Department of Veterans Affairs
WILKES-BARRE VA Medical Center
WILKES-BARRE, PA

Project Number 693-19-106 (VEG 19.25)

RENOVATE 9TH FLOOR MENTAL HEALTH

Product & Equipment Cutsheets

APRIL 18, 2023

Trane Performance Climate Changer Air Handler

Unit Overview - AHU-12

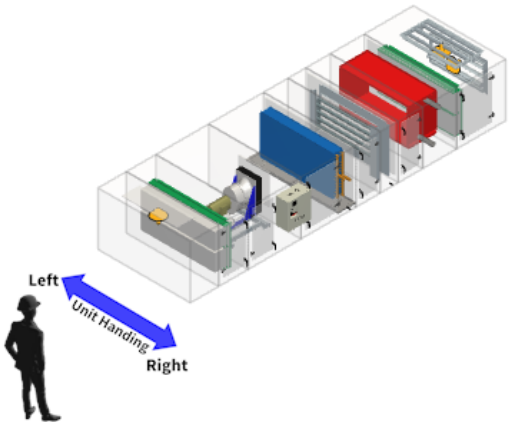
Application	Unit Size	External Dimensions			Weight	
		Height	Width	Length	Installed	Rigging
Indoor unit	CSAA014	41.5 in	72.0 in	246.1 in	3492 lb	3420 lb

Quantity of Shipping Sections	Largest Ship Split			Heaviest Ship Split	Elevation
	Height	Width	Length		
3 piece(s)	41.5 in	72.0 in	94.8 in	1216 lb	0.00 ft

Supply Fan			
Airflow	6000 cfm	**Total Static Pressure**	6.572 in H2O

Construction Features

Panel	2in. foam injected R-13 with thermal break
Panel Material	All unit inner panels - galvanized
Integral Base Frame	2.5in. integral base frame
Short Circuit Current Rating	5 kA
Agency Approval	UL listed unit



Unit Electrical

Circuit	Voltage/Phase/Frequency	FLA	MCA	Max Fuse Size
Circuit number 1 Supply fan motor(s)	460/3/60	14.00 A	17.50 A	30.00 A

Unit Controls

Controller Type	No controller

Warranty

Warranty section	Std. warranty only

Air mixing section - Position: 1

Openings

Face	Path	Type	Airflow	Face Velocity	Area	Pressure Drop	Hood
Back	Outside	Parallel blade damper	6000 cfm	1060 ft/min	5.66 sq ft	0.145 in H2O	
Top	Return	Parallel blade damper	6000 cfm	1060 ft/min	5.66 sq ft	0.219 in H2O	N/A

Filter

Type	Frame	MERV Rating	Quantity	Size
4in. cartridge - MERV 11 - standard	2"/4" combo	MERV 11	4.00 2.00	16in.x20in. 16in.x25in.
Pressure Drop	**Condition**	**Face Velocity**	**Airflow**	**Area**
0.625	Mid-life	416 ft/min	6000 cfm	14.44 sq ft

Prefilter

Type	Frame	MERV Rating	Quantity	Size	Pressure Drop
2" Pleated media - MERV 8	2"/4" combo	MERV 8	4.00 2.00	16in.x20in. 16in.x25in.	0.616

Section Options

Door Location	Right

Heating coil section - Position: 2

Coil Construction	
Model	B-54 horiz IFB coil
Rows	2 rows
Fin Spacing	7 fins per inch
Installed Weight	372.0 lb

Coil Performance	
Capacity	
Total	343.90 MBh
Air	
Flow	6000 cfm
Entering Dry Bulb	4.00 F
Leaving Dry Bulb	56.83 F
Pressure Drop	0.285 in H2O
Face Velocity	642 ft/min
Steam	
Inlet Pressure	25.00 psig
Coil Condensate	368.00 lb/hr

Access/blank/turning section - Position: 3

Options	
Section Length	19.000 in
Door Location 1	Right

Humidifier section - Position: 4

Construction	
Steam Source	Building steam
Steam Pressure	15.00 psig
Connection Location	Right
Required Orifice Size	5/16"
Valve Pipe Connection Size	1/2"
Options	
Drain Connection/Material	Galvanized drain pan
Drain Connection	Right

Performance	
Airflow	6000 cfm
Entering Dry Bulb	50.00 F
Entering Relative Humidity	10.00 %
Leaving Relative Humidity	45.00 %
Steam Rate	77.45 lb/hr
Air Temperature Gain	1.23 F
Condensation Loss	8.37 lb/hr

Access/blank/turning section - Position: 5

Options	
Section Length	19.000 in
Door Location 1	Right

Cooling coil section - Position: 6

Coil Construction	
Model	Chilled water - 3/8" Unit Optimized, High Water Flow(3U)
Rows	8
Tube Diameter	3/8in. tube diameter (9.5 mm)
Coil Connection	Standard
Tube Matl/Wall Thickness	.012" (0.305 mm) copper tubes
Fin Spacing	145 Per Foot
Fin Material	Aluminum fins
Fin Type	Omega flo H (Hi efficient)
Face Area	13.44 sq ft
Coil (top/single) H x L	32 in. (813 mm) X 61" (1549 mm) finned length
Casing	Galvanized
Turbulators	Yes
Rigging Weight	266.9 lb
Installed Weight	339.0 lb
Coil Section Options	
Extended Drain and Vent	Holes only
Drain Pan	Galvanized
Drain Pan Size	Medium
Drain Connection	Right
Minimum Trap Height (L)	9.573 in
H Trap Dimension	5.715 in
J Trap Dimension	2.858 in
Door Location	Right

Coil Performance	
Capacity	
Total	398.47 MBh
Sensible	254.06 MBh
Air	
Flow	6000 cfm
Entering Dry Bulb	89.30 F
Entering Wet Bulb	71.90 F
Leaving Dry Bulb	51.00 F
Leaving Wet Bulb	50.90 F
Pressure Drop	1.079 in H2O
Face Velocity	446 ft/min
Fluid	
Flow	52.97 gpm
Entering	45.00 F
Leaving	60.00 F
Pressure Drop	10.39 ft fluid
Tube Velocity	2.56 ft/s
Reynolds Number	5895.44
Type	Water
Concentration	100.00 %
Fouling Factor	0.00000 hr-sq ft-deg F/Btu
Volume	8.62 gal
AHRI 410 Classification	
AHRI 410 Classification	AHRI ACHC Certified
Data Generation Date	3/31/2023
Trane Select Assist update number	2690

Note: Certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Supply fan section - Position: 7

Fan Data	
Wheel Diameter/Type/Class	20in. dd plenum, 80% width, H press
Fan Quantity	1
Discharge Location	Front top
Motor Location	Right side drive
Blades	Improved sound(lowest overall,less spike
Drive Service Factor	Direct drive
Fan K-factor	2186.00
Fan Performance	
Airflow	6000 cfm
Total Static Pressure	6.572 in H2O
Total Brake Power	9.999 hp
Operating Speed	2638 rpm
AMCA FEG	FEG85
Bare fan peak total efficiency	75.30 %
Unit Static Efficiency	62.17 %
Motor Interface Options	
Selection Type	VFD
Voltage	460/3
Mounting Location	External mounting
Motor Wire In Conduit	Motor wiring conduit
VFD Frequency	89.00 Hz

Motor Data	
Power / Fan	10 hp
Voltage	460/3
Speed	1800
Class	NEMA premium compliant ODP
Efficiency	91.90 %
Part Load Efficiency	89.09 %
Fan electrical power (FEP)	8.46 kW
FEI	1.31
AHRI VFD HP	10.000 hp
Wire to air static efficiency	54.70 %

Note: VFD driven motor fan electrical power calculated in accordance with AHRI 430.

Note: Certified airflow performance per AHRI 430

Fan Section Options	
Fan Wheel Balance	Inverter balance with shaft grounding
Door Location	Right
Door Guard	Yes

Fan Discharge Options

Face	Type	Airflow	Face Velocity	Area	Pressure Drop	Exhaust Hood	Damper Torque Requirement
Front Face Feature			363 ft/min	16.53 sq ft	0.021 in H2O	N/A	N/A

Note: Certified by the AHRI Central Station Air-Handling Unit (AHU) Certification Program, based on AHRI Standard 430/431. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Pressure Drop in (in w.g.)

Supply fan	
Air mixing section	1.46
Coil section	0.28
Humidification section	0.03
Coil section	1.08
Fan section	0.02
Filter section	1.43
Discharge plenum	0.06
Internal Static Pressure	**4.37**
External Static Pressure	**2.20**
Total Static Pressure	**6.57**

Filter section - Position: 8

Primary Filter

Type	Frame	Loading	Airflow	Face Area	Face Velocity	Condition	Pressure Drop	Filter Quantity	Filter Size
12in. cartridge - 95% eff - MERV 15	Bag/cartridge filter frame	Side load filters	6000 cfm	13.44 sq ft	446 ft/min	Mid-life	0.801 in H2O	2.00 1.00 2.00	12x24 20x20 20x24

Prefilter

Type	Airflow	Face Area	Face Velocity	Condition	Pressure Drop	Filter Quantity	Filter Size
2" Pleated media - MERV 8	6000 cfm	13.44 sq ft	446 ft/min	Mid-life	0.628 in H2O	2.00 1.00 2.00	12x24 20x20 20x24

Filter Section Options

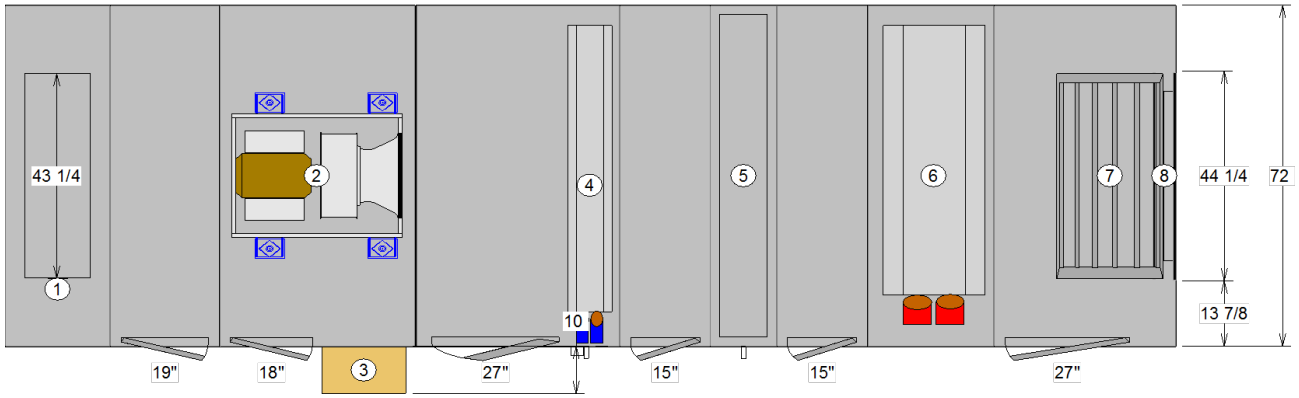
Door Location	Right

Discharge plenum - Position: 9

Openings

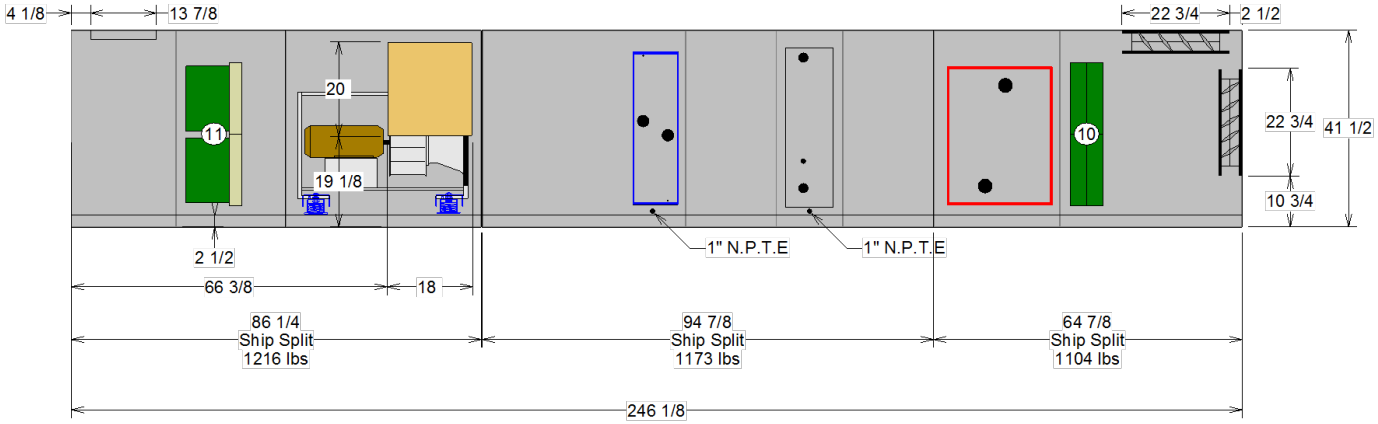
Location	Type	Airflow	Face Velocity	Area	Pressure Drop	Hood
Top Face	Sizeable rectangular opening	6000 cfm	1443 ft/min	4.16 sq ft	0.065 in H2O	N/A

Section Options



1 Opening top
43.2 x 13.86
2 Plenum fan - 20in. dd plenum, 80% width, H press Supply fan 10 hp 460/3
3 External VFD RH
4 Cooling coil - 8 Rows
Coil type 3/8" Unit Optimized, High Water Flow(3U)
5 count=38
6 Heating coil - Rows
Coil type
7 Damper top-parallel blade
44.25 x 22.75
8 Damper back-parallel blade
22.75 x 44.25
9 1" N.P.T.E
10 Combo filters -
11 Cartridge filters - 12in. cartridge - 95% eff - MERV 15

Doors
19 width x 35 height
18 width x 35 height
27 width x 35 height
15 width x 35 height



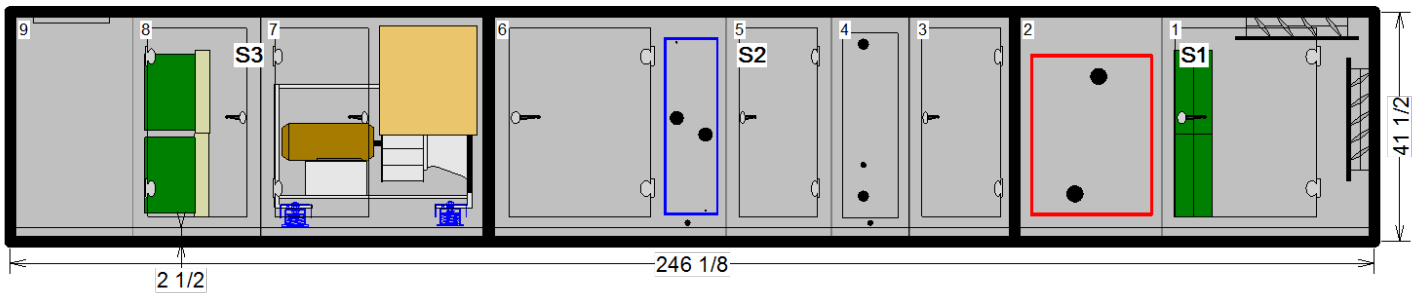
For maneuvering purposes, include 1.125 inches to each ship split length for overlapping panel flange. Flange will not add to overall installed unit length shown.

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 14	Job Name: VA Wilkes-Barre Hospital - VEG 19.25	Unit Casing: 2in Double Wall Foam
Product group: Indoor unit	Actual airflow: 6000	Proposal Number:
Integral base frame: 2.5in. integral base frame	Sales Office:	Tags: AHU-12
Paint:		Rigging weight: 3420.3 / Installed weight: 3492.4

TRANE
Performance Climate Changer
Air Handlers

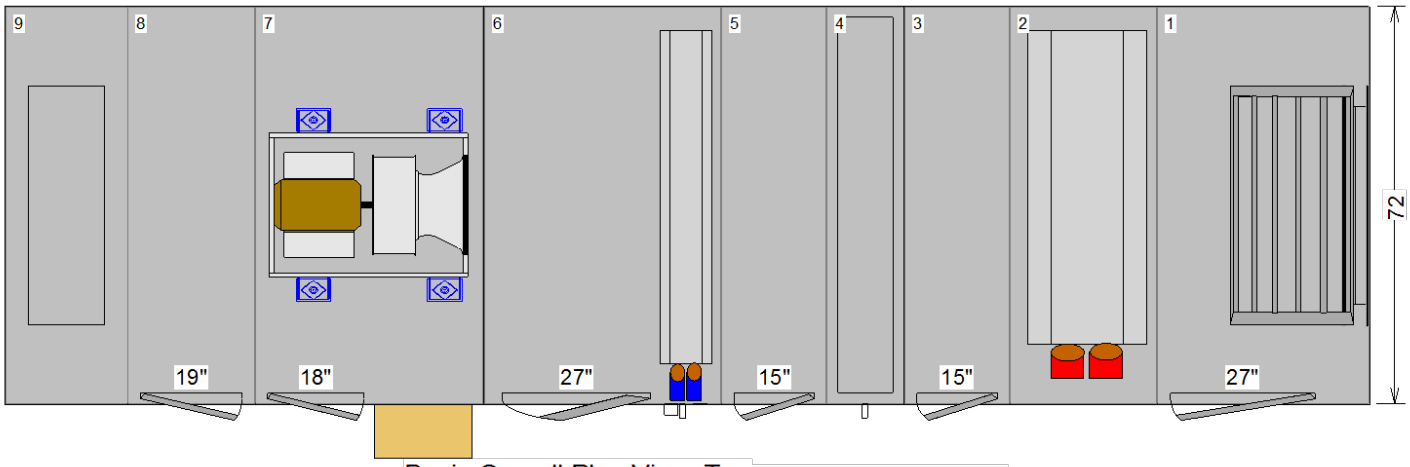
Shipping splits are indicated by thick black lines



For maneuvering purposes, include 1.125 inches to each ship split length for overlapping panel flange. Flange will not add to overall installed unit length sh

Pos #	Module	Length	Weight
1	Air mixing section	38 1/4	351.80
2	Coil section	26 5/8	751.95
3	Access section	19 1/8	129.00
4	Humidification section	14	286.00
5	Access section	19	129.00
6	Coil section	42 7/8	628.61
7	Fan section	41 1/8	827.39
8	Filter section	23	187.00
9	Discharge Plenum	22 1/8	201.65

Installed Unit Weight 3492.41 lbs



Basic Overall Plan View: Top - Measurements in inches

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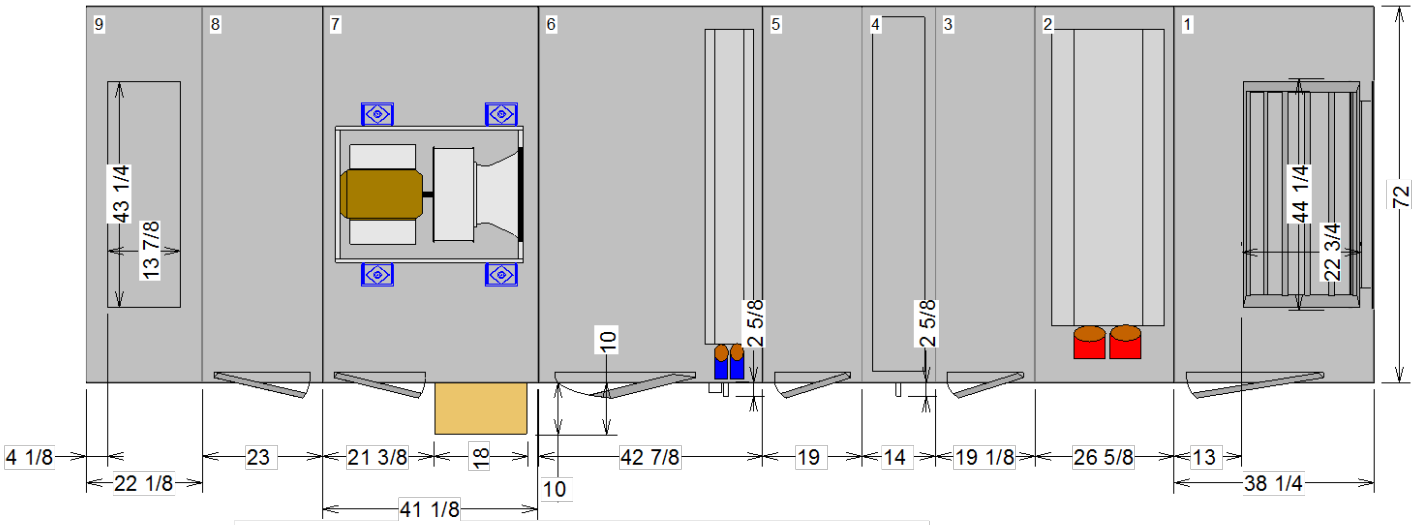
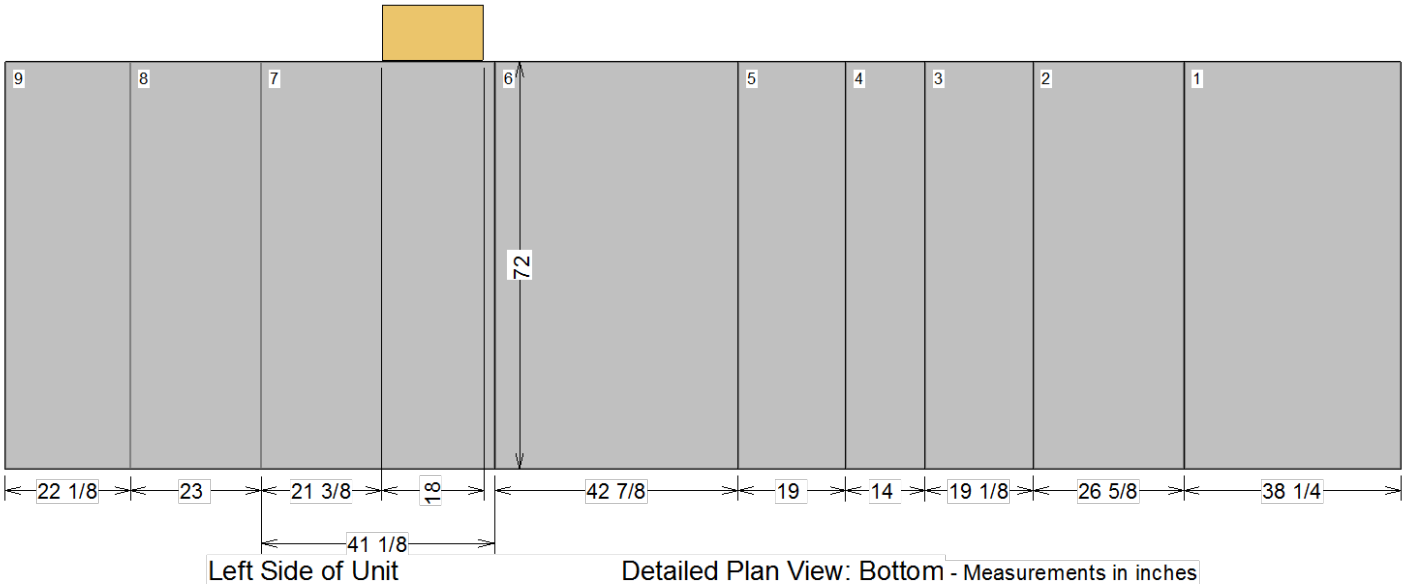
Performance Climate Changer
Air Handlers



Right Side of Unit Detailed Plan View: Top - Measurements in inches



Left Side of Unit Detailed Plan View: Bottom - Measurements in inches

****Placement of electrical conduit may vary by a tolerance of 8" in any direction.**

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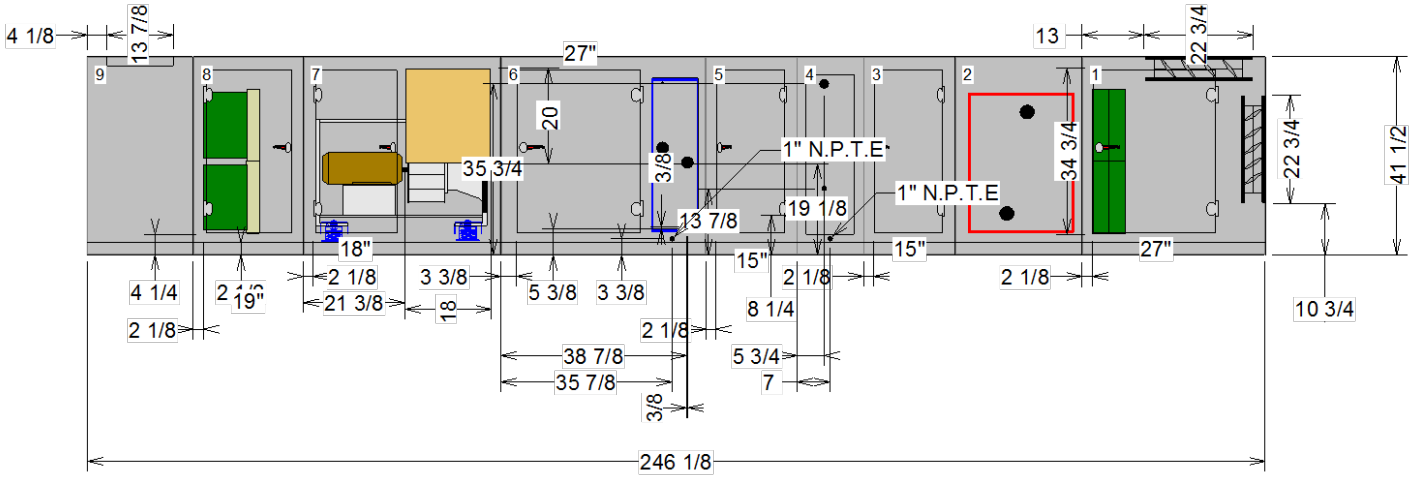
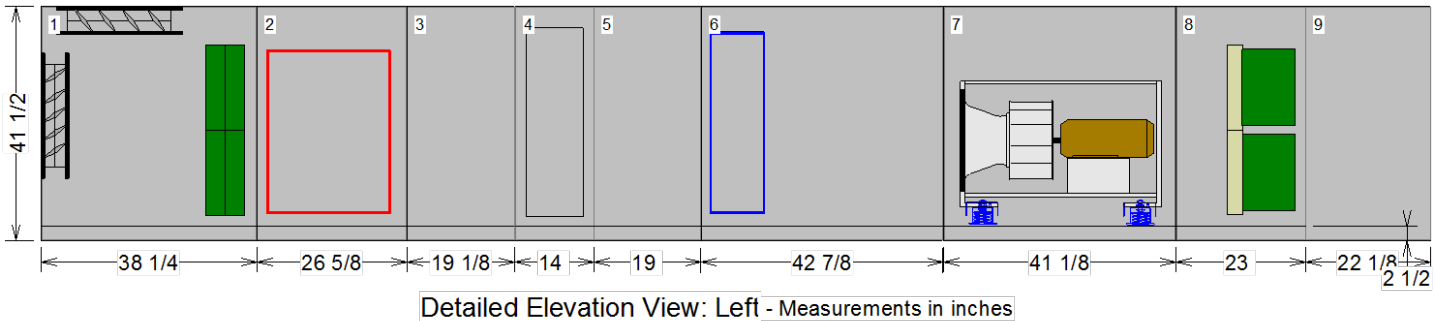
Air Handlers





Detailed Elevation View: Left - Measurements in inches

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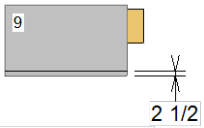
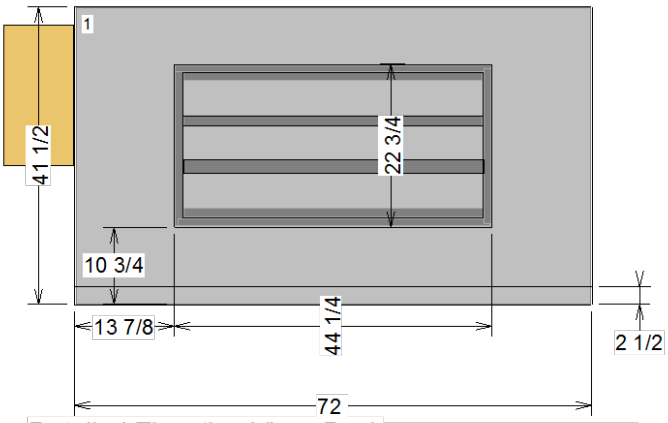
Unit size: 14	Job Name: VA Wilkes-Barre Hospital - VEG 19.25	Unit Casing: 2in Double Wall Foam
Product group: Indoor unit	Actual airflow: 6000	Proposal Number:
Integral base frame: 2.5in. integral base frame	Sales Office:	Tags: AHU-12
Paint:		Rigging weight: 3420.3 / Installed weight: 3492.4

TRANE
Performance Climate Changer Air Handlers



Detailed Elevation View: Front - Measurements in inches



Detailed Elevation View: Back - Measurements in inches

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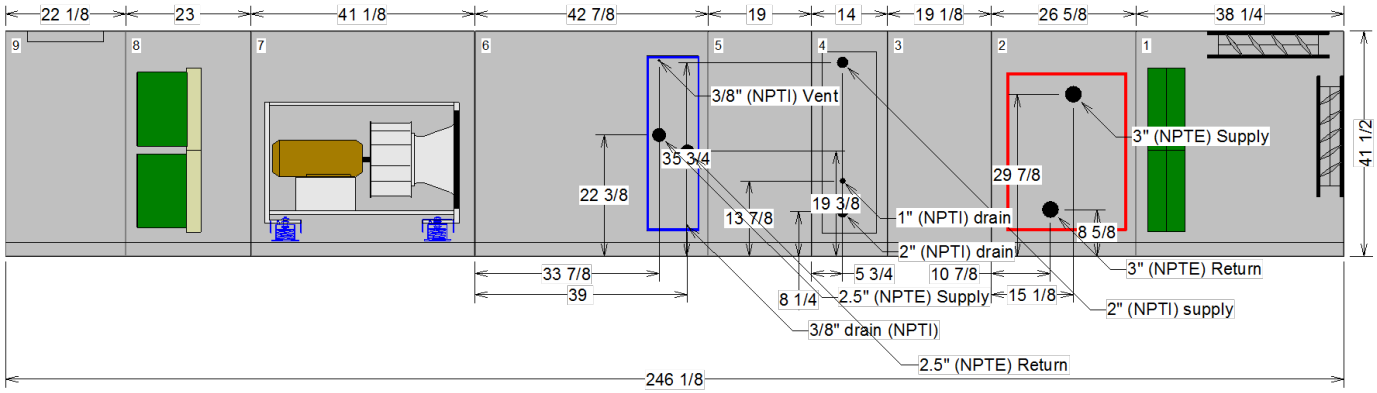
Unit size: 14	Job Name: VA Wilkes-Barre Hospital - VEG 19.25	Unit Casing: 2in Double Wall Foam	TRANE Performance Climate Changer Air Handlers
Product group: Indoor unit	Actual airflow: 6000	Proposal Number:	
Integral base frame: 2.5in. integral base frame	Sales Office:	Tags: AHU-12	
Paint:		Rigging weight: 3420.3 / Installed weight: 3492.4	



NPTI : National Pipe Thread Internal Connection
NPTE : National Pipe Thread External Connection

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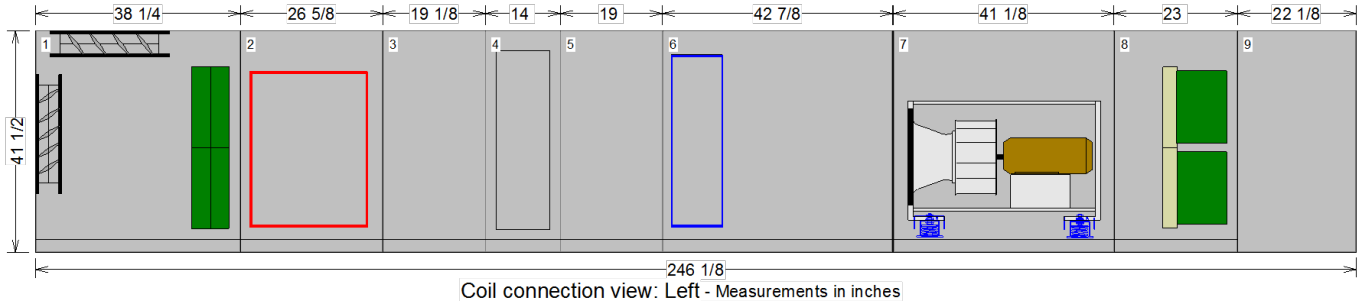
TRANE
Performance Climate Changer
Air Handlers



Coil connection view: Left - Measurements in inches

NPTI : National Pipe Thread Internal Connection
NPTE : National Pipe Thread External Connection

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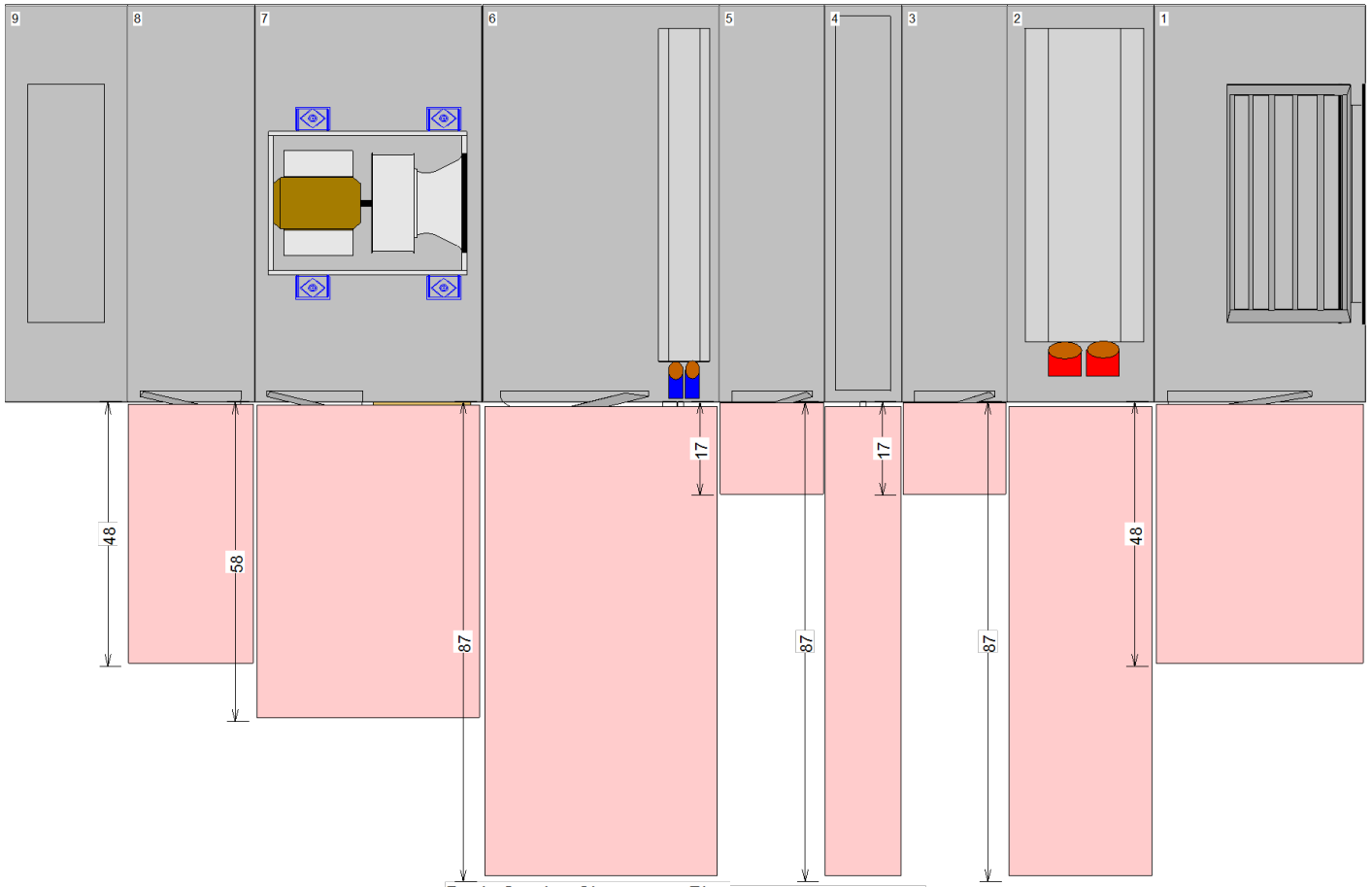
TRANE
Performance Climate Changer
Air Handlers



Basic Service Clearance - Plan - Measurements in inches

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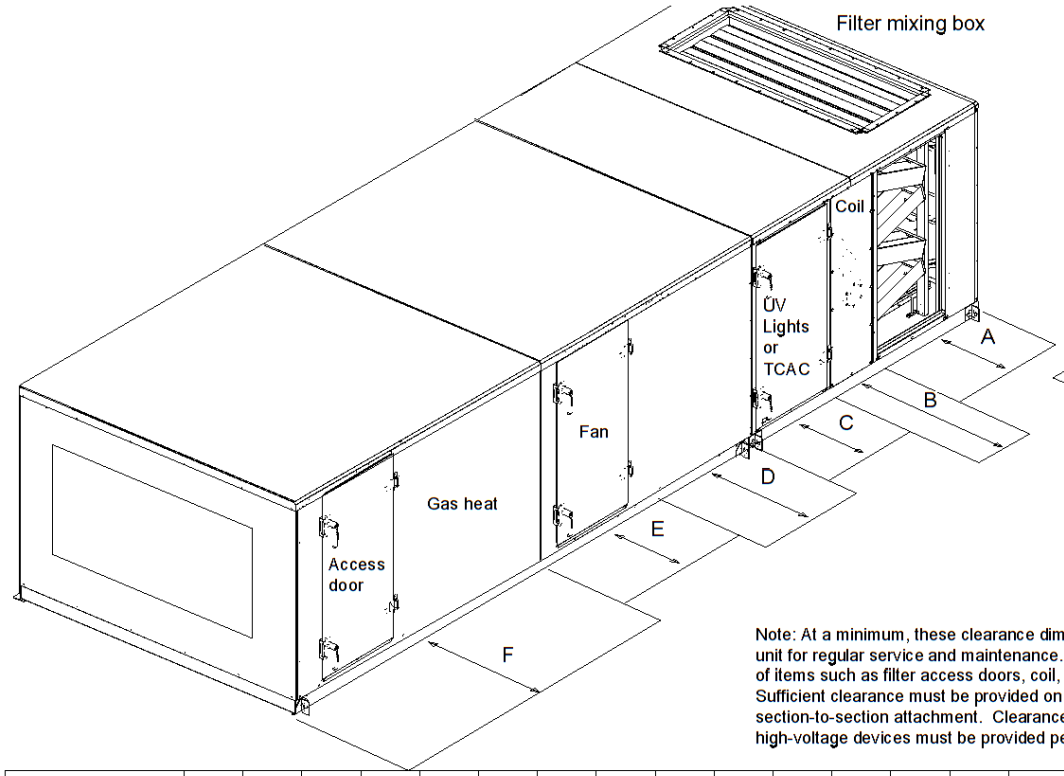
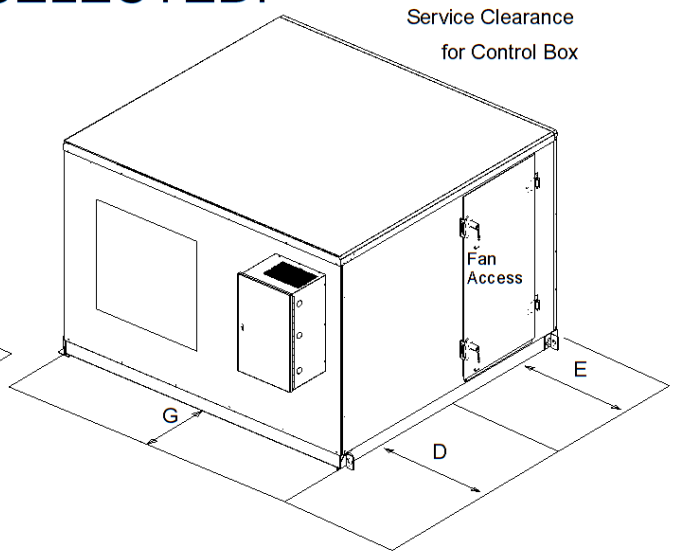
Integral base frame: 2.5in. integral base frame	Sales Office:	Tags: AHU-12
Paint:		Rigging weight: 3420.3 / Installed weight: 3492.4

TRANE
Performance Climate Changer
Air Handlers

EXAMPLE UNIT - NOT CONFIGURED AS SELECTED.



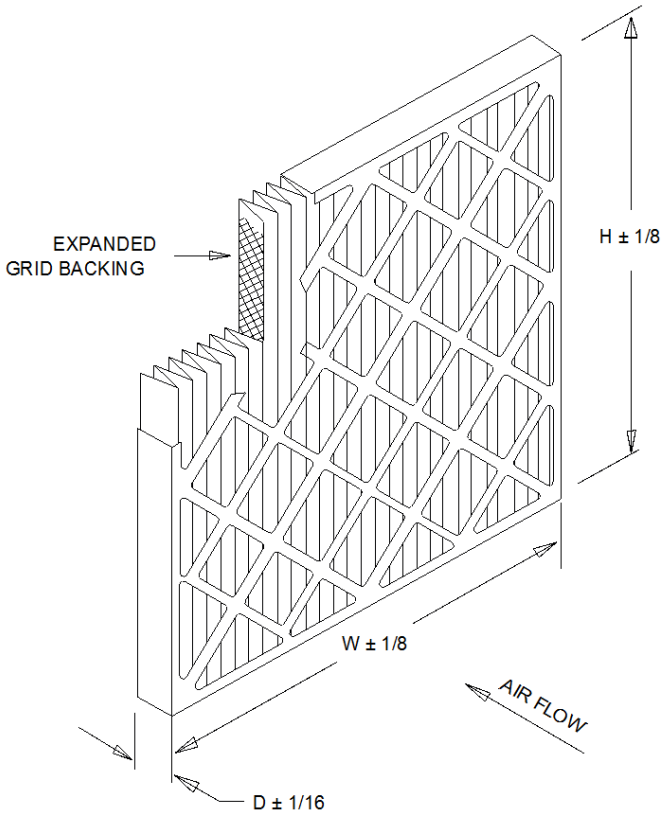


Note: At a minimum, these clearance dimensions are recommended on one side of the unit for regular service and maintenance. Refer to as-built submittal for locations of items such as filter access doors, coil, piping connections, motor locations, etc. Sufficient clearance must be provided on all sides of unit for removal of panels or section-to-section attachment. Clearance for starters, VFDs, or other high-voltage devices must be provided per NEC requirements.

Component	3	4	6	8	10	12	14	17	21	25	30	35	40	50	57	66	80	100	120
A (filter)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	52	56	58	58
B (coil, humidifier)	48	59	59	66	77	82	87	87	95	95	109	115	128	141	141	156	156	170	197
B (staggered coil)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	67	67	76	80	88	96	96	105	105	113	129
C (UV Lights)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	52	56	58	58
C (TCAC)	43	59	59	63	75	81	83	83	58	58	83	75	83	83	83	83	83	75	83
D (External Starter, VFD, LV box or Overload box)	61	61	61	61	61	61	61	61	64	64	64	64	64	64	64	64	64	64	64
D (Internal Starter or VFD)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
E (fan)	48	48	48	48	51	54	58	61	60	66	66	66	70	77	77	93	93	101	101
F (Gas Heat Ext Vestible)	N/A	N/A	89	90	108	100	100	105	115	115	118	136	140	156	156	170	179	180	N/A
F (Gas Heat Int Vestible)	N/A	N/A	56	63	74	79	84	84	92	92	106	112	125	138	138	153	153	167	194

Component	All Sizes
G (Side mount LV box)	36
G (Front mount LV box)	13

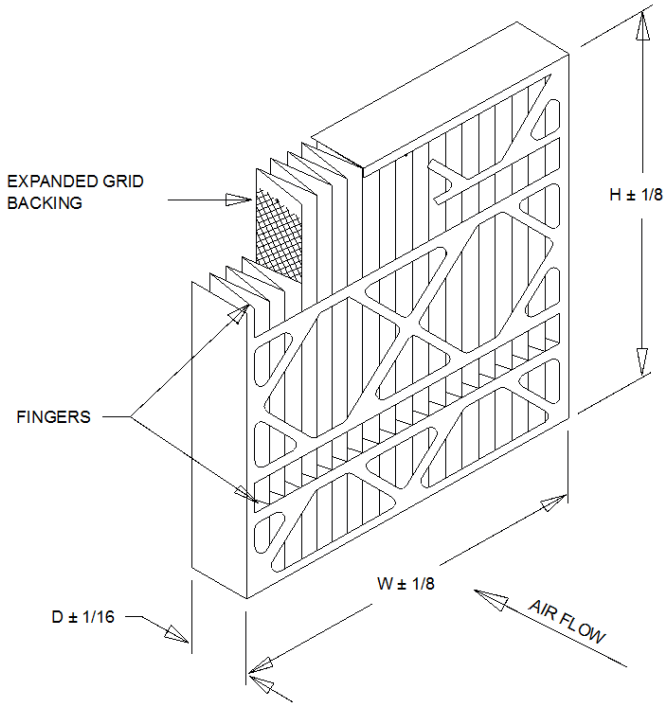
Base Detail



STANDARD CONSTRUCTION
1. 100 % Synthetic White Un-Dyed Media
2. 10.0 Pleats Per Foot
3. Expanded Metal Pleat Supports
4. Moisture Resistant Beverage Board Frame
5. Double Wall Frame

NOTES
1. MERV 8-A Per ASHRAE 52.2-2007 Appendix J.
2. Final Resistance: 1/0" W.G.
3. Rated Velocity: 500 FPM
4. Class 2 Filter Per U.L. Standard 900
5. Maximum Operating Temperature: 225 DEG. F

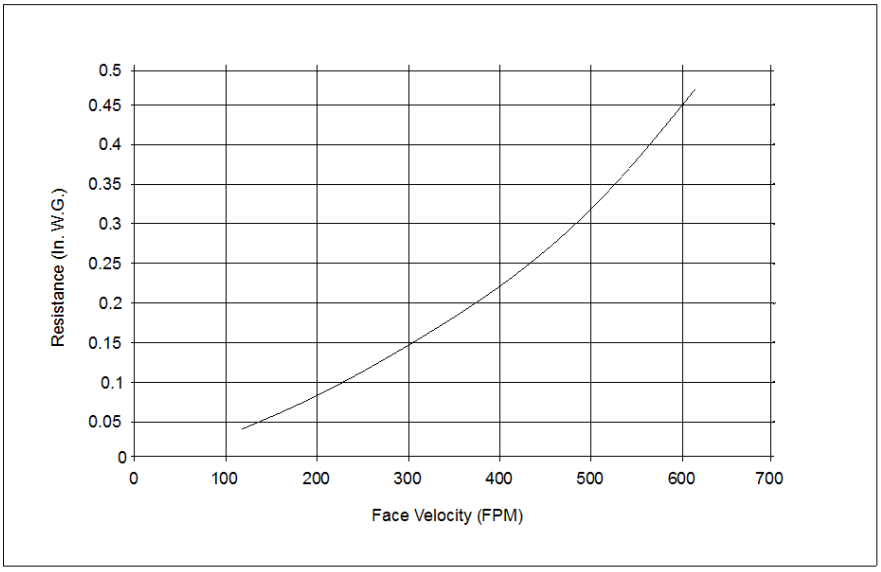
MODEL NUMBER	NOMINAL SIZE IN. W X H X D	ACTUAL SIZE IN. W X H X D	RATED AIR FLOW CFM	INITIAL RESISTANCE IN. W.G.	MEDIA AREA SQ. FT.
MX40-STD2-217	10 X 20 X 2	9-1/2 X 19-1/2 X 1-3/4	700	0.29	4.7
MX40-STD2-220	12 X 20 X 2	11-1/2 X 19-1/2 X 1-3/4	840	0.29	5.5
MX40-STD2-210	12 X 24 X 2	11-3/8 X 23-3/8 X 1-3/4	1000	0.29	6.2
MX40-STD2-239	14 X 20 X 2	13-1/2 X 19-1/2 X 1-3/4	980	0.29	5.7
MX40-2TD2-241	14 X 25 X 2	13-1/2 X 24-1/2 X 1-3/4	1220	0.29	7.1
MX40-STD2-245	15 X 20 X 2	14-1/2 X 19-1/2 X 1-3/4	1050	0.29	6.2
MX40-STD2-201	16 X 20 X 2	15-1/2 X 19-1/2 X 1-3/4	1120	0.29	6.7
MX40-STD2-216	16 X 24 X 2	15-3/8 X 23-3/8 X 1-3/4	1340	0.29	8.0
MX40-STD2-202	16 X 24 X 2	15-1/2 X 24-1/2 X 1-3/4	1400	0.29	8.0
MX40-STD2-280	15 X 20 X 2	17-1/2 X 19-1/2 X 1-3/4	1250	0.29	7.8
MX40-STD2-212	18 X 24 X 2	17-3/8 X 23-3/8 X 1-3/4	1500	0.29	9.3
MX40-STD2-285	18 X 25 X 2	17-1/2 X 24-1/2 X 1-3/4	1570	0.29	9.7
MX40-STD2-203	20 X 20 X 2	19-1/2 X 19-1/2 X 1-3/4	1400	0.29	8.3
MX40-STD2-211	20 X 24 X 2	19-3/8 X 23-3/8 X 1-3/4	1670	0.29	9.9
MX40-STD2-204	20 X 25 X 2	19-1/2 X 24-1/2 X 1-3/4	1750	0.29	10.3
MX40-STD2-205	24 X 24 X 2	23-3/8 X 23-3/8 X 1-3/4	2000	0.29	11.7
MX40-STD2-225	25 X 25 X 2	24-1/2 X 24-1/2 X 1-3/4	2170	0.29	13.6



STANDARD CONSTRUCTION
1. 100 % Synthetic Un-Dyed Media
2. 11 Pleats Per Foot
3. Expanded Metal Pleat Supports
4. Moisture Resistant Beverage Board Frame
5. Double Wall Frame
6. (2) Rows of Fingers on Air Entering Side

NOTES
1. MERV 11 per ASHRAE 52.2-2007
   Tested at 492 FPM on 24x24x4 Nominal Size
2. Final Resistance; 1.0" W.G,
3. Rated Velocity: 500 FPM
4. Classified Per U.L. Standard 900 for Flammibility
5. Maximum Operating Temperature: 200 deg. F

NOMINAL SIZE (WxHxD)	ACTUAL SIZE (WxHxD)	RATED AIR FLOW (IN. W.G.)	INITIAL RESISTANCE (IN. W.G.)	MEDIA AREA (SQUARE FEET)	FILTER UNIT WEIGHT (LBS)
12x24x4	11-3/8 x 23-3/8 x 3-3/4	1000	0.31	12.4	1.7
16x20x4	15-1/2 x 19-1/2 x 3-3/4	1120	0.31	14.5	1.7
16x25x4	15-1/2 x 24-1/2 x 3-3/4	1400	0.31	18.1	2.1
20x20x4	19-1/2 x 19-1/2 x 3-3/4	1400	0.31	18.6	2.1
20x24x4	19-3/8 x 23-3/8 x 3-3/4	1670	0.31	22.3	2.5
20x25x4	19-1/2 x 24-1/2 x 3-3/4	1750	0.31	23.4	2.6
24x24x4	23-3/8 x 23-3/8 x 3-3/4	2000	0.31	27.2	3.0



SUPPLY FAN 1 SCHEMATIC PAGE 1 OF 2

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NOTES:

1. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. PHANTOM LINES INDICATE CONTROL OPTION. REF. CONTROL PANEL SCHEMATIC FOR SPECIFIC DETAIL.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC), STATE AND LOCAL REQUIREMENTS. OTHER COUNTRIES APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS SHALL APPLY. FIELD CONDUCTORS SHALL HAVE INSULATION RATINGNOT LESS THAN 600V COPPER CONDUCTORS ONLY.
3. THE MINIMUM CIRCUIT AMPACITY, THE MAXIMUM FUSE SIZE, AND DISCONNECT SIZE ARE CALCULATED BASED ON THE INVERTER INPUT LINE CURRENTS PER ARTICLE 430-2 OF THE NATIONAL ELECTRICAL CODE.

4 PROGRAM TERMINAL 18 AS RUN.

5 PROGRAM TERMINAL 27 INV. COASTING STOP.

6 CLOSES TO RUN AUTO MODE OR BYPASS AUTO FOR OPTION VFD OR STARTER.

9 REMOVE JUMPER AND INSTALL FIELD SAFETY INTERLOCK.

CAUTION

USE COPPER CONDUCTORS ONLY!

UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

ATTENTION

N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!

LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.

L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'ÉQUIPEMENT.

PRECAUCIÓN

¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!

LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.

SI NO LO HACE, PUEDE OCASIONAR DAÑO AL EQUIPO.

⚠ WARNING

HAZARDOUS VOLTAGE!

DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.

FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠ AVERTISSEMENT

TENSION DANGEREUSE!

COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.

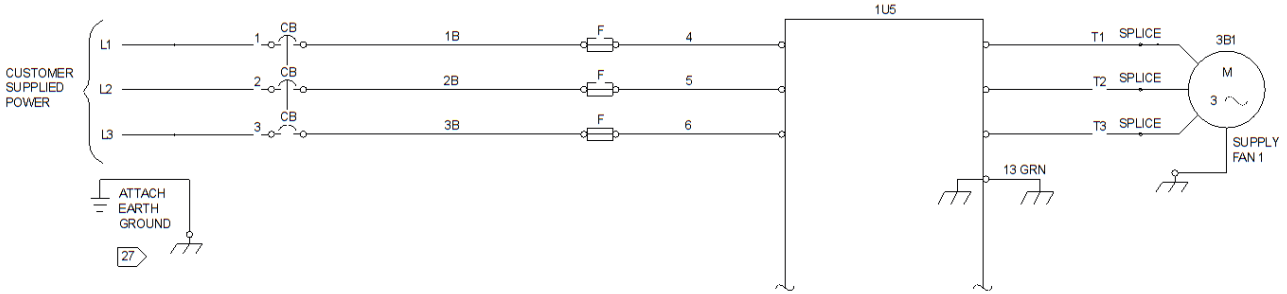
NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.

⚠ ADVERTENCIA

¡VOLTAJE PELIGROSO!

DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGÚRESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON EJE DE DIRECCIÓN DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.

EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.



SEE PAGE 2

VFD FUSES				
FUSE	VOLTAGE	PANEL HP (MAX)	P/N	CLASS
1F40 1F41 1F42	200/230	0.5-2	LP-CC-10	CC
		3	LP-CC-15	CC
		5	LP-CC-25	CC
		7.5-10	JJN-50	T
		15	JJN-80	T
		20-25	JJN-100	T
		30-40	JJN-150	T
		50	JJN-200	T
	460	0.5-2	LP-CC-10	CC
		3-5	LP-CC-15	CC
		7.5-10	LP-CC-25	CC
		15-20	JJS-50	T
		25-30	JJS-80	T
		40	JJS-100	T
		50-60	JJS-125	T
		75-100	JJS-200	T
	575	3-10	LP-CC-20	CC
		15-20	LP-CC-30	CC
		25-40	JJS-80	T
		50-75	JJS-125	T
		100-125	JJS-200	T

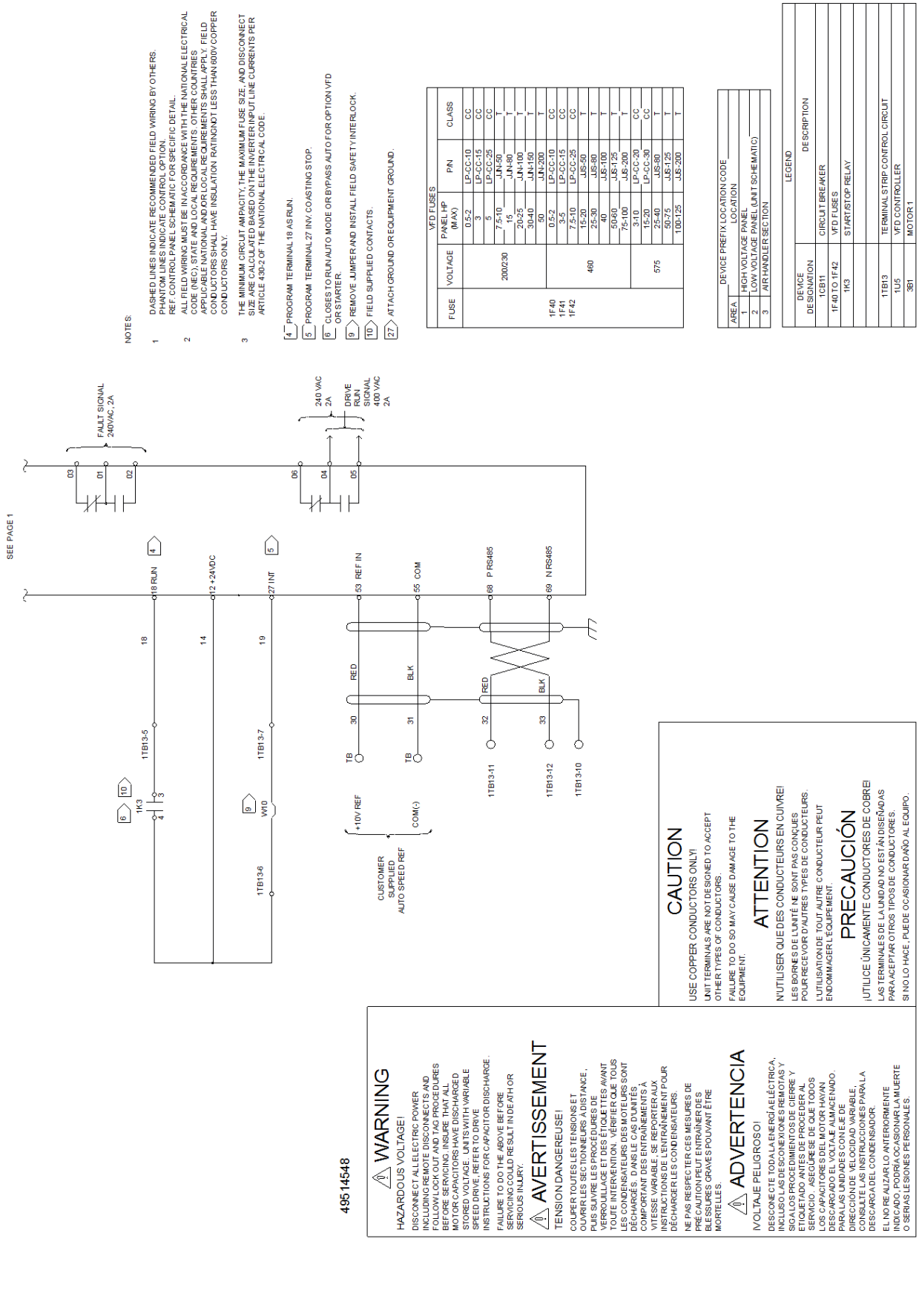
10 FIELD SUPPLIED CONTACTS.

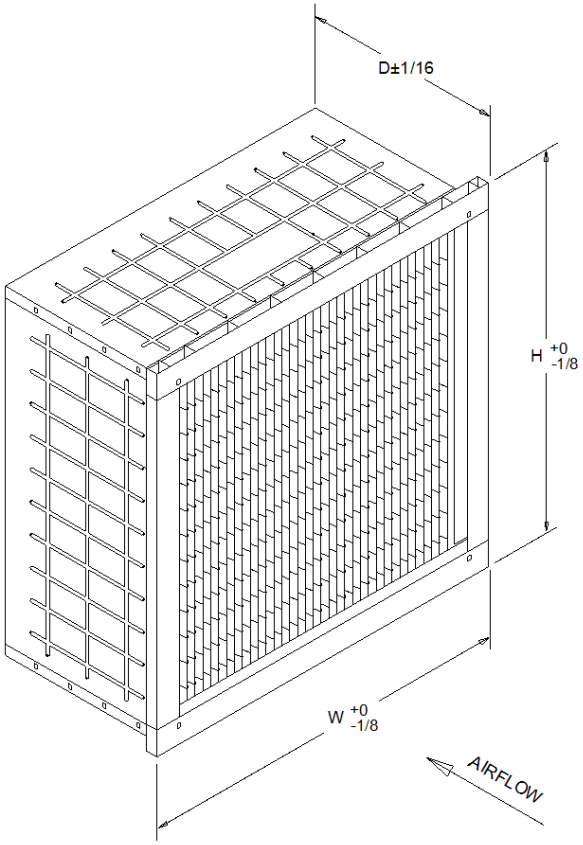
27 ATTACH GROUND OR EQUIPMENT GROUND.

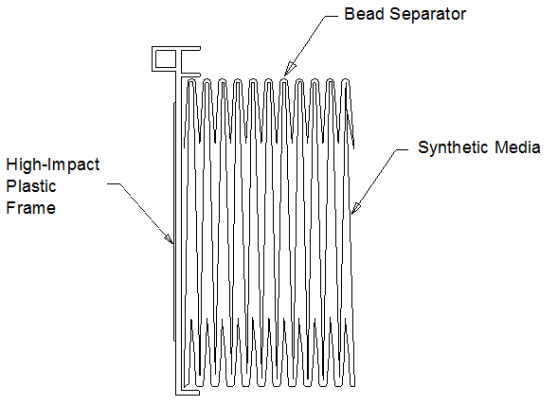
DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	HIGH VOLTAGE PANEL
2	LOW VOLTAGE PANEL (UNIT SCHEMATIC)
3	AIR HANDLER SECTION

LEGEND	
DEVICE DESIGNATION	DESCRIPTION
1CB11	CIRCUIT BREAKER
1F40 TO 1F42	VFD FUSES
1K3	START/STOP RELAY
1TB13	TERMINAL STRIP CONTROL CIRCUIT
1U5	VFD CONTROLLER
3B1	MOTOR 1

SUPPLY FAN 1 SCHEMATIC PAGE 2 OF 2







Filter Cross Section

MODEL NUMBER	NOMINAL SIZE (INCHES) HXWXD	ACTUAL SIZE (INCHES) HXWXD	RATED AIR FLOW (CFM)	INITIAL RESISTANCE (IN. w.G.)	MEDIA AREA (SQUARE FEET)	MERV RATING
DC95	24X24X12	23-3/8X23-3/8X11-1/2	2000	.45	58	15
DC95	20X24X12	19-3/8X23-3/8X11-1/2	1650	.45	47	15
DC95	20X20X12	19-3/8X19-3/8X11-1/2	1400	.45	39	15
DC95	12X24X12	11-3/8X23-3/8X11-1/2	1000	.45	28	15

USTANDARD CONSTRUCTION
1. High Efficiency Synthetic Filter Media
2. Expanded Metal Pleat Supports
3. Adhesive seal on all four Media Pack Sides
4. 24 Gauge Galv. Steel Cell Sides
5. Plastic fingers maintain pleat spacing
6. Diagonal support braces on air enterining and air leaving sides for additional rigidity
7. (4) retainer holes for spring latches,both sides

UNOTES
1. MERV per ASHRAE 52.2-2012
   Tested at 492 FPM on 24x24 Face Size
2. Final Resistance: 1.5" W.G.
3. Rated Velocity - 500 FPM
4. Classified per UL Standard 900 for Flammability
5. Maximum Operating Temperature: 180deg F
6. Optional gasket available, note in the model number
   U-Upstream Gasket
   D-Downstream gasket
   UD-Both sides
7. Special Sizes not available

GENERAL

Per ASHRAE 62.1 recommendation, indoor air handling units will be stretch or shrink wrapped to protect unit from in-transit rain and debris.

Installing contractor is responsible for long term storage in accordance with the Installation, Operation, and Maintenance manual (CLCH-SVX07*-EN).

Unit shall be UL and C-UL Listed.

Supply fans within the scope of AHRI Standard 430 are "Certified by the AHRI Central Station Air-Handling Unit (AHU) Certification Program, based on AHRI Standard 430/431. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org".

Unit sound performance data shall be reported as sound power. Trane, in providing this program and data, does not certify or warrant NC levels. These levels are affected by factors specific to each application and/or installation and therefore unable to be predicted or certified by Trane. Refer to product data for specific fan footnote references.

Manufacturer provided VFDs shall be certified to AHRI Standard 1210 "Performance Rating of Variable Frequency Drives" to ensure documented and reliable VFD efficiency.

Unit Construction

All unit panels shall be 2" solid, double-wall construction to facilitate cleaning of unit interior. Unit panels shall be provided with a mid-span, no-through-metal, internal thermal break. Casing thermal performance shall be such that under 55°F supply air temperature and design conditions on the exterior of the unit of 81°F dry bulb and 73°F wet bulb, condensation shall not form on the casing exterior.

All exterior and interior indoor AHU panels will be made of galvanized steel.

Unit Paint

Unit to ship unpainted from factory. If required, unit to be painted by 3rd party finisher, or by painting contractor at job site.

Casing Deflection

The casing shall not exceed 0.0042 inch deflection per inch of panel span at 1.00 times design static pressure. Maximum design static shall not exceed +8 inches w.g. in all positive pressure sections and -8 inches w.g. in all negative pressure sections.

Floor Construction

The unit floor shall be of sufficient strength to support a 300.0 lb load during maintenance activities and shall deflect no more than 0.0042 inch per inch of panel span.

Unit base

Manufacturer to provide a full perimeter integral base frame for either ceiling suspension of units or to support and raise all sections of the unit for proper trapping. Indoor unit base frame will either be bolted construction or welded construction. All outdoor unit base frames shall be welded construction. For indoor units, refer to schedule for base height and construction type. Contractor will be responsible for providing a housekeeping pad when unit base frame is not of sufficient height to properly trap unit. Unit base frames not constructed of galvanized steel shall be chemically cleaned and coated with both a rust-inhibiting primer and finished coat of rust-inhibiting enamel. Unit base height to be included in total height required for proper trap height.

Insulation

Panel insulation shall provide a minimum thermal resistance (R) value of 13 ft^2-h-^oF/Btu throughout the entire unit. Insulation shall completely fill the panel cavities in all directions so that no voids exist and settling of insulation is prevented. Panel insulation shall comply with NFPA 90A.

