surfaces of the dissimilar material with a heavy coat of bituminous coating (complete coverage), or by separating the contact surfaces with a performed synthetic rubber tape having pressure sensitive adhesive coating on one side.
- B. Isolate the aluminum from plaster, concrete and masonry by coating aluminum with zinc-chromate primer.
- C. Protect finished surfaces from damage during fabrication, erection, and after completion of the work. Strippable plastic coating on organic finish is not approved.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set work accurately, in alignment and where indicated in construction documents. Install plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.
- B. Furnish setting drawings and instructions for installation of anchors and for the positioning of items having anchors to be built into masonry construction. Provide temporary bracing for such items until masonry is set.
- C. Provide anchoring devices and fasteners as shown and as necessary for securing louvers to building construction as specified. Power actuated drive pins may be used, except for removal items and where members would be deformed or substrate damaged by their use.
- D. Set wall louvers in masonry walls during progress of the work. If wall louvers are not delivered to job in time for installation in prepared openings, make provision for later installation. Set in cast-in-place concrete in prepared openings.

3.2 CLEANING AND ADJUSTING

- A. After installation, all exposed prefinished and plated items and all items fabricated from stainless steel and aluminum are to be cleaned as recommended by the manufacturer and protected from damage until completion of the project.
- B. All movable parts, including hardware, are to be cleaned and adjusted to operate as designed without binding or deformation of the members, so as to be centered in the opening of frame, and where applicable, to have all contact surfaces fit tight and even without forcing or warping the components.
- C. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Contracting Officer Representative (COR) damaged units and replace with new units.

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SECTION 09 05 16
SUBSURFACE PREPARATION FOR FLOOR FINISHES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies subsurface preparation requirements for areas to receive the installation of applied and resinous flooring. This section includes testing concrete for moisture and pH, remedial floor coating for concrete floor slabs having unsatisfactory moisture or pH conditions, and floor leveling and repair as required.

1.2 RELATED WORK

- A. Section 07 92 00, JOINT SEALANTS.
B. Section 09 65 16, RESILIENT SHEET FLOORING
C. Section 09 65 19, RESILIENT TILE FLOORING
D. Section 09 68 00, CARPETING

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA and TEST DATA.
B. Written approval confirming product compatibility with subfloor material manufacturer and the flooring manufacturer
C. Product Data:
1. Moisture remediation system
2. Underlayment Primer
3. Cementitious Self-Leveling Underlayment
4. Cementitious Trowel-Applied Underlayment (Not suitable for resinous floor finishes)
D. Test Data:
1. Moisture test and pH results performed by a qualified independent testing agency or warranty holding manufacturer's technical representative.

1.4 DELIVERY AND STORAGE

- A. Deliver materials in containers with labels legible and intact and grade-seals unbroken.
B. Store material to prevent damage or contamination.

1.5 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.

B. American Society for Testing and Materials (ASTM):

- D638-14(2014).....Standard Test Method for Tensile Properties of
Plastics
- D4259-18(2019).....Standard Practice for Preparation of Concrete by
Abrasion Prior to Coating Application.
- C109/C109M-20b(2020)....Standard Test Method for Compressive Strength of
Hydraulic Cement Mortars (Using 2-in. or [50-mm]
Cube Specimens
- 7234-19(2020).....Standard Test Method for Pull-Off Adhesion
Strength of Coatings on Concrete Using Portable
Pull-Off Adhesion Testers
- E96/E96M-16(2016).....Standard Test Methods for Water Vapor Transmission
of Materials
- F710-1e1(2020).....Standard Practice for Preparing Concrete Floors to
Receive Resilient Flooring
- F1869-16a.....Standard Test Method for Measuring Moisture Vapor
Emission Rate of Concrete Subfloor Using Anhydrous
Calcium Chloride
- F2170-19a(2020).....Standard Test Method for Determining Relative
Humidity in Concrete Floor Slabs Using in situ
Probes
- C348-20(2020).....Standard Test Method for Flexural Strength of
Hydraulic-Cement Mortars
- C191-19(2020).....Standard Test Method for Time of Setting of
Hydraulic Cement by Vicat Needle

PART 2 - PRODUCTS

2.1 MOISTURE REMEDIATION COATING:

- A. System Descriptions:
 - 1. High-solids, epoxy system designed to suppress excess moisture in concrete prior to an overlayment. For use under resinous products, VCT, tile and carpet where issues caused by moisture vapor are a concern.
- B. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and clean up.

- C. System Components: Verify specific requirements as systems vary by manufacturer. Verify build up layers and installation method. Verify compatibility with substrate. Use manufacturer's standard components, compatible with each other and as follows:
1. Liquid applied coating:
 - a. Resin: epoxy.
 - b. Formulation Description: Multiple component high solids.
 - c. Application: Per manufacturer's written installation requirements.
 - d. Thickness: Minimum 10 mils.
 - D. Material Vapor Permeance: Application shall achieve a permeance rating of less than 0.1 perm in accordance with ASTM E96/E96M.
 - E. Maximum RH requirement: 100% testing in accordance with ASTM F2170.

Property	Test	Value
Tensile Strength	ASTM D638	4,400 psi
Volatile Organic Compound Limits (V.O.C.)	SCAMD Rule 1113 (Ammended 02/05/2016)	25 grams per liter
Permeance	ASTM E96	0.1 perms
Tensile Modulus	ASTM D638	1.9X10 ⁵ psi
Percent Elongation	ASTM D638	12%
Cure Rate	Per manufacture's Data	4 hours Tack free with 24hr recoat window
Bond Strength	ASTM D7234	100% bond to concrete failure

2.2 CEMENTITIOUS SELF-LEVELING UNDERLAYMENT:

- A. System Descriptions:
1. High performance self-leveling underlayment resurfacer. Single component, self-leveling, cementitious material designed for easy application as an underlayment for all types of flooring materials. It is used for substrate repair and leveling.

- B. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and clean up. Gypsum-based products are unacceptable.
- C. System Characteristics:
1. Wearing Surface: smooth
 2. Thickness: Per architectural drawings, ranging from feathered edge to 1", per application. Applications greater than 1" require additional 3/8" aggregate to mix or as recommended by manufacturer.
- D. Underlayment shall be calcium aluminate cement-based, containing Portland cement. Gypsum-based products are unacceptable.
- E. Compressive Strength: Minimum 4100 psi in 28 days in accordance with ASTM C109/C109M.
- F. Flexural Strength: Minimum 1000 psi in 28 days in accordance with ASTM C348
- G. Dry Time: Underlayment shall receive the application of moisture insensitive tile in 6 hours, and floor coverings in 16 hours,
- H. Primer: compatible and as recommended by manufacturer for use over intended substrate
- I. System Components: Manufacturer's standard components that are compatible with each other and as follows:
1. Primer:
 - a. Resin: copolymer
 - b. Formulation Description: single component ready to use.
 - c. Application Method: Squeegee and medium nap roller.
 - d. All puddles shall be removed, and material shall be allowed to dry, 1-2 hours at 70F/21C.
 - e. Number of Coats: (1) one.
 2. Grout Resurfacing Base:
 - a. Formulation Description: Single component, cementitious self-leveling high-early and high-ultimate strength grout.
 - b. Application Method: colloidal mix pump, cam rake, spike roll.
 - 1) Thickness of Coats: Per architectural scope, 1" lifts.
 - 2) Number of Coats: More than one if needed.
 - c. Aggregates: for applications greater than 1/4", require additional 3/8" aggregate to mix.

Property	Test	Value
Compressive Strength	ASTM	2,200 psi @ 24 hrs

	C109/C109M	3,000 psi @ 7 days
Initial set time	ASTM C191	30-45 min.
Final Set time		1 to 1.5 hours
Bond Strength	ASTM D7234	100% bond to concrete failure

2.3 CEMENTITIOUS TROWEL-APPLIED UNDERLAYMENT (NOT SUITABLE FOR RESINOUS FLOOR FINISHES)

- A. Underlayment shall be calcium aluminate cement-based, containing Portland cement. Gypsum-based products are unacceptable.
- B. Compressive Strength: Minimum 4000 psi in 28 days
- C. Trowel-applied underlayment shall not contain silica quartz (sand).
- D. Dry Time: Underlayment shall receive the application of floor covering in 15-20 minutes.

PART 3 - EXECUTION

3.1 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient temperature of work areas at not less than 16 degree C (60 degrees F), without interruption, for not less than 24 hours before testing and not less than three days after testing.
- B. Maintain higher temperatures for a longer period of time where required by manufacturer's recommendation.
- C. Do not install materials when the temperatures of the substrate or materials are not within 60-85 degrees F/ 16-30 degrees C.

3.2 SURFACE PREPARATION

- A. Existing concrete slabs with existing floor coverings:
 - 1. Conduct visual observation of existing floor covering for adhesion, water damage, alkaline deposits, and other defects.
 - 2. Remove existing floor covering and adhesives. Comply with local, state and federal regulations and the RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, as applicable to the floor covering being removed.
- B. Concrete shall meet the requirements of ASTM F710 and be sound, solid, clean, and free of all oil, grease, dirt, curing compounds, and any substance that might act as a bond-breaker before application. As required prepare slab by mechanical methods. No chemicals or solvents shall be used.

- C. General: Prepare and clean substrates according to flooring manufacturer's written instructions for substrate indicated.
- D. Prepare concrete substrates per ASTM D4259 as follows:
 - 1. Dry abrasive blasting.
 - 2. Wet abrasive blasting.
 - 3. Vacuum-assisted abrasive blasting.
 - 4. Centrifugal-shot abrasive blasting.
 - 5. Comply with manufacturer's written instructions.
- E. Repair damaged and deteriorated concrete according to flooring manufacturer's written recommendations.
- F. Verify that concrete substrates are dry.
- G. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of per flooring manufacturer's formal and project specific written recommendation.
- H. Perform in situ probe test, ASTM F2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity per flooring manufacturer's formal and project specific written recommendation.
- I. Provide a written report showing test placement and results.
- J. Prepare joints in accordance with [**Section 07 92 00, JOINT SEALANTS**][**and material manufacturer's instructions.**]
- K. Alkalinity: Measure surface pH in accordance with procedures provided in ASTM F710 or as outlined by qualified testing agency or flooring manufacturer's technical representative.
- L. Tolerances: Subsurface shall meet the flatness and levelness tolerance specified on drawings or recommended by the floor finish manufacturer. Tolerance shall also not to exceed 1/4" deviation in 10'. As required, install underlayment to achieve required tolerance.
- M. Other Subsurface: For all other subsurface conditions, such as wood or metal, contact the floor finish or underlayment manufacturer, as appropriate, for proper preparation practices.

3.3 MOISTURE REMEDIATION COATING:

- A. Where results of relative humidity testing (ASTM F2170) exceed the requirements of the specified flooring manufacturer, apply remedial coating as specified to correct excessive moisture condition.

- B. Prior to remedial floor coating installation mechanically prepare the concrete surface to provide a concrete surface profile in accordance with ASTM D4259.
- C. Mix and apply moisture remediation coating in accordance with manufacturer's instructions.

3.4 CEMENTITIOUS UNDERLAYMENT:

- A. Install cementitious self-leveling underlayment as required to [**correct surface defects,**][**floor flatness or levelness corrections to meet the tolerance requirements as or detailed on drawings,**][**address non-moving cracks or joints,**][**provide a smooth surface for the installation of floor covering,**] or meet elevation requirements detailed on drawings.
- B. Mix and apply in accordance with manufacturer's instructions.

3.5 PROTECTION

- A. Prior to the installation of the finish flooring, the surface of the underlayment should be protected from abuse by other trades by the use of plywood, tempered hardwood, or other suitable protection course

3.6 FIELD QUALITY CONTROL:

- A. Where specified, field sampling of products shall be conducted by a qualified, independent testing facility.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 09 06 00
SCHEDULE FOR FINISHES

PART I - GENERAL

1.1 DESCRIPTION

A. This section contains a coordinated system in which requirements for materials specified in other sections shown are identified by abbreviated material names and finish codes in the room finish schedule or shown for other locations.

1.2 MANUFACTURERS

A. Manufacturer's trade names and numbers used herein are only to identify colors, finishes, textures and patterns. Products of other manufacturer's equivalent to colors, finishes, textures and patterns of manufacturers listed that meet requirements of technical specifications will be acceptable upon approval in writing by contracting officer for finish requirements.

1.3 SUBMITALS

A. Submit in accordance with SECTION 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES—provide quadruplicate samples for color approval of materials and finishes specified in this section.

1. DIGITAL COLOR PHOTOS-INTERIOR VIEWS:

Room Number and Name	Item/View to be Photographed
1.	
2.	
3.	
4.	

1.4 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.
- B. MASTER PAINTING INSTITUTE: (MPI)
 2001.....Architectural Painting Specification Manual

PART 2- PRODUCTS

2.1 DIGITAL COLOR PHOTOS

- A. Size 24 x 35 mm.
- B. Labeled for:
 - 1. Building name and Number.
 - 2. Room Name and Number.

2.2 DIVISION 31 - EARTHWORK

- A. SECTION 32 31 13, CHAIN LINK FENCES AND GATES

Finish Chain Link Fabric	Finish Posts and Rails	Manufacturer	Mfg. Color Name/No.
Coated			
Galvanized			
Painted (P)			

- B. SECTION 32 17 23, PAVEMENT MARKINGS.

Color	Manufacturer	MFG. Color Name/No.
Yellow		
White		

C. BOLLARDS (ORNAMENTAL)

Material	Finish	Style Name/ No.	Manufacturer	Mfg. Color Name/No.
Precast concrete				
Stone				

D. SITE AND STREET FURNISHINGS

Item	Style Name/No.	Finish	Manufacture	Mfg. Color Name/No.
Benches	TBD	Paint, Satin	TBD	Black
Game Tables				
Planters				
Tree Grates				
Trash Receptacles				
Ash Receptacles				

2.3 DIVISION 03 - CONCRETE

A. SECTION 03 30 53, MISCELLANEOUS CAST-IN-PLACE CONCRETE (SHORT FORM)

Surface	Finish Description

2.4 DIVISION 04 - MASONRY

A. Section 04 05 13, MASONRY MORTARING and Section 04 05 16, MASONRY GROUTING

Finish Code	Manufacturer	Mfg. Color Name
	Glen Gery	Portland Cement & Lime Blend

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B. STONE FACING

Name of Stone	Color, Texture, Finish	Stone Source
Pheasant Ridge (Exterior)	Ledgestone	Scranton Materials
ST-1 (Interior Stone Veneer)	Silver Alabaster, Shadowstone Panel	Realstone Systems

2.5 DIVISION 05 - METALS

A. SECTION 05 12 00, STRUCTURAL STEEL FRAMING

Component	Finish	Color

B. SECTION 05 21 00, STEEL JOIST FRAMING

Finish	Color

C. SECTION 05 31 00, STEEL DECKING, SECTION 05 36 00, COMPOSITE METAL DECKING

Finish	Color

D. SECTION 05 40 00, COLD-FORMED METAL FRAMING

Finish	Color

E. SECTION 05 50 00, METAL FABRICATION

Item	Finish
Modular Channel Units	
Channel Door Frames	
Frames for Lead Lined Doors	
Structural Steel Angle Corner Guards	
Guard Angles for Overhead Doors	
Edge Guards Angles for Opening in Slabs	
Wheel Guards	
Steel Covers and Frames for pits and trenches	
Cast Iron Covers and Frames for Pits and Trenches	
Steel Grating and Frames	
Aluminum Gratings and Frames	
Steel Plank Gratings	
Cast Iron Gratings	
Loose Lintels	
Steel Plate Door Sill	
Aluminum Plate Door Sill	
Cast Iron Safety Nosing	

Aluminum Safety Nosing	
Steel Ladders	
Aluminum Ladders	Anodic Coating with Mill Finish, Painted Black
Steel Ladder Rungs	
Steel Pipe Railings and Gates (not on Steel Stairs)	
Aluminum Railings	
Stainless Steel Railings	
Ornamental Railings	
Catwalks	
Floor Trap Door and Ceiling Hatch	
Sidewalk Door	
Screened Access Door and Frame	
Steel Counter or Bench Top Frame and Legs.	

END OF DIVISION 05

2.6 DIVISION 06 WOOD, PLASTICS, AND COMPOSITES

A. SECTION 06 10 00, ROUGH CARPENTRY

Item	Finish	Color
N/A		

B. SECTION 06 20 00, FINISH CARPENTRY

Finish Code	Manufacturer	Color	Dimensions	Notes
PL-1 - Plastic Laminate	Wilsonart	Palisades Oak 7987-38		Fine Velvet Texture

PL-2 - Plastic Laminate	Wilsonart	Oxidized Silver Y0393-60		Matte Finish
PL-3 - Plastic Laminate	Nevamar	S3023-T Graphite Blue		Matte Finish
SSP-1 - Solid Surface Polymer	LG HI-MACS	Pause R009		
SSP-2 - Solid Surface Polymer	LG HI-MACS	M608 Aurora Gray		
SSP-3 - Solid Surface Polymer	LG HI-MACS	GT945 Portland		
QS-1 - Quartz Surface	Caesarstone	Statuario Maximus 5031	3 cm thk	Bevel square edge
QS-2 - Quartz Surface	Wilsonart	Grayton Beach Q4039	3 cm thk	Bevel square edge
QS-3 - Quartz Surface	Caesarstone	Statuario Maximus 5031	2 cm thk	Mitered edge per detail
DH-1 - Decorative Hardware	Amerock	Bar Pull BP19013SS	10-1/16" center-to-center	Stainless steel finish
DH-2 - Decorative Hardware	Amerock	Bar Pull BP19018SS	25-3/16" center-to-center	Stainless steel finish
MT-2 - Metal Trim	Gordon	Final Forms 1 Projection Molding; 947-CM-25	1/4" x 1/4"	Aluminum with clear coat finish

2.7 DIVISION 07 - THERMAL AND MOISTURE PROTECTION

A. SECTION 07 31 13, ASPHALT SHINGLES

Size	Shape	Manufacturer	Mfg. Color Name/No.
Standard	Architectural	GAF	Timberline Cool Series Cool Barkwood

B. SECTION 07 60 00, FLASHING AND SHEET METAL

Item	Material	Finish
Hanging Gutters and Downspouts	Aluminum	Match Adjacent Surface

C. SECTION 07 41 13 STANDING-SEAM METAL ROOF PANELS (NO VA GUIDE SECTION)

Material	Finish/Color
Aluminum-Zinc Alloy-Coated Steel Sheet	Smooth, Galvanized Charcoal Grey

D. SECTION 07 46 46 FIBER CEMENT SIDING, TRIM AND SOFFIT

Item	Manufacturer	Finish/Color
Vertical Baten Siding	James Hardie	Manufacturer Primed, Third Party Factory Painted Color: Benjamin Moore Lampblack CW-695, Washington Blue CW-630, and Pearl Palace CW-650 Finish: Low Luster
Shake Siding	James Hardie	Manufacturer Primed for Paint, Third Party Factory Painted Color: Benjamin Moore Washington Blue CW-630 & Pearl Palace CW-650 Finish: Low Luster
Trim & Soffit	James Hardie	Manufacturer Primed for Paint, Third Party Factory Painted

		Color: Benjamin Moore Chantilly Lace OC-65 Finish:Satin
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E. SECTION 07 92 00, JOINT SEALANTS

Location	Color	Manufacturer	Manufacturer Color
Stone Sealed Joints	Match Adjacent Surface	Tremco	Match Adjacent Surface

END OF DIVISION 07

2.8 DIVISION 08 - OPENINGS

A. SECTION 08 11 13, HOLLOW METAL DOORS AND FRAMES

Paint both sides of door and frames same color including ferrous metal louvers, and hardware attached to door	
Component	Color of Paint Type and Gloss
Door	Sherwin Williams, Grays Harbor SW6236 TBD, Level 1
Frame	Sherwin Williams, Grays Harbor SW6236 TBD, Level 1
Window frame	Sherwin Williams, Grays Harbor SW6236 TBD, Level 1

B. SECTION 08 14 23, IMPACT RESISTANT WOOD DOORS

Component	Finish/Color
Doors	Construction Specialties, Somerset Panel, #1350 Sable Elm
Frames	Hollow Metal Frame, see finish above

C. SECTION 08 14 33, ALUMINUM-CLAD WOOD DOORS

Type	Finish	Glazing	Manufacturer	Mfg. Color Name/No.
Aluminum-Clad Hinged Wood-Framed Glass Door	Painted (Exterior) Wood (Interior)	Clear, Low-E coated	Pella	Reserve Series & Architect Series

D. SECTION 08 31 13, ACCESS DOORS AND FRAMES

Material	Finish/Color
Steel	Match Adjacent Surface
Stainless steel	Match Adjacent Surface

E. SECTION 08 36 13, SECTIONAL DOORS

Finish	Manufacturer	Manufacturer Color Name/No.
Walnut	Cloplay	Carriage House 5-Layer Construction

F. SECTION 08 52 00, ALUMINUM-CLAD WOOD WINDOWS

Type	Finish	Glazing	Manufacturer	Mfg. Color Name/No.
Exterior Double Hung at fiber cement walls	Painted (Exterior) Wood (Interior)	Clear, Low-E coated	Pella	Architect Series

G. WINDOW SILLS

Location	Material	Manufacturer	Mfg. Color Name/No.
Exterior at fiber cement walls	Fiber cement trim as detailed	James Hardie	Manufacturer Primed for Paint, Third Party Factory Painted

			Color: Benjamin Moore Chantilly Lace OC-65 Finish:Satin
Interior	Solid Surface as detailed	Wilsonart	Pause R009

H. WINDOW STOOLS

Room No. and Name	Material	Finish
	Marble (09310)	
	Ceramic Tiling (09 30 13)	
	Plastic Laminate	
	Finish Carpentry (06 20 00)	

I. SECTION 08 71 00, BUILDERS HARDWARE

Item	Material	Finish
Hinges		
Door Closers		
Floor Closers		
Floor Pivot Sets		
Closer/ Holder		
Floor Stops		
Door Holders		
Lock/ Latches		
Key Cabinet	Steel	

Armor Plates	Metal Plastic	
Kick Mop Plates	Metal Plastic	
Door Edging		
Exit Device		
Flush Bolts		
Door Pulls		
Push Plates		
Combination Push Pull Plate		
Coordinators		
Light Proof Seals		
Weather Strip		
Threshold		

J. SECTION 08 80 00, GLAZING

Glazing Type	Manufacturer	Mfg. Color Name/No.
G-01	Cristacurva	1/4" Low-E and Low Iron Coated Insulated Glazing Unit
G-01A	Cristacurva	Tempered 1/4" Low-E and Low Iron Coated Insulated Glazing Unit
G-02	Cristacurva	3/4" Laminated Low Iron glazing
G-02A		Tempered 3/4" Laminated Low Iron glazing

G-03	Pella	Non-Impact Laminated Low-E coated glazing, thickness verified by Pella
G-04	Pella	Impact Resistant Laminated Low-E coated glazing, thickness verified by Pella

K. SECTION 08 44 13, GLAZED ALUMINUM CURTAIN WALLS

Component	Material	Finish	Manufacturer	Mfg. Color Name/No.
Frame	Extruded Aluminum with Thermal Break Condition Framing			
Glazing		Sentry Glas PlusFlat Polised Edges	Cristacurva	1/4" Low-E and Low Iron Coated Insulated Glazing Unit
Standard Panel				

L. SECTION 08 90 00, LOUVERS AND WALL VENTS

Item	Material	Finish	Manufacturer	Mfg. Color Name/No.
Wall Louver	Extruded Aluminum	Organic	GAF	Benjamin Moore Exterior Grade Paint, Chantilly Lace

END OF DIVISION 08

2.9 DIVISION 09 - FINISHES

A. SECTION 09 30 13, CERAMIC TILING

1. SECTION 09 30 13, CERAMIC TILING						
Finish Code	Manufacturer	Style	Color	Dimensions	Finish	Notes
PT-1	Crossville	Moonstruck	Juno	12" x 24" x 10.5 mm thick	Honed	Metal trim MT-1 on all outside corners and exposed edges
PT-2	Crossville	Moonstruck	Gemini	12" x 24" x 10.5 mm thick	Unpolished	Metal trim MT-1 on all outside corners and exposed edges
PT-3	Tilebar	Manchester	Bianco	3" x 12"	Glazed	Install in herringbone pattern.
PT-4	Crossville	Yin + Yang Natural Stone	Snow Flower	1" x 3" x 10 mm thick		Herringbone Mosaic

PT-5	Nemo	Marvel Pro Porcelain	Travertino Silver Matte	2" x 2" mosaic	Unpolished	Sloped floor tile in resident toilets
PTB-1	Crossville	Moonstruck	Gemini	4" x 24" x 10.5 mm thick	Unpolished	Metal trim MT-1 on all outside corners and exposed edges

2. SECTION 09 30 13, CERAMIC TILING GROUT

Finish Code	Manufacturer	Style	Color
PT-1, PT-2, PT-5 & PTB-1	Laticrete	Spectralock Pro Epoxy	TBD
PT-3	Laticrete	Spectralock Pro Epoxy	TBD
PT-4	Laticrete	Spectralock Pro Epoxy	TBD

3. SECTION 09 30 13, METAL TRIM for CERAMIC TILING

Finish Code	Manufacturer	Style	Color
MT-1	Schluter Systems	Schiene AE100 for 3/8" thick tile	Satin Anodized Aluminum

B. SECTION 09 51 00, ACOUSTICAL CEILINGS

Finish Code	Manufacturer	Style	Color	Dimensions	Notes
C-2	Armstrong	Ultima High NRC 1941	White	24" x 24" x 7/8" thk	15/16" prelude grid

C-3	Armstrong	Clean Room FL	White	24" x 24" x 3/4" thk	15/16" clean room aluminum grid
C-4	Armstrong	Ultima High NRC 1436	White	24" x 72" x 7/8" thk	15/16" prelude grid

C. SECTION 09 54 23, LINEAR METAL CEILINGS (LMC)

Finish Code	Manufacturer	Style	Color	Dimensions	Notes
C-5	Ceilings Plus	Illusions - Sarante	S16N Tan Sawn Oak	12" x 96"	Butt joint, SD06 perforations with acoustic backing

D. SECTION 09 65 19, RESILIENT TILE FLOORING

Finish Code	Manufacturer	Style	Color	Dimensions	Notes
LVT-1 - Luxury Vinyl Tile	Shaw Contract	Soundscape 4063V	Latte 63720	6" x 48" x 5 mm thk	Installation method: Stagger
SVT-1 - Solid Vinyl Tile	Johnsonite	Cortina Grande	Pumice 404	16" x 16" x 1/8" thk	

E. SECTION 09 65 16, VINYL SHEET FLOORING, HEAT WELDED SEAMS

Finish Code	Manufacturer	Style	Color	Dimensions	Notes
SV-1	Armstrong	Medintech with Diamond 10 Technology	Freesia Pearl 84850	6.58' x 98.4' rolls	Provide heat welded seams to match SV-1

F. SECTION 09 65 13, RESILIENT BASE STAIR TREADS AND ACCESSORIES

Finish Code	Manufacturer	Style	Color	Dimensions
RB-1	Johnsonite	Tightlock Cove	Silver Grey 55	4" high x 75' roll
RB-2	Johnsonite	"Inflection" Millwork Base MW-71-G	Storm Cloud 71	5-1/4" high x 96" long
RB-3	Johnsonite	"Inflection" Millwork Base MW-282-G	Vaporize 282	5-1/4" high x 96" long
RB-4	Johnsonite	"Inflection" Millwork Base MW-XX-G	Snowbound TG1	5-1/4" high x 96" long
IB-1 - integral base	Armstrong	Medintech with Diamond 10 Technology	To match SV-1	6" high base

G. SECTION 09 68 00, CARPET TILES

Finish Code	Manufacturer	Style	Color	Dimensions	Notes
CPT-1	Bentley	Ritual #8RR26	Renewal 800222	24" x 24"	Ashlar installation
CPT-2	Shaw Contract	Welcome II Tile 5T031	Navy 31485	24" x 24"	Quarter turn installation

H. SECTION 09 72 00, WALLCOVERINGS

Finish Code	Manufacturer	Style	Color	Dimensions	Type
WC-1	Koroseal/Flex Decorative Wall Protection	Junction	Generation JUN1-30	52" roll width	Type III vinyl with protective coating

WC-2	Maharam	Band Stripe by Paul Smith	399654-002 Foam	54" roll width	Type II vinyl
WC-3	Koroseal	Timberline	Beam T122-46	52-54" roll width	Type II vinyl

I. SECTION 09 72 00, EDGE GUARD OR TRIM for WALLCOVERINGS

Finish Code	Manufacturer	Style	Color
MT-3	Fry Reglet	Wallcovering Trim WCTOSC	Clear anodized aluminum

J. SECTION 09 75 13, STONE WALL FACING

Finish Code	Manufacturer	Style	Color	Dimensions	Notes
ST-1	Realstone Systems	Shadowstone Panel	Silver Alabaster	6" x 24"	Provide manufacturer's corner pieces as required

K. SECTION 09 84 33, SOUND-ABSORBING WALL UNITS

Finish Code	Manufacturer	Style	Color	Notes
AWP-1	Armstrong	Soundsoak 85 Acoustical Wall System	Fabric: Maharam Tek-Well Ombre 399300, Color 006 Egret	Half bevel edge detail, Z-clip installation. Refer to specification for substrate information.
AWP-2	Armstrong	Soundsoak 85 Acoustical Wall System	Fabric: Designtex Ellipsis 3556,	Half bevel edge detail, Z-clip installation. Refer to specification for substrate information.

			Color 3556-802 Sidewalk	
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L. SECTION 09 91 00, PAINT AND COATINGS

1. MPI Gloss and Sheen Standards

		Gloss @60	Sheen @85
Gloss Level 1	a traditional matte finish-flat	max 5 units, and	max 10 units
Gloss Level 2	a high side sheen flat-"a velvet-like" finish	max 10 units, and	10-35 units
Gloss Level 3	a traditional "egg-shell like" finish	10-25 units, and	10-35 units
Gloss Level 4	a "satin-like" finish	20-35 units, and	min. 35 units
Gloss Level 5	a traditional semi-gloss	35-70 units	
Gloss Level 6	a traditional gloss	70-85 units	
Gloss level 7	a high gloss	more than 85 units	

2. Paint code	Gloss	Manufacturer	Color Name/No.
EP-1	Level 5; epoxy	Sherwin Williams	Snowbound SW7004
EP-2	Level 5; epoxy	Sherwin Williams	Evergreen Fog SW9130
P-1	Level 3	Sherwin Williams	Snowbound SW7004
P-2	Level 5	Sherwin Williams	Grays Harbor SW6236
P-3	Level 1	Sherwin Williams	Ceiling Bright White SW7007
P-4	Level 4	Sherwin Williams	Gray Harbor SW6236
P-5	Level 3	Sherwin Williams	Intellectual Gray SW7045
P-6	Level 4	Sherwin Williams	Evergreen Fog SW9130
P-7	Level 3	Sherwin Williams	Rainwashed SW6211

P-8	Level 3	Sherwin Williams	Amazing Gray SW7044
P-9	Level 3	PPG ProLuxe	Warm White 233

END OF DIVISION 09

2.10 DIVISION 10 - SPECIALTIES

A. SECTION 10 21 23, HOSPITAL CUBILCE CURTAINS AND INTRAVENOUS SUPPORT TRACKS

Finish Code	Manufacturer	Style	Color	Notes
PC-1	InPro	Super Bio Stat Shower Curtain Style #2	White	Complete top-to-bottom coverage of same material

B. SECTION 10 26 00, WALL GUARDS AND CORNER GUARDS

Item	Finish Code	Manufacturer	Style	Color	Dimensions	Notes
Corner Guards	CG-1	Construction Specialties	CO-8	Stainless Steel #4 Satin Finish	3-1/2" Wing	Install at top of wall base to underside of finished ceiling where indicated on finish plan
Handrail	HR-1	Construction Specialties	HR-6CRBNSS	#1350 Sable Elm	1-1/2" round handrail	Chameleon simulated pattern handrail with stainless steel brackets and end caps
Plastic Wall Protection	PWP-1	Construction Specialties	Acrovyn 4000	White #949	0.040 thick	Install using manufacturer's top cap and color matched silicone at all vertical seams. PWP to always run the

						full expanse of the wall(s) documented.
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C. SECTION 10 28 00, TOILET AND BATH ACCESSORIES

Room No. and Name	Item	Finish	Manufacturer	Mfg. Color Name/No.
	Mop racks			
	Package Transfer Box			
	Lobby Clock			

D. SECTION 10 44 13, FIRE EXTNGUISHER CABINETS

Component	Material	Finish

E. SECTION 10 28 00, TOILET AND BATH ACCESSORIES

Item	Material	Manufacturer	Mfg. Color Name/No.

F. SECTION 10 28 00, CUSTOM TOILET ACCESSORIES

Item	Component	Finish	Manufacturer	Mfg. Color Name/No.
Toilet Backrest	Support			
	Vinyl Fabric			

2.11 DIVISION 11 - EQUIPMENT

A. SECTION 11 41 00, FOOD SERVICE SELF CONTAINED REFRIGERATION EQUIPMENT

Component	Material	Finish	Manufacturer	Mfg. Color Name/No.
Refrigerators, Mechanical, Food, Self-Contained, Reach-in, Roll- in, Pass Through	Outer Shell			
	Doors			
	Loading Cart			
	Transfer Carriage			

END OF DIVISION 11

2.12 DIVISION 12- FURNISHINGS

A. SECTION 12 32 00, WOOD CASEWORK

Item Type	Location	Finish/Color

B. SECTION 12 36 00, COUNTERTOPS AND ACCESSORIES

Finish Code	Manufacturer	Color	Dimensions	Notes
PL-1 - Plastic Laminate	Wilsonart	Palisades Oak 7987-38		Fine Velvet Texture

PL-2 - Plastic Laminate	Wilsonart	Oxidized Silver Y0393-60		Matte Finish
PL-3 - Plastic Laminate	Nevamar	S3023-T Graphite Blue		Matte Finish
SSP-1 - Solid Surface Polymer	LG HI-MACS	Pause R009		
SSP-2 - Solid Surface Polymer	LG HI-MACS	M608 Aurora Gray		
SSP-3 - Solid Surface Polymer	LG HI-MACS	GT945 Portland		
QS-1 - Quartz Surface	Caesarstone	Statuario Maximus 5031	3 cm thk	Bevel square edge
QS-2 - Quartz Surface	Wilsonart	Grayton Beach Q4039	3 cm thk	Bevel square edge
QS-3 - Quartz Surface	Caesarstone	Statuario Maximus 5031	2 cm thk	Mitered edge per detail
DH-1 - Decorative Hardware	Amerock	Bar Pull BP19013SS	10-1/16" center-to-center	Stainless steel finish
DH-2 - Decorative Hardware	Amerock	Bar Pull BP19018SS	25-3/16" center-to-center	Stainless steel finish
MT-2 - Metal Trim	Gordon	Final Forms 1 Projection Molding; 947-CM-25	1/4" x 1/4"	Aluminum with clear coat finish

END OF DIVISION 12

2.13 DIVISION 22 - PLUMBING

A. SECTION 22 40 00, PLUMBING FIXTURES AND TRIM

Item	Color
Water Closet	
Urinal	
Bathtubs	
Lavatories	
Service Sink Corner	
Service Sink	
Clinic Service Sink	
Plaster Sink	
Laundry Tub	

2.14 DIVISION 26 - ELECTRICAL

A. SECTION 26 51 00, BUILDING LIGHTING INTERIOR

Fixture Type	Exterior Finish	Color

B. SECTION 26 56 00, SITE LIGHTING

Type and Component	Exterior Finish	Manufacturer	Mfg. Name/No.

PART III EXECUTION

3.1 FINISH SCHEDULES & MISCELLANEOUS ABBREVIATIONS

FINISH SCHEDULE & MISCELLANEOUS ABBREVIATIONS	
Term	Abbreviation
Access Flooring	AF
Accordion Folding Partition	AFP
Acoustical Ceiling	AT
Acoustical Ceiling, Special Faced	AT (SP)
Acoustical Metal Pan Ceiling	AMP
Acoustical Wall Panel	AWP
Acoustical Wall Treatment	AWT
Acoustical Wallcovering	AWF
Anodized Aluminum Colored	AAC
Anodized Aluminum Natural Finish	AA
Baked On Enamel	BE

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Brick Face	BR
Brick Flooring	BF
Brick Paving	BP
Carpet	CP
Carpet Athletic Flooring	CAF
Carpet Module Tile	CPT
Ceramic Glazed Facing Brick	CGFB
Ceramic Mosaic Tile	FTCT
Concrete	C
Concrete Masonry Unit	CMU
Divider Strips Marble	DS MB
Epoxy Coating	EC
Epoxy Resin Flooring	ERF
Existing	E
Exposed Divider Strips	EXP
Exterior	EXT
Exterior Finish System	EFS
Exterior Paint	EXT-P
Exterior Stain	EXT-ST
Fabric Wallcovering	WF
Facing Tile	SCT
Feature Strips	FS
Floor Mats & Frames	FM
Floor Tile, Mosaic	FT

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Fluorocarbon	FC
Folding Panel Partition	FP
Foot Grille	FG
Glass Masonry Unit	GUMU
Glazed Face CMU	GCMU
Glazed Structural Facing Tile	SFTU
Granite	GT
Gypsum Wallboard	GWB
High Glazed Coating	SC
Latex Mastic Flooring	LM
Linear Metal Ceiling	LMC
Linear Wood Ceiling	LWC
Marble	MB
Material	MAT
Mortar	M
Multi-Color Coating	MC
Natural Finish	NF
Paint	P
Paver Tile	PVT
Perforated Metal Facing (Tile or Panels)	PMF
Plaster	PL
Plaster High Strength	HSPL
Plaster Keene Cement	KC

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Plastic Laminate	HPDL
Polypropylene Fabric Wallcovering	PFW
Porcelain Paver Tile	PPT
Quarry Tile	QT
Radiant Ceiling Panel System	RCP
Resilient Stair Tread	RST
Rubber Base	RB
Rubber Tile Flooring	RT
Spandrel Glass	SLG
Stain	ST
Stone Flooring	SF
Structural Clay	SC
Suspension Decorative Grids Grids	SDG
Terrazzo Portland Cement	PCT
Terrazzo Tile	TT
Terrazzo, Thin Set	
Textured Gypsum Ceiling Panel	TGC
Textured Metal Ceiling Panel	TMC
Thin set Terrazzo	TST

Veneer Plaster	VP
Vinyl Base	VB
Vinyl Coated Fabric Wallcovering	W
Vinyl Composition Tile	VCT
Vinyl Sheet Flooring	VSF
Vinyl Sheet Flooring (Welded Seams)	WSF
Wall Border	WB
Wood	WD

3.2 FINISH SCHEDULE SYMBOLS

Symbol Definition

- ** Same finish as adjoining walls
- No color required
- E Existing
- XX To match existing
- EFTR Existing finish to remain
- RM Remove

3.3 ROOM FINISH SCHEDULE

A. Match adjoining or existing similar surfaces colors, textures or patterns where disturbed or damaged by alterations or new work when not scheduled.

B. ROOM FINISH SCHEDULE

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Room No. and Name	FLOOR		BASE		WALL		WAINSCOT		CEILING		REMARKS
	MAT	FC	MAT	FCC	MAT	FCC	MAT	FC	MAT	FCC	
E X I S T			N								
			E								
			S								
			W								
			C								
N E W			N								
			E								
			S								
			W								
			C								
E X I S T			N								
			E								
			S								
			W								
			C								
N E W			N								
			E								
			S								
			W								
			C								

	E X I S T			N							
				E							
				S							
				W							
				C							
	N E W			N							
				E							
				S							
				W							
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SECTION 092216

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies steel studs wall systems, shaft wall systems, ceiling or soffit suspended or furred framing, wall furring, fasteners, and accessories for the screw attachment of gypsum board, plaster bases or other building boards.

1.2 RELATED WORK

- A. Load bearing framing: Section 05 40 00, COLD-FORMED METAL FRAMING.
B. Support for wall mounted items: Section 05 50 00, METAL FABRICATIONS.
C. Pull down tabs in steel decking: Section 05 36 00, COMPOSITE METAL DECKING.
D. Ceiling suspension systems for acoustical tile or panels and lay in gypsum board panels: Section 09 51 00, ACOUSTICAL CEILINGS and Section 09 29 00, GYPSUM BOARD.

1.3 TERMINOLOGY

- A. Description of terms shall be in accordance with ASTM C754, ASTM C11, ASTM C841 and as specified.
B. Underside of Structure Overhead: In spaces where steel trusses or bar joists are shown, the underside of structure overhead shall be the underside of the floor or roof construction supported by beams, trusses, or bar joists. In interstitial spaces with walk-on floors the underside of the walk-on floor is the underside of structure overhead.
C. Thickness of steel specified is the minimum bare (uncoated) steel thickness.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Manufacturer's Literature and Data:
1. Studs, runners and accessories.
2. Hanger inserts.
3. Channels (Rolled steel).
4. Furring channels.
5. Screws, clips and other fasteners.
C. Shop Drawings:
1. Typical ceiling suspension system.

2. Typical metal stud and furring construction system including details around openings and corner details.
 3. Typical shaft wall assembly
 4. Typical fire rated assembly and column fireproofing showing details of construction same as that used in fire rating test.
- D. Test Results: Fire rating test designation, each fire rating required for each assembly.

1.5 DELIVERY, IDENTIFICATION, HANDLING AND STORAGE

- A. In accordance with the requirements of ASTM C754.