Drain Pan
In sections provided with a drain pan, the drain pan shall be designed in accordance with ASHRAE 62.1. To address indoor air quality (IAQ) the drain pan shall be sloped in two planes promoting positive drainage to eliminate stagnant water conditions. Drain pan shall be insulated, and of double wall construction. The outlet shall be the lowest point on the pan, and shall be of sufficient diameter to preclude drain pan overflow under normally expected operating conditions. All drain pans connections shall have a threaded connection, extending a minimum of 2-1/2" beyond the unit base, and shall be made from the same material as the drain pan. Drain pan located under a cooling coil shall be of sufficient size to collect all condensate produced from the coil.
Refer to Product Data for specific information on which sections are supplied with a drain pan, the drain pan material and connection location.

Access Door Construction
Access doors shall be 2" double wall construction. Interior and exterior door panels shall be of the same construction as the interior and exterior wall panels respectively. All doors shall be provided with a thermal break construction of door panel and door frame. Gasketing shall be provided around the full perimeter of the doors to prevent air leakage. Surface mounted handles shall be provided to allow quick access to the interior of the functional section and to prevent through cabinet penetrations that could likely weaken the casing leakage and thermal performance. Handle hardware shall be designed to prevent unintended closure. Access doors shall be hinged and removable for quick easy access. Hinges shall be interchangeable with the door handle hardware to allow for alternating door swing in the field to minimize access interference due to unforeseen job site obstructions. Door handle hardware shall be adjustable and visually indicate locking position of door latch external to the section. Door hinges shall be galvanized.

All doors shall be a minimum of 60" high when sufficient height is available or the maximum height allowed by the unit height.

Door handles shall be provided for each latching point of the door necessary to maintain the specified air leakage integrity of the unit. Optionally for indoor AHUs and as standard on outdoor AHUs, outward swing doors are provided with a single handle linked to multiple latching points. An optional shatterproof window shall be provided in access doors where indicated on the plans. Window shall either be single pane, or thermal dual pane, as defined on schedule. Window shall be capable of withstanding unit operating pressures and shall be safe for viewing UV-C lamps.
Refer to Product Data for specific information on which sections are supplied with an access door, the door location, a single handle and a window.

Lifting Instructions
The air handling units must be rigged, lifted, and installed in strict accordance with the Installation, Operation, and Maintenance manual (CLCH-SVX07G-EN). The units are also to be installed in strict accordance with the specifications. Units may be shipped fully assembled or disassembled to the minimum functional section size in accordance with shipping and job site requirements.

Indoor units shall be shipped on an integral base frame (variable from the standard 2.5" to 8" height) for the purpose of mounting units to a housekeeping pad and providing additional height to properly trap condensate from the unit. The integral base frame may be used for ceiling suspension, external isolation, or as a housekeeping pad. Indoor sizes 3 to 30 will also be shipped with a shipping skid designed for forklift transport. Refer to the unit As-Built or Product Data section of the submittal for the base frame height of each unit.

All units will be shipped with an integral base frame designed with the necessary number of lift points for safe installation. All lifting lugs are to be utilized during lift. The lift points will be designed to accept standard rigging devices and be removable after installation. Units shipped in sections will have a minimum of four points of lift.

MIXING SECTION
A mixing section shall be provided to support the damper assembly for outdoor, return, and/or exhaust air.

Dampers
Dampers shall modulate the volume of outdoor, return, or exhaust air. The dampers shall be of double-skin airfoil design with metal, compressible jamb seals and flexible blade-edge seals on all blades. The blades shall rotate on stainless-steel sleeve bearings. The dampers shall be rated for a maximum leakage rate of 3 cfm/ft² at 1 in. w.g. complying with ASHRAE 90.1 maximum damper leakage. All leakage testing and pressure ratings shall be based on AMCA Standard 500-D. Dampers may be arranged in a parallel or opposed-blade configuration.

Title 24
The following specifications apply only to units with outside air and return air dampers, with actuators. The 5 year warranty applies only to these items.
This unit contains Economizer that meets or exceeds all mandatory requirements prescribed by Title 24, including but not limited to:
- 5 yr parts only warranty
- Successfully tested to 60,000 Actuations
- Less than 10 cfm/sq.ft. of damper leakage at 1" WG per AMCA 500L

Filters

Mixing sections shall be provided with a filter rack as indicated in the Product Data and As-Built sections of the submittal.

4 inch high efficiency filters constructed with a fine fiber media made into closely spaced pleats shall be provided. The filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filter media shall be sealed into a frame assembled in a rigid manner. The manufacturer shall supply a side access filter rack capable of holding 4 inch high efficiency filters.

The 4 inch high efficiency filters shall have a MERV 11 rating when tested in accordance with the ANSI/ASHRAE Standard 52.2.

Prefilter Type

2-inch pleated media filters made with 100% synthetic fibers that are continuously laminated to a supported steel-wire grid with water repellent adhesive shall be provided. Filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filters shall have a MERV 8 rating when tested in accordance with the ANSI/ASHRAE Standard 52.2.

FILTER SECTION
A section shall be provided to support the filter rack as indicated throughout the unit. Refer to Product Data and As-Built sections of the submittal for specific locations within each unit.

Primary Filters

Cartridge Filters
The filters shall be 12-inch cartridge filters constructed with a continuous sheet of fine-fiber media made into uniformly spaced pleats. The filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filters shall be sealed into a metal frame assembled in a rigid manner. A gasket material shall be installed on the metal header of the filter to prevent filter bypass where the metal headers meet on the side-access racks. All cartridge filters shall be furnished with a 2-inch prefilter to provide extended cartridge filter life. The manufacturer shall supply a side-access filter rack capable of holding cartridge filters and prefilters.

Cartridge Filters (Front-load)
The filters shall be 12-inch cartridge filters constructed with a continuous sheet of fine-fiber media made into uniformly spaced pleats. The filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filters shall be sealed into a metal frame assembled in a rigid manner. A gasket material shall be installed on the metal header of the filter to prevent filter bypass where the metal headers meet on the side-access racks. All cartridge filters shall be furnished with a 2-inch prefilter to provide extended cartridge filter life. The manufacturer shall supply a side-access filter rack capable of holding cartridge filters and prefilters.

The cartridge filters shall have a MERV 15 rating when tested in accordance with the ANSI/ASHRAE Standard 52.2.

Prefilter Type

2-inch pleated media filters made with 100% synthetic fibers that are continuously laminated to a supported steel-wire grid with water repellent adhesive shall be provided. Filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filters shall have a MERV 8 rating when tested in accordance with the ANSI/ASHRAE Standard 52.2.

COIL SECTION WITH FACTORY INSTALLED COIL
The coil section shall be provided complete with coil and coil holding frame. The coils shall be installed such that headers and return bends are enclosed by unit casings. If two or more cooling coils are stacked in the unit, an intermediate drain pan shall be installed between each coil and be of the same material as the primary drain pan. Like the primary drain pan, the intermediate drain pan shall be designed being of sufficient size to collect all condensation produced from the coil and sloped to promote positive drainage to eliminate stagnant water conditions. The intermediate pan shall begin at the leading face of the water-producing device and be of sufficient length extending downstream to prevent condensate from passing through the air stream of the lower coil. Intermediate drain pan shall include downspouts to direct condensate to the primary drain pan. The outlet shall be located at the lowest point of the pan and shall be sufficient diameter to preclude drain pan overflow under any normally expected operating condition.

Coil with Inspection
The coil section shall include an inspection section complete with a double-wall, removable door downstream of the coil for inspection, cleaning, and maintenance. Interior and exterior door panels shall be of the same construction as the interior and exterior wall panels, respectively. All doors shall be provided with a thermal break construction of door panel and door frame.

Casing penetrations supplied for hydronic drain and vents. Piping contractor shall provide extended piping.

Water Coils (UP, WP, UW, UU, UA, 3W, 3U, W, 5W, 5A, WD, 5D, D1, D2, P, or TT)
The coils shall have aluminum fins and seamless copper tubes. Copper fins may be applied to coils with 5/8-inch tubes. Fins shall have collars drawn, belled, and firmly bonded to tubes by mechanical expansion of the tubes. The coil casing may be galvanized or stainless steel. Refer to the Product Data section of the submittal for the coil casing material.
The coils shall be proof-tested to 300 psig and leak-tested under water to 200 psig. Coils containing water or ethylene glycol are certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org. Propylene glycol and calcium chloride, or mixtures thereof, are outside the scope of AHRI Standard 410 and, therefore, do not require AHRI 410 rating or certification.

Coil connections are constructed of cast iron with female connections, steel block with female connections or steel pipe with male connections. Type P or TT coil connections do not extend out of unit casing. All other water coil types have connections that extend out beyond unit casing. Headers on downstream coil bank of staggered coil sections do not extend beyond the unit casing and must be completed by the on-site piping contractor.

Tubes are 3/8" [9.5 mm] OD 0.012" [0.305 mm] thick copper.

ACCESS/INSPECTION / TURNING SECTION

A section shall be provided to allow additional access/inspection of unit components and space for field-installed components as needed. An access door shall be provided for easy access. All access sections shall be complete with a double-wall, removable door downstream for inspection, cleaning, and maintenance. Interior and exterior door panels shall be of the same construction as the interior and exterior wall panels, respectively. All doors downstream of cooling coils shall be provided with a thermal break construction of door panel and door frame.

DIRECT-DRIVE PLENUM FAN SECTION
The fan type shall be provided as required for stable operation and optimum energy efficiency. The fan shall be a single-width, single-inlet, multiblade-type direct-drive plenum fan. Motor bearing life of the direct-drive plenum fan shall be not less than L-10 250,000 hrs**.** *Refer to the Product Data section for fan quantity and number of blades selected within each unit*. Central Station Air Handling Unit Supply Fans are "Certified by the AHRI Central Station Air-Handling Unit (AHU) Certification Program, based on AHRI Standard 430/431. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org" Central Station Air Handling Unit Supply Fans shall be tested and rated in-accordance with AHRI Standard 260 for sound performance.

Fans that are selected with inverter balancing shall first be dynamically balanced at design RPM. The fans then will be checked in the factory from 25% to 100% of design RPM to insure they are operating within vibration tolerance specifications, and that there are no resonant frequency issues throughout this operating range. Inverter balancing that requires lockout frequencies inputted into a variable frequency drive to in order to bypass resonant frequencies shall not be acceptable. If supplied in this manner by the unit manufacturer, the contractor will be responsible for rebalancing in the field after unit installation. Fans selected with inverter balancing shall have a maintenance free grounding assembly installed on the fan motor to discharge both static and induced shaft currents to ground.

On units supplied with plenum or motorized impeller fans, door guard(s) shall be supplied on the access door(s) to the fan and those downstream access door(s) where unintended access to the plenum or motorized impeller fan could occur. Door guard is intended to deter unauthorized entry and incidental contact with rotating components. *Refer to the Product Data section for fans with access door guard(s)*.

Motor Frame
The motor shall be mounted integral to the isolated fan assembly and furnished by the unit manufacturer. The motor is mounted inside the unit casing on an adjustable base to permit adjustment of drive belt tension (not applicable for direct drive plenum fans). The motor shall meet or exceed all NEMA Standards Publication MG 1 requirements and comply with NEMA Premium efficiency levels when applicable except for fractional horsepower motors which are not covered by the NEMA classification. The motor shall be T-frame, squirrel cage with size, type, and electrical characteristics as shown on the equipment schedule. *Refer to the Product Data section for selected fan motors within each unit.*

Two-Inch Spring Isolators
Direct-drive fan and motor assemblies shall be internally isolated from the unit casing with 2-inch (50.8 mm) deflection spring isolators. The isolation system shall be designed to resist loads produced by external forces, such as earthquakes, and conform to the current IBC seismic requirements.

Starter/VFD shall be mounted externally in a NEMA Type 1 enclosure on the supply fan section. An external disconnect shall be mounted through-the-door to the starter/VFD to disconnect full power from starter/VFD.

Combination VFD / Disconnect
A combination Variable Frequency Drive (VFD) / disconnect shall be provided when variable air volume control is required for fan operation. Whether for single fan, dual fan, or fan array applications, a single VFD shall be provide to ensure proper operation and to optimize operating life. Each VFD / disconnect shall be properly sized, factory mounted in a full metal enclosure, wired to the fan motor(s), and commissioned to facilitate temporary heating, cooling, ventilation, and/or timely completion of the project. VFD / disconnects shall include a circuit breaker disconnect with a through-the-door interlocking handle and shall be lockable. The VFD package shall also include:

a) Electronic manual speed control
b) Hand-Off-Auto (H-O-A) selector switch
c) Inlet fuses to provide maximum protection against inlet short circuit
d) Current limited stall prevention
e) Auto restart after momentary power loss
f) Speed search for starting into rotating motor
g) Anti-windmill w/DC injection before start
h) Phase-to-phase short circuit protection
i) Ground fault protection
j) Manual motor protection MMP

Units with factory-mounted controls shall include power wiring from the VFD panel to the control system transformers, binary output on/off wiring, analog output-speed-signal wiring, and all interfacing wiring between the VFD and the direct digital controller.

The VFD shall be UL508C listed and CSA certified and conform to applicable NEMA, ICS, NFPA, & IEC standards.

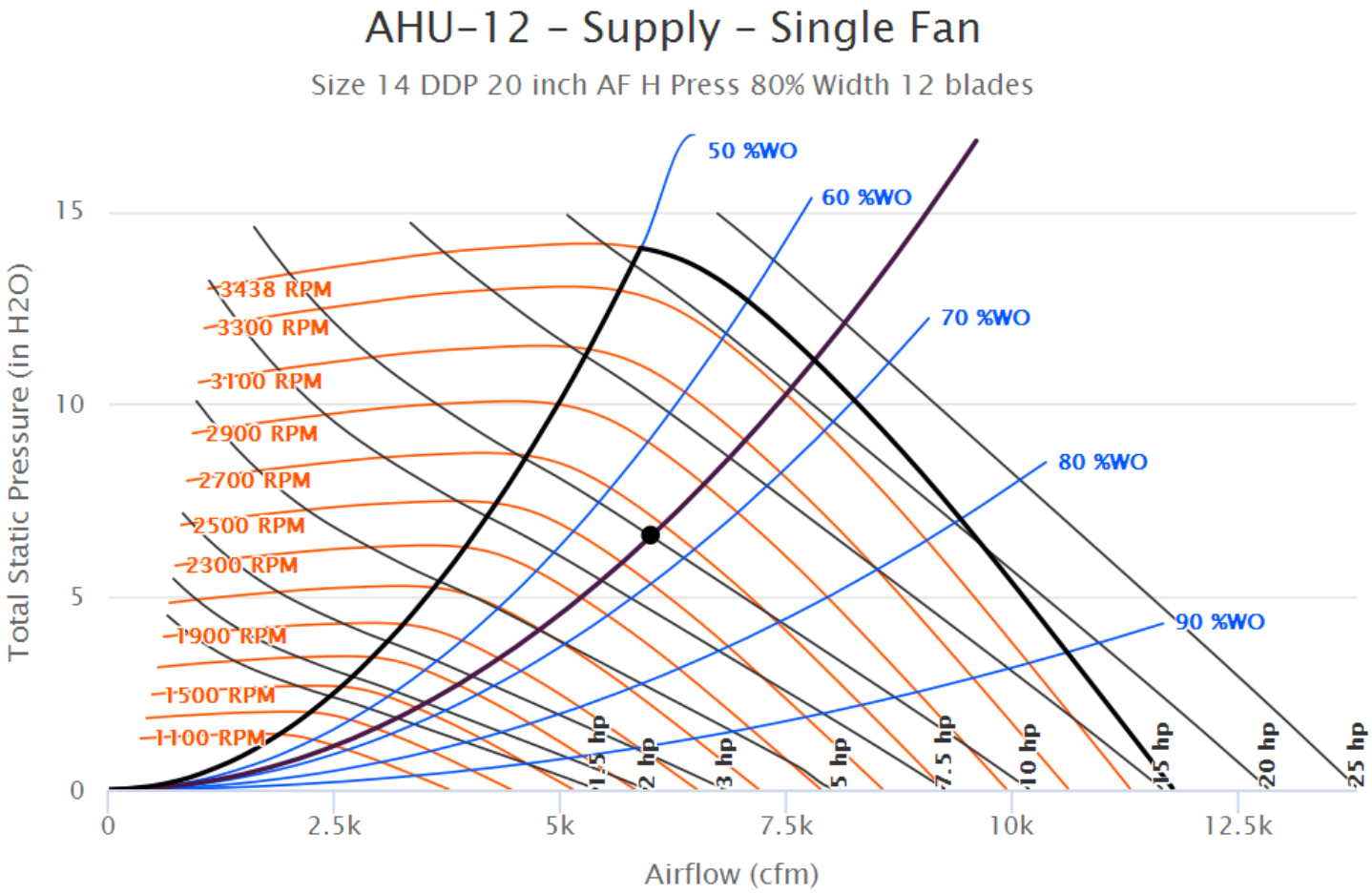
Motor Wiring Conduit
The fan motor wiring shall be factory-wired to the unit-mounted starter/disconnect, variable frequency drive, or external motor junction box within flexible metal conduit of adequate length so that the fan vibration isolation, if applicable, will not be restricted. *Refer to the Product Data section for fans with motor wiring conduit.*

DISCHARGE PLENUM SECTION
Plenums shall be provided to efficiently turn air and provide sound attenuation. Discharge plenum opening types and sizes shall be scaled to meet engineering requirements. The vertical discharge plenum height may be scaled to accommodate the appropriate discharge duct height.

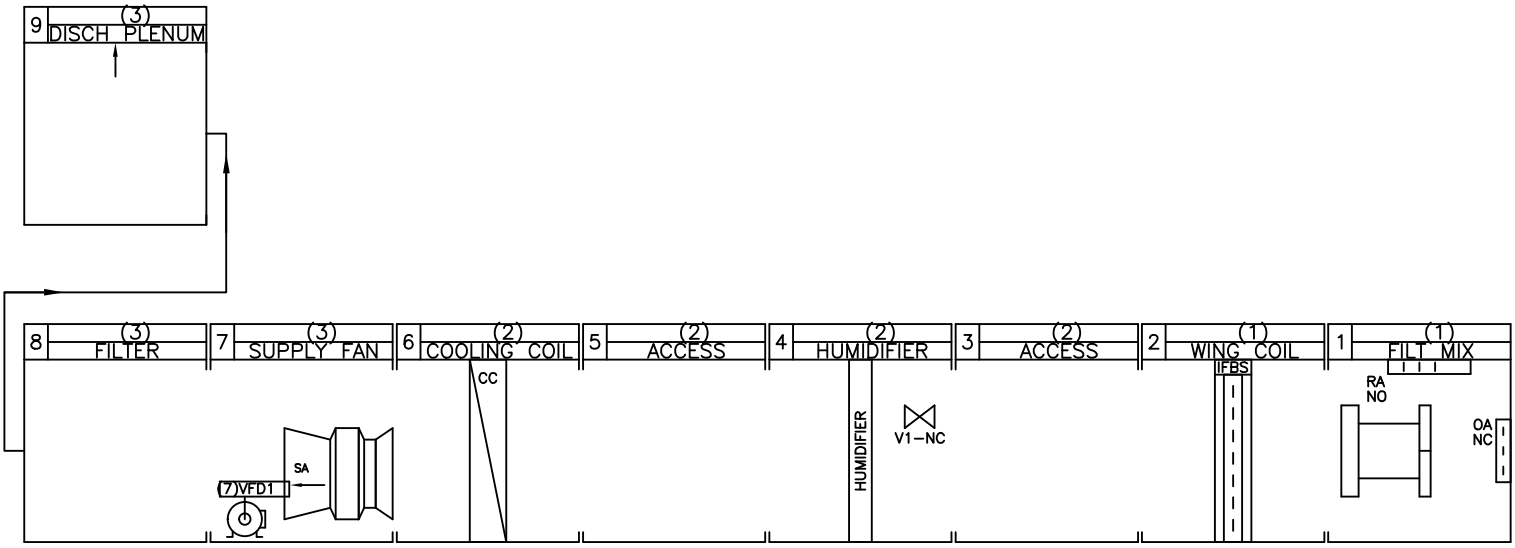
HUMIDIFIER SECTION (Direct Steam)
Humidifier section shall be provided with a humidifier panel designed for building steam. Humidifier panel shall include stainless steel construction of all wetted parts including the integrated header/separator and multiple tube dispersion assembly. Tube-to-header joints shall consist of welded stainless steel. Inlet and outlet connection elbows on the humidifier shall be malleable iron. Humidifier shall provide a uniform steam discharge. Humidifiers shall be provided with a control valve, inverted bucket steam trap, wye strainer, and two float and thermostatic steam traps shipped loose for field installation. All pipe connections shall be made from one side of the air handler.

Fan Details

Unit Size	20UR	**Operating Brake Power**	9.999 hp
Motor Frequency	89.00 Hz	**Altitude**	0.00 ft
Operating Airflow	6,000 cfm	**Design Temp.**	70.00 F
Operating Static Pressure	6.572 in H2O	**Efficiency**	62.17 %
Operating RPM	2,638 rpm		



WIRING DETAIL 1



DRAWN BY SERVICE ACCOUNT	Trane	
DATE 3/31/2023		CSIA–SCHEMATIC UNIT SIZE: 14 UNIT TAG: AHU–12
SOFTWARE VERSION 1.4.0		
DRAWING VERSION		

LEGEND DETAIL 1

POS#	BUILD GROUP	DESCRIPTION	PT	LABEL	PWR HR-WIRE	SIGNAL HR-WIRE	XFMR	POWER VA
4	2	Valve Control	AO1	V1				
4	2	High limit sensor		HLT1				
7	3	Supply Fan VFD	AO2	VFD1				

DRAWN BY SERVICE ACCOUNT	Trane	
DATE 3/31/2023		CSIA-SCHEMATIC UNIT SIZE: 14 UNIT TAG: AHU-12
SOFTWARE VERSION 1.4.0		
DRAWING VERSION		

Trane Performance Climate Changer Air Handler

Unit Overview - AHU-13

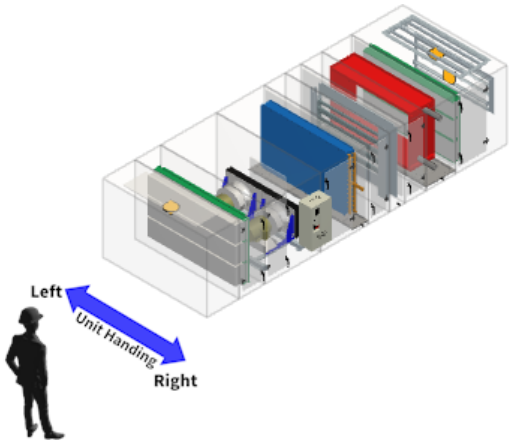
Application	Unit Size	External Dimensions			Weight	
		Height	Width	Length	Installed	Rigging
Indoor unit	CSAA030	61.5 in	93.5 in	269.9 in	5816 lb	5661 lb

Quantity of Shipping Sections	Largest Ship Split			Heaviest Ship Split	Elevation
	Height	Width	Length		
4 piece(s)	61.5 in	93.5 in	91.5 in	1922 lb	0.00 ft

Supply Fan			
Airflow	12150 cfm	**Total Static Pressure**	6.977 in H2O

Construction Features

Panel	2in. foam injected R-13 with thermal break
Panel Material	All unit inner panels - galvanized
Integral Base Frame	2.5in. integral base frame
Short Circuit Current Rating	5 kA
Agency Approval	UL listed unit



Unit Electrical

Circuit	Voltage/Phase/Frequency	FLA	MCA	Max Fuse Size
Circuit number 1 Supply fan motor(s)	460/3/60	40.00 A	50.00 A	90.00 A

Unit Controls

Controller Type	No controller

Warranty

Warranty section	Std. warranty only

Air mixing section - Position: 1

Openings

Face	Path	Type	Airflow	Face Velocity	Area	Pressure Drop	Hood
Back	Outside	Parallel blade damper	12150 cfm	1009 ft/min	12.04 sq ft	0.080 in H2O	
Top	Return	Parallel blade damper	12150 cfm	1009 ft/min	12.04 sq ft	0.176 in H2O	N/A

Filter

Type	Frame	MERV Rating	Quantity	Size
4in. cartridge - MERV 11 - standard	2"/4" combo	MERV 11	3.00 2.00 6.00	12in.x24in. 16in.x20in. 20in.x24in.

Pressure Drop	Condition	Face Velocity	Airflow	Area
0.618	Mid-life	399 ft/min	12150 cfm	30.44 sq ft

Prefilter

Type	Frame	MERV Rating	Quantity	Size	Pressure Drop
2" Pleated media - MERV 8	2"/4" combo	MERV 8	3.00 2.00 6.00	12in.x24in. 16in.x20in. 20in.x24in.	0.610

Section Options

Door Location	Right

Heating coil section - Position: 2

Coil Construction	
Model	D-60 horiz IFB coil
Rows	2 rows
Fin Spacing	7 fins per inch
Installed Weight	591.0 lb
Coil Section Options	
Drain Pan	Galvanized
Drain Connection	Right
Minimum Trap Height (L)	8.371 in
H Trap Dimension	4.914 in
J Trap Dimension	2.457 in

Coil Performance	
Capacity	
Total	666.31 MBh
Air	
Flow	12150 cfm
Entering Dry Bulb	4.40 F
Leaving Dry Bulb	54.54 F
Pressure Drop	0.338 in H2O
Face Velocity	702 ft/min
Steam	
Inlet Pressure	24.00 psig
Coil Condensate	712.00 lb/hr

Access/blank/turning section - Position: 3

Options	
Section Length	19.000 in
Door Location 1	Right

Humidifier section - Position: 4

Construction	
Steam Source	Building steam
Steam Pressure	15.00 psig
Connection Location	Right
Required Orifice Size	5/8"
Valve Pipe Connection Size	3/4"
Options	
Drain Connection/Material	Galvanized drain pan
Drain Connection	Right

Performance	
Airflow	12150 cfm
Entering Dry Bulb	65.00 F
Entering Relative Humidity	10.00 %
Leaving Relative Humidity	45.00 %
Steam Rate	261.11 lb/hr
Air Temperature Gain	1.29 F
Condensation Loss	17.83 lb/hr

Access/blank/turning section - Position: 5

Options	
Section Length	19.000 in
Door Location 1	Right

Cooling coil section - Position: 6

Coil Construction	
Model	Chilled water - 3/8" Unit Optimized, High Water Flow(3U)
Rows	8
Tube Diameter	3/8in. tube diameter (9.5 mm)
Coil Connection	Standard
Tube Matl/Wall Thickness	.012" (0.305 mm) copper tubes
Fin Spacing	142 Per Foot
Fin Material	Aluminum fins
Fin Type	Omega flo H (Hi efficient)
Face Area	29.61 sq ft
Coil (top/single) H x L	52 in. (1321 mm) X 82" (2083 mm) finned length
Casing	Galvanized
Turbulators	Yes
Rigging Weight	538.8 lb
Installed Weight	693.4 lb
Coil Section Options	
Extended Drain and Vent	Holes only
Drain Pan	Galvanized
Drain Pan Size	Medium
Drain Connection	Right
Minimum Trap Height (L)	9.793 in
H Trap Dimension	5.862 in
J Trap Dimension	2.931 in
Door Location	Right

Coil Performance	
Capacity	
Total	806.65 MBh
Sensible	514.46 MBh
Air	
Flow	12150 cfm
Entering Dry Bulb	89.30 F
Entering Wet Bulb	71.90 F
Leaving Dry Bulb	51.00 F
Leaving Wet Bulb	50.90 F
Pressure Drop	0.924 in H2O
Face Velocity	410 ft/min
Fluid	
Flow	94.62 gpm
Entering	45.00 F
Leaving	62.00 F
Pressure Drop	16.94 ft fluid
Tube Velocity	2.78 ft/s
Reynolds Number	6502.97
Type	Water
Concentration	100.00 %
Fouling Factor	0.00000 hr-sq ft-deg F/Btu
Volume	18.50 gal
AHRI 410 Classification	
AHRI 410 Classification	AHRI ACHC Certified
Data Generation Date	3/31/2023
Trane Select Assist update number	2690

Note: Certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Supply fan section - Position: 7

Fan Data	
Wheel Diameter/Type/Class	20in. dd plenum, 80% width, H press
Fan Quantity	2
Discharge Location	Front top
Motor Location	Right side drive
Blades	Improved sound(lowest overall,less spike
Drive Service Factor	Direct drive
Fan K-factor	2186.00
Fan Performance	
Airflow	12150 cfm
Total Static Pressure	6.977 in H2O
Total Brake Power	22.452 hp
Operating Speed	2767 rpm
AMCA FEG	FEG85
Bare fan peak total efficiency	75.30 %
Unit Static Efficiency	59.52 %
Motor Interface Options	
Selection Type	VFD
Voltage	460/3
Mounting Location	External mounting
Motor Wire In Conduit	Motor wiring conduit
VFD Frequency	94.00 Hz

Motor Data	
Power / Fan	15 hp
Voltage	460/3
Speed	1800
Class	NEMA premium compliant ODP
Efficiency	93.50 %
Part Load Efficiency	90.19 %
Fan electrical power (FEP)	18.55 kW
FEI	1.29
AHRI VFD HP	30.000 hp
Wire to air static efficiency	53.63 %

Note: VFD driven motor fan electrical power calculated in accordance with AHRI 430.

Note: Certified airflow performance per AHRI 430

Fan Section Options	
Fan Wheel Balance	Inverter balance with shaft grounding
Door Location	Right
Door Guard	Yes

Fan Discharge Options

Face	Type	Airflow	Face Velocity	Area	Pressure Drop	Exhaust Hood	Damper Torque Requirement
Front Face Feature			355 ft/min	34.18 sq ft	0.020 in H2O	N/A	N/A

Note: Certified by the AHRI Central Station Air-Handling Unit (AHU) Certification Program, based on AHRI Standard 430/431. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Pressure Drop in (in w.g.)

Supply fan	
Air mixing section	1.40
Coil section	0.34
Humidification section	0.03
Coil section	0.92
Fan section	0.02
Filter section	1.41
Discharge plenum	0.05
Internal Static Pressure	**4.18**
External Static Pressure	**2.80**
Total Static Pressure	**6.98**

Filter section - Position: 8

Primary Filter

Type	Frame	Loading	Airflow	Face Area	Face Velocity	Condition	Pressure Drop	Filter Quantity	Filter Size
12in. cartridge - 95% eff - MERV 15	Bag/cartridge filter frame	Side load filters	12150 cfm	28.22 sq ft	431 ft/min	Mid-life	0.792 in H2O	3.00 8.00	12x24 20x20

Prefilter

Type	Airflow	Face Area	Face Velocity	Condition	Pressure Drop	Filter Quantity	Filter Size
2" Pleated media - MERV 8	12150 cfm	28.22 sq ft	431 ft/min	Mid-life	0.622 in H2O	3.00 8.00	12x24 20x20

Filter Section Options

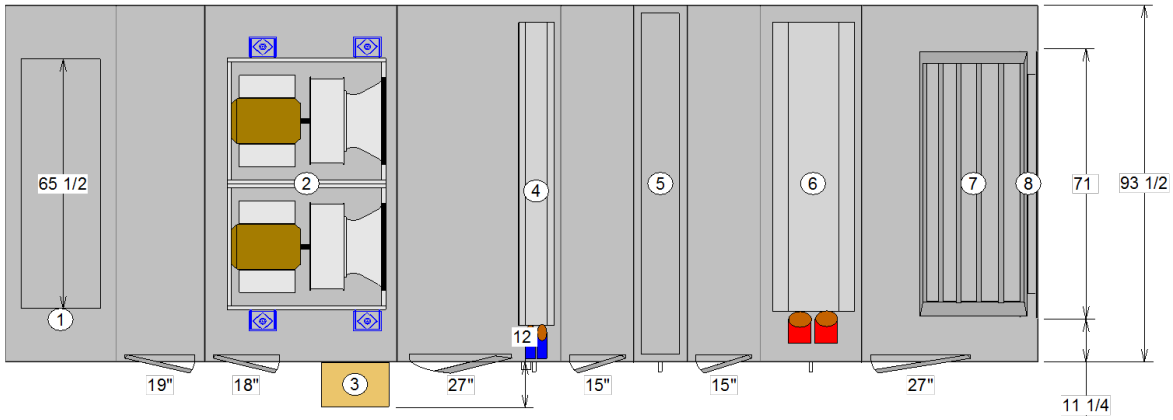
Door Location	Right

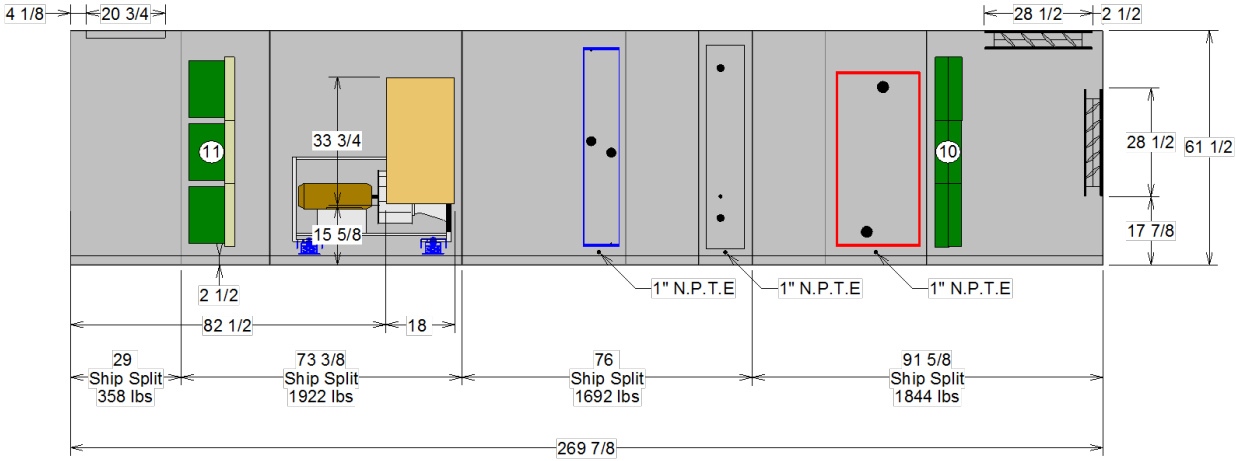
Discharge plenum - Position: 9

Openings

Location	Type	Airflow	Face Velocity	Area	Pressure Drop	Hood
Top Face	Sizeable rectangular opening	12150 cfm	1292 ft/min	9.40 sq ft	0.052 in H2O	N/A

Section Options





1 Opening top
65.45 x 20.69
2 Plenum fan - 20in. dd plenum, 80% width, H press Supply fan 15 hp 460/3
3 External VFD RH
4 Cooling coil - 8 Rows
Coil type 3/8" Unit Optimized, High Water Flow(3U)
5 count=40
6 Heating coil - Rows
Coil type
7 Damper top-parallel blade
71 x 28.5
8 Damper back-parallel blade
28.5 x 71
9 1" N.P.T.E
10 Combo filters -
11 Cartridge filters - 12in. cartridge - 95% eff - MERV 15

Doors
19 width x 55 height
18 width x 55 height
27 width x 55 height
15 width x 55 height

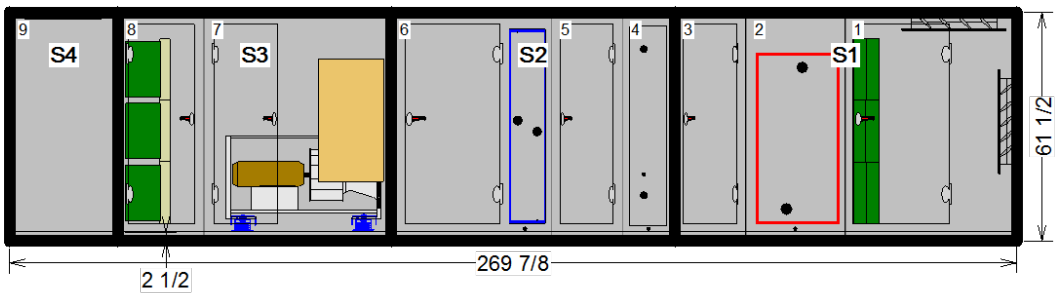
For maneuvering purposes, include 1.125 inches to each ship split length for overlapping panel flange. Flange will not add to overall installed unit length shown.

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 30	Job Name: VA Wilkes-Barre Hospital - VEG 19.25	Unit Casing: 2in Double Wall Foam
Product group: Indoor unit	Actual airflow: 12150	Proposal Number:
Integral base frame: 2.5in. integral base frame	Sales Office:	Tags: AHU-13
Paint:		Rigging weight: 5661.4 / Installed weight: 5816.0

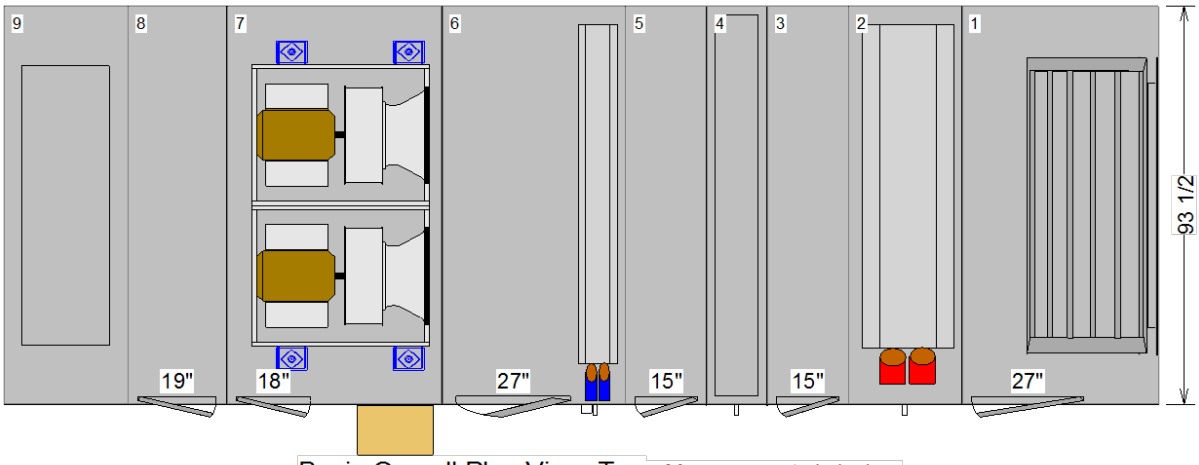
TRANE
Performance Climate Changer
Air Handlers

Shipping splits are indicated by thick black lines



For maneuvering purposes, include 1.125 inches to each ship split length for overlapping panel flange. Flange will not add to overall installed unit length sh

Pos #	Module	Length	Weight
1	Air mixing section	46	572.00
2	Coil section	26 1/2	1101.87
3	Access section	19 1/8	170.00
4	Humidification section	14 1/8	452.00
5	Access section	19	170.00
6	Coil section	42 7/8	1070.20
7	Fan section	50 3/8	1656.52
8	Filter section	23 1/8	265.00
9	Discharge Plenum	29	358.45
		Installed Unit Weight	5816.03 lbs



Basic Overall Plan View: Top - Measurements in inches

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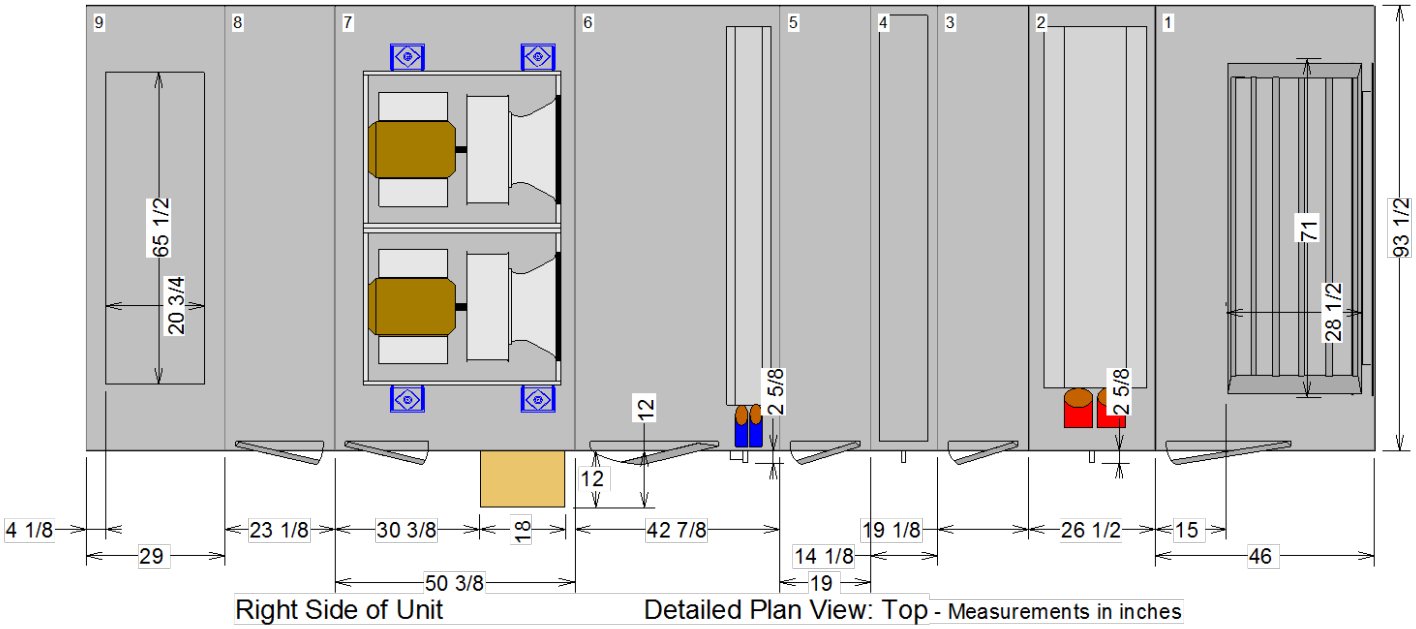
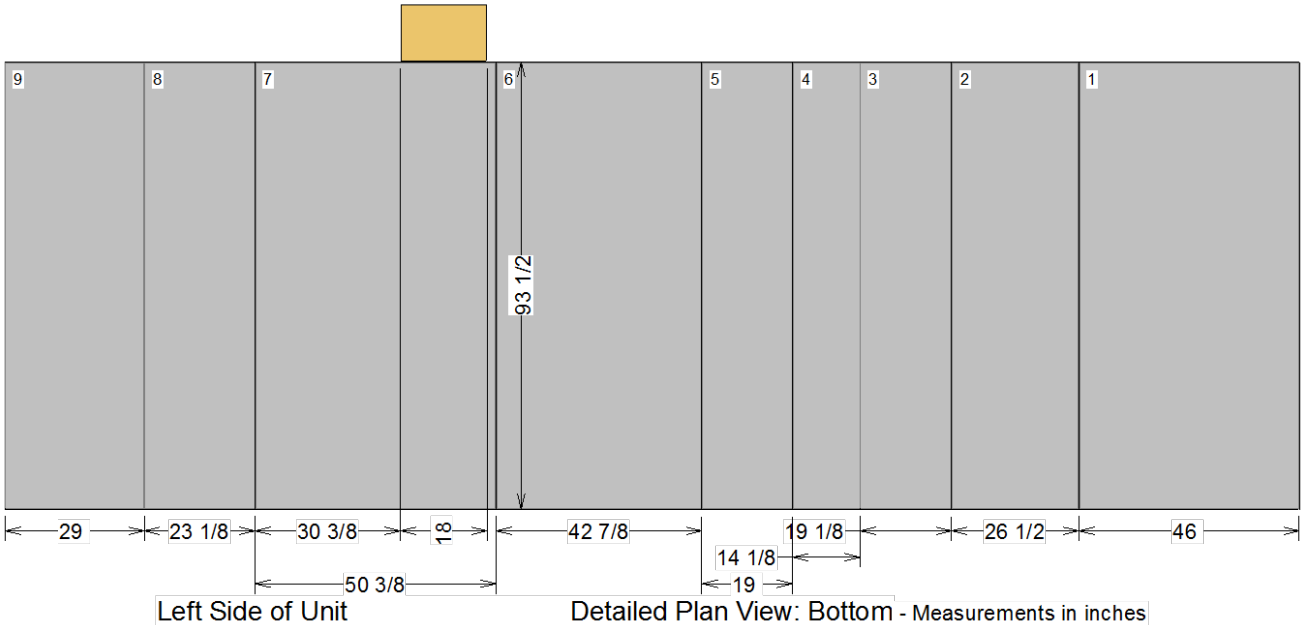
Unit size: 30	Job Name: VA Wilkes-Barre Hospital - VEG 19.25	Unit Casing: 2in Double Wall Foam	TRANE Performance Climate Changer Air Handlers
Product group: Indoor unit	Actual airflow: 12150	Proposal Number:	
Integral base frame: 2.5in. integral base frame	Sales Office:	Tags: AHU-13	
Paint:		Rigging weight: 5661.4 / Installed weight: 5816.0	



Right Side of Unit — Detailed Plan View: Top - Measurements in inches



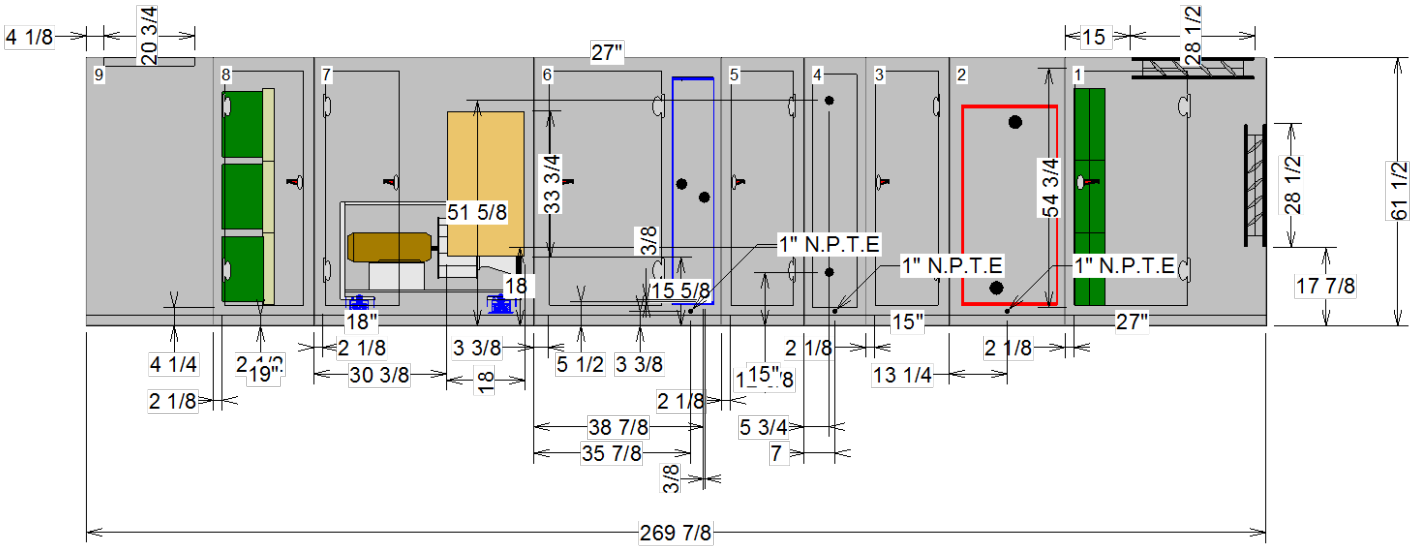
Left Side of Unit — Detailed Plan View: Bottom - Measurements in inches

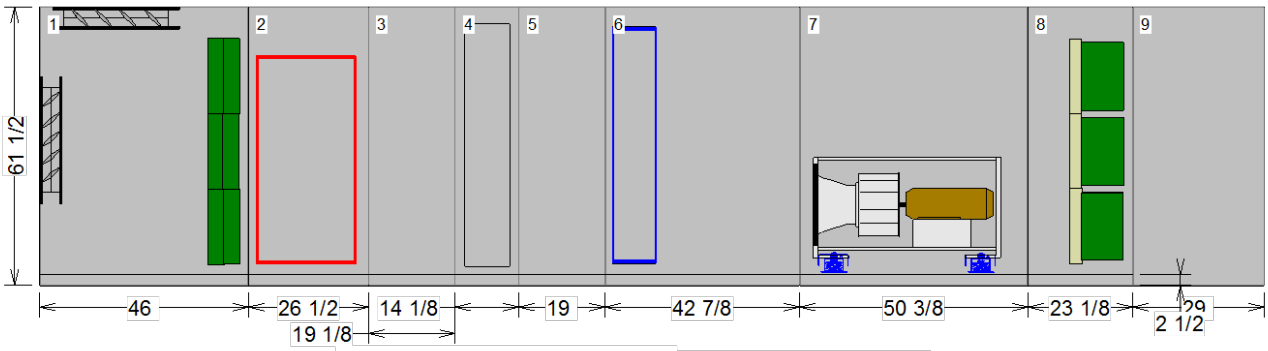
****Placement of electrical conduit may vary by a tolerance of 8" in any direction.**

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 30	Job Name: VA Wilkes-Barre Hospital - VEG 19.25	Unit Casing: 2in Double Wall Foam
Product group: Indoor unit	Actual airflow: 12150	Proposal Number:
Integral base frame: 2.5in. integral base frame	Sales Office:	Tags: AHU-13
Paint:		Rigging weight: 5661.4 / Installed weight: 5816.0

TRANE
Performance Climate Changer
Air Handlers





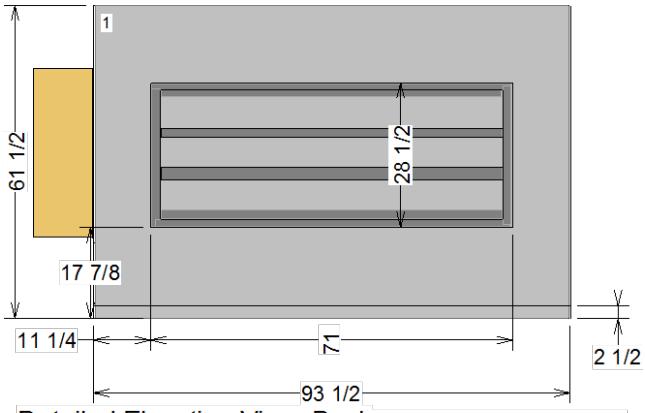
Detailed Elevation View: Left - Measurements in inches

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 30	Job Name: VA Wilkes-Barre Hospital - VEG 19.25	Unit Casing: 2in Double Wall Foam
Product group: Indoor unit	Actual airflow: 12150	Proposal Number:
Integral base frame: 2.5in. integral base frame	Sales Office:	Tags: AHU-13
Paint:		Rigging weight: 5661.4 / Installed weight: 5816.0

TRANE
Performance Climate Changer
Air Handlers

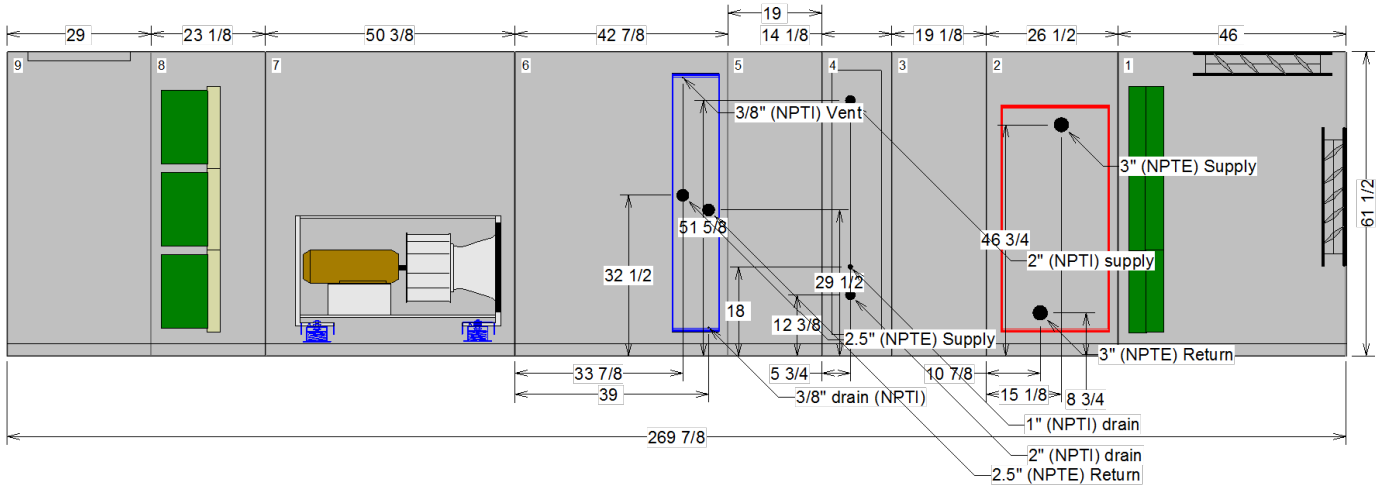
Detailed Elevation View: Front - Measurements in inches



Detailed Elevation View: Back - Measurements in inches

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 30	Job Name: VA Wilkes-Barre Hospital - VEG 19.25	Unit Casing: 2in Double Wall Foam	TRANE Performance Climate Changer Air Handlers
Product group: Indoor unit	Actual airflow: 12150	Proposal Number:	
Integral base frame: 2.5in. integral base frame	Sales Office:	Tags: AHU-13	
Paint:		Rigging weight: 5661.4 / Installed weight: 5816.0	

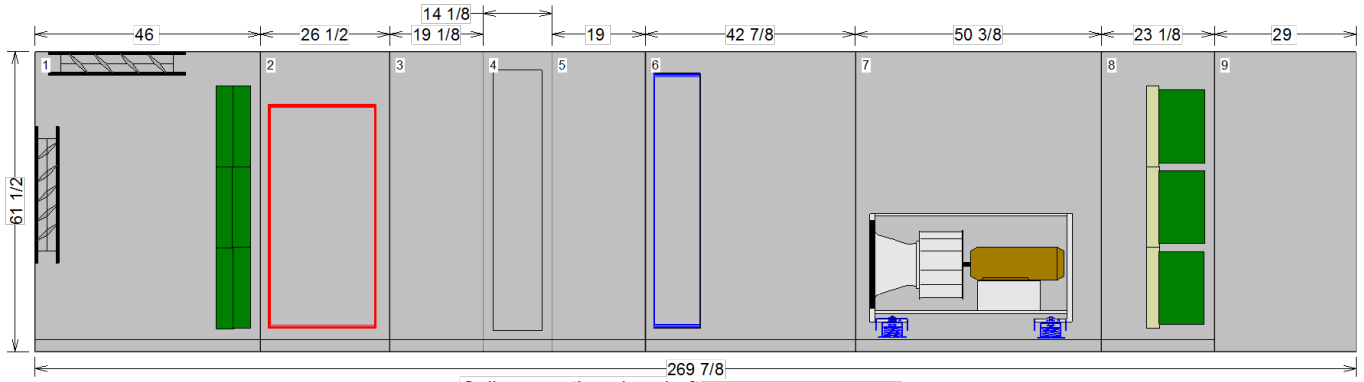


NPTI : National Pipe Thread Internal Connection
NPTE : National Pipe Thread External Connection

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 30	Job Name: VA Wilkes-Barre Hospital - VEG 19.25	Unit Casing: 2in Double Wall Foam
Product group: Indoor unit	Actual airflow: 12150	Proposal Number:
Integral base frame: 2.5in. integral base frame	Sales Office:	Tags: AHU-13
Paint:		Rigging weight: 5661.4 / Installed weight: 5816.0

TRANE
Performance Climate Changer
Air Handlers



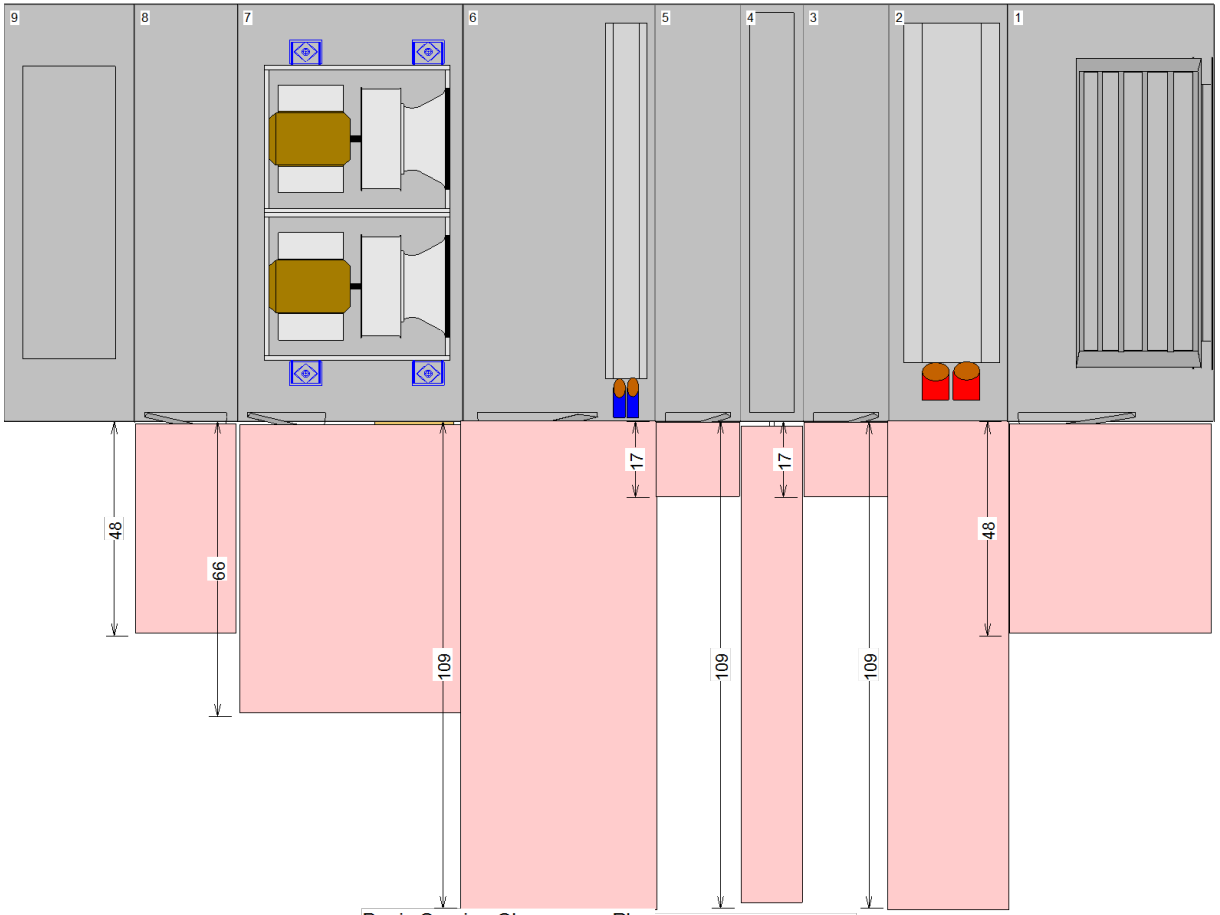
Coil connection view: Left - Measurements in inches

NPTI : National Pipe Thread Internal Connection
NPTE : National Pipe Thread External Connection

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 30	Job Name: VA Wilkes-Barre Hospital - VEG 19.25	Unit Casing: 2in Double Wall Foam
Product group: Indoor unit	Actual airflow: 12150	Proposal Number:
Integral base frame: 2.5in. integral base frame	Sales Office:	Tags: AHU-13
Paint:		Rigging weight: 5661.4 / Installed weight: 5816.0

TRANE
Performance Climate Changer
Air Handlers



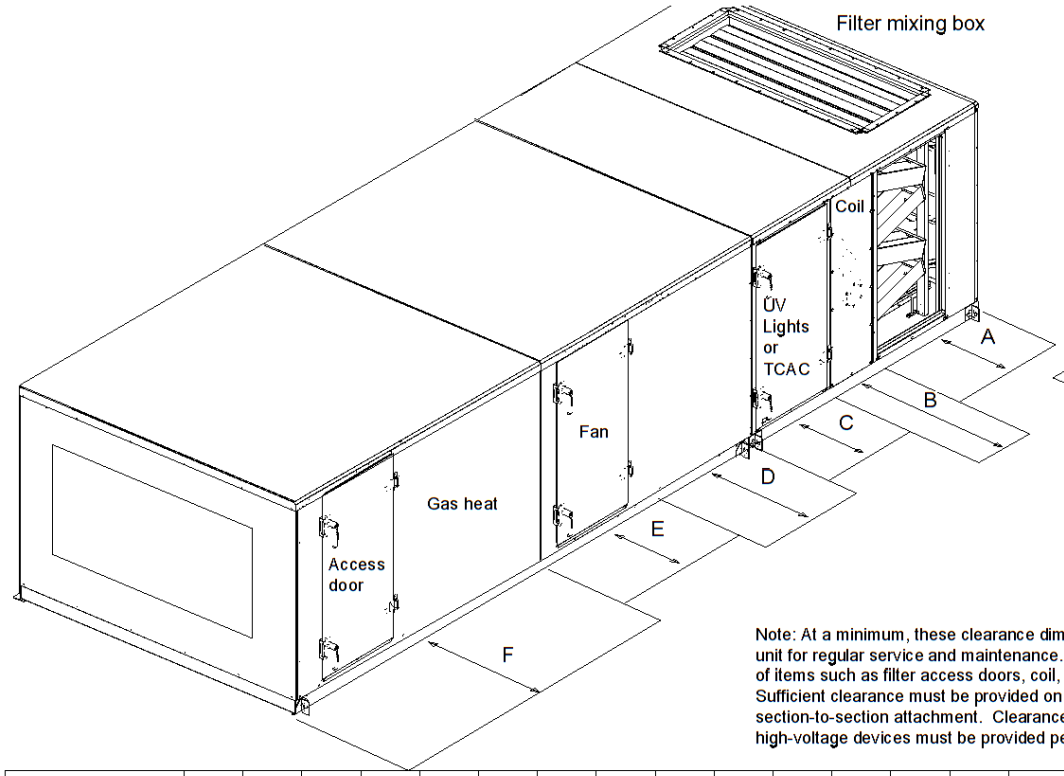
Basic Service Clearance - Plan - Measurements in inches

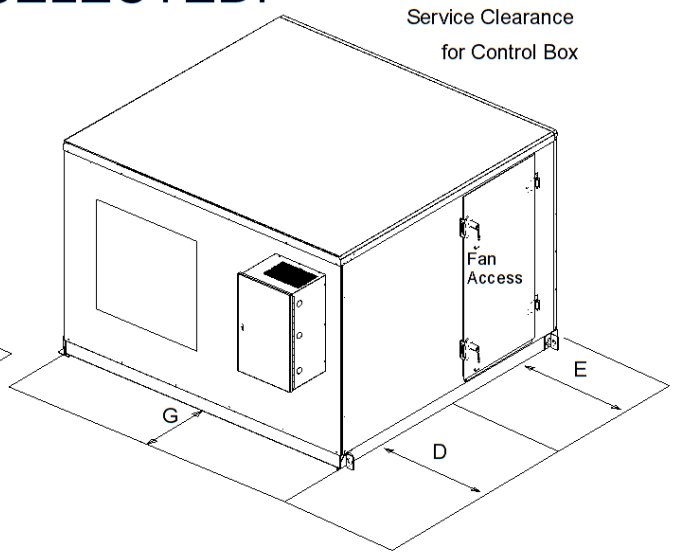
OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 30	Job Name: VA Wilkes-Barre Hospital - VEG 19.25	Unit Casing: 2in Double Wall Foam
Product group: Indoor unit	Actual airflow: 12150	Proposal Number:
Integral base frame: 2.5in. integral base frame	Sales Office:	Tags: AHU-13
Paint:		Rigging weight: 5661.4 / Installed weight: 5816.0

TRANE
Performance Climate Changer
Air Handlers

EXAMPLE UNIT - NOT CONFIGURED AS SELECTED.



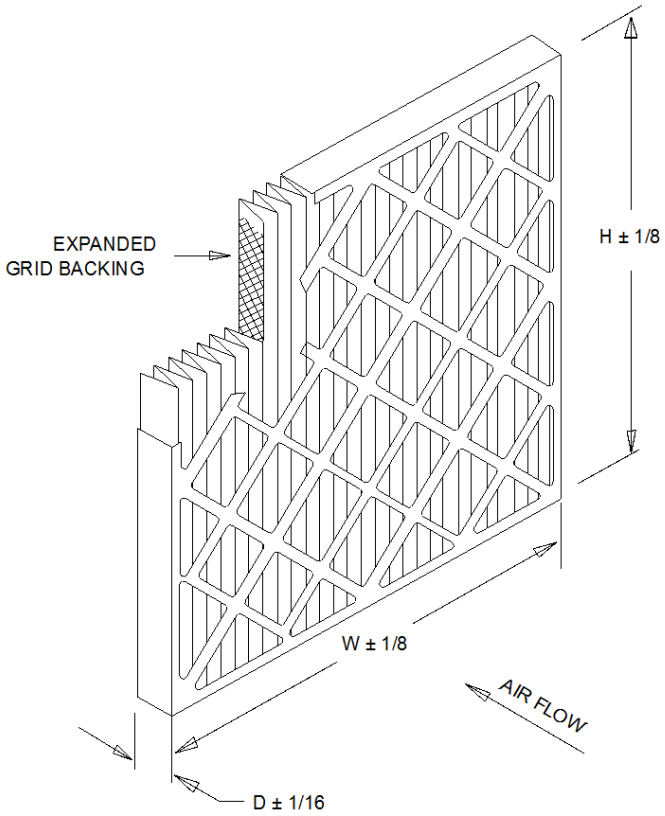


Note: At a minimum, these clearance dimensions are recommended on one side of the unit for regular service and maintenance. Refer to as-built submittal for locations of items such as filter access doors, coil, piping connections, motor locations, etc. Sufficient clearance must be provided on all sides of unit for removal of panels or section-to-section attachment. Clearance for starters, VFDs, or other high-voltage devices must be provided per NEC requirements.