1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society For Testing And Materials (ASTM)
1. A641-09 Zinc-Coated (Galvanized) Carbon Steel Wire
 2. A653/653M-11 Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.
 3. C11-10 Terminology Relating to Gypsum and Related Building Materials and Systems
 4. C635-07 Manufacture, Performance, and Testing of Metal Suspension System for Acoustical Tile and Lay-in Panel Ceilings
 5. C636-08 Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
 6. C645-09 Non-Structural Steel Framing Members
 7. C754-11 Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
 8. C841-03(R2008) Installation of Interior Lathing and Furring
 9. C954-10 Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. to 0.112 in. in Thickness
 10. E580-11 Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Moderate Seismic Restraint.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Horizontal Deflection: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft. (239 Pa)

2.2 PROTECTIVE COATING

- A. Galvanize steel studs, runners (track), rigid (hat section) furring channels, "Z" shaped furring channels, and resilient furring channels, with coating designation of G40 or equivalent.

2.3 STEEL STUDS AND RUNNERS (TRACK)

- A. ASTM C645, modified for thickness specified and sizes as shown.
 - 1. Use C 645 steel, 0.75 mm (0.0296-inch) minimum base-metal (30 mil).
 - 2. Runners same thickness as studs.
 - 3. Embossed, High Strength Steel Studs and Tracks: Not Permitted.
- B. Provide not less than two cutouts in web of each stud, approximately 300 mm (12 inches) from each end, and intermediate cutouts on approximately 600 mm (24-inch) centers.
- C. Doubled studs for openings and studs for supporting concrete backer-board.
- D. Studs 3600 mm (12 feet) or less in length shall be in one piece.
- E. Shaft Wall Framing:
 - 1. Conform to rated wall construction.
 - 2. C-H Studs or C-T Studs.
 - 3. E Studs.
 - 4. J Runners.
 - 5. Steel Jamb-Strut.

2.4 FURRING CHANNELS

- A. Rigid furring channels (hat shape): ASTM C645.
- B. Resilient furring channels:
 - 1. Not less than 0.45 mm (0.0179-inch) thick bare metal.

2. Semi-hat shape, only one flange for anchorage with channel web leg slotted on anchorage side, channel web leg on other side stiffens fastener surface but shall not contact anchorage surface other channel leg is attached to.

C. "Z" Furring Channels:

1. Not less than 0.45 mm (0.0179-inch)-thick base metal, with 32 mm (1-1/4 inch) and 19 mm (3/4-inch) flanges.
2. Web furring depth to suit thickness of insulation.

D. Rolled Steel Channels: ASTM C754, cold rolled; or, ASTM C841, cold rolled.

2.5 FASTENERS, CLIPS, AND OTHER METAL ACCESSORIES

A. ASTM C754, except as otherwise specified.

B. For fire rated construction: Type and size same as used in fire rating test.

C. Fasteners for steel studs thicker than 0.84 mm (0.033-inch) thick. Use ASTM C954 steel drill screws of size and type recommended by the manufacturer of the material being fastened.

D. Clips: ASTM C841 (paragraph 6.11), manufacturer's standard items. Clips used in lieu of tie wire shall have holding power equivalent to that provided by the tie wire for the specific application.

E. Concrete ceiling hanger inserts (anchorage for hanger wire and hanger straps): Steel, zinc-coated (galvanized), manufacturers standard items, designed to support twice the hanger loads imposed and the type of hanger used.

F. Tie Wire and Hanger Wire:

1. ASTM A641, soft temper, Class 1 coating.
2. Gage (diameter) as specified in ASTM C754 or ASTM C841.

G. Attachments for Wall Furring:

1. Manufacturers standard items fabricated from zinc-coated (galvanized) steel sheet.
2. For concrete or masonry walls: Metal slots with adjustable inserts or adjustable wall furring brackets. Spacers may be fabricated from 1 mm (0.0396-inch) thick galvanized steel with corrugated edges.

H. Power Actuated Fasteners: Type and size as recommended by the manufacturer of the material being fastened.

2.6 SUSPENDED CEILING SYSTEM FOR GYPSUM BOARD (OPTION)

A. Conform to ASTM C635, heavy duty, with not less than 35 mm (1-3/8 inch) wide knurled capped flange face designed for screw attachment of gypsum board.

- B. Wall track channel with 35 mm (1-3/8 inch) wide flange.

PART 3 - EXECUTION

3.1 INSTALLATION CRITERIA

- A. Where fire rated construction is required for walls, partitions, columns, beams and floor-ceiling assemblies, the construction shall be same as that used in fire rating test.
- B. Construction requirements for fire rated assemblies and materials shall be as shown and specified, the provisions of the Scope paragraph (1.2) of ASTM C754 and ASTM C841 regarding details of construction shall not apply.

3.2 INSTALLING STUDS

- A. Install studs in accordance with ASTM C754, except as otherwise shown or specified.
- B. Space studs not more than 610 mm (24 inches) on center.
- C. Cut studs 6 mm to 9 mm (1/4 to 3/8-inch) less than floor to underside of structure overhead when extended to underside of structure overhead.
- D. Where studs are shown to terminate above suspended ceilings, provide bracing as shown or extend studs to underside of structure overhead.
- E. Extend studs to underside of structure overhead for fire, rated partitions, smoke partitions, shafts, and sound rated partitions and insulated exterior wall furring.
- F. At existing plaster ceilings and where shown, studs may terminate at ceiling as shown.
- G. Openings:
 - 1. Frame jambs of openings in stud partitions and furring with two studs placed back-to-back or as shown.
 - 2. Fasten back-to-back studs together with 9 mm (3/8-inch) long Type S pan head screws at not less than 600 mm (two feet) on center, staggered along webs.
 - 3. Studs fastened flange to flange shall have splice plates on both sides approximately 50 X 75 mm (2 by 3 inches) screwed to each stud with two screws in each stud. Locate splice plates at 600 mm (24 inches) on center between runner tracks.
- H. Fastening Studs:
 - 1. Fasten studs located adjacent to partition intersections, corners and studs at jambs of openings to flange of runner tracks with two screws through each end of each stud and flange of runner.

2. Do not fasten studs to top runner track when studs extend to underside of structure overhead.

I. Chase Wall Partitions:

1. Locate cross braces for chase wall partitions to permit the installation of pipes, conduits, carriers and similar items.
2. Use studs or runners as cross bracing not less than 63 mm (2-1/2 inches wide).

J. Form building seismic or expansion joints with double studs back-to-back spaced 75 mm (three inches) apart plus the width of the seismic or expansion joint.

K. Form control joint, with double studs spaced 13 mm (1/2-inch) apart.

3.3 INSTALLING WALL FURRING FOR FINISH APPLIED TO ONE SIDE ONLY

A. In accordance with ASTM C754, or ASTM C841 except as otherwise specified or shown.

B. Wall furring-Stud System:

1. Framed with 63 mm (2-1/2 inch) or narrower studs, 600 mm (24 inches) on center.
2. Brace as specified in ASTM C754 for Wall Furring-Stud System or brace with sections or runners, or studs placed horizontally at not less than three foot vertical intervals on side without finish.
3. Securely fasten braces to each stud with two Type S pan head screws at each bearing.

C. Direct attachment to masonry or concrete; rigid channels or "Z" channels:

1. Install rigid (hat section) furring channels at 600 mm (24 inches) on center, horizontally or vertically.
2. Install "Z" furring channels vertically spaced not more than 600 mm (24 inches) on center.
3. At corners where rigid furring channels are positioned horizontally, provide mitered joints in furring channels.
4. Ends of spliced furring channels shall be nested not less than 200 mm (8 inches).
5. Fasten furring channels to walls with power-actuated drive pins or hardened steel concrete nails. Where channels are spliced, provide two fasteners in each flange.

6. Locate furring channels at interior and exterior corners in accordance with wall finish material manufacturers printed erection instructions. Locate "Z" channels within 100 mm (4 inches) of corner.

- D. Installing Wall Furring-Bracket System: Space furring channels not more than 400 mm (16 inches) on center.

3.4 INSTALLING SUPPORTS REQUIRED BY OTHER TRADES

- A. Provide for attachment and support of electrical outlets, plumbing, laboratory or heating fixtures, recessed type plumbing fixture accessories, access panel frames, wall bumpers, wood seats, toilet stall partitions, dressing booth partitions, urinal screens, chalkboards, tackboards, wall-hung casework, handrail brackets, recessed fire extinguisher cabinets and other items like auto door buttons and auto door operators supported by stud construction.
- B. Provide additional studs where required. Install metal backing plates, or special metal shapes as required, securely fastened to metal studs.

3.5 INSTALLING SHAFT WALL SYSTEM

- A. Conform to UL Design No. U438 for two-hour fire rating.
- B. Position J runners at floor and ceiling with the short leg toward finish side of wall. Securely attach runners to structural supports with power driven fasteners at both ends and 600 mm (24 inches) on center.
- C. After liner panels have been erected, cut C-H studs and E studs, from 9 mm (3/8-inch) to not more than 13 mm (1/2-inch) less than floor-to-ceiling height. Install C-H studs between liner panels with liner panels inserted in the groove.
- D. Install full-length steel E studs over shaft wall line at intersections, corners, hinged door jambs, columns, and both sides of closure panels.
- E. Suitably frame all openings to maintain structural support for wall:
 1. Provide necessary liner fillers and shims to conform to label frame requirements.
 2. Frame openings cut within a liner panel with E studs around perimeter.
 3. Frame openings with vertical E studs at jambs, horizontal J runner at head and sill.

3.6 INSTALLING FURRED AND SUSPENDED CEILINGS OR SOFFITS

- A. Install furred and suspended ceilings or soffits in accordance with ASTM C754 or ASTM C841 except as otherwise specified or shown for screw attached gypsum board ceilings and for plaster ceilings or soffits.

1. Space framing at 400 mm (16-inch) centers for metal lath anchorage.
 2. Space framing at 600 mm (24-inch) centers for gypsum board anchorage.
- B. New exposed concrete slabs:
1. Use metal inserts required for attachment and support of hangers or hanger wires with tied wire loops for embedding in concrete.
 2. Furnish for installation under Division 3, CONCRETE.
 3. Suspended ceilings under concrete rib construction shall have runner channels at right angles to ribs and be supported from ribs with hangers at ends and at 1200 mm (48-inch) maximum intervals along channels. Stagger hangers at alternate channels.
- C. Concrete slabs on steel decking composite construction:
1. Use pull down tabs when available.
 2. Use power activated fasteners when direct attachment to structural framing cannot be accomplished.
- D. Where bar joists or beams are more than 1200 mm (48 inches) apart, provide intermediate hangers so that spacing between supports does not exceed 1200 mm (48 inches). Use clips, bolts, or wire ties for direct attachment to steel framing.
- E. Existing concrete construction exposed or concrete on steel decking:
1. Use power actuated fasteners either eye pin, threaded studs or drive pins for type of hanger attachment required.
 2. Install fasteners at approximate mid height of concrete beams or joists. Do not install in bottom of beams or joists.
- F. Steel decking without concrete topping:
1. Do not fasten to steel decking 0.76 mm (0.0299-inch) or thinner.
 2. Toggle bolt to decking 0.9 mm (0.0359-inch) or thicker only where anchorage to steel framing is not possible.
- G. Installing suspended ceiling system for gypsum board (ASTM C635 Option):
1. Install only for ceilings to receive screw attached gypsum board.
 2. Install in accordance with ASTM C636.
 - a. Install main runners spaced 1200 mm (48 inches) on center.
 - b. Install 1200 mm (four foot) tees not over 600 mm (24 inches) on center; locate for edge support of gypsum board.
 - c. Install wall track channel at perimeter.
- H. Installing Ceiling Bracing System:

1. Construct bracing of 38 mm (1-1/2 inch) channels for lengths up to 2400 mm (8 feet) and 50 mm (2 inch) channels for lengths over 2400 mm (8 feet) with ends bent to form surfaces for anchorage to carrying channels and overhead construction. Lap channels not less than 600 mm (2 feet) at midpoint back-to-back. Screw or bolt lap together with two fasteners.
2. Install bracing at an approximate 45-degree angle to carrying channels and structure overhead; secure as specified to structure overhead with two fasteners and to carrying channels with two fasteners or wire ties.
3. Brace suspended ceiling or soffit framing in seismic areas in accordance with ASTM E580.

3.7 TOLERANCES

- A. Fastening surface for application of subsequent materials shall not vary more than 3 mm (1/8-inch) from the layout line.
- B. Plumb and align vertical members within 3 mm (1/8-inch.)
- C. Level or align ceilings within 3 mm (1/8-inch.)

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SECTION 09 29 00

GYP SUM BOARD

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies installation and finishing of gypsum board.

1.2 RELATED WORK

- A. Installation of steel framing members for walls, partitions, furring, soffits, and ceilings: Section 05 40 00, COLD-FORMED METAL FRAMING, and Section 09 22 16, NON-STRUCTURAL METAL FRAMING.
- B. Acoustical Sealants: Section 07 92 00, JOINT SEALANTS.

1.3 TERMINOLOGY

- A. Definitions and description of terms shall be in accordance with ASTM C11, C840, and as specified.
- B. Underside of Structure Overhead: In spaces where steel trusses or bar joists are shown, the underside of structure overhead shall be the underside of the floor or roof construction supported by the trusses or bar joists.
- C. "Yoked": Gypsum board cut out for opening with no joint at the opening (along door jamb or above the door).

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
1. Cornerbead and edge trim.
 2. Finishing materials.
 3. Laminating adhesive.
 4. Gypsum board, each type.
- C. Shop Drawings:
1. Typical gypsum board installation, showing corner details, edge trim details and the like.
 2. Typical sound rated assembly, showing treatment at perimeter of partitions and penetrations at gypsum board.
 3. Typical shaft wall assembly.
 4. Typical fire rated assembly and column fireproofing, indicating details of construction same as that used in fire rating test.
- D. Samples:
1. Cornerbead.

- 2. Edge trim.
- 3. Control joints.

E. Test Results:

- 1. Fire rating test, each fire rating required for each assembly.
- 2. Sound rating test.

F. Certificates: Certify that gypsum board types, gypsum backing board types, cementitious backer units, and joint treating materials do not contain asbestos material.

1.5 DELIVERY, IDENTIFICATION, HANDLING AND STORAGE

A. In accordance with the requirements of ASTM C840.

1.6 ENVIRONMENTAL CONDITIONS

A. In accordance with the requirements of ASTM C840.

1.7 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American Society for Testing and Materials (ASTM):

- C11-15.....Terminology Relating to Gypsum and Related Building Materials and Systems
- C475-15.....Joint Compound and Joint Tape for Finishing Gypsum Board
- C840-13.....Application and Finishing of Gypsum Board
- C919-12.....Sealants in Acoustical Applications
- C954-15.....Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Stud from 0.033 in. (0.84mm) to 0.112 in. (2.84mm) in thickness
- C1002-14.....Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
- C1047-14.....Accessories for Gypsum Wallboard and Gypsum Veneer Base
- C1177-13.....Glass Mat Gypsum Substrate for Use as Sheathing
- C1178/C1178M-18.....Specification for Coated Glass Mat Water Resistant Backing Panel
- C1658-13.....Glass Mat Gypsum Panels

- C1396-14.....Gypsum Board
- C. Underwriters Laboratories Inc. (UL):
Latest Edition.....Fire Resistance Directory
- D. Inchcape Testing Services (ITS):
Latest Editions.....Certification Listings

PART 2 - PRODUCTS

2.1 GYPSUM BOARD

- A. Gypsum Board: ASTM C1396, Type X, 16 mm (5/8 inch) thick unless shown otherwise.
- B. Coreboard or Shaft Wall Liner Panels.
 - 1. ASTM C1396, Type X.
 - 2. ASTM C1658: Glass Mat Gypsum Panels,
 - 3. Coreboard for shaft walls 300, 400, 600 mm (12, 16, or 24 inches) wide by required lengths 25 mm (one inch) thick with paper faces treated to resist moisture.
- C. Water Resistant Gypsum Backing Board: ASTM C1178, Type X, 16 mm (5/8 inch) thick.
- D. Paper facings shall contain 100 percent post-consumer recycled paper content.

2.2 GYPSUM SHEATHING BOARD

- A. ASTM C1177, Type X.

2.3 ACCESSORIES

- A. ASTM C1047, except form of 0.39 mm (0.015 inch) thick zinc coated steel sheet or rigid PVC plastic.
- B. Flanges not less than 22 mm (7/8 inch) wide with punchouts or deformations as required to provide compound bond.

2.4 FASTENERS

- A. ASTM C1002 and ASTM C840, except as otherwise specified.
- B. ASTM C954, for steel studs thicker than 0.04 mm (0.33 inch).
- C. Select screws of size and type recommended by the manufacturer of the material being fastened.
- D. For fire rated construction, type and size same as used in fire rating test.
- E. Clips: Zinc-coated (galvanized) steel; gypsum board manufacturer's standard items.

2.5 FINISHING MATERIALS AND LAMINATING ADHESIVE

- A. ASTM C475 and ASTM C840. Free of antifreeze, vinyl adhesives, preservatives, biocides and other VOC. Adhesive shall contain a maximum VOC content of 50 g/l.

PART 3 - EXECUTION

3.1 GYPSUM BOARD HEIGHTS

- A. Extend all layers of gypsum board from floor to underside of structure overhead on following partitions and furring:
 - 1. Two sides of partitions:
 - a. Fire rated partitions.
 - b. Smoke partitions.
 - c. Sound rated partitions.
 - d. Full height partitions shown (FHP).
 - e. Corridor partitions.
 - 2. One side of partitions or furring:
 - a. Inside of exterior wall furring or stud construction.
 - b. Room side of room without suspended ceilings.
 - c. Furring for pipes and duct shafts, except where fire rated shaft wall construction is shown.
 - 3. Extend all layers of gypsum board construction used for fireproofing of columns from floor to underside of structure overhead, unless shown otherwise.
- B. In locations other than those specified, extend gypsum board from floor to heights as follows:
 - 1. Not less than 100 mm (4 inches) above suspended acoustical ceilings.
 - 2. At ceiling of suspended gypsum board ceilings.
 - 3. At existing ceilings.

3.2 INSTALLING GYPSUM BOARD

- A. Coordinate installation of gypsum board with other trades and related work.
- B. Install gypsum board in accordance with ASTM C840, except as otherwise specified.
- C. Moisture and Mold-Resistant Assemblies: Provide and install moisture and mold-resistant glass mat gypsum wallboard products with moisture-resistant surfaces complying with ASTM C1658 where shown and in locations which might be subject to moisture exposure during construction.

- D. Use gypsum boards in maximum practical lengths to minimize number of end joints.
- E. Bring gypsum board into contact, but do not force into place.
- F. Ceilings:
 - 1. For single-ply construction, use perpendicular application.
 - 2. For two-ply assemblies:
 - a. Use perpendicular application.
 - b. Apply face ply of gypsum board so that joints of face ply do not occur at joints of base ply with joints over framing members.
- G. Walls (Except Shaft Walls):
 - 1. When gypsum board is installed parallel to framing members, space fasteners 300 mm (12 inches) on center in field of the board, and 200 mm (8 inches) on center along edges.
 - 2. When gypsum board is installed perpendicular to framing members, space fasteners 300 mm (12 inches) on center in field and along edges.
 - 3. Stagger screws on abutting edges or ends.
 - 4. For single-ply construction, apply gypsum board with long dimension either parallel or perpendicular to framing members as required to minimize number of joints except gypsum board shall be applied vertically over "Z" furring channels.
 - 5. For two-ply gypsum board assemblies, apply base ply of gypsum board to assure minimum number of joints in face layer. Apply face ply of wallboard to base ply so that joints of face ply do not occur at joints of base ply with joints over framing members.
 - 6. For three-ply gypsum board assemblies, apply plies in same manner as for two-ply assemblies, except that heads of fasteners need only be driven flush with surface for first and second plies. Apply third ply of wallboard in same manner as second ply of two-ply assembly, except use fasteners of sufficient length enough to have the same penetration into framing members as required for two-ply assemblies.
 - 7. No offset in exposed face of walls and partitions will be permitted because of single-ply and two-ply or three-ply application requirements.
 - 8. Installing Two Layer Assembly Over Sound Deadening Board:
 - a. Apply face layer of wallboard vertically with joints staggered from joints in sound deadening board over framing members.

- b. Fasten face layer with screw, of sufficient length to secure to framing, spaced 300 mm (12 inches) on center around perimeter, and 400 mm (16 inches) on center in the field.
9. Control Joints ASTM C840 and as follows:
 - a. Locate at both side jambs of openings if gypsum board is not "yoked". Use one system throughout.
 - b. Not required for wall lengths less than 9000 mm (30 feet).
 - c. Extend control joints the full height of the wall or length of soffit/ceiling membrane.
- H. Acoustical or Sound Rated Partitions, Fire and Smoke Partitions:
 1. Cut gypsum board for a space approximately 3 mm to 6 mm (1/8 to 1/4 inch) wide around partition perimeter.
 2. Coordinate for application of caulking or sealants to space prior to taping and finishing.
 3. For sound rated partitions, use sealing compound (ASTM C919) to fill the annular spaces between all receptacle boxes and the partition finish material through which the boxes protrude to seal all holes and/or openings on the back and sides of the boxes. STC minimum values as shown.
- I. Electrical and Telecommunications Boxes:
 1. Seal annular spaces between electrical and telecommunications receptacle boxes and gypsum board partitions.
- J. Accessories:
 1. Set accessories plumb, level and true to line, neatly mitered at corners and intersections, and securely attach to supporting surfaces as specified.
 2. Install in one piece, without the limits of the longest commercially available lengths.
 3. Corner Beads:
 - a. Install at all vertical and horizontal external corners and where shown.
 - b. Use screws only. Do not use crimping tool.
 4. Edge Trim (casings Beads):
 - a. At both sides of expansion and control joints unless shown otherwise.
 - b. Where gypsum board terminates against dissimilar materials and at perimeter of openings, except where covered by flanges, casings or permanently built-in equipment.

- c. Where gypsum board surfaces of non-load bearing assemblies abut load bearing members.
- d. Where shown.

3.3 INSTALLING GYPSUM SHEATHING

- A. Install in accordance with ASTM C840, except as otherwise specified or shown.
- B. Use screws of sufficient length to secure sheathing to framing.
- C. Space screws 9 mm (3/8 inch) from ends and edges of sheathing and 200 mm (8 inches) on center. Space screws a maximum of 200 mm (8 inches) on center on intermediate framing members.
- D. Apply 600 mm by 2400 mm (2 foot by 8 foot) sheathing boards horizontally with tongue edge up.
- E. Apply 1200 mm by 2400 mm or 2700 mm (4 ft. by 8 ft. or 9 foot) gypsum sheathing boards vertically with edges over framing.

3.4 CAVITY SHAFT WALL

- A. Coordinate assembly with Section 09 22 16, NON-STRUCTURAL METAL FRAMING, for erection of framing and gypsum board.
- B. Conform to UL Design No. U438 or FM WALL CONSTRUCTION 12-2/HR (Nonbearing for two-hour fire rating. Conform to FM WALL CONSTRUCTION 25-1/HR (Non-loadbearing) for one-hour fire rating where shown.
- C. Cut coreboard (liner) panels 25 mm (one inch) less than floor-to-ceiling height and erect vertically between J-runners on shaft side.
 - 1. Where shaft walls exceed 4300 mm (14 feet) in height, position panel end joints within upper and lower third points of wall.
 - 2. Stagger joints top and bottom in adjacent panels.
 - 3. After erection of J-struts of opening frames, fasten panels to J-struts with screws of sufficient length to secure framing staggered from those in base, spaced 300 mm (12 inches) on center.
- D. Gypsum Board:
 - 1. Two-hour wall:
 - a. Erect base layer (backing board) vertically on finish side of wall with end joints staggered. Fasten base layer panels to studs with 25 mm (one inch) long screws, spaced 600 mm (24 inches) on center.
 - b. Use laminating adhesive between plies in accordance with UL or FM if required by fire test.

- c. Apply face layer of gypsum board required by fire test vertically over base layer with joints staggered and attach with screws of sufficient length to secure to framing staggered from those in base, spaced 300 mm (12 inches) on center.
 2. One-hour wall with one layer on finish side of wall: Apply face layer of gypsum board vertically. Attach to studs with screws of sufficient length to secure to framing, spaced 300 mm (12 inches) on center in field and along edges.
 3. Where coreboard is covered with face layer of gypsum board, stagger joints of face layer from those in the coreboard base.
- E. Treat joints, corners, and fasteners in face layer as specified for finishing of gypsum board.

3.5 FINISHING OF GYPSUM BOARD

- A. Finish joints, edges, corners, and fastener heads in accordance with ASTM C840 and to levels indicated below:
 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 2. Level 2: Panels that are substrate for tile.
 3. Level 4: At panel surfaces that will be exposed to view.
- B. Before proceeding with installation of finishing materials, assure the following:
 1. Gypsum board is fastened and held close to framing or furring.
 2. Fastening heads in gypsum board are slightly below surface in dimple formed by driving tool.
- C. Finish joints, fasteners, and all openings, including openings around penetrations, on that part of the gypsum board extending above suspended ceilings to seal surface of non-decorated smoke barrier, fire rated and sound rated gypsum board construction. After the installation of hanger rods, hanger wires, supports, equipment, conduits, piping and similar work, seal remaining openings and maintain the integrity of the smoke barrier, fire rated and sound rated construction. Sanding is not required of non-decorated surfaces.

3.6 REPAIRS

- A. After taping and finishing has been completed, and before decoration, repair all damaged and defective work, including nondecorated surfaces.
- B. Patch holes or openings 13 mm (1/2 inch) or less in diameter, or equivalent size, with a setting type finishing compound or patching plaster.

- C. Repair holes or openings over 13 mm (1/2 inch) diameter, or equivalent size, with 16 mm (5/8 inch) thick gypsum board secured in such a manner as to provide solid substrate equivalent to undamaged surface.
- D. Tape and refinish scratched, abraded or damaged finish surfaces including cracks and joints in non-decorated surface to provide smoke tight construction, fire protection equivalent to the fire rated construction and STC equivalent to the sound rated construction.

3.7 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

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SECTION 09 30 13
CERAMIC/PORCELAIN TILING

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies interior porcelain tile, stone veneer panels, solid surface thresholds, waterproofing membranes for thin-set applications, crack isolation membranes, and tile backer board.

1.2 RELATED WORK:

- A. Section 07 92 00, JOINT SEALANTS: Sealing of Joints.
- B. Section 09 06 00, SCHEDULE FOR FINISHES: Color, Texture, Pattern, and Size of Field Tile and Trim Shapes, and Color of Grout Specified.
- C. Section 09 65 19, RESILIENT TILE FLOORING: Metal and Resilient Edge Strips at Joints with New Resilient Flooring.

1.3 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
1. Base tile, each type, each color, each size.
 2. Mosaic floor tile panels, 228 by 228 mm (9 by 9 inches), each type, color, size and pattern.
 3. Porcelain tile, each type, color, patterns and size.
 4. Wall (or wainscot) tile, each color, size and pattern.
 5. Stone veneer panels, each color, size and pattern.
 6. Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, color, and size.
- C. Product Data:
1. Ceramic and porcelain tile, marked to show each type, size, and shape required.
 2. Stone veneer panels, marked to show each type, size, and shape required.
 3. Chemical resistant mortar and grout (epoxy and furan).
 4. Cementitious backer unit.
 5. Dry-set portland cement mortar and grout.
 6. Divider strip.
 7. Elastomeric membrane and bond coat.
 8. Reinforcing tape.

9. Leveling compound.
10. Latex-portland cement mortar and grout.
11. Commercial portland cement grout.
12. Organic adhesive.
13. Slip resistant tile.
14. Waterproofing isolation membrane.
15. Fasteners.

D. Certification:

1. Master grade certificate, ANSI A137.1.
2. Manufacturer's certificates indicating that the following materials comply with specification requirements:
 - a. Chemical resistant mortar and grout (epoxy and furan).
 - b. Modified epoxy emulsion.
 - c. Commercial portland cement grout.
 - d. Cementitious backer unit.
 - e. Dry-set portland cement mortar and grout.
 - f. Elastomeric membrane and bond coat.
 - g. Reinforcing tape.
 - h. Latex-portland cement mortar and grout.
 - i. Leveling compound.
 - j. Organic adhesive.
 - k. Waterproof isolation membrane.
 - l. Factory back mounted tile documentation for suitability for application in wet area.

E. Installer Qualifications:

1. Submit letter stating installer's experience.

1.4 DELIVERY AND STORAGE:

- A. Deliver materials in containers with labels legible and intact and grade-seals unbroken.
- B. Store material to prevent damage or contamination.

1.5 QUALITY ASSURANCE:

- A. Installers to be from a company specializing in performing installation of products specified and have a minimum of three (3) years' experience.
- B. Each type and color of tile to be provided from a single source.
- C. Each type and color of mortar, adhesive, and grout to be provided from the same source.

1.6 WARRANTY:

- A. Construction Warranty: Comply with FAR clause 52.246-21, "Warranty of Construction".

1.7 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.

- B. American National Standards Institute (ANSI):

- A10.20-06(R2016).....Safe Operating Practices for Tile, Terrazzo and Marble Work
- A108/A118/A136.1:2019...Installation of Ceramic Tile
- A108.01-18.....Subsurfaces and Preparations by Other Trades
- A108.02-19.....Materials, Environmental, and Workmanship
- A108.1A-17.....Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar
- A108.1B-17.....Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar
- A108.1C-17.....Contractors Option; Installation of Ceramic Tile in the Wet-Set method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar
- A108.4-09.....Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive
- A108.5-10Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar
- A108.6-10.....Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy
- A108.8-10.....Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout
- A108.9-10.....Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout
- A108.10-17.....Grout in Tilework
- A108.11-18.....Interior Installation of Cementitious Backer Units
- A108.12-10.....Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar

- A108.13-16.....Load Bearing, Bonded, Waterproof Membranes for
Thin-Set Ceramic Tile and Dimension Stone
- A108.14-10.....Paper-Faced Glass Mosaic Tile
- A108.15-19.....Alternate Method: Paper-Faced Glass Mosaic Tile
- A108.17-16.....Crack Isolation Membranes for Thin-Set Ceramic
Tile and Dimension Stone
- A118.1-19.....Dry-Set Portland Cement Mortar
- A118.3-13.....Chemical Resistant, Water Cleanable Tile-Setting
and -Grouting Epoxy and Water Cleanable
Tile-Setting Epoxy Adhesive
- A118.4-19.....Modified Dry-Set Cement Mortar
- A118.5-16.....Chemical Resistant Furan Mortars and Grouts
- A118.6-19.....Standard Cement Grouts for Tile Installation
- A118.7-1.....High Performance Cement Grouts for Tile
Installation
- A118.8-16.....Modified Epoxy Emulsion Mortar/ Grout
- A118.9-19.....Cementitious Backer Units
- A118.10-14.....Load Bearing, Bonded, Waterproof Membranes for
Thin-Set Ceramic Tile and Dimension Stone
Installation
- A118.11-17.....EGP (Exterior Glue Plywood) Modified Dry-set
Mortar
- A118.12-14.....Crack Isolation Membranes for Thin-Set Ceramic
Tile and Dimension Stone Installation
- A118.13-14.....Bonded Sound Reduction Membranes for Thin-Set
Ceramic Tile Installation
- A118.15-19.....Improved Modified Dry-Set Cement Mortar
- A136.1-13.....Organic Adhesives for Installation of Ceramic Tile
- A137.1-17.....American National Standard Specifications for
Ceramic Tile
- C. ASTM International (ASTM):
 - A666-15.....Annealed or Cold-Worked Austenitic Stainless Steel
Sheet, Strip, Plate and Flat Bar
 - A1064/A1064M-18a.....Carbon-Steel Wire and Welded Wire Reinforcement,
Plain and Deformed, for Concrete
 - C109/C109M-20b.....Standard Test Method for Compressive Strength of

	Hydraulic Cement Mortars (Using 2 inch. or [50-mm] Cube Specimens)
C241/C241M-15e1.....	Abrasion Resistance of Stone Subjected to Foot Traffic
C348-20.....	Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars
C627-18.....	Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester
C954-18.....	Steel Drill Screws for the Application of Gypsum Board on Metal Plaster Base to Steel Studs from 0.033 in (0.84 mm) to 0.112 in (2.84 mm) in thickness
C979/C979M-16.....	Pigments for Integrally Colored Concrete
C1002-18.....	Steel Self-Piercing Tapping Screws for the Application of Panel Products
C1027-19.....	Test Method for Determining Visible Abrasion Resistance of Glazed Ceramic Tile
C1127/C1127M-15.....	Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with an Integral Wearing Surface
C1178/C1178M-18.....	Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
C1325-19.....	Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units
C1353/C1353M-20e1.....	Abrasion Resistance of Dimension Stone Subjected to Foot Traffic Using a Rotary Platform, Double-Head Abraser
D1204-14 (2020).....	Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheet or Film at Elevated Temperature
D2240-15e1.....	Test Method for Rubber Property - Durometer Hardness
D2497-07 (2018).....	Tolerances for Manufactured Organic-Base Filament Single Yarns
D3045-2018.....	Heat Aging of Plastics Without Load
D4397-16.....	Standard Specification for Polyethylene Sheeting

for Construction, Industrial and Agricultural
Applications

D5109-12 (Withdrawn 2020). Standard Test Methods for Copper-Clad

Thermosetting Laminates for Printed Wiring Boards
(recommend deletion)

D. Code of Federal Regulation (CFR):

40 CFR 59.....Determination of Volatile Matter Content, Water
Content, Density Volume Solids, and Weight Solids
of Surface Coating

E. Tile Council of North America, Inc. (TCNA):

Handbook for Ceramic Tile Installation (2020) G. TCNA DCOF

AcuTest-2012, Dynamic Coefficient of Friction Test

PART 2 - PRODUCTS

2.1 TILE:

A. Comply with ANSI A137.1, Standard Grade, except as modified:

1. Inspection procedures listed under the Appendix of ANSI A137.1.

2. Abrasion Resistance Classification:

a. Tested in accordance with values listed in Table 1, ASTM C1027.

b. Class V, 12000 revolutions for floors in Corridors, Kitchens, Storage
including Refrigerated Rooms

c. Class IV, 6000 revolutions for remaining areas.

3. Slip Resistant Tile for Floors:

a. Coefficient of friction, when tested in accordance with ANSI A137.1
and measured per the TCNA DCOF AcuTest.

1) Equal to or greater than .42 for level interior tile floors that
will be walked on when wet.

4. Mosaic tile may be mounted or joined by a resinous bonding material along
tile edges.

5. Factory Blending: For tile with color variations, within the ranges
selected during sample submittals blend tile in the factory and package
so tile units taken from one (1) package show the same range in colors
as those taken from other packages and match approved samples.

B. Unglazed Ceramic Mosaic Tile: Nominal 6 mm (1/4 inch) thick with cushion
edges.

C. Glazed Wall Tile: Cushion edges, glazing.

D. Porcelain Paver Tile: Nominal 8 mm (5/16 inch) thick, with cushion edges. Porcelain tile produced by the dust pressed method are to be made of approximately 50 percent feldspar; the remaining 50 percent is to be made up of various high-quality light firing ball clays yielding a tile with a water absorption rate of 0.5 percent or less and a breaking strength of between 176 to 181 kg (390 to 400 pounds).

E. Trim Shapes:

1. Conform to applicable requirements of adjoining floor and wall tile.
2. Use slip resistant trim shapes for horizontal surfaces of showers and congregate baths, overflow ledges, recessed steps, shower curbs, drying area curbs, and seats.
3. Use trim shapes sizes conforming to size of adjoining field wall tile including existing spaces unless detailed on construction documents or specified otherwise.
4. Internal and External Corners:
 - a. Square internal and external corner joints are not acceptable.
 - b. External corners including edges: Use metal trim as indicated.
 - c. Base to floor external corners: Use special shapes providing bullnose vertical edge with integral cove horizontal joint. Use stop at bottom of openings having bullnose return to wall.
 - d. Wall top edge external corners: Use metal trim as indicated.
 - e. Provide cove and bullnose shapes where indicated in construction documents and required to complete tile work.

2.2 STONE VENEER PANELS:

- A. Material Type: Quartzite.
- B. Finish: Natural.
- C. Size: 6 x 24 inch.
- D. Thickness: 0.4 inch to 1 inch.
- E. Trim shapes: Provide premanufactured corner and end shapes for a complete installation.

2.3 BACKER UNITS:

- A. Glass Mat Water Resistant Backing Board:
 1. Use in showers or wet areas.
 2. Conform to ASTM C1178/C1178M.
 3. Use in maximum lengths available to minimize end to end butt joints.

2.4 SETTING MATERIALS OR BOND COATS:

- A. Conform to TCNA Handbook for Ceramic Tile Installation.
- B. Portland Cement Mortar: ANSI A108.02.
- C. Latex-Portland Cement Mortar: ANSI A118.4.
 - 1. For wall applications, provide non-sagging, latex-portland cement mortar complying with ANSI A118.4.
 - 2. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.
- D. Elastomeric Waterproofing Membrane and Bond Coat:
 - 1. TCNA F122-14 (on ground concrete) and TCNA F112A-14 (above ground concrete).
 - 2. ANSI A118.10.
 - 3. One component polyurethane, liquid applied material having the following additional physical properties:
 - a. Hardness: Shore "A" between 40-60.
 - b. Elongation: Between 300-600 percent.
 - c. Tensile strength: Between .27 - .41 Newton per square millimeter (40-60 pounds per square inch gauge).
 - d. No volatile compounds (VOC).
 - 4. Coal tar modified urethanes are not acceptable.
- E. Waterproofing Isolation Membrane:
 - 1. Sheet System TCNA F122-14 (on-ground concrete) and TCNA F122A-14 (above-ground concrete).
 - 2. Composite sheet consisting of ASTM D5109, Type II, Grade I Chlorinated Polyethylene (CM) sheet reinforced on both sides with a non-woven polyester fiber.
 - 3. Designed for use in wet areas as an isolation and positive waterproofing membranes for thin-set bonding of sheet to substrate and thin-set bonding of ceramic and porcelain tile or marble to sheet. Suited for both horizontal and vertical applications.
 - 4. Conform to the following additional physical properties:

Property	Units	Results	Test Method
Hardness Shore A	Points	70-80	ASTM D2240 (10 Second Reading)
Shrinkage	Percent	5 maximum	ASTM D1204

Brittleness		No crack remains flexible at temperature -37 degrees C (-35 degrees F)	ASTM D2497 13 mm (1/2-inch) Mandrel Bend
Retention of Properties after Heat Aging	Percent of original	80 Tensile 80 Breaking 80 Elongation	ASTM D3045, 90 degrees C (194 degrees F) for 168 hours

5. Manufacturer's standard sheet size with prefabricated or preformed inside and outside corners.

6. Sheet manufacturer's solvent welding liquid or xylene and edge sealant.

2.5 GROUTING MATERIALS:

A. Coloring Pigments:

1. Pure mineral pigments, lime proof and nonfading, complying with ASTM C979/C979M.
2. Coloring pigments may only be added to grout by the manufacturer.
3. Job colored grout is not acceptable.
4. Use is required in Commercial Portland Cement Grout, Dry-Set Grout, and Latex-Portland Cement Grout.
5. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated. Zero VOC content.

B. Standard Cement Grout: ANSI A118.6.

C. High Performance Tile Grout: ANSI A118.7 with a VOC content of 65 g/L or less when calculated according to 40 CFR 59 (EPA Method 24).

1. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.

D. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59 (EPA Method 24).

1. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 60 and 100 degrees C (140 and 212 degrees F), respectively, and certified by manufacturer for intended use.

2.6 PATCHING AND LEVELING COMPOUND:

- A. Portland cement base, polymer-modified, self-leveling compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.
- B. Provide a patching and leveling compound with the following minimum physical properties:
 - 1. Compressive strength - 25 MPa (3500 psig) per ASTM C109/C109M.
 - 2. Flexural strength - 7 MPa (1000 psig) per ASTM C348 (28 day value).
 - 3. Tensile strength - 4.1 MPa (600 psi) per ANSI 118.7.
 - 4. Density - 1.9.
- C. Capable of being applied in layers up to 38 mm (1-1/2 inches) thick without fillers and up to 101 mm (4 inches) thick with fillers, being brought to a feather edge, and being trowelled to a smooth finish.
- D. Primers, fillers, and reinforcement as required by manufacturer for application and substrate condition.
- E. Ready for use in 48 hours after application.

2.7 SOLID SURFACE MATERIAL:

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
- B. Threshold:
 - 1. Thickness and contour as indicated in construction documents.
 - 2. Fabricate from one piece without holes, cracks, or open seams; full depth of wall or frame opening by full width of wall or frame opening; 19 mm (3/4-inch) minimum thickness and 6 mm (1/4-inch) minimum thickness at beveled edge.
 - 3. Set not more than 13 mm (1/2-inch) above adjoining finished floor surfaces, with transition edges beveled on a slope of no greater than 1:2. On existing floor slabs provide 13 mm (1/2-inch) above ceramic tile surface with bevel edge joint top flush with adjacent floor.
 - 4. One-piece full width of door opening. Notch thresholds to match profile of doorjamb.

2.8 METAL EDGE STRIPS:

- A. Embedded leg perforated and deformed for keying to mortar.
- B. Anodized aluminum satin finish.

2.9 WATER:

- A. Clean, potable and free from salts and other injurious elements to mortar and grout materials.

2.10 CLEANING COMPOUNDS:

- A. Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.
- B. Materials containing acid or caustic Material are not acceptable.

2.11 FLOOR MORTAR BED REINFORCING:

- A. ASTM A1064/A1064M welded wire fabric without backing, MW3 x MW3 (2 x 2-W0.5 x W0.5).

2.12 POLYETHYLENE SHEET:

- A. Polyethylene sheet conforming to ASTM D4397.
- B. Nominal thickness: 0.15 mm (6 mils).

PART 3 - EXECUTION

3.1 ENVIRONMENTAL REQUIREMENTS:

- A. Maintain ambient temperature of work areas at not less than 16 degrees C (60 degrees F), without interruption, for not less than 24 hours before installation and not less than three (3) days after installation.
- B. Maintain higher temperatures for a longer period of time where required by manufacturer's recommendation and ANSI Specifications for installation.
- C. Do not install tile when the temperature is above 38 degrees C (100 degrees F).
- D. Do not install materials when the temperature of the substrate is below 16 degrees C (60 degrees F).
- E. Do not allow temperature to fall below 10 degrees C (50 degrees F) after third day of completion of tile work.

3.2 ALLOWABLE TOLERANCE:

- A. Variation in plane of sub-floor, including concrete fills leveling compounds and mortar beds:
 - 1. Not more than 6 mm in 3048 mm (1/4 inch in 10 feet) from required elevation where portland cement mortar setting bed is used.
 - 2. Not more than 3 mm in 3048 mm (1/8 inch in 10 feet) where dry-set portland cement, and latex-portland cement mortar setting beds and chemical-resistant bond coats are used.
- B. Variation in Plane of Wall Surfaces:

1. Not more than 6 mm in 2438 mm (1/4 inch in 8 feet) from required plane where portland cement mortar setting bed is used.
2. Not more than 3 mm in 2438 mm (1/8 inch in 8 feet) where dry-set or latex-portland cement mortar or organic adhesive setting materials is used.

3.3 SURFACE PREPARATION:

A. Cleaning New Concrete or Masonry:

1. Chip out loose material, clean off all oil, grease dirt, adhesives, curing compounds, and other deterrents to bonding by mechanical method, or by using products specifically designed for cleaning concrete and masonry.
2. Use self-contained power blast cleaning systems to remove curing compounds and steel trowel finish from concrete slabs where ceramic tile will be installed directly on concrete surface with thin-set materials.
3. Steam cleaning or the use of acids and solvents for cleaning will not be permitted.

B. Patching and Leveling:

1. Mix and apply patching and leveling compound in accordance with manufacturer's instructions.
2. Fill holes and cracks and align concrete floors that are out of required plane with patching and leveling compound.
 - a. Thickness of compound as required to bring finish tile system to elevation shown on construction documents.
 - b. Float finish except finish smooth for elastomeric waterproofing.
 - c. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
3. Apply patching and leveling compound to concrete and masonry wall surfaces that are out of required plane.
4. Apply leveling coats of material compatible with wall surface and tile setting material to wall surfaces, other than concrete and masonry that are out of required plane.

C. Mortar Bed for Slopes to Drains:

1. Slope compound to drain where drains are shown on construction documents.
2. Install mortar bed in depressed slab sloped to drains not less than 3.2 mm in 305 mm (1/8 inch per foot).
3. Allow not less than 50 mm (2 inch) depression at edge of depressed slab.

4. Screed for slope to drain and float finish.
 5. Cure mortar bed for not less than seven (7) days. Do not use curing compounds or coatings.
 6. Perform flood test to verify mortar bed slopes to drain before installing tile. Contracting Officer Representative (COR) to be present during flood test.
- D. Additional preparation of concrete floors for tile set with epoxy, or furan-resin is to be in accordance with the manufacturer's printed instructions.
- E. Cleavage Membrane:
1. Install polythene sheet as cleavage membrane in depressed slab when waterproof membrane is not scheduled or indicated.
 2. Turn up at edge of depressed floor slab to top of floor.
- F. Walls:
1. In showers or other wet areas cover studs with polyethylene sheet.
 2. Apply patching and leveling compound to concrete and masonry surfaces that are out of required plane.
 3. Apply leveling coats of material compatible with wall surface and tile setting material to wall surfaces, other than concrete and masonry that are out of required plane.
 4. Apply metal lath to framing in accordance with ANSI A108.1:
 - a. Use fasteners specified in paragraph "Fasteners." Use washers when lath opening is larger than screw head.
 - b. Apply scratch and leveling coats to metal lath in accordance with ANSI A108.1C.
 - c. Total thickness of scratch and leveling coats:
 - 1) Apply 9 mm to 16 mm (3/8 inch to 5/8 inch) thick over solid backing.
 - 2) 16 mm to 19 mm (5/8 to 3/4 inch) thick on metal lath over studs.
 - 3) Where wainscots are required to finish flush with wall surface above, adjust thickness required for flush finish.
 - d. Apply scratch and leveling coats more than 19 mm (3/4 inch) thick in two (2) coats.

3.4 GLASS MAT WATER-RESISTANT BACKING BOARD:

- A. Install in accordance with manufacturer's instructions. TCNA Systems W245-1.
- B. Treat joints with tape and latex-portland cement mortar or adhesive.

3.5 SOLID SURFACE MATERIAL:

- A. Secure thresholds and stools in position with minimum of two stainless steel dowels.
- B. Set in dry-set portland cement mortar or latex-portland cement mortar bond coat.
- C. Set threshold to finish 13 mm (1/2 inch) above ceramic tile floor unless shown otherwise on construction documents, with bevel edge joint top flush with adjacent floor similar to TCNA detail TR611-14.

3.6 CERAMIC TILE - GENERAL:

- A. Comply with ANSI A108/A118/A136 series of tile installation standards applicable to methods of installation and TCNA Installation Guidelines.
- B. Installing Mortar Beds for Floors:
 1. Install mortar bed in a manner that does not damage cleavage or waterproof membrane; 32 mm (1-1/2 inch) minimum thickness.
 2. Install floor mortar bed reinforcing centered in mortar fill.
 3. Screed finish to level plane or slope to drains shown on construction documents, float finish.
 4. For thin set systems cure mortar bed not less than seven (7) days. Do not use curing compounds or coatings.
 5. For tile set with portland cement paste over plastic mortar bed coordinate to set tile before mortar bed sets.
- C. Setting Beds or Bond Coats:
 1. Where recessed or depressed floor slabs are filled with portland cement mortar bed, set ceramic mosaic floor tile in either portland cement paste over plastic mortar bed or latex-portland cement mortar over cured mortar bed except as specified otherwise, ANSI A108-1C, TCNA System F121-14 or F111-14.
 2. Set floor tile in elastomeric bond coat over elastomeric membrane per ANSI 108.13, TCNA System F122-14 where indicated on construction documents.
 3. Set wall tile installed over glass mat water resistant backer board in latex-portland cement mortar, ANSI A108.1B.
 4. Set wall tile installed over portland cement mortar bed on metal lath base in portland cement paste over plastic mortar bed, or dry-set portland cement mortar or latex-portland cement mortar over a cured mortar bed, ANSI A108.1C, TCNA System W231-14, W241-14.

5. Set tile installed over gypsum board and gypsum plaster in organic adhesive, ANSI A108.1, TCNA System W242-14.
6. Set trim shapes in same material specified for setting adjoining tile.

D. Workmanship:

1. Lay out tile work so that no tile less than one-half full size is used. Make all cuts on the outer edge of the field.
2. Set tile firmly in place with finish surfaces in true planes. Align tile flush with adjacent tile unless shown otherwise on construction documents.
3. Form intersections and returns accurately.
4. Cut and drill tile neatly without marring surface.
5. Cut edges of tile abutting penetrations, finish, or built-in items:
 - a. Fit tile closely around electrical outlets, piping, fixtures and fittings, so that plates, escutcheons, collars and flanges will overlap cut edge of tile.
 - b. Seal tile joints water tight as specified in Section 07 92 00, JOINT SEALANTS, around electrical outlets, piping fixtures and fittings before cover plates and escutcheons are set in place.
6. Completed work is to be free from hollow sounding areas and loose, cracked or defective tile.
7. Remove and reset tiles that are out of plane or misaligned.
8. Floors:
 - a. Extend floor tile beneath casework and equipment, except those units mounted in wall recesses.
 - b. Align finish surface of new tile work flush with other and existing adjoining floor finish where indicated in construction documents.
 - c. In areas where floor drains occur, slope tile to drains.
 - d. Push and vibrate tiles over 203 mm (8 inches) square to achieve full support of bond coat.
9. Walls:
 - a. Cover walls and partitions, including pilasters, furred areas, and freestanding columns from floor to ceiling, or from floor to nominal wainscot heights as indicated in construction documents with tile.
 - b. Finish reveals of openings with tile, except where other finish materials are indicated in construction documents.
 - c. At window openings, provide tile stools and reveals.

- d. Finish wall surfaces behind and at sides of casework and equipment, except those units mounted in wall recesses, with same tile as scheduled for room proper.

10. Joints:

- a. Keep all joints in line, straight, level, perpendicular and of even width unless shown otherwise on construction documents.
- b. Make joints 2 mm (1/16 inch) wide for glazed wall tile and mosaic tile work.
- c. Make joints in quarry tile work not less than 6 mm (1/4 inch) nor more than 9 mm (3/8 inch) wide. Finish joints flush with surface of tile.
- d. Make joints in paver tile, porcelain type; maximum 3 mm (1/8 inch) wide.

11. Back Buttering: For installations indicated below, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108/A118/A136 series of tile installation standards:

- a. Tile wall installations in wet areas, including showers, tub enclosures, laundries and swimming pools.
- b. Tile installed with chemical-resistant mortars and grouts.
- c. Tile wall installations composed of tiles 203 by 203 mm (8 by 8 inches) or larger.
- d. Exterior tile wall installations.

3.7 CERAMIC TILE INSTALLED WITH PORTLAND CEMENT MORTAR:

- A. Mortar Mixes for Floor, Wall and Base Tile (including Showers): ANSI A108.1A, except specified otherwise.
- B. Installing Wall and Base Tile: ANSI A108.1A, except specified otherwise.
- C. Installing Floor Tile: ANSI A108.1A, except as specified otherwise. Slope mortar beds to floor drains at a minimum of 3 mm in 305 mm (1/8 inch per foot).

3.8 PORCELAIN TILE INSTALLED WITH LATEX PORTLAND CEMENT BONDING MORTAR:

- A. Due to the denseness of porcelain tile use latex portland cement bonding mortar that meets the requirements of ANSI A108.01. Mix bonding mortars in accordance with manufacturer's instructions. Provide liquid ratios and comply with dwell times during the placement of bonding mortar and tile.

3.9 CERAMIC AND PORCELAIN TILE INSTALLED WITH ELASTOMERIC BOND COAT:

- A. Surface Preparation: Prepare surfaces as specified.
- B. Installation of Elastomeric Membrane: ANSI A108.10 and TCNA F122-14 (on ground concrete) and F122A-14 (above-ground concrete).
 - 1. Prime surfaces, where required, in accordance with manufacturer's instructions.
 - 2. Install first coat of membrane material in accordance with manufacturer's instructions, in thickness of 0.76 to 1.3 mm (30 to 50 mils).
 - 3. Extend material over flashing rings of drains and turn up vertical surfaces not less than 101 mm (4 inches) above finish floor surface.
 - 4. When material has set, recoat areas with a second coat of elastomeric membrane material for a total thickness of 1.3 to 1.9 mm (50 to 75 mils).
 - 5. After curing test for leaks with 25 mm (1 inch) of water for 24 hours.
- C. Installation of Tile in Elastomeric Membrane:
 - 1. Spread no more material than can be covered with tile before material starts to set.
 - 2. Apply tile in second coat of elastomeric membrane material in accordance with the coating manufacturer's instructions in lieu at aggregate surfacing specified in ASTM C1127. Do not install topcoat over tile.

3.10 GROUTING:

- A. Grout Type and Location:
 - 1. Grout for glazed wall and base tile, paver tile and unglazed mosaic tile portland cement grout, latex-portland cement grout, dry-set grout, or commercial portland cement grout.
- B. Workmanship:
 - 1. Install and cure grout in accordance with the applicable standard.
 - 2. Sand Portland Cement Grout: ANSI A108.10.
 - 3. Standard Cement Grout: ANSI A118.6.
 - 4. High Performance Grout: ANSI A118.7.
 - 5. Epoxy Grout: ANSI A108.6.
 - 6. Water-Cleanable Epoxy Grout: ANSI A118.3.
 - 7. Furan and Commercial Portland Cement Grout: ANSI A118.5 and in accordance with the manufacturer's printed instructions.

3.11 STONE PANELS INSTALLED WITH LATEX PORTLAND CEMENT BONDING MORTAR:

- A. Install stone panels in accordance with manufacturer's written instructions and recommendations, and TCNA best practices.
- B. Fit panels and corners tightly together with a dry-stack installation. Do not grout joints.

3.12 MOVEMENT JOINTS:

- A. Prepare tile expansion, isolation, construction and contraction joints for installation of sealant. Refer to Section 07 92 00, JOINT SEALANTS.
- B. TCNA details EJ 171-14.
- C. At expansion joints, rake out joint full depth of tile and setting bed and mortar bed. Do not cut waterproof or isolation membrane.
- D. Rake out grout at joints between tile, tub, service sink, at toe of base, and where indicated in construction documents not less than 6 mm (1/4 inch) deep.

3.13 CLEANING:

- A. Thoroughly sponge and wash tile. Polish glazed surfaces with clean dry cloths.
- B. Methods and materials used are not permitted to damage or impair appearance of tile surfaces.
- C. The use of acid or acid cleaners on glazed tile surfaces is prohibited.
- D. Clean tile grouted with epoxy, furan and commercial portland cement grout and tile set in elastomeric bond coat as recommended by the manufacturer of the grout and bond coat.

3.14 PROTECTION:

- A. Keep traffic off tile floor, until grout and setting material is fully set and cured.
- B. Where traffic occurs over tile floor is unavoidable, cover tile floor with not less than 9 mm (3/8 inch) thick plywood, wood particle board, or hardboard securely taped in place. Do not remove protective cover until time for final inspection. Clean tile of any tape, adhesive and stains.

3.15 TESTING FINISH FLOOR:

- A. Test floors in accordance with ASTM C627 to show compliance with codes 1 through 10.
- B. Test kitchen and storage rooms.

- - - E N D - - -

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Acoustical units.
2. Metal ceiling suspension system for acoustical ceilings.
3. Adhesive application.

1.2 RELATED REQUIREMENTS

- A. Color, pattern, and location of each type of acoustical unit: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Linear Metal Ceilings: Section 09 54 23, LINEAR METAL CEILINGS.
- C. Ceiling Suspension System: Section 09 22 16, NON-STRUCTURAL METAL FRAMING.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. ASTM International (ASTM):

1. A641/A641M-09a(2014) - Zinc-coated (Galvanized) Carbon Steel Wire.
2. A653/A653M-15e1 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the Hot-Dip Process.
3. C423-09a - Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
4. C634-13 - Terminology Relating to Environmental Acoustics.
5. C635/C635M-13a - Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
6. C636/C636M-13 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
7. D1779-98(2011) - Adhesive for Acoustical Materials.
8. E84-15b - Surface Burning Characteristics of Building Materials.
9. E119-16 - Fire Tests of Building Construction and Materials.
10. E413-16 - Classification for Rating Sound Insulation.
11. E580/E580M-14 - Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.
12. E1264-14 - Classification for Acoustical Ceiling Products.

C. International Organization for Standardization (ISO):

1. ISO 14644-1 - Classification of Air Cleanliness.

1.4 PREINSTALLATION MEETINGS

- A. Conduct preinstallation meeting [**at project site**] minimum 30 days before beginning Work of this section.
 1. Required Participants:
 - a. Contracting Officer's Representative.
 - b. Architect Engineer and Interior Designer.
 - c. VA Interior Designer.
 - d. Inspection and Testing Agency.
 - e. Contractor.
 - f. Installer.
 - g. Manufacturer's field representative.
 - h. Other installers responsible for adjacent and intersecting work, including sprinkler, HVAC and lighting installers.
 2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.
 - a. Installation schedule.
 - b. Installation sequence.
 - c. Preparatory work.
 - d. Protection before, during, and after installation.
 - e. Installation.
 - f. Terminations.
 - g. Transitions and connections to other work.
 - h. Inspecting and testing.
 - i. Other items affecting successful completion.
 3. Document and distribute meeting minutes to participants to record decisions affecting installation.

1.5 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submittal Drawings:
 1. Show size, configuration, and fabrication and installation details.
- C. Manufacturer's Literature and Data:
 1. Description of each product.
 2. Ceiling suspension system indicating manufacturer recommendation for each application.
 3. Installation instructions.

4. Warranty.

D. Samples:

1. Acoustical units, 150 mm (6 inches) in size, each type,
 - a. Submit quantity required to show full color and texture range.
2. Suspension system, trim and molding, 300 mm (12 inches) long.
3. Colored markers for access service.
4. Approved samples may be incorporated into work.

E. Certificates: Certify each product complies with specifications.

1. Acoustical units, each type.

F. Qualifications: Substantiate qualifications comply with specifications.

1. Manufacturer with project experience list.

G. Operation and Maintenance Data:

1. Care instructions for each exposed finish product.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Regularly manufactures specified products.
2. Manufactured specified products with satisfactory service on five similar installations for minimum five years.
 - a. Project Experience List: Provide contact names and addresses for completed projects.

1.7 DELIVERY

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.8 STORAGE AND HANDLING

- A. Store products indoors in dry, weathertight [**conditioned**] facility.
- B. Protect products from damage during handling and construction operations.

1.9 FIELD CONDITIONS

A. Environment:

1. Product Temperature: Minimum 21 degrees C (70 degrees F) for minimum 48 hours before installation.
2. Work Area Ambient Conditions: HVAC systems are complete, operational, and maintaining facility design operating conditions continuously, beginning 48 hours before installation until Government occupancy.

3. Install products when building is permanently enclosed and when wet construction is completed, dried, and cured.

1.10 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Ceiling System: Acoustical ceilings units on exposed grid suspension systems.

2.2 SYSTEM PERFORMANCE

- A. Design product complying with specified performance:
 1. Maximum Deflection: 1/360 of span, maximum.
- B. Surface Burning Characteristics: When tested according to ASTM E84.
 1. Flame Spread Rating: 25 maximum.
 2. Smoke Developed Rating: 450 maximum.

2.3 PRODUCTS - GENERAL

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Provide acoustical units from one manufacturer.
 1. Provide each product exposed to view from one production run.
- C. Provide suspension system from same manufacturer.

2.4 ACOUSTICAL UNITS

- A. General:
 1. Ceiling Panel and Tile: ASTM E1264, bio-based content according to USDA Bio-Preferred Product requirements.
 - a. Mineral Fiber: 3.6 kg/sq. m (3/4 psf) weight, minimum.
 - b. Integrally colored units.
 2. Classification: Provide type and form as follows:
 - a. Type IV Units - Mineral base with membrane-faced overlay, Form 2 - Water felted, minimum 16 mm (5/8 inch) thick. Apply poly (vinyl) chloride over paint coat.
 - b. NRC (Noise Reduction Coefficient): ASTM C423, minimum 0.80 unless specified otherwise.
 - c. CAC (Ceiling Attenuation Class): ASTM E413, 35-40 range unless specified otherwise.
 - d. LR (Light Reflectance): Minimum 0.87.
 3. Lay-in panels: Sizes as indicated on Drawings, with square edges.
 - a. Sizes:

- 1) As indicated in the Finish Schedule on the Drawings and in Section 09 06 00, SCHEDULE FOR FINISHES.
- 2) Edge and Joint Detail: Beveled edges and joints as required to suit suspension and access system.

B. SPECIAL FACED ACOUSTICAL TILE UNITS AT(SP): Anti-microbial coated surfaces suitable for use in Class 5 Clean Rooms per ISO 14644-1. Special faced acoustical tile units shall meet all general requirements stated in this specification.

1. Type IV Units - Mineral base with membrane-faced overlay, Form 2 - Water felted, minimum 16 mm (5/8 inch) thick. Apply poly (vinyl) chloride over paint coat.
 - a. Form 2, modular, cast or molded.
 - b. NRC: 0.55 minimum.
 - c. Thickness: 19 mm (3/4 inch) minimum.
 - d. Weight, 4.9 kg/sq. m (one pound per square foot).

2.5 METAL SUSPENSION SYSTEM

- A. General: ASTM C635, heavy-duty system, except as otherwise specified.
 1. Suspension System: Provide the following:
 - a. Galvanized cold-rolled steel, bonderized.
 - b. Extruded aluminum.
 2. Main and Cross Runner: Use same construction Do not use lighter-duty sections for cross runners.
- B. Exposed Grid Suspension System: Support of lay-in panels.
 1. Grid Width: 22 mm (7/8 inch) minimum with 8 mm (5/16 inch) minimum panel bearing surface.
 2. Molding: Fabricate from the same material with same exposed width and finish.
 3. Finish: Baked-on enamel flat texture finish.
 - a. Color: To match adjacent acoustical units unless specified otherwise in Section 09 06 00, SCHEDULE FOR FINISHES.
- C. Carrying Channels Secondary Framing: Cold-rolled or hot-rolled steel, black asphaltic paint finish, rust free.
 1. Weight per 300 m (per thousand linear feet), minimum:

Size		Cold-rolled		Hot-rolled	
mm	inches	kg	pound	kg	pound

Size		Cold-rolled		Hot-rolled	
38	1-1/2	215.4	475	508	1120
50	2	267.6	590	571.5	1260

D. Anchors and Inserts: Provide anchors or inserts to support twice the loads imposed by hangers.

1. Hanger Inserts: Steel, zinc-coated (galvanized after fabrication).

a. Nailing type option for wood forms:

1) Upper portion designed for anchorage in concrete and positioning lower portion below surface of concrete approximately 25 mm (one inch).

2) Lower portion provided with minimum 8 mm (5/16 inch) hole to permit attachment of hangers.

b. Flush ceiling insert type:

1) Designed to provide a shell covered opening over a wire loop to permit attachment of hangers and keep concrete out of insert recess.

2) Insert opening inside shell approximately 16 mm (5/8 inch) wide by 9 mm (3/8 inch) high over top of wire.

3) Wire 5 mm (3/16 inch) diameter with length to provide positive hooked anchorage in concrete.

E. Clips: Galvanized steel, designed to secure framing member in place.

F. Tile Splines: ASTM C635.

G. Wire: ASTM A641.

1. Size:

a. Wire Hangers: Minimum diameter 2.68 mm (0.1055 inch).

b. Bracing Wires: Minimum diameter 3.43 mm (0.1350 inch).

2.6 ACCESSORIES

A. Adhesives: Low pollutant-emitting, water-based type recommended by adhered product manufacturer for each application.

B. Perimeter Seal: Vinyl, polyethylene or polyurethane open cell sponge material, density of 1.3 plus or minus 10 percent, compression set less than 10 percent with pressure sensitive adhesive coating on one side.

1. Thickness: As required to fill voids between back of wall molding and finish wall.

2. Size: Minimum 9 mm (3/8 inch) wide strip.

- C. Hold-Down Clips: Manufacturer's standard hold-down.
- D. Access Identification Markers: Colored markers with pressure sensitive adhesive on one side, paper or plastic, 6 to 9 mm (1/4 to 3/8 inch) diameter.
 - 1. Color Code: Provide the following color markers for service identification:

Color	Service
Red	Sprinkler System: Valves and Controls
Green	Domestic Water: Valves and Controls
Yellow	Chilled Water and Heating Water
Orange	Ductwork: Fire Dampers
Blue	Ductwork: Dampers and Controls
Black	Gas: Laboratory, Medical, Air and Vacuum

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.

3.2 INSTALLATION - GENERAL

- A. Install products according to manufacturer's instructions and approved submittal drawings.
 - 1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

3.3 ACOUSTICAL UNIT INSTALLATION

- A. Applications:
 - 1. Cut acoustic units for perimeter borders and penetrations to fit tight against penetration for joint not concealed by molding.
- B. Layout acoustical unit symmetrically, with minimum number of joints.
- C. Installation:
 - 1. Install acoustic tiles after wet finishes have been installed and solvents have cured.
 - 2. Install lay-in acoustic panels in exposed grid with minimum 6 mm (1/4 inch) bearing at edges on supports.
 - a. Install tile to lay level and in full contact with exposed grid.
 - b. Replace cracked, broken, stained, dirty, or tile.

3. Install hold-down clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.
4. Markers:
 - a. Install color coded markers to identify the various concealed piping, mechanical, and plumbing systems.
 - b. Attach colored markers to exposed grid on opposite sides of the units providing access.
 - c. Attach marker on exposed ceiling surface of upward access acoustical unit.
- D. Touch up damaged factory finishes.
 1. Repair painted surfaces with touch up primer.

3.4 CEILING SUSPENSION SYSTEM INSTALLATION

- A. General: Install according to ASTM C636.
 1. Use direct or indirect hung suspension system or combination of both.
 2. Support a maximum area of 1.48 sq. m (16 sq. ft.) of ceiling per hanger.
 3. Prevent deflection in excess of 1/360 of span of cross runner and main runner.
 4. Provide additional hangers located at each corner of support components.
 5. Provide minimum 100 mm (4 inch) clearance from the exposed face of the acoustical units to the underside of ducts, pipe, conduit, secondary suspension channels, concrete beams or joists; and steel beam or bar joist unless furred system is shown.
 6. Provide main runners minimum 1200 mm (48 inches) in length.
 7. Install hanger wires vertically. Angled wires are not acceptable except for seismic restraint bracing wires.
- B. Direct Hung Suspension System: ASTM C635.
 1. Support main runners by hanger wires attached directly to the structure overhead.
 2. Maximum spacing of hangers, 1200 mm (4 feet) on centers unless interference occurs by mechanical systems. Use indirect hung suspension system where not possible to maintain hanger spacing.
- C. Anchorage to Structure:
 1. Concrete:
 - a. Install hanger inserts and wire loops required for support of hanger and bracing wire. Install hanger wires with looped ends through steel deck when steel deck does not have attachment device.

- b. Use eye pins or threaded studs with screw-on eyes in existing or already placed concrete structures to support hanger [**and bracing**] wire. Install in sides of concrete beams or joists at mid height.
2. Steel:
- a. Install carrying channels for attachment of hanger wires.
 - 1) Size and space carrying channels to support load within performance limit.
 - 2) Attach hangers to steel carrying channels, spaced four feet on center, unless area supported or deflection exceeds the amount specified.
 - b. Attach carrying channels to the bottom flange of steel beams spaced not 1200 mm (4 feet) on center before fireproofing is installed. Weld or use steel clips for beam attachment.
 - c. Attach hangers to bottom chord of bar joists or to carrying channels installed between the bar joists when hanger spacing prevents anchorage to joist. Rest carrying channels on top of the bottom chord of the bar joists, and securely wire tie or clip to joist.
- D. Indirect Hung Suspension System: ASTM C635.
1. Space carrying channels for indirect hung suspension system maximum 1200 mm (4 feet) on center. Space hangers for carrying channels maximum 2400 mm (8 feet) on center or for carrying channels less than 1200 mm (4 feet) on center so as to insure that specified requirements are not exceeded.
 2. Support main runners by specially designed clips attached to carrying channels.

3.5 CEILING TREATMENT

A. Moldings:

1. Install metal wall molding at perimeter of room, column, or edge at vertical surfaces.
2. Install special shaped molding at changes in ceiling heights and at other breaks in ceiling construction to support acoustical units and to conceal their edges.

B. Perimeter Seal:

1. Install perimeter seal between vertical leg of wall molding and finish wall, partition, and other vertical surfaces.
2. Install perimeter seal to finish flush with exposed faces of horizontal legs of wall molding.

3.6 CLEANING

- A. Remove excess adhesive before adhesive sets.
- B. Clean exposed surfaces. Remove contaminants and stains.

- - - END - - -

SECTION 09 54 23
LINEAR METAL CEILINGS

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This Section Includes:
 - 1. Suspended metal grid ceiling system including trim.
 - 2. Decorative, linear, formed metal ceiling panels, mechanically mounted on a ceiling suspension system.
 - 3. Accessories:
 - a. Closures, trim, edge molding and all other items required to provide complete installation.
- B. Unit size, texture, finish, and color as specified.
- C. Location and extent of acoustical treatment as shown on construction documents.

1.2 RELATED WORK:

- A. Batt, Blanket and Sound Isolation Insulation: Section 07 21 13, THERMAL INSULATION.
- B. Access Doors: Section 08 31 13, ACCESS DOORS AND FRAMES.
- C. Finish Color: Section 09 06 00, SCHEDULE FOR FINISHES.
- D. Air Outlets and Inlets: Division 23, HEATING, VENTILATING, and AIR CONDITIONING.
- E. Interior Lighting: Section 26 51 00, INTERIOR LIGHTING.

1.3 QUALITY CONTROL:

- A. Qualifications:
 - 1. Manufacturer: Approval required for products of proposed manufacturer, to be based upon submission by certifying that:
 - a. Manufacturer has provided linear metal ceiling systems and related accessories as one of its principal products for a minimum of three (3) years.
 - b. Accessories required for linear metal ceiling systems are to be manufacturer's standard or other systems compatible with linear metal ceiling system manufacturer's material. Items are to be of materials and construction which provide desired functional service.
 - 2. Installer: Approved in writing by manufacturer and having a minimum of three (3) years' experience in the installation of linear metal ceilings on projects of equivalent size.

- B. Coordination of Work: Coordinate layout and installation of linear metal ceiling units and suspension system components with other work supported by, or penetrating through, ceilings, including light fixtures, HVAC equipment, fire-suppression system components (if any), and partition system (if any):
1. Sprinkler heads and light fixtures: Centered width of panel, unless indicated otherwise on construction documents.
 2. HVAC Air Outlets and Inlets: Planned to occur within center of panel systems or provide for equal distance on each side parallel to length of panels.

1.4 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Product Data:
1. Manufacturer's standard details and fabrication methods.
 2. Data on finishing, hardware, components, and accessories.
 3. Recommendations for maintenance and cleaning of finish surfaces.
- C. Shop Drawings:
1. Submit complete composite fabrication, and installation shop drawings including associated components.
 2. Identify panel sections, trim, and other component parts, not included in manufacturer's product data, by name and material and showing design, construction, installation, and anchorage.
 3. Layout and installation details, including relation to adjacent work such as walls and bulkheads.
 4. Composite reflected ceiling plans, at 1:25 (1/4 inch) scale, showing location of all accessories, mechanical and electrical components. _
Indicate the following:
 - a. Joint pattern.
 - b. Ceiling suspension members.
 - c. Method of attaching hangers to building structure.
 - d. Ceiling-mounted items including light fixtures, air outlets and inlets, speakers, sprinkler heads, and access panels. Special moldings at walls, column penetrations, and other junctures with adjoining construction.
 5. Provisions for expansion and contraction.
 6. Anchors and reinforcements.

D. Samples:

1. Submit pairs of samples of each specified color and finish on 305 mm (12 inch) long sections of extrusions or formed shapes for following:
 - a. Linear metal panel.
 - b. Each exposed molding and trim sections.
 - c. Suspension system members.
 - d. Filler strips.
 - e. Insulation.
 - f. End cap.
2. Where normal color variations are anticipated, include 2 units in set indicating extreme limits of color variations.
3. Integrally Colored Anodized or Prefinished Aluminum:
 - a. Sheet not less than 203 by 254 mm (8 by 10 inches).

E. Certificates:

1. Stating that linear metal ceiling system material has been given specified thickness of anodizing or organic coating finish.
2. Indicating manufacturer's and installer's meet qualifications as specified.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Materials: Deliver to site in manufacturer's original unopened containers with brand name and type clearly marked.
- B. Materials: Carefully handle and store in dry, watertight enclosures.
- C. Before installation, linear metal ceiling units are to be stored for not less than 48 hours at same temperature and relative humidity as space where they will be installed to assure temperature and moisture conditions in accordance with manufacturer's recommendations.

1.6 ENVIRONMENTAL REQUIREMENTS:

- A. Uniform temperature of not less than 16 degrees C, (60 degrees F) nor more than 27 degrees C, (80 degrees F) and a relative humidity of not more than 70 percent are to be maintained for a period of 48 hours before, during, and for 48 hours after installation of linear metal ceiling units. After above period, room temperature is not permitted to fall below 13 degrees C (55 degrees F).

1.7 SCHEDULING:

- A. Interior finish work such as plastering, gypsum board finishing, painting, concrete and terrazzo work are to be complete and dry before installation. Mechanical, electrical, and other works above ceiling line are to be completed and heating, ventilating, and air conditioning systems are to be installed and operating in order to maintain temperature and humidity requirements.

1.8 WARRANTY:

- A. Construction Warranty: Comply with FAR clause 52.246-21, "Warranty of Construction".

1.9 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referred to in text by basic designation only.
- B. American Architectural Manufacturers Association (AAMA):
1. 2605-13 High Performance Organic Coatings on Architectural Extrusions and Panels
- C. ASTM International (ASTM):
1. A641/A641M-1 Zinc-coated (Galvanized) Carbon Steel Wire
 2. A653/A653M-20 Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process
 3. B209-14 Aluminum and Aluminum-Alloy Sheet and Plate
 4. B209M-14 Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
 5. C635/C635M-17 Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings
 6. C636/C636M-19 Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
 7. E90-09(2016) Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions
 8. E580/E580M-20 Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint
- D. National Association of Architectural Metal Manufacturers (NAAMM):
- E. Metal Finishes Manual (2006)

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Linear Metal Ceiling System, General:

1. Sheet Metal Characteristics: Form metal panels from sheet metal free from surface blemishes where exposed to view in finished unit. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, stains, discolorations, or other imperfections.
2. Fabrication: Die-form linear metal panels into units standard with manufacturer and finished as specified herein.
3. Sound-Absorptive Fabric Layer: Provide manufacturer's acoustic fabric sized to fit and laminated to concealed surface of panel. Material shall be both non-flammable and sound-absorptive.
 - a. Fire Class shall be Class A, with surface-burning characteristics for flame-spread rating of 25 or less and smoke developed rating of 50 or less. Provide independent accredited lab test results showing compliance with Class A rating as per ASTM E84.
 - b. Achieve absorption value up to .95 NRC. Provide independent accredited laboratory test results illustrating compliance with acoustical requirements as per ASTM C423.
- B. Accessories: Stabilizer bars, clips, splices, hold down clips as required for suspended grid system.
- C. Linear Metal Panels:
 1. General: Formed to snap on and be securely retained on carriers without separate fasteners.
 2. Aluminum Panels: ASTM B209M (B209), roll-formed sheet, alloy 3005-H26, complying with following requirements:
 - a. Minimum Nominal Thickness: 1.0 mm (0.040 inch).
 3. Panel Performance: As follows:
 - a. Noise Reduction Coefficient: NRC 0.95.
 4. Perforation Pattern: SD06.
- D. Suspension Systems, General:
 1. Standard for Metal Suspension Systems: Provide manufacturer's standard types, structural classifications, and finishes indicated that comply with ASTM C635/C635M requirements.
 2. Anchors: Type as recommended by manufacturer. Size for five (5) times design load indicated in ASTM C635/C635M, Table 1, Direct Hung, unless otherwise indicated.
 3. Provide manufacturer's standard compression seismic struts designed to accommodate seismic forces.

- E. Wire for Carriers, Hangers, and Ties: ASTM A641/A641M, Class 1, zinc coating, soft temper.
 - 1. Gage: Minimum 12 gage. Supporting a minimum of 1334 N, (300 pounds) ultimate vertical load without failure of supporting material or attachment.
- F. Hanger Rods: Mild steel, zinc coated, or protected with rust-inhibitive paint.
- G. Flat Hangers: Mild steel, zinc coated, or protected with rust-inhibitive paint.
- H. Angle Hangers: Angles with legs not less than 22 mm (7/8 inch) wide, formed with 0.82 mm (0.0365 inch) galvanized steel sheet complying with ASTM A653/A653M, Coating Designation G90, with bolted connections and 7.6 mm (5/16 inch) diameter bolts.
- I. Edge Moldings and Trim: Manufacturer's standard molding for edges and penetrations of ceiling.
- J. Carriers: Comply with ASTM A653/A653M, cold-rolled, electro-galvanized, 0.55 mm (0.0219 inch) (25 gage) minimum nominal thickness steel.
- K. Miscellaneous Components and Materials:
 - 1. Access Doors: Refer to Section 08 31 13, ACCESS DOORS AND FRAMES for requirements. Access doors, required for use in linear metal ceiling system, are to match adjacent ceiling panel units and be designed and equipped with suitable framing and fastenings for removal and replacement without damage. Provide locking device for this type access door as used in general access doors.
- L. Access Identification: Refer to Section 09 91 00, PAINTING for requirements of identification markers for use, with various mechanical systems above ceiling, under this section.

2.2 FINISHES:

- A. Comply with NAAMM "Metal Finishes Manual".
- B. Protect mechanical finishes on exposed surfaces from damage by application of strippable, temporary protective covering before shipment.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent ceiling units are not acceptable. Noticeable variations in the same piece are not acceptable.
- D. Aluminum Finishes:
 - 1. Color and Gloss: Refer to Section 09 06 00, SCHEDULE FOR FINISHES.
- E. Touch-up Paint For Concealed Items: Zinc rich or Zinc oxide type.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Ceiling Areas: Conform with details, dimensions and tolerances shown on approved linear metal ceiling system composite reflected ceiling plan shop drawings.
- B. Conditions which may adversely affect linear metal ceiling system installation are to be corrected prior to commencement of linear metal ceiling system installation.
- C. Where linear metal ceiling system is installed adjacent to masonry, wash-down of adjacent masonry is to be completed prior to erection of ceiling system to prevent damage to material finish by cleaning materials.

3.2 PREPARATION:

- A. Measure each ceiling area and establish layout of linear metal panel units to balance border widths at opposite edges of each ceiling. Avoid using units less than half wide at borders.

3.3 INSTALLATION:

- A. Standard for Installation of Ceiling Suspension Systems: Comply with ASTM C636/C636M as applicable to linear metal panel ceiling suspension system.
- B. Suspend ceiling hangers from building structural members and as follows:
 - 1. Install hangers plumb, free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers where required to avoid obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 3. Secure hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for structure to which hangers are attached as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or fail because of age, corrosion, and elevated temperatures.

4. Space hangers not more than 1219 mm (48 inches) on center along each member supported directly from hangers, unless otherwise shown on construction documents.
- C. Install edge moldings at edge of each linear metal ceiling area and at locations where edge of units would otherwise be exposed after completion of Work. Level moldings with ceiling suspension system to level tolerance of 3 mm (1/8 inch) in 3657 mm (12 feet).
 1. Masonry and Concrete: Fasten with machine screws into lead-shield-type anchors drilled into construction.
 2. Hollow Masonry or Stud Construction: Fasten with toggle bolts or similar self-expanding screw anchors.
- D. Ceiling Access Doors:
 1. Ceiling access doors are to be located directly under items which require access.
- E. Scribe and cut metal panel units for accurate fit at borders and at interruptions and penetrations by other work through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled metal sheet.
- F. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions, unless otherwise indicated in construction documents.
- G. Install panels with butt joints using internal concealed panel splices and in joint configurations shown on construction documents in reflected ceiling plan.
- H. Install acoustical insulation blankets at right angle to panels so that they do not hang unsupported.

3.4 CLEANING:

- A. Following installation, dirty or discolored surfaces of linear metal ceiling units are to be cleaned, in accordance with manufacturer's written recommendations, and left free from defects. Units that are damaged or improperly installed are to be removed and new units provided as directed.

3.5 PROTECTION:

- A. Protect linear metal ceiling systems from damage until final inspection and acceptance.

- - - END - - -

SECTION 09 65 13
RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Resilient base (RB) adhered to interior walls and partitions.

1.2 RELATED REQUIREMENTS

A. Sheet Flooring Integral Base: Section 09 65 16, RESILIENT SHEET FLOORING.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to the extent specified in this section.

B. ASTM International (ASTM):

1. F1344-15 - Rubber Floor Tile.
2. F1859-14e1 - Rubber Sheet Floor Covering without Backing.
3. F1860-14e1 - Rubber Sheet Floor Covering with Backing.
4. F1861-16 - Resilient Wall Base.
5. D4259-18 - Preparation of Concrete by Abrasion Prior to Coating Application.

C. Federal Specifications (Fed. Spec.):

1. RR-T-650E (1994) - Treads, Metallic and Non-Metallic, Skid-Resistant.

D. International Concrete Repair Institute (ICRI):

1. 310.2R-2013 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:

1. Description of each product.
2. Adhesives and primers indicating manufacturer's recommendation for each application.
3. Installation instructions.

C. Samples:

1. Resilient Base: 150 mm (6 inches) long, each type and color.

D. Operation and Maintenance Data:

1. Care instructions for each exposed finish product.

1.5 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.

- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.6 STORAGE AND HANDLING

- A. Store products indoors in dry, weathertight facility.
- B. Protect products from damage when handling and during construction operations.

1.7 FIELD CONDITIONS

- A. Environment:
- B. Product Temperature: Minimum 21 degrees C (70 degrees F) for minimum 48 hours before installation.
 - 1. Work Area Ambient Temperature Range: 21 to 27 degrees C (70 to 80 degrees F) continuously, beginning 48 hours before installation.
 - 2. Install products when building is permanently enclosed and when wet construction is completed, dried, and cured.

1.8 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 PRODUCTS

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Provide each product from one manufacturer and from one production run.

2.2 RESILIENT BASE

- A. Resilient Base: 3 mm (1/8 inch) thick, 100 mm (4 inches) high.
- B. Type: Rubber or vinyl; use one type throughout.
 - 1. ASTM F1861, Type TP thermoplastic rubber or Type TV thermoplastic vinyl, Group 2 - layered.
- C. Applications:
 - 1. Carpet Flooring Locations: Style A - Straight.
 - 2. Other Locations: Style B - Cove.