Component	3	4	6	8	10	12	14	17	21	25	30	35	40	50	57	66	80	100	120
A (filter)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	52	56	58	58
B (coil, humidifier)	48	59	59	66	77	82	87	87	95	95	109	115	128	141	141	156	156	170	197
B (staggered coil)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	67	67	76	80	88	96	96	105	105	113	129
C (UV Lights)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	52	56	58	58
C (TCAC)	43	59	59	63	75	81	83	83	58	58	83	75	83	83	83	83	83	75	83
D (External Starter, VFD, LV box or Overload box)	61	61	61	61	61	61	61	61	64	64	64	64	64	64	64	64	64	64	64
D (Internal Starter or VFD)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
E (fan)	48	48	48	48	51	54	58	61	60	66	66	66	70	77	77	93	93	101	101
F (Gas Heat Ext Vestible)	N/A	N/A	89	90	108	100	100	105	115	115	118	136	140	156	156	170	179	180	N/A
F (Gas Heat Int Vestible)	N/A	N/A	56	63	74	79	84	84	92	92	106	112	125	138	138	153	153	167	194

Component	All Sizes
G (Side mount LV box)	36
G (Front mount LV box)	13

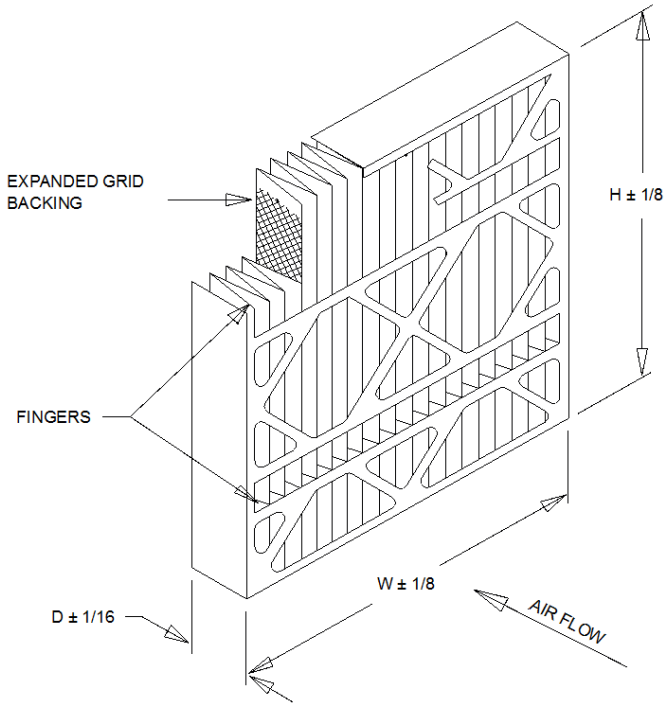
Base Detail



STANDARD CONSTRUCTION
1. 100 % Synthetic White Un-Dyed Media
2. 10.0 Pleats Per Foot
3. Expanded Metal Pleat Supports
4. Moisture Resistant Beverage Board Frame
5. Double Wall Frame

NOTES
1. MERV 8-A Per ASHRAE 52.2-2007 Appendix J.
2. Final Resistance: 1/0" W.G.
3. Rated Velocity: 500 FPM
4. Class 2 Filter Per U.L. Standard 900
5. Maximum Operating Temperature: 225 DEG. F

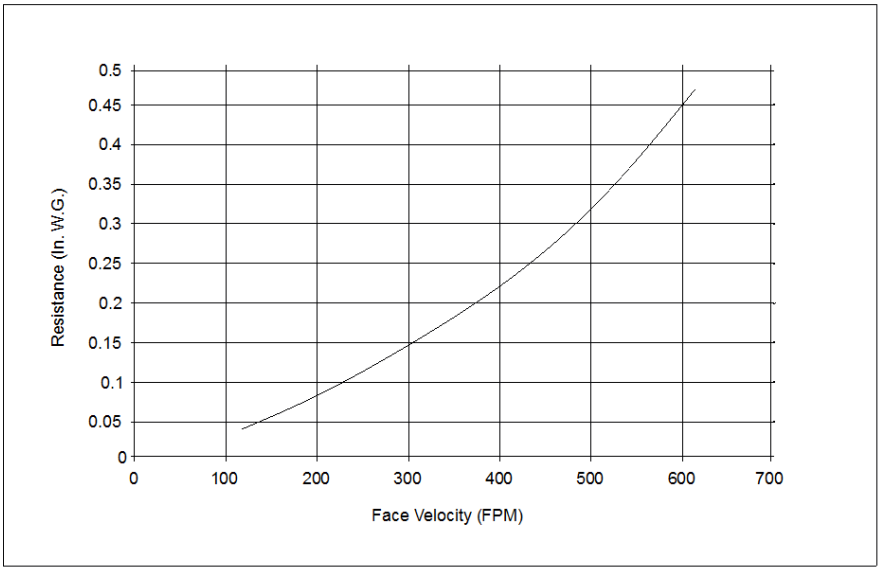
MODEL NUMBER	NOMINAL SIZE IN. W X H X D	ACTUAL SIZE IN. W X H X D	RATED AIR FLOW CFM	INITIAL RESISTANCE IN. W.G.	MEDIA AREA SQ. FT.
MX40-STD2-217	10 X 20 X 2	9-1/2 X 19-1/2 X 1-3/4	700	0.29	4.7
MX40-STD2-220	12 X 20 X 2	11-1/2 X 19-1/2 X 1-3/4	840	0.29	5.5
MX40-STD2-210	12 X 24 X 2	11-3/8 X 23-3/8 X 1-3/4	1000	0.29	6.2
MX40-STD2-239	14 X 20 X 2	13-1/2 X 19-1/2 X 1-3/4	980	0.29	5.7
MX40-2TD2-241	14 X 25 X 2	13-1/2 X 24-1/2 X 1-3/4	1220	0.29	7.1
MX40-STD2-245	15 X 20 X 2	14-1/2 X 19-1/2 X 1-3/4	1050	0.29	6.2
MX40-STD2-201	16 X 20 X 2	15-1/2 X 19-1/2 X 1-3/4	1120	0.29	6.7
MX40-STD2-216	16 X 24 X 2	15-3/8 X 23-3/8 X 1-3/4	1340	0.29	8.0
MX40-STD2-202	16 X 24 X 2	15-1/2 X 24-1/2 X 1-3/4	1400	0.29	8.0
MX40-STD2-280	15 X 20 X 2	17-1/2 X 19-1/2 X 1-3/4	1250	0.29	7.8
MX40-STD2-212	18 X 24 X 2	17-3/8 X 23-3/8 X 1-3/4	1500	0.29	9.3
MX40-STD2-285	18 X 25 X 2	17-1/2 X 24-1/2 X 1-3/4	1570	0.29	9.7
MX40-STD2-203	20 X 20 X 2	19-1/2 X 19-1/2 X 1-3/4	1400	0.29	8.3
MX40-STD2-211	20 X 24 X 2	19-3/8 X 23-3/8 X 1-3/4	1670	0.29	9.9
MX40-STD2-204	20 X 25 X 2	19-1/2 X 24-1/2 X 1-3/4	1750	0.29	10.3
MX40-STD2-205	24 X 24 X 2	23-3/8 X 23-3/8 X 1-3/4	2000	0.29	11.7
MX40-STD2-225	25 X 25 X 2	24-1/2 X 24-1/2 X 1-3/4	2170	0.29	13.6



STANDARD CONSTRUCTION
1. 100 % Synthetic Un-Dyed Media
2. 11 Pleats Per Foot
3. Expanded Metal Pleat Supports
4. Moisture Resistant Beverage Board Frame
5. Double Wall Frame
6. (2) Rows of Fingers on Air Entering Side

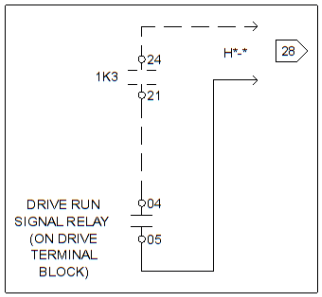
NOTES
1. MERV 11 per ASHRAE 52.2-2007
   Tested at 492 FPM on 24x24x4 Nominal Size
2. Final Resistance; 1.0" W.G,
3. Rated Velocity: 500 FPM
4. Classified Per U.L. Standard 900 for Flammibility
5. Maximum Operating Temperature: 200 deg. F

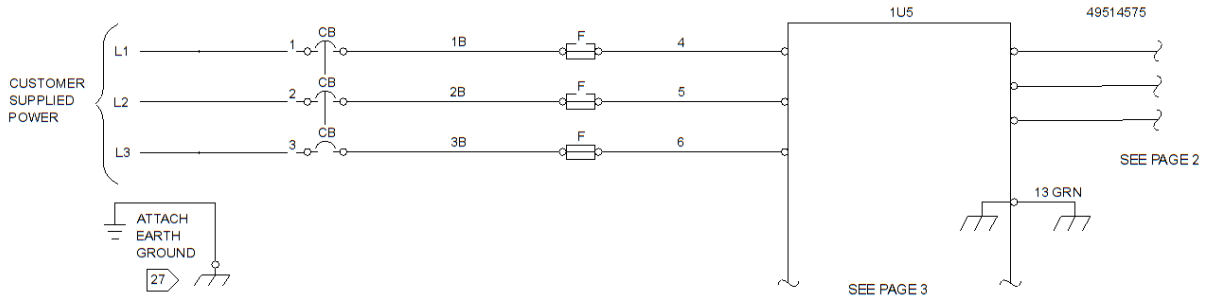
NOMINAL SIZE (WxHxD)	ACTUAL SIZE (WxHxD)	RATED AIR FLOW (IN. W.G.)	INITIAL RESISTANCE (IN. W.G.)	MEDIA AREA (SQUARE FEET)	FILTER UNIT WEIGHT (LBS)
12x24x4	11-3/8 x 23-3/8 x 3-3/4	1000	0.31	12.4	1.7
16x20x4	15-1/2 x 19-1/2 x 3-3/4	1120	0.31	14.5	1.7
16x25x4	15-1/2 x 24-1/2 x 3-3/4	1400	0.31	18.1	2.1
20x20x4	19-1/2 x 19-1/2 x 3-3/4	1400	0.31	18.6	2.1
20x24x4	19-3/8 x 23-3/8 x 3-3/4	1670	0.31	22.3	2.5
20x25x4	19-1/2 x 24-1/2 x 3-3/4	1750	0.31	23.4	2.6
24x24x4	23-3/8 x 23-3/8 x 3-3/4	2000	0.31	27.2	3.0



SUPPLY FAN 1 SCHEMATIC PAGE 1 OF 4

AFS CIRCUIT
2-FAN ARRAY





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NOTES:

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27. ATTACH GROUND OR EQUIPMENT GROUND.
28. AIRFLOW SWITCH INPUT, REFER TO LOW VOLTAGE SCHEMATIC.

DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	HIGH VOLTAGE PANEL
2	LOW VOLTAGE PANEL (UNIT SCHEMATIC)
3	AIR HANDLER SECTION

LEGEND	
DEVICE DESIGNATION	DESCRIPTION
1CB11	CIRCUIT BREAKER
1F40 TO 1F42	VFD FUSES
1K3	START / STOP RELAY
1TB13	TERMINAL STRIP CONTROL CIRCUIT
1U5	VFD CONTROLLER
3B1-A1 TO 3B1-B1	MOTORS (2-FAN ARRAY)
1MP-A1 TO 1MP-B1	MOTOR BREAKERS (2-FAN ARRAY)

SUPPLY FAN 1 SCHEMATIC PAGE 2 OF 4

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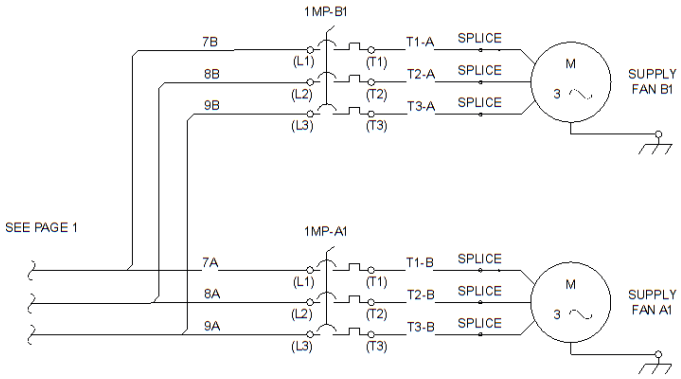

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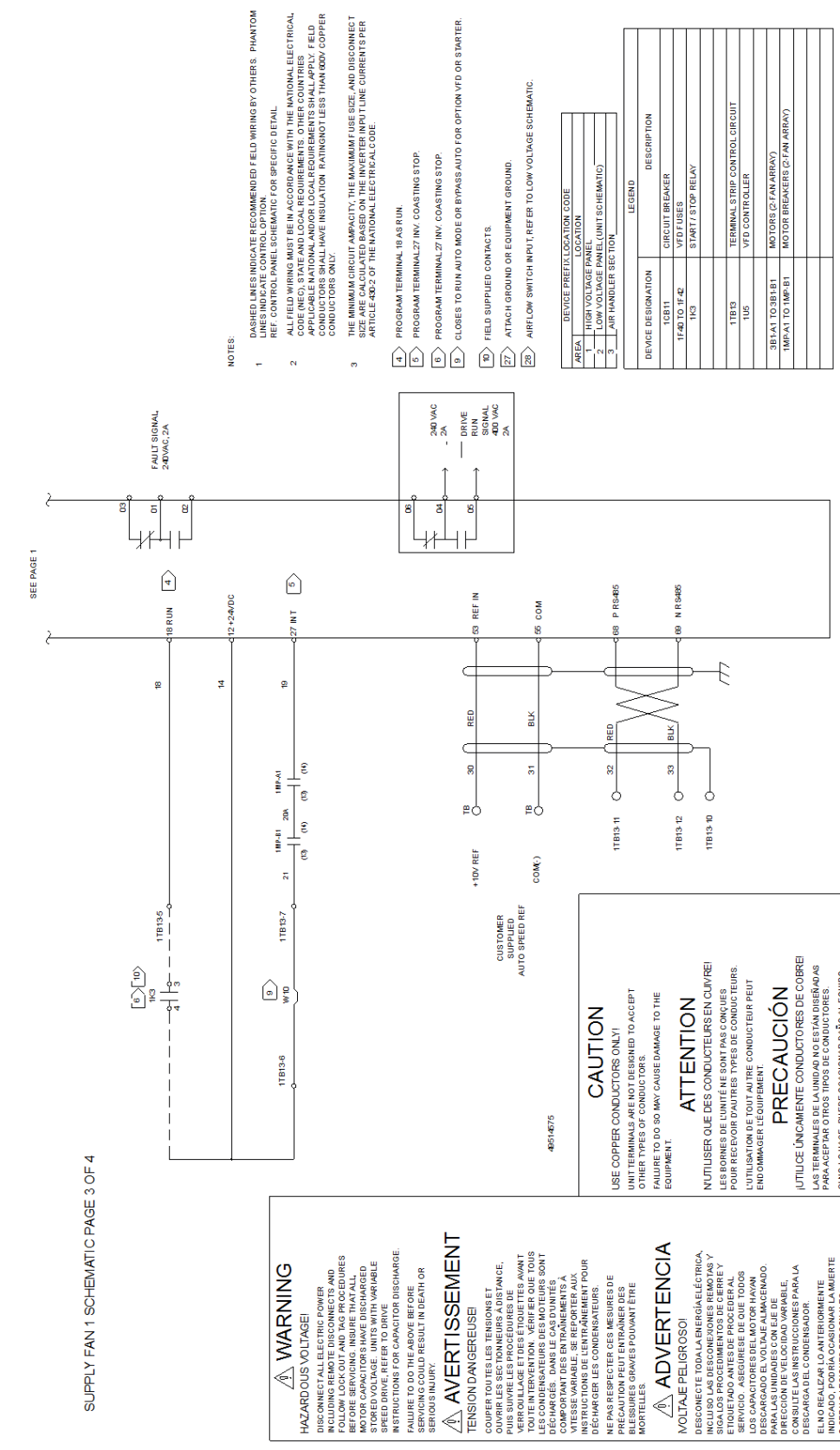
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DEVICE PREFIX/ LOCATION CODE
AREA LOCATION
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2 LOW VOLTAGE PANEL (UNIT SCHEMATIC)
3 AIR HANDLER SECTION
LEGEND
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1F-40 TO 1F-42 VFD FUSES
1K3 START / STOP RELAY
1TB13 TERMINAL STRIP CONTROL CIRCUIT
1U5 VFD CONTROLLER
3B1-A1 TO 3B1-B1 MOTORS (2-FAN ARRAY)
1MP-A1 TO 1MP-B1 MOTOR BREAKERS (2-FAN ARRAY)
SEE PAGE 1
FAULT SIGNAL 240VAC, 2A
240 VAC - 2A
DRIVE RUN SIGNAL 480 VAC 2A
18 RUN
12 +24VDC
27 INT
53 REF IN
55 COM
68 P RS485
69 N RS485
+10V REF
COM(-)
CUSTOMER SUPPLIED AUTO SPEED REF
1TB13-5
1TB13-6
1TB13-7
1K3
W10
1MP-B1
1MP-A1
20A
RED
BLK
1TB13 11
1TB13 12
1TB13 10
4051467S
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SUPPLY FAN 1 SCHEMATIC PAGE 4 OF 4

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1U5	VFD CONTROLLER
3B1-A1 TO 3B1-B1	MOTORS (2-FAN ARRAY)
1MP-A1 TO 1MP-B1	MOTOR BREAKERS (2-FAN ARRAY)

1MP-A1,B1			
VOLTAGE (VOLTS)	MOTOR HP	DRIVE HP	MMP P/N (ABB)
200	3	7.5	MS132-10
	5	15	MS165-16
	7.5	20	MS165-25
	10	20	MS165-25
	10	25	MS165-42
	15	30	MS165-54
230	3	7.5	MS132-10
	5	10	MS165-16
	7.5	15	MS165-20
	7.5	20	MS165-25
	10	20	MS165-25
	15	30	MS165-42
	20	40	MS165-54
460	3	7.5	MS132-4.0
	5	10	MS132-10
	5	15	MS132-10
	7.5	15	MS132-10
	7.5	20	MS165-16
	10	25	MS165-16
	15	30	MS165-20
	15	40	MS165-25
	20	40	MS165-25
	20	50	MS165-32
	25	50	MS165-32
	25	60	MS165-42
	30	60	MS165-42
	40	75	MS165-54
575	3	7.5	MS132-4.0
	5	15	MS132-6.3
	7.5	15	MS132-10
	10	20	MS132-10
	10	30	MS132-16
	15	30	MS132-16
	15	40	MS132-20
	20	40	MS132-20
	20	50	MS132-25
	25	50	MS132-25
	30	60	MS132-32
	40	75	MS165-42

VFD FUSES				
FUSE	VOLTAGE	PANEL HP (MAX)	P/N	CLASS
1F40 1F41 1F42	200/230	5	LP-CC-25	CC
		7.5	JJN-50	T
		15	JJN-80	T
		20	JJN-100	T
		40	JJN-150	T
	200	10	JJN-50	T
		15	JJN-80	T
		25	JJN-100	T
		30	JJN-150	T
		40	JJN-150	T
	230	10	JJN-50	T
		15	JJN-80	T
		25	JJN-100	T
		30	JJN-150	T
		40	JJN-150	T
	460	5	LP-CC-15	CC
		7.5-10	LP-CC-25	CC
		15-20	JJS-50	T
		25-30	JJS-80	T
		40	JJS-100	T
		50-60	JJS-125	T
		75-100	JJS-200	T
	575	5-10	LP-CC-20	CC
		15-20	LP-CC-30	CC
		30-40	JJS-80	T
		50-75	JJS-125	T
		100-125	JJS-200	T

49514575

CAUTION

USE COPPER CONDUCTORS ONLY!

UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

ATTENTION

N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!

LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.

L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'ÉQUIPEMENT.

PRECAUCIÓN

¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!

LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.

SI NO LO HACE, PUEDE OCASIONAR DAÑO AL EQUIPO.

⚠ WARNING

HAZARDOUS VOLTAGE!

DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.

FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠ AVERTISSEMENT

TENSION DANGEREUSE!

COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.

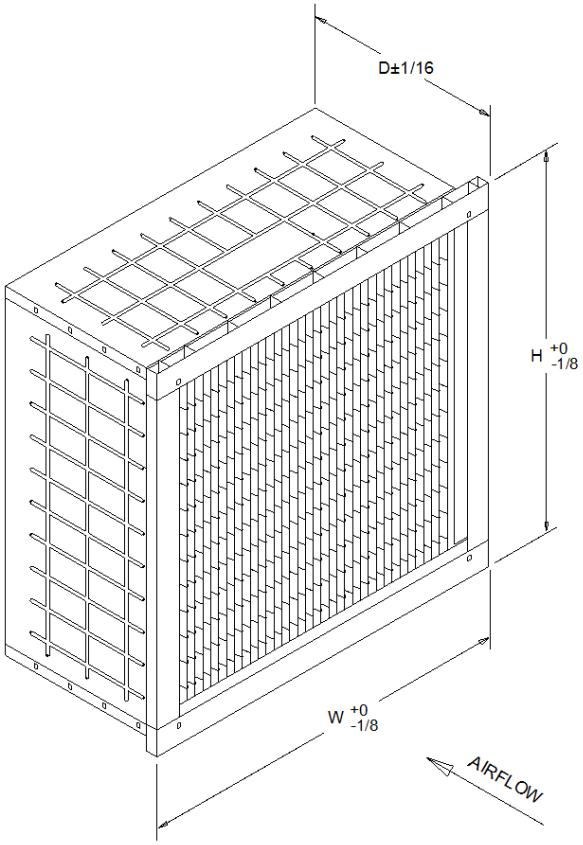
NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.

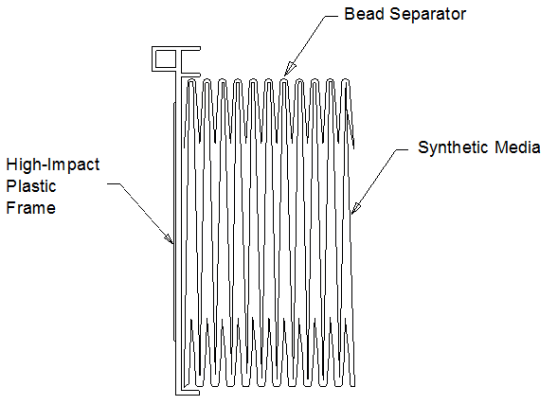
⚠ ADVERTENCIA

¡VOLTAJE PELIGROSO!

DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGÚRESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON EJE DE DIRECCIÓN DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.

EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.





Filter Cross Section

MODEL NUMBER	NOMINAL SIZE (INCHES) HXWXD	ACTUAL SIZE (INCHES) HXWXD	RATED AIR FLOW (CFM)	INITIAL RESISTANCE (IN. w.G.)	MEDIA AREA (SQUARE FEET)	MERV RATING
DC95	24X24X12	23-3/8X23-3/8X11-1/2	2000	.45	58	15
DC95	20X24X12	19-3/8X23-3/8X11-1/2	1650	.45	47	15
DC95	20X20X12	19-3/8X19-3/8X11-1/2	1400	.45	39	15
DC95	12X24X12	11-3/8X23-3/8X11-1/2	1000	.45	28	15

USTANDARD CONSTRUCTION
1. High Efficiency Synthetic Filter Media
2. Expanded Metal Pleat Supports
3. Adhesive seal on all four Media Pack Sides
4. 24 Gauge Galv. Steel Cell Sides
5. Plastic fingers maintain pleat spacing
6. Diagonal support braces on air enterining and air leaving sides for additional rigidity
7. (4) retainer holes for spring latches,both sides

UNOTES
1. MERV per ASHRAE 52.2-2012
   Tested at 492 FPM on 24x24 Face Size
2. Final Resistance: 1.5" W.G.
3. Rated Velocity - 500 FPM
4. Classified per UL Standard 900 for Flammability
5. Maximum Operating Temperature: 180deg F
6. Optional gasket available, note in the model number
   U-Upstream Gasket
   D-Downstream gasket
   UD-Both sides
7. Special Sizes not available

GENERAL

Per ASHRAE 62.1 recommendation, indoor air handling units will be stretch or shrink wrapped to protect unit from in-transit rain and debris.

Installing contractor is responsible for long term storage in accordance with the Installation, Operation, and Maintenance manual (CLCH-SVX07*-EN).

Unit shall be UL and C-UL Listed.

Supply fans within the scope of AHRI Standard 430 are "Certified by the AHRI Central Station Air-Handling Unit (AHU) Certification Program, based on AHRI Standard 430/431. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org".

Unit sound performance data shall be reported as sound power. Trane, in providing this program and data, does not certify or warrant NC levels. These levels are affected by factors specific to each application and/or installation and therefore unable to be predicted or certified by Trane. Refer to product data for specific fan footnote references.

Manufacturer provided VFDs shall be certified to AHRI Standard 1210 "Performance Rating of Variable Frequency Drives" to ensure documented and reliable VFD efficiency.

Unit Construction

All unit panels shall be 2" solid, double-wall construction to facilitate cleaning of unit interior. Unit panels shall be provided with a mid-span, no-through-metal, internal thermal break. Casing thermal performance shall be such that under 55°F supply air temperature and design conditions on the exterior of the unit of 81°F dry bulb and 73°F wet bulb, condensation shall not form on the casing exterior.

All exterior and interior indoor AHU panels will be made of galvanized steel.

Unit Paint

Unit to ship unpainted from factory. If required, unit to be painted by 3rd party finisher, or by painting contractor at job site.

Casing Deflection

The casing shall not exceed 0.0042 inch deflection per inch of panel span at 1.00 times design static pressure. Maximum design static shall not exceed +8 inches w.g. in all positive pressure sections and -8 inches w.g. in all negative pressure sections.

Floor Construction

The unit floor shall be of sufficient strength to support a 300.0 lb load during maintenance activities and shall deflect no more than 0.0042 inch per inch of panel span.

Unit base

Manufacturer to provide a full perimeter integral base frame for either ceiling suspension of units or to support and raise all sections of the unit for proper trapping. Indoor unit base frame will either be bolted construction or welded construction. All outdoor unit base frames shall be welded construction. For indoor units, refer to schedule for base height and construction type. Contractor will be responsible for providing a housekeeping pad when unit base frame is not of sufficient height to properly trap unit. Unit base frames not constructed of galvanized steel shall be chemically cleaned and coated with both a rust-inhibiting primer and finished coat of rust-inhibiting enamel. Unit base height to be included in total height required for proper trap height.

Insulation

Panel insulation shall provide a minimum thermal resistance (R) value of 13 ft^2-h-^oF/Btu throughout the entire unit. Insulation shall completely fill the panel cavities in all directions so that no voids exist and settling of insulation is prevented. Panel insulation shall comply with NFPA 90A.

Drain Pan
In sections provided with a drain pan, the drain pan shall be designed in accordance with ASHRAE 62.1. To address indoor air quality (IAQ) the drain pan shall be sloped in two planes promoting positive drainage to eliminate stagnant water conditions. Drain pan shall be insulated, and of double wall construction. The outlet shall be the lowest point on the pan, and shall be of sufficient diameter to preclude drain pan overflow under normally expected operating conditions. All drain pans connections shall have a threaded connection, extending a minimum of 2-1/2" beyond the unit base, and shall be made from the same material as the drain pan. Drain pan located under a cooling coil shall be of sufficient size to collect all condensate produced from the coil.
Refer to Product Data for specific information on which sections are supplied with a drain pan, the drain pan material and connection location.

Access Door Construction
Access doors shall be 2" double wall construction. Interior and exterior door panels shall be of the same construction as the interior and exterior wall panels respectively. All doors shall be provided with a thermal break construction of door panel and door frame. Gasketing shall be provided around the full perimeter of the doors to prevent air leakage. Surface mounted handles shall be provided to allow quick access to the interior of the functional section and to prevent through cabinet penetrations that could likely weaken the casing leakage and thermal performance. Handle hardware shall be designed to prevent unintended closure. Access doors shall be hinged and removable for quick easy access. Hinges shall be interchangeable with the door handle hardware to allow for alternating door swing in the field to minimize access interference due to unforeseen job site obstructions. Door handle hardware shall be adjustable and visually indicate locking position of door latch external to the section. Door hinges shall be galvanized.

All doors shall be a minimum of 60" high when sufficient height is available or the maximum height allowed by the unit height.

Door handles shall be provided for each latching point of the door necessary to maintain the specified air leakage integrity of the unit. Optionally for indoor AHUs and as standard on outdoor AHUs, outward swing doors are provided with a single handle linked to multiple latching points. An optional shatterproof window shall be provided in access doors where indicated on the plans. Window shall either be single pane, or thermal dual pane, as defined on schedule. Window shall be capable of withstanding unit operating pressures and shall be safe for viewing UV-C lamps.
Refer to Product Data for specific information on which sections are supplied with an access door, the door location, a single handle and a window.

Lifting Instructions
The air handling units must be rigged, lifted, and installed in strict accordance with the Installation, Operation, and Maintenance manual (CLCH-SVX07G-EN). The units are also to be installed in strict accordance with the specifications. Units may be shipped fully assembled or disassembled to the minimum functional section size in accordance with shipping and job site requirements.

Indoor units shall be shipped on an integral base frame (variable from the standard 2.5" to 8" height) for the purpose of mounting units to a housekeeping pad and providing additional height to properly trap condensate from the unit. The integral base frame may be used for ceiling suspension, external isolation, or as a housekeeping pad. Indoor sizes 3 to 30 will also be shipped with a shipping skid designed for forklift transport. Refer to the unit As-Built or Product Data section of the submittal for the base frame height of each unit.

All units will be shipped with an integral base frame designed with the necessary number of lift points for safe installation. All lifting lugs are to be utilized during lift. The lift points will be designed to accept standard rigging devices and be removable after installation. Units shipped in sections will have a minimum of four points of lift.

MIXING SECTION
A mixing section shall be provided to support the damper assembly for outdoor, return, and/or exhaust air.

Dampers

Dampers shall modulate the volume of outdoor, return, or exhaust air. The dampers shall be of double-skin airfoil design with metal, compressible jamb seals and flexible blade-edge seals on all blades. The blades shall rotate on stainless-steel sleeve bearings. The dampers shall be rated for a maximum leakage rate of 3 cfm/ft² at 1 in. w.g. complying with ASHRAE 90.1 maximum damper leakage. All leakage testing and pressure ratings shall be based on AMCA Standard 500-D. Dampers may be arranged in a parallel or opposed-blade configuration.

Title 24

The following specifications apply only to units with outside air and return air dampers, with actuators. The 5 year warranty applies only to these items.
This unit contains Economizer that meets or exceeds all mandatory requirements prescribed by Title 24, including but not limited to:

- 5 yr parts only warranty
- Successfully tested to 60,000 Actuations
- Less than 10 cfm/sq.ft. of damper leakage at 1" WG per AMCA 500L

Filters

Mixing sections shall be provided with a filter rack as indicated in the Product Data and As-Built sections of the submittal.

4 inch high efficiency filters constructed with a fine fiber media made into closely spaced pleats shall be provided. The filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filter media shall be sealed into a frame assembled in a rigid manner. The manufacturer shall supply a side access filter rack capable of holding 4 inch high efficiency filters.

The 4 inch high efficiency filters shall have a MERV 11 rating when tested in accordance with the ANSI/ASHRAE Standard 52.2.

Prefilter Type

2-inch pleated media filters made with 100% synthetic fibers that are continuously laminated to a supported steel-wire grid with water repellent adhesive shall be provided. Filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filters shall have a MERV 8 rating when tested in accordance with the ANSI/ASHRAE Standard 52.2.

FILTER SECTION

A section shall be provided to support the filter rack as indicated throughout the unit. Refer to Product Data and As-Built sections of the submittal for specific locations within each unit.

Primary Filters

Cartridge Filters

The filters shall be 12-inch cartridge filters constructed with a continuous sheet of fine-fiber media made into uniformly spaced pleats. The filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filters shall be sealed into a metal frame assembled in a rigid manner. A gasket material shall be installed on the metal header of the filter to prevent filter bypass where the metal headers meet on the side-access racks. All cartridge filters shall be furnished with a 2-inch prefilter to provide extended cartridge filter life. The manufacturer shall supply a side-access filter rack capable of holding cartridge filters and prefilters.

Cartridge Filters (Front-load)
The filters shall be 12-inch cartridge filters constructed with a continuous sheet of fine-fiber media made into uniformly spaced pleats. The filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filters shall be sealed into a metal frame assembled in a rigid manner. A gasket material shall be installed on the metal header of the filter to prevent filter bypass where the metal headers meet on the side-access racks. All cartridge filters shall be furnished with a 2-inch prefilter to provide extended cartridge filter life. The manufacturer shall supply a side-access filter rack capable of holding cartridge filters and prefilters.

The cartridge filters shall have a MERV 15 rating when tested in accordance with the ANSI/ASHRAE Standard 52.2.

Prefilter Type

2-inch pleated media filters made with 100% synthetic fibers that are continuously laminated to a supported steel-wire grid with water repellent adhesive shall be provided. Filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filters shall have a MERV 8 rating when tested in accordance with the ANSI/ASHRAE Standard 52.2.

COIL SECTION WITH FACTORY INSTALLED COIL
The coil section shall be provided complete with coil and coil holding frame. The coils shall be installed such that headers and return bends are enclosed by unit casings. If two or more cooling coils are stacked in the unit, an intermediate drain pan shall be installed between each coil and be of the same material as the primary drain pan. Like the primary drain pan, the intermediate drain pan shall be designed being of sufficient size to collect all condensation produced from the coil and sloped to promote positive drainage to eliminate stagnant water conditions. The intermediate pan shall begin at the leading face of the water-producing device and be of sufficient length extending downstream to prevent condensate from passing through the air stream of the lower coil. Intermediate drain pan shall include downspouts to direct condensate to the primary drain pan. The outlet shall be located at the lowest point of the pan and shall be sufficient diameter to preclude drain pan overflow under any normally expected operating condition.

Coil with Inspection
The coil section shall include an inspection section complete with a double-wall, removable door downstream of the coil for inspection, cleaning, and maintenance. Interior and exterior door panels shall be of the same construction as the interior and exterior wall panels, respectively. All doors shall be provided with a thermal break construction of door panel and door frame.

Casing penetrations supplied for hydronic drain and vents. Piping contractor shall provide extended piping.

Water Coils (UP, WP, UW, UU, UA, 3W, 3U, W, 5W, 5A, WD, 5D, D1, D2, P, or TT)
The coils shall have aluminum fins and seamless copper tubes. Copper fins may be applied to coils with 5/8-inch tubes. Fins shall have collars drawn, belled, and firmly bonded to tubes by mechanical expansion of the tubes. The coil casing may be galvanized or stainless steel. Refer to the Product Data section of the submittal for the coil casing material.
The coils shall be proof-tested to 300 psig and leak-tested under water to 200 psig. Coils containing water or ethylene glycol are certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org. Propylene glycol and calcium chloride, or mixtures thereof, are outside the scope of AHRI Standard 410 and, therefore, do not require AHRI 410 rating or certification.

Coil connections are constructed of cast iron with female connections, steel block with female connections or steel pipe with male connections. Type P or TT coil connections do not extend out of unit casing. All other water coil types have connections that extend out beyond unit casing. Headers on downstream coil bank of staggered coil sections do not extend beyond the unit casing and must be completed by the on-site piping contractor.

Tubes are 3/8" [9.5 mm] OD 0.012" [0.305 mm] thick copper.

ACCESS/INSPECTION / TURNING SECTION

A section shall be provided to allow additional access/inspection of unit components and space for field-installed components as needed. An access door shall be provided for easy access. All access sections shall be complete with a double-wall, removable door downstream for inspection, cleaning, and maintenance. Interior and exterior door panels shall be of the same construction as the interior and exterior wall panels, respectively. All doors downstream of cooling coils shall be provided with a thermal break construction of door panel and door frame.

DIRECT-DRIVE PLENUM FAN SECTION
The fan type shall be provided as required for stable operation and optimum energy efficiency. The fan shall be a single-width, single-inlet, multiblade-type direct-drive plenum fan. Motor bearing life of the direct-drive plenum fan shall be not less than L-10 250,000 hrs**.** *Refer to the Product Data section for fan quantity and number of blades selected within each unit*. Central Station Air Handling Unit Supply Fans are "Certified by the AHRI Central Station Air-Handling Unit (AHU) Certification Program, based on AHRI Standard 430/431. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org" Central Station Air Handling Unit Supply Fans shall be tested and rated in-accordance with AHRI Standard 260 for sound performance.

Fans that are selected with inverter balancing shall first be dynamically balanced at design RPM. The fans then will be checked in the factory from 25% to 100% of design RPM to insure they are operating within vibration tolerance specifications, and that there are no resonant frequency issues throughout this operating range. Inverter balancing that requires lockout frequencies inputted into a variable frequency drive to in order to bypass resonant frequencies shall not be acceptable. If supplied in this manner by the unit manufacturer, the contractor will be responsible for rebalancing in the field after unit installation. Fans selected with inverter balancing shall have a maintenance free grounding assembly installed on the fan motor to discharge both static and induced shaft currents to ground.

On units supplied with plenum or motorized impeller fans, door guard(s) shall be supplied on the access door(s) to the fan and those downstream access door(s) where unintended access to the plenum or motorized impeller fan could occur. Door guard is intended to deter unauthorized entry and incidental contact with rotating components. *Refer to the Product Data section for fans with access door guard(s)*.

Motor Frame
The motor shall be mounted integral to the isolated fan assembly and furnished by the unit manufacturer. The motor is mounted inside the unit casing on an adjustable base to permit adjustment of drive belt tension (not applicable for direct drive plenum fans). The motor shall meet or exceed all NEMA Standards Publication MG 1 requirements and comply with NEMA Premium efficiency levels when applicable except for fractional horsepower motors which are not covered by the NEMA classification. The motor shall be T-frame, squirrel cage with size, type, and electrical characteristics as shown on the equipment schedule. *Refer to the Product Data section for selected fan motors within each unit.*

Two-Inch Spring Isolators
Direct-drive fan and motor assemblies shall be internally isolated from the unit casing with 2-inch (50.8 mm) deflection spring isolators. The isolation system shall be designed to resist loads produced by external forces, such as earthquakes, and conform to the current IBC seismic requirements.

Starter/VFD shall be mounted externally in a NEMA Type 1 enclosure on the supply fan section. An external disconnect shall be mounted through-the-door to the starter/VFD to disconnect full power from starter/VFD.

Combination VFD / Disconnect
A combination Variable Frequency Drive (VFD) / disconnect shall be provided when variable air volume control is required for fan operation. Whether for single fan, dual fan, or fan array applications, a single VFD shall be provide to ensure proper operation and to optimize operating life. Each VFD / disconnect shall be properly sized, factory mounted in a full metal enclosure, wired to the fan motor(s), and commissioned to facilitate temporary heating, cooling, ventilation, and/or timely completion of the project. VFD / disconnects shall include a circuit breaker disconnect with a through-the-door interlocking handle and shall be lockable. The VFD package shall also include:

a) Electronic manual speed control
b) Hand-Off-Auto (H-O-A) selector switch
c) Inlet fuses to provide maximum protection against inlet short circuit
d) Current limited stall prevention
e) Auto restart after momentary power loss
f) Speed search for starting into rotating motor
g) Anti-windmill w/DC injection before start
h) Phase-to-phase short circuit protection
i) Ground fault protection
j) Manual motor protection MMP

Units with factory-mounted controls shall include power wiring from the VFD panel to the control system transformers, binary output on/off wiring, analog output-speed-signal wiring, and all interfacing wiring between the VFD and the direct digital controller.

The VFD shall be UL508C listed and CSA certified and conform to applicable NEMA, ICS, NFPA, & IEC standards.

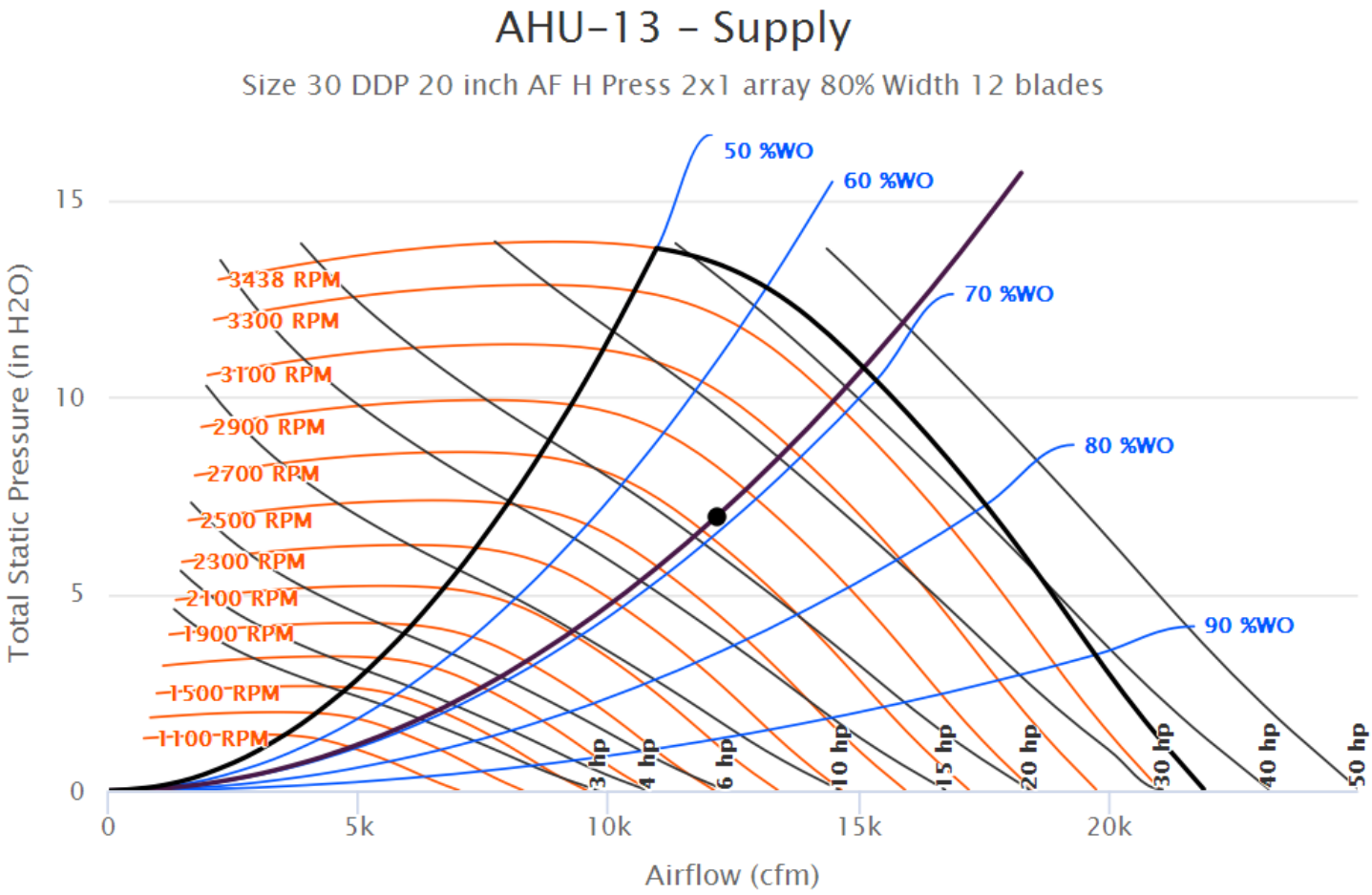
Motor Wiring Conduit
The fan motor wiring shall be factory-wired to the unit-mounted starter/disconnect, variable frequency drive, or external motor junction box within flexible metal conduit of adequate length so that the fan vibration isolation, if applicable, will not be restricted. *Refer to the Product Data section for fans with motor wiring conduit.*

DISCHARGE PLENUM SECTION
Plenums shall be provided to efficiently turn air and provide sound attenuation. Discharge plenum opening types and sizes shall be scaled to meet engineering requirements. The vertical discharge plenum height may be scaled to accommodate the appropriate discharge duct height.

HUMIDIFIER SECTION (Direct Steam)
Humidifier section shall be provided with a humidifier panel designed for building steam. Humidifier panel shall include stainless steel construction of all wetted parts including the integrated header/separator and multiple tube dispersion assembly. Tube-to-header joints shall consist of welded stainless steel. Inlet and outlet connection elbows on the humidifier shall be malleable iron. Humidifier shall provide a uniform steam discharge. Humidifiers shall be provided with a control valve, inverted bucket steam trap, wye strainer, and two float and thermostatic steam traps shipped loose for field installation. All pipe connections shall be made from one side of the air handler.

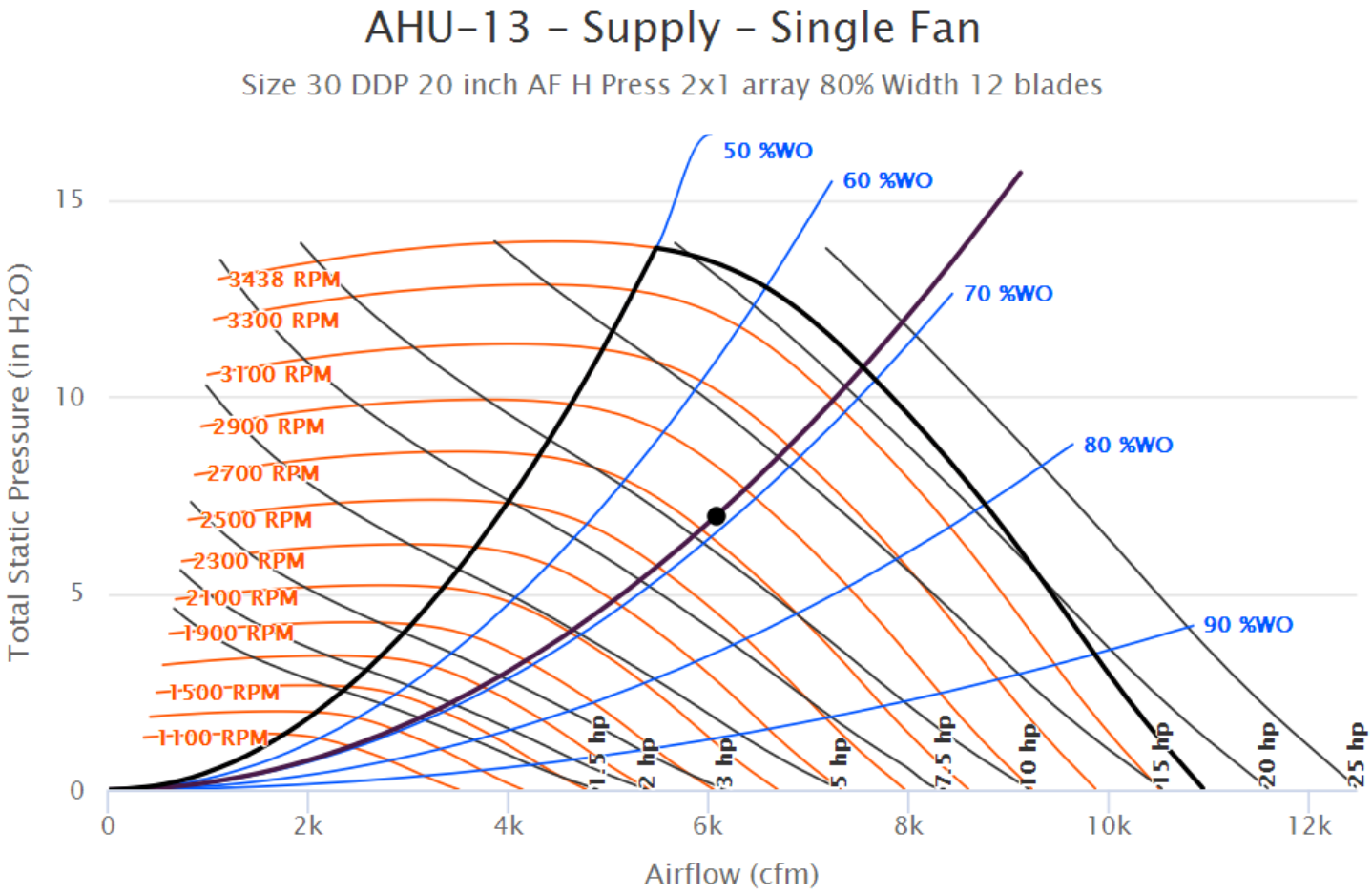
Fan Details

Unit Size	20UR	**Operating Brake Power**	22.452 hp
Motor Frequency	94.00 Hz	**Altitude**	0.00 ft
Operating Airflow	12,150 cfm	**Design Temp.**	70.00 F
Operating Static Pressure	6.977 in H2O	**Efficiency**	59.52 %
Operating RPM	2,767 rpm		

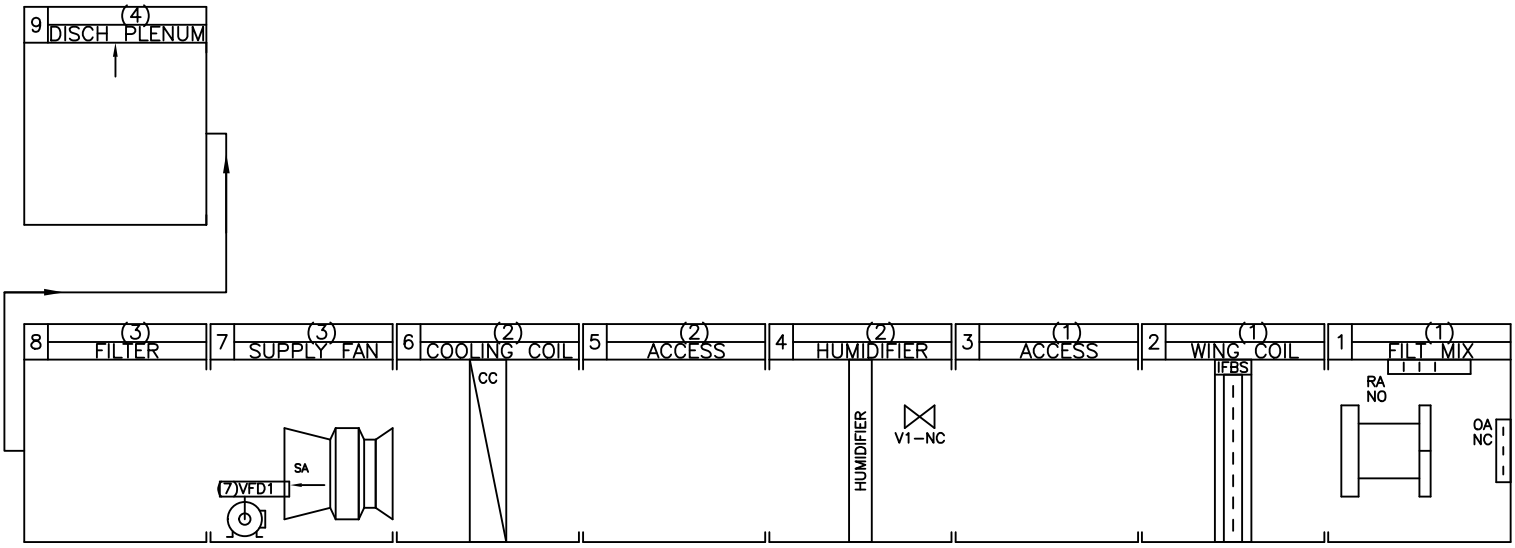


Fan Details

Unit Size	20UR	**Operating Brake Power**	11.226 hp
Motor Frequency	94.00 Hz	**Altitude**	0.00 ft
Operating Airflow	6,075 cfm	**Design Temp.**	70.00 F
Operating Static Pressure	6.977 in H2O	**Efficiency**	59.52 %
Operating RPM	2,767 rpm		



WIRING DETAIL 1



DRAWN BY SERVICE ACCOUNT	Trane	
DATE 3/31/2023		CSIA-SCHEMATIC UNIT SIZE: 30 UNIT TAG: AHU-13
SOFTWARE VERSION 1.4.0		
DRAWING VERSION		

LEGEND DETAIL 1

POS#	BUILD GROUP	DESCRIPTION	PT	LABEL	PWR HR-WIRE	SIGNAL HR-WIRE	XFMR	POWER VA
4	2	Valve Control	AO1	V1				
4	2	High limit sensor		HLT1				
7	3	Supply Fan VFD	AO2	VFD1				

DRAWN BY SERVICE ACCOUNT	Trane	
DATE 3/31/2023		CSIA-SCHEMATIC UNIT SIZE: 30 UNIT TAG: AHU-13
SOFTWARE VERSION 1.4.0		
DRAWING VERSION		

Trane Performance Climate Changer Air Handler

Unit Overview - AHU-17

Application	Unit Size	External Dimensions			Weight	
		Height	Width	Length	Installed	Rigging
Outdoor unit	CSAA012	47.7 in	66.5 in	277.3 in	4356 lb	4008 lb

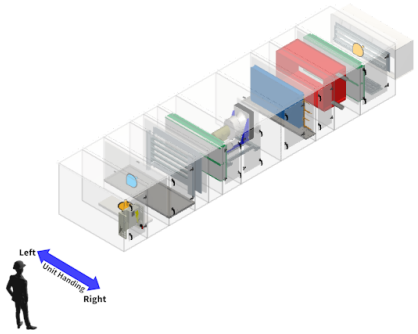
Quantity of Shipping Sections	Largest Ship Split			Heaviest Ship Split	Elevation
	Height	Width	Length		
1 piece(s)	47.7 in	66.5 in	277.0 in	4008 lb	0.00 ft

Supply Fan			
Airflow	5010 cfm	**Total Static Pressure**	4.401 in H2O

Note: Height includes air handler sloped roof panel and standing seam.

Construction Features

Panel	2in. foam injected R-13 with thermal break
Panel Material	All unit inner panels - galvanized
Integral Base Frame	6in. integral base frame
Paint	Slate gray
Short Circuit Current Rating	5 kA
Agency Approval	UL listed unit
Roof Curb Type	Standard roof curb



Unit Electrical

Circuit	Voltage/Phase/Frequency	FLA	MCA	Max Fuse Size
Circuit number 1 Supply fan motor(s)	460/3/60	11.00 A	13.75 A	20.00 A

Unit Controls

Controller Type	No controller

Warranty

Warranty section	Std. warranty only

Air mixing section - Position: 1

Openings

Face	Path	Type	Airflow	Face Velocity	Area	Pressure Drop	Hood
Back	Outside	Parallel blade damper	5010 cfm	982 ft/min	5.10 sq ft	0.209 in H2O	Yes
Bottom	Return	Parallel blade damper	5010 cfm	982 ft/min	5.10 sq ft	0.175 in H2O	N/A

Filter

Type	Frame	MERV Rating	Quantity	Size
4in. cartridge - MERV 11 - standard	2"/4" combo	MERV 11	6.00	16in.x20in.
Pressure Drop	**Condition**	**Face Velocity**	**Airflow**	**Area**
0.608	Mid-life	376 ft/min	5010 cfm	13.33 sq ft

Prefilter

Type	Frame	MERV Rating	Quantity	Size	Pressure Drop
2" Pleated media - MERV 8	2"/4" combo	MERV 8	6.00	16in.x20in.	0.601

Section Options

Door Location	Right

Heating coil section - Position: 2

Coil Construction	
Model	B-48 horiz IFB coil
Rows	2 rows
Fin Spacing	7 fins per inch
Installed Weight	354.0 lb

Coil Performance	
Capacity	
Total	207.86 MBh
Air	
Flow	3250 cfm
Entering Dry Bulb	9.00 F
Leaving Dry Bulb	67.95 F
Pressure Drop	0.110 in H2O
Face Velocity	392 ft/min
Steam	
Inlet Pressure	15.00 psig
Coil Condensate	219.00 lb/hr

Access/blank/turning section - Position: 3

Options	
Section Length	19.000 in
Door Location 1	Right

Cooling coil section - Position: 4

Coil Construction	
Model	Refrigerant - 1/2" Unit Optimized, General (UF)
Rows	4
Tube Diameter	1/2in. tube diameter (12.7 mm)
Tube Matl/Wall Thickness	Internally enhanced copper tubes
Fin Spacing	155 Per Foot
Fin Material	Aluminum fins
Fin Type	Delta flo H (Hi efficient)
Face Area	12.30 sq ft
Coil (top/single) H x L	32 in. (813 mm) X 55" (1397 mm) finned length
Casing	Galvanized
Rigging Weight	145.3 lb
Coil Section Options	
Drain Pan	Galvanized
Drain Pan Size	Small
Drain Connection	Left
Minimum Trap Height (L)	8.092 in
H Trap Dimension	4.728 in
J Trap Dimension	2.364 in
Door Location	Right

Coil Performance	
Capacity	
Total	231.38 MBh
Sensible	148.20 MBh
Air	
Flow	5010 cfm
Entering Dry Bulb	80.00 F
Entering Wet Bulb	67.00 F
Leaving Dry Bulb	53.00 F
Leaving Wet Bulb	51.67 F
Pressure Drop	0.498 in H2O
Face Velocity	407 ft/min
Refrigerant	
Type	R-410A
Liquid Temperature	115.00 F
Suction Temperature	41.83 F
Suction superheat	8.00 F
Circuiting Type	Intertwined circuits
Capacity Circuits	Full circuiting
Number of Distributors	2
AHRI 410 Classification	
AHRI 410 Classification	AHRI ACHC Certified
Data Generation Date	3/27/2023
Trane Select Assist update number	2690

Note: Certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Supply fan section - Position: 5

Fan Data	
Wheel Diameter/Type/Class	20in. dd plenum, 80% width, M press
Fan Quantity	1
Discharge Location	Front top
Motor Location	Right side drive
Blades	Improved sound(lowest overall,less spike
Drive Service Factor	Direct drive
Fan K-factor	2186.00

Fan Performance	
Airflow	5010 cfm
Total Static Pressure	4.401 in H2O
Total Brake Power	5.622 hp
Operating Speed	2179 rpm
AMCA FEG	FEG85
Bare fan peak total efficiency	75.30 %
Unit Static Efficiency	61.84 %

Motor Interface Options	
Selection Type	VFD
Voltage	460/3
Mounting Location	Internal mounting
VFD Frequency	74.00 Hz

Motor Data	
Power / Fan	7.5 hp
Voltage	460/3
Speed	1800
Class	NEMA premium compliant ODP
Efficiency	91.40 %
Part Load Efficiency	85.74 %
Fan electrical power (FEP)	4.83 kW
FEI	1.36
AHRI VFD HP	7.500 hp
Wire to air static efficiency	53.58 %

Note: VFD driven motor fan electrical power calculated in accordance with AHRI 430.

Note: Certified airflow performance per AHRI 430

Fan Section Options	
Fan Wheel Balance	Inverter balance with shaft grounding
Door Location	Right
Door Guard	Yes

Fan Discharge Options

Face	Type	Airflow	Face Velocity	Area	Pressure Drop	Exhaust Hood	Damper Torque Requirement
Front Face Feature			330 ft/min	15.19 sq ft	0.017 in H2O	N/A	N/A

Note: Certified by the AHRI Central Station Air-Handling Unit (AHU) Certification Program, based on AHRI Standard 430/431. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

AHRI CERTIFIED® www.ahridirectory.org Central Station Air-Handling Unit Supply Fans AHRI Standards 430/431

Pressure Drop in (in w.g.)

Supply fan	
Air mixing section	1.58
Coil section	0.11
Coil section	0.50
Fan section	0.02
Filter section	0.62
Humidification section	0.03
Discharge plenum	0.05
Internal Static Pressure	**2.90**
External Static Pressure	**1.50**
Total Static Pressure	**4.40**

Filter section - Position: 6

Primary Filter									
Type	**Frame**	**Loading**	**Airflow**	**Face Area**	**Face Velocity**	**Condition**	**Pressure Drop**	**Filter Quantity**	**Filter Size**
4in. cartridge - MERV 13 - standard	2in./4in. combo w/ space for dual sensor	Side load filters	5010 cfm	13.33 sq ft	376 ft/min	Mid-life	0.618 in H2O	6.00	16x20

Prefilter							
Type	**Airflow**	**Face Area**	**Face Velocity**	**Condition**	**Pressure Drop**	**Filter Quantity**	**Filter Size**
Customer supplied 2" prefilter	5010 cfm		376 ft/min	Mid-life		6.00	16x20

Filter Section Options	
Door Location	Right

Access/blank/turning section - Position: 7

Options	
Section Length	14.000 in

Humidifier section - Position: 8

Construction	
Steam Source	Building steam
Steam Pressure	15.00 psig
Connection Location	Right
Required Orifice Size	1/4"
Valve Pipe Connection Size	1/2"
Options	
Drain Connection/Material	Galvanized drain pan
Drain Connection	Left

Performance	
Airflow	5010 cfm
Entering Dry Bulb	65.00 F
Entering Relative Humidity	30.00 %
Leaving Relative Humidity	50.00 %
Steam Rate	64.34 lb/hr
Air Temperature Gain	1.26 F
Condensation Loss	7.18 lb/hr

Access/blank/turning section - Position: 9

Options	
Section Length	26.500 in
Door Location 1	Right
Drain Pan	Galvanized
Drain Connection	Left

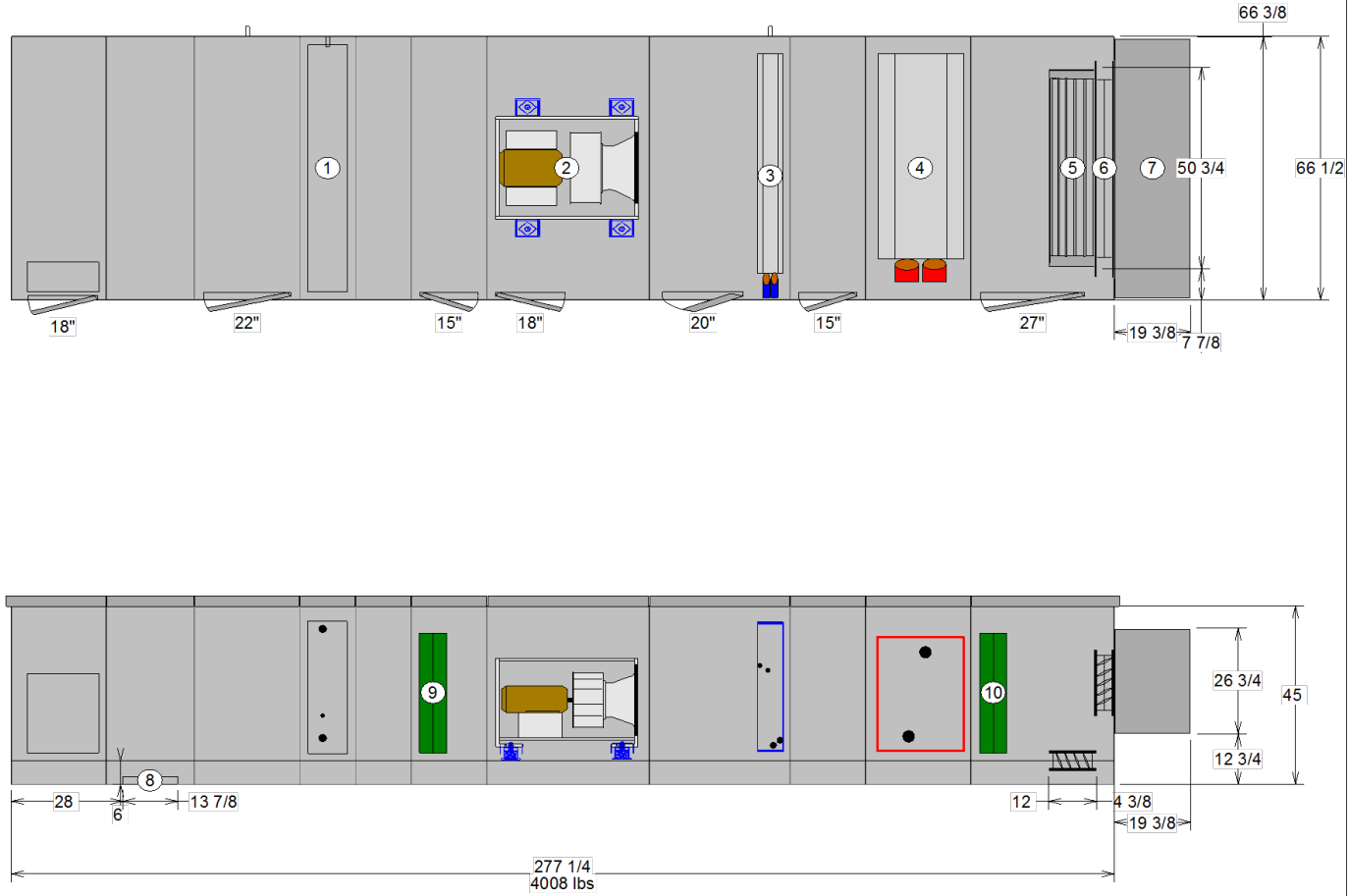
Discharge plenum - Position: 10

Openings						
Location	**Type**	**Airflow**	**Face Velocity**	**Area**	**Pressure Drop**	**Hood**
Bottom Face	Sizeable rectangular opening	5010 cfm	1253 ft/min	4.00 sq ft	0.049 in H2O	N/A

Section Options	

Starter/VFD only section - Position: 11

Supply Fan Motor Interface Door	Right



1	count=109
2	Plenum fan - 20in. dd plenum, 80% width, M press Supply fan 7.5 hp 460/3
3	Cooling coil - 4 Rows Coil type 1/2" Unit Optimized, General (UF)
4	Heating coil - Rows Coil type
5	Damper bottom-parallel blade 50.75 x 12
6	Damper back-parallel blade 17 x 55.5
7	Hood back
8	Opening bottom 41.56 x 13.859
9	Combo filters - 4in. cartridge - MERV 13 - standard
10	Combo filters -
	Doors 18 width x 35 height 22 width x 35 height 15 width x 35 height 20 width x 35 height 27 width x 35 height

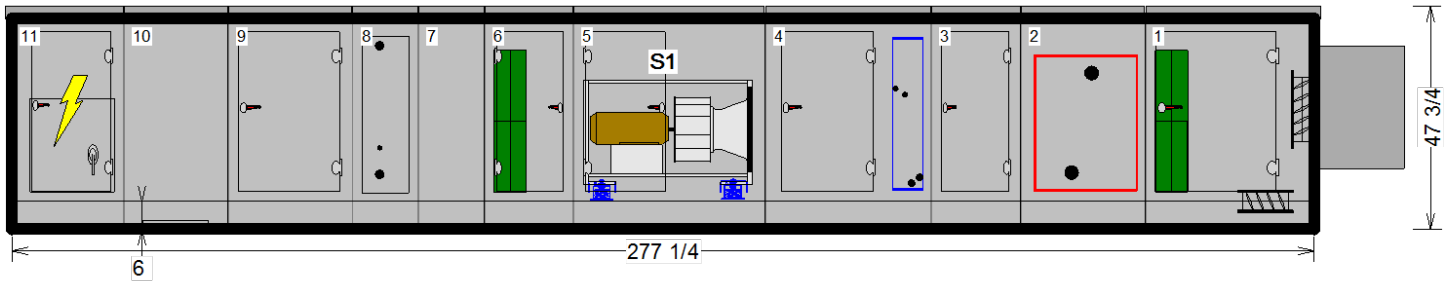
For maneuvering purposes, include 1.125 inches to each ship split length for overlapping panel flange. Flange will not add to overall installed unit length shown.

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 12	Job Name: VA Wilkes-Barre Hospital - VEG 19.25 (Valhalla)	Unit Casing: 2in Double Wall Foam
Product group: Outdoor unit	Actual airflow: 5010	Proposal Number:
Integral base frame: 6in. integral base frame	Sales Office:	Tags: AHU-17
Paint: Slate gray		Rigging weight: 4008.3 / Installed weight: 4356.5

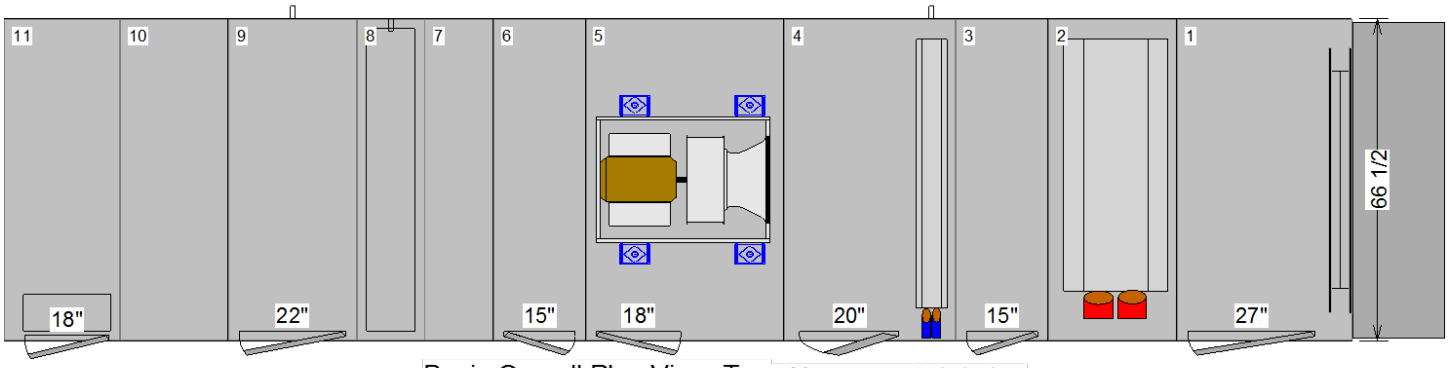
TRANE
Performance Climate Changer
Air Handlers

Shipping splits are indicated by thick black lines



For maneuvering purposes, include 1.125 inches to each ship split length for overlapping panel flange. Flange will not add to overall installed unit length sh

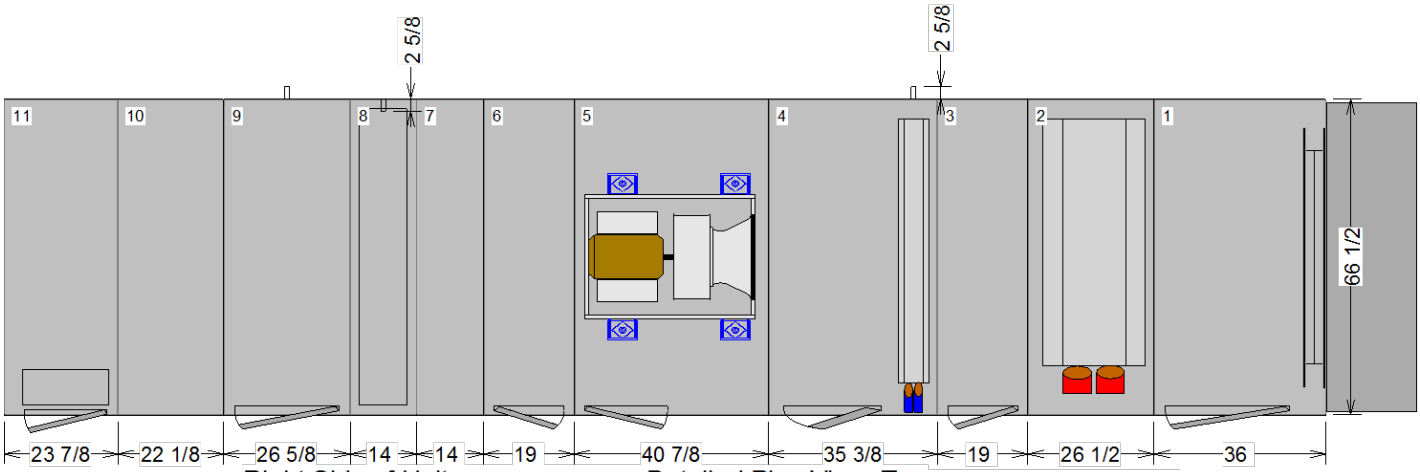
Pos #	Module	Length	Weight
1	Air mixing section	36	443.01
2	Coil section	26 1/2	759.03
3	Access section	19	157.04
4	Coil section	35 3/8	446.12
5	Fan section	40 7/8	851.86
6	Filter section	19	205.04
7	Access section	14	126.06
8	Humidification section	14	295.06
9	Access section	26 5/8	215.52
10	Discharge Plenum	22 1/8	205.15
11	Controls section	23 7/8	304.42
	Roof Curb		348.15
	Installed Unit Weight		4356.46 lbs



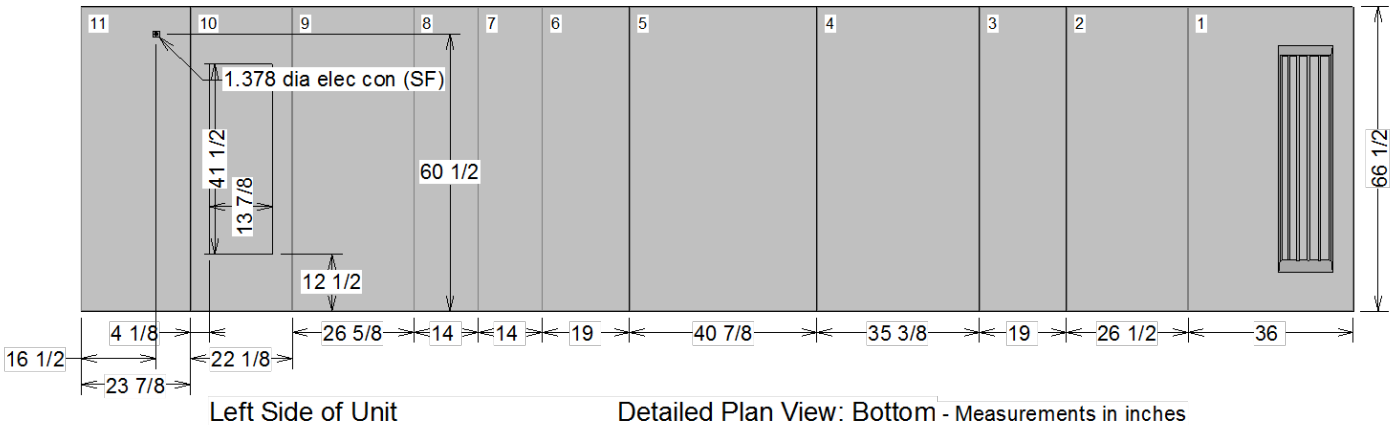
Basic Overall Plan View: Top - Measurements in inches

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 12	Job Name: VA Wilkes-Barre Hospital - VEG 19.25 (Valhalla)	Unit Casing: 2in Double Wall Foam	TRANE Performance Climate Changer Air Handlers
Product group: Outdoor unit	Actual airflow: 5010	Proposal Number:	
Integral base frame: 6in. integral base frame	Sales Office:	Tags: AHU-17	
Paint: Slate gray		Rigging weight: 4008.3 / Installed weight: 4356.5	



Right Side of Unit Detailed Plan View: Top - Measurements in inches



Left Side of Unit Detailed Plan View: Bottom - Measurements in inches

****Placement of electrical conduit may vary by a tolerance of 8" in any direction.**

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

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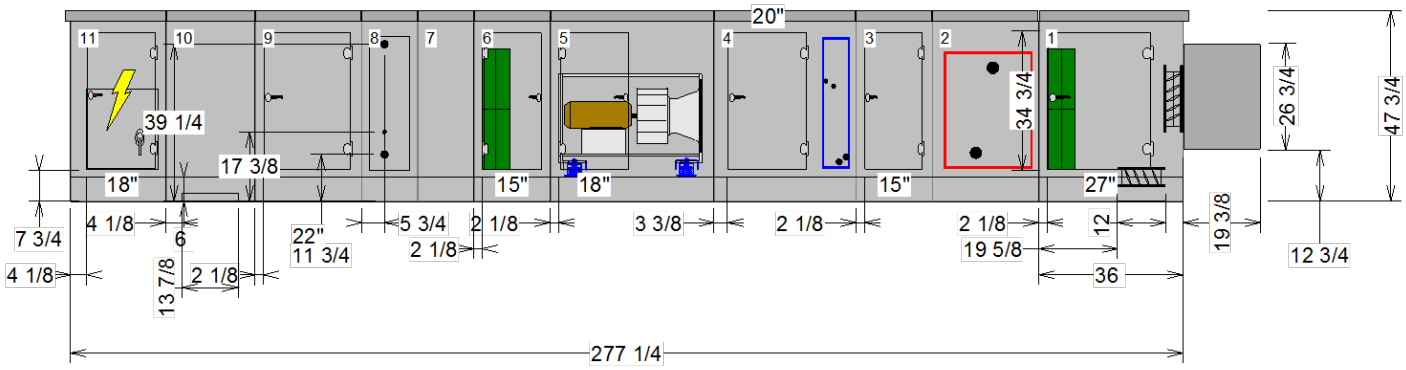
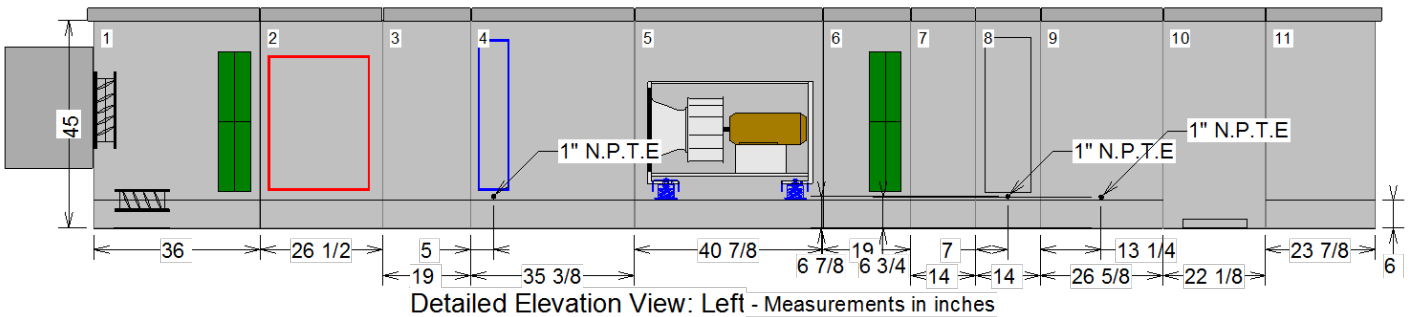
Product group: Outdoor unit	Actual airflow: 5010	Proposal Number:	
Integral base frame: 6in. integral base frame	Sales Office:	Tags: AHU-17	
Paint: Slate gray		Rigging weight: 4008.3 / Installed weight: 4356.5	





Detailed Elevation View: Left - Measurements in inches

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

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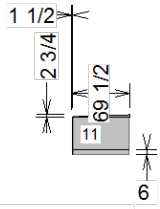
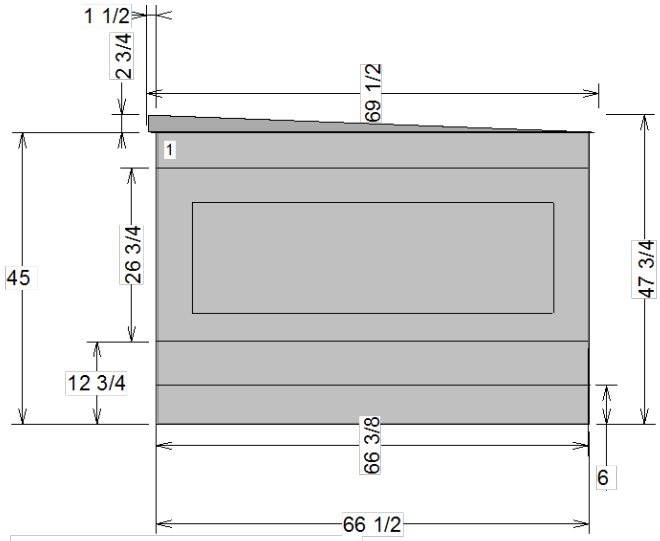
Product group: Outdoor unit	Actual airflow: 5010	Proposal Number:	
Integral base frame: 6in. integral base frame	Sales Office:	Tags: AHU-17	
Paint: Slate gray		Rigging weight: 4008.3 / Installed weight: 4356.5	



Detailed Elevation View: Front - Measurements in inches



Detailed Elevation View: Back - Measurements in inches

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

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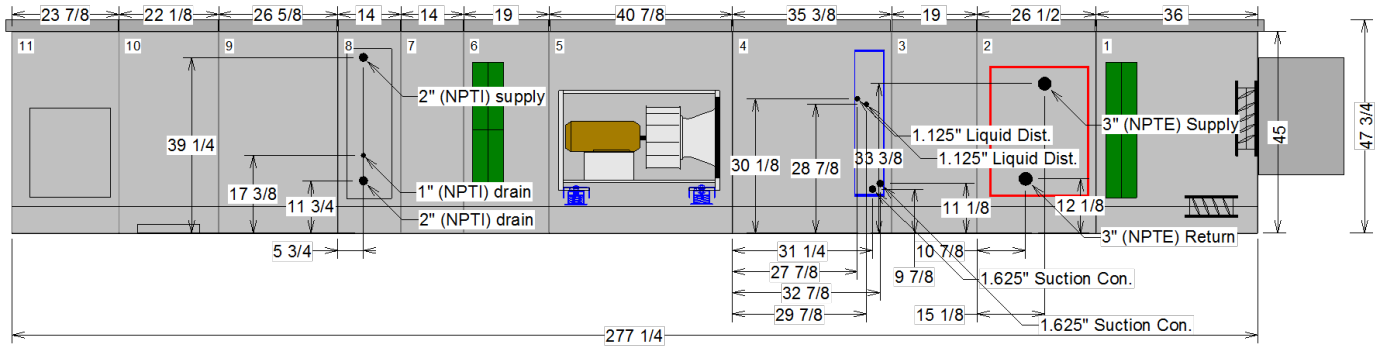
Product group: Outdoor unit	Actual airflow: 5010	Proposal Number:	
Integral base frame: 6in. integral base frame	Sales Office:	Tags: AHU-17	
Paint: Slate gray		Rigging weight: 4008.3 / Installed weight: 4356.5	

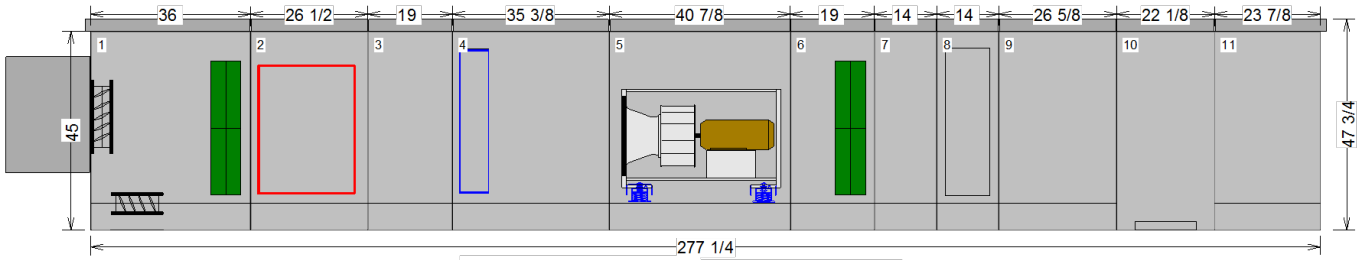


NPTI : National Pipe Thread Internal Connection
NPTE : National Pipe Thread External Connection

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 12	Job Name: VA Wilkes-Barre Hospital - VEG 19.25 (Valhalla)	Unit Casing: 2in Double Wall Foam
Product group: Outdoor unit	Actual airflow: 5010	Proposal Number:
Integral base frame: 6in. integral base frame	Sales Office:	Tags: AHU-17
Paint: Slate gray		Rigging weight: 4008.3 / Installed weight: 4356.5

TRANE
Performance Climate Changer
Air Handlers



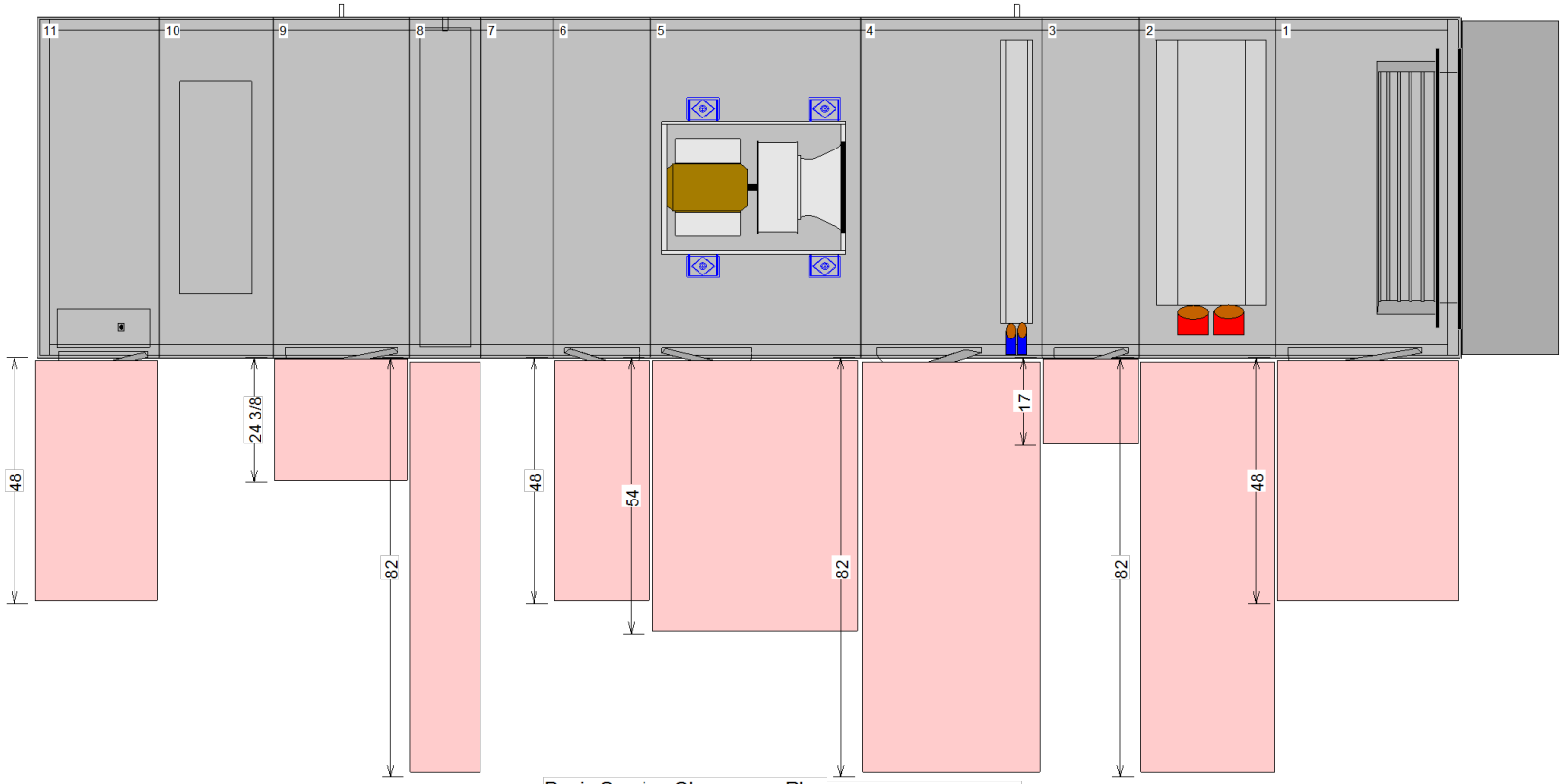
Coil connection view: Left - Measurements in inches

NPTI : National Pipe Thread Internal Connection
NPTE : National Pipe Thread External Connection

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 12	Job Name: VA Wilkes-Barre Hospital - VEG 19.25 (Valhalla)	Unit Casing: 2in Double Wall Foam
Product group: Outdoor unit	Actual airflow: 5010	Proposal Number:
Integral base frame: 6in. integral base frame	Sales Office:	Tags: AHU-17
Paint: Slate gray		Rigging weight: 4008.3 / Installed weight: 4356.5

TRANE
Performance Climate Changer
Air Handlers

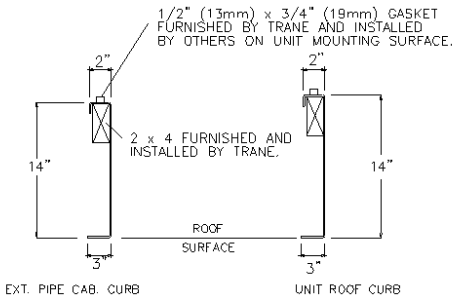


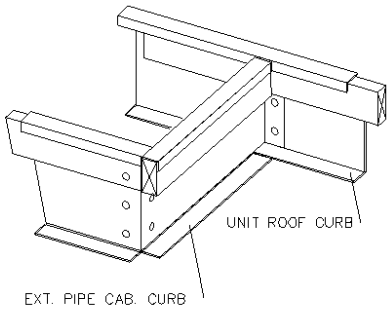
Basic Service Clearance - Plan - Measurements in inches

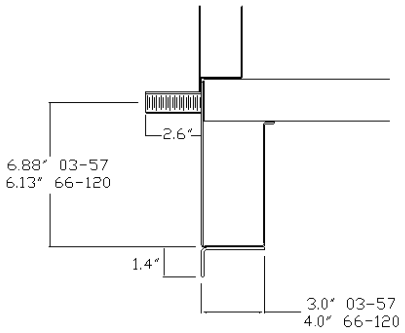
OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 12	Job Name: VA Wilkes-Barre Hospital - VEG 19.25 (Valhalla)	Unit Casing: 2in Double Wall Foam
Product group: Outdoor unit	Actual airflow: 5010	Proposal Number:
Integral base frame: 6in. integral base frame	Sales Office:	Tags: AHU-17
Paint: Slate gray		Rigging weight: 4008.3 / Installed weight: 4356.5

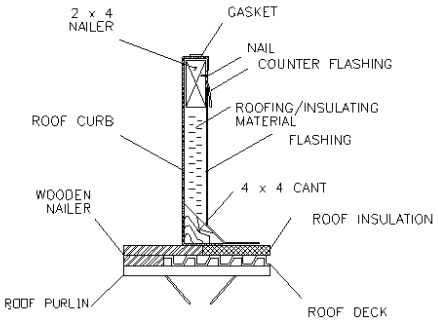
TRANE
Performance Climate Changer
Air Handlers



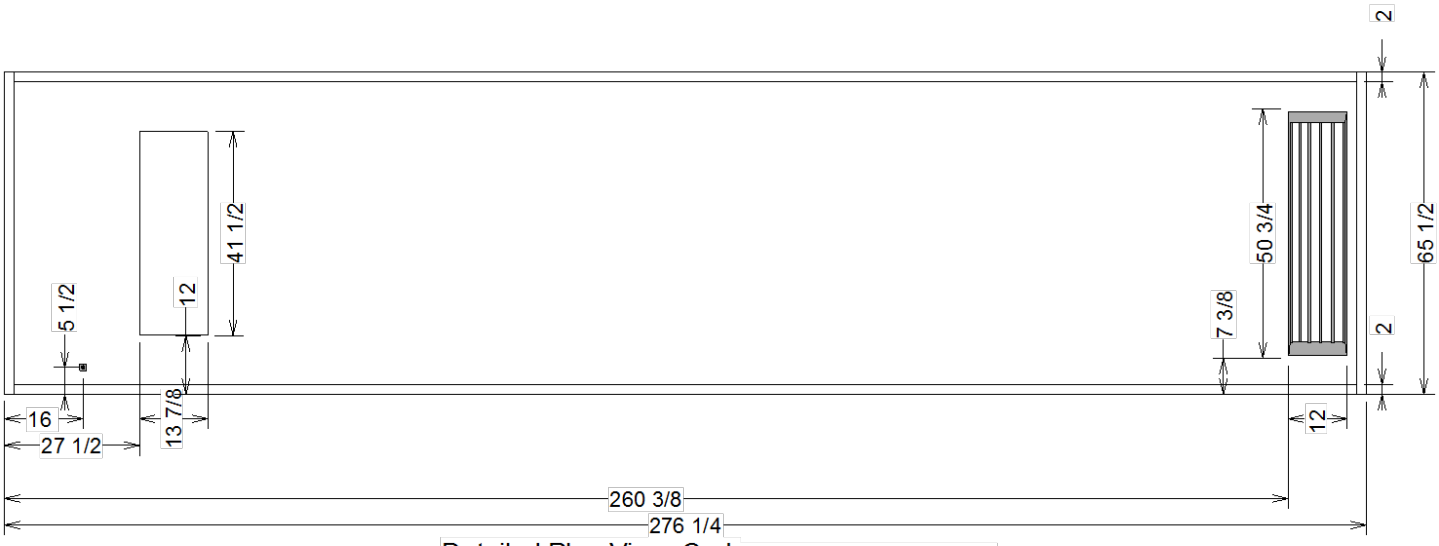




DRAIN CONNECTION



NOTE:
MATERIALS TO ATTACH ROOF CURB TO ROOF ARE TO BE SUPPLIED BY THE INSTALLER.

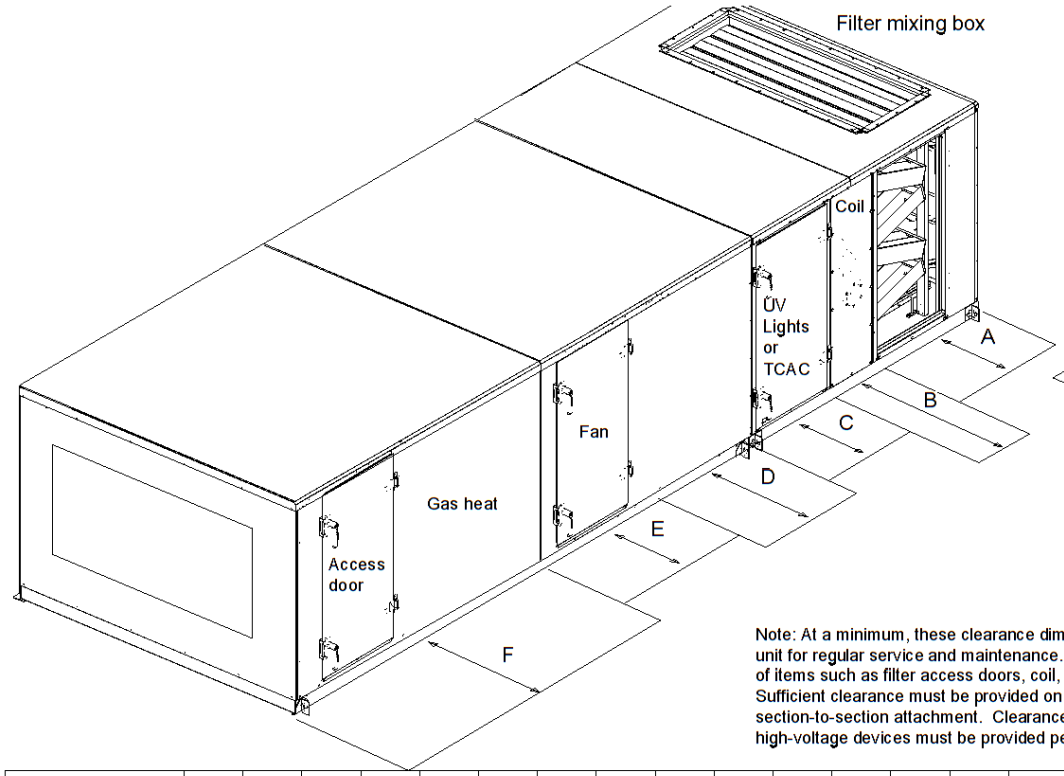


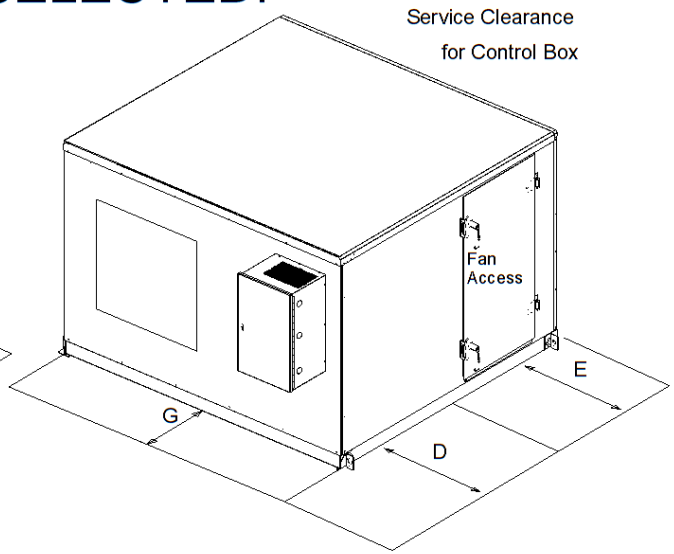
Detailed Plan View: Curb - Measurements in inches

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 12	Job Name: VA Wilkes-Barre Hospital - VEG 19.25 (Valhalla)	Unit Casing: 2in Double Wall Foam	TRANE Performance Climate Changer Air Handlers
Product group: Outdoor unit	Actual airflow: 5010	Proposal Number:	
Integral base frame: 6in. integral base frame	Sales Office:	Tags: AHU-17	
Paint: Slate gray		Rigging weight: 4008.3 / Installed weight: 4356.5	

EXAMPLE UNIT - NOT CONFIGURED AS SELECTED.

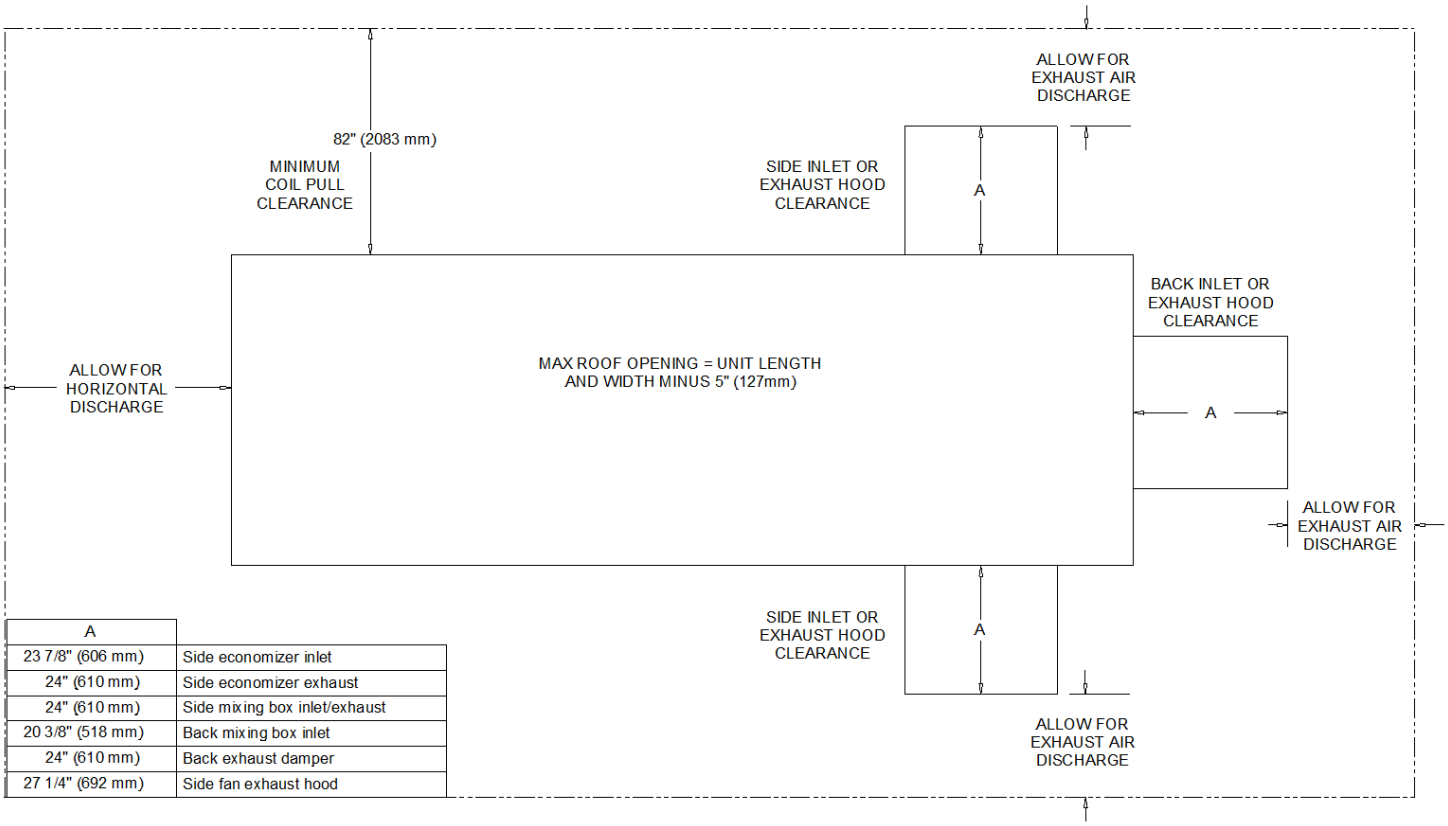




Note: At a minimum, these clearance dimensions are recommended on one side of the unit for regular service and maintenance. Refer to as-built submittal for locations of items such as filter access doors, coil, piping connections, motor locations, etc. Sufficient clearance must be provided on all sides of unit for removal of panels or section-to-section attachment. Clearance for starters, VFDs, or other high-voltage devices must be provided per NEC requirements.

Component	3	4	6	8	10	12	14	17	21	25	30	35	40	50	57	66	80	100	120
A (filter)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	52	56	58	58
B (coil, humidifier)	48	59	59	66	77	82	87	87	95	95	109	115	128	141	141	156	156	170	197
B (staggered coil)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	67	67	76	80	88	96	96	105	105	113	129
C (UV Lights)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	52	56	58	58
C (TCAC)	43	59	59	63	75	81	83	83	58	58	83	75	83	83	83	83	83	75	83
D (External Starter, VFD, LV box or Overload box)	61	61	61	61	61	61	61	61	64	64	64	64	64	64	64	64	64	64	64
D (Internal Starter or VFD)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
E (fan)	48	48	48	48	51	54	58	61	60	66	66	66	70	77	77	93	93	101	101
F (Gas Heat Ext Vestible)	N/A	N/A	89	90	108	100	100	105	115	115	118	136	140	156	156	170	179	180	N/A
F (Gas Heat Int Vestible)	N/A	N/A	56	63	74	79	84	84	92	92	106	112	125	138	138	153	153	167	194

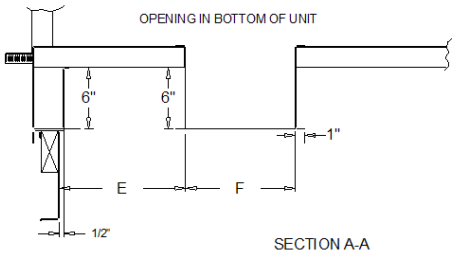
Component	All Sizes
G (Side mount LV box)	36
G (Front mount LV box)	13



A	
23 7/8" (606 mm)	Side economizer inlet
24" (610 mm)	Side economizer exhaust
24" (610 mm)	Side mixing box inlet/exhaust
20 3/8" (518 mm)	Back mixing box inlet
24" (610 mm)	Back exhaust damper
27 1/4" (692 mm)	Side fan exhaust hood

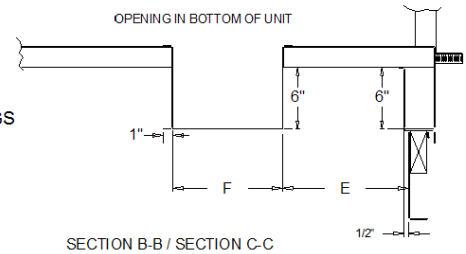
RELATIONSHIP OF CURB TO UNIT AS-BUILT

RECTANGULAR OPENINGS



SECTION A-A

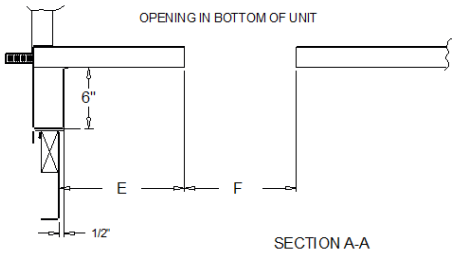
SUPPLY FAN OR DISCHARGE PLENUM (SEE NOTE 1)



SECTION B-B / SECTION C-C

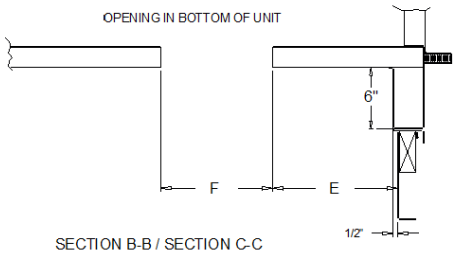
MIX BOX, RETURN FAN OR EXHAUST FAN SECTION (SEE NOTE 1)

ROUND OPENINGS



SECTION A-A

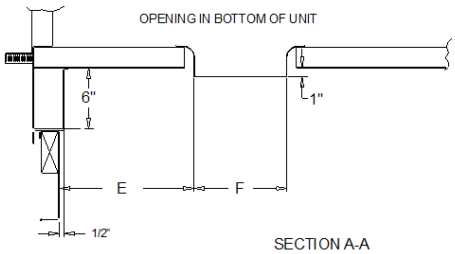
SUPPLY FAN OR DISCHARGE PLENUM (SEE NOTE 1)



SECTION B-B / SECTION C-C

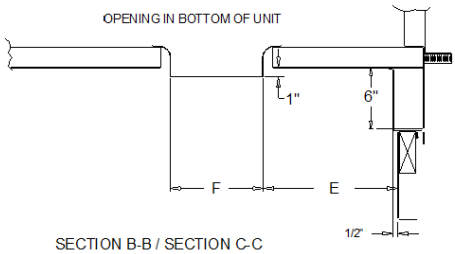
MIX BOX, RETURN FAN OR EXHAUST FAN SECTION (SEE NOTE 1)

BELLMOUTH OPENINGS



SECTION A-A

SUPPLY FAN OR DISCHARGE PLENUM (SEE NOTE 1)

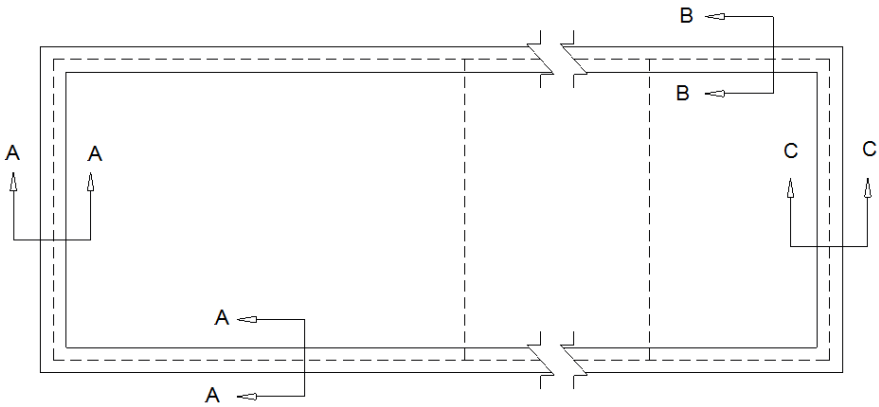


SECTION B-B / SECTION C-C

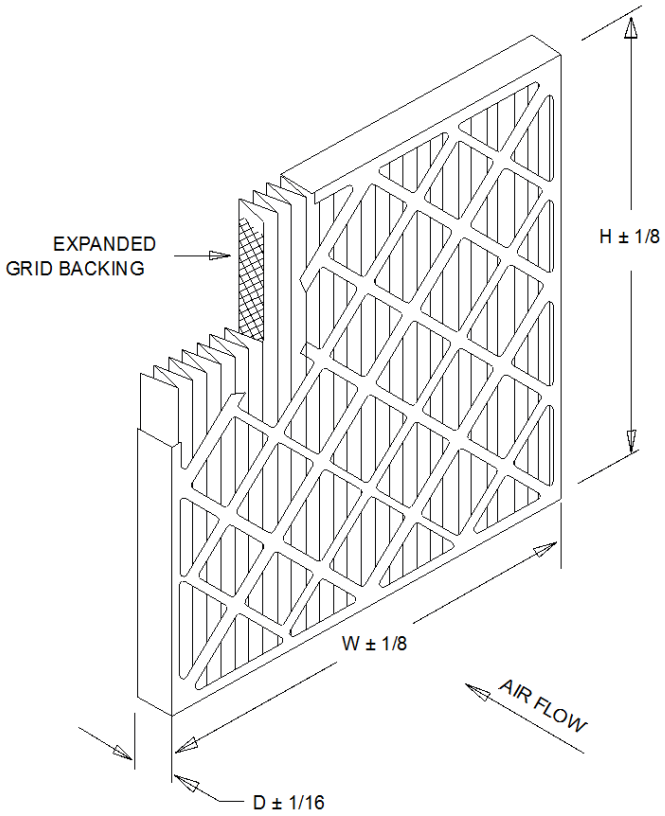
MIX BOX, RETURN FAN OR EXHAUST FAN SECTION (SEE NOTE 1)

NOTE:

1. E and F are representative of dimensions on the accessory as-built used to locate opening(s) in the roof surface.



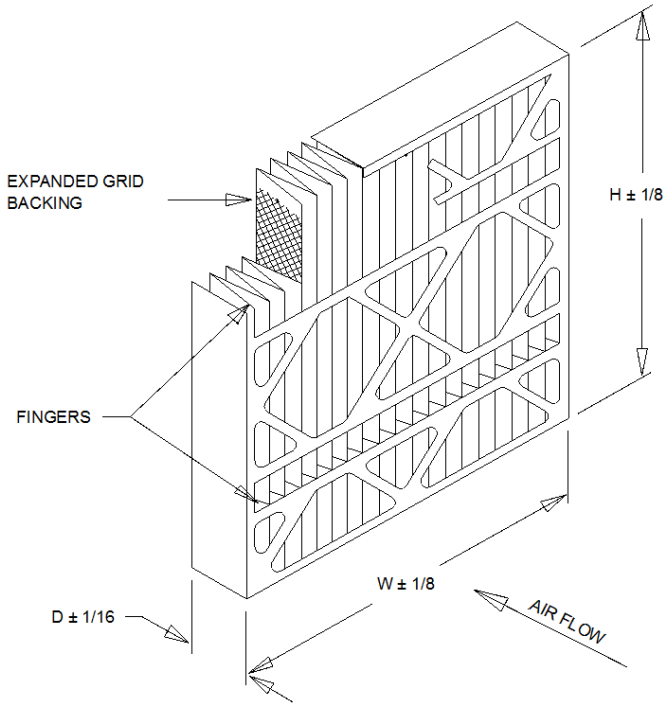
Base Detail



STANDARD CONSTRUCTION
1. 100 % Synthetic White Un-Dyed Media
2. 10.0 Pleats Per Foot
3. Expanded Metal Pleat Supports
4. Moisture Resistant Beverage Board Frame
5. Double Wall Frame

NOTES
1. MERV 8-A Per ASHRAE 52.2-2007 Appendix J.
2. Final Resistance: 1/0" W.G.
3. Rated Velocity: 500 FPM
4. Class 2 Filter Per U.L. Standard 900
5. Maximum Operating Temperature: 225 DEG. F

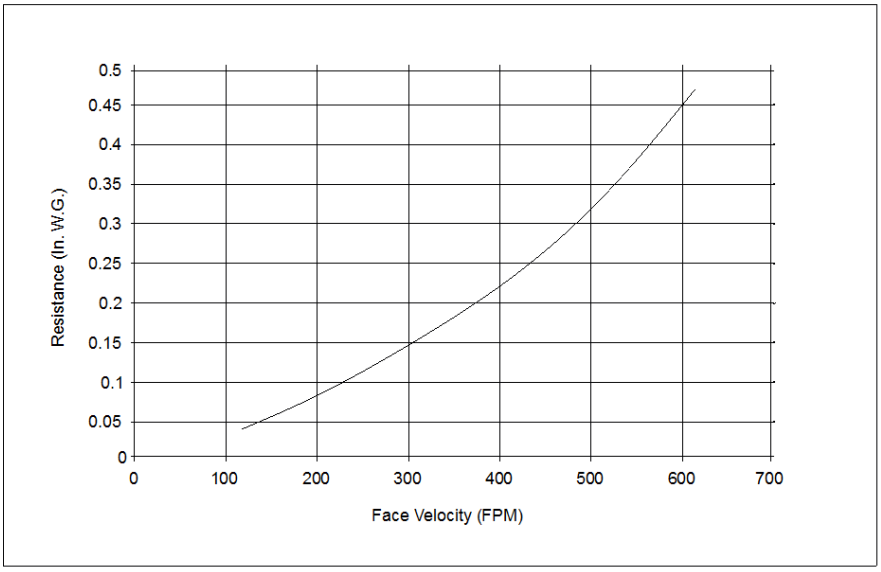
MODEL NUMBER	NOMINAL SIZE IN. W X H X D	ACTUAL SIZE IN. W X H X D	RATED AIR FLOW CFM	INITIAL RESISTANCE IN. W.G.	MEDIA AREA SQ. FT.
MX40-STD2-217	10 X 20 X 2	9-1/2 X 19-1/2 X 1-3/4	700	0.29	4.7
MX40-STD2-220	12 X 20 X 2	11-1/2 X 19-1/2 X 1-3/4	840	0.29	5.5
MX40-STD2-210	12 X 24 X 2	11-3/8 X 23-3/8 X 1-3/4	1000	0.29	6.2
MX40-STD2-239	14 X 20 X 2	13-1/2 X 19-1/2 X 1-3/4	980	0.29	5.7
MX40-2TD2-241	14 X 25 X 2	13-1/2 X 24-1/2 X 1-3/4	1220	0.29	7.1
MX40-STD2-245	15 X 20 X 2	14-1/2 X 19-1/2 X 1-3/4	1050	0.29	6.2
MX40-STD2-201	16 X 20 X 2	15-1/2 X 19-1/2 X 1-3/4	1120	0.29	6.7
MX40-STD2-216	16 X 24 X 2	15-3/8 X 23-3/8 X 1-3/4	1340	0.29	8.0
MX40-STD2-202	16 X 24 X 2	15-1/2 X 24-1/2 X 1-3/4	1400	0.29	8.0
MX40-STD2-280	15 X 20 X 2	17-1/2 X 19-1/2 X 1-3/4	1250	0.29	7.8
MX40-STD2-212	18 X 24 X 2	17-3/8 X 23-3/8 X 1-3/4	1500	0.29	9.3
MX40-STD2-285	18 X 25 X 2	17-1/2 X 24-1/2 X 1-3/4	1570	0.29	9.7
MX40-STD2-203	20 X 20 X 2	19-1/2 X 19-1/2 X 1-3/4	1400	0.29	8.3
MX40-STD2-211	20 X 24 X 2	19-3/8 X 23-3/8 X 1-3/4	1670	0.29	9.9
MX40-STD2-204	20 X 25 X 2	19-1/2 X 24-1/2 X 1-3/4	1750	0.29	10.3
MX40-STD2-205	24 X 24 X 2	23-3/8 X 23-3/8 X 1-3/4	2000	0.29	11.7
MX40-STD2-225	25 X 25 X 2	24-1/2 X 24-1/2 X 1-3/4	2170	0.29	13.6



STANDARD CONSTRUCTION
1. 100 % Synthetic Un-Dyed Media
2. 11 Pleats Per Foot
3. Expanded Metal Pleat Supports
4. Moisture Resistant Beverage Board Frame
5. Double Wall Frame
6. (2) Rows of Fingers on Air Entering Side

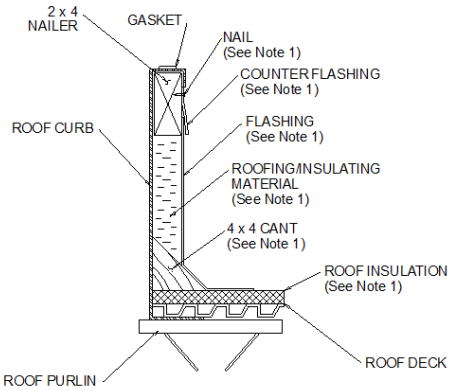
NOTES
1. MERV 11 per ASHRAE 52.2-2007
   Tested at 492 FPM on 24x24x4 Nominal Size
2. Final Resistance; 1.0" W.G,
3. Rated Velocity: 500 FPM
4. Classified Per U.L. Standard 900 for Flammibility
5. Maximum Operating Temperature: 200 deg. F

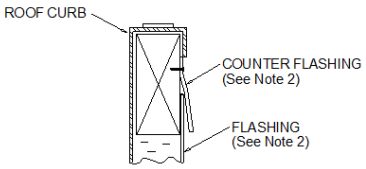
NOMINAL SIZE (WxHxD)	ACTUAL SIZE (WxHxD)	RATED AIR FLOW (IN. W.G.)	INITIAL RESISTANCE (IN. W.G.)	MEDIA AREA (SQUARE FEET)	FILTER UNIT WEIGHT (LBS)
12x24x4	11-3/8 x 23-3/8 x 3-3/4	1000	0.31	12.4	1.7
16x20x4	15-1/2 x 19-1/2 x 3-3/4	1120	0.31	14.5	1.7
16x25x4	15-1/2 x 24-1/2 x 3-3/4	1400	0.31	18.1	2.1
20x20x4	19-1/2 x 19-1/2 x 3-3/4	1400	0.31	18.6	2.1
20x24x4	19-3/8 x 23-3/8 x 3-3/4	1670	0.31	22.3	2.5
20x25x4	19-1/2 x 24-1/2 x 3-3/4	1750	0.31	23.4	2.6
24x24x4	23-3/8 x 23-3/8 x 3-3/4	2000	0.31	27.2	3.0

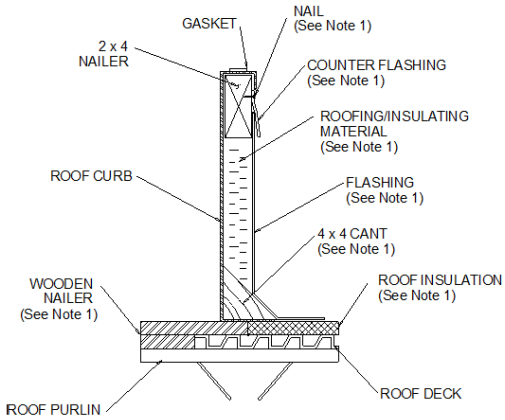


Recommendation for Roof Curb Installation

Refer to Performance IOM for specific installation instructions





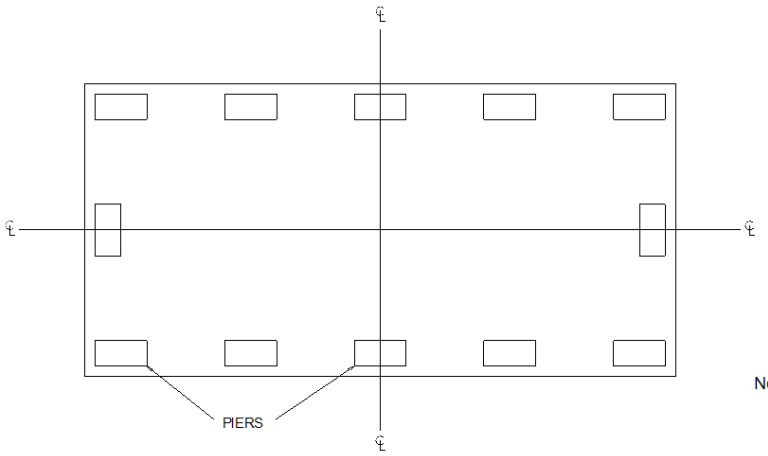


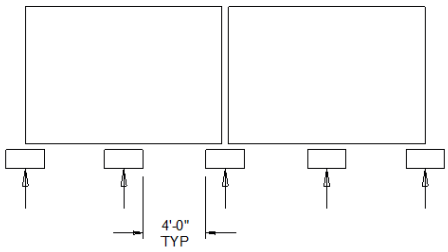
Note:

1. Materials to attach roof curb to roof are to be supplied by the installer.
2. Flashing or counter flashing should not come to or over top of curb.
3. Roof curb must be mechanically fastened to roof surface.

Recommendation for Pier Mounting

Refer to Performance IOM for specific installation instructions





Note:

1. Pier supports should be inside 3" (3 - 50) or 4" (57 - 120) flat of unit base. Unit cannot be supported by unit base drip leg.
2. Piers beneath shipping splits must be structurally sound to support the weight of the unit.

SUPPLY FAN 1 SCHEMATIC PAGE 1 OF 2

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NOTES:

1. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. PHANTOM LINES INDICATE CONTROL OPTION. REF. CONTROL PANEL SCHEMATIC FOR SPECIFIC DETAIL.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC), STATE AND LOCAL REQUIREMENTS. OTHER COUNTRIES APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS SHALL APPLY. FIELD CONDUCTORS SHALL HAVE INSULATION RATINGNOT LESS THAN 600V COPPER CONDUCTORS ONLY.
3. THE MINIMUM CIRCUIT AMPACITY, THE MAXIMUM FUSE SIZE, AND DISCONNECT SIZE ARE CALCULATED BASED ON THE INVERTER INPUT LINE CURRENTS PER ARTICLE 430-2 OF THE NATIONAL ELECTRICAL CODE.

4 PROGRAM TERMINAL 18 AS RUN.

5 PROGRAM TERMINAL 27 INV. COASTING STOP.

6 CLOSES TO RUN AUTO MODE OR BYPASS AUTO FOR OPTION VFD OR STARTER.

9 REMOVE JUMPER AND INSTALL FIELD SAFETY INTERLOCK.

CAUTION

USE COPPER CONDUCTORS ONLY!

UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

ATTENTION

N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!

LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.

L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'ÉQUIPEMENT.

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SI NO LO HACE, PUEDE OCASIONAR DAÑO AL EQUIPO.

⚠ WARNING

HAZARDOUS VOLTAGE!

DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.

FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠ AVERTISSEMENT

TENSION DANGEREUSE!

COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.

NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.

⚠ ADVERTENCIA

¡VOLTAJE PELIGROSO!

DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGÚRESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON EJE DE DIRECCIÓN DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.

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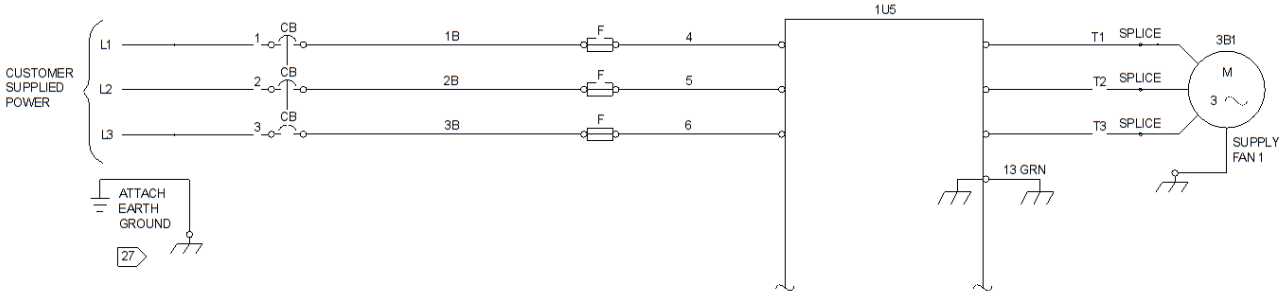


SEE PAGE 2

VFD FUSES				
FUSE	VOLTAGE	PANEL HP (MAX)	P/N	CLASS
1F40 1F41 1F42	200/230	0.5-2	LP-CC-10	CC
		3	LP-CC-15	CC
		5	LP-CC-25	CC
		7.5-10	JJN-50	T
		15	JJN-80	T
		20-25	JJN-100	T
		30-40	JJN-150	T
		50	JJN-200	T
	460	0.5-2	LP-CC-10	CC
		3-5	LP-CC-15	CC
		7.5-10	LP-CC-25	CC
		15-20	JJS-50	T
		25-30	JJS-80	T
		40	JJS-100	T
		50-60	JJS-125	T
		75-100	JJS-200	T
	575	3-10	LP-CC-20	CC
		15-20	LP-CC-30	CC
		25-40	JJS-80	T
		50-75	JJS-125	T
		100-125	JJS-200	T

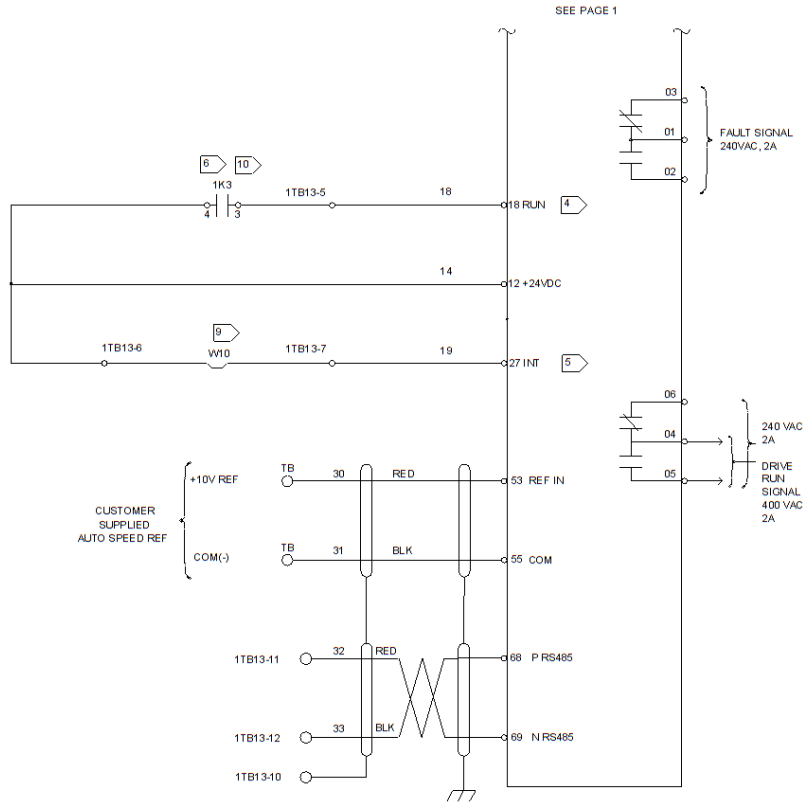
10 FIELD SUPPLIED CONTACTS.

27 ATTACH GROUND OR EQUIPMENT GROUND.

DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	HIGH VOLTAGE PANEL
2	LOW VOLTAGE PANEL (UNIT SCHEMATIC)
3	AIR HANDLER SECTION

LEGEND	
DEVICE DESIGNATION	DESCRIPTION
1CB11	CIRCUIT BREAKER
1F40 TO 1F42	VFD FUSES
1K3	START/STOP RELAY
1TB13	TERMINAL STRIP CONTROL CIRCUIT
1U5	VFD CONTROLLER
3B1	MOTOR 1

SUPPLY FAN 1 SCHEMATIC PAGE 2 OF 2



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49514548

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VFD FUSES				
FUSE	VOLTAGE	PANEL HP (MAX)	P/N	CLASS
1F40 1F41 1F42	200/230	0.5-2	LP-CC-10	CC
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		5	LP-CC-25	CC
		7.5-10	JJN-50	T
		15	JJN-80	T
		20-25	JJN-100	T
		30-40	JJN-150	T
		50	JJN-200	T
	460	0.5-2	LP-CC-10	CC
		3-5	LP-CC-15	CC
		7.5-10	LP-CC-25	CC
		15-20	JJS-50	T
		25-30	JJS-80	T
		40	JJS-100	T
		50-60	JJS-125	T
		75-100	JJS-200	T
	575	3-10	LP-CC-20	CC
		15-20	LP-CC-30	CC
		25-40	JJS-80	T
		50-75	JJS-125	T
		100-125	JJS-200	T

DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	HIGH VOLTAGE PANEL
2	LOW VOLTAGE PANEL (UNIT SCHEMATIC)
3	AIR HANDLER SECTION

LEGEND	
DEVICE DESIGNATION	DESCRIPTION
1CB11	CIRCUIT BREAKER
1F40 TO 1F42	VFD FUSES
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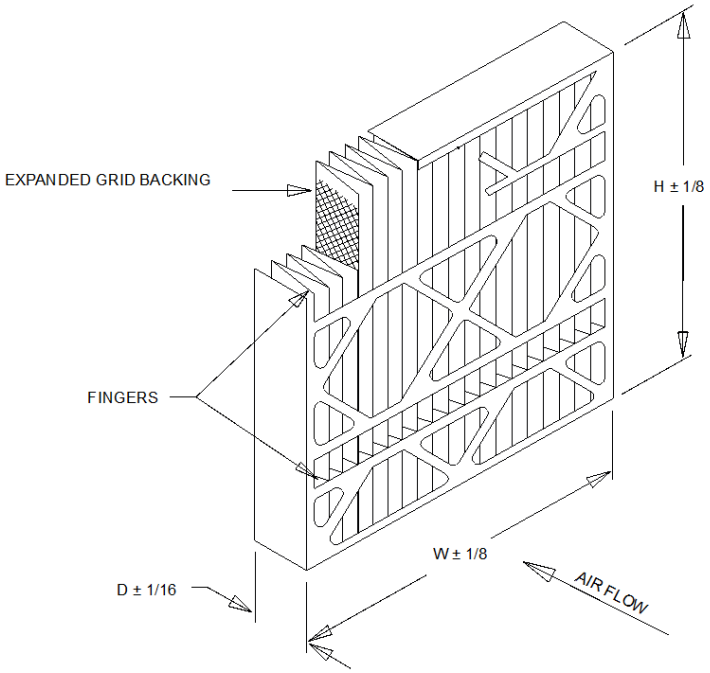
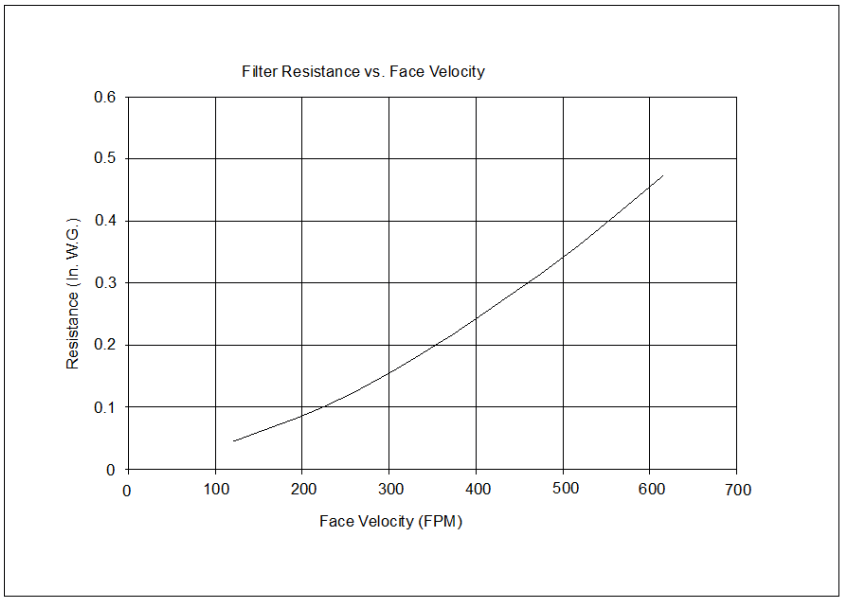


STANDARD CONSTRUCTION
1. 100 % Synthetic Un-Dyed Media
2. 11 Pleats Per Foot
3. Expanded Metal Pleat Supports
4. Moisture Resistant Beverage Board Frame
5. Double Wall Frame
6. (2) Rows of Fingers on Air Entering Side

NOTES
1. MERV 13 per ASHRAE 52.2-2012
   Tested at 492 FPM on 24x24x4 Nominal Size
2. Final Resistance: 1.0" W.G,
3. Rated Velocity: 500 FPM
4. Classified Per U.L. Standard 900 for Flammability
5. Maximum Operating Temperature: 200 deg. F

NOMINAL SIZE (WxHxD)	ACTUAL SIZE (WxHxD)	RATED AIR FLOW (IN. W.G.)	INITIAL RESISTANCE (IN. W.G.)	MEDIA AREA (SQUARE FEET)	FILTER UNIT WEIGHT (LBS)
12x24x4	11-3/8 x 23-3/8 x 3-3/4	1000	0.34	12.4	1.7
16x20x4	15-1/2 x 19-1/2 x 3-3/4	1120	0.34	14.6	1.7
16x25x4	15-1/2 x 24-1/2 x 3-3/4	1400	0.34	18.3	2.1
20x20x4	19-1/2 x 19-1/2 x 3-3/4	1400	0.34	18.8	2.1
20x24x4	19-3/8 x 23-3/8 x 3-3/4	1670	0.34	22.4	2.5
20x25x4	19-1/2 x 24-1/2 x 3-3/4	1750	0.34	23.5	2.6
24x24x4	23-3/8 x 23-3/8 x 3-3/4	2000	0.34	27.4	3.0



GENERAL

Outdoor air handling units will be shipped with all openings covered to protect unit interior from in-transit debris.