2.3 RESILIENT MILLWORK CONTOURABLE WALL BASE

- A. Product Standard: Meets performance requirements for ASTM F 1861 Standard Specification for Resilient Wall Base, Type TP, Group 1.
- B. Dimensions, Colors and Patterns: As indicated in Section 09 06 00, SCHEDULE FOR FINISHES

2.4 ADHESIVES

- A. Adhesives: Low pollutant-emitting, water-based type recommended by adhered product manufacturer for each application.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.
- C. Correct substrate deficiencies.
- D. Fill cracks, pits, and depressions with leveling compound.
- E. Remove protrusions; grind high spots.
 - 1. Apply leveling compound to achieve 3 mm (1/8 inch) in 3 m (10 feet) maximum surface variation.
- F. Clean substrates. Remove contaminants capable of affecting subsequently installed product's performance.
- G. Allow substrate to dry and cure.
- H. Perform flooring manufacturer's recommended bond, substrate moisture content, and pH tests.

3.2 INSTALLATION GENERAL

- A. Install products according to manufacturer's instructions.
 - 1. When instructions deviate from specifications, submit proposed resolution for Contracting Officer consideration.

3.3 RESILIENT BASE INSTALLATION

- A. Applications:
 - 1. Install resilient base in rooms scheduled on Drawings.
 - 2. Install resilient base on casework and locker toe spaces, and other curb supported fixed equipment.
 - 3. Extend resilient base into closets, alcoves, and cabinet knee spaces, and around columns within scheduled room.
- B. Lay out resilient base with minimum number of joints.
 - 1. Length: 600 mm (24 inches) minimum, each piece.
 - 2. Locate joints 150 mm (6 inches) minimum from corners and intersection of adjacent materials.
- C. Installation:
 - 1. Apply adhesive uniformly for full contact between resilient base and substrate.
 - 2. Set resilient base with hairline butted joints aligned along top edge.

- D. Factory form corners and end stops: Install preformed corners before installing straight pieces.
- E. Roll resilient base ensuring complete adhesion.

3.4 CLEANING

- A. Remove excess adhesive before adhesive sets.
- B. Clean exposed resilient base surfaces. Remove contaminants and stains.
 - 1. Clean with mild detergent. Leave surfaces free of detergent residue.

3.5 PROTECTION

- A. Protect products from construction traffic and operations.
- B. Maintain protection until directed by Contracting Officer's Representative.
- C. Replace damaged products and re-clean.
 - 1. Damaged Products include cut, gouged, scraped, torn, and unbonded products.

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SECTION 09 65 16
RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Welded seam sheet flooring (WSF) with heat welded seams and integral cove base.

1.2 RELATED REQUIREMENTS

- A. Color, Pattern and Texture: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Resilient Base over Base of Lockers, Equipment and Casework: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to the extent specified in this section.
- B. ASTM International (ASTM):
1. D4259-88(2012) - Abrading Concrete.
 2. E648-15e1 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 3. E662-15a - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 4. F1303-04(2014) - Sheet Vinyl Floor Covering with Backing.
 5. F1860-14 - Rubber Sheet Floor Covering with Backing.
 6. F1913-04(2014) - Vinyl Sheet Floor Covering Without Backing.
- C. International Concrete Repair Institute (ICRI):
1. 310.2R-13 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays, and Concrete Repair.
- D. SCS Global Services (SCS):
1. FloorScore.

1.4 SUBMITTALS

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
1. Show size, configuration, and fabrication and installation details.
- B. Manufacturer's Literature and Data:
1. Description of each product.
 2. Installation instructions.
 3. Warranty.
- C. Samples:

1. Sheet material, 38 mm by 300 mm (1-1/2 inch by 12 inch), of each color and pattern with welded seam using specified welding rod 300 mm (12 inches) square for each type, pattern and color.
 2. Cap strip and fillet strip, 300 mm (12 inches) for integral base.
 3. Shop Drawings and Certificates: Layout of joints showing patterns where joints are expressed, and type and location of obscure type joints. Indicate orientation of directional patterns.
 4. Certificates: Quality Control Certificate Submittals and lists specified in paragraph, QUALIFICATIONS.
 5. Edge strips: 150 mm (6 inches) long each type.
 6. Primer: Pint container, each type.
- D. Certificates: Certify products comply with specifications.
1. Heat welded seaming is manufacturer's prescribed method of installation.
- E. Qualifications: Substantiate qualifications comply with specifications.
1. Installer with project experience list.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A company specializing in installation with minimum three (3) years' experience and employs experienced flooring installers who have retained, and currently hold, an INSTALL Certification, or a certification from a comparable certification program.
1. Installers to be certified by INSTALL or a comparable certification program with the following minimum criteria:
 - a. US Department of Labor approved four (4) year apprenticeship program, 160 hours a year.
 - b. Career long training.
 - c. Manufacturer endorsed training.
 - d. Fundamental journeyman skills certification.
- B. Furnish product type materials from the same production run.

1.6 DELIVERY

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.7 STORAGE AND HANDLING

- A. Store products indoors in dry, weathertight conditioned facility.

B. Protect products from damage during handling and construction operations.

1.8 FIELD CONDITIONS

A. Environment:

1. Work Area Ambient Temperature Range: Minimum 18 to 38 degrees C (65 to 100 degrees F) continuously, beginning 48 hours before installation. Maintain room temperature above 18 degrees C (65 degrees F) after installation.
2. Install products when building is permanently enclosed and when wet construction is completed, dried, and cured.

1.9 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."
- B. Manufacturer's Warranty: Warrant resilient sheet flooring against material and manufacturing defects.
 1. Warranty Period: Ten (10) years.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

- A. Sheet Flooring:
 1. Critical Radiant Flux: ASTM E648; 0.45 watts per sq.cm or more, Class I.
 2. Smoke Density: ASTM E662; less than 450.

2.2 PRODUCTS - GENERAL

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Provide vinyl sheet color and pattern from one production run.

2.3 RESILIENT SHEET FLOORING

- A. Resilient Sheet Flooring (RSF): ASTM F1913; Vinyl, without backing.
 1. Wear Surface: Smooth.
 2. Thickness: 2 mm (0.080 inches).
- B. Sheet Size: Provide maximum size sheet produced by manufacturer to minimize joints.
 1. Minimum Width: 2000 mm (79 inches).

2.4 ACCESSORIES

- A. Welding Rod: Flooring manufacturer's standard, in color matching field color of sheet flooring.
- B. Adhesives: Water resistant type recommended by flooring manufacturer to suit application.
- C. Base Accessories:

1. Fillet Strip: 19 mm (3/4 inch) radius fillet strip compatible with flooring material.
 2. Cap Strip: J-Shape extruded vinyl flanged reducer strip compatible with flooring material approximately 25 mm (1 inch) exposed height with 13 mm (1/2 inch) flange.
- D. Leveling Compound:
1. Provide cementitious type with latex or polyvinyl acetate resins additive.
- E. Primer:
1. Type recommended by adhesive or flooring manufacturer.
- F. Edge Strips:
1. Extruded aluminum, mill finish, mechanically cleaned.
 2. 28 mm (1-1/8 inch) wide, 6 mm (1/4 inch) thick, bevel one edge to 3 mm (1/8 inch) thick.
 3. Drill and counter sink edge strips for flat head screws. Space holes near ends and approximately 225 mm (9 inches) on center.
 4. Fasteners: Stainless steel, type to suit application.
- G. Sealant:
1. As specified in Section 07 92 00, JOINT SEALANTS.
 2. Compatible with flooring.
- H. Polish: Type recommended by flooring manufacturer to suit application and anticipated traffic.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.
- C. Ensure interior finish work such as plastering, drywall finishing, concrete, terrazzo, ceiling work, and painting work is complete and dry before installation.
 1. Complete mechanical, electrical, and other work above ceiling line.
 2. Ensure heating, ventilating, and air conditioning systems are installed and operating in order to maintain temperature and humidity requirements.
- D. Correct substrate deficiencies.
 1. Fill cracks, pits, and dents with leveling compound.
 2. Grind, sand, or cut away protrusions. Grind high spots.

3. Level flooring substrate to 3 mm (1/8 inch) maximum variation.
- E. Clean substrates. Remove contaminants capable of affecting subsequently installed product's performance.
 1. Mechanically clean concrete floor substrate according to ASTM D4259.
 2. Surface Profile: ICRI 310.2R CSP 3 to CSP 4.
- F. Perform flooring manufacturer's recommended bond, substrate moisture content, and pH tests.
- G. Broom or vacuum clean substrates immediately before flooring installation.
- H. Primer: Apply primer according to manufacturer's instructions.

3.2 INSTALLATION - GENERAL

- A. Install products according to manufacturer's instructions.
 1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

3.3 INSTALLATION OF FLOORING

- A. Flooring Layout:
 1. Arrange pattern in one direction with side and end joints pattern matched.
 2. Extend flooring wall-to-wall, under cabinets, casework, laboratory and pharmacy furniture, and other equipment for seamless flooring installation.
 3. Arrange sheets to minimize seams.
 4. Locate seams in inconspicuous and low traffic areas, minimum 150 mm (6 inches) away from parallel joints in flooring substrates.
- B. Match edges of flooring for color shading and pattern at seams.
- C. Install flooring flush with adjacent floor finishes.
- D. Extend flooring into toe spaces, door reveals, closets, and similar openings.
- E. Install flooring fully adhered to substrate.
 1. Air pockets or loose edges are not acceptable.
 2. Trim sheet materials tight to flooring penetrations; seal joints at pipe with waterproof sealant specified in Section 07 92 00, JOINT SEALANTS.
- F. Butt joints tight, without gaps and bulges.
- G. Installation of Edge Strips:
 1. Install edge strips at flooring terminations and transitions to other floor finishes.

2. Locate edge strips under center lines of doors unless otherwise indicated.
3. Set edge strips in adhesive and mechanically fasten to substrate.

3.4 INTEGRAL COVE BASE INSTALLATION

- A. Set preformed fillet strip at floor intersection with walls and other vertical surfaces.
- B. Extend flooring over fillet strip and 150 mm (6 inches) up wall surface.
- C. Form straight or radius internal and external corners to suit Application.
- D. Adhere base to wall surface.
- E. Terminate base exposed top edge with cap strip. Seal cap strip to wall with sealant.
- F. Weld joints as specified for flooring.

3.5 HEAT WELDING

- A. Heat weld joints of flooring and base using welding rod.
- B. Rout joint, insert welding rod into routed space, and fuse flooring and welding rods for seamless, watertight installation.
 1. Fuse joints for seamless weld.
- C. Finish joints flush, free from voids, and recessed or raised areas.

3.6 CLEANING

- A. Remove excess adhesive before adhesive sets.
- B. Clean and polish materials.
- C. Vacuum floor thoroughly.
- D. Perform initial maintenance according to flooring manufacturer's instructions.
 1. Delay washing flooring until adhesive is fully set and welded joints can contain wash water.

3.7 PROTECTION

- A. Protect flooring from traffic and construction operations.
- B. Keep traffic off sheet flooring for minimum 24 hours after installation.
- C. Cover flooring with reinforced kraft paper, and plywood or hardboard.
- D. Remove protective materials immediately before acceptance.
- E. Repair damage.
- F. Apply polish to vinyl flooring only as recommended by flooring manufacturer.
- G. Buff flooring to uniform sheen.

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SECTION 096519
RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies the installation of solid vinyl tile flooring, luxury vinyl tile, rubber tile, linoleum tile and accessories required for a complete installation.

1.2 RELATED WORK:

- A. Resilient Base: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.
B. Subfloor Testing and Preparation: Section 09 05 16, SUBSURFACE PREPARATION FOR FLOOR FINISHES.
C. Color, Pattern and Texture for Resilient Tile Flooring and Accessories: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Manufacturer's Literature and Data:
1. Description of each product.
2. Resilient material manufacturer's recommendations for adhesives, underlayment, primers, and polish.
3. Application, installation and maintenance instructions.
C. Samples:
1. Tile: Each type, color, thickness and finish.
2. Edge Strips: Each type, color, thickness and finish.
3. Feature Strips: Each type, color, thickness and finish.
D. Shop Drawings:
1. Layout of patterns as shown on the construction documents.
2. Edge strip locations showing types and detail cross sections.
E. Test Reports:
1. Abrasion resistance: Depth of wear for each tile type and color and volume loss of tile, certified by independent laboratory. Tested per ASTM F510/F510M.
2. Moisture and pH test results as per Section 090516, SUBSURFACE PREPARATION FOR FLOOR FINISHES.

1.4 DELIVERY:

- A. Deliver materials to the site in original sealed packages or containers, clearly marked with the manufacturer's name or brand, type and color, production run number and date of manufacture.
- B. Materials from containers which have been distorted, damaged or opened prior to installation are not acceptable.

1.5 STORAGE:

- A. Store materials in a clean, dry, enclosed space off the ground, protected from harmful weather conditions and at temperature and humidity conditions recommended by the manufacturer. Protect adhesives from freezing. Store flooring, adhesives, and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.

1.6 QUALITY ASSURANCE:

- A. Installer Qualifications: A company specializing in installation with minimum three (3) years' experience and employs experienced flooring installers who have retained, and currently hold, an INSTALL Certification, or a certification from a comparable certification program.
 - 1. Installers to be certified by INSTALL or a comparable certification program with the following minimum criteria:
 - a. US Department of Labor approved four (4) year apprenticeship program, 160 hours a year.
 - b. Career long training.
 - c. Manufacturer endorsed training.
 - d. Fundamental journeyman skills certification.
- B. Furnish product type materials from the same production run.

1.7 WARRANTY:

- A. Construction Warranty: Comply with FAR clause 52.246-21, 'Warranty of Construction'.

1.8 APPLICABLE PUBLICATIONS:

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. ASTM International (ASTM):
 - 1. D2047-11 Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine
 - 2. D2240-05(R2010) Test Method for Rubber Property-Durometer Hardness

3. D4078-02(R2008) Water Emulsion Floor Finish
 4. E648-14c Critical Radiant Flux of Floor Covering Systems Using a Radiant Energy Source
 5. E662-14 Specific Optical Density of Smoke Generated by Solid Materials
 6. E1155/E1155M-14 Determining Floor Flatness and Floor Levelness Numbers
 7. F510/F510M-14 Resistance to Abrasion of Resilient Floor Coverings Using an Abrader with a Grit Feed Method
 8. F710-11 Preparing Concrete Floors to Receive Resilient Flooring
 9. F925-13 Test Method for Resistance to Chemicals of Resilient Flooring
 10. F1344-12(R2013) Rubber Floor Tile
 11. F1700-13a Solid Vinyl Floor Tile
 12. F1869-11 Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 13. F2170-11 Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in Situ Probes
 14. F2195-13 Linoleum Floor Tile
- C. Code of Federal Regulation (CFR):
1. 40 CFR 59 Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coating
- D. International Standards and Training Alliance (INSTALL):

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS:

- A. Provide adhesives, underlayment, primers, and polish recommended by resilient floor material manufacturer.
- B. Critical Radiant Flux: 0.45 watts per sq. cm or more, Class I, per ASTM E648.
- C. Smoke Density: Less than 450 per ASTM E662.
- D. Slip Resistance - Not less than 0.5 when tested with ASTM D2047.

2.2 SOLID VINYL-TILE:

- A. Tile Standard: ASTM F1700.
 1. Class: Class I, monolithic vinyl tile Class II, surface-decorated vinyl tile.
 2. Type: A, smooth surface.
- B. Thickness: 3.2 mm (0.125 inch).
- C. Size: 406 x 406 mm (16 x 16 inches).

2.3 LUXURY VINYL TILE:

- A. ASTM F1700, Class III, Printed Film Vinyl Tile, Type A B.

- B. Thickness: 5 mm (0.197 inch).
- C. Size: 15 x 122 cm (6 x 48 inches)
- D. Chemical Resistance: ASTM F925; pass.

2.4 ADHESIVES:

- A. Provide water resistant type adhesive for flooring, base and accessories as recommended by the manufacturer to suit substrate conditions. VOC content to be less than 50 grams/L when calculated according to 40 CFR 59 (EPA Method 24). Submit manufacturer's descriptive data, documentation stating physical characteristics, and mildew and germicidal characteristics.

2.5 PRIMER FOR CONCRETE SUBFLOORS:

- A. Provide in accordance with Section 090516, SUBSURFACE PREPARATION FOR FLOOR FINISHES.

2.6 LEVELING COMPOUND FOR CONCRETE FLOORS:

- A. Provide cementitious products with latex or polyvinyl acetate resins in the mix in accordance with Section 090516, SUBSURFACE PREPARATION FOR FLOOR FINISHES.

2.7 POLISH AND CLEANERS:

- A. Cleaners: As recommended in writing by floor tile manufacturer.
- B. Polish: ASTM D4078.

2.8 MOULDING:

- A. Provide tapered mouldings of vinyl rubber-colored anodized aluminum clear anodized aluminum and types as indicated on the construction documents for both edges and transitions of flooring materials specified. Provide vertical lip on moulding of maximum 6 mm (1/4 inch). Provide bevel change in level between 6 and 13 mm (1/4 and 1/2 inch) with a slope no greater than 1:2.
- B. Fasteners for Aluminum Mouldings: Stainless steel of type required for substrate condition.

PART 3 - EXECUTION

3.1 ENVIRONMENTAL REQUIREMENTS:

- A. Maintain flooring materials and areas to receive resilient flooring at a temperature above 20 degrees C (68 degrees F) for three (3) days before application, during application and two (2) days after application, unless otherwise directly by the flooring manufacturer for the flooring being installed. Maintain a minimum temperature of 13 degrees C (55 degrees F) thereafter. Provide adequate ventilation to remove moisture from area and to comply with regulations limiting concentrations of hazardous vapors.

- B. Do not install flooring until building is permanently enclosed and wet construction in or near areas to receive tile materials is complete, dry and cured.

3.2 SUBFLOOR TESTING AND PREPARATION:

- A. Prepare and test surfaces to receive resilient tile and adhesive as per Section 090516, SUBSURFACE PREPARATION FOR FLOOR FINISHES.
 - 1. Remove existing resilient floor and existing adhesive.
- B. Prepare concrete substrates in accordance with ASTM F710.
- C. Perform work regarding removal of flooring and adhesive containing asbestos as specified in Section 028213.19, ASBESTOS FLOOR TILE AND MASTIC ABATEMENT.

3.3 INSTALLATION:

- A. Install in accordance with manufacturer's instructions for application and installation unless specified otherwise.
- B. Mix tile from at least two containers. An apparent line either of shades or pattern variance is not acceptable.
- C. Tile Layout:
 - 1. If layout is not shown on construction documents, lay tile symmetrically about center of room or space with joints aligned.
 - 2. Vary edge width as necessary to maintain full size tiles in the field, no edge tile to be less than 1/2 the field tile size, except where irregular shaped rooms make it impossible.
 - 3. Place tile pattern in the same direction; do not alternate tiles unless specifically indicated in the construction documents to the contrary. Match tile installation to approved mockup.
- D. Application:
 - 1. Adhere floor tile to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
 - 2. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
 - 3. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
 - 4. Roll tile floor with a minimum 45 kg (100 pound) roller.

- E. Seal joints at pipes with sealants in accordance with Section 079200, JOINT SEALANTS.
- F. Installation of Edge Strips:
 - 1. Locate edge strips under center line of doors unless otherwise shown on construction documents.
 - 2. Set resilient edge strips in adhesive. Anchor metal edge strips with anchors and screws.
 - 3. Where tile edge is exposed, butt edge strip to touch along tile edge.
 - 4. Where thin set ceramic tile abuts resilient tile, set edge strip against floor file and against the ceramic tile edge.

3.4 CLEANING AND PROTECTION:

- A. Clean adhesive marks on exposed surfaces during the application of resilient materials before the adhesive sets. Exposed adhesive is not acceptable.
- B. Keep traffic off resilient material for a minimum of 72 hours after installation.
- C. Clean flooring as recommended in accordance with manufacturer's printed maintenance instructions and within the recommended time frame. As required by the manufacturer, apply the recommended number of coats and type of polish and/or finish in accordance with manufacturer's written instructions.
- D. When construction traffic occurs over tile, cover resilient materials with reinforced kraft paper properly secured and maintained until removal is directed by COR. At entrances and where wheeled vehicles or carts are used, cover tile with plywood, hardboard, or particle board over paper, secured and maintained until removal is directed by COR.
- E. When protective materials are removed and immediately prior to acceptance, replace damaged tile and moldings, re-clean resilient materials.

3.5 LOCATION:

- A. Unless otherwise indicated in construction documents, install tile flooring, under areas where casework, laboratory and pharmacy furniture and other equipment occur.
- B. Extend tile flooring for room into adjacent closets and alcoves.

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SECTION 09 68 00

CARPETING

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. Section specifies carpet, edge strips, adhesives, and other items required for complete installation.

1.2 RELATED WORK:

- A. Section 09 05 16, SUBSURFACE PREPARATION FOR FLOOR FINISHES: Testing of Concrete Floors Before Installation.
- B. Section 09 06 00, SCHEDULE FOR FINISHES: Manufacturer, Color and Style of Carpet and Edge Strip.
- C. Section 09 65 13, RESILIENT BASE AND ACCESSORIES: Resilient Wall Base.

1.3 QUALITY ASSURANCE:

- A. Installer Qualifications: A company specializing in carpet installation with a minimum three (3) years' experience and employing experienced flooring installers who have retained, and currently hold, an INSTALL Certification, or a certification from a comparable certification program, and a valid OSHA 10 certification.
 - 1. Installers to be certified by INSTALL or a comparable certification program with the following minimum criteria:
 - a. US Department of Labor approved four (4) year apprenticeship program, 160 hours a year.
 - b. Career long training.
 - c. Manufacturer endorsed training.
 - d. Fundamental journeyman skills certification.

1.4 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data:
 - 1. Manufacturer's catalog data and printed documentation stating physical characteristics, durability, resistance to fading and flame resistance characteristics for each type of carpet material and installation accessory.
 - 2. Manufacturer's printed installation instructions for the carpet, including preparation of installation substrate, seaming techniques and recommended adhesives and tapes.

C. Samples:

1. Carpet: "Production Quality" samples 305 x 305 mm (12 x 12 inches) of carpets, showing quality, pattern and color specified in Section 09 06 00, SCHEDULE FOR FINISHES.
2. Floor Edge Strip (Molding): 152 mm (6 inches) long of each color and type specified.
3. Base Edge Strip (Molding): 152 mm (6 inches) long of each color specified.

D. Shop Drawings: Installers layout plan showing seams and cuts for sheet carpet and carpet module.

E. Maintenance Data: Carpet manufacturer's maintenance instructions describing recommended type of cleaning equipment and material, spotting and cleaning methods and cleaning cycles.

F. Installer's Qualifications.

G. Manufacturer's warranty.

1.5 DELIVERY AND STORAGE:

A. Deliver carpet in manufacturer's original wrappings and packages clearly labeled with manufacturer's brand name, size, dye lot number and related information. Transport carpet to job site in a manner that prevents damage and distortion that might render it unusable. When bending or folding is unavoidable for delivery purposes, unfold carpet and lay flat immediately.

B. Deliver adhesives in containers clearly labeled with manufacturer's brand name, number, installation instructions, safety instructions and flash points.

C. Store in a clean, dry, well-ventilated area, protected from damage and soiling. Before installation, acclimate carpet to the atmospheric conditions of the areas in which it will be installed for 2 days prior to installation

1.6 ENVIRONMENTAL REQUIREMENTS:

A. Maintain areas in which carpeting is to be installed at a temperature between 18 - 35 degrees C (65 - 95 degrees F) with a maximum relative humidity of 65 percent for two (2) days before installation, during installation and for three (3) days after installation.

B. Minimum Substrate Surface Temperature: 18 degrees C (65 degrees F) at time of installation.

C. Three (3) days after installation, maintain minimum temperature of 10 degrees C (50 degrees F) for the duration of the contract.

1.7 WARRANTY:

- A. Construction Warranty: Comply with FAR clause 52.246-21, "Warranty of Construction".
- B. Manufacturer Warranty: Manufacturer shall warranty their carpet for a minimum of ten (10) years from date of installation and final acceptance by the Government. Submit manufacturer warranty.

1.8 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.
- B. American National Standards Institute (ANSI):
 - 1. ANSI/NSF 140-10 Sustainable Carpet Assessment Standard
- C. American Association of Textile Chemists and Colorists (AATCC):
 - 1. 16-04 Colorfastness to Light
 - 2. 134-11 Electric Static Propensity of Carpets
 - 3. 165-08 Colorfastness to Crocking: Textile Floor Coverings-AATCC Crockmeter Method
 - 4. 174-11 Antimicrobial Activity Assessment of New Carpets
- D. ASTM International (ASTM):
 - 1. D1335-17e1 Tuft Bind of Pile Yarn Floor Coverings
 - 2. D3278-20 Flash Point of Liquids by Small Scale Closed-Cup Apparatus
 - 3. D5116-17 Determinations of Organic Emissions from Indoor Materials/Products
 - 4. D5252-20 Operation of the Hexapod Tumble Drum Tester
 - 5. D5417-16 Operation of the Vettermann Drum Tester
 - 6. E648-19ael Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
- E. Code of Federal Regulation (CFR):
 - 1. 40 CFR 59 Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coating
- F. The Carpet and Rug Institute (CRI):
 - 1. CIS Carpet Installation Standard
- G. International Standards and Training Alliance (INSTALL)
- H. International Organization for Standardization (ISO):
 - 1. 2551-81 Machine-Made Textile Floor Coverings
- I. U.S. Consumer Product and Safety Commission (CPSC):
 - 1. 16 CFR 1630 Surface Flammability of Carpets and Rugs

PART 2 - PRODUCTS

2.1 CARPET:

A. Physical Characteristics:

1. Carpet free of visual blemishes, streaks, poorly dyed areas, fuzzing of pile yarn, spots or stains and other physical and manufacturing defects.
2. Type:
 - a. Carpet Construction: Tufted.
 - b. Carpet Type: 24 by 24-inch square with 0.15 percent growth/shrink rate in accordance with ISO 2551.
 - c. Pile Type: Multilevel loop. Pile type and thickness must conform to ADA requirements.
 - d. Pile Fiber: Commercial 100 percent branded (federally registered trademark), nylon continuous filament.
3. Static Control: Provide static control to permanently regulate static buildup to less than 3.5 kV when tested at 20 percent relative humidity and 21 degrees C (70 degrees F) in accordance with AATCC 134.
4. Backing Materials: Provide backing for release adhesive for modular tile installations. For healthcare installations, provide impervious moisture backing that is 100 percent PVC free.
 - a. Modular Tile:
 - 1) Primary Backing/Backcoating: Manufacturer's standard composite materials.
 - 2) Secondary Backing: Manufacturer's standard material.
5. Appearance Retention Rating (ARR): Carpet to be tested and have the minimum 3.5 - 4.0 severe ARR when tested in accordance with either the ASTM D5252 (Hexapod) or ASTM D5417 (Vettermann) test methods using the number of cycles for short- and long-term tests as specified in the ASTM standard.
6. Tuft Bind: Comply with ASTM D1335 for tuft bind force required to pull a tuft or loop free from carpet backing with a minimum 36 N (8 pound) average force for modular carpet tile.
7. Colorfastness to Crocking: Dry and wet crocking and water bleed, comply with AATCC 165 Color Transference Chart for colors, minimum class 4 rating.

8. Colorfastness to Light (AATCC 16, Option 3): Color change between the exposed and unexposed carpet areas equivalent to a minimum of Grade 4 on the Gray Scale for Color Change after an exposure of 40 AFU (AATCC fading units) for all specified colors.
9. Delamination Strength: Minimum of 440 N/m (2.5 lb./inch) between secondary backing.
10. Flammability and Critical Radiant Flux Requirements:
 - a. Comply with 16 CFR 1630.
 - b. Test Carpet in accordance with ASTM E648.
 - c. Class I: Minimum critical radiant flux of 0.45 watts per square centimeter (2.9 watts per square inch).
 - d. Class II: Minimum critical radiant flux of 0.22 watts per square centimeter (1.4 watts per square inch).
 - e. Carpet in corridors, exits and Medical Facilities to be Class I.
11. Average Pile Yarn Density (APYD):
 - a. Corridors, lobbies, entrances, common areas or multipurpose rooms, open offices, waiting areas and dining areas: Minimum APYD 6000.
 - b. Other areas: Minimum APYD 4000.

2.2 ENTRYWAY CARPET TILE (by VA)

- A. Physical Characteristics:
 1. Carpet free of visual blemishes, streaks, poorly dyed areas, fuzzing of pile yarn, spots or stains and other physical and manufacturing defects.
 2. Type:
 - a. Carpet Construction: Neddlebond Hobnail.
 - b. Dimensions: 24 x 24 inch.
 - c. Fiber: Pet Polyester.
 - d. Dye Method: 100% Solution Dyed.
 - e. Primary Backing: Polypropylene.
 - f. Secondary Backing: Manufacture's standard.
 - g. Tufted Weight: 49 oz/sqyd
 - h. Thickness: 0.362 inches.

2.3 ADHESIVE AND CONCRETE PRIMER:

- A. Provide water resistant, mildew resistant, nonflammable, and nonstaining adhesives and concrete primers for carpet installation. Provide release adhesive for modular tile carpet as recommended by the carpet manufacturer. Provide adhesives flashpoint of minimum 60 degrees C (140 degrees F) in accordance with ASTM D3278. Materials are to have a VOC maximum of 50 g/L when calculated according to 40 CFR 59, (EPA Method 24).

2.4 SEAMING TAPE:

- A. Provide tape for seams as recommended by the carpet manufacturer for the type of seam used in installation. Seam sealant is to have a maximum VOC content of 50 g/L when calculated according to 40 CFR 59, (EPA Method 24). Do not use sealants that contain 1, 1, 1-trichloroethane or toluene.

2.5 EDGE STRIPS (MOLDING):

- A. Metal:
1. Hammered surface aluminum, pinless, clamp down type designed for the carpet being installed.
 2. Floor flange not less than 38 mm (1-1/2 inches) wide, face not less than 16 mm (5/8 inch) wide.
 3. Finish: Clear anodic coating unless specified otherwise in Section 090600, SCHEDULE FOR FINISHES.
- B. Vinyl Edge Strip:
1. Beveled floor flange minimum 50 mm (2 inches) wide.
 2. Beveled surface to finish flush with carpet for tight joint and other side to floor finish.
 3. Color as specified in Section 09 06 00, SCHEDULE FOR FINISHES.
- C. Carpet Base Top Edge Strip:
1. Vinyl "J" strip wall flange minimum of 38 mm (1-1/2 inches) wide with cap beveled from wall to finish flush with carpet being installed.
 2. Color as specified in Section 09 06 00, SCHEDULE FOR FINISHES.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION:

- A. Contractor to prepare and test surfaces to receive carpet and adhesives as per Section 09 05 16, SUBSURFACE PREPARATION FOR FLOOR FINISHES.

3.2 GENERAL INSTALLATION:

- A. Isolate area of installation from rest of building.

- B. Perform all work by manufacturer's approved installers. Conduct installation in accordance with the manufacturer's printed instructions and CRI CIS.
- C. Protect edges of carpet meeting hard surface flooring with molding and install in accordance with the molding manufacturer's printed instructions.
- D. Follow ventilation, personal protection, and other safety precautions recommended by the adhesive manufacturer. Continue ventilation during installation and for at least three (3) days following installation.
- E. Do not permit traffic or movement of furniture or equipment in carpeted areas for 24 hours after installation.
- F. Complete other work which would damage the carpet prior to installation of carpet.
- G. Follow carpet manufacturer's recommendations for matching pattern and texture directions.
- H. Cut openings in carpet where required for installing equipment, pipes, outlets, and penetrations. Bind or seal cut edge of sheet carpet. Use additional adhesive to secure carpets around pipes and other vertical projections.

3.3 MODULAR TILE INSTALLATION:

- A. Install per CRI CIS, Adhesive Application.
- B. Lay carpet modules with pile in same direction unless specified otherwise in Section 09 06 00, SCHEDULE FOR FINISHES.
- C. Install carpet modules so that cleaning methods and solutions do not cause dislocation of modules.
- D. Lay carpet modules uniformly to provide tight flush joints free from movement when subject to traffic.

3.4 EDGE STRIPS installation

- A. Install edge strips over exposed carpet edges adjacent to uncarpeted finish flooring.
- B. Anchor metal strips to floor with suitable fasteners. Apply adhesive to edge strips, insert carpet into lip and press it down over carpet.
- C. Anchor vinyl edge strip to floor with adhesive. Apply adhesive to edge strip and insert carpet into lip and press lip down over carpet.
- D. Carpet Base Top Edge Strip Installation:
 - 1. Place carpet molding at top edge of carpet where turned up as base.
 - 2. Install molding in accordance with manufacturer's instructions.

3.5 PROTECTION AND CLEANING:

- A. Once a carpet installation is complete, clean up scrap materials and debris, and vacuum the area, using manufacturer-approved equipment. Inspect seams carefully for evenness and protruding backing yarns, and inspect the perimeter of the installation for an acceptable finished appearance.
- B. Protect installed carpet if furniture is being moved, by laying plywood, fiberboard or porous non-staining sheeting material for minimum time practical. Based on manufacturer guidelines, protect carpet from rolling or foot traffic. Protect against other materials or renovation or construction activities, including dust, debris, paint, contractor traffic, until it is ready for its final use.
- C. Do not move furniture or equipment on unprotected carpeted surfaces.
- D. Just before final acceptance of work, remove protection and vacuum carpet clean.

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SECTION 097216

VINYL-COATED FABRIC WALL COVERINGS

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. Section specifies vinyl coated fabric wall covering and installation.

1.2 RELATED WORK:

- A. Section 09 06 00, SCHEDULE FOR FINISHES: Color, pattern, type, direction of hanging and areas to receive wall covering.

1.3 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
1. Each type and pattern as specified in Section 090600, SCHEDULE FOR FINISHES.
 2. Size: Full width of mill run not less than 450 mm (18 inches) in length.
- C. Manufacturer's Certificates:
1. Compliance with WA W-101.
 2. Wall covering manufacturer's approval of adhesive.
- D. Manufacturer's Literature and Data:
1. Wall covering primer and adhesive.
 2. Installation instructions.
 3. Maintenance instructions, including recommended materials and methods for maintaining wall covering with precautions in use of cleaning material.
 4. Adhesive for edge guard [**and wainscot cap**].
- E. Tests: Substrate moisture.

1.4 QUALITY ASSURANCE:

- A. Finish one complete wall (full height, not less than 2438 mm (8 feet) in length) of each type (color and pattern) of wall covering showing specified colors and patterns.
- B. After Contracting Officer Representative (COR) approval, the sample installation will serve as a standard for work throughout the project.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Deliver in original unopened containers bearing the manufacturer's name, brand name, and product designation.
- B. Store in accordance with manufacturer's instructions.

C. Handle to prevent damage to material.

1.6 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. ASTM International (ASTM):
1. E84-20 Surface Burning Characteristics of Building Materials
 2. G21-15 Determining Resistance of Synthetic Polymeric Materials to Fungi
- C. Code of Federal Regulation (CFR):
1. 40 CFR 59(2016) Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coating
- D. D. Wallcovering Association (WA):
1. W-101-17 Quality Standard Polymer Coated Fabric Wallcoverings

PART 2 - PRODUCTS

2.1 VINYL COATED FABRIC WALL COVERING:

- A. Comply with WA W-101.
- B. Fungi Resistance: ASTM G21, rating of zero (0).
- C. Factory-applied clear delustered polyvinyl-fluoride (PVF) coating:
1. Minimum 0.0125 mm (1/2 mil) thickness.
 2. Do not include PVF coating weight in minimum total weight.
 3. Fire hazard classification with PVF coating: Class A unless specified otherwise.
- D. Type II (Medium Duty) where indicated.
- E. Type III (Heavy Duty) where indicated.

2.2 PRIMER AND ADHESIVE:

- A. Adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, (EPA Method 24).
- B. Vermin, mildew resistant and germicidal inhibiting type recommended by wall covering manufacturer for use on substrate to receive wall covering.

2.3 WALL LINER:

- A. Provide a non-woven polyester cellulose blend having a minimum weight of 0.125 Kg/square meter (3.7 ounces per square yard) and a total minimum thickness of 0.325 mm (0.013 inches). Wall liner is to have a flame spread rating of 0-20 and smoke development rating of 0-25 when tested in accordance with ASTM E84.

2.4 EDGE GUARDS OR WAINSCOT CAP TRIM:

- A. Provide metal trims in profiles and finishes indicated on the Drawings.
- B. "J" shape with groove to receive the wall covering.
- C. Concealed edge feathered, not less than 19 mm (3/4 inch) wide.
- D. Designed for adhesive attachment.
- E. Use anodized extruded aluminum.

PART 3 - EXECUTION

3.1 JOB CONDITIONS:

- A. Temperatures:
 - 1. Do not perform work until surfaces and materials have been maintained at minimum of 16 degrees C (60 degrees F) for three (3) days before work begins.
 - 2. Maintain minimum temperatures of 16 degrees C (60 degrees F) until adhesives are dried or cured.
- B. Lighting:
 - 1. Do not proceed unless a minimum lighting level of 15 candela per 0.09 square meter (15 candela per square foot) is provided.
 - 2. Measure light level at mid-height of wall.
 - 3. Ventilation: Provide continuous ventilation as required to rid the spaces in which the wall coverings are being installed of volatile compounds given off by the wall coverings, sealers and adhesives and as recommended by the product manufacturer for full drying or curing.
- C. Protect other surfaces from damage resulting from installation of wall coverings. Provide drop cloths, shields and protective equipment to prevent primers, adhesives or wall covering from fouling adjacent surfaces and in particular, storage and preparation areas.
- D. Store flammable rubbish, waste, cloths and materials which may constitute a fire hazard, in closed metal containers. Daily remove and properly dispose of flammable wastes from the site.

3.2 SURFACE CONDITION AND PREPARATION:

- A. Inspect surfaces to receive wall coverings to assure that:
 - 1. Patches and repairs to substrates are completed.
 - 2. Surfaces are clean, smooth and prime painted.
 - 3. Masonry and concrete walls are to have flush joints. Coat these walls with cement plaster or wall/liner as substrate preparation.

- B. Surfaces to receive wall covering are to be dry. Test moisture content of plaster, concrete, and masonry walls with an electric moisture meter. The moisture content is not permitted to be more than 5 percent. Submit test results.
- C. Do not proceed until discovered defects have been corrected by other trades and surfaces are ready to receive wall covering.
- D. Carefully remove electrical outlet and switch plates, mechanical diffusers, escutcheons, registers, surface hardware, fittings and fastenings, prior to starting work and store items for reinstallation.
- E. Install Edge Guard or Wainscot Cap Trim:
 - 1. Locate where shown or specified in construction documents.
 - 2. Run edge guards from top of base to ceiling or wainscot cap in continuous length.
 - 3. Run wainscot cap trim level unless shown otherwise in construction documents.
 - 4. Install as specified by manufacturer of edge guard or wainscot cap trim, in adhesive.
 - 5. Smooth adhesive edge. Do not leave adhesive exposed to view.
 - 6. Leave ready to receive wall covering.

3.3 APPLICATION OF ADHESIVE:

- A. Mix and apply adhesives in accordance with manufacturer's directions.
- B. Prevent adhesive from getting on face of wall covering.
- C. Apply adhesive to wall covering back.

3.4 INSTALLATION:

- A. Use wall covering of same batch or run in each area. Use fabric rolls in consecutive numerical sequence of manufacture.
- B. Install material completely adhered, smooth, clean, without wrinkles, air pockets, gaps or overlaps.
- C. Extend wall covering continuous behind non-built-in casework and other items which are not bolted to the walls.
- D. Install wall covering before installation of resilient base. Extend wall covering not more than 6 mm (1/4 inch) below top of resilient base.
- E. Install wall covering panels consecutively in order in which they are cut from the roll including filling spaces above or below windows, doors, or similar penetrations.
- F. Do not install horizontal seams.

G. Except on match patterns, hang fabric by reversing alternate strips, except as recommended by the manufacturer.

H. Cutting:

1. Cut on a work table with a straight edge.
2. Joints or seams that are not cut clean are unacceptable.
3. Trim additional selvage to achieve a color and pattern match at seams. Overlapped seams are not allowed.
4. Do not double cut seams on wall unless specified.
5. If double cutting on the wall is necessary, place a three-inch strip of Type I wall covering under pasted edge.
 - a. Do not cut into wall surface.
 - b. After cutting, remove strip and excess adhesive from seam before proceeding to next seam.
 - c. Smooth down seam in adhesive for tight bond and joint.

I. Trim strip-matched patterns which are not factory pre-trimmed.

J. Inside Corners:

1. Wrap wall covering around corners.
2. Do not seam within 50 mm (2 inches) of inside corners.
3. Double cut seams.

K. Outside Corners:

1. Wrap wall covering around corners.
2. Do not seam within 152 mm (6 inches) of outside corners.
3. Double cut seams.

3.5 PATCHING:

A. Replace surface damaged wall covering in a space as specified for new work:

1. Replace full height of surface.
2. Replace from break in plane to break in plane when same batch or run is not used.
3. Double cut seams.
4. Adjoining differential colors from separate batches or runs is not acceptable.

B. Correct loose or raised seams with adhesives to lay flat with tight bonded joint as specified for new work.

3.6 CLEANING AND INSTALLING TEMPORARY REMOVED ITEMS:

A. Remove adhesive from wall covering as work proceeds.

- B. Remove adhesives where spilled, splashed or splattered on wall coverings or adjacent surfaces in a manner not to damage surface from which it is removed.
- C. Upon completion of work, leave wall covering free of dirt or soil.
- D. Remove all debris associated with wall covering installation.
- E. Reinstall previously removed electrical outlet and switch plates, mechanical diffusers, escutcheons, registers, surface hardware, fittings and fastenings.