Installing contractor is responsible for long term storage in accordance with the Installation, Operation, and Maintenance manual (CLCH-SVX07*-EN).

Unit shall be UL and C-UL Listed.

Supply fans within the scope of AHRI Standard 430 are "Certified by the AHRI Central Station Air-Handling Unit (AHU) Certification Program, based on AHRI Standard 430/431. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org".

Unit sound performance data shall be reported as sound power. Trane, in providing this program and data, does not certify or warrant NC levels. These levels are affected by factors specific to each application and/or installation and therefore unable to be predicted or certified by Trane. Refer to product data for specific fan footnote references.

Manufacturer provided VFDs shall be certified to AHRI Standard 1210 "Performance Rating of Variable Frequency Drives" to ensure documented and reliable VFD efficiency.

Unit Construction

Outdoor unit roofs shall incorporate a standing seam on the exterior to ensure a rigid roof construction and prevent water infiltration. Roof assembly shall overhang all walls by 1.5-inch minimum to prevent sheeting from roof to side panels. Rain gutters shall also be provided over all doors shorter than total unit height to direct rain away from the door assembly. Outdoor roofs shall be sloped, not less than 0.125 inches per foot, for water drainage. Where outdoor units are shipped in multiple sections, provide standing-seam joiners at each split with adhesive, hardware, and cover strips for field joining by the installing contractor.

All unit panels shall be 2" solid, double-wall construction to facilitate cleaning of unit interior. Unit panels shall be provided with a mid-span, no-through-metal, internal thermal break. Casing thermal performance shall be such that under 55°F supply air temperature and design conditions on the exterior of the unit of 81°F dry bulb and 73°F wet bulb, condensation shall not form on the casing exterior.

All outdoor AHU interior casing panels will be made of galvanized steel.

Unit Paint

External surface of unit casing will be coated with water-based polyurethane paint. Color to be standard "Slate Gray". Factory-painted units will be able to withstand a salt spray test in accordance with ASTM B117 for a minimum of 500 consecutive hours and shall meet the following requirements following the salt-spray test:
- Mean scribe creepage rating of at least 6 per ASTM D1654 procedure A
- Blister size no larger than #6 per ASTM D714
- Blister density no greater than Medium per ASTM D714
- No onset of red rust

Casing Deflection
The casing shall not exceed 0.0042 inch deflection per inch of panel span at 1.00 times design static pressure. Maximum design static shall not exceed +8 inches w.g. in all positive pressure sections and -8 inches w.g. in all negative pressure sections.

Floor Construction
The unit floor shall be of sufficient strength to support a 300.0 lb load during maintenance activities and shall deflect no more than 0.0042 inch per inch of panel span.

Unit base

Manufacturer to provide a full perimeter integral base frame for either ceiling suspension of units or to support and raise all sections of the unit for proper trapping. Indoor unit base frame will either be bolted construction or welded construction. All outdoor unit base frames shall be welded construction. For indoor units, refer to schedule for base height and construction type. Contractor will be responsible for providing a housekeeping pad when unit base frame is not of sufficient height to properly trap unit. Unit base frames not constructed of galvanized steel shall be chemically cleaned and coated with both a rust-inhibiting primer and finished coat of rust-inhibiting enamel. Unit base height to be included in total height required for proper trap height.

Insulation
Panel insulation shall provide a minimum thermal resistance (R) value of 13 ft^2-h-^oF/Btu throughout the entire unit. Insulation shall completely fill the panel cavities in all directions so that no voids exist and settling of insulation is prevented. Panel insulation shall comply with NFPA 90A.

Drain Pan
In sections provided with a drain pan, the drain pan shall be designed in accordance with ASHRAE 62.1. To address indoor air quality (IAQ) the drain pan shall be sloped in two planes promoting positive drainage to eliminate stagnant water conditions. Drain pan shall be insulated, and of double wall construction. The outlet shall be the lowest point on the pan, and shall be of sufficient diameter to preclude drain pan overflow under normally expected operating conditions. All drain pans connections shall have a threaded connection, extending a minimum of 2-1/2" beyond the unit base, and shall be made from the same material as the drain pan. Drain pan located under a cooling coil shall be of sufficient size to collect all condensate produced from the coil.
Refer to Product Data for specific information on which sections are supplied with a drain pan, the drain pan material and connection location.

Access Door Construction
Access doors shall be 2" double wall construction. Interior and exterior door panels shall be of the same construction as the interior and exterior wall panels respectively. All doors shall be provided with a thermal break construction of door panel and door frame. Gasketing shall be provided around the full perimeter of the doors to prevent air leakage. Surface mounted handles shall be provided to allow quick access to the interior of the functional section and to prevent through cabinet penetrations that could likely weaken the casing leakage and thermal performance. Handle hardware shall be designed to prevent unintended closure. Access doors shall be hinged and removable for quick easy access. Hinges shall be interchangeable with the door handle hardware to allow for alternating door swing in the field to minimize access interference due to unforeseen job site obstructions. Door handle hardware shall be adjustable and visually indicate locking position of door latch external to the section. Door hinges shall be galvanized.

All doors shall be a minimum of 60" high when sufficient height is available or the maximum height allowed by the unit height.

Door handles shall be provided for each latching point of the door necessary to maintain the specified air leakage integrity of the unit. Optionally for indoor AHUs and as standard on outdoor AHUs, outward swing doors are provided with a single handle linked to multiple latching points. An optional shatterproof window shall be provided in access doors where indicated on the plans. Window shall either be single pane, or thermal dual pane, as defined on schedule. Window shall be capable of withstanding unit operating pressures and shall be safe for viewing UV-C lamps.
Refer to Product Data for specific information on which sections are supplied with an access door, the door location, a single handle and a window.

Factory-supplied Curb
Outdoor AHU will be provided with a factory-supplied roof curb. Curb will be shipped to jobsite disassembled. Contractor will be responsible for assembly and mounting to roof structure per the Roof Curb Manual. Units with factory-supplied external piping cabinet(s), the factory-supplied curb will include a curb section for the pipe cabinet(s).
Refer to the Roof Curb Detail drawing and Product Data section of submittal for height of factory-supplied roof curb(s).

Lifting Instructions
The air handling units must be rigged, lifted, and installed in strict accordance with the Installation, Operation, and Maintenance manual (CLCH-SVX07G-EN). The units are also to be installed in strict accordance with the specifications. Units may be shipped fully assembled or disassembled to the minimum functional section size in accordance with shipping and job site requirements.

Outdoor units shall be shipped on 6" integral base frame for the purpose of mounting units on a roof curb or field-supplied pier support system. Refer to the Product Data section for type of the base frame provided (for roof curb or pier-mount).

All units will be shipped with an integral base frame designed with the necessary number of lift points for safe installation. All lifting lugs are to be utilized during lift. The lift points will be designed to accept standard rigging devices and be removable after installation. Units shipped in sections will have a minimum of four points of lift.

MIXING SECTION
A mixing section shall be provided to support the damper assembly for outdoor, return, and/or exhaust air.

Dampers
Dampers shall modulate the volume of outdoor, return, or exhaust air. The dampers shall be of double-skin airfoil design with metal, compressible jamb seals and flexible blade-edge seals on all blades. The blades shall rotate on stainless-steel sleeve bearings. The dampers shall be rated for a maximum leakage rate of 3 cfm/ft² at 1 in. w.g. complying with ASHRAE 90.1 maximum damper leakage. All leakage testing and pressure ratings shall be based on AMCA Standard 500-D. Dampers may be arranged in a parallel or opposed-blade configuration.

Inlet Hoods
Inlet hoods are provided on the outside air openings and equipped with high performance moisture eliminators to minimize water carryover from the outside into the unit casing. Eliminators also perform the function of a bird screen to prevent nesting.
Refer to the unit As-Built and Product Data section for specific information on which sections are supplied with inlet hood.

Title 24
The following specifications apply only to units with outside air and return air dampers, with actuators. The 5 year warranty applies only to these items.
This unit contains Economizer that meets or exceeds all mandatory requirements prescribed by Title 24, including but not limited to:
- 5 yr parts only warranty
- Successfully tested to 60,000 Actuations
- Less than 10 cfm/sq.ft. of damper leakage at 1" WG per AMCA 500L

Filters

Mixing sections shall be provided with a filter rack as indicated in the Product Data and As-Built sections of the submittal.

4 inch high efficiency filters constructed with a fine fiber media made into closely spaced pleats shall be provided. The filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filter media shall be sealed into a frame assembled in a rigid manner. The manufacturer shall supply a side access filter rack capable of holding 4 inch high efficiency filters.

The 4 inch high efficiency filters shall have a MERV 11 rating when tested in accordance with the ANSI/ASHRAE Standard 52.2.

Prefilter Type

2-inch pleated media filters made with 100% synthetic fibers that are continuously laminated to a supported steel-wire grid with water repellent adhesive shall be provided. Filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filters shall have a MERV 8 rating when tested in accordance with the ANSI/ASHRAE Standard 52.2.

FILTER SECTION

A section shall be provided to support the filter rack as indicated throughout the unit. Refer to Product Data and As-Built sections of the submittal for specific locations within each unit.

Primary Filters

4 inch high efficiency filters constructed with a fine fiber media made into closely spaced pleats shall be provided. The filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filter media shall be sealed into a frame assembled in a rigid manner. The manufacturer shall supply a side access filter rack capable of holding 4 inch high efficiency filters.

The 4 inch high efficiency filters shall have a MERV 13 rating when tested in accordance with the ANSI/ASHRAE Standard 52.2.

COIL SECTION WITH FACTORY INSTALLED COIL

The coil section shall be provided complete with coil and coil holding frame. The coils shall be installed such that headers and return bends are enclosed by unit casings. If two or more cooling coils are stacked in the unit, an intermediate drain pan shall be installed between each coil and be of the same material as the primary drain pan. Like the primary drain pan, the intermediate drain pan shall be designed being of sufficient size to collect all condensation produced from the coil and sloped to promote positive drainage to eliminate stagnant water conditions. The intermediate pan shall begin at the leading face of the water-producing device and be of sufficient length extending downstream to prevent condensate from passing through the air stream of the lower coil. Intermediate drain pan shall include downspouts to direct condensate to the primary drain pan. The outlet shall be located at the lowest point of the pan and shall be sufficient diameter to preclude drain pan overflow under any normally expected operating condition.

Coil with Inspection

The coil section shall include an inspection section complete with a double-wall, removable door downstream of the coil for inspection, cleaning, and maintenance. Interior and exterior door panels shall be of the same construction as the interior and exterior wall panels, respectively. All doors shall be provided with a thermal break construction of door panel and door frame.

No casing penetrations supplied for hydronic drain and vents. If required, piping contractor will need to drill drain and vent penetrations using factory located features provided in coil panel.

Refrigerant Cooling Coils

The coils shall have aluminum fins and seamless copper tubes. The fins shall have collars drawn, belled, and firmly bonded to tubes by mechanical expansion of the tubes. Suction and liquid line connections shall extend to the unit exterior. The coil casing may be galvanized or stainless steel. Refer to the Product Data section of the submittal for the coil casing material.
The coils shall be proof-tested to 715 psig and leak-tested to 650 psig air pressure under water or equivalent tracer gas leak test. After testing, the inside of the coils shall be dried, all connections shall be sealed, and the coil shall be shipped with a charge of dry air or nitrogen.
Suction headers and liquid connections shall be constructed of copper tubing with connections penetrating unit casings to permit sweat connections to refrigerant lines. The coils shall have equalizing vertical distributors sized according to the capacities of the coils. Cooling coil performance is certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org. Heating performance for heat pump or condenser mode is not certified.

Refrigerant coil tubes are 1/2" [13mm] OD, 0.016" [0.406mm] thick, internally enhanced copper.

ACCESS/INSPECTION / TURNING SECTION

A section shall be provided to allow additional access/inspection of unit components and space for field-installed components as needed. An access door shall be provided for easy access. All access sections shall be complete with a double-wall, removable door downstream for inspection, cleaning, and maintenance. Interior and exterior door panels shall be of the same construction as the interior and exterior wall panels, respectively. All doors downstream of cooling coils shall be provided with a thermal break construction of door panel and door frame.

DIRECT-DRIVE PLENUM FAN SECTION

The fan type shall be provided as required for stable operation and optimum energy efficiency. The fan shall be a single-width, single-inlet, multiblade-type direct-drive plenum fan. Motor bearing life of the direct-drive plenum fan shall be not less than L-10 250,000 hrs**.** *Refer to the Product Data section for fan quantity and number of blades selected within each unit*. Central Station Air Handling Unit Supply Fans are "Certified by the AHRI Central Station Air-Handling Unit (AHU) Certification Program, based on AHRI Standard 430/431. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org" Central Station Air Handling Unit Supply Fans shall be tested and rated in-accordance with AHRI Standard 260 for sound performance.

Fans that are selected with inverter balancing shall first be dynamically balanced at design RPM. The fans then will be checked in the factory from 25% to 100% of design RPM to insure they are operating within vibration tolerance specifications, and that there are no resonant frequency issues throughout this operating range. Inverter balancing that requires lockout frequencies inputted into a variable frequency drive to in order to bypass resonant frequencies shall not be acceptable. If supplied in this manner by the unit manufacturer, the contractor will be responsible for rebalancing in the field after unit installation. Fans selected with inverter balancing shall have a maintenance free grounding assembly installed on the fan motor to discharge both static and induced shaft currents to ground.

On units supplied with plenum or motorized impeller fans, door guard(s) shall be supplied on the access door(s) to the fan and those downstream access door(s) where unintended access to the plenum or motorized impeller fan could occur. Door guard is intended to deter unauthorized entry and incidental contact with rotating components. *Refer to the Product Data section for fans with access door guard(s)*.

Motor Frame

The motor shall be mounted integral to the isolated fan assembly and furnished by the unit manufacturer. The motor is mounted inside the unit casing on an adjustable base to permit adjustment of drive belt tension (not applicable for direct drive plenum fans). The motor shall meet or exceed all NEMA Standards Publication MG 1 requirements and comply with NEMA Premium efficiency levels when applicable except for fractional horsepower motors which are not covered by the NEMA classification. The motor shall be T-frame, squirrel cage with size, type, and electrical characteristics as shown on the equipment schedule. *Refer to the Product Data section for selected fan motors within each unit.*

Two-Inch Spring Isolators

Direct-drive fan and motor assemblies shall be internally isolated from the unit casing with 2-inch (50.8 mm) deflection spring isolators. The isolation system shall be designed to resist loads produced by external forces, such as earthquakes, and conform to the current IBC seismic requirements.

Combination VFD / Disconnect
A combination Variable Frequency Drive (VFD) / disconnect shall be provided when variable air volume control is required for fan operation. Whether for single fan, dual fan, or fan array applications, a single VFD shall be provide to ensure proper operation and to optimize operating life. Each VFD / disconnect shall be properly sized, factory mounted in a full metal enclosure, wired to the fan motor(s), and commissioned to facilitate temporary heating, cooling, ventilation, and/or timely completion of the project. VFD / disconnects shall include a circuit breaker disconnect with a through-the-door interlocking handle and shall be lockable. The VFD package shall also include:

a) Electronic manual speed control
b) Hand-Off-Auto (H-O-A) selector switch
c) Inlet fuses to provide maximum protection against inlet short circuit
d) Current limited stall prevention
e) Auto restart after momentary power loss
f) Speed search for starting into rotating motor
g) Anti-windmill w/DC injection before start
h) Phase-to-phase short circuit protection
i) Ground fault protection
j) Manual motor protection MMP

Units with factory-mounted controls shall include power wiring from the VFD panel to the control system transformers, binary output on/off wiring, analog output-speed-signal wiring, and all interfacing wiring between the VFD and the direct digital controller.

The VFD shall be UL508C listed and CSA certified and conform to applicable NEMA, ICS, NFPA, & IEC standards.

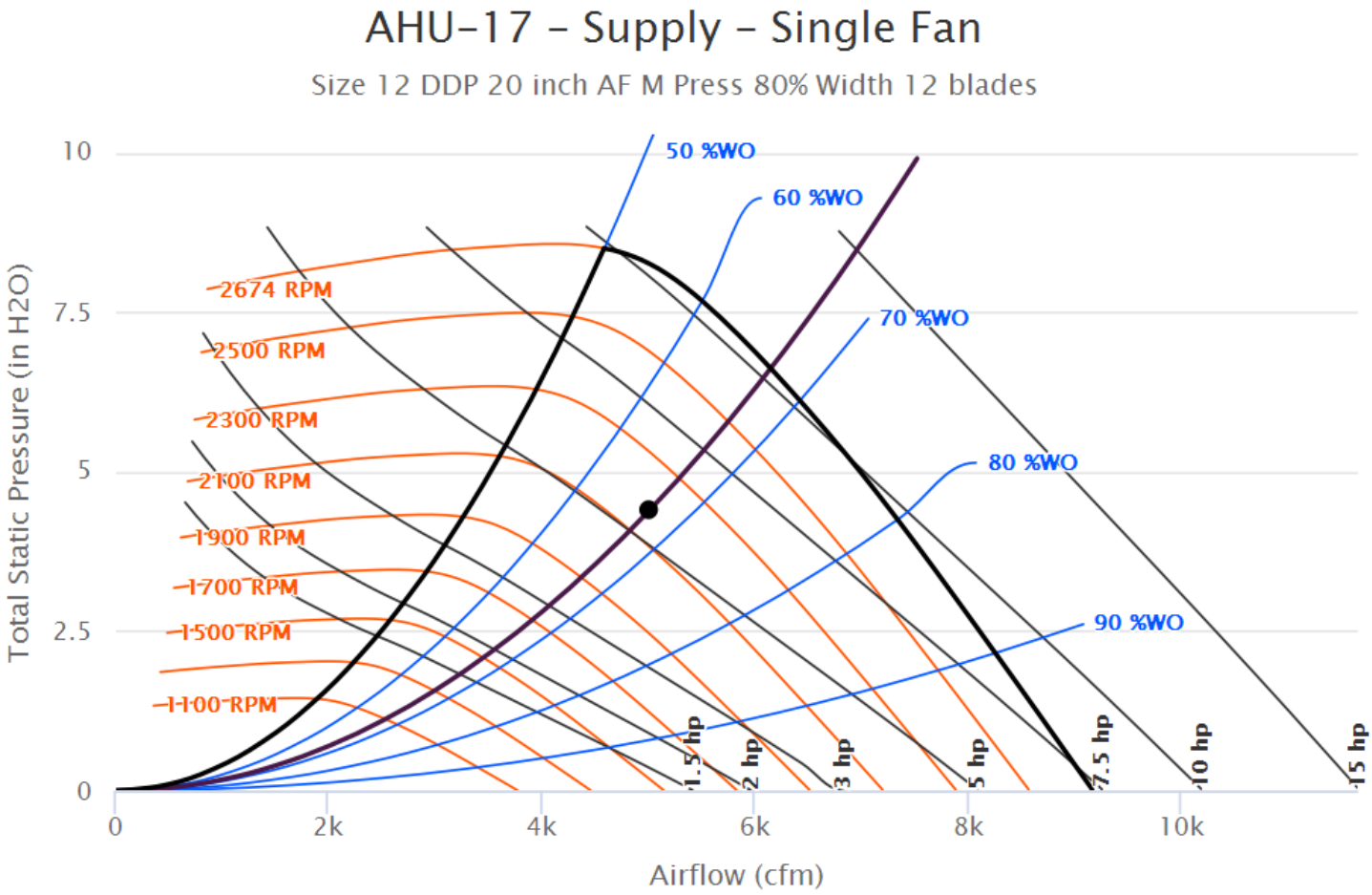
The supply fan's Starter/VFD shall be mounted internal of unit casing in the controls section. The internal enclosure shall be an integral part of the unit casing to allow for thermal venting to casing interior, but shall be accessible from unit exterior through access door. Internally mounted starters shall have doors with the same construction as other doors on unit. An external disconnect shall be mounted through the door to the starter/VFD to disconnect full power from starter/VFD.

DISCHARGE PLENUM SECTION
Plenums shall be provided to efficiently turn air and provide sound attenuation. Discharge plenum opening types and sizes shall be scaled to meet engineering requirements. The vertical discharge plenum height may be scaled to accommodate the appropriate discharge duct height.

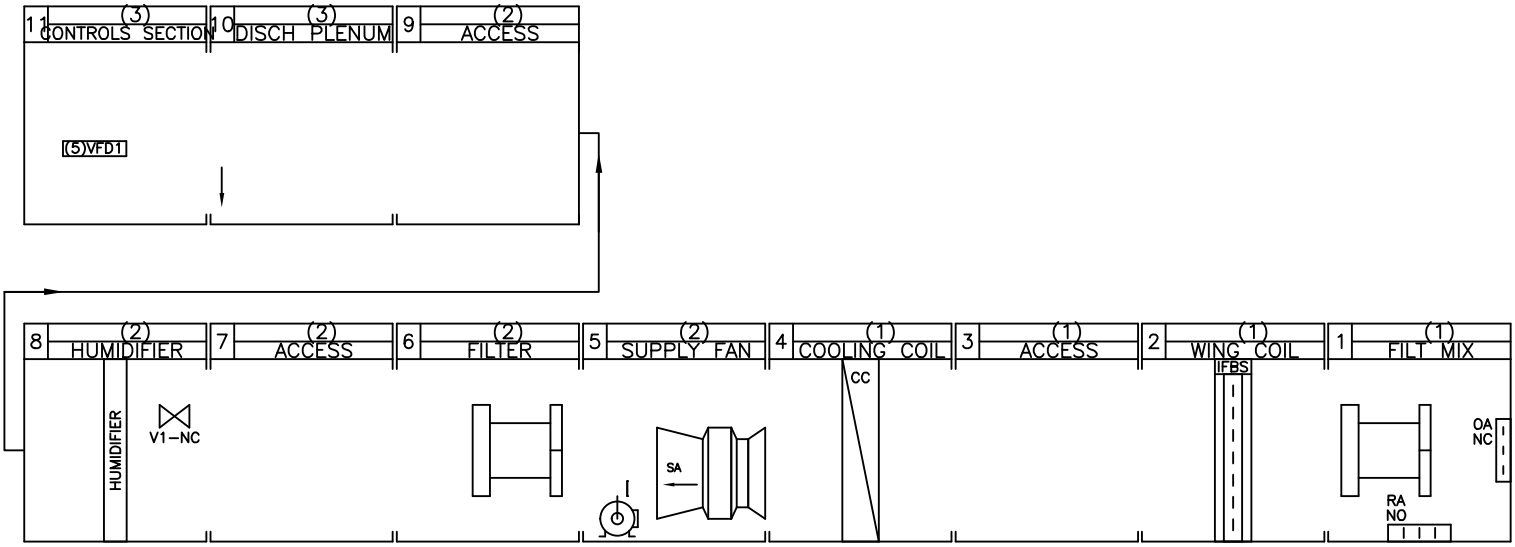
HUMIDIFIER SECTION (Direct Steam)
Humidifier section shall be provided with a humidifier panel designed for building steam. Humidifier panel shall include stainless steel construction of all wetted parts including the integrated header/separator and multiple tube dispersion assembly. Tube-to-header joints shall consist of welded stainless steel. Inlet and outlet connection elbows on the humidifier shall be malleable iron. Humidifier shall provide a uniform steam discharge. Humidifiers shall be provided with a control valve, inverted bucket steam trap, wye strainer, and two float and thermostatic steam traps shipped loose for field installation. All pipe connections shall be made from one side of the air handler.

Fan Details

Unit Size	20TR	**Operating Brake Power**	5.622 hp
Motor Frequency	74.00 Hz	**Altitude**	0.00 ft
Operating Airflow	5,010 cfm	**Design Temp.**	70.00 F
Operating Static Pressure	4.401 in H2O	**Efficiency**	61.84 %
Operating RPM	2,179 rpm		



WIRING DETAIL 1 (OUTDOOR)



DRAWN BY SERVICE ACCOUNT	Trane	
DATE 3/27/2023		CSOA-SCHEMATIC
SOFTWARE VERSION 1.4.0		UNIT SIZE: 12
DRAWING VERSION		UNIT TAG: AHU-17

LEGEND DETAIL 1
(OUTDOOR)

POS#	BUILD GROUP	DESCRIPTION	PT	LABEL	PWR HR-WIRE	SIGNAL HR-WIRE	XFMR	POWER VA
8	2	Valve Control	AO1	V1				
8	2	High limit sensor		HLT1				
11	3	Supply Fan VFD	AO2	VFD1				

DRAWN BY SERVICE ACCOUNT	Trane	
DATE 3/27/2023		CSOA-SCHEMATIC UNIT SIZE: 12 UNIT TAG: AHU-17
SOFTWARE VERSION 1.4.0		
DRAWING VERSION		

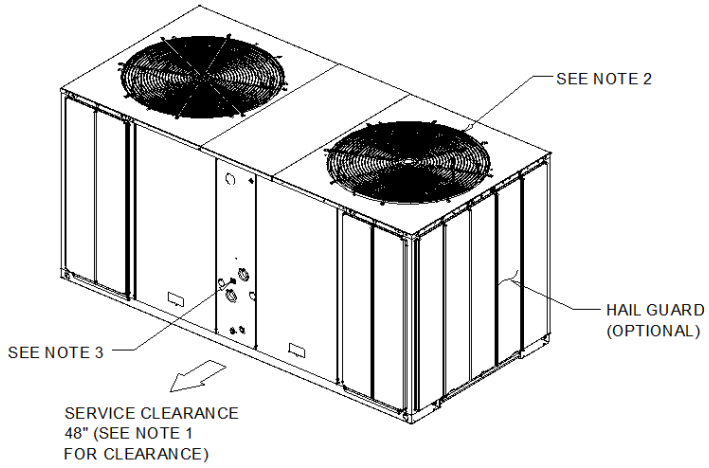
6 - 25 Ton Unitary Split Systems Outdoor

Unit Overview

Model	TTA24044DAA***S0100010000000000000000000
Unit Tonnage	20 Tons
Controls	Symbio (Cooling)
Unit Voltage	460/60/3
Refrigeration Circuit / Stage	Dual Compressors / Dual Circuit
Unit Function	Cooling
Max. Cond. Operating Weight	709.0 lb

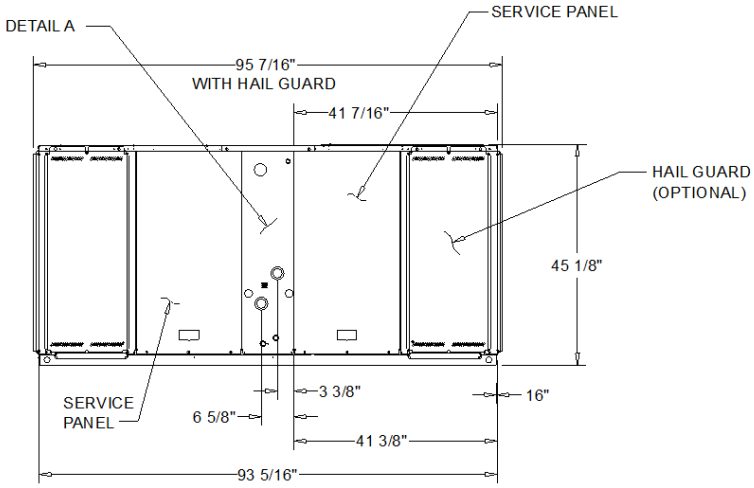
Electrical Information

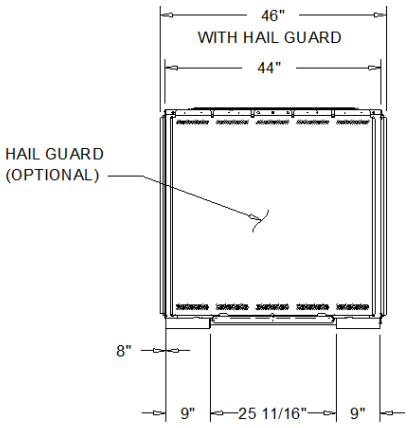
MCA	40.00 A	**Compressor 2 RLA**	14.80 A
MOP	50.00 A	**Cond. Motor 1 FLA**	2.50 A
Compressor 1 RLA	16.50 A	**Cond. Motor 2 FLA**	2.50 A

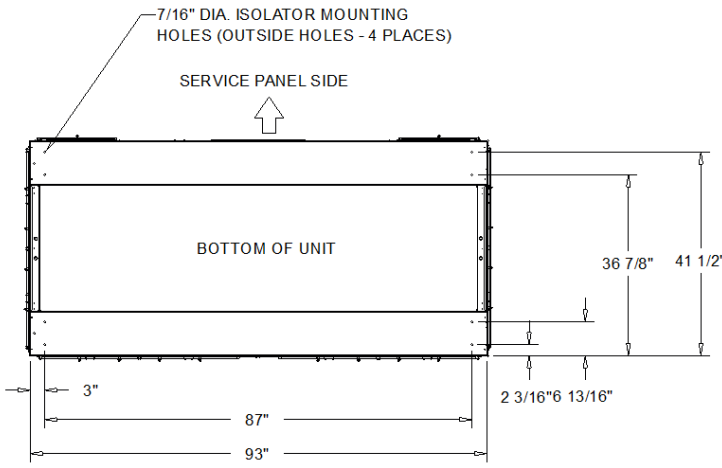


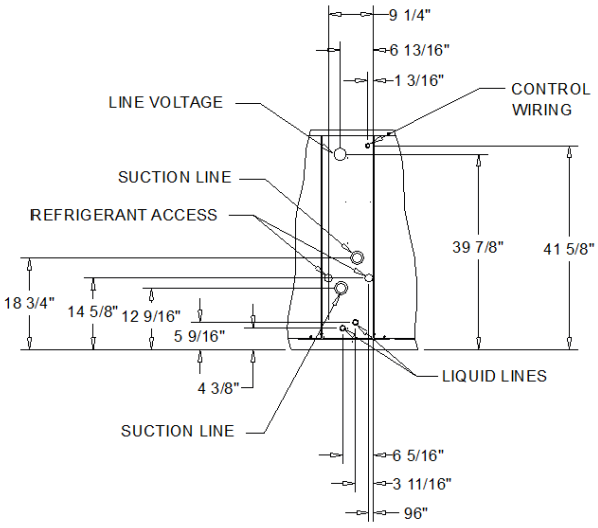
NOTES:
1. MINIMUM CLEARANCE FOR PROPER OPERATION IS 36" FROM WALLS, SHRUBBERY, PRIVACY FENCES ETC. MINIMUM CLEARANCE BETWEEN ADJACENT UNITS IS 72". RECOMMENDED SERVICE CLEARANCE 48"
2. TOP DISCHARGE AREA SHOULD BE UNRESTRICTED FOR 100" MINIMUM. UNIT SHOULD BE PLACED SO ROOF RUN-OFF WATER DOES NOT POUR DIRECTLY ON UNIT
3. OUTDOOR AIR TEMPERATURE SENSOR OPENING (DO NOT BLOCK OPENING)

REFRIGERANT
1. SUCTION CONNECTION (1 3/8" OD) AND LIQUID CONNECTION (1/2" OD)





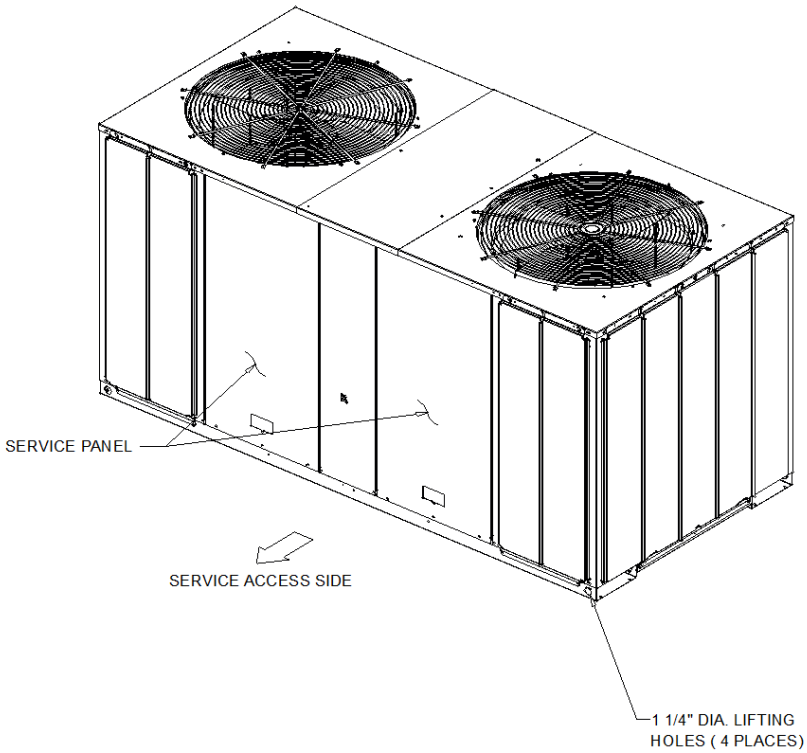


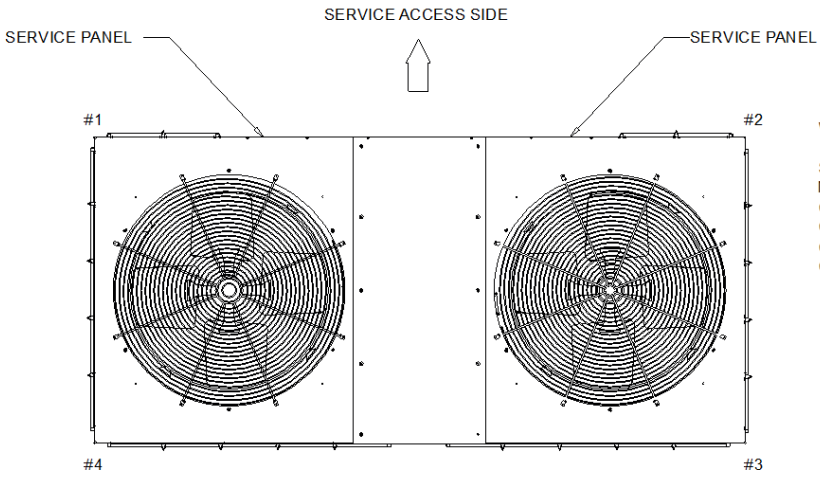


FRONT DETAIL A
DIMENSIONAL DETAIL

15 - 20 TON COOLING CONDENSER (DUAL COMPRESSOR)

DIMENSIONAL DRAWING



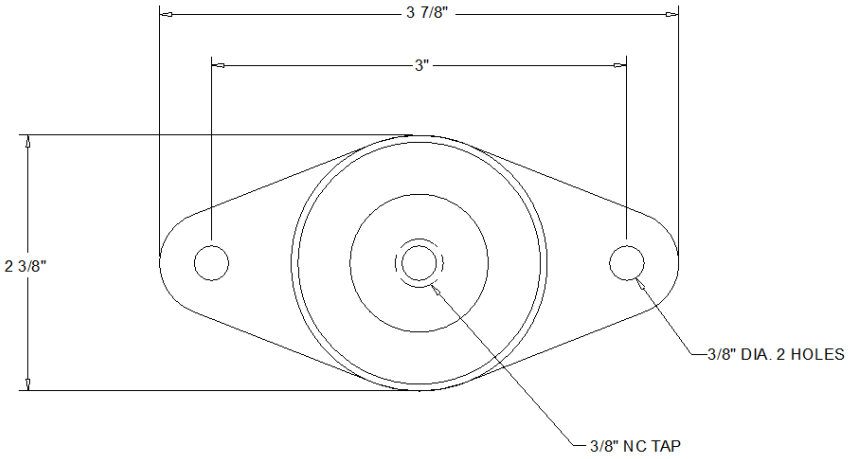


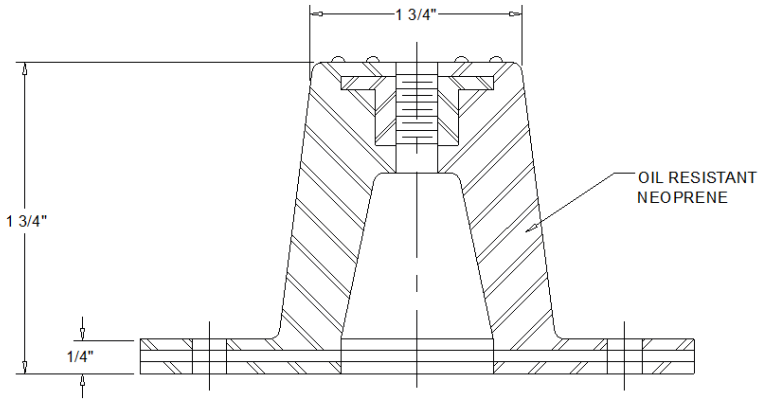
WEIGHTS AND CORNER WEIGHTS

Shipping:
Net
Corner 1:
Corner 2:
Corner 3:
Corner 4:

WEIGHTS AND LOAD POINT LOCATION FOR CONDENSOR

WEIGHT AND RIGGING





NOTE S
1. VERIFY WEIGHT, TYPE, AND ALL DIMENSIONS WITH INSTALLER DOCUMENTS BEFORE INSTALLATION.
2. VERIFY NUMBER OF ISOLATORS AND LOCATION BEFORE INSTALLATION.

RUBBER FLOOR ISOLATOR

BAYISLT004, 005, 009, 010

General - *(TTA)*
- Weatherproofed steel mounting/lifting rails
- Hermetic scroll compressors
- Microchannel condenser coils
- Fans and motors
- Standard operating range 50.0 F-125.0 F (min. 0.0 F with low ambient accessory)
- Nitrogen holding charge
- Certified and rated in accordance with AHRI and DOE standards
- Certified to UL 1995
- Capacities and efficiencies for split systems are rated within the scope of the Air-Conditioning, Heating, & Refrigeration Institute (AHRI)
certification program and display the AHRI Standard 340-360 (I-P) mark. This standard applies to units between 65,000 and 250,000 btu/hr.
- Capacities and efficiencies for split system cooling condensers are rated within the scope of the Air-Conditioning, Heating, & Refrigeration
Institute (AHRI) certification program and display the AHRI Standard 365 (I-P) mark. This standard applies to cooling units between
135,000 and 250,000 btu/hr.

Casing - *TTA*
- Zinc coated, heavy gauge, galvanized steel
- Weather resistant baked enamel finish
- Meets ASTM B117, 672-hour salt spray test
- Removable single side maintenance access panels
- Lifting handles in maintenance access panels
- Unit base provisions for forklift and/or crane lifting

Refrigeration System - Dual Compressor (TTA0724*D, TTA0904*D, TTA1204*D, TTA1504*D, TTA1804*D, TTA2404*D)
- Two (2) separate and independent refrigerant circuits
- Each refrigeration circuit equipped with integral subcooling circuit
- Front or rear refrigerant line connections (TTA180**D/240**D)
- Two (2) direct drive hermetic scroll compressor
- Suction gas-cooled motors w/ ± 10% voltage utilization range of unit nameplate voltage
- Crankcase Heaters
- Internal temperature and current sensitive motor overloads
- Factory installed liquid line filter driers
- Phase loss/reverse rotation monitor
- No compressor suction and/or discharge valves (reduced vibration/sound)
- External high pressure cutout devices
- External low pressure cutout devices
- Evaporator defrost control
- Loss of charge protection (discharge temperature limits)

Condenser Coil (Microchanne) - *(TTA)*
- Microchannel coils burst tested by the manufacturer
- Coils shall be leak tested to ensure the pressure integrity
- Factory pressure and leak tested to 660 psig
- Perforated steel hail guards available (factory installed option or field installed accessory)

Condenser Fan - *(TTA)*
- 26" or 28" propeller fan(s)
- Direct drive
- Statically and dynamically balanced

Controls - *(TTA)*
- Centralized microprocessor
- Indoor and outdoor temperature sensors drive algorithms, making decisions for all heating, cooling, and ventilation
- Integrated anti-short cycle timer
- Integrated time delay between compressors
- Completely internally wired
- Colored and keyed connectors and colored wires
- Contactor pressure lugs or terminal block
- Unit external mounting location for disconnect device
- Single point power entry
- Front or rear electrical connections (TTA 1804*C/D, 2404*C/D, 3004*C only)

Condenser Motor(s) - *(TTA)*
- Permanently lubricated totally enclosed or open construction
- Built-in current and thermal overloads
- Ball or sleeve bearing type

Hail Guards
- Condenser coil protection from hail, vandals, etc.
- Perforated, painted galvanized steel
- Field installed

Phase Monitor/Reversal Protection
Phase monitor shall provide 100% protection for motors and compressors against problems caused by phase loss, phase imbalance, and phase reversal. Phase monitors are equipped with an LED that provides an ON or FAULT indicator. Quick-Access Panels

- Remove a few screws for access to the standardized internal components and wiring.

Service Valves
- Liquid line service valve (with gauge port)
- Suction line service valve (with gauge port)

Vibration Isolators
- Neoprene-in-shear or spring flex choice
- Reduce vibration transmission to building structures, equipment, and adjacent spaces
- Reduce noise transmission to building structures, equipment, and adjacent spaces

Condenser and Air Handler Pairings

Table 3. Model number descriptions

TWE Air Handler with Symbio
Digit 15 — Controls **1** = Constant Volume **C** = 2 Stage Airflow (Electromechanical Condenser Only) **D** = 2 Stage Airflow/Single Zone VAV (Symbio Condenser Only)

TWE Air Handler (pre-Symbio)
Digit 15 — Controls **0** = Constant Volume **A** = 2 Stage Airflow (Electromechanical Condenser Only) **B** = Single Zone VAV (ReliaTel Condenser Only)

Table 4. Condenser and air handler pairing instructions (See document SS-SVN016A-EN)

Condenser (model # digit)	**Air Handler**		**Wiring Reference**	**Instructions**
	Type	**Supply Fan Type (model # digit)**		
Odyssey Electromechanical (Digit 15 = E)	Odyssey Symbio	Constant Volume (Digit 15 = 1)	"Pairing C or 3," p. 10	
		2-Speed Airflow (Digit 15 = C)		
		Single Zone VAV (Digit 15 = D)	"Pairing D," p. 12	Pairing F, D or G require wire harness kit WIR010190 (required) and WIR010185 (optional) to connect Air Handler Relay Board to VFD.
Odyssey ReliaTel (Digit 15 = R)	Odyssey Symbio	Constant Volume (Digit 15 = 1)	"Pairing 4," p. 14	
		2-Speed Airflow (Digit 15 = C)	"Pairing E," p. 16	
		Single Zone VAV (Digit 15 = D)	"Pairing F," p. 16	Pairing F, D or G require wire harness kit WIR010190 (required) and WIR010185 (optional) to connect Air Handler Relay Board to VFD.

Table 4. Condenser and air handler pairing instructions (continued) (See document SS-SVN016A-EN)

Condenser (model # digit)	Air Handler		Wiring Reference	Instructions
	Type	Supply Fan Type (model # digit)		
Odyssey Symbio (Digit 15 = S)	Odyssey Symbio	Constant Volume (Digit 15 = 1)	"Pairing A," p. 18	Install a shielded, twisted pair cable if the Air Handler has Electric Heat and/or requires Single Zone VAV operation (Trane IMC communication)
		2-Speed Airflow (Digit 15 = C)	"Pairing H," p. 20	Pairing G, H, and 2 will not have heat in defrost. Pairing G, H, and 2; electric heat will not operate if zone sensor installed, only with a thermostat Install a shielded, twisted pair cable if the Air Handler has Electric Heat and/or requires Single Zone VAV operation (Trane IMC communication)
		Single Zone VAV (Digit 15 = D)	"Pairing B," p. 18	Install a shielded, twisted pair cable if the Air Handler has Electric Heat and/or requires Single Zone VAV operation (Trane IMC communication) Install a shielded, twisted pair cable for Symbio Condenser control of the Air Handler supply fan VFD (Modbus communication)
	Odyssey Electromechanical	Constant Volume (Digit 15 = 0)	"Pairing 1 or 2," p. 22	Pairing G, H, and 2 will not have heat in defrost. Pairing G, H, and 2; electric heat will not operate if zone sensor installed, only with a thermostat.
		2-Speed Airflow (Digit 15 = A)		
	Odyssey ReliaTel	Variable Speed, Single Zone VAV (Digit 15 = B)	"Pairing G (preferred)," p. 24	Pairing G, H, and 2 will not have heat in defrost. Pairing G, H, and 2; electric heat will not operate if zone sensor installed, only with a thermostat. Install a shielded, twisted pair cable for Symbio Condenser control of the Air Handler supply fan VFD (Modbus communication)
			"Pairing G (optional)," p. 27	Pairing G, H, and 2; electric heat will not operate if zone sensor installed, only with a thermostat. Pairing F, D or G require wire harness kit WIR010190 (required) and WIR010185 (optional) to connect Air Handler Relay Board to VFD. This pairing requires the replacement of the RTOM module with a Symbio Relay Board (MOD03105) and that the VFD wires 81B, 82B, 93B, 94B and 94D be replaced with wire harness kit WIR010190 (required) and WIR010185 (optional). The Air Handler will operate as a 2-speed fan.
	Generic Air Handler	Constant Volume	"Pairing Y," p. 29	
Two Symbio Condensers (2 condensers to 1 air handler)	Odyssey Electromechanical		"Pairing Z," p. 30	

SE SERIES

Steam Exchange Humidifiers

Humidification and Evaporative Cooling

condair

hospitals
educational facilities
government buildings
institutional buildings
printing plants
museums and galleries
commercial offices

Humidifiers designed to deliver reliable humidity from facility steam boilers.

People spend 90% of their lives indoors, therefore the importance of correct temperature and humidity levels are critical to personal health and comfort. Too much humidity can be as destructive as too little.

Manufacturing and industrial processes are also directly affected by the indoor environment. Like people, machines work better in favorable surroundings. All equipment and processes respond in various ways to temperature and humidity fluctuations. For maximum performance, reliable temperature and humidity are essential.

In hospitals, universities, museums, galleries, and other facilities, boiler steam humidification is a tried and true way to achieve reliable humidity control.

SE-Series steam to steam heat exchange humidifiers use central facility steam as an energy source to boil potable, reverse osmosis, or deionized water. The result is clean, hygienic humidification steam, completely free of boiler chemicals and amines.

SE outdoor model

Technology

SE-Series steam exchange humidifiers generate, clean, atmospheric steam using facility boiler steam as an energy source. Boiler steam passes through high-quality 316 stainless steel heat exchangers, turning fresh water into steam. This technique prevents chemical boiler treatments from being dispersed into the building air supply.

The SE-Series is a complete packaged humidifier and includes all required components, most of which are contained within the cabinetry. The humidifier is designed for easy installation, reliable operation, and rapid maintenance. Available capacities range from 50-1050 lbs/hr (23 to 475 kg/hr), when supplied with facility steam pressure at a maximum of 15 psi (1 bar).

- 2 models available: premium SETC and rugged outdoor SETC
- Capacities up to 1050 lbs/hr (475 kg/hr)
- "Total Controller" with backlit display
- Automatic scale management based on steam production
- All components suitable for RO, DI or potable water
- Built-in drain water cooling
- Fully modulating down to 15% of capacity
- Built-in float & thermostatic steam trap(s) and P-trap
- Fully insulated tank for efficient operation
- Pre-cleaning sequence for easier and faster maintenance
- Includes valve, actuator and strainer
- Building management system compatible

Features	
Complete cabinetry with insulation	■
Side and top maintenance access (most capacities)	■
Stainless steel flat-surface heat exchanger	■
Valve, actuator, wye strainer included	■
Built-in float & thermostatic steam trap(s)	■
Built-in drain water cooler	■
Precise water level indication system	■
Fully modulating down to 15% of total capacity	■
Modulating demand signal acceptance	■
Transducer signal acceptance	■
Single or dual modulation	■
LED unit status indicators	■
Dry contacts for remote fault indication	■
3-day drain with no call for humidity	■
Full tank blow down capability via time of day, timer, or signal from BMS	■
Automatic blow down cycles based on steam production	■
Backlit LCD display and keypad	■
On-screen unit status	■
Self-diagnostic capabilities	■
Fault and maintenance history	■
Onscreen troubleshooting guide	■
Networking capability up to 10 units	■
Low and high relative humidity alarms	■
Time to next maintenance alarm	■
Keep warm feature	■
Water saving smart drain water cooling	■
Pre-cleaning sequence	■
Freeze protection	■
Floor stand	■
Links-Series Building Management System	■

■ Standard ■ Optional

SPECIFICATION	SE 050	SE 100	SE 175	SE 250	SE 375	SE 525	SE 750	SE 1050
Pressure range - psig (kPa)	5-15 (35-105)							
Max. capacities (at 15 psi steam pressure) - lbs/hr (kg/hr)	50 (23)	100 (45)	175 (79)	250 (114)	375 (170)	525 (240)	750 (340)	1050 (476)
Physical data - Width x Height x Depth	25.6" x 20.6" x 18.4" 65.1cm x 52.4cm x 46.7cm	46.4" x 32.0"x 20.0" 117.8cm x 81.4cm x 50.8cm		46.4" x 32.0"x 26.4" 117.8cm x 81.4cm x 67.1cm		46.4" x 32.0"x 42.0" 117.8cm x 81.4cm x 106.7cm		46.4" x 32.0" x 58.0" 117.8cm x 81.4cm x 147.3cm
Standard actuator	Electric Modulating 0-10 VDC, 24 VAC							
Built-in steam trap	Float & Thermostatic							
Insulation & Cabinetry	Standard							
Voltage/Phase	110-120/1							
Full load amps	2.1							
Internal Smart Drain Water Cooler	Standard							
Steam Outlets (s) - OD	1 x 1.75" (1 x 4.44cm)		1 x 3" (1 x 7.62cm)			1 x 4" (1 x 10.16cm)	2 x 4" (2 x 10.16cm)	

Options

Keep Warm Feature	no	yes
Freeze Protection	no	yes
Outdoor Model	no	yes
Floor Stand	yes	

Options

Links-Series

BP-Series
AS-Series
AM-Series

Links-Series offers monitoring and control allowing humidifier(s) to communicate to your Building Management System (BMS). The controller is factory installed and is located internally to the humidifier. Simply specify at time of order what operating protocol you are using – BACnet, LonWorks or Johnson N2.

ISO 9001

As a leading manufacturer of commercial/industrial humidification systems for more than 70 years, Condair has the technology and application expertise to meet the needs of any application.

Contact us today and ensure you have the best humidification solution for your application.

USA 1860 Renaissance Boulevard, Sturtevant, WI 53177
826 Proctor Avenue, Ogdensburg, NY 13669
Canada 2740 Fenton Road, Ottawa, Ontario K1T 3T7
Tel 1.866.667.8321 **Fax** 613.822.7964 **Email** na.info@condair.com

Important:

- **The instructions in both this manual and the SE Series Installation manual must be followed for installation and operation of the SE Outdoor Humidifier.**
- **Read and save these instructions. This guide to be left with equipment.**

Nortec SETC Outdoor

Supplemental Installation and Spare Parts Manual

Includes additional installation information, wiring diagram, and spare parts lists for your outdoor SETC B+ steam exchange humidifier.

condair

2552939-C | 23/11/2018

Thank you for choosing Condair.

INSTALLATION DATE (MM/DD/YYYY)

MODEL #
SERIAL #

Proprietary Notice

Liability Notice

Copyright Notice

Contents

Note:
This manual is a supplement to the Nortec SE Series Installation and Operation Manual. It contains only additional information required to install the Nortec SETC Outdoor.

For information on Start Up, Operation, Maintenance and Servicing refer to the Nortec SE Series Installation and Operation Manual

Introduction

CAUTION: Servicing

- Disconnect main power before any servicing.
- Shut off pressurized steam supply and ensure steam pressure is safely relieved before any servicing of pressurized steam components.
- The electrical compartment contains high voltage components and wiring. Access should be limited to authorized personnel only.
- During and following operation of the humidifier, the steam and components in contact with the steam such as the tank, blower pack, steam lines, steam distributors, and condensate lines can become hot and can burn if touched.
- Condair does not accept any liability for installations of humidity equipment installed by unqualified personnel or the use of parts/components/equipment that are not authorized or approved by Condair.

CAUTION: Electrical

- All electrical work should be done according to local electrical code.
- Electrical connection to be performed by a licensed electrician.

CAUTION: Plumbing / Steam Lines

- Plumbing to be performed by a licensed plumber.
- Pressurized steam line installation to be performed by a qualified installer.
- Drain water from humidifier can be very hot. Do not drain to public sink.
- All plumbing and pressurized steam supply line work should be done according to local plumbing code.

CAUTION: Installation

- **Internal heaters will not keep the Nortec SETC from freezing in cold climates. They are intended to maintain electronics at a minimum operating temperature for cold weather startup.**
- **Keep warm and freeze protection must be installed and configured for climates where there is any risk of temperature falling below 32°F (0°C).**
- The Nortec SETC/P produces steam at atmospheric pressure no devices which could block steam output should be connected to the steam outlet.
- Steam output lines must be installed so that no restriction can produce backpressure in the humidifier.
- Regardless of selecting On/Off or modulating control method, Condair humidifiers must have a closed circuit across its On/Off security loop control terminal to operate. Condair highly recommends the use of a high limit humidistat and an air proving switch in series for this function.
- Unit damage caused by water quality outside of the specified ranges is not covered under warranty.

Receiving and Unpacking

1. Check packing slip to ensure ALL material has been delivered.
2. All material shortages are to be reported to Condair within 48 hours from receipt of goods. Condair assumes no responsibility for any material shortages beyond this period.

Note: A steam valve, actuator, and wye strainer are shipped along with the SETC/P humidifier but in separate small boxes.

3. Inspect shipment for damage and note damages on shipping waybill accordingly.
4. After unpacking, inspect equipment for damage and if damage is found, notify the shipper promptly.
5. All Condair products are shipped on an FOB factory basis. Any and all damage, breakage or loss claims are to be made directly to the shipping company.

Before Installation

1. Ensure that available voltage and phase corresponds with humidifier voltage and phase as indicated on humidifier's specification label.
2. If steam supply is from a Medium or High Pressure boiler ensure supply steam line includes a relief valve to prevent supply pressure from exceeding 15 psig.
3. Ensure means for returning boiler steam condensate to boiler at atmospheric pressure are available.
4. Ensure sufficient clearances will be available as described in Location 9.
5. Ensure steam lines can be routed to distributor, Nortec SAM-e manifold, or blower pack as described in Steam Lines and Condensate Returns on page 15.
6. Report any discrepancy immediately to the site engineer.

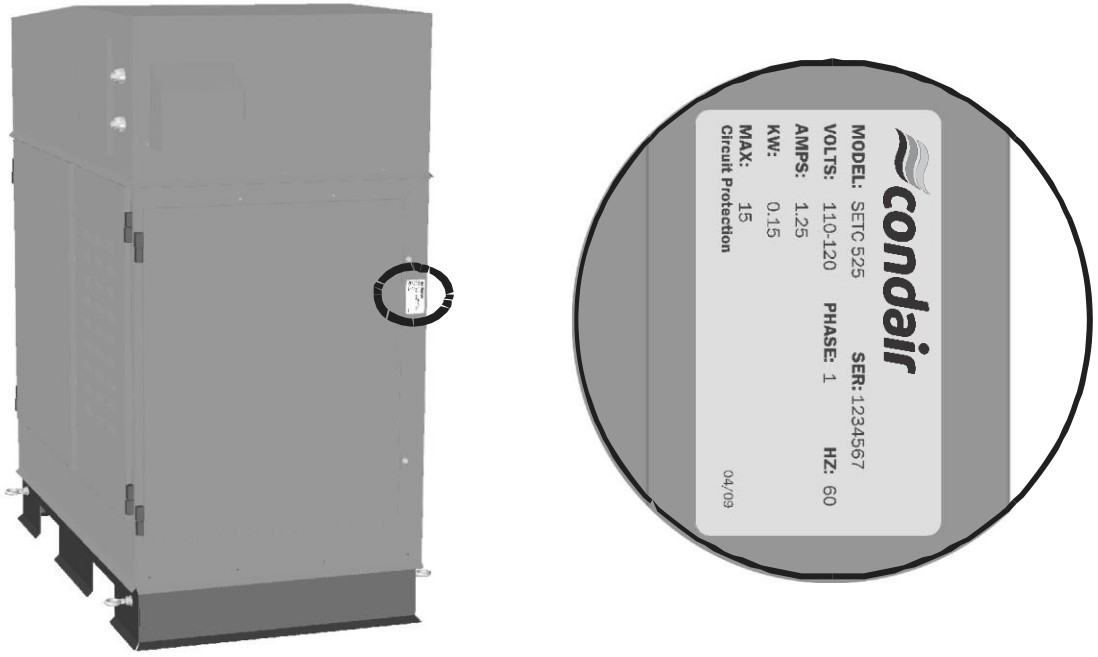


Figure 1: Nortec SETC Outdoor Specification Label Location

Nortec SETC Outdoor Specific Components

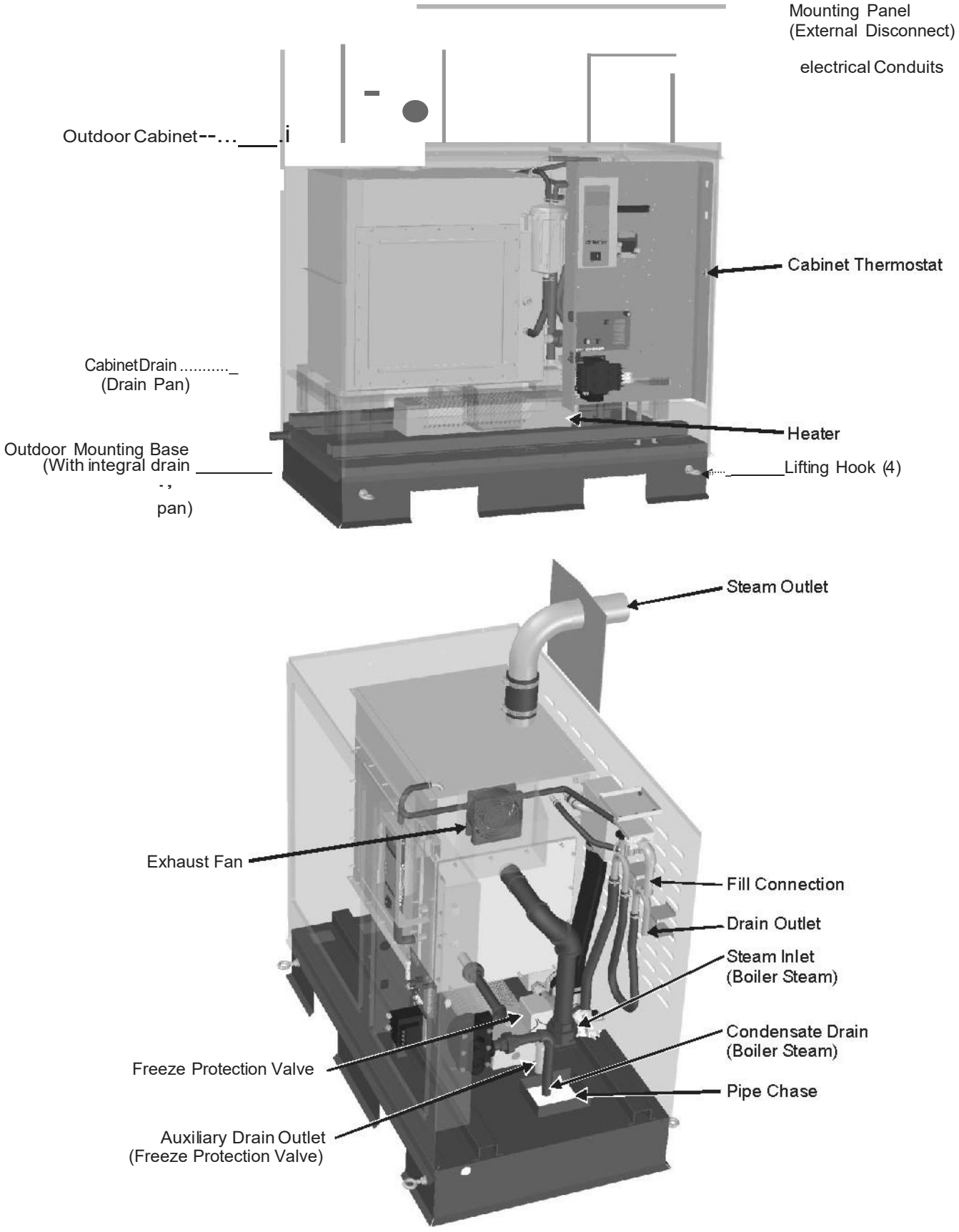


Figure2: Nortec SETC Outdoor Humidifier Components

Description of Nortec SETC Outdoor Specific Components

Note: See Humidifier Components on page 3 of the Nortec SE Series Installation manual for a description of other Nortec SE components.

Table 1: SETC Outdoor Humidifier Components

Component	Function of Component
Auxiliary Drain Outlet	Drains water from tank in case of pump failure or in case of fault or power failure if freeze protection valve is installed.
Cabinet Drain	Drain outlet for integrated cabinet drain pan (outdoor unit only). Drain to rooftop.
Cabinet Thermostat	Sensor that activates the heaters if the cabinet temperature is too cold for the electronics (will not prevent the tank and water components from freezing).
Condensate Drain	Drains condensate formed from boiler steam in the heat exchanger(s). (routed to pipe chase).
Drain Outlet	Drain port used for draining water from the humidifier tank.
Electrical Conduits	Two sealed conduits which provide a way for bringing electrical power routed up through the pipe chase to an external disconnect.
Exhaust Fan	Cooling fan which is activated if the electrical cabinet gets too hot.
Fill Connection	1/2 in. NPT connection to the humidifier fill valve.
Freeze Protection Valve	A normally open valve part of the freeze protection package. It allows the tank to drain in case of power failure or in case of a fault when humidifier operation cannot keep the humidifier warm enough to prevent freezing.
Heater	Electrical cabinet heater used to keep electronics warm enough for operation and cold weather start up only.
Lifting Hooks	Hooks provided for lifting the humidifier.
Mounting Panel	A panel provided on the outside of the humidifier for mounting a dedicated external disconnect.
Outdoor Cabinet	An enclosure that provides protection from precipitation and allows the Nortec SETC to be installed outdoors.
Outdoor Mounting Base	An integrated support for the humidifier which includes a drain pan (outdoor unit only), a pipe chase, and a means for curb mounting the humidifier.
Pipe Chase	An opening in the outdoor cabinet's drain pan which is used for routing electrical power, controls, boiler steam, boiler condensate, fill water, and drain water through the base of the humidifier.
Steam Inlet	Connection for boiler steam, it is connected to the heat exchangers.
Steam Outlet	Outlet for steam produced by the humidifier. Connect to steam line with steam hose.

Nortec SETC Outdoor Models

The Nortec SETC Outdoor with its Total Controller and state-of-the-art features and options is the most advanced outdoor steam exchange humidifier available. The Nortec SETC Outdoor is available in capacities ranging from 100 lb/hr (45 kg/hr) to 1050 lb/hr (475 kg/hr). The Nortec SETC Outdoor humidifiers are packaged in four different cabinets depending on their capacity. Figure 3: Nortec SETC/P Models shows the configuration and relative size of the five different cabinets. Table 3 provides specifications for the Nortec SETC/P product line.

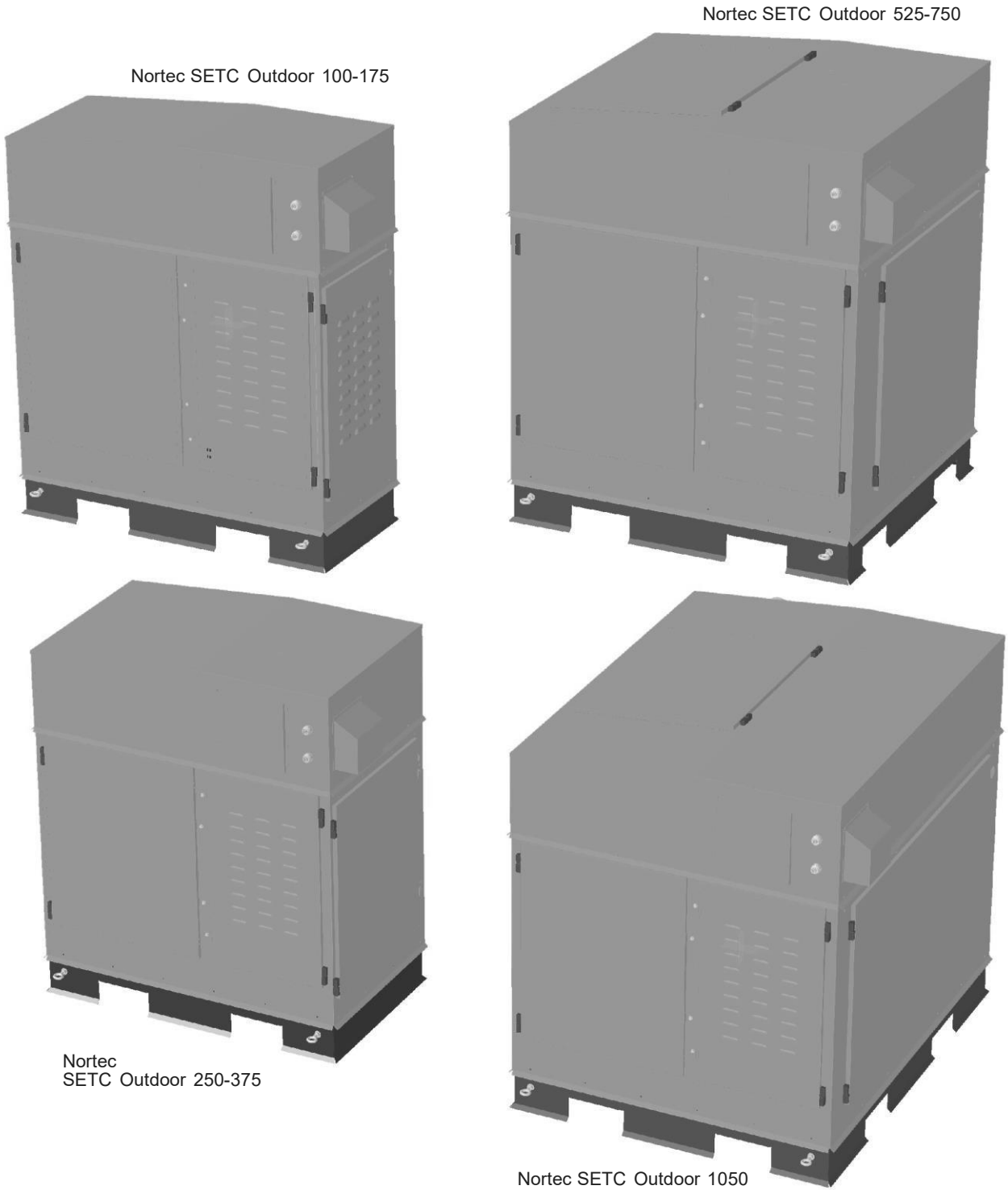


Figure 3: Nortec SETC Outdoor Models

The Nortec SE 50, 100, 175, 250, and 375 all have a single heat exchanger. The Nortec SE 525 and 750 have two heat exchangers. The Nortec SE 1050 has three heat exchangers. All models have a single pressurized steam inlet and condensate drain with internal manifold connecting separate heat exchangers if they are present.