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SECTION 09 84 33

SOUND-ABSORBING WALL UNITS (by VA)

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies the requirements for fabric covered acoustical wall panels.

1.2 RELATED WORK:

- A. Section 09 06 00, SCHEDULE FOR FINISHES: Color and location for hanging.

1.3 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples: Fabric covering as specified in Section 09 06 00, SCHEDULE FOR FINISHES, size 457 mm (18 inches). Submit four (4) each, full width of mill run for each color specified.
- C. Manufacturer's Literature and Data: Complete instructions for installation of wall panels. Include fabric facing, panel edge, core material and acoustical data for each sound-absorbing wall unit.
- D. Certificate: Flame spread and smoke development index factors.

1.4 APPLICABLE PUBLICATIONS:

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in text by basic designation only.
- B. American Association of Textile Chemists and Colorists (AATCC):
1. TM 16-04 Test Method: Colorfastness to Light
- C. ASTM International (ASTM):
1. C423-17 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 2. D5034-09(2017) Breaking Strength and Elongation of Textile Fabrics (Grab Test)
 3. E84-20 Surface Burning Characteristics of Building Materials
- D. Code of Federal Regulation (CFR):
1. 40 CFR 59 Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coating
- E. Underwriter's Laboratory (UL):
1. 723-10(R2013) Test for Surface Burning Characteristics of Building Materials

PART 2 - PRODUCTS

2.1 WALL COVERING PANELS:

- A. Width: 610 mm (2 feet) unless shown otherwise on construction documents. End filler panels may vary in width as necessary to cover wall-to-wall installation.
- B. Height:
 - 1. For full height panels, field measure panels for custom fit flush to ceiling and tolerance at floor to within 3 mm (1/8-inch) at top of base.
 - 2. As indicated on construction documents.
- C. Thickness: As required to meet the indicated NRC range but not less than 25 mm (1 inch) nominal.
- D. Fabric Covering:
 - 1. Polyolefin Polyester woven fabric, 12.4 ounces per linear yard, acrylic backed with stain repellent finish.
 - 2. Provide fabric covering stretched free of wrinkles and then bonded to the edges and back or bonded directly to the panel face, edges, and back of panel a minimum distance standard with the manufacturer. Light fastness (fadeometer) is to be not less than 40 hours in accordance with AATCC TM 16.
- E. Fabric Covering at Health Care Areas: In addition to that indicated above, provide fabric that is flame resistant, stain resistant, and antimicrobial. Fabric is to be cleanable with water or solvent based cleaning agents or diluted household bleach.
- F. Fire rating for the complete composite system: Class A, 200 or less smoke density and flame spread less than 25 when tested in accordance with ASTM E84 or UL 723. Identify products with appropriate markings of testing agency.
- G. Substrate: Fiberglass or mineral fiber.
- H. Core Type: Standard acoustical core.
- I. Noise Reduction Coefficient (NRC) Range: 0.80-0.90 in accordance with ASTM C423.
- J. Edge Construction: Manufacturer's standard chemically hardened core with no frame.
 - 1. Recycled Content of metal products: Post-consumer content plus one-half of preconsumer content not less than 30 percent.
- K. Edge Detail: Half bevel edge.

- L. Mounting acoustical panels are to be mounted by manufacturer's standard two-part metal "Z" clips.

PART 3 - EXECUTION

3.1 WALL PREPARATION:

- A. Walls are to be clean, smooth, oil free, contain no protrusions, and prepared in accordance with manufacturer's printed instructions.

3.2 INSTALLATION:

- A. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.
- B. Locate panels as shown on construction documents.
- C. Unless indicated otherwise, install units with vertical surfaces and edge plumb, top edges level and in alignment with other units. Install faces flush, and scribed to fit adjoining work accurately at borders and at penetrations. Variation from plumb and level installation are to be no more than 1.6 mm in 1200 mm (1/16 inch in 48 inches). Non-cumulative variation in joint width is to be no more than 1.6 mm (1/16 inch) from hairline in 1219 mm (48 inches) non-cumulative.

3.3 CLEANING:

- A. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.
- B. Panels that are damaged, discolored, or improperly installed are to be removed and new panels provided as directed by Contracting Officer Representative (COR).

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 09 91 00

PAINTING

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the painting and finishing as shown on the construction documents and/or specified herein, including, but not limited to, the following:
1. Prime coats which may be applied in shop under other sections.
 2. Prime painting unprimed surfaces to be painted under this Section.
 3. Painting items furnished with a prime coat of paint, including touching up of or repairing of abraded, damaged or rusted prime coats applied by others.
 4. Painting ferrous metal (except stainless steel) exposed to view.
 5. Painting galvanized ferrous metals exposed to view.
 6. Painting interior concrete block exposed to view.
 7. Painting gypsum drywall exposed to view.
 8. Painting of wood exposed to view, except items which are specified to be painted or finished under other Sections of these specifications. Back painting of all wood in contact with concrete, masonry or other moisture areas.
 9. Painting pipes, pipe coverings, conduit, ducts, insulation, hangers, supports and other mechanical and electrical items and equipment exposed to view.
 10. Painting surfaces above, behind or below grilles, gratings, diffusers, louvers lighting fixtures, and the like, which are exposed to view through these items.
 11. Painting includes shellacs, stains, varnishes, coatings specified, and striping or markers and identity markings.
 12. Incidental painting and touching up as required to produce proper finish for painted surfaces, including touching up of factory finished items.
 13. Painting of any surface not specifically mentioned to be painted herein or on construction documents, but for which painting is obviously necessary to complete the job, or work which comes within the intent of these specifications, is to be included as though specified.

1.2 RELATED WORK:

- A. Section 01 35 26, SAFETY REQUIREMENTS: Activity Hazard Analysis.
- B. Section 040513, MASONRY MORTARING: Masonry Repairs.
- C. Division 05 METALS: Shop prime painting of steel and ferrous metals.
- D. Division 08 OPENINGS: Shop prime painting of steel and ferrous metals.
- E. Section 09 06 00, SCHEDULE FOR FINISHES: Type of Finish, Color, and Gloss Level of Finish Coat.
- F. Division 10 SPECIALTIES: Shop prime painting of steel and ferrous metals.
- G. Division 11 EQUIPMENT: Shop prime painting of steel and ferrous metals.
- H. Division 12 FURNISHINGS: Shop prime painting of steel and ferrous metals.
- I. Division 21 FIRE SUPPRESSION: Shop prime painting of steel and ferrous metals.
- J. Division 22 PLUMBING: Shop prime painting of steel and ferrous metals.
- K. Division 23 HEATING; VENTILATION AND AIR-CONDITIONING: Shop prime painting of steel and ferrous metals.
- L. Division 26 ELECTRICAL: Shop prime painting of steel and ferrous metals.
- M. Division 27 COMMUNICATIONS: Shop prime painting of steel and ferrous metals.
- N. Division 28 ELECTRONIC SAFETY AND SECURITY: Shop prime painting of steel and ferrous metals.
- O. Division 32 EXTERIOR IMPROVEMENTS: Shop prime painting of steel and ferrous metals.**
- P. Section 321723, PAVEMENT MARKINGS: Asphalt and concrete pavement marking.

1.3 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Painter qualifications.
- C. Manufacturer's Literature and Data:
 - 1. Before work is started, or sample panels are prepared, submit manufacturer's literature and technical data, the current Master Painters Institute (MPI) "Approved Product List" indicating brand label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification.

The Contractor may choose to use subsequent MPI "Approved Product List", however, only one (1) list may be used for the entire contract and each coating system is to be from a single manufacturer. All coats on a particular substrate must be from a single manufacturer. No variation from the MPI "Approved Product List" where applicable is acceptable.

D. Sample Panels:

1. After painters' materials have been approved and before work is started submit sample panels showing each type of finish and color specified.
2. Panels to Show Color: Composition board, 100 x 250 mm (4 x 10 inch).
3. Panel to Show Transparent Finishes: Wood of same species and grain pattern as wood approved for use, 100 x 250 mm (4 x 10-inch face) minimum, and where both flat and edge grain will be exposed, 250 mm (10 inches) long by sufficient size, 50 x 50 mm (2 x 2 inch) minimum or actual wood member to show complete finish.
4. Attach labels to panel stating the following:
 - a. Federal Specification Number or manufacturers name and product number of paints used.
 - b. Specification code number specified in Section 09 06 00, SCHEDULE FOR FINISHES.
 - c. Product type and color.
 - d. Name of project.
5. Strips showing not less than 50 mm (2 inch) wide strips of undercoats and 100 mm (4 inch) wide strip of finish coat.

E. Sample of identity markers if used.

F. Manufacturers' Certificates indicating compliance with specified requirements:

1. Manufacturer's paint substituted for Federal Specification paints meets or exceeds performance of paint specified.
2. High temperature aluminum paint.
3. Epoxy coating.
4. Intumescent clear coating or fire retardant paint.
5. Plastic floor coating.

1.4 DELIVERY AND STORAGE:

A. Deliver materials to site in manufacturer's sealed container marked to show following:

1. Name of manufacturer.

2. Product type.
 3. Batch number.
 4. Instructions for use.
 5. Safety precautions.
- B. In addition to the manufacturer's label, provide a label legibly printed as following:
1. Federal Specification Number, where applicable, and name of material.
 2. Surface upon which material is to be applied.
 3. Specify Coat Types: Prime; body; finish; etc.
- C. Maintain space for storage, and handling of painting materials and equipment in a ventilated, neat and orderly condition to prevent spontaneous combustion from occurring or igniting adjacent items.
- D. Store materials at site at least 24 hours before using, at a temperature between 7 and 30 degrees C (45- and 85-degrees F).

1.5 QUALITY ASSURANCE:

- A. Qualification of Painters: Use only qualified journeyman painters for the mixing and application of paint on exposed surfaces. Submit evidence that key personnel have successfully performed surface preparation and application of coating on a minimum of three (3) similar projects within the past three (3) years.
- B. Paint Coordination: Provide finish coats which are compatible with the prime paints used. Review other Sections of these specifications in which prime paints are to be provided to ensure compatibility of the total coatings system for the various substrates. Upon request from other subcontractors, furnish information on the characteristics of the finish materials proposed to be used, to ensure that compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify the Contracting Officer Representative (COR) in writing of any anticipated problems using the coating systems as specified with substrates primed by others.

1.6 REGULATORY REQUIREMENTS:

- A. Paint materials are to conform to the restrictions of the local Environmental and Toxic Control jurisdiction.
1. Volatile Organic Compounds (VOC) Emissions Requirements: Field-applied paints and coatings that are inside the waterproofing system to not exceed limits of authorities having jurisdiction.

2. Lead-Base Paint:
 - a. Comply with Section 410 of the Lead-Based Paint Poisoning Prevention Act, as amended, and with implementing regulations promulgated by Secretary of Housing and Urban Development.
 - b. Regulations concerning prohibition against use of lead-based paint in federal and federally assisted construction, or rehabilitation of residential structures are set forth in Subpart F, Title 24, Code of Federal Regulations, Department of Housing and Urban Development.
 - c. Do not use coatings having a lead content over 0.06 percent by weight of non-volatile content.
3. Asbestos: Provide materials that do not contain asbestos.
4. Chromate, Cadmium, Mercury, and Silica: Provide materials that do not contain zinc-chromate, strontium-chromate, Cadmium, mercury or mercury compounds or free crystalline silica.
5. Human Carcinogens: Provide materials that do not contain any of the ACGIH-BKLT and ACGHI-DOC confirmed or suspected human carcinogens.
6. Use high performance acrylic paints in place of alkyd paints.

1.7 SAFETY AND HEALTH

- A. Apply paint materials using safety methods and equipment in accordance with the following:
 1. Comply with applicable Federal, State, and local laws and regulations, and with the ACCIDENT PREVENTION PLAN, including the Activity Hazard Analysis (AHA) as specified in Section 01 35 26, SAFETY REQUIREMENTS. The AHA is to include analyses of the potential impact of painting operations on painting personnel and on others involved in and adjacent to the work zone.
- B. Safety Methods Used During Paint Application: Comply with the requirements of SSPC PA Guide 10.
- C. Toxic Materials: To protect personnel from overexposure to toxic materials, conform to the most stringent guidance of:
 1. The applicable manufacturer's Material Safety Data Sheets (MSDS) or local regulation.
 2. 29 CFR 1910.1000.
 3. ACHIH-BKLT and ACGHI-DOC, threshold limit values.

1.8 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only.
- B. American Conference of Governmental Industrial Hygienists (ACGIH):
 - 1. ACGIH TLV-BKLT-2012 Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)
 - 2. ACGIH TLV-DOC-2012 Documentation of Threshold Limit Values and Biological Exposure Indices, (Seventh Edition)
- C. ASME International (ASME):
 - 1. A13.1-07(R2013) Scheme for the Identification of Piping Systems
- D. Code of Federal Regulation (CFR):
 - 1. 40 CFR 59 Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coating
- E. Commercial Item Description (CID):
 - 1. A-A-1272A Plaster Gypsum (Spackling Compound)
- F. Federal Specifications (Fed Spec):
 - 1. TT-P-1411A Paint, Copolymer-Resin, Cementitious (For Waterproofing Concrete and Masonry Walls) (CEP)
- G. Master Painters Institute (MPI):
 - 1.....Aluminum Paint
 - 3.....Primer, Alkali Resistant, Water Based
 - 4.....Interior/ Exterior Latex Block Filler
 - 5.....Exterior Alkyd Wood Primer
 - 6.....Exterior, Latex for Exterior Wood Primer
 - 7.....Exterior Oil Wood Primer
 - 8.....Exterior Alkyd, Flat MPI Gloss Level 1
 - 9.....Exterior Alkyd Enamel MPI Gloss Level 6
 - 10.....Exterior Latex, Flat
 - 11.....Exterior Latex, Semi-Gloss
 - 15.....Exterior Latex, Low Sheen (MPI Gloss Level 3-4)
 - 17.....Primer, Bonding, Waterbased
 - 18.....Organic Zinc Rich Primer
 - 22.....Aluminum Paint, High Heat (up to 590° - 1100F)
 - 23.....Primer, Metal, Surface Tolerant

- 27.....Exterior / Interior Alkyd Floor Enamel, Gloss
- 31.....Polyurethane, Moisture Cured, Clear Gloss
- 36.....Knot Sealer
- 39.....Primer, Latex, for Interior Wood
- 40.....Exterior, Latex High Build
- 42.....Textured Coating, Latex, Flat
- 43.....Interior Satin Latex, MPI Gloss Level 4
- 44.....Interior Low Sheen Latex, MPI Gloss Level 2
- 45.....Interior Primer Sealer
- 46.....Interior Enamel Undercoat
- 47.....Interior Alkyd, Semi-Gloss, MPI Gloss Level 5
- 48.....Interior Alkyd, Gloss, MPI Gloss Level 6
- 50.....Interior Latex Primer Sealer
- 51.....Interior Alkyd, Eggshell, MPI Gloss Level 3
- 52.....Interior Latex, MPI Gloss Level 3
- 53.....Interior Latex, Flat, MPI Gloss Level 1
- 54.....Interior Latex, Semi-Gloss, MPI Gloss Level 5
- 59.....Interior/Exterior Alkyd Porch & Floor Enamel, Low
Gloss
- 60.....Interior/Exterior Latex Porch & Floor Paint, Low
Gloss
- 66.....Interior Alkyd Fire Retardant, Clear Top-Coat (ULC
Approved)
- 67.....Interior Latex Fire Retardant, Top-Coat (ULC
Approved)
- 68.....Interior/ Exterior Latex Porch & Floor Paint, Gloss
- 71.....Polyurethane, Moisture Cured, Clear, Flat
- 77.....Epoxy Cold Cured, Gloss
- 79.....Marine Alkyd Metal Primer
- 90.....Interior Wood Stain, Semi-Transparent
- 91.....Wood Filler Paste
- 94.....Exterior Alkyd, Semi-Gloss
- 95.....Fast Drying Metal Primer
- 98.....High Build Epoxy Coating
- 99.....Sealer, Water-based, for Concrete Floors
- 101.....Epoxy Anti-Corrosive Metal Primer

- 107.....Primer, Rust-Inhibitive, Water-based
- 108.....High Build Epoxy Coating, Low Gloss
- 113.....Elastomeric, Pigmented, Exterior, Water-based,
Flat
- 114.....Interior Latex, Gloss
- 115.....Epoxy-Modified Latex, Interior Gloss (MPI gloss
level 6)
- 118.....Dry Fall, Latex Flat
- 119.....Exterior Latex, High Gloss (acrylic)
- 134.....Galvanized Water Based Primer
- 135.....Non-Cementitious Galvanized Primer
- 138.....Interior High-Performance Latex, MPI Gloss Level
2
- 139.....Interior High-Performance Latex, MPI Gloss Level
3
- 140.....Interior High-Performance Latex, MPI Gloss Level
4
- 141.....Interior High-Performance Latex (SG) MPI Gloss
Level 5
- 144.....Latex, Interior, Institutional Low Odor / VOC, (MPI
Gloss Level 2)
- 145.....Latex, Interior, Institutional Low Odor / VOC, (MPI
Gloss Level 3)
- 146.....Latex, Interior, Institutional Low Odor / VOC, (MPI
Gloss Level 4)
- 151.....Light Industrial Coating, Interior, Water-based,
(MPI Gloss Level 3)
- 153.....Light Industrial Coating, Interior, Water-based,
(MPI Gloss Level 4)
- 163.....Exterior Water Based Semi-Gloss Light Industrial
Coating, MPI Gloss Level 5
- 164.....Exterior, Water Based, Gloss, Light Industrial
Coating, MPI Gloss Level 6

- H. Society for Protective Coatings (SSPC):
- 1. SSPC SP 1-82(R2004) Solvent Cleaning

2. SSPC SP 2-82(R2004) Hand Tool Cleaning
 3. SSPC SP 3-28(R2004) Power Tool Cleaning
 4. SSPC SP 10/NACE No.2 Near-White Blast Cleaning
 5. SSPC PA Guide 10 Guide to Safety and Health Requirements
- I. Maple Flooring Manufacturer's Association (MFMA):
- J. U.S. National Archives and Records Administration (NARA):
1. 29 CFR 1910.1000 Air Contaminants
- K. J. Underwriter's Laboratory (UL)

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Conform to the coating specifications and standards referenced in PART 3. Submit manufacturer's technical data sheets for specified coatings and solvents.

2.2 PAINT PROPERTIES:

- A. Use ready-mixed (including colors), except two component epoxies, polyurethanes, polyesters, paints having metallic powders packaged separately and paints requiring specified additives.
- B. Where no requirements are given in the referenced specifications for primers, use primers with pigment and vehicle, compatible with substrate and finish coats specified.
- C. Provide undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only to recommended limits.
- D. VOC Content: For field applications that are inside the weatherproofing system, paints and coating to comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
1. Flat Paints and Coatings: 50 g/L.
 2. Non-flat Paints and Coatings: 150 g/L.
 3. Dry-Fog Coatings: 400 g/L.
 4. Primers, Sealers, and Undercoaters: 200 g/L.
 5. Anticorrosive and Antirust Paints applied to Ferrous Metals: 250 g/L.
 6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
 7. Pretreatment Wash Primers: 420 g/L.
 8. Shellacs, Clear: 730 g/L.
 9. Shellacs, Pigmented: 550 g/L.

- E. VOC test method for paints and coatings is to be in accordance with 40 CFR 59 (EPA Method 24). Part 60, Appendix A with the exempt compounds' content determined by Method 303 (Determination of Exempt Compounds) in the South Coast Air Quality Management District's (SCAQMD) "Laboratory Methods of Analysis for Enforcement Samples" manual.

2.3 PLASTIC TAPE:

- A. Pigmented vinyl plastic film in colors as specified in Section 09 06 00, SCHEDULE FOR FINISHES or specified.
- B. Pressure sensitive adhesive back.
- C. Snap on coil plastic markers.
- D. Widths as shown on construction documents.

2.4 BIOBASED CONTENT

- A. Paint products shall comply with following bio-based standards for biobased materials:

Material Type	Percent by Weight
Interior Paint	20 percent biobased material
Interior Paint- Oil Based and Solvent Alkyd	67 percent biobased material
Exterior Paint	20 percent biobased material
Wood & Concrete Stain	39 percent biobased content
Polyurethane Coatings	25 percent biobased content
Water Tank Coatings	59 percent biobased content
Wood & Concrete Sealer- Membrane Concrete Sealers	11 percent biobased content
Wood & Concrete Sealer- Penetrating Liquid	percent biobased content

- B. The minimum-content standards are based on the weight (not the volume) of the material.

PART 3 - EXECUTION

3.1 JOB CONDITIONS:

- A. Safety: Observe required safety regulations and manufacturer's warning and instructions for storage, handling and application of painting materials.

1. Take necessary precautions to protect personnel and property from hazards due to falls, injuries, toxic fumes, fire, explosion, or other harm.
2. Deposit soiled cleaning rags and waste materials in metal containers approved for that purpose. Dispose of such items off the site at end of each day's work.

B. Atmospheric and Surface Conditions:

1. Do not apply coating when air or substrate conditions are:
 - a. Less than 3 degrees C (5 degrees F) above dew point.
 - b. Below 10 degrees C (50 degrees F) or over 35 degrees C (95 degrees F), unless specifically pre-approved by the COR and the product manufacturer. Under no circumstances are application conditions to exceed manufacturer recommendations.
 - c. When the relative humidity exceeds 85 percent; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.
2. Maintain interior temperatures until paint dries hard.
3. Do no exterior painting when it is windy and dusty.
4. Do not paint in direct sunlight or on surfaces that the sun will warm.
5. Apply only on clean, dry and frost free surfaces except as follows:
 - a. Apply water thinned acrylic and cementitious paints to damp (not wet) surfaces only when allowed by manufacturer's printed instructions.
 - b. Concrete and masonry when permitted by manufacturer's recommendations, dampen surfaces to which water thinned acrylic and cementitious paints are applied with a fine mist of water on hot dry days to prevent excessive suction and to cool surface.
6. Varnishing:
 - a. Apply in clean areas and in still air.
 - b. Before varnishing vacuum and dust area.
 - c. Immediately before varnishing wipe down surfaces with a tack rag.

3.2 INSPECTION:

- A. Examine the areas and conditions where painting and finishing are to be applied and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.3 GENERAL WORKMANSHIP REQUIREMENTS:

- A. Application may be by brush or roller. Spray application only upon acceptance from the COR in writing.
- B. Furnish to the COR a painting schedule indicating when the respective coats of paint for the various areas and surfaces will be completed. This schedule is to be kept current as the job progresses.
- C. Protect work at all times. Protect all adjacent work and materials by suitable covering or other method during progress of work. Upon completion of the work, remove all paint and varnish spots from floors, glass and other surfaces. Remove from the premises all rubbish and accumulated materials of whatever nature not caused by others and leave work in a clean condition.
- D. Remove and protect hardware, accessories, device plates, lighting fixtures, and factory finished work, and similar items, or provide in place protection. Upon completion of each space, carefully replace all removed items by workmen skilled in the trades involved.
- E. When indicated to be painted, remove electrical panel box covers and doors before painting walls. Paint separately and re-install after all paint is dry.
- F. Materials are to be applied under adequate illumination, evenly spread and flowed on smoothly to avoid runs, sags, holidays, brush marks, air bubbles and excessive roller stipple.
- G. Apply materials with a coverage to hide substrate completely. When color, stain, dirt or undercoats show through final coat of paint, the surface is to be covered by additional coats until the paint film is of uniform finish, color, appearance and coverage, at no additional cost to the Government.
- H. All coats are to be dry to manufacturer's recommendations before applying succeeding coats.
- I. All suction spots or "hot spots" in plaster after the application of the first coat are to be touched up before applying the second coat.
- J. Do not apply paint behind frameless mirrors that use mastic for adhering to wall surface.

3.4 SURFACE PREPARATION:

- A. General:

1. The Contractor shall be held wholly responsible for the finished appearance and satisfactory completion of painting work. Properly prepare all surfaces to receive paint, which includes cleaning, sanding, and touching-up of all prime coats applied under other Sections of the work. Broom clean all spaces before painting is started. All surfaces to be painted or finished are to be completely dry, clean and smooth.
 2. See other sections of specifications for specified surface conditions and prime coat.
 3. Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.
 4. Clean surfaces before applying paint or surface treatments with materials and methods compatible with substrate and specified finish. Remove any residue remaining from cleaning agents used. Do not use solvents, acid, or steam on concrete and masonry. Schedule the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.
 5. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Concrete: 12 percent.
 - b. Fiber-Cement Board: 12 percent.
 - c. Masonry (Clay and CMU's): 12 percent.
 - d. Wood: 15 percent.
 - e. Gypsum Board: 12 percent.
 - f. Plaster: 12 percent.
- B. Wood:
1. Sand to a smooth even surface and then dust off.
 2. Sand surfaces showing raised grain smooth between each coat.
 3. Wipe surface with a tack rag prior to applying finish.
 4. Surface painted with an opaque finish:
 - a. Coat knots, sap and pitch streaks with MPI 36 (Knot Sealer) before applying paint.
 - b. Apply two coats of MPI 36 (Knot Sealer) over large knots.
 5. After application of prime or first coat of stain, fill cracks, nail and screw holes, depressions and similar defects with wood filler paste. Sand the surface to make smooth and finish flush with adjacent surface.

6. Before applying finish coat, reapply wood filler paste if required, and sand surface to remove surface blemishes. Finish flush with adjacent surfaces.
 7. Fill open grained wood such as oak, walnut, ash and mahogany with MPI 91 (Wood Filler Paste), colored to match wood color.
 - a. Thin filler in accordance with manufacturer's instructions for application.
 - b. Remove excess filler, wipe as clean as possible, dry, and sand as specified.
- C. Ferrous Metals:
1. Remove oil, grease, soil, drawing and cutting compounds, flux and other detrimental foreign matter in accordance with SSPC-SP 1 (Solvent Cleaning).
 2. Remove loose mill scale, rust, and paint, by hand or power tool cleaning, as defined in SSPC-SP 2 (Hand Tool Cleaning) and SSPC-SP 3 (Power Tool Cleaning).
 3. Fill dents, holes and similar voids and depressions in flat exposed surfaces of hollow steel doors and frames, access panels, roll-up steel doors and similar items specified to have semi-gloss or gloss finish with TT-F-322D (Filler, Two-Component Type, For Dents, Small Holes and Blow-Holes). Finish flush with adjacent surfaces.
 - a. Fill flat head countersunk screws used for permanent anchors.
 - b. Do not fill screws of item intended for removal such as glazing beads.
 4. Spot prime abraded and damaged areas in shop prime coat which expose bare metal with same type of paint used for prime coat. Feather edge of spot prime to produce smooth finish coat.
 5. Spot prime abraded and damaged areas which expose bare metal of factory finished items with paint as recommended by manufacturer of item.
- D. Zinc-Coated (Galvanized) Metal and Aluminum, Surfaces Specified Painted:
1. Clean surfaces to remove grease, oil and other deterrents to paint adhesion in accordance with SSPC-SP 1 (Solvent Cleaning).
 2. Spot coat abraded and damaged areas of zinc-coating which expose base metal on hot-dip zinc-coated items with MPI 18 (Organic Zinc Rich Coating). Prime or spot prime with MPI 134 (Waterborne Galvanized Primer) or MPI 135 (Non-Cementitious Galvanized Primer) depending on finish coat compatibility.

E. Masonry, Concrete, Cement Board, Cement Plaster and Stucco:

1. Clean and remove dust, dirt, oil, grease efflorescence, form release agents, laitance, and other deterrents to paint adhesion.
2. Use emulsion type cleaning agents to remove oil, grease, paint and similar products. Use of solvents, acid, or steam is not permitted.
3. Remove loose mortar in masonry work.
4. Neutralize Concrete floors to be painted by washing with a solution of 1.4 Kg (3 pounds) of zinc sulfate crystals to 3.8 L (1 gallon) of water, allow to dry three (3) days and brush thoroughly free of crystals.
5. Repair broken and spalled concrete edges with concrete patching compound to match adjacent surfaces as specified in Division 03, CONCRETE Sections. Remove projections to level of adjacent surface by grinding or similar methods.

F. Gypsum Plaster and Gypsum Board:

1. Remove efflorescence, loose and chalking plaster or finishing materials.
2. Remove dust, dirt, and other deterrents to paint adhesion.
3. Fill holes, cracks, and other depressions with CID-A-A-1272A finished flush with adjacent surface, with texture to match texture of adjacent surface. Patch holes over 25 mm (1-inch) in diameter as specified in Section for plaster or gypsum board.

3.5 PAINT PREPARATION:

- A. Thoroughly mix painting materials to ensure uniformity of color, complete dispersion of pigment and uniform composition.
- B. Do not thin unless necessary for application and when finish paint is used for body and prime coats. Use materials and quantities for thinning as specified in manufacturer's printed instructions.
- C. Remove paint skins, then strain paint through commercial paint strainer to remove lumps and other particles.
- D. Mix two (2) component and two (2) part paint and those requiring additives in such a manner as to uniformly blend as specified in manufacturer's printed instructions unless specified otherwise.
- E. For tinting required to produce exact shades specified, use color pigment recommended by the paint manufacturer.

3.6 APPLICATION:

- A. Start of surface preparation or painting will be construed as acceptance of the surface as satisfactory for the application of materials.

- B. Unless otherwise specified, apply paint in three (3) coats; prime, body, and finish. When two (2) coats applied to prime coat are the same, first coat applied over primer is body coat and second coat is finish coat.
- C. Apply each coat evenly and cover substrate completely.
- D. Allow not less than 48 hours between application of succeeding coats, except as allowed by manufacturer's printed instructions, and approved by COR.
- E. Apply by brush or roller. Spray application for new or existing occupied spaces only upon approval by acceptance from COR in writing.
 - 1. Apply painting materials specifically required by manufacturer to be applied by spraying.
 - 2. In new construction and in existing occupied spaces, where paint is applied by spray, mask or enclose with polyethylene, or similar air tight material with edges and seams continuously sealed including items specified in "Building and Structural Work Field Painting"; "Work not Painted"; motors, controls, telephone, and electrical equipment, fronts of sterilizes and other recessed equipment and similar prefinished items.
- F. Do not paint in closed position operable items such as access doors and panels, window sashes, overhead doors, and similar items except overhead roll-up doors and shutters.

3.7 PRIME PAINTING

- A. After surface preparation, prime surfaces before application of body and finish coats, except as otherwise specified.
- B. Spot prime and apply body coat to damaged and abraded painted surfaces before applying succeeding coats.
- C. Additional field applied prime coats over shop or factory applied prime coats are not required except for exterior exposed steel apply an additional prime coat.
- D. Prime rabbets for stop and face glazing of wood, and for face glazing of steel.
- E. Wood and Wood Particleboard:
 - 1. Use same kind of primer specified for exposed face surface.
 - a. Exterior wood: MPI 7 (Exterior Oil Wood Primer) for new construction and MPI 5 (Exterior Alkyd Wood Primer) for repainting bare wood primer except where MPI 90 (Interior Wood Stain, Semi-Transparent) is scheduled.

- b. Interior wood except for transparent finish: MPI 45 (Interior Primer Sealer) or MPI 46 (Interior Enamel Undercoat), thinned if recommended by manufacturer.
 - c. Transparent finishes as specified under "Transparent Finishes on Wood Except Floors Article" .
2. Apply two (2) coats of primer MPI 7 (Exterior Oil Wood Primer) or MPI 5 (Exterior Alkyd Wood Primer) or sealer MPI 45 (Interior Primer Sealer) or MPI 46 (Interior Enamel Undercoat) to surfaces of wood doors, including top and bottom edges, which are cut for fitting or for other reason.
 3. Apply one (1) coat of primer MPI 7 (Exterior Oil Wood Primer) or MPI 5 (Exterior Alkyd Wood Primer) or sealer MPI 45 (Interior Primer Sealer) or MPI 46 (Interior Enamel Undercoat) as soon as delivered to site to surfaces of unfinished woodwork, except concealed surfaces of shop fabricated or assembled millwork and surfaces specified to have varnish, stain or natural finish.
 4. Back prime and seal ends of exterior woodwork, and edges of exterior plywood specified to be finished.
 5. Apply MPI 67 (Interior Latex Fire Retardant, Top-Coat (UL Approved) to wood for fire retardant finish.
- F. Metals except boilers, incinerator stacks, and engine exhaust pipes:
1. Steel and iron: MPI 79 (Marine Alkyd Metal Primer) MPI 95 (Fast Drying Metal Primer). Use MPI 101 (Cold Curing Epoxy Primer) where MPI 108 (High Build Epoxy Marine Coating finish is specified).
 2. Zinc-coated steel and iron: MPI 134 (Waterborne Galvanized Primer).
 3. Aluminum scheduled to be painted: MPI 95 (Fast Drying Metal Primer).
 4. Terne Metal: MPI 79 (Marine Alkyd Metal Primer) MPI 95 (Fast Drying Metal Primer).
 5. Copper and copper alloys scheduled to be painted: MPI 95 (Fast Drying Metal Primer).
 6. Machinery not factory finished: MPI 9 (Exterior Alkyd Enamel).
 7. Asphalt coated metal: MPI 1 (Aluminum Paint).
 8. Metal over 94 degrees C (201 degrees F), Boilers, Incinerator Stacks, and Engine Exhaust Pipes: MPI 22 (High Heat Resistant Coating).
- G. Gypsum Board and Hardboard:

1. Surfaces scheduled to have MPI 53 (Interior Latex, Flat), MPI Gloss Level 1)MPI 52 (Interior Latex, MPI Gloss Level 3)MPI 54 (Interior Latex, Semi-Gloss, MPI Gloss Level 5) MPI 114 (Interior Latex, Gloss) finish: Use MPI 53 (Interior Latex, MPI Gloss Level 3)MPI 52 (Interior Latex, MPI Gloss Level 3)MPI 54 (Interior Latex, Semi-Gloss, MPI Gloss Level 5)MPI 114 (Interior Latex, Gloss) respectively.
2. Primer: MPI 50 (Interior Latex Primer Sealer) except use MPI 45 (Interior Primer Sealer) in shower and bathrooms.
3. Surfaces scheduled to receive vinyl coated fabric wall covering:
4. Use MPI 101 (Cold Curing Epoxy Primer) for surfaces scheduled to receive MPI 77 (Epoxy Cold Cured, Gloss).

H. Concrete Floors: MPI 99 (Water-based Acrylic Curing and Sealing Compound).

3.8 EXTERIOR FINISHES:

- A. Apply following finish coats where specified in Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Fiber-Cement Siding:
 - a. Low-Sheen Topcoat: Latex, exterior, low sheen (MPI Gloss Level 3-4), MPI #15. Products and techniques as recommended by the manufacturer.
- C. Wood:
 1. Sealers / Clear Wood Preservative:
 - a. One (1) coat of sealer MPI 71 (flat). Coat ends of wood members with three (3) or more consecutive coats to give full protection. Allow at least one (1) hour between coats.
- D. Steel and Ferrous Metal, Including Tern:
 1. Two (2) coats of MPI 8 (Exterior Alkyd, Flat)MPI 9 (Exterior Alkyd Enamel) or MPI 94 (Exterior Alkyd, Semi-Gloss) on exposed surfaces, except on surfaces over 94 degrees C (201 degrees F).
 2. One (1) coat of MPI 22 (High Heat Resistant Coating) on surfaces over 94 degrees K (290 degrees F) and on surfaces of boiler, , stacks engine exhaust pipes.
- E. Machinery without factory finish except for primer: One (1) coat MPI 94 (Exterior Alkyd, Semi-Gloss).

3.9 INTERIOR FINISHES:

- A. Apply the following finish coats over prime coats in spaces or on surfaces specified in Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Metal Work:

1. Apply to exposed surfaces.
 2. Omit body and finish coats on surfaces concealed after installation except electrical conduit containing conductors over 600 volts.
 3. Ferrous Metal, Galvanized Metal, and Other Metals Scheduled:
 - a. Apply two (2) coats of MPI 47 (Interior Alkyd, Semi-Gloss) unless specified otherwise.
 - b. Machinery: One (1) coat MPI 9 (Exterior Alkyd Enamel).
 - c. Ferrous Metal over 94 degrees K (290 degrees F): Boilers, Incinerator Stacks, and Engine Exhaust Pipes: One (1) coat MPI 22 (High Heat Resistant Coating).
- C. Gypsum Board:
1. One (1) coat of MPI 45 (Interior Primer Sealer) plus one (1) coat of MPI 139 (Interior High-Performance Latex, MPI Gloss level 3).
- D. Wood:
1. Sanding:
 - a. Use 220-grit sandpaper.
 - b. Sand sealers and varnish between coats.
 - c. Sand enough to scarify surface to assure good adhesion of subsequent coats, to level roughly applied sealer and varnish, and to knock off "whiskers" of any raised grain as well as dust particles.
 2. Sealers:
 - a. MPI 31 (gloss) or MPI 71 (flat) thinned as recommended by manufacturer at rate of one (1) part of thinner to four (4) parts of varnish.
 - b. Apply sealers specified except sealer may be omitted where pigmented, penetrating, or wiping stains containing resins are used.
 - c. Allow manufacturer's recommended drying time before sanding, but not less than 24 hours or 36 hours in damp or muggy weather.
 - d. Sand as specified.
 3. Paint Finish:
 - a. One (1) coat of MPI 45 (Interior Primer Sealer) plus one (1) coat of MPI 47 (Interior Alkyd, Semi-Gloss).
 4. Transparent Finishes on Wood Except Floors.
 - a. Natural Finish / Clear Wood Preservative:
 - 1) One (1) coat of sealer MPI 71 (flat). Coat ends of wood members with three (3) or more consecutive coats to give full protection. Allow at least one (1) hour between coats.

b. Stain Finish:

- 1) One (1) coat of MPI 90 (Interior Wood Stain, Semi-Transparent).
- 2) Use wood stain of type and color required to achieve finish specified. Do not use varnish type stains.
- 3) Two (2) coats of MPI 71 (Polyurethane, Moisture Cured, Clear Flat).

E. Concrete Floors: One (1) coat of MPI 68 (Interior/ Exterior Latex Porch & Floor Paint, Gloss).

F. Miscellaneous:

1. Apply where specified in Section 09 06 00, SCHEDULE FOR FINISHES.
2. MPI 1 (Aluminum Paint): Two (2) coats of aluminum paint.

3.10 PAINT COLOR:

A. Color and gloss of finish coats is specified in Section 09 06 00, SCHEDULE FOR FINISHES.

B. For additional requirements regarding color see Articles, "REFINISHING EXISTING PAINTED SURFACE" and "MECHANICAL AND ELECTRICAL FIELD PAINTING SCHEDULE".

C. Coat Colors:

1. Color of priming coat: Lighter than body coat.
2. Color of body coat: Lighter than finish coat.
3. Color prime and body coats to not show through the finish coat and to mask surface imperfections or contrasts.

D. Painting, Caulking, Closures, and Fillers Adjacent to Casework:

1. Paint to match color of casework where casework has a paint finish.
2. Paint to match color of wall where casework is stainless steel, plastic laminate, or varnished wood.

3.11 MECHANICAL AND ELECTRICAL WORK FIELD PAINTING SCHEDULE:

A. Field painting of mechanical and electrical consists of cleaning, touching-up abraded shop prime coats, and applying prime, body and finish coats to materials and equipment if not factory finished in space scheduled to be finished.

B. In spaces not scheduled to be finish painted in Section 09 06 00, SCHEDULE FOR FINISHES paint as specified below.

- C. Paint various systems specified in Division 02 - EXISTING CONDITIONS, Division 21 - FIRE SUPPRESSION, Division 22 - PLUMBING, Division 23 - HEATING, VENTILATION AND AIR-CONDITIONING, Division 26 - ELECTRICAL, Division 27 - COMMUNICATIONS, and Division 28 - ELECTRONIC SAFETY AND SECURITY.
- D. Paint after tests have been completed.
- E. Omit prime coat from factory prime-coated items.
- F. Finish painting of mechanical and electrical equipment is not required when located in interstitial spaces, above suspended ceilings, in concealed areas such as pipe and electric closets, pipe basements, pipe tunnels, trenches, attics, roof spaces, shafts and furred spaces except on electrical conduit containing feeders 600 volts or more.
- G. Omit field painting of items specified in "BUILDING AND STRUCTURAL WORK FIELD PAINTING"; "Building and Structural Work not Painted".
- H. Color:
 - 1. Paint items having no color specified in Section 09 06 00, SCHEDULE FOR FINISHES to match surrounding surfaces.
 - 2. Paint colors as specified in Section 09 06 00, SCHEDULE FOR FINISHES except for following:
 - a. White: Exterior unfinished surfaces of enameled plumbing fixtures. Insulation coverings on breeching and uptake inside boiler house, drums and drum-heads, oil heaters, condensate tanks and condensate piping.
 - b. Gray: Heating, ventilating, air conditioning and refrigeration equipment (except as required to match surrounding surfaces), and water and sewage treatment equipment and sewage ejection equipment.
 - c. Aluminum Color: Ferrous metal on outside of boilers and in connection with boiler settings including supporting doors and door frames and fuel oil burning equipment, and steam generation system (bare piping, fittings, hangers, supports, valves, traps and miscellaneous iron work in contact with pipe).
 - d. Federal Safety Red: Exposed fire protection piping hydrants, post indicators, electrical conduits containing fire alarm control wiring, and fire alarm equipment.
 - e. Federal Safety Orange: Entire lengths of electrical conduits containing feeders 600 volts or more.

- f. Color to match brickwork sheet metal covering on breeching outside of exterior wall of boiler house.
- I. Apply paint systems on properly prepared and primed surface as follows:
1. Exterior Locations:
 - a. Apply two (2) coats of MPI 94 (Exterior Alkyd, Semi-gloss) to the following ferrous metal items:
 - 1) Vent and exhaust pipes with temperatures under 94 degrees C (201 degrees F), roof drains, fire hydrants, post indicators, yard hydrants, exposed piping and similar items.
 - b. Apply two (2) coats of MPI 11 (Exterior Latex, Semi-Gloss) to galvanized and zinc-copper alloy metal.
 - c. Apply one (1) coat of MPI 22 (High Heat Resistant Coating), 650 degrees C (1200 degrees F) to incinerator stacks, boiler stacks, and engine generator exhaust.
 2. Interior Locations:
 - a. Apply two (2) coats of MPI 47 (Interior Alkyd, Semi-Gloss) to following items:
 - 1) Metal under 94 degrees C (201 degrees F) of items such as bare piping, fittings, hangers and supports.
 - 2) Equipment and systems such as hinged covers and frames for control cabinets and boxes, cast-iron radiators, electric conduits and panel boards.
 - 3) Heating, ventilating, air conditioning, plumbing equipment, and machinery having shop prime coat and not factory finished.
 - b. Apply one (1) coat of MPI 50 (Interior Latex Primer Sealer) and one (1) coat of MPI 52 (Interior Latex, MPI Gloss Level 3) on finish of insulation on boiler breeching and uptakes inside boiler house, drums, drumheads, oil heaters, feed water heaters, tanks and piping.
 - c. Apply two (2) coats of MPI 22 (High Heat Resistant Coating) to ferrous metal surface over 94 degrees K (290 degrees F) of following items:
 - 1) Garbage and trash incinerator.
 - 2) Medical waste incinerator.
 - 3) Exterior of boilers and ferrous metal in connection with boiler settings including supporting members, doors and door frames and fuel oil burning equipment.

- 4) Steam line flanges, bare pipe, fittings, valves, hangers and supports over 94 degrees K (290 degrees F).
 - 5) Engine generator exhaust piping and muffler.
 - d. Paint electrical conduits containing cables rated 600 volts or more using two (2) coats of MPI 9 (Exterior Alkyd Enamel) in the Federal Safety Orange color in exposed and concealed spaces full length of conduit.
3. Other exposed locations:
- a. Metal surfaces, except aluminum, of cooling towers exposed to view, including connected pipes, rails, and ladders: Two (2) coats of MPI 1 (Aluminum Paint).
 - b. Cloth jackets of insulation of ducts and pipes in connection with plumbing, air conditioning, ventilating refrigeration and heating systems: One (1) coat of MPI 50 (Interior Latex Primer Sealer) and one (1) coat of MPI 11 (Exterior Latex Semi-Gloss).

3.12 BUILDING AND STRUCTURAL WORK FIELD PAINTING:

- A. Painting and finishing of interior and exterior work except as specified here-in-after.
1. Painting and finishing of new work including colors and gloss of finish selected is specified in Finish Schedule, Section 09 06 00, SCHEDULE FOR FINISHES.
 2. Painting of disturbed, damaged and repaired or patched surfaces when entire space is not scheduled for complete repainting or refinishing.
 3. Painting of ferrous metal and galvanized metal.
 4. Painting of wood with fire retardant paint exposed in attics, when used as mechanical equipment space (except shingles).
 5. Identity painting and safety painting.
- B. Building and Structural Work not Painted:
1. Prefinished items:
 - a. Casework, doors, elevator entrances and cabs, metal panels, wall covering, and similar items specified factory finished under other sections.
 - b. Factory finished equipment and pre-engineered metal building components such as metal roof and wall panels.
 2. Finished surfaces:
 - a. Hardware except ferrous metal.

- b. Anodized aluminum, stainless steel, chromium plating, copper, and brass, except as otherwise specified.
- c. Signs, fixtures, and other similar items integrally finished.
- 3. Concealed surfaces:
 - a. Inside dumbwaiter, elevator and duct shafts, interstitial spaces, pipe basements, crawl spaces, pipe tunnels, above ceilings, attics, except as otherwise specified.
 - b. Inside walls or other spaces behind access doors or panels.
 - c. Surfaces concealed behind permanently installed casework and equipment.
- 4. Moving and operating parts:
 - a. Shafts, chains, gears, mechanical and electrical operators, linkages, and sprinkler heads, and sensing devices.
 - b. Tracks for overhead or coiling doors, shutters, and grilles.
- 5. Labels:
 - a. Code required label, such as Underwriters Laboratories Inc., Intertek Testing Service or Factory Mutual Research Corporation.
 - b. Identification plates, instruction plates, performance rating, and nomenclature.
- 6. Galvanized metal:
 - a. Exterior chain link fence and gates, corrugated metal areaways, and gratings.
 - b. Gas Storage Racks.
 - c. Except where specifically specified to be painted.
- 7. Metal safety treads and nosings.
- 8. Gaskets.
- 9. Concrete curbs, gutters, pavements, retaining walls, exterior exposed foundations walls and interior walls in pipe basements.
- 10. Face brick.
- 11. Structural steel encased in concrete, masonry, or other enclosures.
- 12. Structural steel to receive sprayed-on fire proofing.
- 13. Ceilings, walls, columns in interstitial spaces.
- 14. Ceilings, walls, and columns in pipe basements.
- 15. Wood Shingles.

3.13 IDENTITY PAINTING SCHEDULE:

A. Identify designated service in new buildings or projects with extensive remodeling in accordance with ASME A13.1, unless specified otherwise, on exposed piping, piping above removable ceilings, piping in accessible pipe spaces, interstitial spaces, and piping behind access panels. For existing spaces where work is minor match existing.

1. Legend may be identified using snap-on coil plastic markers or by paint stencil applications.
2. Apply legends adjacent to changes in direction, on branches, where pipes pass through walls or floors, adjacent to operating accessories such as valves, regulators, strainers and cleanouts a minimum of 12.2 M (40 feet) apart on straight runs of piping. Identification next to plumbing fixtures is not required.
3. Locate Legends clearly visible from operating position.
4. Use arrow to indicate direction of flow using black stencil paint.
5. Identify pipe contents with sufficient additional details such as temperature, pressure, and contents to identify possible hazard. Insert working pressure shown on construction documents where asterisk appears for High, Medium, and Low Pressure designations as follows:
 - a. High Pressure - 414 kPa (60 psig) and above.
 - b. Medium Pressure - 104 to 413 kPa (15 to 59 psig).
 - c. Low Pressure - 103 kPa (14 psig) and below.
 - d. Add Fuel oil grade numbers.
6. Legend name in full or in abbreviated form as follows:

PIPING	COLOR OF EXPOSED PIPING	COLOR OF BACKGROUND	COLOR OF LETTERS	LEGEND ABBREVIATIONS
Blow-off		Green	White	Blow-off
Boiler Feedwater		Green	White	Blr Feed
A/C Condenser Water Supply		Green	White	A/C Cond Wtr Sup
A/C Condenser Water Return		Green	White	A/C Cond Wtr Ret
Chilled Water Supply		Green	White	Ch. Wtr Sup
Chilled Water Return		Green	White	Ch. Wtr Ret

Shop Compressed Air	Blue	White	Shop Air
Air-Instrument Controls	Green	White	Air-Inst Cont
Drain Line	Green	White	Drain
Emergency Shower	Green	White	Emg Shower
High Pressure Steam	Green	White	H.P. _____*
High Pressure Condensate Return	Green	White	H.P. Ret _____*
Medium Pressure Steam	Green	White	M. P. Stm _____*
Medium Pressure Condensate Return	Green	White	M.P. Ret _____*
Low Pressure Steam	Green	White	L.P. Stm _____*
Low Pressure Condensate Return	Green	White	L.P. Ret _____*
High Temperature Water Supply	Green	White	H. Temp Wtr Sup
High Temperature Water Return	Green	White	H. Temp Wtr Ret
Hot Water Heating Supply	Green	White	H. W. Htg Sup
Hot Water Heating Return	Green	White	H. W. Htg Ret
Gravity Condensate Return	Green	White	Gravity Cond Ret
Pumped Condensate Return	Green	White	Pumped Cond Ret
Vacuum Condensate Return	Green	White	Vac Cond Ret
Fuel Oil - Grade []	Brown		
Fuel Oil-Grade			
	White []	(Diesel Fuel included under Fuel Oil)	
Boiler Water Sampling	Green	White	Sample
Chemical Feed	Green	White	Chem Feed
Continuous Blow-Down	Green	White	Cont. B D
Pumped Condensate	Green	White	Pump Cond
Pump Recirculating	Green	White	Pump-Recirc.
Vent Line	Green	White	Vent
Alkali	Orange	Black	Alk
Bleach	Orange	Black	Bleach
Detergent	Yellow	Black	Det
Liquid Supply	Yellow	Black	Liq Sup
Reuse Water	Yellow	Black	Reuse Wtr

Cold Water (Domestic)	White	Green	White C.W. Dom	
Hot Water (Domestic)				
Supply	White	Yellow	Black H.W. Dom	
Return	White	Yellow	Black H.W. Dom Ret	
Tempered Water	White	Yellow	Black Temp. Wtr	
Ice Water				
Supply	White	Green	White Ice Wtr	
Return	White	Green	White Ice Wtr Ret	
Reagent Grade Water	Green	White	RG	
Reverse Osmosis	Green	White	RO	
Sanitary Waste	Green	White	San Waste	
Sanitary Vent	Green	White	San Vent	
Storm Drainage	Green	White	St Drain	
Pump Drainage	Green	White	Pump Disch	
Chemical Resistant Pipe				
Waste	Orange	Black	Acid Waste	
Vent	Orange	Black	Acid Vent	
Atmospheric Vent	Green	White	ATV	
Silver Recovery	Green	White	Silver Rec	
Oral Evacuation	Green	White	Oral Evac	
Fuel Gas	Yellow	Black	Gas	
Fire Protection Water				
Sprinkler	Red	Red	White	Auto Spr
Standpipe	Red		Red	White Stand
Sprinkler	Red		Red	White Drain

7. Electrical Conduits containing feeders over 600 volts, paint legends using 50 mm (2 inch) high black numbers and letters, showing the voltage class rating. Provide legends where conduits pass through walls and floors and at maximum 6096 mm (20 foot) intervals in between. Use labels with yellow background with black border and words Danger High Voltage Class, 15000.
8. See Sections for methods of identification, legends, and abbreviations of the following:

- a. Laboratory gas and vacuum lines: Section 22 62 00, VACUUM SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES / Section 22 63 00, GAS SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES.
 - b. Medical Gases and vacuum lines: Section 22 62 00, VACUUM SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES / Section 22 63 00, GAS SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES.
 - c. Conduits containing high voltage feeders over 600 volts: Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS / Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS.
- B. Fire and Smoke Partitions:
1. Identify partitions above ceilings on both sides of partitions except within shafts in letters not less than 64 mm (2 1/2 inches) high.
 2. Stenciled message: "SMOKE BARRIER" or, "FIRE BARRIER" as applicable.
 3. Locate not more than 6096 mm (20 feet) on center on corridor sides of partitions, and with a least one (1) message per room on room side of partition.
 4. Use semi-gloss paint of color that contrasts with color of substrate.
- C. Identify columns in pipe basements and interstitial space:
1. Apply stenciled number and letters to correspond with grid numbering and lettering indicated on construction documents.
 2. Paint numbers and letters 101 mm (4 inches) high, locate 45 mm (18 inches) below overhead structural slab.
 3. Apply on four (4) sides of interior columns and on inside face only of exterior wall columns.
 4. Color:
 - a. Use black on concrete columns.
 - b. Use white or contrasting color on steel columns.
- 3.14 PROTECTION CLEAN UP, AND TOUCH-UP:**
- A. Protect work from paint droppings and spattering by use of masking, drop cloths, removal of items or by other approved methods.
 - B. Upon completion, clean paint from hardware, glass and other surfaces and items not required to be painted of paint drops or smears.
 - C. Before final inspection, touch-up or refinished in a manner to produce solid even color and finish texture, free from defects in work which was damaged or discolored.

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SECTION 10 21 23
CUBICLE CURTAIN TRACKS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies shower curtain tracks.

1.2 RELATED WORK

- A. Section 05 50 00, METAL FABRICATIONS: Steel shapes for suspending track assembly.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
1. 305 mm (12 inch) long piece of cubicle curtain track with carrier access and end stop.
 2. Curtain carrier for attaching curtain to track.
- C. Shop Drawings: Showing layout of tracks and method of anchorage.
- D. Manufacturer's Literature and Data:
1. Cubicle curtain track.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver material in original package marked to identify the contents, brand name, and the name of the manufacturer or supplier.
- B. Store in dry and protected location. Store so as to not bend or warp the tracks.
- C. Do not open packages until contents are needed for installation, unless verification inspection is required.

1.5 WARRANTY

- A. Construction Warranty: Cubicle curtain tracks are subject to the terms of the Article "Warranty of Construction," FAR clause 52.246-21.

1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. ASTM International (ASTM):
1. B221-14 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes

2. B221M-13 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes (Metric)
 3. B456-17 Electrodeposited Coatings for Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
- C. Aluminum Association (AA):
1. DAF 45-09 Designation System for Aluminum Finishes
- D. American Architectural Manufacturers Association (AAMA):
1. 2603-20 Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
- E. The National Association of Architectural Metal Manufacturers (NAAMM):
1. AMP 500-06 Series Metal Finishes Manual

PART 2 - PRODUCTS

2.1 SHOWER CURTAIN

- A. Vinyl Material: Provide heavy duty, 13-gauge, flame retardant, anti-microbial Super Bio Stat vinyl. Features include: Polyester reinforced medical grade PVC, anti-static, antimicrobial, flame retardant, stain resistant, odor resistant, water repellent, wear resistant, scrubbable and colorfast.
- B. Shield Fabric: Provide 100% polyester, impregnated and multi-coated with Aqueous based microporous polymers.
- C. Chalet Fabric: Provide Woven 100% Polyester, Fire Rated, Visa Finish, treated with an antimicrobial agent to inhibit and control bacteria/mildew growth.
- D. Open Mesh Cloth: Provide curtain heading of open weave nylon mesh material with #50, 1/2" holes to permit air circulation and sprinkler action. Mesh is to be flame retardant, washable and dry-cleanable.

2.2 SHOWER CURTAIN TRACK

- A. Provide water/corrosion resistant aluminum surface mounted track system and glider hooks at 10 per meter (3.28 feet).

2.3 FASTENERS

- A. Exposed Fasteners, Screws and Bolts: Stainless steel.
- B. Concealed Fasteners, Screws and Bolts: Stainless steel.
- C. Metal Clips: Anchor curtain tracks to exposed grid of lay-in acoustical tile ceilings, with concealed metal (butterfly) type or two-piece snap locking type ceiling clip of high strength spring steel.

1. When it is not possible to install the metal ceiling clip, the cubicle curtain track may be screwed to the ceiling grid.

2.4 FINISHES

- A. Aluminum: Finish numbers for aluminum specified are in accordance with AA DAF 45. AA-C22A31 finish, chemically etched medium matte with clear anodic coating, Class II Architectural, .01 mm (0.4 mils) thick.
- B. Baked Enamel or Powder Coat Finish: AAMA 2603.

2.5 FABRICATION

- A. Weld and grind smooth joints of fabricated components.
- B. Form tracks and bends of lengths that will produce the minimum number of joints. Make track sections up to 4877 mm (16 feet) without joints. Form corner bend on a 305 mm (12 inch) radius.
- C. Provide steel anchor plates, supports, and anchors for securing components to building construction.
- D. Form flat surface without distortion.
- E. Shop assembles components and package complete with anchors and fittings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install tracks after finish painting and ceiling finishing operations are complete.
- B. Install track level and hangers plumb and securely anchor to the ceiling to form a rigid installation.
- C. Anchor surface mounted curtain tracks to concrete, plaster and gypsum board ceilings with a minimum of 3 mm (1/8-inch) diameter fastenings or concealed clips spaced not more than 914 mm (3 feet) on center.
- D. Fasten end stop caps to prevent them from being forced out by the striking weight of carriers.
- E. Remove damaged or defective components and replace with new components or repair to the original condition.
- F. Install track rigid, plumb, level and true, and securely anchored to the overhead construction.
- G. Verify that carrier units operate smoothly and easily over the full range of travel.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 10 26 00

WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies handrails, corner guards and high impact wall covering.

1.2 RELATED WORK:

- A. Section 08 71 00, DOOR HARDWARE: Armor plates and kick plates not specified in this section.
- B. Section 09 06 00, SCHEDULE FOR FINISHES: Color and texture of aluminum and resilient material.

1.3 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Manufacturer with a minimum of three (3) years' experience in providing items of type specified.
 - 1. Obtain wall and door protection from single manufacturer.
- B. Installer's Qualifications: Installers are to have a minimum of three (3) years' experience in the installation of units required for this project.

1.4 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Show design and installation details.
- C. Manufacturer's Literature and Data:
 - 1. Handrails
 - 2. Corner Guards.
 - 3. High Impact Wall covering.
- D. Test Report: Showing that resilient material complies with specified fire and safety code requirements.
- E. Manufacturer's qualifications.
- F. Installer's qualifications.
- G. Manufacturer's warranty.

1.5 DELIVERY AND STORAGE:

- A. Deliver materials to the site in original sealed packages or containers marked with the name and brand, or trademark of the manufacturer.
- B. Protect from damage from handling and construction operations before, during and after installation.
- C. Store in a dry environment of approximately 21 degrees C (70 degrees F) for at least 48 hours prior to installation.

1.6 WARRANTY:

- A. Construction Warranty: Comply with FAR clause 52.246-21 "Warranty of Construction".
- B. Manufacturer Warranty: Manufacturer shall warranty their wall and door protection for a minimum of five (5) years from date of installation and final acceptance by the Government. Submit manufacturer warranty.

1.7 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. ASTM International (ASTM):
 - 1. A240/A240M-20 Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and For General Applications
 - 2. B221-14 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
 - 3. B221M-13 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
 - 4. D256-10(2018) Determining the Izod Pendulum Impact Resistance of Plastics
 - 5. D635-18 Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
 - 6. E84-20 Surface Burning Characteristics of Building Materials
- C. Aluminum Association (AA):
 - 1. DAF 45-09 Designation System for Aluminum Finishes
- D. American Architectural Manufacturers Association (AAMA):
 - 1. 611-14 Voluntary Specification for Anodized Architectural Aluminum
- E. Code of Federal Regulation (CFR):
 - 1. 40 CFR 59(2020) Subpart D National Volatile Organic Compound Emission Standards for Architectural Coatings
- F. The National Association of Architectural Metal Manufacturers (NAAMM):
 - 1. AMP 500-06 Metal Finishes Manual
- G. National Fire Protection Association (NFPA):
 - 1. 80-2019 Standard for Fire Doors and Other Opening Protectives
- H. SAE International (SAE):
 - 1. J 1545-2014-10 Instrumental Color Difference Measurement for Exterior Finishes, Textiles and Colored Trim.
- I. Underwriters Laboratories Inc. (UL):
 - 1. Annual Issue, Building Materials Directory

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Stainless Steel: A240/A240M, Type 304.
- B. Aluminum Extruded: ASTM B221M (B221), Alloy 6063, Temper T5 or T6. Provide aluminum alloy used for colored anodizing coating as required to produce specified color.
- C. Resilient Material:
 - 1. Provide resilient material consisting of high impact resistant extruded acrylic vinyl, polyvinyl chloride, or injection molded thermal plastic conforming to the following:
 - a. Minimum impact resistance of 960.8 N-m/m (18 ft.-lbs./sq. inch) when tested in accordance with ASTM D256 (Izod impact, ft.-lbs. per inch notched).
 - b. Class 1 fire rating when tested in accordance with ASTM E84, having a maximum flame spread of 25 and a smoke developed rating of 450 or less.
 - c. Rated self-extinguishing when tested in accordance with ASTM D635.
 - d. Provide material labeled and tested by Underwriters Laboratories or other approved independent testing laboratory.
 - e. Provide resilient material for protection on fire rated doors and frames assemblies that is listed by the testing laboratory performing the tests.
 - f. Provide resilient material installed on fire rated wood/steel door and frame assemblies that have been tested on similar type assemblies. Test results of material tested on any other combination of door and frame assembly are not acceptable.
 - g. Provide integral color with colored components matched in accordance with SAE J 1545 to within plus or minus 1.0 on the CIE-LCH scales.

2.2 CORNER GUARDS:

- A. Fabricate stainless steel corner guards of 1.27 mm (.05 inch) thick material conforming to ASTM A240/A240M, Type 304. Install corner guards as indicated on construction documents. Form corner guard to dimensions shown on construction documents.

2.3 WALL GUARDS AND HANDRAILS:

- A. Resilient Handrails:
 - 1. Single Handrail:

- a. Snap-on covers of resilient material, minimum 2 mm (0.078-inch) thick.
 - b. Free-floating on a continuous, extruded aluminum retainer, minimum 1.82 mm (0.072-inch) thick.
 - c. Mounting Bracket: Extended mounting on stainless steel mounting brackets.
 - d. Anchor to wall at maximum 762 mm (30 inches) on center.
2. Provide handrails with prefabricated end closure caps, inside and outside corners, concealed splices, cushions, mounting hardware and other accessories as required. End caps and corners to be field adjustable to assure close alignment with handrails and wall guards. Screw or bolt closure caps to aluminum retainer in a concealed manner.

2.4 HIGH IMPACT WALL COVERING:

- A. Provide wall covering/panels consisting of high impact rigid acrylic vinyl or polyvinyl chloride resilient material.
- B. Panel sizes to be 48 by 120 inches (1219 by 3048 mm) for roll.
- C. Submit fire rating and extinguishing test results for resilient material.
- D. Submit statements attesting that the items comply with specified fire and safety code requirements.
- E. Rigid Vinyl Acrylic Wall Covering: Wall covering thickness to be 1.02 mm (0.040 inch).
- F. Trim Moldings: Extruded rigid plastic that matches wall-covering color.
- G. Provide adhesive as recommended by the wall covering manufacturer. Provide adhesive with VOC content of 250 g/L or less when calculated according to 40 CFR 59, (EPA Method 24).

2.5 FASTENERS AND ANCHORS:

- A. Provide fasteners and anchors as required for each specific type of installation.
- B. Where type, size, spacing or method of fastening is not shown or specified in construction documents, submit shop drawings showing proposed installation details.

2.6 FINISH:

- A. Aluminum: In accordance with AA DAF-45.
 1. Exposed aluminum: AAMA 611 AA-M12C22A32 chemically etched medium matte with integrally colored anodic coating, Class II Architectural .01 mm (0.4 mil) thick.

2. Concealed aluminum: Mill finish as fabricated, uniform in color and free from surface blemishes.
- B. Stainless Steel: In accordance with NAAMM AMP 500 finish Number 4.
- C. Resilient Material: Embossed textures and color in accordance with SAE J1545.

PART 3 - INSTALLATION

3.1 STAINLESS STEEL CORNER GUARDS:

- A. Mount guards on external corners of interior walls, partitions and columns as shown on construction documents.
- B. Where corner guards are installed on gypsum board, clean surface and anchor guards with a neoprene solvent-type contact adhesive specifically manufactured for use on gypsum board construction. Remove excess adhesive from around edge of guard and allow curing undisturbed for 24 hours.

3.2 RESILIENT HANDRAILS

- A. Secure guards to walls with brackets and fasteners in accordance with manufacturer's details and instructions.

3.3 HIGH IMPACT WALL COVERING:

- A. Surfaces to receive protection to be clean, smooth and free of obstructions.
- B. Install protectors after frames are in place but preceding installation of doors in accordance with approved shop drawings and manufacturer's specific instructions.
- C. Apply with adhesive in controlled environment according to manufacturer's recommendations.
- D. Install top moldings as required for a complete installation. Seal all vertical joints with clear silicone sealant.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES (by VA)

PART 1 - GENERAL

1.1 DESCRIPTION

A. SUMMARY:

1. Section Includes: Toilet and bath accessories at pantry, toilets, baths, and other areas indicated on drawings.

1.2 RELATED REQUIREMENTS

- A. Section 09 06 00, SCHEDULE FOR FINISHES: Color of finishes.
- B. Section 09 30 13, CERAMIC/PORCELAIN TILING: Ceramic Toilet and Bath Accessories.
- C. Section 10 21 23, CUBICLE CURTAIN TRACKS: Shower Curtain Break Away Pendant Chain Hooks.

1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.
- B. American Society of Mechanical Engineers (ASME):
 1. B18.6.4-98(R2005) - Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws inch.
- C. American Welding Society (AWS):
 1. D10.4-86(2000) - Welding Austenitic Chromium-Nickle Stainless Steel Piping and Tubing.
- D. ASTM International (ASTM):

A269/A269M-15a(2019)....Seamless and Welded Austenitic Stainless Steel
Tubing for General Service.

A312/A312M-19.....Seamless, Welded, and Heavily Cold Worked
Austenitic Stainless Steel Pipes.

A653/A653M-20.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron
Alloy-Coated (Galvannealed) by the Hot-Dip
Process.

A666-15.....Annealed or Cold-Worked Austenitic Stainless Steel
Sheet, Strip, Plate, and Flat Bar.

A1011/A1011M-18a.....Steel, Sheet and Strip, Hot-Rolled, Carbon,
Structural, High-Strength Low-Alloy,
High-Strength Low-Alloy with Improved
Formability, and Ultra-High Strength.

- B30-20.....Copper Alloys in Ingot Form.
- B75/B75M-20.....Seamless Copper Tube.
- B221-14.....Aluminum and Aluminum-Alloy Extruded Bars, Rods,
Wire, Profiles, and Tubes.
- B221M-13.....Aluminum and Aluminum-Alloy Extruded Bars, Rods,
Wire, Profiles, and Tubes (Metric).
- B456-17.....Electrodeposited Coatings of Copper Plus Nickel
Plus Chromium and Nickel Plus Chromium.
- B824-17.....General Requirements for Copper Alloy Castings.
- C1036-16.....Flat Glass.
- C1048-18.....Heat-Strengthened and Fully Tempered Flat Glass.
- D635-18.....Rate of Burning and/or Extent and Time of Burning
of Plastics in a Horizontal Position.
- F446-19.....Grab Bars and Accessories Installed in the Bathing
Area.

E. Federal Specifications (Fed. Spec.):

- 1. A-A-3002 - Mirror, Glass.
- 2. FF-S-107C(2) - Screws, Tapping and Drive.
- 3. WW-P-541/8B(1) - Plumbing Fixtures (Accessories, Land Use).

F. National Architectural Metal Manufacturers (NAAMM):

- 1. AMP 500-06 - Metal Finishes Manual.

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:

- 1. Show size, configuration, and fabrication, anchorage and installation details.
- 2. Show mounting locations and heights.

C. Manufacturer's Literature and Data:

- 1. Description of each product.
- 2. Installation instructions.

D. Samples:

- 1. Full sized, complete assembly of each product specified.
- 2. Approved samples may be incorporated into project.

E. Certificates: Certify each product complies with specifications.

1. Soap dispensers: Certify soap dispensers are fabricated of material that will not be affected by liquid soap, aseptic detergents, and hexachlorophene solutions.

F. Qualifications: Substantiate qualifications comply with specifications.

1. Manufacturer with project experience list.

G. Operation and Maintenance Data:

1. Care instructions for each exposed finish product.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Regularly manufactures specified products.

1.6 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.

B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.

C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.7 STORAGE AND HANDLING

A. Store products indoors in dry, weathertight facility.

B. Protect products from damage during handling and construction operations.

1.8 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum: ASTM B221M (ASTM B221), Alloy 6063-T5 and Alloy 6463-T5.

B. Stainless Steel:

1. Plate Or Sheet: ASTM A666, Type 304, 0.8 mm (0.031 inch) thick unless otherwise specified.

C. Tubing: ASTM A269/A269M, Grade TP 304, seamless or welded.

D. Pipe: ASTM A312/A312M; Grade TP 304.

E. Steel Sheet: ASTM A653/A653M, zinc-coated (galvanized) coating designation G90.

F. Chrome Plating (Service Condition Number SC 2): ASTM B456.

G. Brass Castings: ASTM B30.

H. Copper:

1. Tubing: ASTM B75/B75M.
2. Castings: ASTM B824.

I. Glass:

1. ASTM C1036, Type 1, Class 1, Quality q2, for mirrors, and for mirror doors in medicine cabinets.
2. ASTM C1036, Type 1 Class 1 Quality q3, for shelves in medicine cabinets.
3. ASTM C1048, Kind FT, Condition A, Type 1, Class 1 for glass and mirrors in Mental Health and Behavior Patient Care Units, and Security Examination Rooms.

2.2 PRODUCTS - GENERAL

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES and TOILET ACCESSORY SCHEDULE on the Drawings.
- B. Provide each product from one manufacturer.

2.3 PAPER TOWEL DISPENSERS

- A. Surface mounted type with sloping top.
- B. Dispensing capacity for 300 sheets of any type of paper toweling.
- C. Fabricate of stainless steel.
- D. Provide door with continuous hinge at bottom, and spring tension cam lock or tumbler lock, keyed alike, at top, and refill sight slot in front.

2.4 TOILET TISSUE DISPENSERS

- A. Double roll surface mounted type.
- B. Mount on continuous backplate.
- C. Removable spindle ABS plastic or chrome plated plastic.
- D. Wood rollers are not acceptable.
- E. Toilet Tissue Dispensers Used In Mental Health And Behavioral Patient Care Units: Soft plastic rod incapable of supporting load greater than 22.6 kg (50 pounds) with concealed or tamper resistant fasteners.

2.5 GRAB BARS

- A. Fed. Spec. WW-P-541/8B, Type IV, bars, surface mounted, Class 2, grab bars and complying with ASTM F446.
- B. Fabricate from stainless steel:
 1. Stainless steel: Grab bars, flanges, mounting plates, supports, screws, bolts, and exposed nuts and washers.
- C. Mounting:
 1. Floor Mounted Grab Bars: Exposed type.
 2. Swing Up Grab Bars: Exposed type.
 3. Other Types and Locations: Concealed type.
- D. Bars:

1. Fabricate to 38 mm (1-1/2 inch) outside diameter.
 - a. Stainless steel, minimum 1.2 mm (0.05 inch) thick.
2. Fabricate in one continuous piece with ends turned toward walls.
3. Swing up grab bars and grab bars continuous around three sides of showers may be fabricated in two sections, with concealed slip joint between.
4. Continuously weld intermediate support to grab bar.
5. Swing Up Bars: Manually operated; designed to prevent bar from falling when in raised position.

E. Flange for Concealed Mounting:

1. Minimum 2.65 mm (0.1 inch) thick, maximum 79 mm (3-1/8 inch) diameter by 13 mm (1/2 inch) deep, with minimum three set screws for securing flange to back plate.
2. Insert grab bar through center of flange and continuously weld perimeter of grab bar flush to back side of flange.
3. In lieu of providing flange for concealed mounting, and back plate as specified, grab bar may be welded to back plate covered with flange.

F. Flange for Exposed Mounting:

1. Minimum 5 mm (3/16 inch) thick, maximum 79 mm (3-1/8 inch) diameter.
2. Insert grab bar through flange and continuously weld perimeter of grab bar flush to backside of flange.
3. Where mounted on floor, provide four equally spaced holes, sized to accommodate 5 mm (3/8 inch) diameter bolts, maximum 5 mm (3/8 inch) from edge of flange.

G. Back Plates:

1. Minimum 2.65 mm (0.1046 inch) thick metal.
2. Fabricate in one piece, maximum 6 mm (1/4 inch) deep, with diameter sized to fit flange. Provide slotted holes to accommodate anchor bolts.
3. Provide spreaders, through bolt fasteners, and cap nuts, where grab bars are mounted on partitions.

2.6 CLOTHES HOOKS, ROBE OR COAT

- A. Fabricate hook units from chromium plated brass with satin finish, or stainless steel, using 6 mm (1/4 inch) minimum thick stock, with edges and corners rounded smooth to thickness of metal, or 3 mm (1/8 inch) minimum radius.
- B. Fabricate each unit as a double hook on a single shaft, integral with or permanently fastened to wall flange, provided with concealed fastenings.

- C. Clothes Hooks Used In Mental Health And Behavioral Patient Care Units:
Provide units free of anchor points and secured to the wall using tamper resistant hardware.

2.7 TOWEL BARS

- A. Fed. Spec. WW-P-541/8B, Type IV, Bar, Surface mounted; Class 1, towel.
B. Stainless steel, or chromium plated copper alloy.
C. Bar Length: 450 and 600 mm (18 and 24 inches) as shown.
D. Finish brackets and supports to match bar.

2.8 METAL FRAMED MIRRORS

- A. Fed. Spec. A-A-3002 metal frame; stainless steel.
B. Mirror Glass:
1. Minimum 6 mm (1/4 inch) thick.
2. Set mirror in a protective vinyl glazing tape.
C. Frames:
1. Channel or angle shaped section with face of frame minimum 9 mm (3/8 inch) wide. Fabricate with square corners.
2. Metal Thickness 0.9 mm (0.035 inch).
3. Filler:
a. Where mirrors are mounted on walls having ceramic tile wainscots not flush with wall above, provide fillers contoured to conceal void between back of mirror and wall surface.
b. Fabricate fillers from same material and finish as mirror frame.
4. Attached Shelf for Mirrors:
a. Fabricate shelf of same material and finish as mirror frame.
b. Make shelf maximum 150 mm (6 inches) in depth, and extend full width of mirror.
c. Close ends and front edge of shelf to same thickness as mirror frame width.
d. Form shelf for aluminum framed mirror as integral part of bottom frame member.
e. Form stainless steel shelf with concealed brackets to attach to mirror frame.
D. Back Plate:
1. Fabricate backplate for concealed wall hanging from zinc-coated, or cadmium plated 0.9 mm (0.036 inch) thick sheet steel, die cut to fit face of mirror frame.

2. Provide set screw type theft resistant concealed fastening system for mounting mirrors.

E. Mounting Bracket:

1. Designed to support mirror tight to wall.
2. Designed to retain mirror with concealed set screw fastenings.

2.9 MEDICINE CABINETS

A. Fed. Spec. WW-P-541/8B, Type III Medicine cabinets, Style R, Recessed.

1. Glass Shelves: Minimum 6 mm (1/4 inch) thick, with bulb-edges at front. Support shelves on adjustable aluminum brackets. Provide three shelves for each cabinet.
2. Cabinet Body: Fabricate from 0.9 mm (0.036 inch) thick sheet steel, with baked enamel finish, or 0.9 mm (0.036 inch) thick stainless steel. Form body in one piece, without seams, and with rounded inside corners.

B. Hinged Door:

1. Swing door.
2. Fabricate mirror door approximately 400 by 560 mm (16 by 22 inches).
3. Cabinet concealed when doors are closed.
4. Mirror Door Frame: Channel shape, 15 mm (0.060 inch) thick chromium plated brass, or 0.9 mm (0.036 inch) thick stainless steel.
5. Provide door with full length stainless steel piano hinge, magnetic or friction catches, rubber bumpers, and 90 degree restraining arm with spring type stop.

2.10 SOAP DISPENSER

- A. Fabricate of stainless steel.

2.11 PAPER CUP DISPENSER

- A. Fabricate of stainless steel.

- B. Provide door with concealed stainless steel pivoting rod or piano hinge, and spring tension cam lock, or tumbler lock, keyed alike when more than one accessory unit is provided, and with cup level refill sight slot in door front.

- C. Fabricate for flat bottom cups.

- D. 90 Milliliters (3 ounce) Dispenser Unit:

1. Surface mounted single stack dispenser unit having a capacity of maximum one hundred fifty cups.
2. Form door from one piece to cover front and sides warp free.

- E. 120 Milliliters (4 ounce) Dispenser Unit:

1. Recessed type single stack dispenser unit having a capacity of Maximum one hundred cups.
 2. Form face frame in one piece.
 3. Fabricate door double-pan warp free.
- F. Combination 90 to 180 Milliliters (3 to 6 ounce) Dispenser and Disposal Unit:
1. Recessed type, having a capacity of Maximum 170 cups.
 2. Fabricate as twin stack dispenser unit with adjustable dispensing mechanism to dispense any size cup.
 3. Fabricate face frames in one piece and doors double pan warp free.
 4. Fabricate recessed disposal unit with removable waste receptacle having a capacity of minimum 11 L (3.1 gallons).

2.12 MOP RACKS

- A. Minimum 1016 mm (40 inches) long with five holders.
- B. Clamps:
 1. Minimum of 1.3 mm (0.05 inch) thick stainless steel bracket retaining channel with hard rubber serrated cam; pivot mounted to channel.
 2. Clamps to hold handles from 13 mm (1/2 inch) minimum to 32 mm (1-1/4 inch) maximum diameter.
- C. Support:
 1. Minimum 1 mm (0.04 inch) thick stainless steel hat shape channel to hold clamps away from wall as indicated.
 2. Drill wall flange for 3 mm (1/8 inch) fasteners above and below clamp locations.
- D. Secure clamps to support with oval head machine screws or rivets into continuous reinforcing back of clamps.

2.13 FABRICATION - GENERAL

- A. Welding, AWS D10.4.
- B. Grind, dress, and finish welded joints to match finish of adjacent surface.
- C. Form exposed surfaces from one sheet of stock, free of joints.
- D. Provide steel anchors and components required for secure installation.
- E. Form flat surfaces without distortion. Keep exposed surfaces free from scratches and dents. Reinforce doors to prevent warp or twist.
- F. Isolate aluminum from dissimilar metals and from contact with building materials as required to prevent electrolysis and corrosion.
- G. Hot-dip galvanized steel or stainless steel, anchors and fastening devices.

- H. Shop assemble accessories and package with components, anchors, fittings, fasteners and keys.
- I. Key items alike.
- J. Provide templates and rough-in measurements.
- K. Round and deburr edges of sheets to remove sharp edges.

2.14 FINISH

- A. Stainless Steel: NAAMM AMP 500; No. 4 polished finish.
- B. Aluminum Anodized Finish: NAAMM AMP 500.
 - 1. Clear Anodized Finish: AA-C22A41; Class I Architectural, 0.018 mm (0.7 mil) thick.
 - 2. Color Anodized Finish: AA-C22A42 or AA-C22A44; Class I Architectural, 0.018 mm (0.7 mil) thick.
 - 3. Chromium Plating: ASTM B456, satin or bright as specified, Service Condition No. SC2.

2.15 ACCESSORIES

- A. Fasteners:
 - 1. Fasteners in Mental Health and Behavioral Patient Care Units: Tamper resistant hot-dipped galvanized or stainless steel.
- B. Exposed Fasteners: Stainless steel or chromium plated brass, finish to match adjacent surface.
 - 1. Concealed Fasteners:
 - a. Shower, Bath Tubs, and High Moisture Areas: Stainless steel.
 - b. Other Locations: Steel, hot-dipped galvanized.
- C. Toggle Bolts: For use in hollow masonry or frame construction.
 - 1. Sex bolts: For through bolting on thin panels.
 - 2. Expansion Shields: Lead or plastic for solid masonry and concrete substrate as recommended by accessory manufacturer to suit application.
 - 3. Screws:
 - a. ASME B18.6.4.
 - b. Fed. Spec. FF-S-107, Stainless steel Type A.
- D. Adhesive: As recommended by manufacturer to suit application.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
 - 1. Verify blocking to support accessories is installed and located correctly.

- B. Verify location of accessories with Contracting Officer's Representative.

3.2 INSTALLATION

- A. Install products according to manufacturer's instructions [**and approved submittal drawings**].
 - 1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.
- B. Install grab bars according to ASTM F446.
- C. Set work accurately, in alignment and where indicated, parallel or perpendicular as required to line and plane of surface. Install accessories plumb, level, free of rack and twist.
- D. Toggle bolt to steel anchorage plates in frame partitions and hollow masonry. Expansion bolt to concrete or solid masonry.
- E. Install accessories to function as designed. Perform maintenance service without interference with performance of other devices.
- F. Position and install dispensers, and other devices in countertops, clear of drawers, permitting ample clearance below countertop between devices, and ready access for maintenance.
- G. Align mirrors, dispensers and other accessories even and level, when installed in battery.
- H. Install accessories to prevent striking by other moving, items or interference with accessibility.
- I. Install accessories in Mental Health and Behavioral Units with tamper resistant screws that are flush mounted so that they will not support a rope or material for hanging.

3.3 CLEANING

- A. After installation, clean toilet accessories according to manufacturer's instructions.

3.4 PROTECTION

- A. Protect accessories from damage until project completion.

3.5 SCHEDULE OF ACCESSORIES

- A. Refer to Drawings.

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SECTION 10 31 00

CLAY CHIMNEY POTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies clay chimney tops.

1.2 RELATED SECTIONS

- A. Section 07 60 00: FLASHING AND SHEET METAL

1.3 REFERENCES

- A. ASTM C315-02 - Standard Specification for Clay Flue Liners ASTM C301-98- Standard Test Methods for Vitrified Clay Pipe. ASTM C67-02a- Standard Methods of Sampling and Testing Brick and Structural Clay Tile. ASTM C1283-02- Standard Practice for Installing Clay Flue Lining. ASTM C270-01a- Standard Specification for Mortar for Unit Masonry. ASTM C150- Specification for Portland Cement.
- B. ASTM C207- Specification for Hydrated Lime for Masonry Purposes ASTM C144- Specification for Aggregate for Masonry ACI 530.1- Building Code Requirements & Specifications for Masonry Structures.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data: Clay chimney pot including installation instruction and rough opening required.