Indoor Model

The Nortec SE is available in two indoor models, the Nortec SETC with total controller and a base Nortec SEP model. The Nortec SE Series Installation and Operation Manual provides complete information for installing and operating Nortec SE Series Indoor humidifiers.

Options and Accessories

Condair provides a complete line of options and accessories for every humidification application. The following options and accessories are available and may have been delivered with your Nortec SETC Outdoor humidifier. Refer to the installation instructions that came with the accessories for their proper installation and operation.

Table 2: Options and Accessories

Option / Accessory	Used For
Freeze Protection Package	Emptying the tank in case of fault or power failure to prevent freezing. (Factory installed)
Steam Distributors	Adding steam into air ducts
Remote Blower Pack	Adding steam into a space remote from the humidifier.
SAM-e Steam Distribution Manifold	Adding steam into air ducts where short absorption is required.
Digital or Analog Control Humidistats	Controlling the output of the humidifier based on sensed RH (can be mounted in the space being humidified or in the duct).
Digital RH Transducers	Communicating RH in a space or duct to the humidifier
Digital or Analog High Limit Humidistats	Preventing over humidification in a duct by shutting down or throttling down the humidifier when duct RH gets high.
Air Proving Switches	Insuring humidification only occurs when air is moving in a duct.
Links II (Nortec SETC Only)	Connecting the humidifier to a building management interface. hardware allows control of the humidifier via BACnet, Lonworks, Johnson N2, or Modbus.
Online (Nortec SETC Only)	User and factory monitoring and configuration of the humidifier via the internet.

Table 3: Nortec SETC Outdoor Specifications

Model	Part No	Net/Full Weight lb (kg)	Amps A	Power KW	Max. Disconnect A	Voltage and Phase
100	2550081	267/423 (121/192)	5.4	0.65	15	Voltage 110-120 Phase 1
175	2550082		5.4	0.65	15	
250	2550083	355/599 (161/272)	5.4	0.65	15	
375	2550084		5.4	0.65	15	
525	2550085	529/992 (240/450)	9.6	1.15	15	
750	2550086		9.6	1.15	15	
1050	2550088	703/1384 (318/628)	13.8	1.65	20	

Note: See Table 3: Nortec SETC/P Specifications and Table 4: Nortec SETC/P Capacities and Water Consumption on page 7 of Nortec SE Series Installation manual for remaining specifications

Installation

Typical Nortec SETC Outdoor Installation

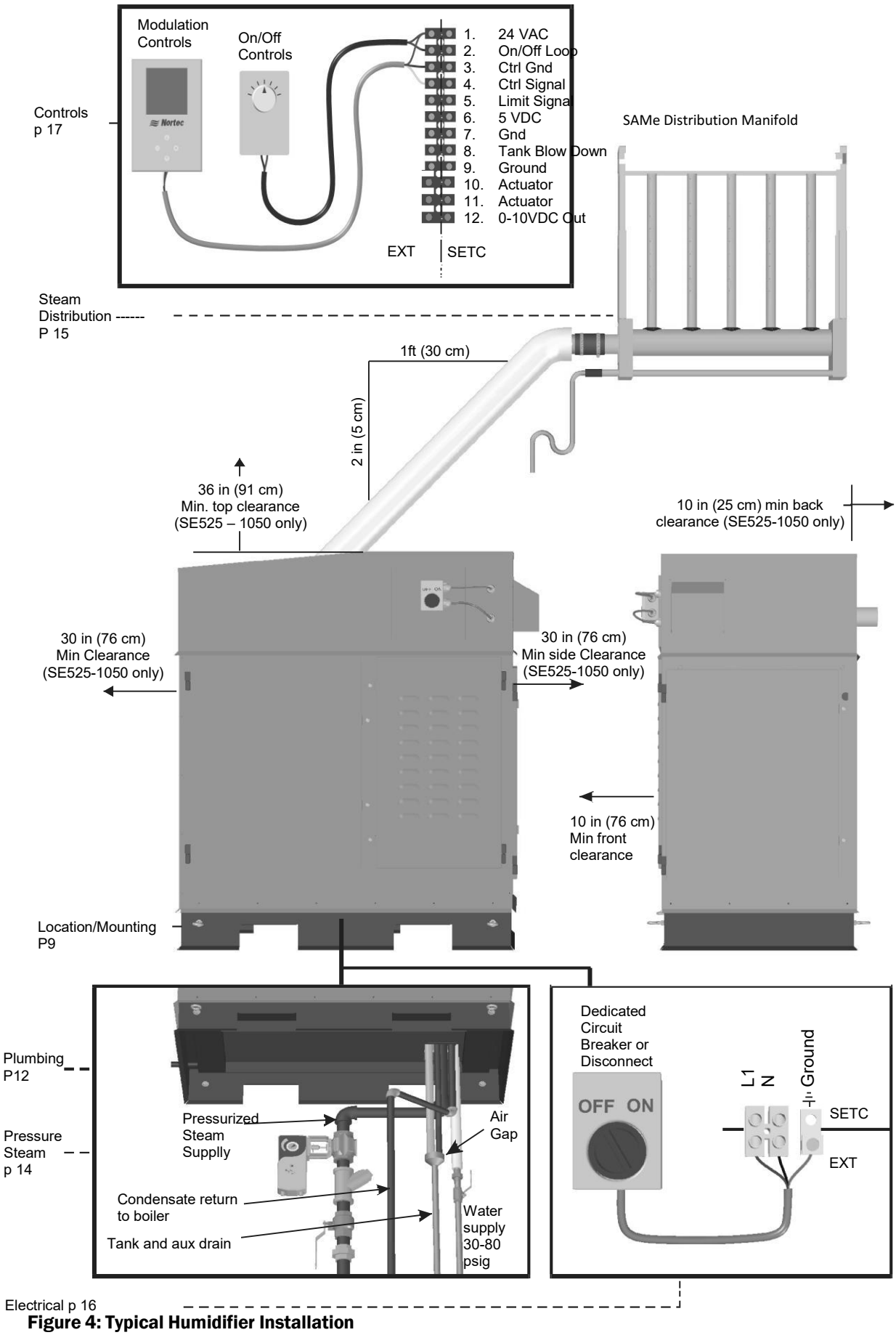
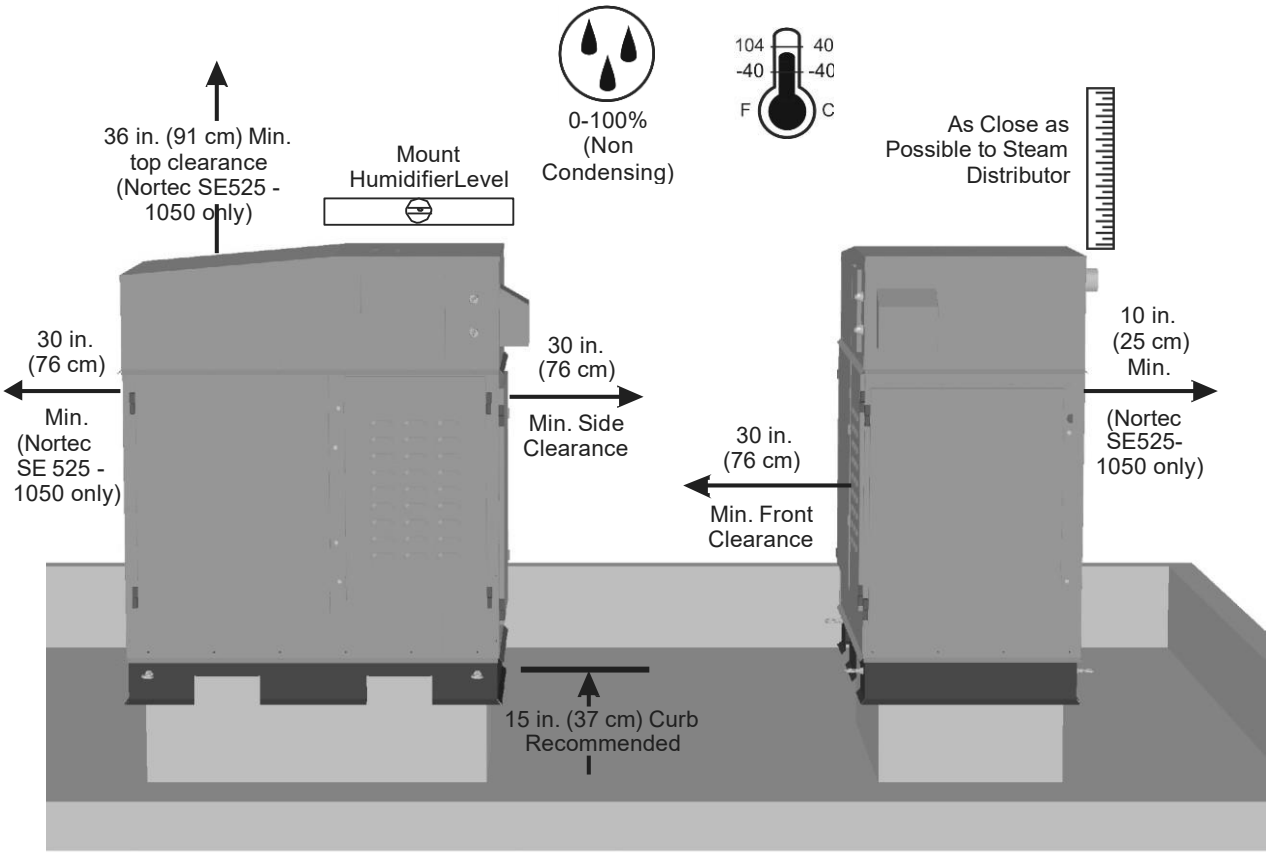


Figure 4: Typical Humidifier Installation

Location

The Nortec SETC Series Outdoor Models are designed to be rooftop mounted on a roof curb (by others). When properly installed the outdoor enclosure will provide protection from rain, wind, and snow in areas with ambient temperature –40 to 104 °F (-40 to 40 °C) and relative humidity 0 - 100% (non condensing). All models include a ventilation package to prevent overheating in warm months, and a freeze protection package to prevent freezing in cold months.

- Refer to Figure 5: Installation Location / Clearance for minimum clearance requirements and to Table 3: Nortec SETC Outdoor Specifications for minimum structural requirements. Ensure mounting surface is strong enough to support the full weight of the humidifier and accessories.
- The Nortec SETC Outdoor is designed to be mounted on a roof curb. Use pipe chase in enclosure base for routing of services to the humidifier from below. See Figure 6: Nortec SETC Outdoor Roof Curb and Table 4: Nortec SETC Roof Curb Depth (Dimension A) for roof curb dimensions and pipe chase location..
- Install in location where electrical power, boiler steam, and drain can be connected to the humidifier.
- DO NOT locate the humidifier any further then absolutely necessary from the steam distributor location as net output will be reduced as a result of heat loss through the steam line.
- Clearance dimensions shown are for reference only and are the minimum required for maintenance of the humidifier. Consult local and national codes before final location and installation. Condair does not accept responsibility for installation code violations.



- Seal building after plumbing to ensure that building pressure remains as intended.
- Avoid installing the humidifier in an area where building exhaust may enter the cabinet through ventilation louvers. A minimum clearance of 10ft (3m) from mechanical exhaust outlets is recommended.
- Install so that ventilation louvers are not obstructed and cannot be blocked by accumulation of ice and snow.

Caution: When installing the Nortec SETC Outdoor in conditions where freezing temperatures may occur ensure that freeze protection guidelines are followed. See Freeze Protecting Water Supply on page 13.

Note:

- Cut-outs in the base of the unit are designed to allow lifting with a forklift.
- Four removable lugs on the base are provided to allow the humidifier to be craned into position. Protect the cabinet from cable/strap/chain damage while lifting.

SETC Outdoor Curb

The base of the Nortec SETC includes a drain pan with a pipe chase to route water, drain, boiler steam, boiler steam condensate, control wiring, and primary power wiring. The roof curb should be designed to support the base and allow services to be routed to the humidifier through the pipe chase.

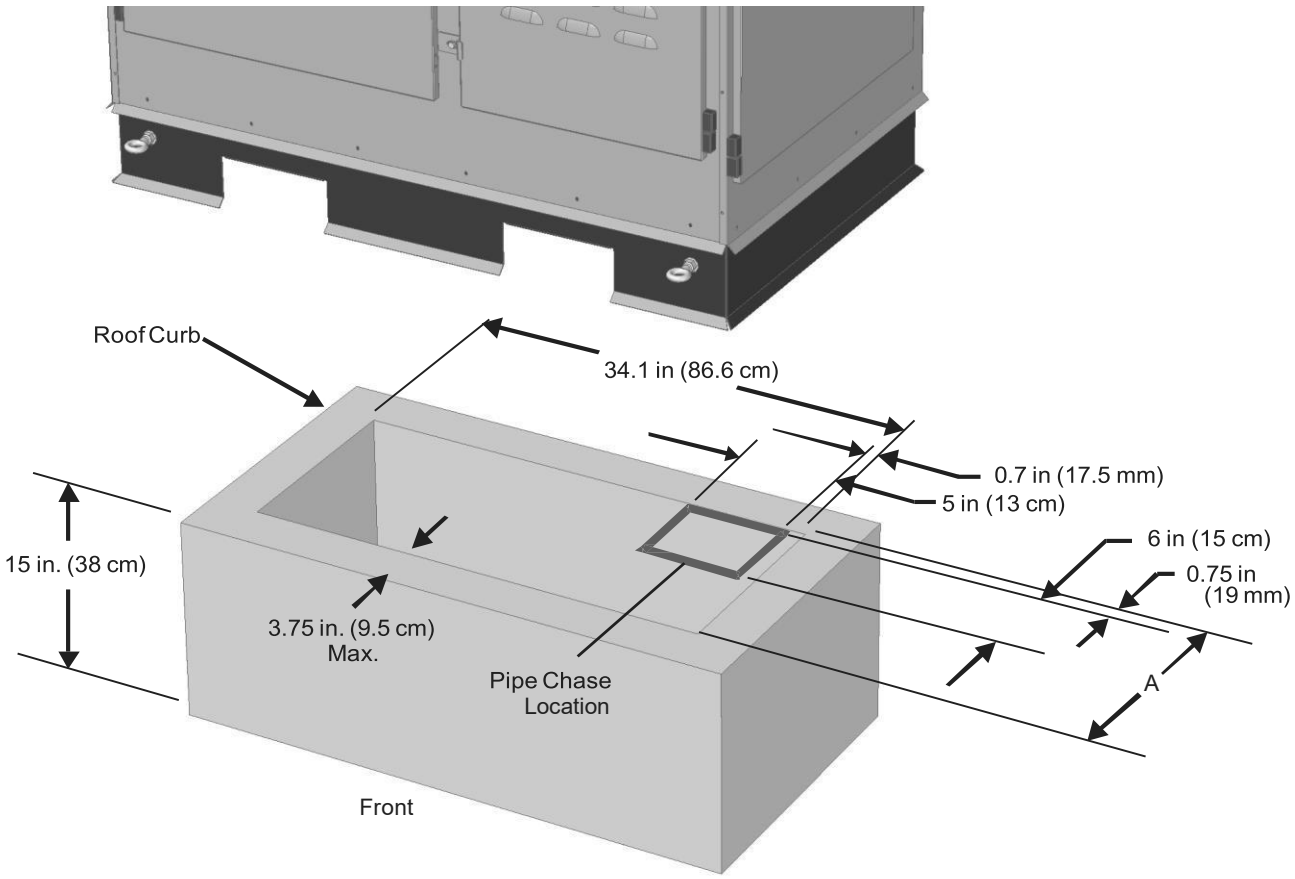


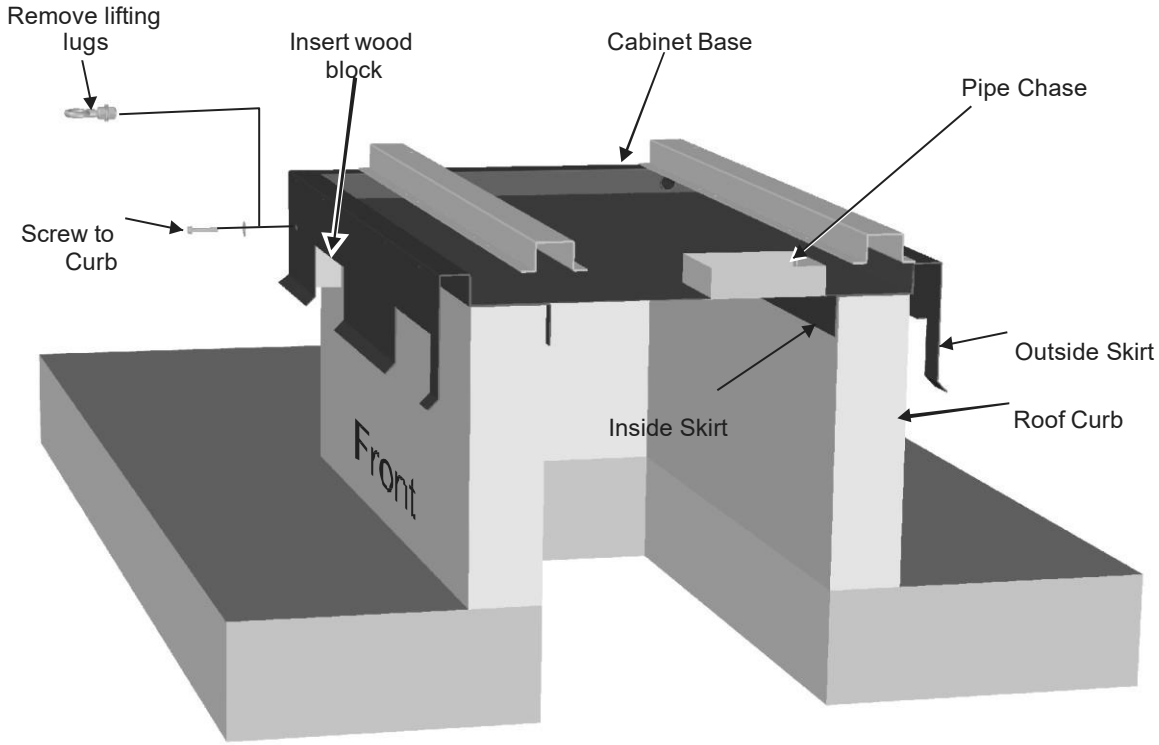
Figure 6: Nortec SETC Outdoor Roof Curb

Table 4: Nortec SETC Roof Curb Depth (Dimension A)

Model	A (Inside Curb Depth) In (cm)
100	8.6 (28 cm)
175	8.6 (28 cm)
250	15 (38 cm)
375	15 (38 cm)
525	30.6 (78 cm)
750	30.6 (78 cm)
1050	46.3 (118 cm)

Installing on the Curb

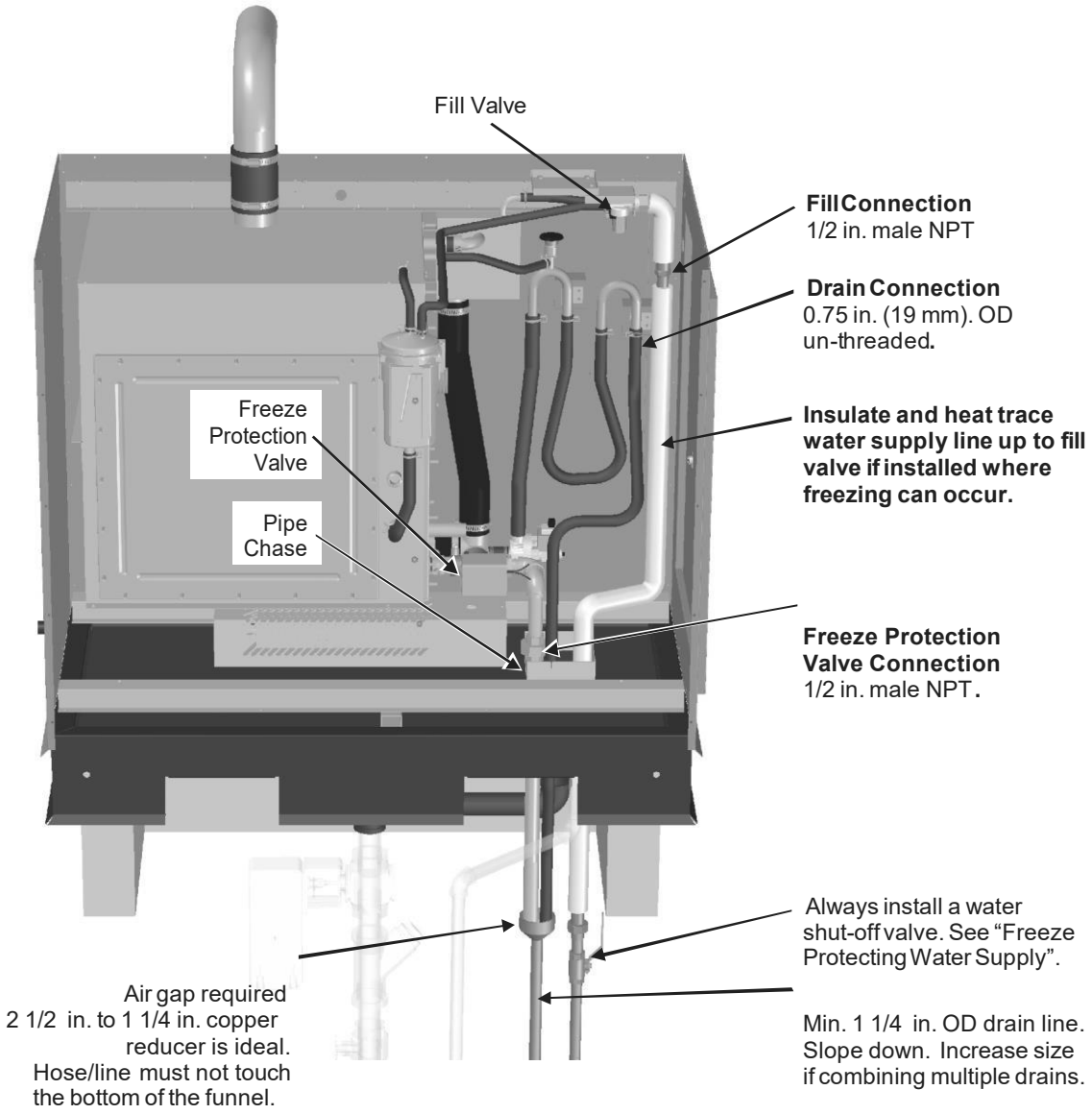
- If desired sealing material such as caulking or a gasket can be laid on the top of the curb prior to lifting the Nortec SETC into place.
- Use the removable lugs installed in the base of the humidifier to lift it into place. Ensure that the cable/chain/straps used for lifting do not come into contact with and damage the cabinet. The inside skirt of the base must fit inside the roof curb.
- To secure the Nortec SETC in place remove the four lifting lugs and insert shims or blocks to fill any gap between the outside skirt of the base and the curb. Drive screws through the four holes to secure the unit to the curb.
- If the building is positively or negatively pressured the pipe chase opening or the roof curb opening should be closed around the piping to prevent the building drawing cold air in or exhausting warm air out through the Nortec SETC cabinet.



Cross section of curb and cabinet base from right side

Figure 7: Installing on the Curb

Plumbing



*Pipe, unions, insulation, heat trace, and water shut-off valve not supplied by Condair.

Figure 8: Nortec SETC Outdoor Water Supply and Drain Connection

Caution:

- See Plumbing on page 14 of Nortec SE Series Installation Manual for additional plumbing requirements. This Information provided only to show routing and location of plumbing connections on Nortec SETC outdoor model.
- When installing the Nortec SETC Outdoor in conditions where freezing temperatures may occur follow instructions in Freeze Protecting Water Supply on page 13 to prevent damage in case of power failure or humidifier fault.
- **Internal heaters will not keep the Nortec SETC from freezing in cold climates. They are intended to maintain electronics at a minimum operating temperature for cold weather startup.**

Note: The freeze protection valve is normally open and will drain the tank whenever the hum turned off or faults. Close manual shut off valve while troubleshooting.

Freeze Protecting Water Supply

Caution:.

When installing the Nortec SETC Outdoor in condition where the temperature may drop below 0ºC (32 ºF) always follow these guidelines to protect the water supply line from freezing. A frozen and burst water line can cause serious damage to property.

- Heat trace and insulate the water supply line all the way up to the fill valve.
- In case of power shut off or power failure the water supply line will not be protected from freezing by the heat trace. Water trapped in the supply line may freeze and cause damage. Install the valve system outlined below to shut off water inside the building and drain any water in the supply line. Valves, fittings, insulation and heat trace shown are not supplied by Condair.

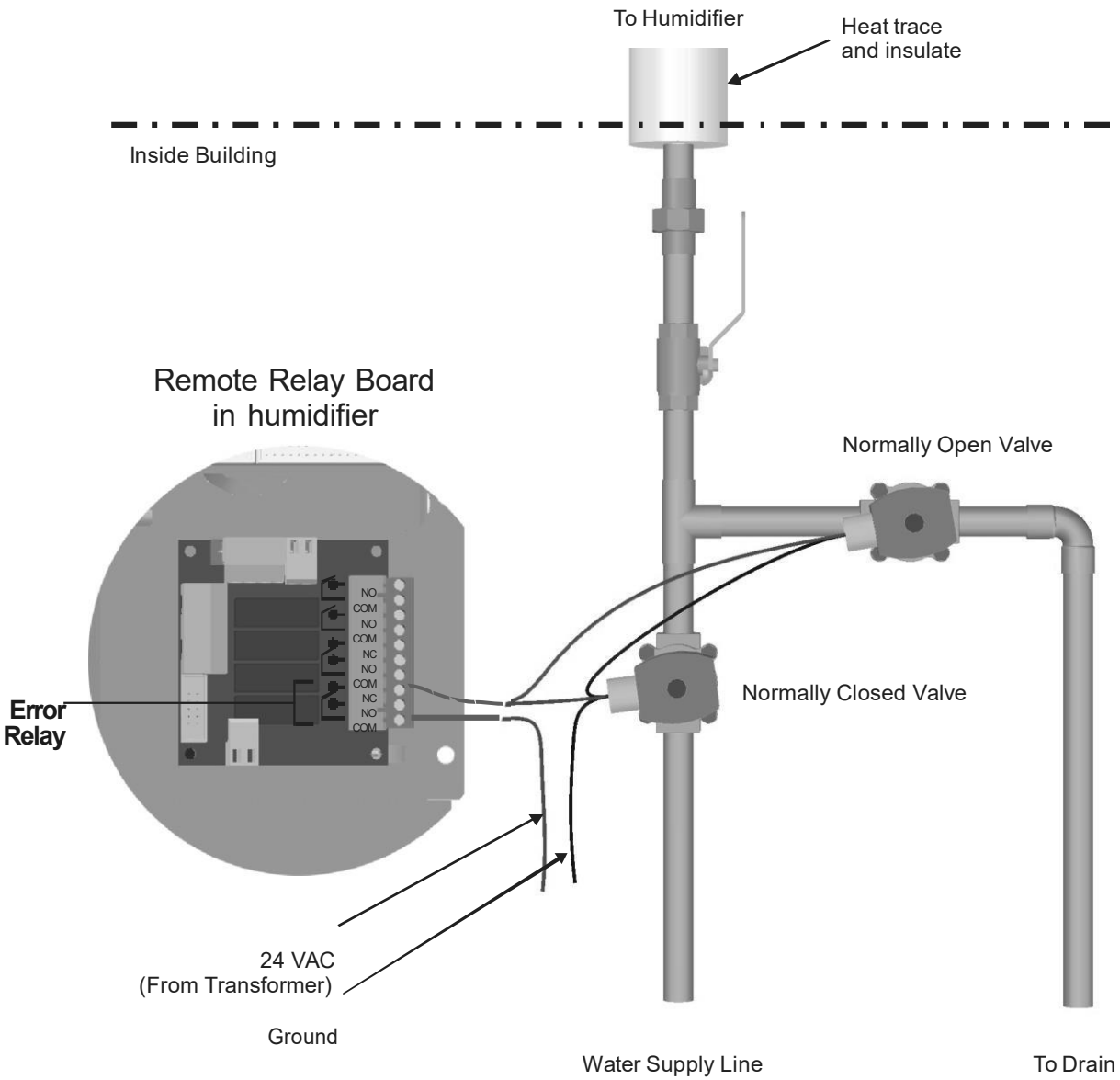


Figure 9: Freeze Protecting Water Supply

Boiler Steam and Boiler Condensate Return

Caution:

See Boiler Steam and Boiler Condensate Return on page 15 of SE Series Installation Manual for additional steam line installation requirements. This information provided only to show routing and location of connections on Nortec SETC Outdoor model.

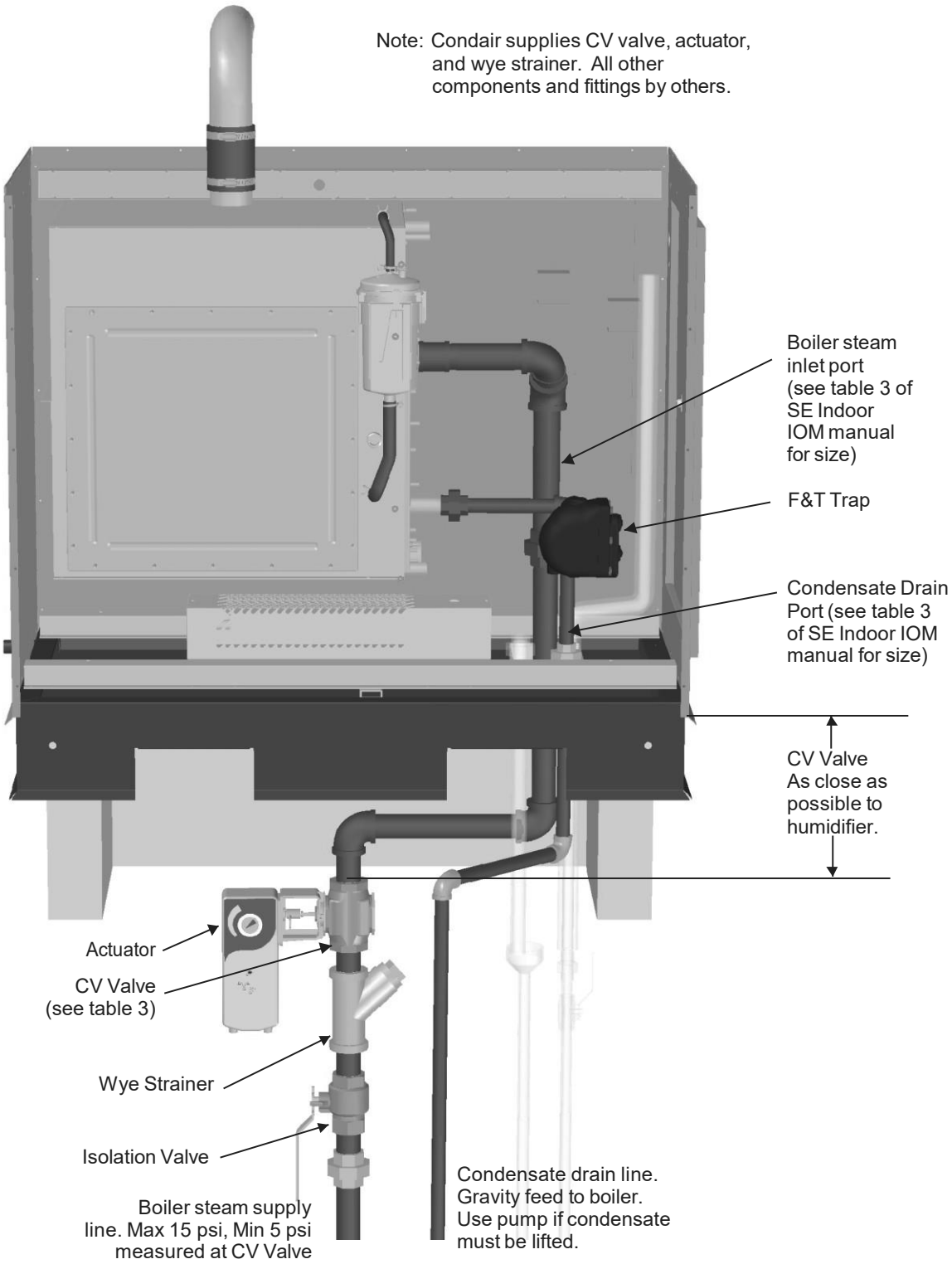


Figure 10: Nortec SETC Outdoor Boiler Steam and Condensate Connection

Steam Lines and Condensate Returns

With the following exceptions the Nortec SETC Outdoor steam lines and condensate returns should be installed as shown in the Nortec SE Series Installation Manual. The size of the outlets and the number of outlets is given in Table 5: Recommended Steam Line Material on page 17 of the Nortec SE Series Installation Manual.

- The Steam outlet(s) of the Nortec SETC Outdoor is from the back of the humidifier and does not require 12 in. (30 cm) of vertical steam run immediately after the humidifier. The steam line may be routed directly down or horizontally from the outlet. See Figure 11: Nortec SETC Outdoor Steam Outlet.
- The Nortec SETC Outdoor steam line must be insulated in all cases even for very short runs.

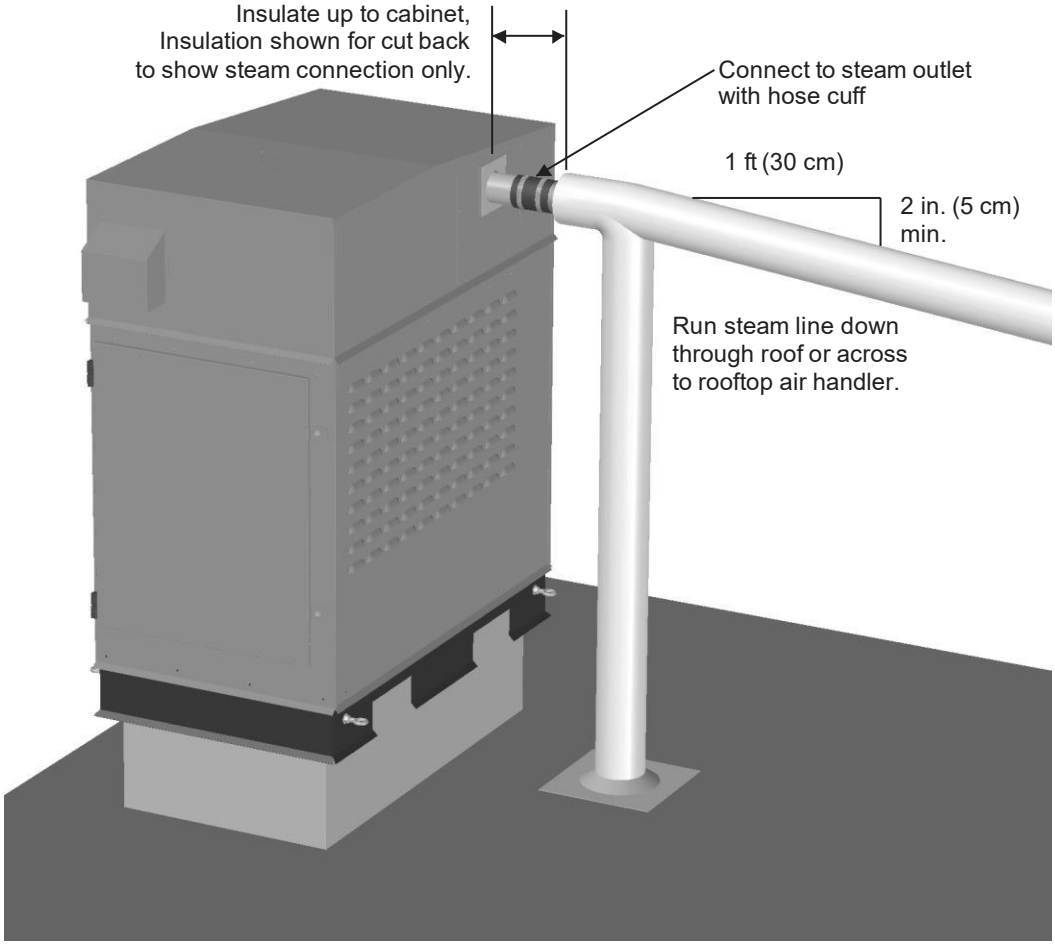
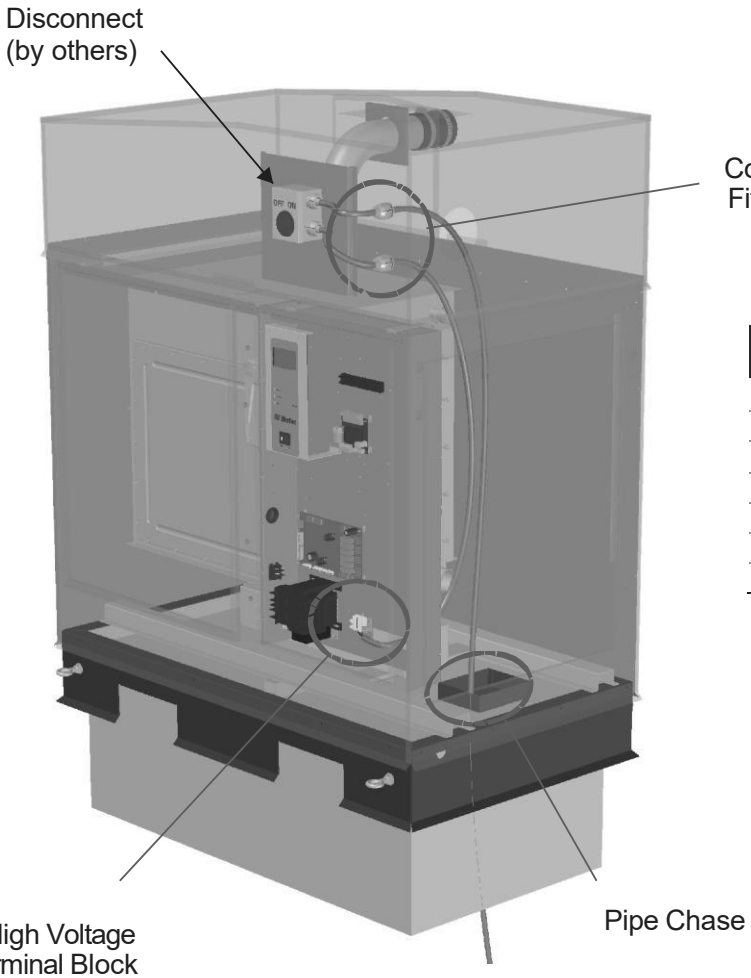


Figure 11: Nortec SETC Outdoor Steam Outlet

Electrical

Caution:

- Wiring to be performed by a licensed Electrician.
- All SE humidifiers operate on 120 VAC, single phase, 60 HZ power. Refer to specification label for power requirements.



SETC Outdoor Power and Disconnect

Nortec Model	Power (kW)	Disconnect (A)
SETC OD 100	0.65	15
SETC OD 175		
SETC OD 250		
SETC OD 375		
SETC OD 525	1.15	
SETC OD 750		
SETC OD 1050	1.65	20

Note:

1. Dedicated external fused disconnect must be installed. Fusing must not exceed max circuit protection as indicated on the specification label.
2. Ensure that adequate power is available to carry full humidifier amp draw as indicated on the specification label.
3. Primary power may be routed up through pipe chase and conduit fittings or from roof top source.
4. All wiring to be in accordance with national and local electrical codes.

Nortec SETC Outdoor Primary Power Wiring

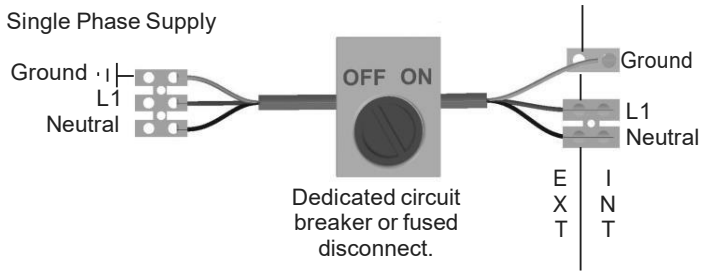


Figure 12: Primary Power Connection

External Controls

The control wiring of the Nortec SETC Outdoor is identical to the Nortec SE Indoor with the exception that the wiring from controls must be routed to the humidifier's control terminal strip through the pipe chase. See External Controls on page 23 of the Nortec SE Series Installation manual for full information on connecting external controls to the Nortec SETC Outdoor.

Optional Outdoor Temperature Reset

The outdoor temperature reset should be used in cold climates where there is risk of condensation forming on external walls, windows, and trim. The Temperature reset function is part of all Condair Digital controls and should be installed as described in Optional Outdoor Temperature Reset on page 28 of the Nortec SE Series Installation Manual.

CV Valve Actuator Wiring

Wire the CV valve actuator as described in CV Valve Actuator Wiring on page 29 of the Nortec SE Series Installation Manual.

Remote Relay Board Wiring

Wire the remote relay board as described in Remote Relay Board Wiring on page 30 of the Nortec SE Series Installation Manual.

Staged Modulation Wiring

Wire the humidifiers as described in Staged Modulation Wiring (Nortec SETC Only) on page 31of the Nortec SE Series Installation Manual.

Options and Accessories

Note:

For installation of options and accessories follow the instructions that are provided with them.

Remote Blower Pack

Remote blower packs can be installed with the Nortec SE Outdoor for applications where steam for humidification must be introduced directly into the space being humidified. For instructions on installing the remote blower pack refer to the installation instructions supplied with it. The steam line and condensate return instructions provided in this and the Nortec SE Series Installation Manual are also applicable to remote mounted blower packs.

The blower packs include a safety relay which should be used to prevent the humidifier from operating if the blower packs do not have power. Wire humidifier security loop in series through all blower packs and other On/Off controls.

Drain Water Cooling (External)

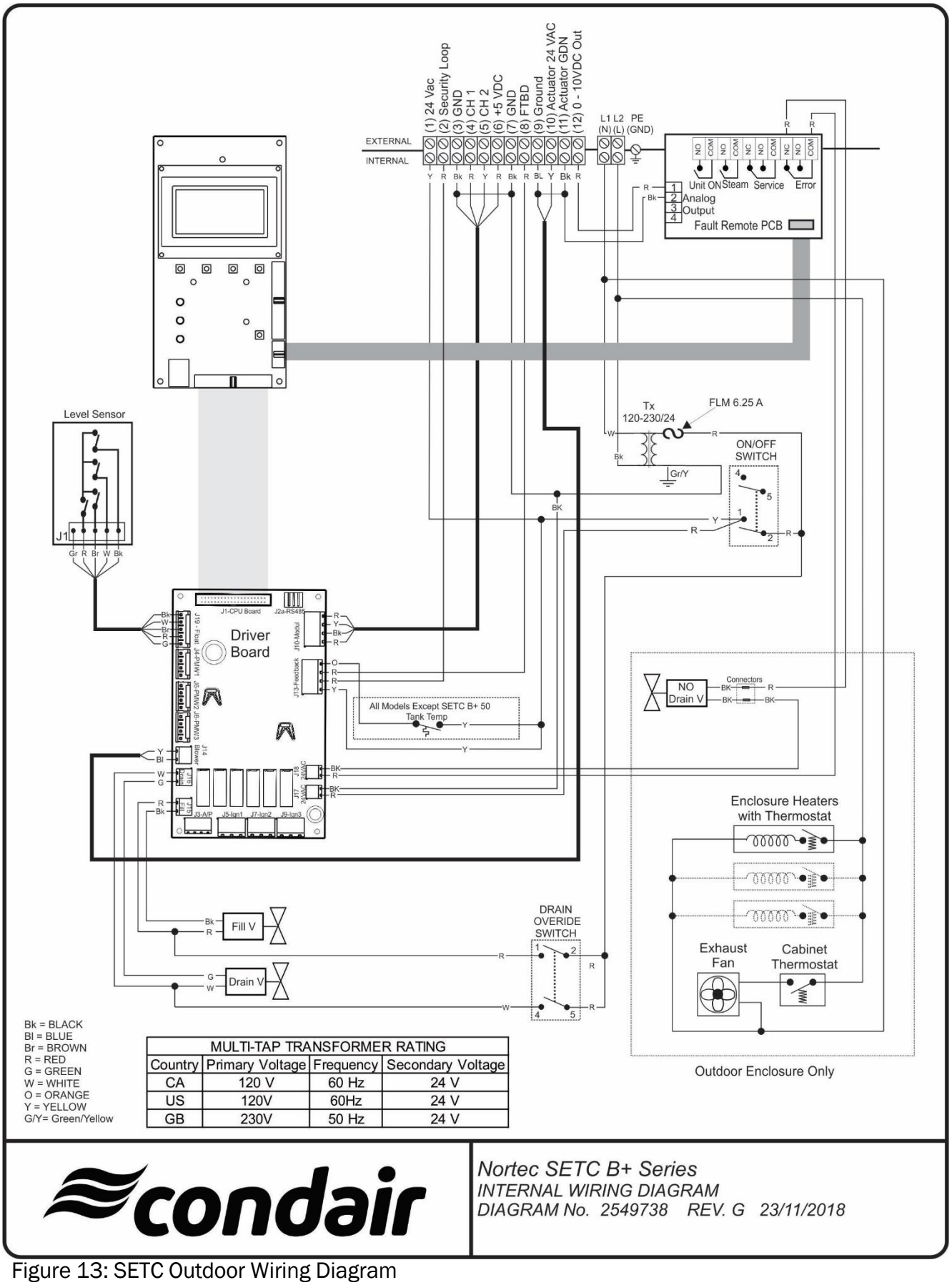
Pneumatic and electric drain water coolers are available from Condair for installation outside the humidifier or on condensate drains from steam traps, distributors, and SAM-e headers. If condensate cannot be routed back to the humidifier tank via the humidifier's fill cup then an external drain water cooler may be required to meet regulations restricting the temperature of hot water that can be fed to drain. The external drain water cooler is only available for field installation.

Troubleshooting

20 Nortec SETC Outdoor Wiring Diagram

For all other troubleshooting see chapter on troubleshooting in the Nortec SE Series Installation Manual.

SETC Outdoor Wiring Diagram



MULTI-TAP TRANSFORMER RATING			
Country	Primary Voltage	Frequency	Secondary Voltage
CA	120 V	60 Hz	24 V
US	120V	60Hz	24 V
GB	230V	50 Hz	24 V

condair

Nortec SETC B+ Series
INTERNAL WIRING DIAGRAM
DIAGRAM No. 2549738 REV. G 23/11/2018

Figure 13: SETC Outdoor Wiring Diagram

Spare Parts

Distributor Spare Parts

Figure 14: Distributor Exploded View and Spare Parts

Nortec SETC Outdoor Plumbing Parts

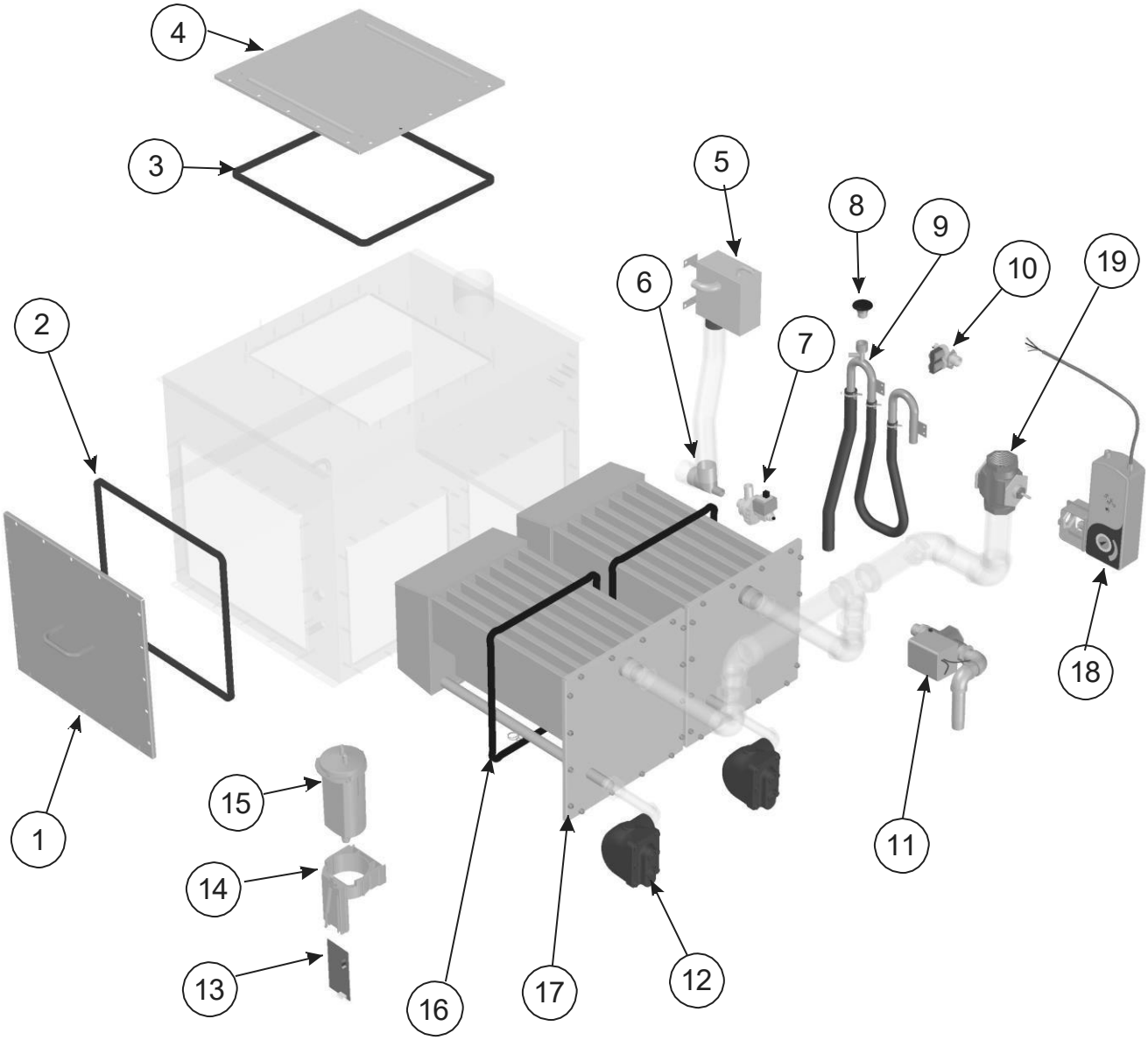


Figure 15: Nortec SETC 100-1050 Plumbing Parts

Table 5: Nortec SETC B+ Outdoor Plumbing Parts List

Item	Description	Part No.	100	175	250	375	525	750	1050
1	Cover Plate Assy.	2544439	1	1	1	1	1	1	1
2	O-ring, Clean Out Port	2524361	1	1	1	1	1	1	1
3	O-ring, Clean Out Port,	2524361					1	1	2
4	Cover Plate, Clean Out Port	2547539					1	1	2
5	Fill Box Assy.	2526152	1	1	1	1	1	1	1
6	Lower Mixing Box	1506749	1	1	1	1	1	1	1
7	Drain Pump 24v 60 Hz	1502644	1	1	1	1	1	1	1
8	Vacuum Break Valve 1/2" NPT	1505959	1	1	1	1	1	1	1
9	P-Trap, Outdoor	2547342	1	1	1	1	1	1	1
10	Dual Fill Valve 10.0 l/min & 0.35 l/min	1505759	1	1	1	1	1		
	Dual Fill Valve, 17.0L/Min & 0.35L/Min	1508581						1	1
11	Freeze Protect Valve Assembly Outdoor	1509014	1	1	1	1	1	1	1
12	Steam Trap, 15psi	1508849	1	1	1	1	2	2	3
13	Float Board	2511137	1	1	1	1	1	1	1
14	Float Chamber Mounting Bracket	1113777	1	1	1	1	1	1	1
15	Float Chamber	1115933	1	1	1	1	1	1	1
16	O-ring, Heat Exchanger, Large	2524403			1	1	2	2	3
	O-ring, Heat Exchanger, Mini	2524405	1	1					
17	Heat Exchanger Kit, Single	2581131			1	1	2	2	3
	Heat Exchanger Kit, Mini	2581132	1	1					
18	Modulating Actuator 0-10 VDC	1507549	1	1	1	1	1	1	
	Modulating Actuator 0-10 VDC, 2.5 Val	1508472							1
19	Valve 3/4 in. CV 5.5	1594322	1						
	Valve 1 in. CV 10.0	1594324		1					
	Valve 1 in. CV 12.0	1594332			1				
	Valve 1.25 in. CV 20.0	1594341				1			
	Valve 1.5 in. CV 28.0	1594350					1		
	Valve 2.0 in. CV 40.0	1594360						1	
	Valve 2.5 in. CV 65.0	1508473							1

Nortec SETC Outdoor Cabinet and Electrical Parts

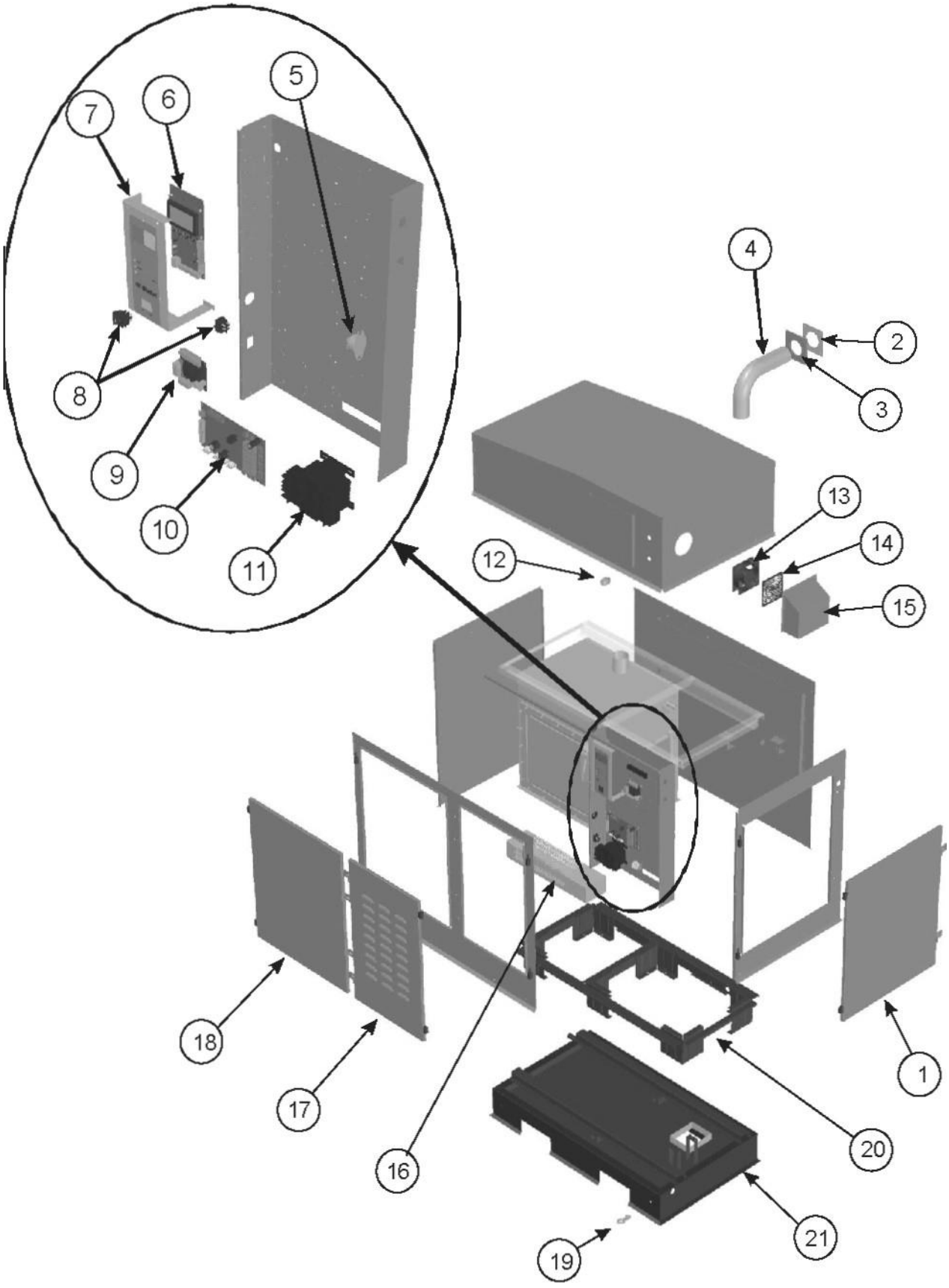


Figure 16: Nortec SETC/P100-050 Cabinet and Electrical Parts

Table 6: Nortec SETC B+ Outdoor Cabinet and Electrical Parts List

Item	Description	Part No.	100	175	250	375	525	750	1050
1	Service Door, Mini	1507801	1	1					
	Service Door, Double	1507860					1	1	
	Service Door	1507800			1	1			2
2	Gasket Steam Line 1.5 in.	1508105	1						
	Gasket Steam Line 3 in.	1507872		1	1				
	Gasket Steam Line 4 in.	1507871				1	1	1	2
3	Plate Cover 1.5 in.	1508106	1						
	Plate Cover 3 in.	1507870		1	1				
	Plate Cover 4 in.	1507810				1	1	1	2
4	Steam Line 1.5 Outdoor	1508015	1						
	Steam Line 3 Outdoor	1508049		1	1				
	Steam Line 4 Outdoor	1508048				1	1	2	2
5	Thermostat On/Off	1508042	1						
6	Kit Processor Board SE	2553861	1						
Not Shown	Cable , 40 Pin Ribbon	2537230	1						
7	Panel Processor Display Outdoor	2544255	1						
Not Shown	Membrane, Nortec	1509735	1						
8	Switch Rocker DPST	2522489	2						
9	Remote Fault Indication Board SETC	2550184	1						
Not Shown	Cable, 10pin Ribbon	2522062	1						
10	PCB Driver Board	2535504	1						
11	Transformer,120/240V,24V ,150VA	2532672	1						
12	Conduit Fitting,1/2	1506259	2						
13	Fan Axial 108 cfm	1506904	1						
14	Fan Cover	1504281	1						
15	Hood Fan Outdoor	1507811	1						
16	Pump house heater	1508039	1						
17	Access Door, Electronics, Outdoor	1507801	1						
18	Access Door, Tank, Outdoor	1507800	1						
19	Base Assembly	Reference - Contact Factory							
20	Base Assembly Outdoor	Reference - Contact Factory							

Warranty

Condair Inc. and/or Condair Ltd. (hereinafter collectively referred to as THE COMPANY), warrant for a period of two years after installation or 30 months from manufacturer's ship date, whichever date is earlier, that THE COMPANY's manufactured and assembled products, not otherwise expressly warranted are free from defects in material and workmanship. No warranty is made against corrosion, deterioration, or suitability of substituted materials used as a result of compliance with government regulations.

THE COMPANY's obligations and liabilities under this warranty are limited to furnishing replacement parts to the customer, F.O.B. THE COMPANY's factory, providing the defective part(s) is returned freight prepaid by the customer. Parts used for repairs are warranted for the balance of the term of the warranty on the original humidifier or 90 days, whichever is longer.

The warranties set forth herein are in lieu of all other warranties expressed or implied by law. No liability whatsoever shall be attached to THE COMPANY until said products have been paid for in full and then said liability shall be limited to the original purchase price for the product. Any further warranty must be in writing, signed by an officer of THE COMPANY.

THE COMPANY's limited warranty on accessories, not of the companies manufacture, such as controls, humidistats, pumps, etc. is limited to the warranty of the original equipment manufacturer from date of original shipment of humidifier.

THE COMPANY makes no warranty and assumes no liability unless the equipment is installed in strict accordance with a copy of the catalog and installation manual in effect at the date of purchase and by a contractor approved by THE COMPANY to install such equipment.

THE COMPANY makes no warranty and assumes no liability whatsoever for consequential damage or damage resulting directly from misapplication, incorrect sizing or lack of proper maintenance of the equipment.

THE COMPANY makes no warranty and assumes no liability whatsoever for damage resulting from freezing of the humidifier, supply lines, drain lines, or steam distribution systems.

THE COMPANY makes no warranty and assumes no liability whatsoever for equipment that has failed due to ambient conditions when installed in locations having climates below 14 °F (-10 °C) during January or above 104 °F (40 °C) during July.

THE COMPANY retains the right to change the design, specification and performance criteria of its products without notice or obligation.

U.S.A.
2700 90th St.
Sturtevant, WI 53177

835 Commerce Park Dr.
Ogdensburg, NY 13669-2209

CANADA
2740 Fenton Road
Ottawa, Ontario K1T 3T7

TEL: 1.866.667.8321
EMAIL: na.info@condair.com
WEBSITE: www.condair.com

condair

Job Name: G-120-B Cut Sheet

EF-1

Quantity: 1

Printed Date: January 19, 2023

Model: G-120-B

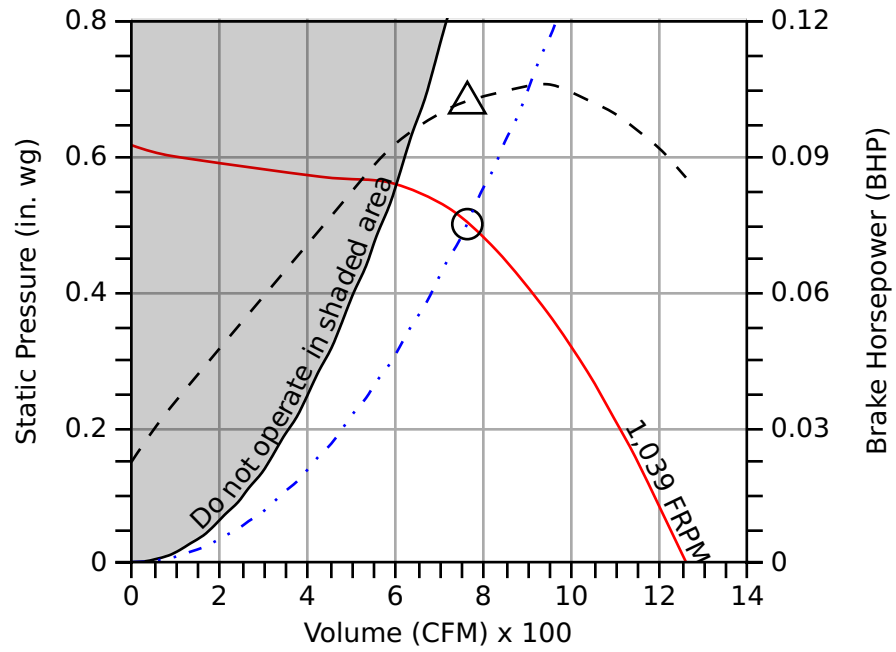
Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features: Aluminum housing. Centrifugal backward inclined aluminum (composite for sizes 60-95) wheel. Direct driven motor mounted on vibration isolation.

Fan Configuration	
Drive type	Direct

Performance	
Requested Volume (CFM)	760
Actual Volume (CFM)	760
Total External SP (in. wg)	0.5
Operating frequency (Hz)	55
Fan RPM	1,039
Operating Power (bhp)	0.1
Startup Power (bhp)	0.13
Air Stream Temp (F)	70
Start-up Temp (F)	70
Air Density (lbs/ft^3)	0.072
Elevation (ft)	961
Static Efficiency (%)	59
Outlet Velocity (ft/min)	817

Motor	
V/C/P	115/60/1



Fan curve

Brake horsepower curve

Operating Point SP

Operating Bhp point

Max system curve

System curve

Sound

	Octave Bands (hz)								LwA	dBA	Sones
	62.5	125	250	500	1000	2000	4000	8000			
Inlet	66	71	69	62	56	53	48	46	65	53	6.8

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.The AMCA certified ratings seal applies to sound and air performance ratings only.Power rating does not include transmission losses.

Dimensions and Weights		
Label	**Value**	**Description**
-	54	Weight w/o accessories (lbs)
-	12	Duct / Damper Width (in)
-	12	Duct / Damper Length (in)
-	14.5	Roof Opening Width (in)
-	14.5	Roof Opening Length (in)

*All dimensions are in inches.

Job Name: 19.25
Tag: EF-2
Quantity: 1
Printed Date: July 20, 2022

Model: G-090-VG

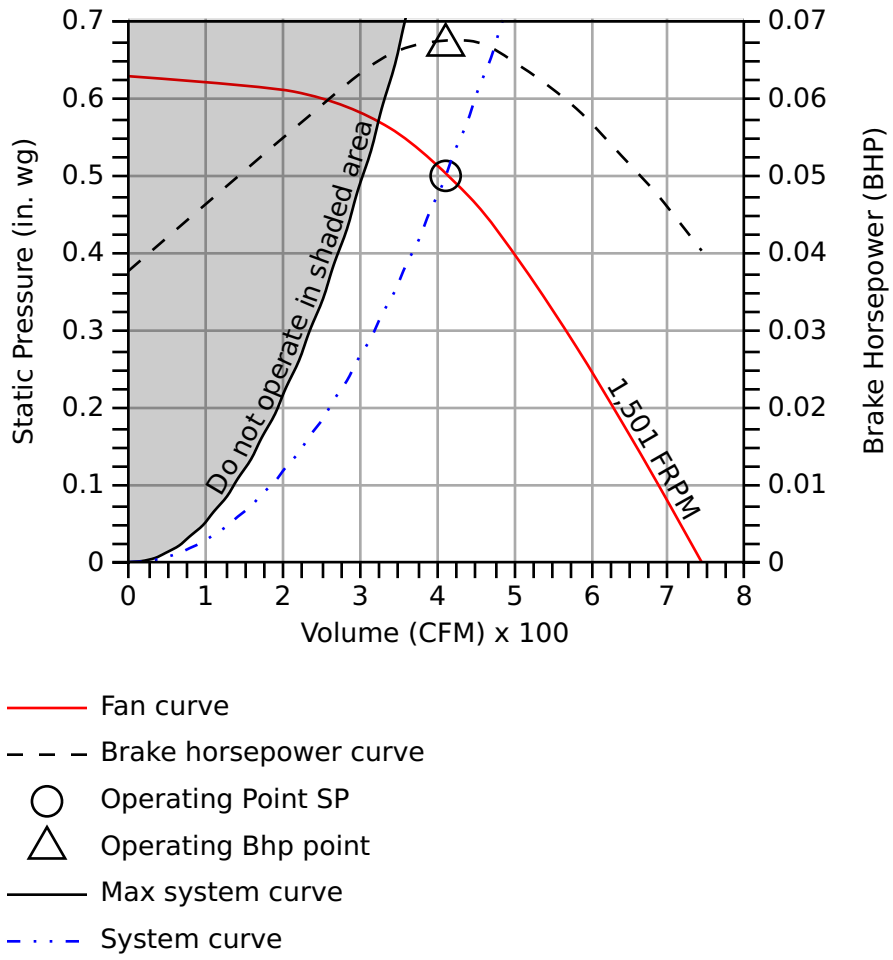
Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features: Aluminum housing. Centrifugal backward inclined aluminum (composite for sizes 60-95) wheel. Direct driven motor mounted on vibration isolation.

Fan Configuration	
Drive type	Direct

Performance	
Requested Volume (CFM)	410
Actual Volume (CFM)	410
Total External SP (in. wg)	0.5
Fan RPM	1,501
Operating Power (bhp)	0.07
Startup Power (bhp)	0.07
Air Stream Temp (F)	70
Start-up Temp (F)	70
Air Density (lbs/ft^3)	0.072
Elevation (ft)	961
Static Efficiency (%)	48
Outlet Velocity (ft/min)	586

Motor	
Size (hp)	1/10
V/C/P	115/60/1
NEC FLA (Amps)	1.5

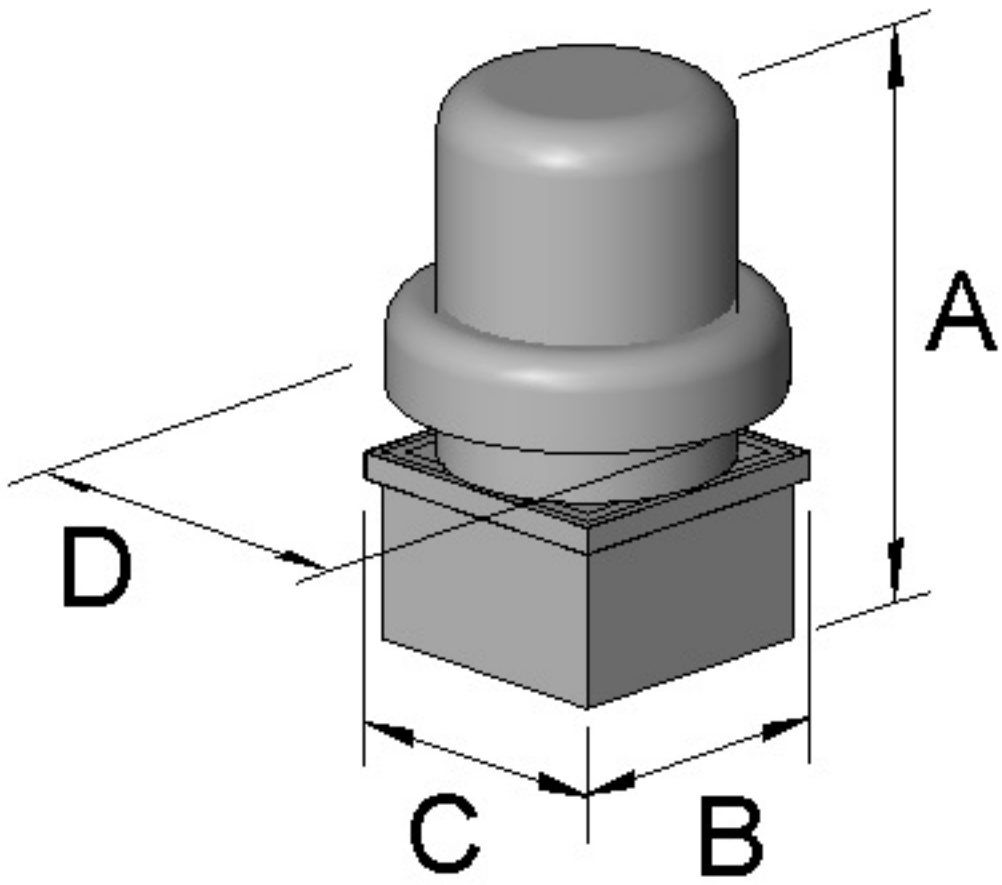


Sound

	Octave Bands (hz)								LwA	dBA	Sones
	62.5	125	250	500	1000	2000	4000	8000			
Inlet	76	73	67	61	57	54	50	43	65	53	7.1

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.The AMCA certified ratings seal applies to sound and air performance ratings only.Performance certified is for installation type A: Free inlet, free outlet.Power rating does not include transmission losses.Performance ratings include the effects of birdscreen.The sound ratings shown are loudness values in hemispherical sones at 1.5 m (5 ft) in a hemispherical free field calculated per ANSI/AMCA Standard 301.Values shown are for Installation Type A: free inlet hemispherical sone levels.dBA levels are not licensed by AMCA International. The AMCA Certified Ratings Seal for Sound applies to inlet sone ratings only.

Dimensions and Weights		
Label	**Value**	**Description**
-	29	Weight w/o accessories (lbs)
A	27	Overall Height (in)
D	22	Overall Width (in)
B	17	Curb Cap Width (in)
C	17	Curb Cap Length (in)
-	10	Duct / Damper Width (in)
-	10	Duct / Damper Length (in)
-	12.5	Roof Opening Width (in)
-	12.5	Roof Opening Length (in)



*All dimensions are in inches.

Model: SQ-160

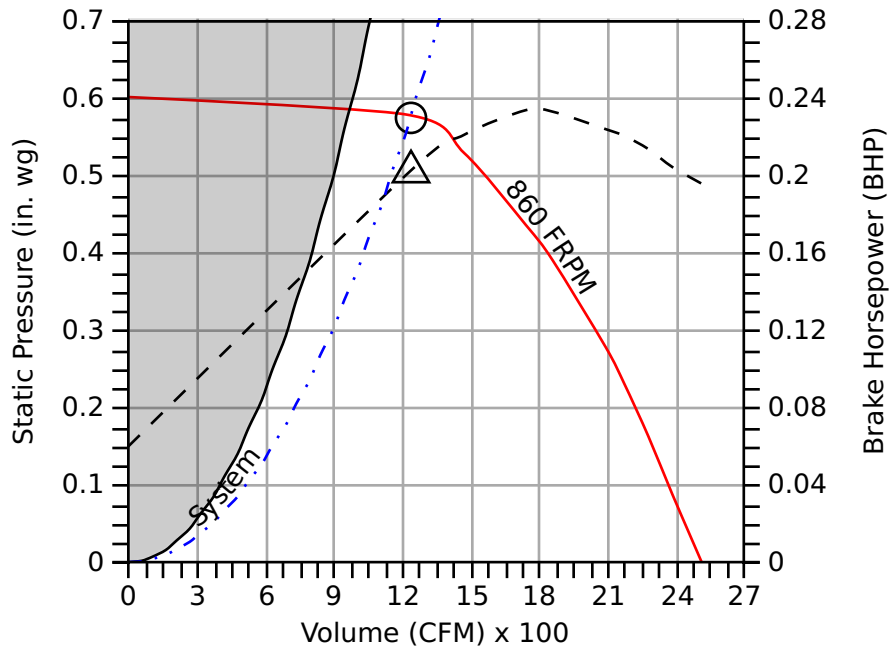
Direct Drive Inline Fan

Standard Construction Features: Galvanized steel housing (optional aluminum). Aluminum wheel. Direct driven motor in the air stream.

Fan Configuration	
Drive type	Direct

Performance	
Requested Volume (CFM)	1,150
Actual Volume (CFM)	1,233
Total External SP (in. wg)	0.58
Fan RPM	860
Operating Power (bhp)	0.2
Startup Power (bhp)	0.2
Air Stream Temp (F)	70
Start-up Temp (F)	70
Air Density (lbs/ft^3)	0.072
Elevation (ft)	961
Static Efficiency (%)	55
Outlet Velocity (ft/min)	344

Motor	
Size (hp)	1/4
V/C/P	115/60/1
NEC FLA (Amps)	5.8



- Fan curve
- Brake horsepower curve
- Operating Point SP
- Operating Bhp point
- Max system curve
- System curve

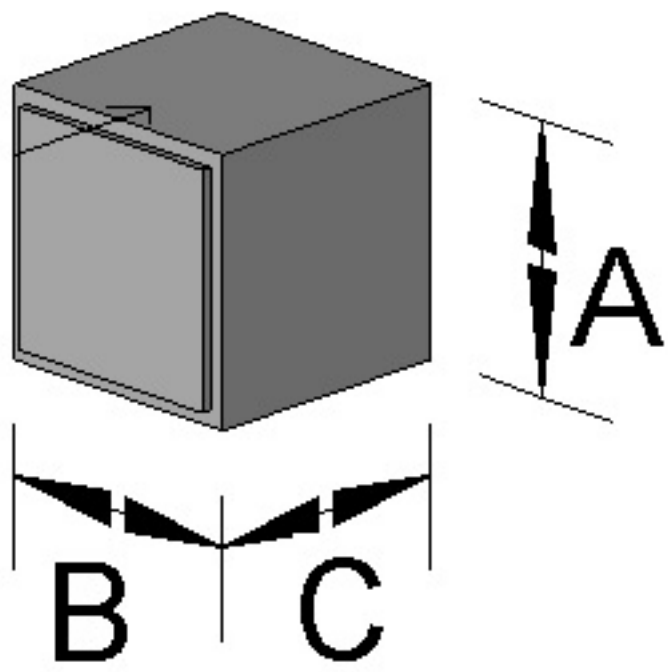
Static Pressure Calculations	
External SP	0.5 in. wg
Direct Drive RPM Adjustment	0.08 in. wg
Total External SP	0.58 in. wg

Sound

	Octave Bands (hz)								LwA	dBA	Sones
	62.5	125	250	500	1000	2000	4000	8000			
Inlet	66	68	64	63	55	53	49	44	63	52	6.1

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.The AMCA certified ratings seal applies to sound and air performance ratings only.Performance certified is for installation type B: Free inlet, ducted outlet.Power rating does not include transmission losses.Performance ratings do not include the effects of appurtenances.The sound ratings shown are loudness values in hemispherical sones at 1.5 m (5 ft) in a hemispherical free field calculated per ANSI/AMCA Standard 301.Values shown are for Installation Type B: free inlet hemispherical sone levels.dBA levels are not licensed by AMCA International. The AMCA Certified Ratings Seal for Sound applies to inlet sone ratings only.

Dimensions and Weights		
Label	**Value**	**Description**
-	138	Weight w/o accessories (lbs)
A	26	Overall Height (in)
B	26	Overall Width (in)
C	29	Overall Length (in)
-	22.875	Inlet Width (in)
-	22.875	Inlet Height (in)
-	22.875	Outlet Width (in)
-	22.875	Outlet Height (in)



*All dimensions are in inches.

Model: SQ-160-VG

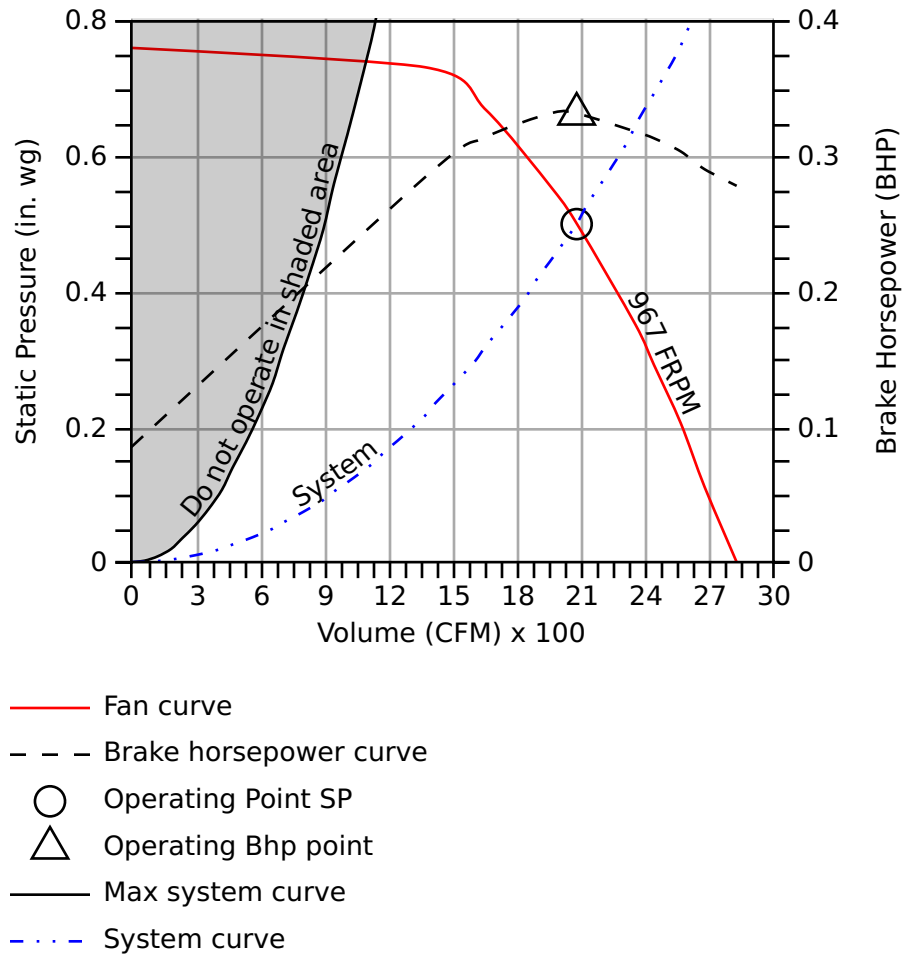
Direct Drive Inline Fan

Standard Construction Features: Galvanized steel housing (optional aluminum). Aluminum wheel. Direct driven motor in the air stream.

Fan Configuration	
Drive type	Direct

Performance	
Requested Volume (CFM)	2,070
Actual Volume (CFM)	2,070
Total External SP (in. wg)	0.5
Fan RPM	967
Operating Power (bhp)	0.33
Startup Power (bhp)	0.33
Air Stream Temp (F)	70
Start-up Temp (F)	70
Air Density (lbs/ft^3)	0.072
Elevation (ft)	961
Static Efficiency (%)	49
Outlet Velocity (ft/min)	577

Motor	
Size (hp)	3/4
V/C/P	115/60/1
NEC FLA (Amps)	10

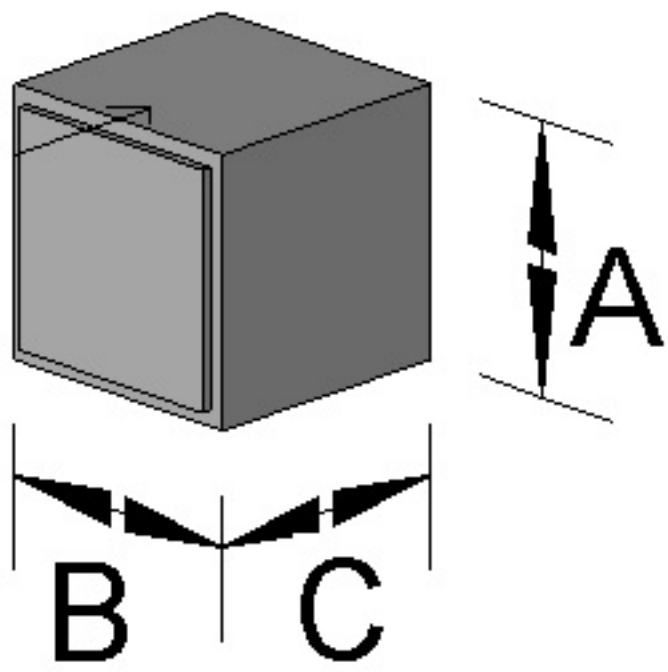


Sound

	Octave Bands (hz)								LwA	dBA	Sones
	62.5	125	250	500	1000	2000	4000	8000			
Inlet	68	72	70	68	61	58	53	49	69	57	8.3

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.The AMCA certified ratings seal applies to sound and air performance ratings only.Performance certified is for installation type B: Free inlet, ducted outlet.Power rating does not include transmission losses.Performance ratings do not include the effects of appurtenances.The sound ratings shown are loudness values in hemispherical sones at 1.5 m (5 ft) in a hemispherical free field calculated per ANSI/AMCA Standard 301.Values shown are for Installation Type B: free inlet hemispherical sone levels.dBA levels are not licensed by AMCA International. The AMCA Certified Ratings Seal for Sound applies to inlet sone ratings only.

Dimensions and Weights		
Label	**Value**	**Description**
-	136	Weight w/o accessories (lbs)
A	26	Overall Height (in)
B	26	Overall Width (in)
C	29	Overall Length (in)
-	22.875	Inlet Width (in)
-	22.875	Inlet Height (in)
-	22.875	Outlet Width (in)
-	22.875	Outlet Height (in)



*All dimensions are in inches.

Job Name: 19.25
Tag: EF-6
Quantity: 1
Printed Date: July 21, 2022

Model: SQ-99-VG

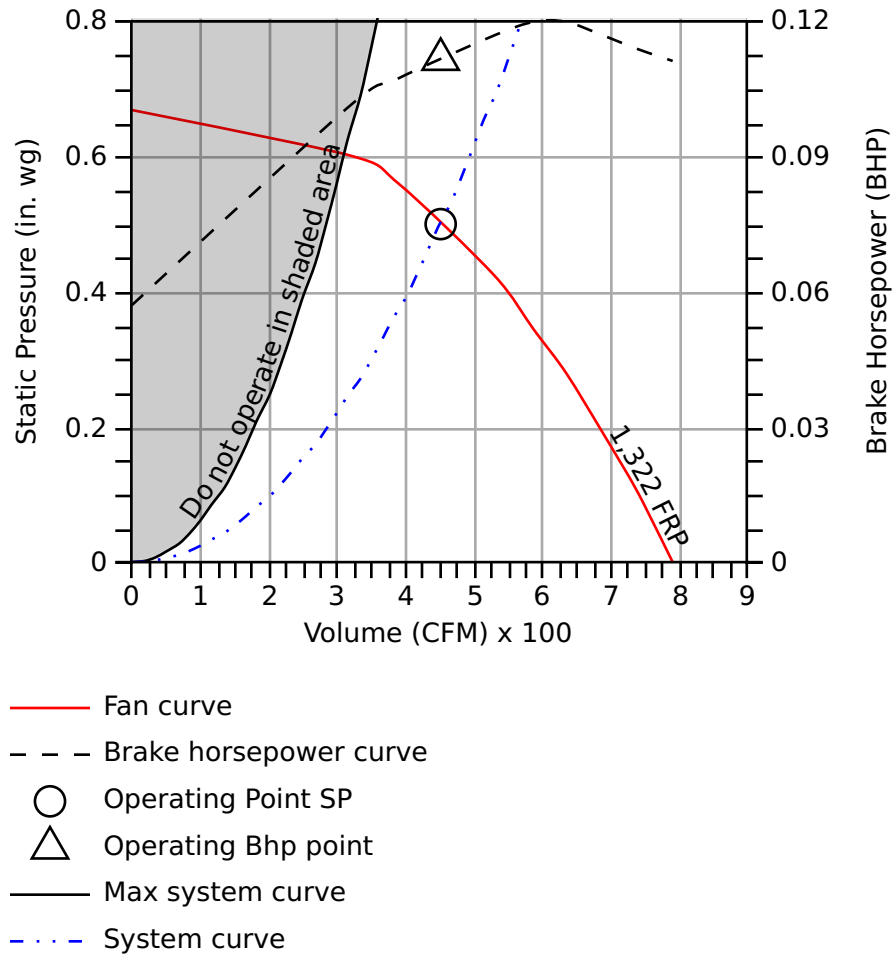
Direct Drive Inline Fan

Standard Construction Features: Galvanized steel housing (optional aluminum). Aluminum wheel. Direct driven motor in the air stream.

Fan Configuration	
Drive type	Direct

Performance	
Requested Volume (CFM)	450
Actual Volume (CFM)	450
Total External SP (in. wg)	0.5
Fan RPM	1,322
Operating Power (bhp)	0.11
Startup Power (bhp)	0.11
Air Stream Temp (F)	70
Start-up Temp (F)	70
Air Density (lbs/ft^3)	0.072
Elevation (ft)	961
Static Efficiency (%)	32
Outlet Velocity (ft/min)	344

Motor	
Size (hp)	1/4
V/C/P	115/60/1
NEC FLA (Amps)	3.8

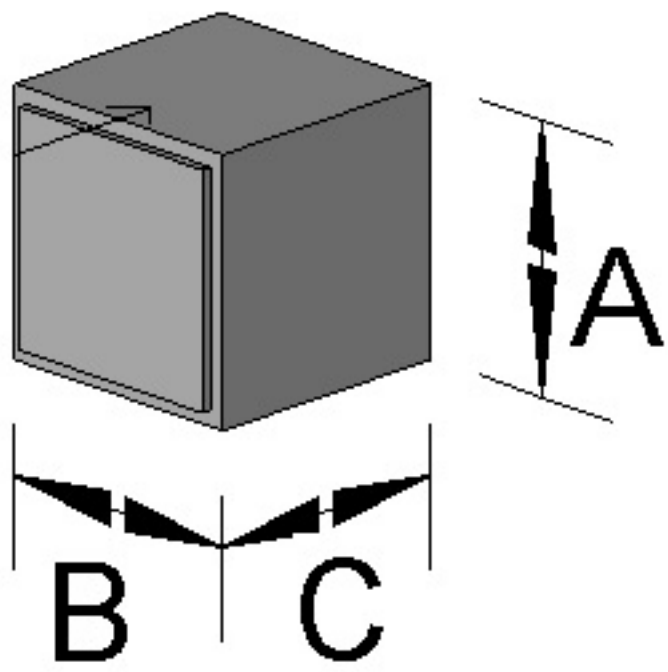


Sound

	Octave Bands (hz)								LwA	dBA	Sones
	62.5	125	250	500	1000	2000	4000	8000			
Inlet	79	80	68	65	57	54	51	45	68	57	9.3

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.The AMCA certified ratings seal applies to sound and air performance ratings only.Performance certified is for installation type B: Free inlet, ducted outlet.Power rating does not include transmission losses.Performance ratings do not include the effects of appurtenances.The sound ratings shown are loudness values in hemispherical sones at 1.5 m (5 ft) in a hemispherical free field calculated per ANSI/AMCA Standard 301.Values shown are for Installation Type B: free inlet hemispherical sone levels.dBA levels are not licensed by AMCA International. The AMCA Certified Ratings Seal for Sound applies to inlet sone ratings only.

Dimensions and Weights		
Label	**Value**	**Description**
-	47	Weight w/o accessories (lbs)
A	15	Overall Height (in)
B	15	Overall Width (in)
C	24	Overall Length (in)
-	11.875	Inlet Width (in)
-	11.875	Inlet Height (in)
-	11.875	Outlet Width (in)
-	11.875	Outlet Height (in)



*All dimensions are in inches.

Model: SQ-120

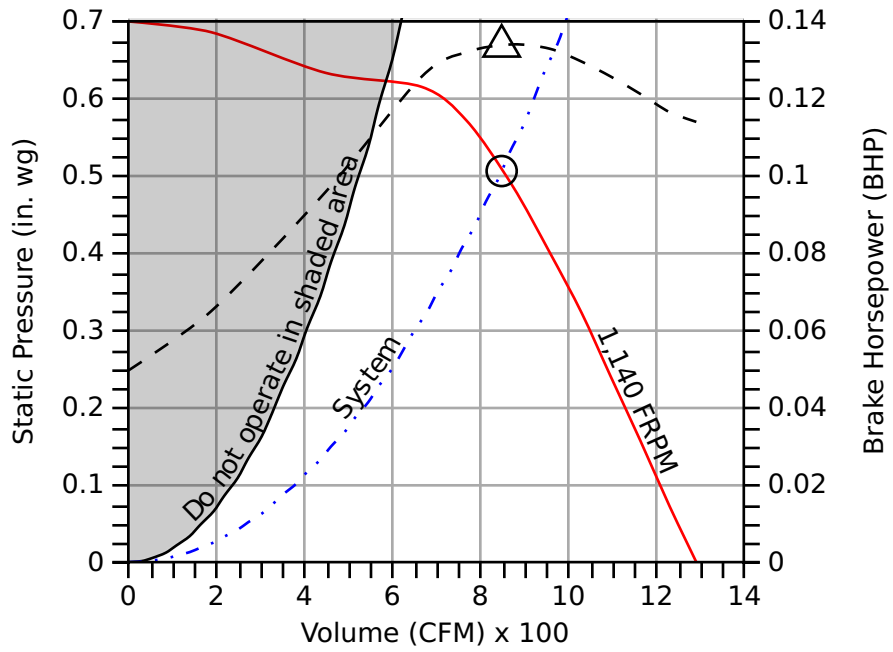
Direct Drive Inline Fan

Standard Construction Features: Galvanized steel housing (optional aluminum). Aluminum wheel. Direct driven motor in the air stream.

Fan Configuration	
Drive type	Direct

Performance	
Requested Volume (CFM)	840
Actual Volume (CFM)	845
Total External SP (in. wg)	0.51
Fan RPM	1,140
Operating Power (bhp)	0.13
Startup Power (bhp)	0.13
Air Stream Temp (F)	70
Start-up Temp (F)	70
Air Density (lbs/ft^3)	0.072
Elevation (ft)	961
Static Efficiency (%)	50
Outlet Velocity (ft/min)	491

Motor	
Size (hp)	1/6
V/C/P	115/60/1
NEC FLA (Amps)	4.4



- Fan curve
- Brake horsepower curve
- Operating Point SP
- Operating Bhp point
- Max system curve
- System curve

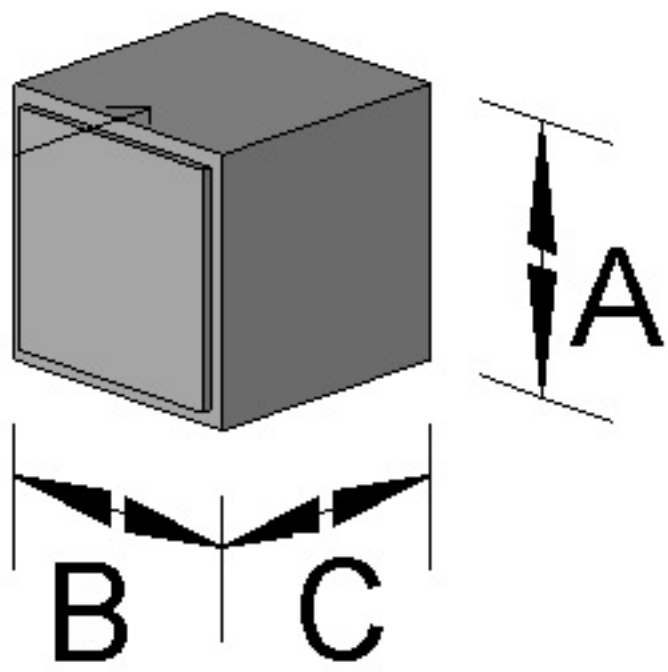
Static Pressure Calculations	
External SP	0.5 in. wg
Direct Drive RPM Adjustment	0.01 in. wg
Total External SP	0.51 in. wg

Sound

	Octave Bands (hz)								LwA	dBA	Sones
	62.5	125	250	500	1000	2000	4000	8000			
Inlet	66	64	64	63	55	52	48	42	63	52	5.8

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.The AMCA certified ratings seal applies to sound and air performance ratings only.Performance certified is for installation type B: Free inlet, ducted outlet.Power rating does not include transmission losses.Performance ratings do not include the effects of appurtenances.The sound ratings shown are loudness values in hemispherical sones at 1.5 m (5 ft) in a hemispherical free field calculated per ANSI/AMCA Standard 301.Values shown are for Installation Type B: free inlet hemispherical sone levels.dBA levels are not licensed by AMCA International. The AMCA Certified Ratings Seal for Sound applies to inlet sone ratings only.

Dimensions and Weights		
Label	**Value**	**Description**
-	61	Weight w/o accessories (lbs)
A	19	Overall Height (in)
B	19	Overall Width (in)
C	24	Overall Length (in)
-	15.875	Inlet Width (in)
-	15.875	Inlet Height (in)
-	15.875	Outlet Width (in)
-	15.875	Outlet Height (in)



*All dimensions are in inches.

Model: SQ-120

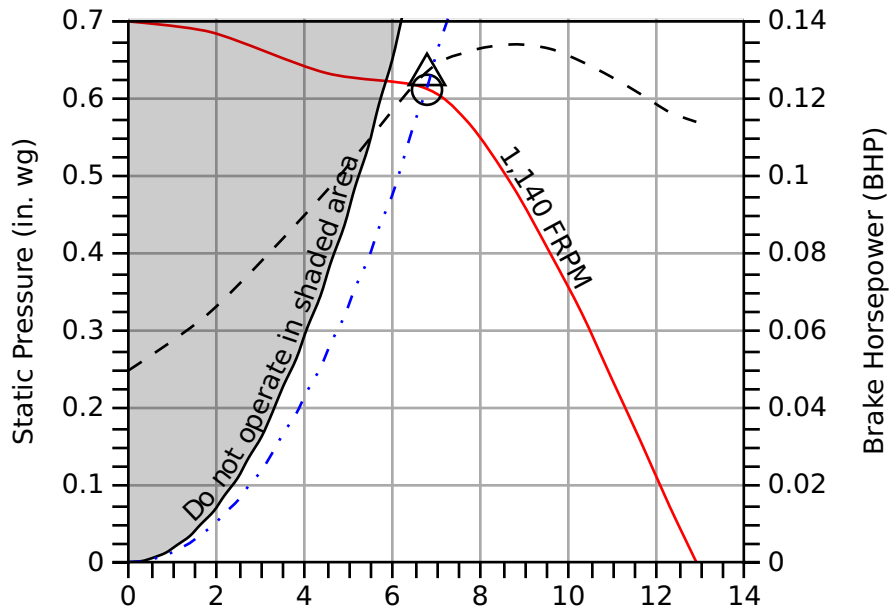
Direct Drive Inline Fan

Standard Construction Features: Galvanized steel housing (optional aluminum). Aluminum wheel. Direct driven motor in the air stream.

Fan Configuration	
Drive type	Direct

Performance	
Requested Volume (CFM)	610
Actual Volume (CFM)	675
Total External SP (in. wg)	0.61
Fan RPM	1,140
Operating Power (bhp)	0.13
Startup Power (bhp)	0.13
Air Stream Temp (F)	70
Start-up Temp (F)	70
Air Density (lbs/ft^3)	0.072
Elevation (ft)	961
Static Efficiency (%)	51
Outlet Velocity (ft/min)	392

Motor	
Size (hp)	1/6
V/C/P	115/60/1
NEC FLA (Amps)	4.4



Fan curve
Brake horsepower curve
Operating Point SP
Operating Bhp point
Max system curve
System curve

Static Pressure Calculations	
External SP	0.5 in. wg
Direct Drive RPM Adjustment	0.11 in. wg
Total External SP	0.61 in. wg

Sound

	Octave Bands (hz)								LwA	dBA	Sones
	62.5	125	250	500	1000	2000	4000	8000			
Inlet	68	66	64	62	55	52	47	41	63	51	5.8

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.The AMCA certified ratings seal applies to sound and air performance ratings only.Performance certified is for installation type B: Free inlet, ducted outlet.Power rating does not include transmission losses.Performance ratings do not include the effects of appurtenances.The sound ratings shown are loudness values in hemispherical sones at 1.5 m (5 ft) in a hemispherical free field calculated per ANSI/AMCA Standard 301.Values shown are for Installation Type B: free inlet hemispherical sone levels.dBA levels are not licensed by AMCA International. The AMCA Certified Ratings Seal for Sound applies to inlet sone ratings only.

Dimensions and Weights		
Label	**Value**	**Description**
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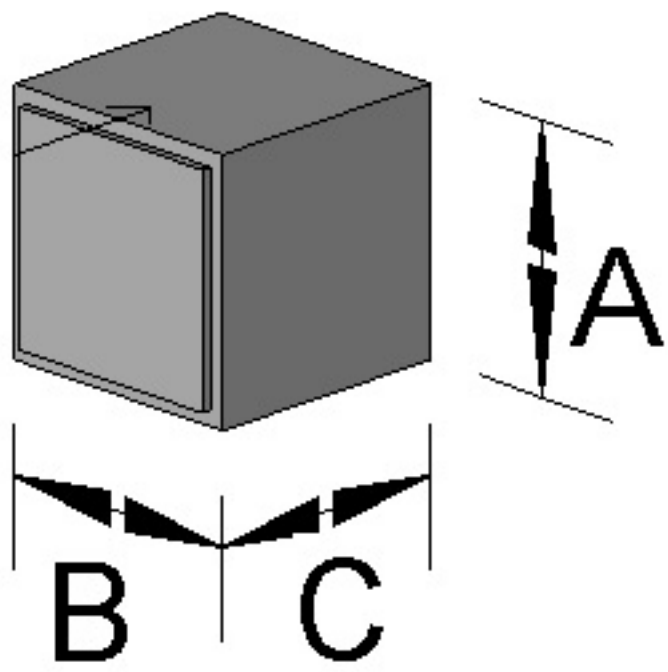
B	19	Overall Width (in)
C	24	Overall Length (in)
-	15.875	Inlet Width (in)
-	15.875	Inlet Height (in)
-	15.875	Outlet Width (in)
-	15.875	Outlet Height (in)



*All dimensions are in inches.

MODINE

STEAM/HOT WATER UNIT HEATERS

MODEL HSB/HC

MODEL V/VN

MODEL PT/PTN

MODEL GLW

1-150.15 • APRIL, 2019

Table of Contents

Refer to page 9 for information regarding the Breeze™ AccuSpec Sizing and Selection Program

Canadian Registered heat exchangers CRN OH 9234.5C
****Does not apply to V/ PT 952***

As Modine Manufacturing Company has a continuous product improvement program, it reserves the right to change design and specifications without notice.

Application, Design, Construction Overview - All Units

Wide Product Selection

- Ratings as low as 11,300 Btu/hr for hot water to as high as 952,000 Btu/hr for steam, based on standard conditions.
- Horizontal, Vertical, and Power-Throw™ (high velocity horizontal air delivery) models offer maximum application flexibility.
- Ratings are shown as Btu/hr (based on 2 PSI steam, 60°F entering air conditions), eliminating the need to convert from EDR. This simplifies the matching of unit ratings to building heat loss.

Application Flexibility

- Horizontal and Power-Throw™ units are furnished with louvers for directional control of heated air. Vertical units are available with various louver, truncone, and cone-jet deflector options to accommodate many different air distribution patterns. See page 22 for more information.
- Units are available as low outlet temperature (LOT) models. LOT models have coils with fewer fins per inch to reduce the output rating. This is a benefit for applications where the steam pressure exceeds 30 PSI and mounting height is critical; the lower output results in outlet air temperatures that approximate that of standard coils at standard steam pressure. LOT models are also well suited for dirty environments where the increased fin spacing decreases the build-up of foreign particles. Finally, LOT models offer lower airside resistance resulting in greater allowable mounting heights and greater heat throw.
- Vertical and Power-Throw™ units are available with 90/10 cupro-nickel coils for high pressure/temperature applications, up to 250 PSI or 400°F.
- Side piping connections on the HC horizontal air delivery model allow for low clearance installations.
- Explosion-proof motors are available for use in hazardous areas. See page 8 for additional details.
- Design assures the correct relationship between air temperature, velocity, and air volume for greater heat throw; air is delivered to the floor at maximum mounting height, increasing comfort and reducing fuel costs.

Ease of Installation/Maintenance = Reliability

- Units are compact and lightweight, requiring fewer contractor hours to install.
- All units include an electrical junction box, either integral to the motor or mounted on the unit casing, to allow for easy electrical connections.
- All motors are totally enclosed. All single phase and explosion-proof motors include internal overload protection to protect the motor from insulation damaging heat, resulting in longer motor life.
- Different suspension options are available for most units including threaded rod or pipe hanger adapters.
- All units are component tested for proper motor function and the coils are leak tested under pressure to ensure proper function when the unit arrives at the jobsite.
- Fins on all units are vertical to limit build-up of foreign particles, prolonging periods between cleanings. Fins on vertical and Power-Throw™ units are exposed for easy cleaning.

Blends with the Environment

- Quiet operation is assured through the use of carefully selected motors, fans, and scientifically designed venturi fan shrouds.
- HSB and HC models have squared off corners for a clean, defined appearance. Vertical and Power-Throw™ units have a pleasing circular symmetry.
- Casings are treated for corrosion resistance and finished with a neutral gray-green baked-on, electrostatically applied polyester powder coat paint finish.

Unit Features - Horizontal Delivery Unit Heaters

Horizontal delivery unit heaters are the most popular of all types. These units are ideal for heating buildings with large open areas and low ceilings. They are used to counter heat loss along outside building walls, especially where windows are present.

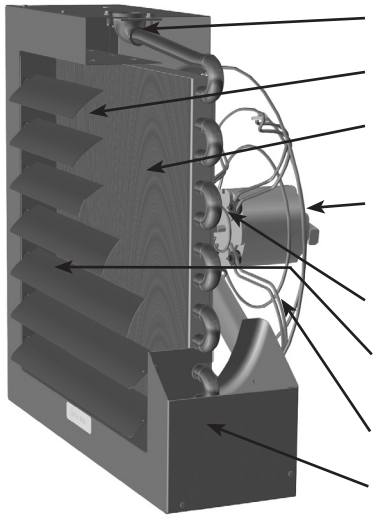
HSB MODEL
TOP/BOTTOM CONNECTIONS

HC MODEL
SIDE CONNECTIONS

In addition to the features noted on page 2, features that enhance the popularity of the horizontal delivery unit heater are:

- HSB units have top and bottom supply and return connections. This permits the unit to be rotated 360° without piping changes.
- HC units have side supply and return connections. This permits the unit to be installed in low clearance areas.
- Units have a 2-piece casing for easy coil access.
- All models have tapped holes for suspension by threaded rod or optional pipe hanger adapter kit, except HSB 18 and HSB 24 which mount directly to and are supported by the supply and return piping.
- Serpentine copper tube coil design has high resistance to thermal shock, even under high steam pressures.
- Absence of coil headers eliminates potential leaks and increases coil face area without increasing overall size of unit.
- Coil designed for greater water carrying capacity with lower friction loss.

Figure 4.1 - Unit Features



Connections – Female type permits direct connection of unit heater to the piping and eliminates the need for additional fittings.

Vertical Fins – Less opportunity for dust and dirt to collect. Reduces cleaning. Fins die-formed for added strength and heat transfer.

Coil – All air passes through coil. Heating is uniform. Design assures maximum control over air delivery and temperature of air leaving the heater. Aluminum fins die-formed for added strength – increased heat transfer. Fins mechanically bonded to serpentine copper tube.

Motor – All motors are totally enclosed. Single phase and explosion-proof types include built in thermal overload protection. Selected and tested for operation on specific unit heater models. All motor wiring is terminated in an electrical junction box either supplied on the unit heater casing, or as an integral part of the motor.

Fan – Lightweight. Blades accurately balanced and pitched to move air quietly and positively – with minimum power requirement.

Deflector Blades – Adjustable horizontal air-deflector blades are standard. Vertical blades are also standard on models HC/HSB-258, HC/HSB-290 and HC/HSB-340 and are optional on other models. Both horizontal and vertical blades are illustrated.

Safety Fan Guard – Standard equipment. Bolted to rear casing, steel rod fan guard completely surrounds the fan offering constant protection.

Casings – Baked-on gray-green polyester powdercoat paint is applied over rust-and corrosion-resistance-treated steel for long life.

Unit Features - Vertical Delivery Unit Heaters

Vertical delivery unit heaters are ideal for heating buildings with high ceilings or areas that require the heater to be mounted above obstructions such as craneways. Selection from a variety of heat throw patterns is made easy by choosing from four types of air deflectors. Heat throw patterns range from a high-velocity narrow jet to a gentle-velocity broad based cone of heated air.

In addition to the features noted on page 2, features that enhance the popularity of the vertical delivery unit heater are:

- Extended motor life with the use of the standard motor cooling cone. The cooling cone protects the motor from intense radiant and convection heat from the coil when the fan is not running. The cone also meters a controlled volume of ambient air over the motor to reduce motor temperature, when the motor is running.
- All models through V/VN 279 have tapped holes for threaded rod or optional pipe hanger adapter kit.
- All models V/VN 333 and larger have angle-iron mounting bracket with 5/8" diameter hanger holes.
- All vertical units are supplied with an outlet fan guard covering the opening in the bottom of the unit.

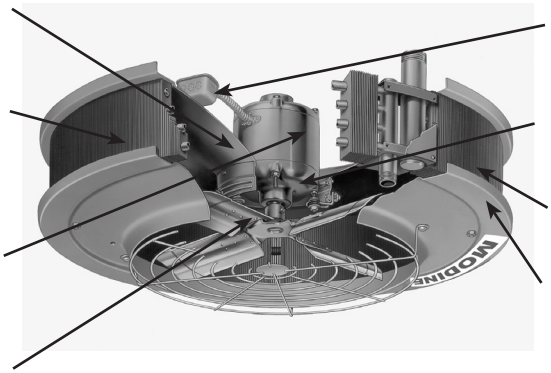
Figure 5.1 - Unit Features

Motor-Cooling Cone – Shields motor from coil heat - prolongs life of insulation, windings, and lubricant. Prolongs motor life (V/VN models only).

Coil – Aluminum fins firmly bonded to tubes for maximum heat transfer. Steam and water-carrying passages between extra-heavy steel pipe connections are copper for model V/PT and cupro-nickel for model VN/PTN.

Motor – All motors are totally enclosed. Single phase and explosion-proof types include built in thermal overload protection. Selected and tested for operation on specific unit heater models.

Fan – Accurately balanced to operate quietly and at lowest possible power cost.



Junction Box – All motor wiring is terminated in an electrical junction box either supplied on the unit heater casing or as an integral part of the motor.

Motor Easily Removable – Modine design permits motor to be removed through opening below the unit especially important where heaters are installed close to ceiling (V/VN models only).

Vertical Fins – Less opportunity for dust and dirt to collect. Exposed for easy cleaning with air hose and brush.

Casings – Baked-on, gray-green polyester powder coat paint applied over rust- and corrosion-resistance treated steel lasts longer.

Unit Features - Power-Throw™ Horizontal Delivery Unit Heaters

Power-Throw™ horizontal delivery unit heaters are ideal for heating large buildings where a number of smaller units can be replaced by a few larger Power-Throw™ units. This results in a more economical installation. Their high velocity air delivery results in the greatest heat throw available.

Power-Throw™ units are also ideally suited for blanketing doors that frequently open.

Because of high velocity air delivery, care must be taken to avoid directing the air stream at building occupants.

In addition to the features noted on page 2, features that enhance the popularity of the Power-Throw™ horizontal delivery unit heater are:

- All models through PT/PTN 279 have hanger brackets with 5/8" diameter hanger holes for 3-point suspension.
- All models larger than PT/PTN 279 have hanger brackets with 5/8" diameter hanger holes for 2-point suspension and angle supports for 4-point suspension.
- Air distribution is controlled by a standard adjustable position horizontal louver assembly.
- The air stream can be concentrated into a high velocity jet or broadened to cover a greater area.
- Fan blades are properly balanced and pitched to move large volumes of high velocity air at relatively low sound levels.
- Refer to Figure 5.1 for features similar to the V/VN vertical models.

Unit Features - Low Water Temperature Greenhouse Heating Units

The Modine model GLW units are specifically designed to heat greenhouses with low-temperature water. They can be successfully used in applications where waste or reject heat from steam-electric power plants, refineries, pumping stations, distilleries, and other industrial or processing plants can be utilized for heating. With the ever-increasing cost of fossil fuel, utilizing reject heat as a heat source for greenhouses is a sensible solution with the model GLW.

Standard features include:

- Hot water coil with 1/2" O.D. copper tubes, aluminum fins, and 1-1/2" MPT copper connections.
- Maximum operating pressure is 300 PSI, maximum operating water temperature is 180°F
- Frame, enclosure panels, and 24" polytube transitions are galvanized steel for corrosion resistance in humid environments.
- 1/2 HP, totally enclosed motors (1 for GLW330S, 2 for GLW660S), available for single phase or three phase voltages.
- High airflow, 3850CFM for GLW330S and 7700CFM for GLW660S, based on 150 feet of polytube duct.

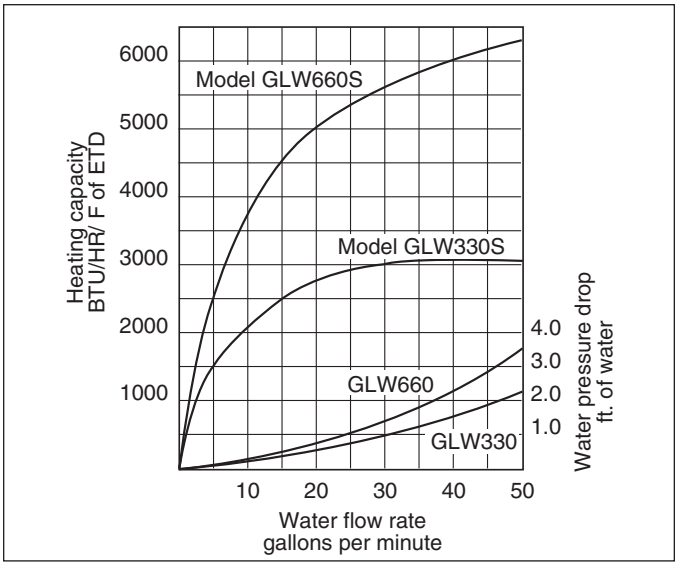
Unit Sizing

Unit performance is based on the flow rate and the temperature of the water relative to the ambient air temperature. Refer to Figure 6.1 and the following example for determining performance.

Example:
Determine heating capacity in BTU/hr for model GLW660S at 20GPM, 100°F entering water, and 70°F entering air.

1. Figure 6.1 shows output in terms of BTU/hr per °F of ETD (Entering Temperature Difference). ETD is the difference between the entering water temperature and the entering air temperature. For this example, ETD = 100°F – 70°F = 30°F.
2. From Figure 6.1, at 20GPM, the BTU/hr per °F of ETD for the GLW660S is 5000.
3. The heating capacity = 5000 x 30 = 150,000 BTU/hr.
4. The water temperature drop = (heating capacity)/(500 x GPM) = 150,000/(500 x 20) = 15°F.
5. The water pressure drop from the curve is 0.7 Ft. of water.

Figure 6.1 - Model GLW Performance Curves



Dimensions and Specifications - Model GLW660S, GLW330S (All dimensions in inches)

Figure 6.2 - Top View

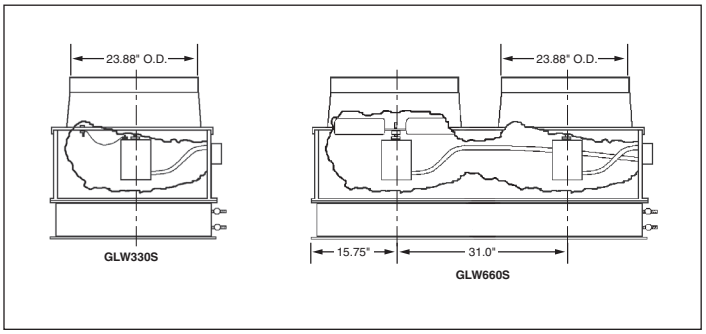
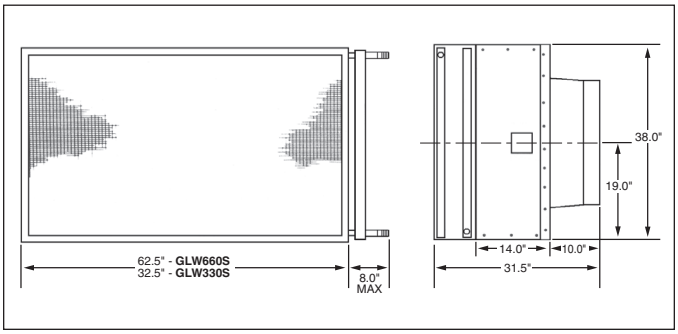


Figure 6.3 - Discharge and Side Views



Weight: GLW330S=200 lbs., GLW660S=380 lbs.

Note: Information on this page applies only to Model GLW units. Information contained in Catalog that is not on this page does not apply to Model GLW units.

Options and Accessories

Table 7.1
Factory Mounted Options

Factory Mounted Option	Description
Fingerproof Fan Guard	Standard fan guard may be factory replaced with fingerproof fan guard. For HSB/HC units only. Not available for units with explosion-proof motors.

Table 7.2
Field Installed Accessories for Horizontal Models

Field Installed Accessories	Description
Vertical Deflector Blades	Blades used to deflect airflow in directions left or right of unit heater. Used in addition to standard horizontal deflector blades. Vertical deflector blades are standard on HSB/HC models 258 through 340. Not available for Power-Throw™ models.
Solid State Speed Control	Allows for remote control of airflow volume by controlling fan speed. Available only on HSB/HC models 18 through 108 with Power Code 01.

Table 7.3
Field Installed Accessories for Vertical Models

Field Installed Accessories	Description
Cone-Jet	The cone-jet allows the discharge air stream to be adjusted from a concentrated high velocity jet to a broadened air stream to cover a larger area. See page 22 for additional information.
Truncone	The truncone causes a broad discharge air stream covering a larger area than possible with the cone-jet. See page 22 for additional information.
One Way Louver	The one-way louver allows the discharge air stream to be adjusted in one direction. See page 22 for additional information.
Two Way Louver	The two-way louver allows the discharge air stream to be adjusted in two directions. See page 22 for additional information.

Table 7.4
Field Installed General Accessories

Field Installed Accessories	Description
Thermostat	Honeywell T4051A1003, 50-80°F range, 16A @ 115V, 8A @ 230V
Thermostat	Honeywell T451A3005, 44-86°F range, 9.8A @ 115V, 4.9A @ 230V
Thermostat	Johnson Controls T22BBC-1, 40-90°F range, Auto/Off/Fan switch, 10A @ 115V, 4.9A @ 230V
Explosion-proof Thermostat	Honeywell T6051B1006, 46-84° range, 10.2A @ 115V, 6.5A @ 230V
Aquastat	Aquastat, 10 amps @ 115V; 6 amps @ 230V; 100°-240°F range, SPDT, 10°F Diff. Fixed, Johnson A19DAC-1
Thermostat Guard	Clear plastic locking guard with tumbler lock and two keys. Available only on thermostat Item Codes 23124, 23125 and 90348.
Pipe Hanger Adapter Kit	Allows unit heater to be suspended by threaded pipe instead of threaded rod. Two kits are required for V and VN models. Kits are not available for HSB-18 and HSB-24 models or Power-Throw™ models.
Manual Starter	Toggle switch starter with thermal overload protection for remote on/off control of unit fan operation. Available for power codes 01 and 02 only.
Step-Down Transformer	For supply voltages of 208V/60Hz/1ph and all non-explosion-proof 3 phase voltages of 208, 230, 460 and 575, certain Model Numbers require that a 115V/60Hz/1 phase Power Code 01 unit heater be used with a shipped loose accessory transformer. See page 23 for additional information.

Power Code Descriptions & Control Sequence

Table 8.1
Power Code Descriptions

Power Code	Supply Voltage	Motor Enclosure	Motor Type	Thermal Overload Protection	Motor Starter
01	115/60/1	Totally Enclosed	①	Yes	N/A
02	230/60/1	Totally Enclosed	①	Yes	N/A
04	200-208/60/3	Totally Enclosed	Polyphase Induction	No	Field Supplied/Installed
05	230/460/60/3	Totally Enclosed	Polyphase Induction	No	Field Supplied/Installed
06	115/60/1	Explosion-proof ②	Split Phase	Yes	N/A
09	230/460/60/3	Explosion-proof ②	Polyphase Induction	Yes	Field Supplied/Installed
10	575/60/3	Totally Enclosed	Polyphase Induction	No	Field Supplied/Installed

① Motors are shaded pole for models HSB/HC 18-33 and V/VN 42-95. Models HSB/HC 47-340 and V/VN 139-333 are permanent split capacitor.
② Explosion-proof motors are suitable for Class I, Group D, Class II, Groups F and G, and Class III, Division 1 and 2 environments. Canadian Standard Association (CSA) requirements state that the explosion-proof units may not be used with a fluid temperature in excess of 329°F or pressures greater than 87 psig and still maintain their T3B temperature rating.
Class I, Group D motors are for operations in areas containing gasoline, petroleum, naphtha, benzene, butane, propane, alcohol, acetone, lacquer solvent or natural gas.
Class II, Group F motors are for operations in areas containing carbon black, coal or coke dust.
Class II, Group G motors are for operations in areas containing flour, starch or grain dust.
Class III motors are for operations in areas containing easily ignitable fibers and flyings.

Control Sequence

The following control sequence descriptions are typical for steam/hot water unit heaters:

Intermittent Fan Operation - Hot Coil
When a room thermostat calls for heat, the motor is energized. Hot water or steam is continuously supplied to the unit heater, even when the motor is not running. When the thermostat is satisfied, the motor is de-energized.

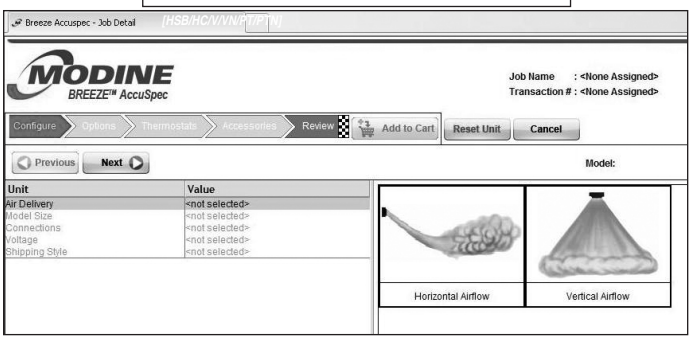
Continuous Fan Operation - Intermittent Hot/Cold Coil
When a room thermostat calls for heat, a valve is opened, allowing steam or hot water to enter the unit heater. When the thermostat is satisfied, the valve is closed. The fan runs continuously.

Intermittent Fan Operation - Intermittent Hot/Cold Coil
When a room thermostat calls for heat, the motor is energized. At the same time, a valve is opened allowing steam or hot water to enter the unit heater. An aquastat may be attached to the supply or return piping to prevent fan operation until the coil is adequately heated to avoid cold air delivery. When the thermostat is satisfied, the valve closes and the motor is de-energized.

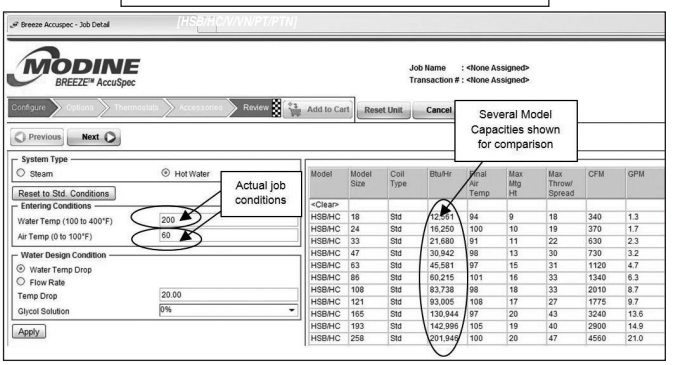
Modine Breeze™ AccuSpec Sizing and Selection Program

The Modine Breeze AccuSpec is the fastest way to generate performance data based on actual job conditions. The Breeze AccuSpec program is a web-based sizing and selection program. The program provides a series on step-by-step questions that allow for the easy configuration of Modine products. After a model has been configured, the program can generate Submittal Schedules, Submittal Data including performance and dimensional drawings, and Specifications.

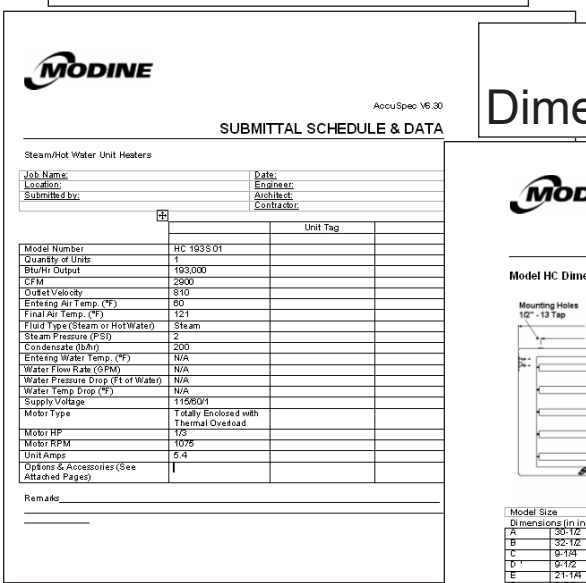
Pictures for Visual Selection



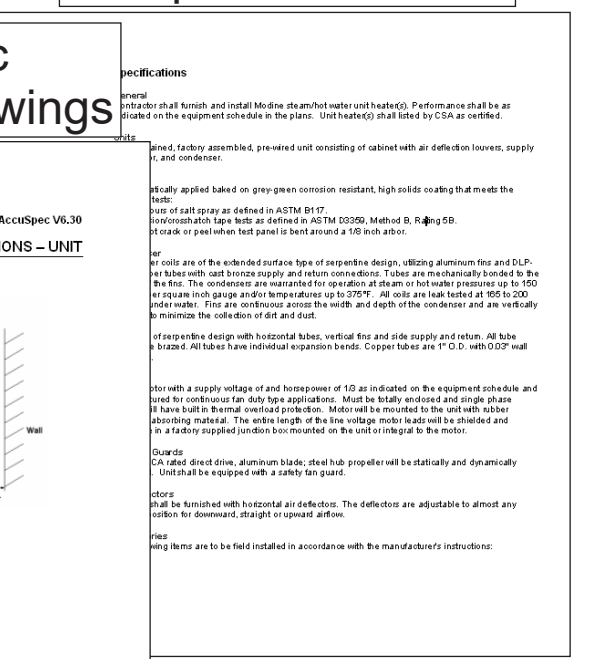
Capacities at Job Conditions



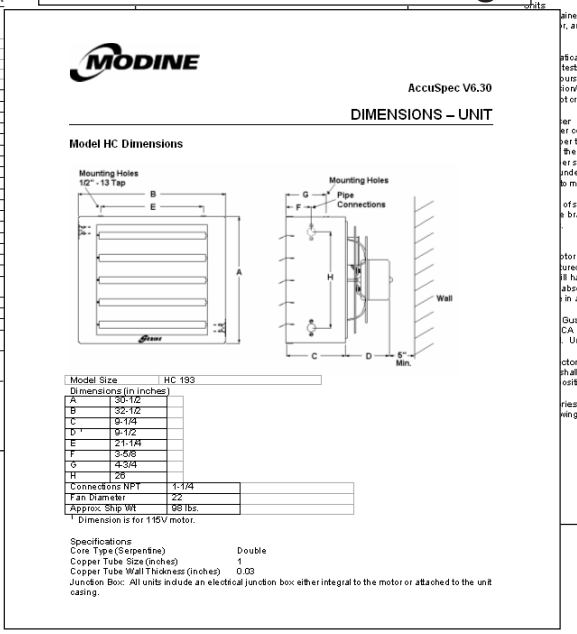
Submittal Schedules



Job Specific Specifications



Unit Specific Dimensional Drawings



For access to the Breeze AccuSpec program, contact your local Modine sales representative.

Steam Conversion Tables

Table 10.1 and the formulas below are used to determine the heating capacity (Btu/hr) of a unit heater at a steam pressure and/or entering air temperature other than standard conditions of 2 lb. steam, 60°F entering air temperature.

Table 10.1
Steam Heating Capacity Conversion Factors

Unit Heater Type	Steam Pressure (PSIG)	Entering Air Temperature (°F)											
		-10	0	10	20	30	40	50	60	70	80	90	100
Horizontal Delivery	0	1.54	1.45	1.37	1.27	1.19	1.11	1.03	0.96	0.88	0.81	0.74	0.67
	2	1.59	1.50	1.41	1.32	1.24	1.16	1.08	1.00	0.93	0.85	0.78	0.71
	5	1.64	1.55	1.46	1.37	1.29	1.21	1.13	1.05	0.97	0.90	0.83	0.76
	10	1.73	1.64	1.55	1.46	1.38	1.29	1.21	1.13	1.06	0.98	0.91	0.84
	15	1.80	1.71	1.61	1.53	1.44	1.34	1.28	1.19	1.12	1.04	0.97	0.90
	20	1.86	1.77	1.68	1.58	1.50	1.42	1.33	1.25	1.17	1.10	1.02	0.95
	30	1.97	1.87	1.78	1.68	1.60	1.51	1.43	1.35	1.27	1.19	1.12	1.04
	40	2.06	1.96	1.86	1.77	1.68	1.60	1.51	1.43	1.35	1.27	1.19	1.12
	50	2.13	2.04	1.94	1.85	1.76	1.67	1.58	1.50	1.42	1.34	1.26	1.19
	60	2.20	2.09	2.00	1.90	1.81	1.73	1.64	1.56	1.47	1.39	1.31	1.24
	70	2.26	2.16	2.06	1.96	1.87	1.78	1.70	1.61	1.53	1.45	1.37	1.29
	75	2.28	2.18	2 09	1.99	1.90	1.81	1.72	1.64	1.55	1.47	1.40	1.32
	80	2.31	2.21	2.11	2.02	1.93	1.84	1.75	1.66	1.58	1.50	1.42	1.34
	90	2.36	2.26	2.16	2.06	1.97	1.88	1.79	1.71	1.62	1.54	1.46	1.38
	100	2.41	2.31	2.20	2.11	2.02	1.93	1.84	1.75	1.66	1.58	1.50	1.42
	125	2.51	2.41	2.31	2.21	2.11	2.02	1.93	1.84	1.76	1.68	1.59	1.51
	150	2.60	2.50	2.40	2.30	2.20	2.11	2.02	1.93	1.84	1.76	1.67	1.59
Vertical Delivery and Power-Throw	0	1.49	1.41	1.33	1.25	1.18	1.11	1.03	0.96	0.90	0.83	0.76	0.69
	2	1.52	1.45	1.37	1.29	1.22	1.15	1.07	1.00	0.93	0.86	0.80	0.73
	5	1.58	1.50	1.42	1.34	1.27	1.20	1.12	1.05	0.98	0.91	0.85	0.78
	10	1.64	1.57	1.49	1.41	1.34	1.27	1.19	1.12	1.05	0.98	0.91	0.85
	15	1.70	1.62	1.55	1.47	1.40	1.32	1.25	1.18	1.11	1.04	0.97	0.90
	20	1.75	1.67	1.60	1.52	1.45	1.37	1.30	1.23	1.16	1.09	1.02	0.96
	30	1.83	1.75	1.68	1.61	1.53	1.46	1.39	1.32	1.25	1.18	1.11	1.04
	40	1.90	1.82	1.75	1.68	1.61	1.53	1.46	1.39	1.32	1.25	1.18	1.11
	50	1.96	1.87	1.81	1.74	1.67	1.59	1.52	1.45	1.38	1.31	1.24	1.17
	60	2.02	1.94	1.87	1.79	1.72	1.64	1.57	1.50	1.43	1.36	1.29	1.22
	70	2.07	1.99	1.92	1.84	1.76	1.69	1.62	1.55	1.47	1.40	1.33	1.27
	75	2.10	2.02	1.94	1.86	1.79	1.71	1.64	1.57	1.49	1.42	1.36	1.29
	80	2.11	2.04	1.96	1.88	1.80	1.73	1.66	1.59	1.51	1.44	1.38	1.31
	90	2.15	2.08	2.00	1.92	1.84	1.77	1.69	1.62	1.55	1.48	1.41	1.34
	100	2.19	2.11	2.03	1.95	1.88	1.80	1.73	1.66	1.59	1.52	1.45	1.38
	125	2.27	2.19	2.11	1.99	1.91	1.88	1.81	1.74	1.67	1.60	1.53	1.46
	150	2.34	2.26	2.18	2.10	2.03	1.95	1.88	1.81	1.74	1.67	1.60	1.53
	175	2.40	2.32	2.24	2.16	2.09	2.01	1.94	1.87	1.80	1.73	1.66	1.59
	200	2.45	2.37	2.29	2.22	2.14	2.07	1.99	1.92	1.85	1.78	1.71	1.64
	225	2.50	2.42	2.34	2.26	2.19	2.12	2.04	1.97	1.90	1.83	1.76	1.69
	250	2.54	2.46	2.38	2.31	2.23	2.16	2.09	2.01	1.94	1.87	1.80	1.73

Applicable formulas (examples on page 15):

To find actual unit heater capacity when operated at non-standard (actual) conditions:

$Btu_A = Btu_S$ x Heating Capacity Factor

To select a heater capacity based on standard conditions to meet a heating capacity at non-standard (actual) conditions:

$Btu_S = Btu_A \div$ Heating Capacity Factor

Where:
Btu_S = Capacity at standard conditions (2 lb. steam, 60°F entering air temperature) from Tables 13.1 through 14.2
Btu_A = Capacity at non-standard (actual) conditions

Steam Conversion Tables

Table 11.1 and the formulas below are used to determine the air temperature rise of a unit heater at a steam pressure and/or entering air temperature other than standard conditions of 2 lb. steam, 60°F entering air temperature.