1.5 QUALITY ASSURANCE

- A. Subcontractors Qualifications: All work to be performed by mechanics experienced in handling and setting of clay chimney pots.

1.6 PRODUCT HANDLING, STORAGE AND DELIVERY

- A. Inspect chimney top upon delivery. Any non-conformity must be indicated on delivery ticket. If the product is damaged in transit, the seller shall be immediately notified in writing. The responsibility for cost of such replacement shall be determined at the point of delivery. The contractor shall assume the responsibility for necessary proof of damage.
- B. Storage at job site: Units shall stay in their original packing material until ready for use. Crates/pallets shall not be stacked, and shall remain in upright position.
- C. Store on firm, level and smooth surface, protected from weather to prevent staining.

1.7 JOB CONDITIONS

- A. Cold Weather: Perform work in accordance with ACI 530.1 current edition.
Hot Weather: Perform work in accordance with ACI 530.1 current edition.
At the end of each workday, or during rainy weather, cover masonry work exposed to weather with waterproof coverage and securely anchor as necessary.

PART 2 - PRODUCT

2.1 MATERIAL

- A. Basis of Design: Vitrified Clay Chimney Pots, manufactured by Superior Clay Corporation, Uhrichsville, Ohio 44683. 1-800-848-6166. Shall be manufactured from clay, shale, or a combination of these materials that is fired at suitable temperature.

- B. Quality Control:

Chimney pots shall conform to the physical requirements listed below as preformed in accordance with ASTM Specifications.

Test average (based on 5 samples)	Method	Criteria
Absorption (5 hour boil) - 8%	ASTM-C301	ASTM- C315
Freeze/Thaw Resistance	ASTM C67	ASTM- C315
Acid Resistance < .25%	ASTM- C301	ASTM- C315

- C. Dimension Tolerance:

The maximum difference in the diagonal dimensions of square and rectangular Chimney Pots shall not exceed _ inch for sizes up to and including 12 inch by 12 inch and _ inch for larger sizes.

Variation in dimensions of round Chimney Pots shall not exceed those shown in ASTM - C315, Table 3.

Overall height variation not to exceed +/- 1/2 inch per foot.

Finish faces that will be exposed when installed shall be free from chips, blisters or other imperfections detracting from the appearance when viewed from normal viewing distance or a minimum of 15 feet.

All anchors used for securing Chimney Pot shall be of stainless steel or non-corrosive metals.

2.2 MORTARS

- A. Mortars shall comply with ASTM C270

Cementitious Materials:

Portland Cement: ASTM C150, Type II or I: low- alkali per ASTM C150, table 2.

Hydrated Lime: ASTM C207, Type S

B. Aggregates:

Sand: Clean, washed natural or manufactured silica sand graded according to ASTM C144. Sand shall contain no more than 50 parts per million of chloride ions and shall be free of organic contaminants.

C. Water:

Potable, clean and free from injurious amounts of oil, alkali, organic matter or other deleterious material.

PART 3 - EXECUTION

3.1 INSTALLATION GENERAL

A. Install plumb

Set Chimney Pot in bed of mortar on top of chimney cap.

Chimney cap constructed in accordance with ASTM C1283-02 8, or approved alternate.

All anchors shall be either stainless steel or non-corrosive metal.

Mortar a minimum of 2-inch up base of Chimney Pot.

Flash method as required by referenced standards.

3.2 MIXING MORTAR

A. Setting mortar:

Use Type M mortar, in accordance with ASTM C270 with the following material mix proportion by volume:

Portland Cement: 1 part

Hydrated Lime: 1/2 part

Sand: 3-1/2 parts

B. Use colored sand to obtain desired mortar color.

3.3 CUTTING AND FITTING

A. If necessary, any cutting or drilling done at job shall be done using a diamond blade or diamond tip drill, while applying a steady stream of cooling water.

3.4 CLEANING

A. Remove excess mortar from all surfaces upon completion of setting to prevent staining.

3.5 PROTECTION

A. Protect completed work from damage or staining due to construction operations.

B. Upon project completion remove all temporary protection.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
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SECTION 10 44 13
FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section covers recessed fire extinguisher cabinets.

1.2 SUBMITTALS

A. Submit in accordance with Section 013323, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data: Fire extinguisher cabinet including installation instruction and rough opening required.

1.3 APPLICATION PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American Society of Testing and Materials (ASTM):

1. D4802-15 Poly (Methyl Methacrylate) Acrylic Plastic Sheet

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHER CABINET

A. Recessed type with flat trim of size and design shown.

2.2 FABRICATION

A. Form body of cabinet from 0.9 mm (0.0359 inch) thick sheet steel.

B. Fabricate door and trim from 1.2 mm (0.0478 inch) thick sheet steel with all face joints fully welded and ground smooth.

1. Glaze doors with 6 mm (1/4 inch) thick ASTM D4802, clear acrylic sheet, Category B-1, Finish 1.
2. Design doors to open 180 degrees.
3. Provide continuous hinge, pull handle, and adjustable roller catch.

2.3 FINISH

A. Finish interior of cabinet body with baked-on semigloss white enamel.

B. Finish door, frame with manufacturer's standard baked-on prime coat suitable for field painting.

PART 3 - EXECUTION

A. Install fire extinguisher cabinets in prepared openings and secure in accordance with manufacturer's instructions.

B. Install cabinet so that the extinguisher height within meets the requirements of NFPA 10

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Department of Veterans Affairs
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Lebanon, PA

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SECTION 10 51 13
METAL LOCKERS (by VA)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
1. Welded corridor lockers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker.
- B. Shop Drawings: For metal lockers.
1. Include plans, elevations, sections, and attachment details.
2. Show locker trim and accessories.
3. Include locker identification system and numbering sequence.
- C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available.
- D. Product Schedule: For lockers. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Faulty operation of latches and other door hardware.
 2. Damage from deliberate destruction and vandalism is excluded.
 3. Warranty Period for Welded Metal Lockers: Lifetime from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain metal lockers and accessories from single source from single locker manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: For lockers indicated to be accessible, comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.3 WELDED CORRIDOR LOCKERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. ASI Storage Solutions; ASI Group, 2 Person Z-lockers.
 2. General Storage Systems; Pro Line Z-lockers.
 3. Penco Products, Inc.
 4. Republic Storage Systems, LLC.
- B. Doors: One piece; fabricated from 0.075-inch nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.
1. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches wide; welded to inner face of doors.
 2. Door Style: Vented panel as follows:
 - a. Louvered Vents: No fewer than six louver openings at top and bottom for 2-person "Z" lockers.
- C. Body: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:

1. Tops, Bottoms, and Sides: 0.060-inch nominal thickness.
 2. Backs: 0.048-inch nominal thickness.
 3. Shelves: 0.060-inch nominal thickness, with double bend at front and single bend at sides and back.
- D. Frames: Channel formed; fabricated from 0.060-inch nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral, full-height door strikes on vertical main frames.
- E. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees; self-closing.
1. Hinges: Manufacturer's standard, steel, continuous or knuckle type.
- F. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond door face; pry and vandal resistant.
1. Single-Point Latching: Nonmoving latch hook with steel padlock loop that projects through recessed cup and is finished to match metal locker body.
 - a. Latch Hook: Equip each door with one latch hook, fabricated from 0.120-inch nominal-thickness steel sheet; welded midway up full-height door strike; with resilient silencer.
- G. Door Handle and Latch for Box Lockers: Stainless-steel strike plate with integral pull; with steel padlock loop that projects through metal locker door.
- H. Locks: Combination padlocks.
- I. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch high.
- J. Hooks: Manufacturer's standard ball-pointed, aluminum or steel; zinc plated.
- K. Continuous Zee Base: Fabricated from, manufacturer's standard thickness, but not less than 0.060-inch nominal-thickness steel sheet.
1. Height: 4 inches.
- L. Continuous Sloping Tops: Fabricated from 0.048-inch nominal-thickness steel sheet, with a pitch of approximately 20 degrees.
1. Closures: Vertical -end type.
- M. Filler Panels: Fabricated from 0.048-inch nominal-thickness steel sheet.

N. Finished End Panels: Fabricated from 0.024-inch nominal-thickness steel sheet to cover unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.

O. Materials:

1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.

P. Finish: Baked enamel or powder coat.

1. Color: As selected by Architect from manufacturer's full range.

2.4 LOCKS

A. Combination Padlock: Provided by Owner.

2.5 FABRICATION

A. Fabricate metal lockers square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.

1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.

B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments.

C. Equipment: Provide each locker with an identification plate and the following equipment:

1. Double-Tier Units: One double-prong ceiling hook and two single-prong wall hooks.

D. Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory weld main locker groups into one-piece structures. Grind exposed welds smooth and flush.

E. Accessible Lockers: Fabricate as follows:

1. Locate bottom shelf no lower than 15 inches above the floor.
2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches above the floor.

F. Continuous Zee Base: Fabricated in lengths as long as practical to enclose base and base ends; finished to match lockers.

- G. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.
 - 1. Sloping-top corner fillers, mitered.
- H. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.
- I. Finished End Panels: Fabricated to conceal unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.

2.6 ACCESSORIES

- A. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
- B. Anchors: Material, type, and size required for secure anchorage to each substrate.
 - 1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls, and elsewhere as indicated, for corrosion resistance.
 - 2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and floors or support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install lockers level, plumb, and true; shim as required, using concealed shims.
 - 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
 - 2. Anchor single rows of metal lockers to walls near top and bottom of lockers.

- B. Welded Lockers: Connect groups together with manufacturer's standard fasteners, with no exposed fasteners on face frames.
- C. Equipment:
 - 1. Attach hooks with at least two fasteners.
 - 2. Attach door locks on doors using security-type fasteners.
 - 3. Identification Plates: Identify metal lockers with identification indicated on Drawings.
 - a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
- D. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
 - 1. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.
 - 2. Attach sloping-top units to metal lockers, with closures at exposed ends.
 - 3. Attach finished end panels using fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.

3.3 ADJUSTING

- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding.

3.4 PROTECTION

- A. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.
- B. Touch up marred finishes or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

- - - E N D - - -

SECTION 11 40 11
CUSTOM FABRICATED FOODSERVICE EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies custom-fabricated food service equipment as follows:

1. Tables.
2. Sinks.

1.2 RELATED WORK

- A. Metal Supports: Section 05 50 00, METAL FABRICATIONS.
- B. Warewashing Equipment: Section 11 48 00, CLEANING AND DISPOSAL EQUIPMENT.
- C. Plumbing Connections: Section 22 05 19, METERS AND GAGES FOR PLUMBING PIPING, Section 22 05 23, GENERAL-DUTY VALVES FOR PLUMBING PIPING, Section 22 11 00, FACILITY WATER DISTRIBUTION, Section 22 13 00, FACILITY SANITARY SEWERAGE, and Section 23 11 23, FACILITY NATURAL-GAS PIPING.
- D. Electrical Connections: Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, Section 27 05 11, REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS.

1.3 QUALITY CONTROL

- A. Manufacturer Qualifications: Approved by NSF International (NSF) for manufacturing items indicated.
- B. Installer Qualifications: Experienced in food service equipment installation or supervised by an experienced food service equipment installer.
 1. Where required to complete equipment installation, electrician and plumber shall be licensed in jurisdiction where project is located.
- C. NSF Compliance: Equipment bears NSF Certification Mark or UL Classification Mark indicating compliance with NSF/ANSI 2.
- D. Electrical Components: Listed by UL and marked for intended use.
- E. Plumbing Fixture Fittings: Comply with ASME A112.18.1.
- F. Seismic Restraint:
 1. Comply with applicable guidelines for seismic restraint of kitchen equipment contained in SMACNA's "Kitchen Ventilation Systems and Food Service Equipment Guidelines," Appendix A.

- G. In-Use Service: At least one factory-authorized service agency for equipment shall be located in the geographical area of the installation and shall have the ability to provide service within 24 hours after receiving a service call.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Show dimensions, method of assembly, installation and conditions relating to adjoining work which requires cutting or close fitting, reinforcement, anchorage, and other work required for complete installation.
- C. Operating Instructions: In accordance with requirements in Section 01 00 00, GENERAL REQUIREMENTS.
- D. Within sixty (60) days after award of contract (before equipment is purchased) the following shall be submitted in accordance with Section 01 33 00 SUBMITAL PROCEDURES.
1. The submittal package will include the following: Product data book (cut sheet book) this product data book should account for all item numbers in this contract up to and including spare numbers and existing equipment. Product data cut sheets shall be marked up in a way that indicates model and accessories included with the item.
 2. Submittal drawings will consist of the following: Custom shop drawings (hoods, walk-ins, millwork, serving lines custom fabrication, etc.) Equipment layout drawings, Plumbing connection drawings, electrical connection drawings, HVAC layout drawings and Special condition drawings (Wall backing, floor depressions, etc.)
- E. Electronically submit (PDFs) assembly drawings, electrical and mechanical rough-in connection plans, details for plumbing, electrical, air conditioning and ventilation services for all kitchen equipment and brochures, catalog cut-sheets, specifications and operating characteristics for buy-out equipment. Clearly indicate any deviations from contract Documents, such as arrangement of piping, connections, wiring method of fabrication, manner of structural conditions, standard shop practices, or other reasons, and note in Cover Sheet accompanying submittals.
- F. Drawing of fabricated equipment shall not be less than $\frac{3}{4}$ " equal one-foot scale.

- G. Rough-in drawings shall not be less than ¼" equal one-foot scale.
- H. Product Data: Provide data on appliances; indicate configuration, sizes, materials, finishes, locations, utility connections and locations.
- I. Samples: Submit samples of stainless steel and other finish materials for color selection.
- J. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- K. Manufacturer's Certificate: Certify that exhaust system and tests meet or exceed specified requirements.

1.5 WARRANTY

- A. Warrant food service equipment to be free from defects in materials and workmanship in accordance with requirements of "Warranty of Construction", FAR clause 52.246-21.

1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. ASME International (ASME):
A112.18.1-11.....Plumbing Fixture Fittings
- C. ASTM International (ASTM):
A554-10.....Welded Stainless Steel Mechanical Tubing
A666-10.....Annealed or Cold-Worked Austenitic Stainless-
Steel Sheet, Strip, Plate, and Flat Bar
- D. National Association of Architectural Metal Manufacturers (NAAMM):
AMP 500-06.....Metal Finishes Manual
- E. NSF International/American National Standards Institute (NSF/ANSI):
2-10.....Food Equipment
- F. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA): Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines, 2001

PART 2 - PRODUCTS

2.1 STAINLESS STEEL, GENERAL

- A. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304, stretcher leveled.
- B. Tube: ASTM A 554, Grade MT-304.
- C. Minimum Specified Thickness:

1. Table and or Counter Surfaces: 2.0 mm (0.0781 inch).
 2. Drainboards: 2.0 mm (0.0781 inch).
 3. Shelf Surfaces: 1.6 mm (0.0625 inch).
 4. Sink Bowls: 2.0 mm (0.0781 inch).
 5. Legs: 1.6 mm (0.0625 inch).
 6. Crossbracing: 1.6 mm (0.0625 inch).
- D. Finishes: Comply with NAAMM's AMP 500-505, Metal Finishes Manual. Grind and polish surfaces to produce uniform, directional textured, polished, free of cross scratches. Run grain with long dimension of each piece.
1. Exposed Surfaces: No. 4 finish (bright, directional polish).
 2. Concealed Surfaces: No. 2B finish (bright, cold-rolled, unpolished finish).
- E. Provide as specified per item

2.2 COMPONENTS, GENERAL

- A. Sink Fittings:
1. Faucets: Equip sinks with one faucet per sink bowl, unless otherwise indicated.
 - a. All required faucets will be noted in the specification to be either Deck or Splash mounted based on model specified.
 - b. Lever handles.
 - c. Chrome-plated copper alloy.
 2. Drains: Equip sinks with 50 mm (2 inch) diameter, nickel-plated bronze, rotary-handle wastes and stainless-steel strainer plates with chrome-plated brass connected overflows.
- B. Splashes:
1. Where backs of units abut walls, equip with splashbacks.
 2. Where units abut walls on sides, equip with side splashes.
- C. Legs: Fitted to top with 3 mm (1/8 inch) thick flange welded to underside of table/body.
1. Feet: Adjustable, stainless steel, NSF certified.
 2. Spacing: Maximum 1825 mm (72 inches) o.c.
- D. Undercounter Shelves: Where specified the Stainless-steel sheet 25 mm (1 inch) diameter, stainless-steel tubing, running left to right, at 100 mm (4 inches) o.c. front to back
- E. Sink Covers: To fit within sink opening; perforated with 10 mm (3/8 inch) holes at 50 mm (2 inches) o.c.; and with turned down edges and two recessed handles.

- F. Baskets: Stainless-steel wire baskets, 406 by 406 by 356 mm (16 by 16 by 14 inches); 32 mm (1-1/4 inch) square mesh, of 3 mm (0.12 inch) wire. Handles and frame supports are of 8 mm (5/16 inch) diameter rod. Handles welded to top and bottom frame members and extended 150 mm (6 inches) above top of basket. Equip handle with 125 mm (5 inch) wide, coil wire grip.
- G. Waste Hoppers: Shaped to funnel waste into waste disposer and with safety cover interconnected with waste disposer.
- H. Pot Washers: As specified in Section 11 48 00, CLEANING AND DISPOSAL EQUIPMENT.
- I. Provide as specified per item

2.3 TABLES

A. Tables:

Item No.	Item Type	Description
Item 21	Work table Three (3) Required OWNER SUPPLIED	Eagle Group Model T3084SEB-BS Dimensions: 39.63(h) x 84(w) x 30(d) Deluxe Series Work Table, 84"W x 30"D, 16/300 series stainless steel top with rolled front edge & 4-1/2" backsplash, adjustable 430 stainless steel undershelf with marine edge, Uni-Lok® gusset system, (4) stainless steel legs & adjustable bullet feet, NSF. Provide each with the following: 1. 2 ea. Model 502971 Spec-Master® Heavy Duty Drawer Assembly, 20" x 20" x 5", 304 type stainless steel, insulated drawer front, removable drawer pan, self-closing drawer slides, stackable, hemmed safety pull handle 2. 1 ea. Model -L Drawer Lock 3. FSC to field measure to ensure a proper fit
Item 23	Mobile Work Table One (1) Required OWNER SUPPLIED	Eagle Group Model T2448SEB-HA Dimensions: 48(w) x 24(d) ADA/Ergonomic Height Adjustable Work Table, 48"W x 24"D, 32"-40" adjustable height, 575 lbs. capacity, 16/304 stainless steel top, folding crank case handle, Uni-Lok® gusset system, adjustable stainless-steel undershelf with marine edge, stainless steel legs & adjustable bullet feet. Provide with the following: 1. 1 ea. Crank case located on left end of work table, add suffix (-L) 2. 1 ea. Model 502971 Spec-Master® Heavy Duty Drawer Assembly, 20" x 20" x 5", 304 type stainless steel, insulated drawer front, removable drawer pan, self-closing drawer slides, stackable, hemmed safety pull handle 3. 4 ea. Model 300698 Caster, 4"diameter, with brake, each 4. 1 ea. Model -L Drawer Lock

2.4 SINKS

A. Drop-in Sinks:

Item No.	Item Type	Description
Item 1	Drop-in Sink (1) One Required OWNER SUPPLIED	Advance Tabco Model DI-1-10 Dimensions: 10(h) x 13(w) x 19(d) Drop-In Sink, 1-compartment, 10" wide x 14" front-to-back x 10" deep bowl, 20-gauge 304 stainless steel, with deck mounted gooseneck faucet, basket drain, NSF 1. 1 ea. Model K-316-LU Wrist Handles Only, for splash or deck mount hand sink faucet (1 pair hot & cold 4" long blades), fits faucets supplied after November 2015 with hot & cold color rings that do not have exposed screw head 2. 1 ea. Model 7-PS-10 P-trap, heavy duty, 1-1/2", 17 gauge 3. FSC to coordinate with millwork contractor. This item is to be dropped into item #5 Millwork counter
Item 10	Drop -in 3 Compartment Sink (1) One required OWNER SUPPLIED	Advance Tabco Model DI-3-1410 Dimensions: 10(h) x 50(w) x 21(d) Drop-In Sink, 3-compartment, 14" wide x 16" front-to-back x 10" deep each/bowl, 18-gauge 304 stainless steel, deck mounted 8" swing spout faucets, basket drains. Provide with the following: 1. 1 ea. Model K-76 Paint-on sound deadening under top (each) 2. 1 ea. Model K-316-LU Wrist Handles Only, for splash or deck mount hand sink faucet (1 pair hot & cold 4" long blades), fits faucets supplied after November 2015 with hot & cold color rings that do not have exposed screw head 3. FSC to coordinate with millwork contractor. This item is to be dropped into item #11 Millwork counter One drainboard

Item 13	<p>Drop -in Sink (1) One Required</p> <p>OWNER SUPPLIED</p>	<p>Advance Tabco Model DI-1-168 Dimensions: 8(h) x 19(w) x 19(d) Drop-In Sink, 1-compartment, 16"W x 14"D front-to-back, 8" deep bowl, Deep Drawn™ sink bowl, 18-gauge 304 stainless steel, includes: deck mounted gooseneck faucet (K-52), & basket drain, NSF</p> <ol style="list-style-type: none"> 1. 1 ea. Model K-52 OMIT To Delete Faucet 2. 1 ea. Model K-50 Faucet, 4" OC, deck mounted with 8" swing spout, lead free 3. 1 ea. Model K-316-LU Wrist Handles Only, for splash or deck mount hand sink faucet (1 pair hot & cold 4" long blades), fits faucets supplied after November 2015 with hot & cold color rings that do not have exposed screw head 4. 1 ea. Model 7-PS-10 P-trap, heavy duty, 1-1/2", 17 gauge 5. FSC to coordinate with millwork contractor. This item is to be dropped into item #12 Millwork counter Two drainboards
Item 20	<p>Hand Sink (1) One Required</p> <p>OWNER SUPPLIED</p>	<p>Advance Tabco Model 7-PS-62 Dimensions: 17.25(h) x 17.25(w) x 15.25(d) Hand Sink, wall mounted, 14" wide x 10" front-to-back x 5" deep bowl, Deep Drawn™ sink bowl, 20-gauge 304 stainless steel, splash mounted gooseneck faucet, knee valve, basket drain, keyhole wall mount bracket, NSF, cCSAus</p> <ol style="list-style-type: none"> 1. 1 ea. Model 7-PS-10 P-trap, heavy duty, 1-1/2", 17 gauge

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install custom-fabricated equipment level and plumb; arranged for safe and convenient operation; with access clearances required for maintenance and cleaning.
- B. Interconnect equipment to service utilities.
- C. Install seismic restraints for equipment.
- D. Field measure to ensure a proper fit
- E. Coordinate all drop-in sinks with millwork company

3.2 CLEAN-UP

- A. At completion of the installation, clean and adjust custom-fabricated equipment as required to produce ready-for-use condition.
- B. Where stainless-steel surfaces are damaged during installation procedures, repair finishes to match adjoining undamaged surfaces.

3.3 INSTRUCTIONS

- A. Instruct personnel and transmit operating instructions in accordance with requirements in Section 01 00 00, GENERAL REQUIREMENTS.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 11 41 00
FOOD STORAGE EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies self-contained refrigeration equipment and food storage equipment as follows:

1. Automatic ice making and dispensing stations.
2. Storage Wire shelving
3. Refrigerators reach-in

1.2 RELATED WORK

A. Plumbing Connections: Section 22 11 00, FACILITY WATER DISTRIBUTION.

1.3 QUALITY CONTROL

A. Installer Qualifications: Factory-trained refrigeration technicians and experienced with food service refrigeration equipment installation or supervised by an experienced food service equipment installer.

B. NSF Compliance: Equipment bears NSF Certification Mark or UL Classification Mark:

1. Refrigerators and Freezers: Evaluated according to NSF/ANSI 7.
2. Ice Makers: Evaluated according to NSF/ANSI 12.

C. UL Listing: Equipment is listed and labeled by UL:

1. Refrigerators and Freezers: Evaluated according to UL 471.
2. Ice Makers: Evaluated according to UL 563.

D. Seismic Restraint:

1. Comply with applicable guidelines for seismic restraint of kitchen equipment contained in SMACNA's "Kitchen Ventilation Systems and Food Service Equipment Guidelines Publication 1767," Appendix A.

E. In-Use Service: At least one factory-authorized service agency for equipment shall be located in the geographical area of the installation and shall have the ability to provide service within 24 hours after receiving a service call.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:

1. Include manufacturer's address and telephone number.

2. Include catalog or model numbers and illustrations and descriptions of refrigeration equipment and accessories.
3. Proof of appliances being Energy Star qualified.
- C. Installation Drawings: Show dimensions, details of installation, coordination with plumbing and electrical work, and other work required for a complete installation.
- D. Operating Instructions: In accordance with requirements in.

1.5 WARRANTY

- A. Warrant food service equipment to be free from defects in materials and workmanship in accordance with requirements of "Warranty of Construction", FAR clause 52.246-21, except warranty period for refrigeration compressors shall be five years.

1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. NSF International/American National Standards Institute (NSF/ANSI):
7-09.....Commercial Refrigerators and Freezers
12-09.....Automatic Ice Making Equipment
- C. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA): Publication 1767 Kitchen Ventilation Systems & Food Service Equipment Fabrication and Installation Guidelines, 2001.
- D. Underwriters Laboratories Inc. (UL):
471-10.....Commercial Refrigerators and Freezers, 8th
Edition: Revised 2004
563-09.....Ice Makers, 7th Edition: Revised 2006

PART 2 - PRODUCTS

2.1 AUTOMATIC ICE MAKING AND DISPENSING STATIONS

- A. General Requirements: Automatic ice makers and dispensers as follows:
 1. Stainless-steel exterior, front and sides.
 2. Air-cooled compressor.
 3. Insulated storage bin with agitator.
 4. Cube-type ice.
 5. Dispensing area located between 813 and 1016 mm (32 and 40 inches) above the floor.
 6. Ice dispenser.
 7. Accessories:

- a. Stainless-steel stand with 152 mm (6 inch) stainless-steel legs.
- b. Water filter with 0.1-L/s (1.67-gpm) maximum flow rate.
- 8. Provide Energy Star qualified appliances.
- B. Automatic Ice Making and Dispensing Units:

SYMBOL	CAPACITY	
Item 6	Counter Top Ice/Water Dispenser OWNER SUPPLIED	Follett LLC Model 15CI100A-IW-CF-ST-00 One (1) Required Dimensions: 22.5(h) x 14.62(w) x 23.5(d) 15 Series Ice & Water Dispenser, countertop, integral air-cooled ice machine, Chewblet® ice, up to 125 lb. production in 24 hours, 15 lb. storage capacity, stainless steel exterior with accent trim, capacitive touch dispensing with replaceable Agion® antimicrobial shield, Agion® antimicrobial protection of key ice and water contact components, internal filter, drainless design, 115v/60/1-ph, NSF, cETLus 1. 1 ea. 2-year parts and labor warranty 2. 1 ea. 5-year compressor parts compressor warranty 3. 1 ea. Model 00981977 Drip Tray Drain Kit, for 7CI and 15CI, includes 4" legs 4. 1 ea. 115v/60/1-ph, 5.0 amps, 0.26 kW, 8' cord & NEMA 5-15P, 15 MCA, 5. 1 ea. Model 00968107 Water Filter Replacement Cartridge, for 7 Series and 15 Series

2.2 STORAGE SHELVING

- A. General Requirements:
 - 1. All shelving shall be epoxy coated.
 - 2. NSF

SYMBOL	CAPACITY	
Item 24	Dry Storage Shelving One Lot (1 Lot) Required OWNER SUPPLIED	<p>A. Four tier Metro Model A----NK3 Super Adjustable Super Erecta® Shelf, wire, Metroseal 3 (corrosion-resistant) finish, corner release system, with Microban® antimicrobial protection, NSF.</p> <p>B. Each shelving unit shall have four (4) Model 74PK3 Super Erecta® SiteSelect™ Post, 74-5/8"H, adjustable leveling bolt, posts are grooved at 1" increments & numbered at 2" increments, double grooved every 8", Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection. Shelving shall be provided as shown on drawing (No "S" clips allowed),</p> <p>1. It shall be the responsibility of this contractor to verify and adjust shelving sizes to insure proper fit.</p>

2.3 REFRIGERATORS, REACH-IN

A. General Requirements:

1. Exterior Finish: Stainless steel, door, sides, and top.
2. Interior Finish: as specified.
3. Doors: as specified

Item No	Item Type	Description
Item 7	Refrigerator w/Freezer Base Two (2) Required OWNER SUPPLIED	<p>Viking Model RVRF3361 Two (2) Required</p> <p>French door refrigerator with bottom freezer 15.4 CF refrigerator 6.7 CF freezer Led lighting adjustable cold zone drawer adjustable humidity zone drawer. 4 adjustable tempered glass shelving in door dairy compartment 5 large door bins. Provided with Premium air and water filters. Freezer base has slide out basket separate ice bucket and drawer is self closing. Electronic control with digital temperature readouts height temp and power fail alarms. 35-5/8" wide x 70" high 1/4" cooper tubing inlet water line max 100 psi 347 lbs. 120/60 15-amp 3 wire cord with grounded plug</p>

<p>Item 19</p>	<p>2 Door Refrigerator/Freezer One (1) Required OWNER SUPPLIED</p>	<p>Continental Refrigerator Model 2RFEN One (1) Required Dimensions: 82.25(h) x 57(w) x 35.38(d) Extra-Wide Refrigerator/Freezer, reach-in, 57"W, two-section, self-contained refrigeration, stainless steel front, aluminum interior & ends, standard depth, full-height solid doors, cylinder locks, electronic control with digital display, freezer can be adjusted to operate as low as -10°F, hi-low alarm, unit comes standard with expansion valve, electric condensate evaporator, R290 Hydrocarbon refrigerant, dual 1/4 & 1/2 HP, cETLus, NSF, Made in USA. Provide with the following:</p> <ol style="list-style-type: none"> 1. 1 ea. Standard warranty (for the United States & Canada Only): 3-year parts and labor; additional 4-year compressor part 2. 1 ea. 115v/60/1-ph, 5.2 amps, cord & plug (refrigerator) 3. 1 ea. 115v/60/1-ph, 7.6 amps, cord & plug (freezer) 4. 1 ea. Left Door hinged on left & right door hinged on right 5. 1 ea. 5" Casters 6. 4 ea. Shelf, epoxy coated, plated steel with clips
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PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install self-contained refrigeration equipment level and plumb; arranged for safe and convenient operation; with access clearances required for maintenance and cleaning; and according to manufacturer's written instructions.
- B. Install seismic restraints for equipment.

3.2 CLEAN-UP

- A. At completion of the installation, clean and adjust self-contained refrigeration equipment as required to produce ready-for-use condition.
- B. Where stainless-steel surfaces are damaged during installation procedures, repair finishes to match adjoining undamaged surfaces.

3.3 INSTRUCTIONS

- A. Instruct personnel and transmit operating instructions in accordance with requirements in.

Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 11 44 00
FOOD COOKING EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies food service cooking equipment as follows:

1. Toasters electric
2. Ranges Top gas.
3. Can Openers Manual
4. Exhaust Hood w/Fire Suppression
5. Ovens
6. Coffee Brewers electric

1.2 RELATED WORK

A. Plumbing Connections: Section 22 05 19, METERS AND GAGES FOR PLUMBING PIPING, Section 22 05 23, GENERAL-DUTY VALVES FOR PLUMBING PIPING , Section 22 11 00, FACILITY WATER DISTRIBUTION, Section 22 13 00, FACILITY SANITARY SEWERAGE, Section 22 13 23, SANITARY WASTE INTERCEPTORS, and Section 23 11 23, FACILITY NATURAL-GAS PIPING.

B. Electrical Connections: Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, Section 27 05 11, REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS, and Section 28 05 11, REQUIREMENTS FOR ELECTRONIC SAFETY AND SECURITY INSTALLATIONS.

C. Electrical Disconnect Switches: Section 26 29 21, DISCONNECT SWITCHES.

1.3 QUALITY CONTROL

A. Installer Qualifications: Experienced in food service equipment installation or supervised by an experienced food service equipment installer:

1. Where required to complete equipment installation, electrician and plumber shall be licensed in jurisdiction where project is located.

B. NSF Compliance: Equipment bears NSF Certification Mark or UL Classification Mark indicating compliance with NSF/ANSI 4E.

C. UL Listing: Equipment is listed in UL "Heating, Cooling, Ventilating and Cooking Equipment Directory" and is labeled for intended use.

1. Electric Cooking Equipment: Evaluated according to UL 197.
2. Gas-Burning Cooking Equipment: Evaluated according to ANSI Z83.11/CGA 1.8-M96 and its addendum.

D. Steam-Generating Equipment: Fabricated and labeled to comply with ASME BPVC.

E. Seismic Restraint:

1. Comply with requirements in Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS.
2. Comply with applicable guidelines for seismic restraint of kitchen equipment contained in SMACNA's "Kitchen Ventilation Systems and Food Service Equipment Guidelines," Publication 1767, Appendix A.

F. In-Use Service: At least one factory-authorized service agency for equipment shall be located in the geographical area of the installation and shall have the ability to provide service within 24 hours after receiving a service call.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:

1. Include manufacturer's address and telephone number.
2. Include catalog or model numbers and illustrations and descriptions of cooking equipment.
3. Proof of appliances being Energy Star qualified where applicable.

C. Installation Drawings: Show dimensions, details of installation, coordination with plumbing and electrical work, and other work required for a complete installation.

D. Operating Instructions: In accordance with requirements in Section 01 00 00, GENERAL REQUIREMENTS.

E. Within sixty (60) days after award of contract (before equipment is purchased) the following shall be submitted in accordance with Section 01 33 00 SUBMITAL PROCEDURES.

1. The submittal package will include the following: Product data book (cut sheet book) this product data book should account for all item numbers in this contract up to and including spare numbers and existing equipment. Product data cut sheets shall be marked up in a way that indicates model and accessories included with the item.
2. Submittal drawings will consist of the following: Custom shop drawings (hoods, walk-ins, millwork, serving lines custom fabrication, etc.) Equipment layout drawings, Plumbing connection drawings, electrical connection drawings, HVAC layout drawings and Special condition drawings (Wall backing, floor depressions, etc.)

- F. Electronically submit (PDFs) assembly drawings, electrical and mechanical rough-in connection plans, details for plumbing, electrical, air conditioning and ventilation services for all kitchen equipment and brochures, catalog cut-sheets, specifications and operating characteristics for buy-out equipment. Clearly indicate any deviations from contract Documents, such as arrangement of piping, connections, wiring method of fabrication, manner of structural conditions, standard shop practices, or other reasons, and note in Cover Sheet accompanying submittals.
- G. Drawing of fabricated equipment shall not be less than $\frac{3}{4}$ " equal one-foot scale.
- H. Rough-in drawings shall not be less than $\frac{1}{4}$ " equal one-foot scale.
- I. Product Data: Provide data on appliances; indicate configuration, sizes, materials, finishes, locations, utility connections and locations.
- J. Samples: Submit samples of stainless steel and other finish materials for color selection.
- K. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- L. Manufacturer's Certificate: Certify that exhaust system and tests meet or exceed specified requirements.

1.5 WARRANTY

- A. Warrant food service equipment to be free from defects in materials and workmanship in accordance with requirements of "Warranty of Construction", FAR clause 52.246-21.

1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American National Standards Institute/Canadian Gas Assoc. (ANSI/CGA):
Z83.11-09.....Gas Food Service Equipment
- C. ASME International (ASME):
BPVC-11.....Boiler and Pressure Vessel Code
- D. NSF International/American National Standards Institute (NSF/ANSI):
4E-09.....Commercial Cooking, Rethermalization, and
Powered Hot Food Holding and Trans Equipment

- E. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA): Publication 1767 Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines, 2001
- F. Underwriters Laboratories Inc. (UL):
 197-10.....Commercial Electric Cooking Appliances UL Heating, Cooling, Ventilating and Cooking Equipment Directory

PART 2 - PRODUCTS

2.1 TOASTER ELECTRIC

- A. General Requirements: Heavy-duty (designed for constant use in institutional-type kitchen) electric toaster as follows:
 - 1. Stainless-steel exterior finish.
- B. Toaster:

Item No.	Item Type	Description
Item 4	4 Slot Toaster (1) One Required OWNER SUPPLIED	Hatco Model TPT-120 - One (1) Required Dimensions: 8.13(h) x 13.63(w) x 12.38(d) Pop-Up Toaster, (4) 1-1/4" wide self centering slots, individual manual controls, removable crumb tray, stainless steel construction, cULus, UL EPH Classified 1. 1 ea. NOTE: Includes 24/7 parts & service assistance, call 800-558-0607 2. 1 ea. One-year replacement warranty, contact Hatco service team for details 3. 1 ea. 120v/60/1-ph, 1800w, 15.0 amps, 6' cord with NEMA 5-15P 4. 1 ea. Stainless steel finish

2.2 RANGES, GAS

- A. General Requirements: Heavy-duty (designed for constant use in institutional-type kitchen) gas ranges as follows:
 - 1. Stainless-steel exterior finish.
 - 2. Electronic ignition.
 - 3. Flue riser not less than 406 mm (16 inch) high.
 - 4. Rear gas connection.
 - 6. Gas flex hose and quick disconnect with restraining device.
- B. Gas Range Units:

SYMBOL	Item Type	Description
Item 15	Range Top One (1) Required OWNER SUPPLIED	Viking Range Model VRT736-46 - One (1) Required 7 SERIES VRT (6) six burner brass flame ports provide 23000 btu's 3 burner size with simmer setting and spark ignition system. Provide with 10" back guard model bg107362ss 35-7/8" x 30" x 19" high gas line connection 1/2" 120/60/1 .5 amps 3 wire cord and plug 1. 1 ea. Model 107362SS 10" back guard 2. 1 kit Dormont Model 1650KIT48 Dormont Blue Hose™ Moveable Gas Connector Kit, 1/2" inside dia., 48" long, covered with stainless steel braid, coated with blue antimicrobial PVC, (1) SnapFast® QD, (1) full port valve, (2) 90° elbows, coiled restraining cable with hardware, 68,000 BTU/hr minimum flow capacity, limited lifetime 3. FSC to coordinate with Millwork Counter item #17 4. FSC to coordinate gas hose size and length with range and site conditions

2.3 CAN OPENER

A. General Requirements: Heavy-duty

Item No.	Description
Item 22 OWNER SUPPLIED	Manual Can Opener - One (1) Required Edlund Model S-11 Can Opener, manual, stainless steel, with cast stainless steel base, NSF certified 1. 5-year limited warranty 2. FSC to field mount on item 21 work table as shown on drawings Cabinet base

2.4 EXHAUST HOOD WITH FIRE SUPPRESSION SYSTEM

A. General Requirements, as follows:

1. NPFA Life safety Codes.
2. 300A & 507 Standards
3. NSF & ETL Listed.

Item	Item Type	Description
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<p>Item 16</p>	<p>Exhaust Hood w/Fire Suppression System</p> <p>One (1) Required</p> <p>OWNER SUPPLIED</p>	<p>Denlar wall mounted range hood _ One (1) Required</p> <p>Model D1036-D (one section) approximately 10-5" High x 19 -3/4" wide x 36" long to protect item 15 One (1) shatter proof 60-watt light. Roof mounted fan with 50 ft cable upgrade to NFPA life safety codes. 304 brushed stainless steel with a typical hanging height of 36" (max) above cooking equipment. Grease baffle stainless steel filter with drip tray. ADA Controls. Hood constructed and designed UL 300A & 507 Standards. The hood is NSF and ETL listed. D1000-FBO Control Module to allow the use of a fan not provided by DF). D1000-DED Dual Element disconnect integrated E & G for D1000 Models NEMA is 5-15R. CLBX The clock box password protected. D1000-ADA Handicap Accessible. D100 MPK manual Pull Kit Face Place Plate, three elbows 25 ft cable</p> <p>1. NOTE: Filed verify all collar locations with structure above prior to releasing the hood for fabrication.</p> <p>2. Supply and install S/S closure panels around perimeter of hood to finished ceiling (if required - coordinate with architect)</p> <p>B. Denlar Pre-pipe Fire suppression system Amerex 660 shall provide coverage for item 15 Furnish a complete wet chemical fire suppression system with U.L. 300 standards. The system shall include factory preppie, all permits and test as required by the authority having jurisdiction. Automatic actuation shall be by means of fusible with no visible conduit. System shall include an electrically actuated release mechanism. System shall be furnished and installed by an Amerex certified distributor in accordance with manufacturer's instructions and the authority having jurisdiction.</p> <p>1. Microswitches shall be furnished as part of the fire protection system for tie in of building alarm and for makeup air/fire/fuel shut down. (if required)</p> <p>2. All access openings, holes, sleeves, chases, etc., in building structure necessary to permit piping and control tubing to be run between system unit, ventilator and duct work are to be provided by the General Contractor.</p> <p>3. The Building Alarm System Contractor is to furnish a control relay to detect operation of the system by connection to the microswitches supplied. The Electrical Contractor is to furnish and install all wiring required for the system specified.</p> <p>4. All exposed piping and nozzles of fire protection system shall be chrome or Stainless steel sleeved including manual pull station piping.</p> <p>5. Whenever possible coordinate with general contractor and fire suppression supplier and architect to run pull station piping recessed in wall. This will need to be completed during framing of wall.</p> <p>6. All horizontal piping is to be done on the top of the ventilator unless otherwise specified.</p> <p>7. Verify location of remote manual pull station.</p> <p>8. "Electrical contractor/ shunt trip breaker by EC</p> <p>9.FSC to provide shop drawings for approval</p>
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2.5 OVENS

A. General Requirements: as follows:

1. Stainless-steel exterior.
2. Per specified.

Item No.	Item Type	Description
Item 3	Microwave Ovens OWNER SUPPLIED	ACP Model RFS18TS - One (1) Required Dimensions: 14.4(h) x 21.75(w) x 21(d) Amana® Commercial Microwave Oven, 1.2 cu. ft., 1800 watts, medium volume, 4-stage cooking, (5) power levels, (100) memory settings, 60-minute max cooking time, LED display, touch control, ADA-compliant Braille touch pads, audible end of cycle signal, side hinged door with tempered glass, lighted interior, sealed and recessed ceramic shelf, stainless steel exterior & interior, 208-240v/60/1-ph, 13.5 amps, 20 MCA, 2800 watts (total), NEMA 6-20P, cETLus, ETL-Sanitation. Provide each with the following: 1. 3- year full warranty
Item 14	Double Deck Wall Oven OWNER SUPPLIED	Wolf Model DO30PM/S/PH - One (1) Required Wolf 30" M series professional built in double wall oven WIFI enabled. 29-7/8" x 50-7/8" x 23D over all capacity 5.1CF 240/208 60 50-amp dedicated circuit with 5 ft. C & P

2.6 COFFEE BREWER

A. Provided by Vendor Coordinated by Owner. For informational use only

SYMBOL	COMPARTMENTS/ CAPACITY
Item 2 BY OWNER OWNER SUPPLIED	- Coffee Maker (Vendor Supplied) - One (1) A. Select Brew Model NG-300 Coffee system Provides 2 coffee varieties as well as dispenses hot water 120V-15 AMP supplies 66 cups per hour 3/8" waterline NSF UL listed. 1. Vendor Provided - Owner to coordinate

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install cooking equipment level and plumb; arranged for safe and convenient operation; with access clearances required for maintenance and cleaning; and according to manufacturer's written instructions.
- B. Install seismic restraints for equipment.

3.2 CLEAN-UP

- A. At completion of the installation, clean and adjust cooking equipment as required to produce ready-for-use condition.
- B. Where stainless-steel surfaces are damaged during installation procedures, repair finishes to match adjoining undamaged surfaces.

3.3 INSTRUCTIONS

- A. Instruct personnel and transmit operating instructions in accordance with requirements in Section 01 00 00, GENERAL REQUIREMENTS.

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SECTION 11 48 00
CLEANING AND DISPOSAL EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies food service warewashing equipment as follows:

1. Dishwashing machines, undercounter.

1.2 RELATED WORK

- A. Warewashing Tables.
- B. Plumbing Connections: Section 22 11 00, FACILITY WATER DISTRIBUTION AND Section 22 13 00, FACILITY SANITARY SEWERAGE.
- C. Electrical Disconnect Switches: Section 26 29 21, DISCONNECT SWITCHES.

1.3 QUALITY CONTROL

- A. Installer Qualifications: Licensed electrician and plumber either experienced with food service equipment installation or supervised by an experienced food service equipment installer.
- B. NSF Compliance: Equipment bears the NSF Certification Mark or UL Classification Mark indicating conformance with NSF/ANSI 3.
- C. UL Listing: Equipment has been evaluated according to UL 921, is listed and labeled by UL.
- D. Seismic Restraint:
 1. Comply with applicable guidelines for seismic restraint of kitchen equipment contained in SMACNA's "Kitchen Ventilation Systems and Food Service Equipment Guidelines 1767," Appendix A.
- E. In-Use Service: At least one factory-authorized service agency for equipment shall be located in the geographical area of the installation and shall have the ability to provide service within 24 hours after receiving a service call.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
 1. Include manufacturer's address and telephone number.
 2. Include catalog or model numbers, and illustrations and descriptions of warewashing equipment and accessories.
 3. Proof of appliance being Energy Star qualified.

- C. Installation Drawings: Show dimensions; method of assembly; and details of installation, adjoining construction, coordination with plumbing and electrical work, and other work required for a complete installation.

1.5 WARRANTY

- A. Warrant food service equipment to be free from defects in materials and workmanship in accordance with requirements of "Warranty of Construction", FAR clause 52.246-21.

1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. NSF International/American National Standards Institute (NSF/ANSI):
3-2010.....Commercial Warewashing Equipment
- C. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA): 1767-2001 - Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines.
- D. Underwriters Laboratories Inc. (UL):
921-06.....Commercial Electric Dishwashers, including
revision through and including March 16, 2000

PART 2 - PRODUCTS

2.1 DISHWASHING MACHINES, UNDERCOUNTER

- A. General Requirements:
 - 1. Stainless-steel construction.
 - 2. Stainless-steel top and side panels.
 - 3. Capacity based on 508 by 508 mm (20 by 20 inch) racks.
 - 4. Accessories:
 - a. Water-pressure regulating valve.
 - 5. Provide Energy Star qualified appliances.
- B. Sanitizing Systems:
 - 1. Booster Heater: Built-in, electric that produces a 39 degrees C (70 degrees F) water-temperature rise.
- C. Undercounter Dishwashing Machine Units:

Item No.	Item Type	Description
Item 8	Undercounter Dish Washer (1) One Required OWNER SUPPLIED	<p>Hobart Model LXEH+BUILDUP One (1) Required</p> <p>Dimensions: 32.94(h) x 23.94(w) x 25.56(d) LXe Dishwasher, undercounter, 23-15/16"W x 25-9/16"D x 32-15/16"H, high temperature sanitizing, 32 Racks/Hour, Fresh Water Rinse, .74 gal/rack, Delime Notification, Auto Chemical Priming, Service Diagnostics, Detergent & Rinse Aid Pump, ENERGY STAR®</p> <ol style="list-style-type: none"> 1. 1 ea. Warranty - 1-Year parts, labor & travel time 2. 1 ea. Model LXEH-ELE0KU 120/208-240v/60/1-ph (3 wire), 30.5 amps, standard 3. 1 ea. Model CORD-PWRKIT-LXE Power Cord Kit, for LXeH & LXeR, 120/208-240v(3w)/60/1-ph, NEMA 14-50P plug included 4. 1 ea. Model DWT-LXE Drain water tempering kit for LXe 5. 1 ea. Installation of DWT kit only (NET) 6. 1 ea. Model PRESREG-3/40BR 3/4" brass pressure regulator 7. 1 ea. Model WTRHAM-ARREST Water hammer arrestor kit, includes 3/4" brass pressure regulator valve 8. 2 ea. Model DISHRAK-PEG20 Peg rack 9. 2 ea. Model DISHRAK-COM20 Combination rack 10. 1 ea. Model COVER-TRIM-LXE Trim Cover 11. FSC to coordinate with millwork counter item #8
Item 25	Washer (1) Required OWNER SUPPLIED	<p>Electrolux Professional Model ELD-620 - One (1) Required</p> <p>Professional series washer model ELD620 with washer base model 96020. Ability to store up to 45 wash programs energy and water saving technology 130 G force spin with super balance efficient dosing to reduce chemical costs. Dry weight capacity of 20 LBC 26" x 28 - 9/16" x 44" 408/1</p>
Item 26	Dryer (1) One Required OWNER SUPPLIED	<p>Electrolux Professional Model DE-635 - One (1) Required</p> <p>Professional series dryer with auto stop sensor reverse dry which prevents wet spots 2X 35 capacity 31 1/8" x 43 7/8" x 76 3/8" duct diameter 8" 408/1</p>

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install warewashing equipment, including controls and accessory equipment, arranged for safe and convenient operation and maintenance.
- B. Install warewashing equipment to prevent backflow of polluted water or waste into water supply system or into the warewashing equipment.
- C. Install and interconnect electrical controls and switches.
- D. Install seismic restraints for equipment.

3.2 CLEAN-UP

- A. At completion of the installation, clean, lubricate, and adjust warewashing equipment as required to produce ready-for-use condition.
- B. Where stainless-steel surfaces are damaged during warewashing equipment installation procedures, repair finishes to match adjoining undamaged surfaces.

3.3 INSTRUCTIONS

- A. Instruct personnel and transmit operating instructions in accordance with requirements in Section 01 00 00, GENERAL REQUIREMENTS.

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SECTION 11 73 00

CEILING MOUNTED PATIENT LIFT SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Ceiling Mounted Patient Lift Systems for the transfer of physically challenged patients are specified in this section.
- B. VA will purchase and install motors. The patient lift tracts, power and balance of components are the responsibility of the contractor for a complete patient lift system.

1.2 RELATED WORK

- A. Section 01 00 00, GENERAL REQUIREMENTS: Requirements for pre-test of equipment.
- B. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General Electrical Requirements and items, which are common to sections of Division 26.

1.3 QUALITY ASSURANCE

- A. Certification for compliance is required for Ceiling Mounted Patient Lift Systems. Certifications shall be provided by the manufacturer who will conduct testing to ensure that the ceiling lift and charging system are safe and in compliance with ISO 10535 & UL 60601-1.
- B. Inspection of equipment after installation is required prior to use for patient movement. Inspection shall be in accordance with manufacturer's installation checklist and the facilities installation checklist (Patient Safety Alert AL14-07).
- C. Certification of compliance with VA requirements shall be provided by an independent third party, Inspector of Record (IOR), who will observe installation and manufacturer's testing to ensure that the ceiling structure, ceiling lift, and charging system is safe and compliance with shop drawings, structural calculations, specifications, ISO 10535 requirements, and code requirements. IOR shall be a registered structural engineer in the state of installation.

1.4 SUBMITTALS

- A. Submit in accordance with specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

1. Shop drawings shall show structural supports to the underside of structure. Structural calculations for the support of the track and its attachment to ceiling structure shall be submitted. Shop drawings used in the quoting phase shall be PDFs, and either 2D CAD files or 3D BIM files showing structural support to underside of structure. Shop drawings shall also provide general room layout with bed position and all obstructions to ceiling lift.
2. Once the purchase order is accepted by the vendor, a set of stamped drawings shall be provided by the vendor. Shop drawings and structural calculations shall be signed and stamped by a registered structural engineer and shall meet all code requirements in the jurisdiction having authority. Structural engineer shall ensure ceiling minimum structure capacity shall support the loads specified in the shop and installation drawings and be in compliance with local structural and seismic codes.
3. Shop drawings shall show obstructions such as lights and sprinklers, and coordinate their relocation.
4. Manufacturer shall provide BIM (Building Information Model) for clash detection on the request of the COR (RE), VA Construction Agent, or General Contractor.

B. Certificates of Compliance from Manufacturer

C. Manufacturer's Literature and Data:

1. Lifting Capacity
2. Lifting Speed
3. Vertical Axis Motor
4. Emergency Brake
5. Emergency Lowering Device
6. Emergency Stopping Device
7. Electronic Soft-Start and Soft-Stop Motor Control
8. Current Limiter for Circuit Protection
9. Strap Length
10. All equipment anchors and supports. Submittals shall include weights, dimensions, center of gravity, standard connections, manufacturer's recommendations and behavior problems (e.g., vibration, thermal expansion,) associated with equipment or piping so that the proposed installation can be properly reviewed.

- D. Individual Room layouts showing location of lift system installation shall be approved before proceeding with installation of lifts.
- E. Manufacturer's Checklist for after installation inspection.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are listed in the text by the basic designation only.
- B. International Organization for Standardization (ISO):
 - 1. 10535-06 Hoist for the Transfer of Disabled Persons-Requirements and Test Methods
- C. Underwriters Laboratories (UL):
 - 1. 60601-1(2003) Medical Electrical Equipment: General Requirements for Safety
 - 2. 94-2013 UL Standards for Safety Test for Flammability of Plastic Materials for Parts in Devices and Appliances-Fifth Edition
- D. International Electromagnetic Commission (IEC):
 - 1. 60601-1-2(2015) Medical electrical equipment - Part 1-2: General requirements for basic safety and essential performance - Collateral Standard: Electromagnetic disturbances - Requirements and tests.
- E. VA Patient Safety Alert AL14-07

PART 2 - PRODUCTS

2.1 CEILING TRACK SYSTEM

- A. The Ceiling Track shall be made from high strength extruded aluminum or VA approved equal. Provide anchor supports at ceiling substrate.
- B. Installed rail shall be security tested for 1.5 times greater than the motor's weight capacity and maximum allowable deflection of a horizontal rail is no more than 1mm (1/16th inch) per 200mm (7.87 inch) of track length. (As per ISO 10535 standards.)

2.2 LIFT UNIT

- A. The Lift Unit shall be constructed of a steel frame system driven by a gear reduced high torque motor.
- B. The Lift system shall have the following features.
 - 1. Lifting capacity: 550 lbs (249.476 kg) for non-bariatric lifts and 750-1000 lbs (340.194- 498.952 kg) for bariatric lifts
 - 2. Electronic soft-start and soft-stop motor control
 - 3. Emergency lowering device

4. Emergency stopping device
5. Current limiter for circuit protection in case of overload.
6. Safety device that stops the motor to lift when batteries are low.
7. Horizontal axis motor
8. Emergency brake (in case of mechanical failure)
9. Strap length:
10. Cab: VO plastic-fire retardant, UL 94

2.3 MOTORS (by VA)

- A. Vertical Movement-DC Motor

2.4 BATTERIES

- A. The life cycle (number of charging cycles) for batteries shall be in compliance with IEC 6100-1-2.
- B. Provide rechargeable batteries with up to 35 transfers with a load of 200lbs (74kg) (for repositioning) a minimum of 17 transfers with its maximum load.

2.5 CHARGER

- A. Charger

2.6 STRAPS AND SLING

- A. The straps shall meet ISO 10535, Appendix A guidelines. The straps shall ensure the patient's safety by preventing the patient from falling out of the sling.
- B. The sling shall meet ISO 10535 guidelines. The sling shall cradle the body of the patient. Bariatric slings shall be rated to a minimum of 750 lbs.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install ceiling mounted patient lift system as per manufacturer's instruction and under the supervision of manufacturer's qualified representative and as shown on drawings.
- B. If the distance in between the suspended ceiling and anchors is more than 12" consult with the manufacturer to determine if lateral braces will be required.

3.2 INSTRUCTION AND PERSONNEL TRAINING

- A. Training shall be provided for the required personnel to educate them on proper operation and maintenance for the lift system equipment.

3.3 TEST

- A. Conduct performance test, in the presence of the COR (RE), Inspector of Record (IOR), and a manufacturer's field representative, to show that the patient lift system equipment and control devices operate properly and in accordance with design, specification, and code requirements.

3.4 INSPECTION

- A. Inspection of installed ceiling mounted patient lift systems shall be conducted in accordance with the manufacturer's installation checklist and the facilities installation checklist (Patient Safety Alert AL14-07) prior to use for patient movement.
- B. Periodic Inspection shall be provided by the manufacturer on a yearly basis in compliance with ISO 10535.

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Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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SECTION 12 32 00
MANUFACTURED WOOD CASEWORK

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies wood veneer casework, plastic laminate casework as detailed on the construction documents, including related components and accessories required to form integral units. Wood casework items shown on the construction documents, but not specified below are to be included as part of the work under this section, and applicable portions of the specification are to apply to these items.

1.2 RELATED WORK:

- A. Section 06 20 00, FINISH CARPENTRY: Custom Wood Casework.
B. Section 07 92 00, JOINT SEALANTS: Sealants.
C. Section 09 06 00, SCHEDULE OF FINISHES: Color of Casework Finish.
D. Section 09 22 16, NON-STRUCTURAL METAL FRAMING: Backing Plates for Wall Mounted Casework.
E. Section 09 65 13, RESILIENT BASE AND ACCESSORIES: Resilient Base.
F. Section 12 36 00, COUNTERTOPS: Countertop Construction and Materials and Items Installed in Countertops.
G. Division 22, PLUMBING: Plumbing Requirements Related to Casework.
H. Division 26, ELECTRICAL: Electrical Lighting and Power Requirements Related to Casework.

1.3 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Manufacturer's Literature and Data:
1. Locks for doors and drawers.
2. Adhesive cements.
3. Casework hardware.
C. Samples:
1. Plastic laminate.
D. Shop Drawings (1/2 full size):
1. Each casework type, showing details of construction, including materials, hardware and accessories.
2. Fastenings and method of installation.
E. Certification:

1. Manufacturer's qualifications specified.
2. Installer's qualifications specified.

1.4 QUALITY ASSURANCE:

- A. Approval by COR is required of manufacturer and installer based upon certification of qualifications specified.
- B. Manufacturer's qualifications:
 1. Manufacturer is regularly engaged in design and manufacture of modular [wood veneer] [plastic laminate] casework, casework components and accessories of scope and type similar to indicated requirements for a period of not less than five (5) years.
 2. Manufacturer has successfully completed at least three (3) projects of scope and type similar to indicated requirements.
 3. Submit manufacturer's qualifications and list of projects, including owner contact information.
- C. Installer Qualifications:
 1. Installer has completed at least three (3) projects in last five (5) years in which these products were installed.
 2. Submit installer qualifications.

1.5 WARRANTY:

- A. Construction Warranty: Comply with FAR clause 52.246-21 "Warranty of Construction".
- B. Manufacturer Warranty: Manufacturer shall warranty their wood casework for a minimum of five (5) years from date of installation and final acceptance by the Government. Submit manufacturer warranty.

1.6 APPLICABLE PUBLICATIONS:

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.
- B. ASTM International (ASTM):

A240/A240M-20.....Chromium and Chromium-Nickel Stainless Steel
Plate, Sheet, and Strip for Pressure Vessels and
for General Applications
A1008/A1008M-18.....Steel, Sheet, Cold-Rolled, Carbon, Structural,
High Strength Low Alloy
C1036-16.....Flat Glass

- C. Builders Hardware Manufacturers Association (BHMA):
 - A156.1-16.....Butts and Hinges
 - A156.5-20.....Auxiliary Locks and Associated Products
 - A156.9-15.....Cabinet Hardware
 - A156.11-19.....Cabinet Locks
 - A156.16-18.....Auxiliary Hardware
- D. Composite Panel Association (CPA):
 - A208.1-09.....Particleboard
 - A208.2-09.....Medium Density Fiberboard (MDF) for Interior Applications
- E. U.S. Department of Commerce Product Standards (Prod. Std):
 - PS 1-09.....Construction and Industrial Plywood
- F. Hardwood, Plywood and Veneer Association (HPVA):
 - HP-1-16.....Hardwood and Decorative Plywood
- G. Architectural Woodwork Institute (AWI):
 - Architectural Woodwork Standards, Edition 2 Certification Program - 2014
- H. American Society of Mechanical Engineers (ASME):
 - A112.18.1-18.....Plumbing Fixture Fittings
- I. National Electrical Manufacturers Association (NEMA):
 - LD 3-05.....High Pressure Decorative Laminates
- J. Scientific Equipment and Furniture Association (SEFA):
 - 2.3-10.....Installation of Scientific Laboratory Furniture and Equipment
- K. Underwriters Laboratories Inc. (UL):
 - 437-13.....Key Locks

PART 2 - PRODUCTS

2.1 PLASTIC LAMINATE:

- A. NEMA LD 3.
- B. Exposed decorative surfaces, both sides of cabinet doors, and for items having plastic laminate finish. General purpose Type HGL.
- C. Cabinet Interiors Including Shelving: Both of following options to comply with NEMA LD 3 as a minimum.
 - 1. Plastic laminate clad plywood or MDF (excluding shelves).
- D. Backing sheet on bottom of plastic laminate covered wood tops. Backer Type BKL.
- E. Post Forming Fabrication, Decorative Surface: Post forming Type HGP.

2.2 PLYWOOD, SOFTWOOD:

- A. Prod. Std. PS1, five (5) ply construction from 13 mm to 28 mm (1/2 inch to 1-1/8 inch) thickness, and seven (7) ply for 31 mm (1 1/4 inch) thickness.

2.3 MEDIUM DENSITY FIBERBOARD (MDF):

- A. Fully waterproof bond conforming to CPA A208.1 and CPA A208.2. Grade 130, MR50 moisture resistance.

2.4 GLASS:

- A. ASTM C1048 Kind FT Type I, Class 1, Quality q3.
B. For Doors: 6 mm (1/4 inch) thick.

2.5 HARDWARE:

A. Cabinet Locks:

1. Provide where locks are indicated on construction documents.
2. Locked pair of hinged door over 915 mm (36 inches) high:
 - a. ANSI/BHMA A156.5, key one side.
 - b. On active leaf use three (3) point locking device, consisting of two (2) steel rods and lever controlled cam at lock, to operate by lever having lock cylinder housed therein.
 - c. On inactive leaf provide dummy lever of same design.
 - d. Provide keeper holes for locking device rods and cam.
3. Door and Drawer: ANSI/BHMA A156.11 cam locks. Provide one (1) type for each condition as follows:
 - a. Drawer and Hinged Door up to 915 mm (36 inches) high: E07261.
 - b. Drawer and Hinged Door: Pin-tumbler, cylinder type lock with not less than four (4) pins or a UL 437 rated wafer lock with brass working parts and case.
 - c. Sliding Door: E07161.
4. Key locks differently for each type casework and master key for each service, such as Nursing Units, Administrative, Pharmacy.
 - a. Key drug locker inner door different from outer door.
 - b. Furnish two (2) keys per lock.
 - c. Furnish six (6) master keys per service or Nursing Unit.
5. Marking of Locks and Keys:
 - a. Name of manufacturer, or trademark which can readily be identified legibly marked on each lock and key change number marked on exposed face of lock.
 - b. Key change numbers stamped on keys.

c. Key change numbers to provide sufficient information for manufacturer to replace key.

B. Hinged Doors:

1. Provide doors 915 mm (36 inches) and more in height with three (3) hinges and doors less than 915 mm (36 inches) in height is to have two (2) hinges. Each door is to close against two (2) rubber bumpers.
2. Concealed Hinges: BHMA A156.9, Type B01602, 135degrees of opening, self-closing.
3. Fasteners: Provide full thread wood screws to fasten hinge leaves to door and cabinet frame. Finish screws to match finish of hinges.

C. Door Catches:

1. Friction or Magnetic type, fabricated with metal housing.
2. Provide one (1) catch for cabinet doors 1220 mm (48 inches) high and under, and two (2) for doors over 1220 mm (48 inches) high.

D. Drawer and Door Pulls:

1. Provide types indicated on the Drawings.
2. Drawer and door pulls to be of a design that can be operated with a force of 22.2 N (5 pounds) or less, with one (1) hand and not require tight grasping, pinching or twisting of the wrist.

E. Drawer Slides:

1. Full extension steel slides with nylon ball-bearing rollers.
2. Slides to have positive stop.
3. Equip drawers with rubber bumpers.

F. Sliding Doors:

1. Each door to be supported by two ball bearing bronze or nylon rollers, or sheaves riding on a stainless steel track at top or bottom, and to be restrained by a nylon or stainless steel guide at the opposite end.
2. Plastic guides are not acceptable.
3. Each door to have rubber silencers set near top and bottom of each jamb.

G. Shelf Standards (Except For Fixed Shelves):

1. Bright zinc-plated steel for recessed mounting with screws, 16 mm (5/8 inch) wide by 5 mm (3/16 inch) high providing 13 mm (1/2 inch) adjustment, complete with shelf supports.

H. Gate Bolt:

1. Surface mounted barrel type with strike.

I. Hinged Gates:

1. Gates to have two (2) double-acting [**hinges**][**pivots**], size as required for gate size and weight.

J. Castors:

1. Locking type rated for 79 kg (175 lbs.) each.

K. Floor Glides:

1. Non-skid material minimum 25 mm (1 inch) diameter with minimum 16 mm (5/8 inch) height adjustment.

2.6 MANUFACTURED PRODUCTS:

- A. When two (2) or more units are required, use products of one (1) manufacturer.
- B. Manufacturer of casework assemblies is to assume complete responsibility for the final assembled unit.
- C. Provide products of a single manufacturer for parts which are alike.

2.7 FABRICATION:

- A. Casework to be of the flush overlay or exposed face frame design as detailed on the Drawings; and, except as otherwise specified, be of Premium Grade construction and of component thickness in conformance with AWI Quality Standards.
- B. Fabricate architectural cabinets to dimensions, profiles, and details indicated.
- C. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 1. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- D. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- E. Fabricate casework of plastic laminated covered plywood or MDF as follows:
 1. Where shown, doors, drawers, shelves and all semi-concealed surfaces to be plastic laminated.

2. Glazed doors to have 6 mm (1/4 inch) thick glass, set in glazing compound.
3. Edges: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.

F. Support Members for Tops of Tables and Countertops:

1. Construct as detailed on construction documents.
2. Provide miscellaneous steel members and anchor as shown on construction drawings.

2.8 PRODUCTS OF OTHER COMPONENTS DIRECTLY RELATED TO CASEWORK:

- A. Refer to Section 07 92 00, JOINT SEALANTS for work related to sealants used in conjunction with joints of countertops, casework systems, and adjacent materials.
- B. Refer to Section 09 65 13, RESILIENT BASE AND ACCESSORIES for work related to rubber base adhered to casework systems.
- C. Refer to Section 09 22 16, NON-STRUCTURAL METAL FRAMING for backing plates used in conjunction with wall assemblies for the attachment of casework systems.
- D. Refer to Section 12 36 00, COUNTERTOPS for work related to plastic laminate, acid-resistant plastic laminate, metal, molded resin, wood, and methyl methacrylic polymer countertops and/or shelving used in conjunction with casework systems. When countertop materials are provided by the casework manufacturer, they are to include the following features:
 1. Capable of being suspended from vertical support rails or horizontal wall strips or service modules.
 2. Provided with rounded corners and impact resistant material on exposed edges.
 3. Capable of being easily relocated and installed without tools.
 4. Capable of being suspended and easily changed under counter mounted storage units.
 5. Provide leveling adjustment capability so units can be brought into a level position.
 6. Secured using fasteners. Show detail on shop drawings.
- E. Refer to Section 12 36 00, COUNTERTOPS for work related to and integral with countertop systems such as pegboards, funnel and graduate racks.
- F. Refer to Division 22, PLUMBING for the following work related to casework systems:

1. Sinks, faucets and other plumbing service fixtures, venting, and piping systems.
 2. Compressed air, gas, vacuum and piping systems.
- G. Refer to Division 26, ELECTRICAL for the following work related to casework systems:
1. Connections and wiring devices.
 2. Connections and lighting fixtures except when factory installed by the manufacturer.

PART 3 - EXECUTION

3.1 COORDINATION:

- A. Begin only after work of other trades is complete, including wall and floor finish completed, ceilings installed, light fixtures and diffusers installed and connected and area free of trash and debris.
- B. Verify location and size of mechanical and electrical services as required and perform cutting of components of work installed by other trades.
- C. Verify reinforcement of walls and partitions for support and anchorage of casework.
- D. Coordinate with other Divisions and Sections of the specification for work related to installation of casework systems to avoid interference and completion of service connections.

3.2 INSTALLATION:

- A. Install casework in accordance with manufacturer's written instructions .
 1. Install in available space; arranged for safe and convenient operation and maintenance.
 2. Align cabinets for flush joints except where shown otherwise.
 3. Install with bottom of wall cabinets in alignment and tops of base cabinets aligned level, plumb, true, and straight to a tolerance of 3.2 mm in 2438 mm (1/8 inch in 96 inches).
 4. Install corner cabinets with hinges on corner side with filler or spacers sufficient to allow opening of drawers.
- B. Support Rails:
 1. Install true to horizontal at heights shown on construction documents; maximum tolerance for uneven floors is plus or minus 13 mm (1/2 inch).
 2. Shim as necessary to accommodate variations in wall surface not exceeding 5 mm (3/16 inch) at fastener.
- C. Wall Strips:

1. Install true to vertical and spaced as shown on construction documents.
2. Align slots to assure that hanging units will be level.

D. Plug Buttons:

1. Install plug buttons in predrilled or prepunched perforations not used.
2. Use chromium plate plug buttons or buttons finish to match adjacent surfaces.

- E. Seal junctures of casework systems with mildew-resistant silicone sealants as specified in Section 07 92 00, JOINT SEALANTS.

3.3 CLOSURES AND FILLER PLATES:

- A. Close openings larger than 6 mm (1/4 inch) wide between cabinets and adjacent walls with flat, steel closure strips, scribed to required contours, or machined formed steel fillers with returns, and secured with sheet metal screws to tubular or channel members of units, or bolts where exposed on inside.
- B. Where ceilings interfere with installation of sloping tops, omit sloping tops and provide flat steel filler plates.
- C. Secure filler plates to casework top members, unless shown otherwise on construction documents.
- D. Secure filler plates more than 152 mm (6 inches) in width top edge to a continuous 25 x 25 mm (1 x 1 inch) 0.889 mm (1/16 inch) thick steel formed steel angle with screws.
- E. Anchor angle to ceiling with toggle bolts.
- F. Install closure strips at exposed ends of pipe space and offset opening into concealed space.
- G. Finish closure strips and fillers with same finishes as cabinets.

3.4 FASTENINGS AND ANCHORAGE:

- A. Do not anchor to wood ground strips.
- B. Provide hat shape metal spacers where fasteners span gaps or spaces.
- C. Use 6 mm (1/4 inch) diameter toggle or expansion bolts, or other appropriate size and type fastening device for securing casework to walls or floor. Use expansion bolts shields having holding power beyond tensile and shear strength of bolt and breaking strength of bolt head.
- D. Use 6 mm (1/4 inch) diameter hex bolts for securing cabinets together.
- E. Use 6 mm (1/4 inch) by minimum 38 mm (1-1/2 inch) length lag bolt anchorage to wood blocking for concealed fasteners.

- F. Use not less than No. 12 or 14 wood screws with not less than 38 mm (1-1/2 inch) penetration into wood blocking.
- G. Space fastening devices 305 mm (12 inches) on center with minimum of three (3) fasteners in 915 or 1220 mm (3 or 4 foot) unit width.
- H. Anchor floor mounted cabinets with a minimum of four (4) bolts through corner gussets. Anchor bolts may be combined with or separate from leveling device.
- I. Secure cabinets in alignment with hex bolts or other internal fastener devices removable from interior of cabinets without special tools. Do not use fastener devices which require removal of tops for access.
- J. Where units abut end to end, anchor together at top and bottom of sides at front and back. Where units are back to back, anchor backs together at corners with hex bolts placed inconspicuously inside casework.
- K. Where type, size, or spacing of fastenings is not shown on construction documents or specified, show on shop drawings proposed fastenings and method of installation.

3.5 ADJUSTMENTS:

- A. Adjust equipment to ensure proper alignment and operation.
- B. Replace or repair damaged or improperly operating materials, components or equipment.

3.6 CLEANING:

- A. Immediately following installation, clean each item, removing finger marks, soil and foreign matter.
- B. Remove from job site trash, debris and packing materials.
- C. Leave installed areas clean of dust and debris.

3.7 INSTRUCTIONS:

- A. Provide operational and cleaning manuals and verbal instructions in accordance with Article INSTRUCTIONS, SECTION 01 00 00, GENERAL REQUIREMENTS.
- B. Provide in service training both prior to and after facility opening. Coordinate in service activities with COR.
- C. Commencing at least seven (7) days prior to opening of facility, provide one (1) four (4) hour day of on-site orientation and technical instruction on use and cleaning procedures application to products and systems specified herein.

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SECTION 12 36 00

COUNTERTOPS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies casework countertops with integral accessories.
- B. Integral accessories include:
 - 1. Sinks with traps and drains.

1.2 RELATED WORK

- A. Color and patterns of solid surface polymer and quartz agglomerate materials: SECTION 09 06 00, SCHEDULE FOR FINISHES.
- B. DIVISION 22, PLUMBING.
- C. Equipment Reference Manual for SECTION 12 36 00, COUNTERTOPS.

1.3 SUBMITTALS

- A. Submit in accordance with SECTION 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings
 - 1. Show dimensions of section and method of assembly.
 - 2. Show details of construction at a scale of ½ inch to a foot.
- C. Samples:
 - 1. 150 mm (6 inch) square samples each top.
 - 2. Front edge, back splash, end splash and core with surface material and booking.

1.4 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. American Hardboard Association (AHA):
 - 1. A135.4-95 Basic Hardboard
- C. Composite Panel Association (CPA):
 - 1. A208.1-09 Particleboard
- D. American Society of Mechanical Engineers (ASME):
 - 1. A112.18.1-12 Plumbing Supply Fittings
 - 2. A112.1.2-12 Air Gaps in Plumbing System
 - 3. A112.19.3-08(R2004) Stainless Steel Plumbing Fixtures (Designed for Residential Use)
- E. American Society for Testing and Materials (ASTM):

1. A167-99 (R2009) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
 2. A1008-10 Steel, Sheet, Cold-Rolled, Carbon, Structural, High Strength, Low Alloy
 3. D256-10 Pendulum Impact Resistance of Plastic
 4. D570-98(R2005) Water Absorption of Plastics
 5. D638-10 Tensile Properties of Plastics
 6. D785-08 Rockwell Hardness of Plastics and Electrical Insulating Materials
 7. D790-10 Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
 8. D4690-99(2005) Urea-Formaldehyde Resin Adhesives
- F. Federal Specifications (FS):
1. A-A-1936 Adhesive, Contact, Neoprene Rubber
- G. U.S. Department of Commerce, Product Standards (PS):
1. PS 1-95 Construction and Industrial Plywood
- H. National Electrical Manufacturers Association (NEMA):
1. LD 3-05 High Pressure Decorative Laminates

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Plywood: PS 1, Exterior type, veneer grade AC not less than five ply construction.
- B. Fasteners:
1. Use studs, bolts, spaces, threaded rods with nuts or screws suitable for materials being joined with metal splice plates, channels or other supporting shape.
- C. Solid Polymer Material:
1. Filled Methyl Methacrylic Polymer.
 2. Performance properties required:

<u>Property</u>	<u>Result</u>	<u>Test</u>
Elongation	0.3% min.	ASTM D638
Hardness	90 Rockwell M	ASTM D785
Gloss (600 Gordon)	5-20	NEMA LD3.1
Color stability	No change	NEMA LD3 except 200 hour

<u>Property</u>	<u>Result</u>	<u>Test</u>
Abrasion resistance	No loss of pattern Max wear depth 0.0762 mm (0.003 in) - 10000 cycles	NEMA LD3
Water absorption weight (5 max)	24 hours 0.9	ASTM D-570
Izod impact	14 N·m/m(0.25 ft-lb/in)	ASTM D256 (Method A)
Impact resistance	No fracture	NEMA LD-3 900 mm (36") drop 1 kg (2 lb.) ball
Boiling water surface resistance	No visible change	NEMA LD3
High temperature resistance	Slight surface dulling	NEMA LD3

3. Cast into sheet form and bowl form.
4. Color throughout with subtle veining through thickness.
5. Joint adhesive and sealer: Manufacturers silicone adhesive and sealant for joining methyl methacrylic polymer sheet.
6. Bio-based products will be preferred.

D. Quartz Agglomerate Material:

1. Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with ICPA SS-1, except for composition.
2. Color throughout with subtle veining through thickness.
3. Joint adhesive and sealer: Manufacturers silicone adhesive and sealant for joining quartz agglomerate material sheet.

E. Laminar Flow Control Device

1. Smooth bright stainless steel or satin finish, chrome plated metal laminar flow device shall provide non-aeration, clear, coherent laminar flow that will not splash in basin. Device shall also have a flow control restrictor and have vandal resistant housing.
2. Flow Control Restrictor:
 - a. Capable of restricting flow of 7.5 to 8.5 Lpm (2.0 to 2.2 gpm) for sinks provided in paragraph 2.2D.
 - b. Compensates for pressure fluctuation maintaining flow rate specified above within 10 percent between 175 and 550 kPa (25 and 80 psi).

- c. Operates by expansion and contraction, eliminates mineral/sediment building up with self-clearing action, and is capable of easy manual cleaning.

2.2 SINKS

A. Stainless Steel:

1. ANSI/ASME A112.19.3, Type 304.
2. Refer to Plumbing Fixture Schedule.

B. Sinks of Methyl Methacrylic Polymer:

1. Minimum 19 mm (3/4 inch) thick, cast into bowl shape with overflow to drain.
2. Provide for underhung installation to countertop.
3. Provide openings for drain.

2.3 TRAPS AND FITTINGS

A. Material as specified in DIVISION 22, PLUMBING.

B. For Stainless Steel Sinks:

1. Either cast or wrought brass or stainless steel P-traps and drain fittings; ASME A112.18.1
2. Flat strainer, except where cup strainer or overflow standpipe specified.
 - a. Provide cup strainer in cabinet type 1B.
 - b. Provide stainless steel overflow stand pipe to within 38 mm (1-1/2 inches) of sink rim.
3. Exposed surface chromium plated finish.

C. Air Gap Fittings: ASME A112.1.2.

D. Methyl Methacrylic Polymer Sink Traps:

1. Cast or wrought brass with flat grid strainer, off-set tail piece, adjustable 38 x 32 mm (1-1/2 x 1 1/4-inch) P trap.
2. Chromium plated finish.

2.4 WATER FAUCETS

A. ASME A112.18.1.

1. Cast or forged brass, compression type with replaceable seat and stem assembly or replaceable cartridge.
2. Indexed lever handles either with or without head.
3. Gooseneck minimum clearance above countertop of 190 mm (7-1/2 inches), bent 180 degrees for vertical discharge.
4. Swing spouts elevated to clear handles.
5. Exposed brass surfaces chromium plated.

6. Cast combination hot and cold fixture with one piece body for multiple outlets.
7. Adapter type connection which will permit field conversion of swing spouts to fixed or gooseneck grouts or vice versa.
8. Pedestals Top for Laboratory or Pharmacy:
 - a. Modern design tapered to a round base, factory assembled and tested.
 - b. Brass shanks, locknuts and washers for attaching to top or curbs.
- B. Laminar flow control device on spouts.
- C. Automatic Controlled Faucets.
 1. Infra-red photocell sensor and a solenoid valve to control water flow automatically.
 2. Breaking light beam activates water flow.
 3. Water stops when user moves away from light beam.

2.5 FIXTURE IDENTIFICATION

- A. Code fixtures with full view plastic index buttons.
- B. Use following colors and codes:

SERVICE	COLOR	CODE	COLOR OF LETTERS
Cold Water	Dark Green	CW	White
Hot Water	Red	HW	White

2.6 COUNTERTOPS

- A. Fabricate in largest sections practicable.
- B. Fabricate with joints flush on top surface.
- C. Fabricate countertops to overhang front of cabinets and end of assemblies 25 mm (one inch) except where against walls or cabinets.
- D. Provide 1 mm (0.039 inch) thick metal plate connectors or fastening devices (except epoxy resin tops).
- E. Join edges in a chemical resistant waterproof cement or epoxy cement, except weld metal tops.
- F. Fabricate with end splashes where against walls or cabinets.
- G. Splash Backs and End Splashes:
 1. Not less than 19 mm (3/4 inch) thick.
 2. Height 100 mm (4 inches) unless noted otherwise.
 3. Fabricate splash back in maximum lengths practical of the same material.
- H. Drill or cutout for sinks, and penetrations.
 1. Accurately cut for size of penetration.

I. Methyl Methacrylic Polymer and Quartz Tops:

1. Fabricate countertop of methyl methacrylic polymer cast sheet, 13 mm (1/2 inch) thick.
2. Fabricate back splash and end splash to height shown.
3. Fabricate skirt to depth shown.
4. Fabricate with marine edge where sinks occur.
5. Fabricate in one piece for full length from corner to corner up to 3600 mm (12 feet).
6. Join pieces with adhesive sealant.
7. Cut out countertop for lavatories, plumbing trim.
8. Provide concealed fasteners and epoxy cement for anchorage of sinks to countertop.

J. Countertop products shall comply with following standards for biobased materials:

Material Type	Percent by Weight
Composite Panel	89 percent biobased material
Hardwood	89 percent biobased material
Particleboard	89 percent biobased material
Plywood	89 percent biobased material

The minimum-content standards are based on the weight (not the volume) of the material in the insulating core only.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before installing countertops verify that wall surfaces have been finished as specified and that mechanical and electrical service locations are as required.
- B. Secure countertops to supporting rails of cabinets with metal fastening devices, or screws through pierced slots in rails.
 1. Where type, size or spacing of fastenings is not shown or specified, submit shop drawings showing proposed fastenings and method of installation.
 2. Use round head bolts or screws.
 3. Use epoxy or silicone to fasten the epoxy resin countertops to the cabinets.
 4. Use wood or sheet metal screws for wood or plastic laminate tops; minimum penetration into top 16 mm (5/8 inch), screw size No 8, or 10.

C. Sinks

1. Install stainless steel sink in plastic laminate tops with epoxy compound to form watertight seal under shelf rim.
 - a. Install faucets and fittings on sink ledges with watertight seals where shown.
2. Install methyl methacrylic polymer sinks in manufacturers recommended adhesive sealer or epoxy compound to underside of methyl methacrylic polymer countertop.
 - a. Bolt or screw to countertop to prevent separation of bowl and fracture of adhesive sealant joint.
 - b. Install drain and traps to sink.

D. Faucets, Fixtures, and Outlets:

1. Seal opening between fixture and top.
2. Secure to top with manufacturers standard fittings.

3.2 PROTECTION AND CLEANING

- A. Tightly cover and protect against dirt, water, and chemical or mechanical injury.
- B. Clean at completion of work.

- - - E N D - - -

Department of Veterans Affairs
Lebanon VA Medical Center
Lebanon, PA

VA Project No. 595-601
Construct New CLC
Bid Documents: 02/09/2023

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