Table 11.1
Air Temperature Rise Conversion Factors

Unit Heater Type	Steam Pressure (PSIG)	Entering Air Temperature (°F)											
		-10	0	10	20	30	40	50	60	70	80	90	100
Horizontal Delivery	0	1.33	1.28	1.24	1.17	1.12	1.07	1.01	0.96	0.90	0.84	0.78	0.72
	2	1.38	1.33	1.27	1.22	1.17	1.11	1.06	1.00	0.94	0.88	0.83	0.76
	5	1.43	1.38	1.33	1.27	1.21	1.16	1.11	1.05	1.00	0.93	0.88	0.82
	10	1.50	1.45	1.40	1.35	1.29	1.24	1.19	1.13	1.07	1.02	0.95	0.90
	15	1.56	1.51	1.46	1.42	1.36	1.31	1.24	1.19	1.14	1.08	1.02	0.97
	20	1.61	1.56	1.52	1.46	1.41	1.36	1.30	1.25	1.19	1.14	1.08	1.02
	30	1.70	1.65	1.61	1.55	1.51	1.46	1.40	1.35	1.29	1.24	1.18	1.12
	40	1.78	1.73	1.68	1.62	1.58	1.54	1.48	1.43	1.38	1.32	1.26	1.21
	50	1.84	1.79	1.74	1.69	1.65	1.60	1.55	1.50	1.45	1.39	1.33	1.28
	60	1.91	1.86	1.81	1.75	1.71	1.66	1.61	1.56	1.50	1.45	1.40	1.33
	70	1.95	1.91	1.86	1.81	1.76	1.71	1.66	1.61	1.56	1.51	1.45	1.39
	75	1.97	1.93	1.89	1.84	1.79	1.74	1.69	1.64	1.58	1.53	1.47	1.42
	80	2.00	1.95	1.91	1.86	1.82	1.76	1.72	1.66	1.61	1.56	1.49	1.44
	90	2.04	2.00	1.95	1.90	1.86	1.81	1.75	1.70	1.65	1.60	1.54	1.49
	100	2.08	2.04	1.99	1.95	1.89	1.85	1.79	1.75	1.69	1.64	1.59	1.53
	125	2.17	2.13	2.09	2.04	1.99	1.94	1.89	1.84	1.79	1.74	1.68	1.63
	150	2.25	2.21	2.17	2.12	2.07	2.03	1.98	1.93	1.87	1.83	1.77	1.71
Vertical Delivery and Power-Throw	0	1.36	1.31	1.25	1.19	1.13	1.08	1.02	0.96	0.90	0.84	0.78	0.72
	2	1.41	1.35	1.29	1.24	1.18	1.12	1.06	1.00	0.94	0.88	0.82	0.76
	5	1.46	1.40	1.35	1.29	1.23	1.17	1.12	1.06	1.00	0.94	0.88	0.82
	10	1.54	1.48	1.43	1.37	1.31	1.25	1.20	1.14	1.08	1.02	0.96	0.89
	15	1.61	1.55	1.49	1.44	1.38	1.32	1.26	1.20	1.14	1.09	1.02	0.97
	20	1.67	1.61	1.55	1.50	1.44	1.38	1.32	1.26	1.20	1.15	1.08	1.02
	30	1.77	1.71	1.65	1.60	1.54	1.48	1.42	1.36	1.30	1.25	1.18	1.12
	40	1.85	1.79	1.74	1.68	1.62	1.56	1.51	1.45	1.39	1.33	1.27	1.21
	50	1.92	1.86	1.81	1.75	1.69	1.64	1.58	1.52	1.46	1.40	1.34	1.28
	60	1.99	1.93	1.88	1.82	1.76	1.70	1.65	1.58	1.53	1.47	1.41	1.35
	70	2.05	1.99	1.94	1.88	1.82	1.76	1.70	1.65	1.59	1.53	1.47	1.41
	75	2.08	2.02	1.96	1.91	1.85	1.79	1.73	1.67	1.62	1.56	1.50	1.43
	80	2.10	2.04	1.99	1.93	1.87	1.81	1.75	1.70	1.64	1.58	1.52	1.46
	90	2.15	2.09	2.04	2.00	1.92	1.86	1.80	1.74	1.69	1.63	1.57	1.51
	100	2.19	2.14	2.08	2.02	1.97	1.91	1.85	1.79	1.73	1.67	1.61	1.55
	125	2.29	2.24	2.18	2.12	2.07	2.01	1.95	1.89	1.83	1.77	1.71	1.65
	150	2.39	2.33	2.27	2.22	2.16	2.10	2.04	1.99	1.93	1.87	1.81	1.75
	175	2.46	2.41	2.35	2.29	2.24	2.18	2.12	2.06	2.00	1.94	1.88	1.82
	200	2.54	2.48	2.42	2.37	2.31	2.25	2.19	2.13	2.07	2.02	1.96	1.89
	225	2.60	2.54	2.49	2.43	2.37	2.32	2.26	2.20	2.14	2.08	2.02	1.96
	250	2.66	2.60	2.55	2.49	2.43	2.38	2.32	2.26	2.20	2.14	2.08	2.02

Applicable formulas (examples on page 15):

To find actual air temperature rise of unit heater when operated at non-standard (actual) conditions:

$$ATR_A = (FAT_S - EAT_S) \times \text{Air Temperature Rise Factor}$$

To find actual final air temperature of unit heater when operated at non-standard (actual) conditions:

$$FAT_A = EAT_A + ATR_A$$

Where:

EAT_S = Standard conditions entering air temperature (60°F)
EAT_A = Non-standard (actual) entering air temperature
FAT_S = Final air temperature at standard conditions from Tables 13.1 through 14.2
FAT_A = Final air temperature at non-standard (actual) conditions
ATR_A = Air temperature rise at non-standard (actual) conditions

Steam Conversion Tables

Table 12.1 is used to determine how steam pressures other than 2 lb. affect mounting height.

Table 12.1
Steam Unit Heater Mounting Height Correction Factors ①②

	Steam Pressure, PSIG																		
	2	5	10	15	20	30	40	50	60	70	80	90	100	125	150	175	200	225	250
Correction Factor	1.00	0.97	0.94	0.92	0.89	0.86	0.84	0.82	0.80	0.79	0.77	0.76	0.76	0.74	0.72	0.71	0.70	0.69	0.68

① Factors are for use with entering air temperatures that range from 50° to 70°F.
② While all units are capable of operation on steam pressures greater than 30 lb., low outlet temperature models are ideally suited for steam pressures above 30 lb. when mounting height is critical.

Applicable formula (examples on page 15):

Max. Mounting Height$_A$ = Max. Mounting Height$_S$ x Correction Factor

Where:
Max. Mounting Height$_A$ = Maximum mounting height at actual conditions
Max. Mounting Height$_S$ = Maximum mounting height at standard conditions

Table 12.2 is used to determine the rate of condensate production at steam pressures other than 2 lb.

Table 12.2
Properties of Steam

Gauge Pressure (PSIG)	Temp (°F)	Latent Heat (Btu/lb.)	Gauge Pressure (PSIG)	Temp (°F)	Latent Heat (Btu/lb.)	Gauge Pressure (PSIG)	Temp (°F)	Latent Heat (Btu/lb.)	Gauge Pressure (PSIG)	Temp (°F)	Latent Heat (Btu/lb.)
0	212.0	970.3	34	279.4	924.7	70	316.0	897.3	109	343.6	875.4
2	218.5	966.2	36	281.9	922.9	72	317.7	896.0	112	345.4	873.9
4	224.4	962.4	38	284.3	921.1	74	319.3	894.8	115	347.2	872.5
5	227.2	960.6	40	286.7	919.3	76	320.9	893.5	118	348.9	871.0
6	229.8	958.8	42	289.0	917.6	78	322.4	892.3	121	350.7	869.6
8	234.8	955.6	44	291.3	915.9	80	323.9	891.1	124	352.4	868.2
10	239.4	952.5	46	293.5	914.3	82	325.4	889.9	125	352.9	867.8
12	243.7	949.6	48	295.6	912.7	84	326.9	888.8	127	354.0	866.9
14	247.8	946.8	50	297.7	911.2	86	328.4	887.6	130	355.7	865.5
16	251.6	944.2	52	299.7	909.7	88	329.8	886.5	133	357.3	864.1
18	255.3	941.7	54	301.7	908.2	90	331.2	885.4	136	358.9	862.9
20	258.8	939.3	56	303.6	906.7	92	332.5	884.3	139	360.4	861.5
22	262.1	936.9	58	305.5	905.3	94	333.9	883.2	142	362.0	860.3
24	265.3	934.7	60	307.3	903.9	96	335.2	882.1	145	363.5	859.0
26	268.3	932.5	62	309.1	902.5	98	336.6	881.1	150	365.9	856.9
28	271.3	930.5	64	310.9	901.2	100	337.9	880.0	175	377.4	846.8
30	274.1	928.5	66	312.6	899.9	103	339.8	878.5	200	387.9	837.2
32	276.8	926.6	68	314.4	898.6	106	341.7	876.9	225	397.3	828.5
-	-	-	-	-	-	-	-	-	250	406.1	820.0

Applicable formula (examples on page 15):

Condensate rate = Btu$_A$ ÷ Latent Heat of Steam

Where:
Btu$_A$ = Capacity at actual operating conditions

Steam Performance Data - Standard Models

Table 13.1 - Performance Data for Standard Units at Standard Conditions of 2 lb. Steam and 60°F Entering Air High Motor Speed

Type	Model No.	Btu/hr	Sq. Ft. EDR	Air Data								Motor Data	
				Maximum Mounting Height (ft.) ①		Heat Throw or Spread @ Max. Height ①		CFM ②	Outlet Velocity (Fpm)	Final Air Temp. (°F)	Condensate lb/hr	Hp	Approx. RPM
Horizontal Delivery	HSB/HC 18	18,000	75	8		17		340	625	107	19	1/60	1,550
	HSB/HC 24	24,000	100	9		18		370	695	119	25	1/25	1,550
	HSB/HC 33	33,000	138	10		21		630	690	108	34	1/25	1,550
	HSB/HC 47	47,000	196	12		28		730	810	119	49	1/12	1,550
	HSB/HC 63	63,000	263	14		29		1,120	690	111	65	1/12	1,550
	HSB/HC 86	86,000	358	15		31		1,340	835	118	89	1/8	1,625
	HSB/HC 108	108,000	450	17		31		2,010	790	109	112	1/8	1,625
	HSB/HC 121	121,000	504	16		25		1,775	715	122	125	1/5	1,075
	HSB/HC 165	165,000	688	19		40		3,240	880	106	171	1/3	1,075
	HSB/HC 193	193,000	804	18		38		2,900	810	121	200	1/3	1,075
	HSB/HC 258	258,000	1,075	19		44		4,560	750	111	267	1/2	1,075
	HSB/HC 290	290,000	1,208	20		46		4,590	765	117	300	1/2	1,075
	HSB/HC 340	340,000	1,417	20		46		5,130	735	120	352	1/2	1,075
Power Throw™ ③	PT/PTN 279	279,000	1,163	16		100		5,460	2,165	111	289	1/2	1,075
	PT/PTN 333	333,000	1,388	17		110		5,980	2,165	116	345	3/4	1,140
	PT/PTN 385	385,000	1,604	17		115		7,680	1,860	110	398	1	1,140
	PT/PTN 500	500,000	2,083	18		130		10,390	2,520	108	517	1 1/2	1,140
	PT/PTN 610	610,000	2,542	20		140		11,750	2,315	112	631	1 1/2	1,140
	PT 952	952,000	3,967	21		145		12,170	2,321	139	985	2	1,140
Vertical Delivery ③	V/VN 42	42,000	175	11	***15***	17	***11***	950	825	103	43	1/30	1,050
	V/VN 59	59,000	246	14	***19***	21	***14***	1,155	1,005	111	61	1/30	1,050
	V/VN 78	78,000	325	15	***20***	23	***15***	1,590	1,065	109	81	1/15	1,050
	V/VN 95	95,000	396	15	***20***	23	***15***	1,665	1,120	118	98	1/15	1,050
	V/VN 139	139,000	579	18	***24***	27	***18***	2,660	1,285	112	144	1/6	1,075
	V/VN 161	161,000	671	20	***27***	30	***20***	2,945	1,420	115	167	1/3	1,075
	V/VN 193	193,000	804	22	***30***	33	***22***	3,500	1,690	116	200	1/3	1,075
	V/VN 212	212,000	883	22	***30***	33	***22***	3,610	1,740	120	219	1/3	1,075
	V/VN 247	247,000	1,029	26	***34***	39	***26***	4,820	1,910	111	256	1/2	1,075
	V/VN 279	279,000	1,163	30	***37***	45	***30***	5,460	2,165	111	289	1/2	1,075
	V/VN 333	333,000	1,388	30	***37***	45	***30***	5,980	2,165	116	345	3/4	1,140
	V/VN 385	385,000	1,604	30	***36***	45	***30***	7,680	1,860	110	398	1	1,140
	V/VN 500	500,000	2,083	37	***44***	56	***37***	10,390	2,520	108	517	1 1/2	1,140
	V/VN 610	610,000	2,542	36	***43***	54	***36***	11,750	2,315	112	631	1 1/2	1,140
	V 952	952,000	3,967	37		56		12,170	2,321	139	985	2	1,140

Table 13.2 - Performance Data for Standard Units at Standard Conditions of 2 lb. Steam and 60°F Entering Air Reduced Motor Speed ④

Type	Model No.	Btu/hr	Sq. Ft. EDR	Air Data						Motor Data	
				Maximum Mounting Height (ft.) ①	Heat Throw or Spread @ Max. Height ①	CFM ②	Outlet Velocity (Fpm)	Final Air Temp. (°F)	Condensate lb/hr	Hp	Approx. RPM
Horizontal Delivery	HSB/HC 18	14,000	58	8	10	220	415	118	14	1/60	1,000
	HSB/HC 24	18,000	75	9	11	230	440	131	19	1/25	1,000
	HSB/HC 33	25,000	104	10	13	395	440	118	26	1/25	1,000
	HSB/HC 47	38,000	158	12	17	450	515	137	39	1/12	1,000
	HSB/HC 63	47,000	195	14	17	685	430	122	49	1/12	1,000
	HSB/HC 86	64,000	265	15	19	825	525	131	66	1/8	1,000
	HSB/HC 108	81,000	340	17	19	1,255	500	119	84	1/8	1,000

① Horizontal units with horizontal louvers open 30° from vertical plane. Vertical types equipped with cone jet deflector, blades fully opened are shown in bold. Please see page 22 for additional outlet accessory performance data.
② Cfm for horizontal types is entering Cfm. Cfm for vertical and Power-Throw™ types is leaving Cfm.
③ V and PT models have copper tubes, VN and PTN models have 90/10 cupro-nickel tubes.
④ Requires Solid State Motor Speed Controller.

Steam Performance Data - Low Outlet Temperature Models

Table 14.1 - Performance Data for Low Outlet Temperature Units at Standard Conditions of 2 lb. Steam and 60°F Entering Air High Motor Speed

Type	Model No.	Btu/hr	Sq. Ft. EDR	Air Data								Motor Data	
				Maximum Mounting Height (ft.) ①		Heat Throw or Spread @ Max. Height ①		CFM ②	Outlet Velocity (Fpm)	Final Air Temp. (°F)	Condensate lb/hr	Hp	Approx. RPM
Horizontal Delivery	HSB/HC 18L	15,900	66	9		20		364	655	100	16	1/60	1,550
	HSB/HC 24L	19,300	80	11		21		435	795	100	20	1/25	1,550
	HSB/HC 33L	29,500	123	12		24		695	745	99	31	1/25	1,550
	HSB/HC 47L	32,000	133	14		32		855	910	94	33	1/12	1,550
	HSB/HC 63L	52,500	219	16		33		1,170	710	101	54	1/12	1,550
	HSB/HC 86L	61,500	256	17		36		1,510	910	97	64	1/8	1,625
	HSB/HC 108L	86,500	360	19		36		2,150	825	97	90	1/8	1,625
	HSB/HC 121L	88,000	367	18		29		2,070	800	98	91	1/5	1,075
	HSB/HC 165L	143,000	596	21		45		3,480	930	97	148	1/3	1,075
	HSB/HC 258L	190,000	792	22		51		4,655	750	98	197	1/2	1,075
	HSB/HC 290L	207,000	863	23		53		5,040	805	94	214	1/2	1,075
	HSB/HC 340L	255,000	1,063	23		53		5,575	775	102	264	1/2	1,075
Power Throw™ ③	PT/PTN 610L	470,000	1,958	22		154		2,400	2,445	97	486	1-1/2	1,140
Vertical Delivery ③	V 42L	33,000	138	13	**17**	20	**13**	960	835	94	34	1/30	1,050
	V 59L	44,000	183	16	**22**	24	**16**	1,190	1,035	96	45	1/30	1,050
	V 78L	62,000	258	19	**26**	29	**19**	1,740	1,070	95	65	1/15	1,050
	V 95L	71,000	296	19	**26**	29	**19**	1,760	1,180	99	73	1/15	1,050
	V/VN 139L	103,000	429	23	**31**	35	**23**	2,860	1,380	95	106	1/6	1,075
	V/VN 161L	127,000	529	26	**35**	39	**26**	3,400	1,640	96	132	1/3	1,075
	V/VN 193L	149,000	621	27	**36**	41	**27**	3,710	1,790	99	154	1/3	1,075
	V/VN 212L	163,000	679	27	**36**	41	**27**	3,830	1,845	102	169	1/3	1,075
	V/VN 247L	190,000	792	32	**42**	48	**32**	5,110	2,030	96	197	1/2	1,075
	V/VN 279L	215,000	896	36	**45**	54	**36**	5,790	2,300	96	222	1/2	1,075
	V/VN 333L	256,000	1,067	36	**45**	54	**36**	6,340	2,300	100	265	3/4	1,140
	V/VN 385L	296,000	1,233	36	**43**	54	**36**	8,140	1,970	95	307	1	1,140
	V/VN 500L	385,000	1,604	45	**54**	68	**45**	11,000	2,670	94	400	1-1/2	1,140
	V/VN 610L	470,000	1,958	44	**52**	66	**44**	12,400	2,445	97	485	1-1/2	1,140
	V 952L	733,000	3,055	45	**-**	68	**-**	12,940	2,450	115	759	2	1,140

Table 14.2 - Performance Data for Low Outlet Temperature Units at Standard Conditions of 2 lb. Steam and 60°F Entering Air Reduced Motor Speed ④

Type	Model No.	Btu/hr	Sq. Ft. EDR	Air Data						Motor Data	
				Maximum Mounting Height (ft.) ①	Heat Throw or Spread @ Max. Height ①	CFM ②	Outlet Velocity (Fpm)	Final Air Temp. (°F)	Condensate lb/hr	Hp	Approx. RPM
Horizontal Delivery	HSB/HC 18L	12,000	51	9	12	230	425	108	12	1/60	1,000
	HSB/HC 24L	14,400	60	11	13	265	490	109	15	1/25	1,000
	HSB/HC 33L	22,000	92	12	14	430	470	107	23	1/25	1,000
	HSB/HC 47L	24,300	101	14	19	540	580	101	25	1/12	1,000
	HSB/HC 63L	39,500	164	16	20	725	445	109	41	1/12	1,000
	HSB/HC 86L	46,000	192	17	22	925	565	105	48	1/8	1,000
	HSB/HC 108L	65,000	270	19	22	1,330	520	104	67	1/8	1,000

① Horizontal units with horizontal louvers open 30° from vertical plane. Vertical types equipped with cone jet deflector, blades fully opened are shown in bold. Please see page 22 for additional outlet accessory performance data.
② Cfm for horizontal types is entering Cfm. Cfm for vertical and Power-Throw™ types is leaving Cfm.
③ V and PT models have copper tubes, VN and PTN models have 90/10 cupro-nickel tubes.
④ Requires Solid State Motor Speed Controller.

Steam Conversion Tables - Example Calculations

Conversion factor example #1:

For an HSB340S operating at 30 lb. steam and 50°F entering air temperature, determine the following:

- Capacity (Btu/hr)
- Final air temperature (°F)
- Condensate (lb./hr)
- Maximum mounting height

Solution:

The factors/data necessary to solve this problem are as follows:

- Steam heating capacity conversion factor for 30 lb. steam and 50°F entering air is 1.43, from Table 10.1.
- Air temperature rise conversion factor is 1.40, from Table 11.1.
- The latent heat of steam at 30 lb. is 928.5 Btu/lb., from Table 12.2.
- The mounting height correction factor is 0.86, from Table 12.1.
- The standard rated capacity of an HSB 340 is 340,000 Btu/hr, from Table 13.1.
- The final air temperature of an HSB 340 at standard conditions is 120°F, from Table 13.1.
- The maximum mounting height at standard conditions is 20 feet, from Table 13.1.

$Btu_A = Btu_S$ x Heating Capacity Factor = 340,000 x 1.43 = 486,200 Btu/hr

$ATR_A = (FAT_S - EAT_S)$ x Air Temp Rise Factor = (120°F - 60°F) x 1.40 = 84°F
$FAT_A = EAT_A + ATR_A$ = 50°F + 84°F = 134°F

Condensate rate = Btu_A ÷ Latent Heat of Steam = 486,200 ÷ 928.5 = 523.6 lb./hr

Max. Mounting $Height_A$ = Max. Mounting $Height_S$ x Correction Factor = 20 feet x 0.86 = 17.2 feet

Conversion factor example #2:

Which vertical unit heater model is required to deliver 155,500 Btu/hr at 20 lb. steam and 60°F entering air temperature. What will be the actual capacity and rate of condensate production for the selected unit?

Solution:

The factors/data necessary to solve this problem are as follows:

- Steam heating capacity conversion factor for 20 lb. steam and 60°F entering air is 1.23, from Table 10.1.
- The latent heat of steam at 20 lb. is 939.3 Btu/lb. from Table 12.2.

$Btu_S = Btu_A$ ÷ Heating Capacity Factor = 155,500 ÷ 1.23 = 126,423 Btu/hr (at standard conditions)
From Table 13.1, a V 139 model meets the requirement with a rated capacity of 139,000 Btu/hr at standard conditions.

The capacity of the V 139 at actual conditions will be $Btu_A = Btu_S$ x Heating Capacity Factor =
139,000 x 1.23 = 170,970 Btu/hr.

Condensate rate = Btu_A ÷ Latent Heat of Steam = 170,970 ÷ 939.3 = 182.0 lb./hr.

Alternate Solution:

Low Outlet Temperature models are normally recommended for steam pressures above 30 lb. However, the use of these models with steam pressure less than 30 lb. is acceptable.

Based on the example above, a V 161L model, from Table 14.1, meets the requirement with a rated capacity of 127,000 Btu/hr at standard conditions.

The capacity of the V 161L at actual conditions will be $Btu_A = Btu_S$ x Heating Capacity Factor =
127,000 x 1.23 = 156,210 Btu/hr.

Condensate rate = Btu_A ÷ Latent Heat of Steam = 156,210 ÷ 939.3 = 166.3 lb./hr.

Hot Water Conversion Tables

Table 16.1 and the formulas below are used to determine the heating capacity (Btu/hr) of a unit heater at a water temperature and/or entering air temperature other than standard conditions of 200° entering water temperature, 60° entering air temperature.

Table 16.1
Hot Water Heating Capacity Conversion Factors

Entering Water	Entering Air Temperature (°F)										
Temp. (°F)	0	10	20	30	40	50	60	70	80	90	100
60	0.462	0.380	0.300	0.222	0.146	0.072	0	0	0	0	0
70	0.539	0.456	0.375	0.296	0.219	0.145	0.071	0	0	0	0
80	0.615	0.531	0.450	0.370	0.293	0.217	0.143	0.071	0	0	0
90	0.692	0.607	0.524	0.444	0.366	0.289	0.214	0.141	0.070	0	0
100	0.769	0.683	0.599	0.518	0.439	0.361	0.286	0.212	0.140	0.069	0
110	0.846	0.759	0.674	0.592	0.512	0.434	0.357	0.283	0.210	0.138	0.068
120	0.923	0.835	0.749	0.666	0.585	0.506	0.429	0.353	0.279	0.207	0.137
130	1.000	0.911	0.824	0.740	0.658	0.578	0.500	0.424	0.349	0.276	0.205
140	1.077	0.987	0.899	0.814	0.731	0.651	0.571	0.494	0.419	0.345	0.273
150	1.154	1.063	0.974	0.888	0.805	0.723	0.643	0.565	0.489	0.414	0.342
160	1.231	1.139	1.049	0.962	0.878	0.795	0.714	0.636	0.559	0.483	0.410
170	1.308	1.215	1.124	1.036	0.950	0.867	0.786	0.706	0.629	0.552	0.478
180	1.385	1.291	1.199	1.110	1.024	0.940	0.857	0.777	0.699	0.621	0.547
190	1.462	1.367	1.274	1.184	1.097	1.012	0.929	0.848	0.768	0.690	0.615
200	1.539	1.443	1.349	1.258	1.170	1.084	1.000	0.918	0.838	0.759	0.684
210	1.615	1.519	1.424	1.332	1.243	1.157	1.071	0.989	0.908	0.828	0.752
220	1.692	1.594	1.499	1.406	1.312	1.229	1.143	1.060	0.978	0.897	0.820
230	1.769	1.670	1.573	1.480	1.390	1.301	1.214	1.130	1.048	0.966	0.889
240	1.846	1.746	1.649	1.554	1.463	1.373	1.286	1.201	1.118	1.035	0.957
250	1.923	1.822	1.723	1.628	1.536	1.446	1.357	1.272	1.188	1.104	1.025
260	2.000	1.898	1.798	1.702	1.609	1.518	1.429	1.342	1.257	1.173	1.094
270	2.077	1.974	1.873	1.776	1.682	1.590	1.500	1.413	1.327	1.242	1.162
280	2.154	2.050	1.948	1.850	1.755	1.663	1.571	1.483	1.397	1.311	1.230
290	2.231	2.126	2.023	1.924	1.829	1.734	1.643	1.554	1.467	1.380	1.300
300	2.308	2.202	2.098	1.998	1.902	1.807	1.714	1.625	1.537	1.449	1.367
310	2.385	2.278	2.173	2.072	1.974	1.879	1.786	1.695	1.607	1.518	1.436
320	2.462	2.354	2.248	2.146	2.048	1.952	1.857	1.766	1.677	1.587	1.504
330	2.539	2.430	2.323	2.220	2.121	2.024	1.929	1.837	1.746	1.656	1.572
340	2.615	2.506	2.398	2.294	2194	2.096	2.000	1.907	1.816	1.725	1.641
350	2.962	2.581	2.473	2.368	2.267	2.168	2.071	1.978	1.886	1.794	1.709
360	2.769	2.657	2.548	2.442	2.340	2.241	2.143	2.049	1.956	1.863	1.778
370	2.846	2.733	2.622	2.516	2.413	2.313	2.214	2.119	2.026	1.932	1.846
380	2.923	2.809	2.697	2.590	2.486	2.385	2.286	2.190	2.096	2.001	1.914
390	3.000	2.885	2.772	2.664	2.560	2.458	2.357	2.261	2.165	2.070	1.983
400	3.077	2.961	2.847	2.738	2.633	2.530	2.429	2.331	2.235	2.139	2.051

Applicable formulas (examples on page 21):

To find actual unit heater capacity when operated at non-standard (actual) conditions:

$Btu_A = Btu_S$ x Heating Capacity Factor

To select a heater capacity based on standard conditions to meet a heating capacity at non-standard (actual) conditions:

$Btu_S = Btu_A \div$ Heating Capacity Factor

Where:

Btu_S = Capacity at standard conditions (200°F entering water temperature, 60°F entering air temperature) from Tables 19.1 through 20.2

Btu_A = Capacity at non-standard (actual) conditions

Hot Water Conversion Tables

Table 17.1 - Minimum Water Flow and Water Volume (gallons) ①

Type	Model	Min. GPM	Max. GPM	Coil Volume (gals)	Type	Model	Min. GPM	Max. GPM	Coil Volume (gals)	Type	Model	Min. GPM	Max. GPM	Coil Volume (gals)
HORIZONTAL DELIVERY *HSB/HC*	18	0.25	5	0.13	POWER-THROW™ *PT/PTN*	279	4.50	60	0.97	VERTICAL DELIVERY *V/VN*	42	0.50	10	0.15
	24	0.25	5	0.13		333	4.50	100	1.24		59	0.75	15	0.23
	33	0.40	10	0.41		385	4.50	100	1.24		78	1.00	20	0.31
	47	0.40	10	0.41		500	6.00	100	1.66		95	1.25	25	0.38
	63	0.50	20	0.66		610	6.00	100	1.98		139	1.00	30	0.43
	86	0.50	20	0.66		952	14.00	200	6.50		161	1.25	40	0.54
	108	0.50	30	0.98							193	1.50	50	0.65
	121	0.50	30	0.98							212	2.00	60	0.86
	165	2.00	30	1.35							247	2.00	60	0.86
	193	2.00	50	1.45							279	2.25	75	0.97
	258	2.50	70	2.20							333	2.25	75	1.24
	290	2.50	70	2.20							385	2.25	75	1.24
	340	2.50	70	2.50							500	3.00	100	1.66
											610	6.00	100	1.98
											952	14.00	200	6.50

① Water flow and water volume is the same for standard coils and low-outlet temperature coils

Table 17.2 - Ethylene Glycol Correction Factors ②

Table 17.2 is used to determine how glycol solutions affect heater capacity. These factors should be applied to the heater capacity at actual entering water and air temperature conditions.

	Ethylene Glycol Solution %						
Solution Temperature (°F)	20%	30%	40%	50%	60%	70%	80%
60	0.99	0.96	0.93	0.89	0.85	0.81	0.76
100	0.99	0.96	0.93	0.89	0.85	0.81	0.76
150	0.99	0.96	0.94	0.90	0.87	0.83	0.78
200	0.99	0.96	0.94	0.92	0.88	0.85	0.81
250	0.98	0.96	0.94	0.92	0.89	0.86	0.82
300	0.98	0.95	0.95	0.92	0.90	0.87	0.83
350	0.98	0.95	0.95	0.93	0.91	0.88	0.84
400	0.97	0.95	0.95	0.93	0.92	0.89	0.85

② For Propylene Glycol solution correction factor, multiply Ethylene Glycol correction factor by 0.95.

Applicable formulas (examples on page 21):
To find actual unit heater capacity when operated with glycol solution:

$$Btu_{AG} = Btu_S \text{ (or } Btu_A) \times \text{Glycol Correction Factor}$$

To select a heater capacity based on standard conditions to meet a heating capacity with a glycol solution:

$$Btu_S \text{ (or } Btu_A) = Btu_{AG} \div \text{Glycol Correction Factor}$$

Where:

Btu_S = Capacity at standard conditions (200°F entering water temperature, 60°F entering air temperature) from Tables 19.1 through 20.2
Btu_A = Capacity at non-standard (actual) conditions
Btu_{AG} = Capacity with glycol solution

Table 17.3 - Hot Water Unit Heater Mounting Height Correction Factors ③

Table 17.3 is used to determine how hot water temperatures other than 200°F affect mounting height.

Entering Water Temperature, °F	Correction Factor	Entering Water Temperature, °F	Correction Factor	Entering Water Temperature, °F	Correction Factor
140	1.33	230	0.91	320	0.74
150	1.25	240	0.89	330	0.72
160	1.19	250	0.86	340	0.71
170	1.13	260	0.84	350	0.70
180	1.08	270	0.82	360	0.69
190	1.04	280	0.80	370	0.67
200	1.00	290	0.78	380	0.66
210	0.97	300	0.77	390	0.65
220	0.94	310	0.75	400	0.64

③ Factors are for use with entering air temperatures that range from 50° to 70°F

Applicable formula (examples on page 21):

$$\text{Max. Mounting Height}_A = \text{Max. Mounting Height}_S \times \text{Correction Factor}$$

Where:

Max. Mounting $Height_A$ = Maximum mounting height at actual conditions
Max. Mounting $Height_S$ = Maximum mounting height at standard conditions

Hot Water Conversion Tables - Miscellaneous Formulas

Table 18.1 is used to determine how water temperature drop affects heater capacity in Btu, water flow rate in GPM and pressure drop in feet of water. These factors should be applied to the values at actual entering water and air temperature conditions.

Table 18.1
Correction Factors for Varying Water Temperature Drop ①

	Water Temperature Drop, °F											
	5	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**
Btu Correction Factor	1.23	1.13	1.06	1.00	0.95	0.90	0.86	0.82	0.78	0.72	0.69	0.67
GPM Correction Factor	4.64	2.21	1.40	1.00	0.76	0.61	0.50	0.42	0.36	0.30	0.26	0.23
WPD Correction Factor	17.24	4.32	1.85	1.00	0.61	0.41	0.30	0.22	0.18	0.14	0.12	0.11

① Water temperature drop correction factors valid only for standard 200°F entering water and 60°F air temperature conditions.

Applicable formulas (examples on page 21):

To find actual unit heater capacity or flow rate or water pressure drop when operated at non-standard (actual) conditions:

$$Btu_A = Btu_S \times \text{Btu Correction Factor}$$

$$GPM_A = GPM_S \times \text{GPM Correction Factor}$$

$$WPD_A = WPD_S \times \text{WPD Correction Factor}$$

To select a heater capacity based on standard conditions to meet a heating capacity at non-standard (actual) conditions:

$$Btu_S = Btu_A \div \text{Btu Correction Factor}$$

Where:
- Btu_S = Capacity at standard conditions (200°F entering water temperature, 60°F entering air temperature) from Tables 19.1 through 20.2
- Btu_A = Capacity at non-standard (actual) conditions
- GPM_S = Flow rate at standard conditions (200°F entering water temperature, 60°F entering air temperature) from Tables 19.1 through 20.2
- GPM_A = Flow rate at non-standard (actual) conditions
- WPD_S = Water pressure drop at standard conditions (200°F entering water temperature, 60°F entering air temperature) from Tables 19.1 through 20.2
- WPD_A = Water pressure drop at non-standard (actual) conditions

Other miscellaneous useful formulas:

$$FAT_A = EAT_A + [(460 + EAT_A) \times (Btu_A) \div (573 \times Cfm_S)]$$ ***for HSB and HC units only***

$$FAT_A = EAT_A + [(460 + EAT_A) \div ((573 \times Cfm_S \div Btu_A) - 1)]$$ ***for V/VN and PT/PTN units only***

$$WTD_A = Btu_A \div (480 \times GPM_A)$$

Where:
- EAT_A = Entering air temperature at actual conditions
- FAT_A = Final air temperature at actual conditions
- Btu_A = Capacity at actual conditions
- Cfm_S = Unit airflow as found in Tables 19.1 through 20.2
- GPM_A = Water flow rate at actual conditions in GPM
- WTD_A = Water temperature drop at actual conditions

Hot Water Performance Data - Standard Models

Table 19.1 - Performance Data for Standard Units at Standard Conditions of 200°F Entering Water and 60°F Entering Air High Motor Speed

Type	Model No.	Btu/hr	Water Data			Air Data						Motor Data	
			GPM	Pressure Drop (Ft. of Water)	Min/Max GPM	Maximum Mounting Height (ft.) ①		Heat Throw or Spread @ Max. Height ①		CFM ②	Outlet Velocity (Fpm)	Final Air Temp. (°F)	Hp	Approx. RPM
Horizontal Delivery	HSB/HC 18	12,600	1.3	0.5	0.3 / 5.0	9		18		340	615	93	1/60	1,550
	HSB/HC 24	16,200	1.7	0.8	0.3 / 5.0	10		19		370	675	100	1/25	1,550
	HSB/HC 33	21,700	2.3	0.2	0.4 / 10.0	11		23		630	675	91	1/25	1,550
	HSB/HC 47	30,900	3.2	0.4	0.4 / 10.0	13		30		730	785	98	1/12	1,550
	HSB/HC 63	45,600	4.7	0.6	0.5 / 20.0	15		31		1,120	680	97	1/12	1,550
	HSB/HC 86	60,200	6.3	1.0	0.5 / 20.0	16		33		1,340	820	101	1/8	1,625
	HSB/HC 108	83,700	8.7	2.8	0.5 / 30.0	18		33		2,010	775	98	1/8	1,625
	HSB/HC 121	93,000	9.7	3.3	0.7 / 30.0	17		27		1,775	700	107	1/5	1,075
	HSB/HC 165	130,900	13.6	8.6	2.0 / 30.0	20		43		3,240	870	96	1/3	1,075
	HSB/HC 193	143,000	14.9	1.4	2.0 / 50.0	19		41		2,900	790	105	1/3	1,075
	HSB/HC 258	201,900	21.0	5.7	2.5 / 70.0	20		47		4,560	740	100	1/2	1,075
	HSB/HC 290	228,600	23.8	7.1	2.5 / 70.0	22		50		4,590	750	105	1/2	1,075
	HSB/HC 340	271,100	28.2	11.3	2.8 / 70.0	22		50		5,130	720	108	1/2	1,075
Power Throw™ ③	PT/PTN 279	192,300	20.0	0.2	4.5 / 60.0	17		108		5,460	2,165	94	1/2	1,075
	PT/PTN 333	238,500	24.8	0.4	4.5 / 100.0	18		117		5,980	2,165	99	3/4	1,140
	PT/PTN 385	276,100	28.8	0.6	4.5 / 100.0	18		124		7,680	1,860	95	1	1,140
	PT/PTN 500	358,000	37.3	0.5	6.0 / 100.0	19		138		10,390	2,520	93	1-1/2	1,140
	PT/PTN 610	450,400	46.9	1.0	6.0 / 100.0	22		151		11,750	2,315	97	1-1/2	1,140
	PT 952	721,600	75.2	1.1	14.0 / 200.0	23		150		12,166	2,321	120	2	1,140
Vertical Delivery ③	V/VN 42	30,100	3.1	0.6	0.5 / 10.0	12	**16**	18	**12**	950	825	90	1/30	1,050
	V/VN 59	42,600	4.4	0.5	0.8 / 15.0	15	**20**	22	**15**	1,155	1,005	96	1/30	1,050
	V/VN 78	57,000	5.9	0.5	1.0 / 20.0	16	**22**	24	**16**	1,590	1,065	95	1/15	1,050
	V/VN 95	69,300	7.2	0.5	1.3 / 25.0	16	**22**	24	**16**	1,665	1,120	101	1/15	1,050
	V/VN 139	106,600	11.1	2.6	1.0 / 30.0	19	**26**	29	**19**	2,660	1,285	99	1/6	1,075
	V/VN 161	123,200	12.8	2.2	1.3 / 40.0	21	**29**	32	**22**	2,945	1,420	101	1/3	1,075
	V/VN 193	147,200	15.3	2.2	1.5 / 50.0	23	**32**	35	**24**	3,500	1,690	101	1/3	1,075
	V/VN 212	161,700	16.8	1.5	2.0 / 60.0	23	**32**	35	**24**	3,610	1,740	104	1/3	1,075
	V/VN 247	188,700	19.7	2.1	2.0 / 60.0	28	**37**	41	**28**	4,820	1,910	98	1/2	1,075
	V/VN 279	212,600	22.2	2.1	2.3 / 75.0	32	**40**	48	**32**	5,460	2,165	98	1/2	1,075
	V/VN 333	260,100	27.1	3.8	2.8 / 75.0	32	**40**	48	**32**	5,980	2,165	102	3/4	1,140
	V/VN 385	302,100	31.5	5.0	3.3 / 75.0	32	**39**	48	**32**	7,680	1,860	98	1	1,140
	V/VN 500	391,700	40.8	4.8	3.0 / 100.0	39	**47**	59	**40**	10,390	2,520	96	1-1/2	1,140
	V/VN 610	450,400	46.9	1.0	6.0 / 100.0	38	**46**	57	**39**	11,750	2,315	97	1-1/2	1,140
	V 952	721,600	75.2	1.1	14.0 / 200.0	39	-	59	-	12,166	2,321	120	2	1,140

Table 19.2 - Performance Data for Standard Units at Standard Conditions of 200°F Entering Water and 60°F Entering Air Reduced Motor Speeds ④

Type	Model No.	Btu/hr	Water Data		Air Data					Motor Data	
			GPM	Pressure Drop (Ft. of Water)	Maximum Mounting Height (ft.) ①	Heat Throw or Spread @ Max. Height ①	CFM ②	Outlet Velocity (Fpm)	Final Air Temp. (°F)	Hp	Approx. RPM
Horizontal Delivery	HSB/HC 18	9,900	1.3	0.5	9	11	220	400	101	1/60	1,000
	HSB/HC 24	12,400	1.7	0.8	10	12	230	425	109	1/25	1,000
	HSB/HC 33	16,700	2.3	0.2	11	14	395	430	98	1/25	1,000
	HSB/HC 47	23,600	3.2	0.4	13	18	450	490	107	1/12	1,000
	HSB/HC 63	34,600	4.7	0.6	15	18	685	420	106	1/12	1,000
	HSB/HC 86	45,900	6.3	1.0	16	20	825	515	110	1/8	1,000
	HSB/HC 108	64,300	8.7	2.8	18	20	1,255	490	106	1/8	1,000

① Horizontal units with horizontal louvers open 30° from vertical plane. Vertical types equipped with cone jet deflector, blades fully opened are shown in bold. Please see page 22 for additional outlet accessory performance data.
② Cfm for horizontal types is entering Cfm. Cfm for vertical and Power-Throw™ types is leaving Cfm.
③ V and PT models have copper tubes, VN and PTN models have 90/10 cupro-nickel tubes.
④ Requires Solid State Motor Speed Controller.

Hot Water Performance Data - Low Outlet Temperature Models

Table 20.1 - Performance Data for Low Outlet Temperature Units at Standard Conditions of 200°F Entering Water and 60°F Entering Air – High Motor Speed

Type	Model No.	Btu/hr	Water Data			Air Data						Motor Data	
			GPM	Pressure Drop (Ft. of Water)	Min/Max GPM	Maximum Mounting Height (ft.) ①		Heat Throw or Spread @ Max. Height ①		CFM ②	Outlet Velocity (Fpm)	Final Air Temp. (°F)	Hp	Approx. RPM
Horizontal Delivery	HSB/HC 18L	11,300	1.2	0.4	0.3 / 5.0	10		21		364	650	88	1/60	1,550
	HSB/HC 24L	13,700	1.4	0.6	0.3 / 5.0	12		22		435	775	88	1/25	1,550
	HSB/HC 33L	19,300	2.0	0.2	0.4 / 10.0	13		26		695	730	85	1/25	1,550
	HSB/HC 47L	21,100	2.2	0.2	0.4 / 10.0	15		34		855	890	82	1/12	1,550
	HSB/HC 63L	37,900	4.0	0.4	0.5 / 20.0	17		35		1,170	695	89	1/12	1,550
	HSB/HC 86L	44,600	4.6	0.6	0.5 / 20.0	18		38		1,510	890	87	1/8	1,625
	HSB/HC 108L	66,100	6.9	1.8	0.8 / 30.0	20		38		2,150	815	88	1/8	1,625
	HSB/HC 121L	66,700	6.9	1.9	0.8 / 30.0	19		31		2,070	785	89	1/5	1,075
	HSB/HC 165L	113,200	11.8	6.6	2.0 / 30.0	23		48		3,480	920	89	1/3	1,075
	HSB/HC 258L	147,400	15.4	3.2	2.5 / 70.0	23		54		4,655	735	89	1/2	1,075
	HSB/HC 290L	161,100	16.8	3.7	2.5 / 70.0	25		57		5,040	800	89	1/2	1,075
	HSB/HC 340L	200,900	20.9	6.6	2.5 / 70.0	25		57		5,575	760	93	1/2	1,075
Power Throw™ ③	PT/PTN 610L	344,900	35.9	0.6	6.0 / 100.0	24		158		12,400	2,445	86	1 1/2	1,140
Vertical Delivery ③	V 42L	23,000	2.4	0.4	0.5 / 10.0	14	**18**	21	**14**	960	835	83	1/30	1,050
	V 59L	32,600	3.4	0.3	0.8 / 15.0	17	**23**	25	**17**	1,190	1,035	86	1/30	1,050
	V 78L	43,600	4.5	0.3	1.0 / 20.0	20	**28**	31	**21**	1,740	1,170	84	1/15	1,050
	V 95L	53,100	5.5	0.3	1.3 / 25.0	20	**28**	31	**21**	1,760	1,180	89	1/15	1,050
	V/VN 139L	81,200	8.5	1.6	1.0 / 30.0	24	**33**	37	**25**	2,860	1,380	87	1/6	1,075
	V/VN 161L	93,900	9.8	1.3	1.3 / 40.0	28	**37**	41	**28**	3,400	1,640	86	1/3	1,075
	V/VN 193L	112,500	11.7	1.3	1.5 / 50.0	29	**38**	43	**29**	3,710	1,790	89	1/3	1,075
	V/VN 212L	123,400	12.9	0.9	2.0 / 60.0	29	**38**	43	**29**	3,830	1,845	91	1/3	1,075
	V/VN 247L	143,600	15.0	1.2	2.0 / 60.0	34	**45**	51	**35**	5,110	2,030	87	1/2	1,075
	V/VN 279L	162,200	16.9	1.2	2.3 / 75.0	38	**48**	57	**39**	5,790	2,300	87	1/2	1,075
	V/VN 333L	198,300	20.7	2.3	2.3 / 75.0	38	**48**	57	**39**	6,340	2,300	90	3/4	1,140
	V/VN 385L	229,100	23.9	3.0	2.3 / 75.0	38	**46**	57	**49**	8,140	1,970	87	1	1,140
	V/VN 500L	295,000	30.7	2.8	3.0 / 100.0	48	**57**	72	**49**	11,000	2,670	85	1 1/2	1,140
	V/VN 610L	344,900	35.9	0.6	6.0 / 100.0	47	**55**	70	**48**	12,400	2,445	86	1 1/2	1,140
	V 952L	546,700	56.9	0.7	14.0 / 100.0	48		72		12,800	2,440	102	2	1,140

Table 20.2 - Performance Data for Low Outlet Temperature Units at Standard Conditions of 200°F Entering Water and 60°F Entering Air – Reduced Motor Speeds ④

Type	Model No.	Btu/hr	Water Data		Air Data					Motor Data	
			GPM	Pressure Drop (Ft. of Water)	Maximum Mounting Height (ft.) ①	Heat Throw or Spread @ Max. Height ①	CFM ②	Outlet Velocity (Fpm)	Final Air Temp. (°F)	Hp	Approx. RPM
Horizontal Delivery	HSB/HC 18L	8,700	1.2	0.4	10	13	230	410	94	1/60	1,000
	HSB/HC 24L	10,400	1.4	0.6	12	14	265	475	95	1/25	1,000
	HSB/HC 33L	14,700	2.0	0.2	13	16	430	455	91	1/25	1,000
	HSB/HC 47L	16,300	2.2	0.2	15	21	540	570	87	1/12	1,000
	HSB/HC 63L	29,000	4.0	0.4	17	21	725	435	96	1/12	1,000
	HSB/HC 86L	33,900	4.6	0.6	18	23	925	550	93	1/8	1,000
	HSB/HC 108L	50,500	6.9	1.8	20	23	1,330	510	94	1/8	1,000

① Horizontal units with horizontal louvers open 30° from vertical plane. Vertical types equipped with cone jet deflector, blades fully opened are shown in bold. Please see page 22 for additional outlet accessory performance data.
② Cfm for horizontal types is entering Cfm. Cfm for vertical and Power-Throw™ types is leaving Cfm.
③ V and PT models have copper tubes, VN and PTN models have 90/10 cupro-nickel tubes.
④ Requires Solid State Motor Speed Controller.

Hot Water Conversion Tables - Example Calculations

Conversion factor example #1:

What is the capacity (Btu/hr), water flow rate (GPM), water temperature drop (°F) and final air temperature (°F) for an HSB 86 at 240°F entering water temperature (EWT) and 70°F entering air temperature (EAT)? What is the maximum mounting height?

Solution:

The factors/data necessary to solve this problem are as follows:

- Hot water heating capacity conversion factor for 240°F EWT and 70°F entering air is 1.201, from Table 16.1.
- The standard rated capacity of an HSB 86 is 60,200 Btu/hr, from Table 19.1.
- The standard rated capacity of an HSB 86 is based on water flow rate of 6.3 GPM, from Table 19.1.
- The standard high motor speed airflow of an HSB 86 is 1340 CFM, from Table 19.1.
- The maximum mounting height, at standard conditions for an HSB 86 is 16 feet, from Table 19.1.
- The mounting height correction factor for 240°F EWT is 0.89 from Table 17.2.

$Btu_A = Btu_S$ x Heating Capacity Factor = 60,200 x 1.201 = 72,300 Btu/hr

For water flow rate, since only the entering water and air temperature conditions have changed, the water flow rate will remain 6.3 GPM.

$WTD_A = Btu_A \div (480 \times G_A)$ = 72,300 Btu/hr ÷ (480 x 6.3 GPM) = 23.9°F

$FAT_A = EAT_A + [(460 + EAT_A) \times (Btu_A) \div (576 \times Cfm_S)]$ = 70°F + [(460 + 70°F) x (72,300) ÷ (576 x 1340)] = 120°F

Max. Mounting $Height_A$ = Max. Mounting $Height_S$ x Correction Factor = 16 ft. x 0.89 = 14.2 feet

Conversion factor example #2:

Select a vertical unit heater model that can deliver at least 150,000 Btu/hr with 160°F EWT and 60°F EAT. What will be the required water flow rate, water temperature drop, final air temperature and maximum mounting height?

Solution:

The factors/data necessary to solve this problem are as follows:

- Hot water heating capacity conversion factor for 160°F EWT and 60°F entering air is 0.714, from Table 16.1.
- The mounting height correction factor for 160°F EWT is 1.19, from Table 17.2.

$Btu_S = Btu_A \div$ Heating Capacity Factor = 150,000 ÷ 0.714 = 210,084 Btu/hr (at standard conditions)
From Table 19.1, a V 279 model will meet the requirement with a rated capacity of 212,600 Btu/hr at standard conditions.

The capacity of the V 279 at actual conditions will be $Btu_A = Btu_S$ x Heating Capacity Factor = 212,600 x 0.714 = 151,796 Btu/hr.

Since the capacity was calculated based off standard conditions with factors for changes in entering water and air temperature conditions, the water flow rate will remain 22.2 GPM.

$WTD_A = Btu_A \div (480 \times GPM_A)$ = 151,796 Btu/hr ÷ (480 x 22.2 GPM) = 14.2°F

$FAT_A = EAT_A + [(460 + EAT_A) \div ((576 \times Cfm_S \div Btu_A) - 1)]$ = 60°F + [(460 + 60°F) ÷ ((576 x 5,460 ÷ 151,796) - 1)] = 86.4°F

Max. Mounting $Height_A$ = Max. Mounting $Height_S$ x Correction Factor = 40 ft. (with cone-jet deflector) x 1.19 = 47.6 feet

Maximum Mounting Heights for Vertical Outlet Accessories, Dimensions

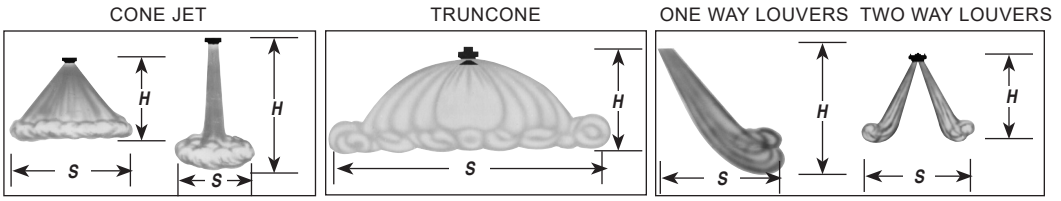


Table 22.1
Mounting Height/Spread for Vertical Unit Air Outlet Accessories①②③④

	Cone-Jet				Truncone				One Way Louvers				Two Way Louvers			
	Standard		L.O.T.		Standard		L.O.T.		Standard		L.O.T.		Standard		L.O.T.	
Model	H	S	H	S	H	S	H	S	H	S	H	S	H	S	H	S
V/VN 42	15	11	17	13	8	19	9	23	13	11	15	13	8	22	9	26
V/VN 59	19	14	22	16	9	25	11	28	16	14	18	16	10	28	11	32
V/VN 78	20	15	26	19	11	26	14	33	17	15	22	19	11	30	13	38
V/VN 95	20	15	26	19	11	26	14	33	17	15	22	19	11	30	13	38
V/VN 139	24	18	31	23	13	32	17	40	21	18	26	23	13	36	16	46
V/VN 161	27	20	35	26	14	35	18	46	23	20	30	26	14	40	18	52
V/VN 193	30	22	36	27	16	39	19	47	25	22	31	27	15	44	19	54
V/VN 212	30	22	36	27	16	39	19	47	25	22	31	27	15	44	19	54
V/VN 247	34	26	42	32	17	46	21	56	30	26	37	32	18	52	22	64
V/VN 279	37	30	45	36	18	53	22	63	35	30	41	36	21	60	25	72
V/VN 333	37	30	45	36	17	53	20	63	35	30	41	36	21	60	25	72
V/VN 385	36	30	43	36	17	53	20	63	35	30	41	36	21	60	25	72
V/VN 500	44	37	54	45	19	65	24	79	42	37	51	45	26	74	31	90
V/VN 610	43	36	52	44	19	63	24	77	41	41	50	44	25	72	30	88
V 952	-	-	-	-	-	-	-	-	45	56	54	65	26	66	31	82

① Data shown for standard 2 lb. steam, 60°F entering air temperature conditions. For louvers or cone-jet, data shown for deflectors in fully-opened position. For mounting height/spread at steam pressures other than 2 lb., multiply the value by the correction factor in Table 11.1.
② For mounting height and spread for hot water, multiple the values above by 1.06 to approximate the mounting height and spread at 200°F entering water temperature. For entering water temperature other than 200°F, multiply the values above by 1.06 and than multiply the correction factor in Table 16.2
③ All dimensions in feet.
④ V models have copper tubes and VN models have 90/10 cupro-nickel tubes.

Figure 22.2 - Vertical Air Outlet Accessories

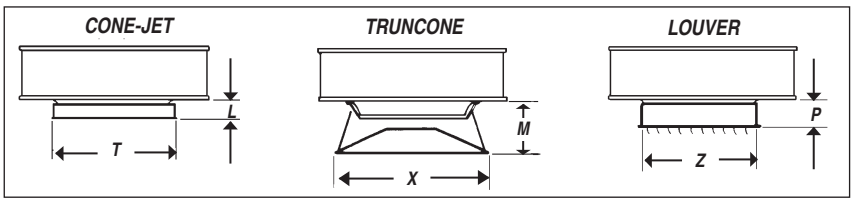


Table 22.2 - Vertical Air Outlet Accessories Dimensions ⑤

Model	Cone-Jet		Truncone		Louvers	
Number	L	T	M	X	P	Z
V 42, V 59	6-1/2	18-7/8	12	22	6-1/2	16-7/8
V 78, V 95	6-1/2	18-7/8	12	22	6-1/2	16-7/8
V 139, V 212	7-1/2	24-3/4	13	27	7-1/2	19-3/4
V 247, V 279	8	26-7/8	16	34	8	22-3/4
V 333	8-1/2	28	16	34	8-1/2	22-3/4
V 385, V 500	10	22-3/4	21	41	10	27-3/4
V 610	10-1/2	36-3/4	21	41	10-1/2	30-3/4
V-952	-	-	-	-	19-1/2	32

⑤ All dimensions in inches.

Motor Data, Step-Down Transformer Accessory Data

Table 23.1 - Motor Data ①②

Model Number	Motor HP ③	Amp Draw by Motor Type, Voltage and Power Code							
		Totally Enclosed						Explosion-proof	
		115/60/1	208/60/1	230/60/1	208/60/3	230/460/3	575/60/3	115/60/1	230/460/60/3
		01	N/A	02	04	05	10	06	09
HSB/HC 18	1/60	0.8	④	0.5	④	④	④	3.1	-
HSB/HC 24, 33	1/25	1.6	④	0.5	④	④	④	3.1	-
HSB/HC 47, 63	1/12	1.7	④	1.0	④	1.4/0.7 ⑤	④	4.3	-
HSB/HC 86, 108	1/8	2.2	④	1.0	④	1.4/0.7 ⑤	④	4.3	-
HSB/HC 121	1/5	2.5	④	1.6	2.2 ⑤	2.1/1.05 ⑤	④	4.1	1.5/0.75
HSB/HC 165, 193	1/3	4.6	④	2.2	2.2 ⑤	2.1/1.05 ⑤	④	6.1	1.5/0.75
HSB/HC 258-340	1/2	7.0	④	3.5	3.2 ⑤	3.0/1.5 ⑤	④	7.2	2.0/1.0
V/VN 42, 59	1/30	1.9	④	1.3	2.2 ⑤	2.1/1.05 ⑤	④	4.1	-
V/VN 78, 95	1/15	2.6	④	1.3	2.2 ⑤	2.1/1.05 ⑤	④	4.1	-
V/VN 139	1/5	2.5	④	1.6	2.2 ⑤	2.1/1.05 ⑤	④	4.1	1.5/0.75
V/VN 161-212	1/3	4.6	④	2.2	2.2 ⑤	2.1/1.05 ⑤	④	6.1	1.5/0.75
V/VN 247	1/2	7.0	④	3.5	3.2 ⑤	3.0/1.5 ⑤	④	5.8	2.0/1.0
V/VN, PT/PTN 279	1/2	7.0	④	3.5	3.2 ⑤	3.0/1.5 ⑤	④	5.8	2.0/1.0
V/VN, PT/PTN 333	3/4	7.0	④	4.4	3.7 ⑤	3.5/1.75 ⑤	④	-	-
V/VN, PT/PTN 385	1	-	-	-	4.2	4.0/2.0	1.5	-	3.5/1.75
V/VN, PT/PTN 500, 610	1-1/2	-	-	-	7.4	5.8/2.9	2.0	-	5.8/2.9
V, PT 952	2	-	-	-	-	7.2/3.4	-	-	6.2/3.1

① Ratings shown are for Standard and Low Outlet Temperature Models.
② All HSB/HC units, V/VN 42 thru V/VN, PT/PTN 333 motor HP listed for power code 01. V/VN PT/PTN 333 thru V/VN, PT/PTN 610 motor HP listed for power code 04 and V/PT 952 motor HP listed for power code 05.
③ For model sizes V/VN/PT/PTN 385 and above, motors for Power Codes 04, 05, and 10 do not have thermal overload protection.
④ For supply voltages of 208V/60Hz/1ph and all non-explosion-proof 3 phase voltages of 208, 230, 460 and 575, Model Numbers indicated with Note ④, require that a 115V/60Hz/1 phase Power Code 01 unit heater be used with a shipped loose accessory transformer. See Table 23.2 for Transformer Sizes.
⑤ For non-explosion-proof 3 phase supply voltages of 208, 230, and 460, Model Numbers indicated with Note ⑤, can be ordered with a Power Code (208V/3ph=04, 230/460V/3ph=05) that provides a motor matched to the supply voltage with amp draw as shown. Alternately, a 115V/60Hz/1 phase Power Code 01 unit heater could be used with a shipped loose accessory transformer. See Table 23.2 for Transformer Sizes.

Figure 23.1
Field Installed Transformer Accessory

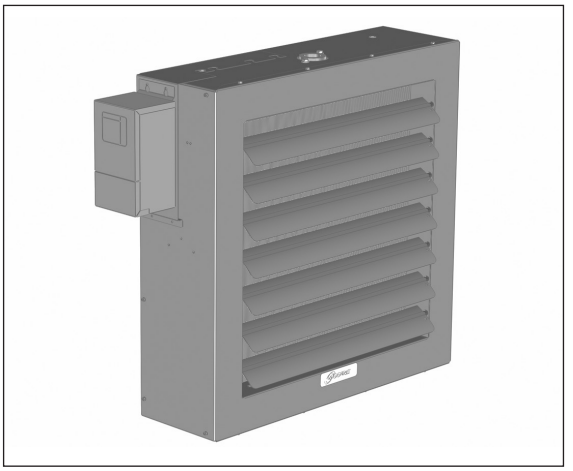


Table 23.2 - Step-Down Transformer Accessory Selection

Model Number	208V/60Hz/1 or 3 phase kVA	230/460V/ 60Hz/3 phase kVA	575V/60Hz/ 3 phase kVA
HSB/HC 18-63	0.50	0.25	0.25
HSB/HC 86-121		0.50	0.50
HSB/HC 165-193	1.00	0.75	0.75
HSB/HC 258-340		1.00	1.00
V/VN 42-59	0.50	0.25	0.25
V/VN 78-139		0.50	0.50
V/VN 161-212	1.00	0.75	0.75
V/VN 247-333		1.00	1.00
PT/PTN 279-333	1.00	1.00	1.00

kVA Size	Ship Wt. (Lb.)
0.25	7
0.50	13
0.75	15
1.00	19

Dimensions - Horizontal Air Delivery Models

Figure 24.1 - Model Dimensions HSB 18-193

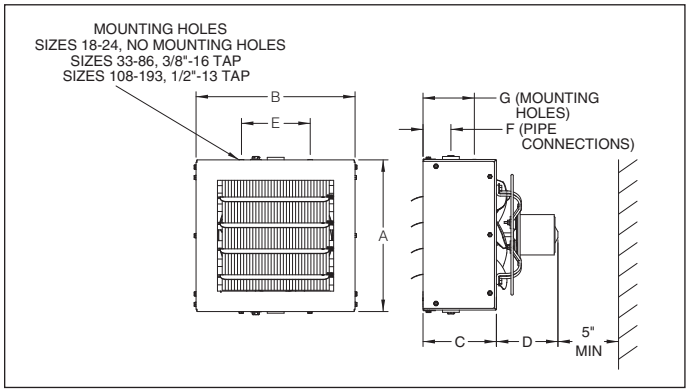


Figure 24.2 - Model Dimensions HSB 258-340

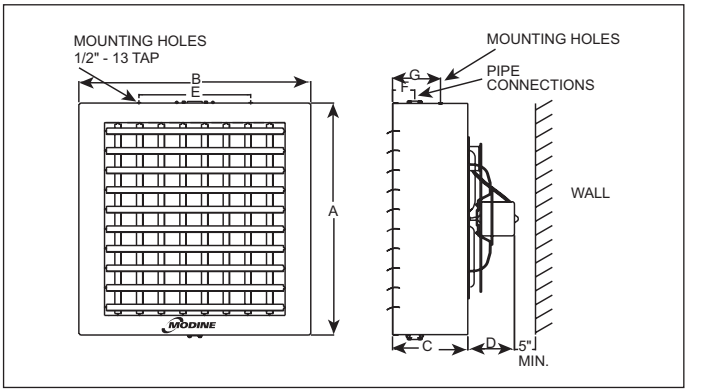


Figure 24.3 - Model Dimensions HC 18-165

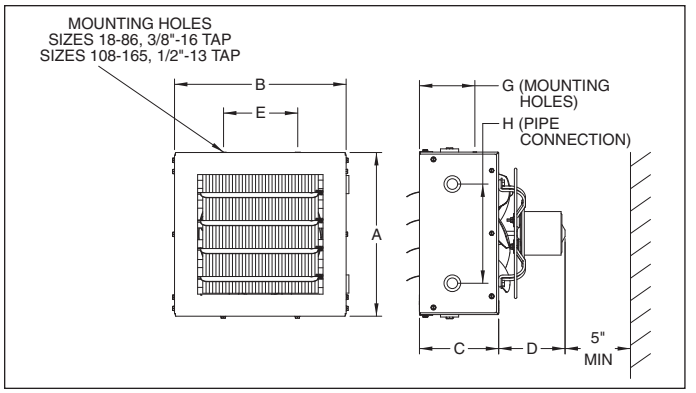
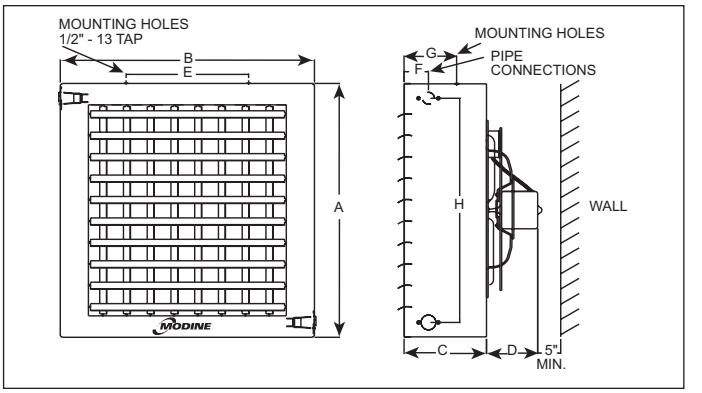


Figure 24.4 - Model Dimensions HC 193-340 ①



① Vertical deflector blades shown are standard on models HC 258-340 and optional on model HC 193.

Table 24.1 - Model HSB and HC Dimensions ②③

Model Number	A	B	C	D 115 Std. Motor	D 115V Exp. Motor	E	F	G	H	Female Connections NPT	Fan Diameter	Approx. Shipping Wt. lb.
HSB 18	12-3/8	13	6	5	12-1/4	-	3	-	-	3/4	9	16
HSB 24	12-3/8	13	6	5	12-1/4	-	3	-	-	3/4	9	20
HSB 33	16-3/8	17-1/2	8-3/4	6	11-3/4	11	3-5/8	6	-	1-1/4	12	34
HSB 47	16-3/8	17-1/2	8-3/4	6	11-3/4	11	3-5/8	6	-	1-1/4	12	36
HSB 63	20-7/16	21-1/2	8-3/4	7-3/4	12	15	3-5/8	6	-	1-1/4	14	48
HSB 86	20-7/16	21-1/2	8-3/4	7-3/4	12	15	3-5/8	6	-	1-1/4	14	52
HSB 108	24-7/16	25-1/2	9-1/2	6-3/4	13-1/4	18	3-3/4	6-3/8	-	1-1/4	18	74
HSB 121	24-7/16	25-1/2	9-1/2	6-3/4	13-1/4	18	3-3/4	6-3/8	-	1-1/4	18	76
HSB 165	30-1/2	30-1/2	9-1/4	8-1/2	14	21-1/4	3-3/4	6-3/8	-	1-1/4	22	92
HSB 193	30-1/2	30-1/2	9-1/4	8-1/2	14	21-1/4	3-3/4	6-3/8	-	1-1/4	22	98
HSB 258	38-1/2	38-1/2	12-1/2	10	15	18-1/2	3-5/8	7-7/8	-	1-1/4	22	162
HSB 290	38-1/2	38-1/2	12-1/2	10	15	18-1/2	3-5/8	7-7/8	-	1-1/4	24	168
HSB 340	38-1/2	44-1/2	12-1/2	10	15	18-1/2	3-5/8	7-7/8	-	1-1/4	24	176
HC 18	11-1/2	13	6	5	12-1/4	5-5/8	2-1/4	4-1/8	7-1/2	1/2	9	16
HC 24	11-1/2	13	6	5	12-1/4	5-5/8	2-1/4	4-1/8	7-1/2	1/2	9	20
HC 33	15	17-1/2	8-3/4	6	11-3/4	11	3-5/8	6	10	3/4	12	34
HC 47	15	17-1/2	8-3/4	6	11-3/4	11	3-5/8	6	10	3/4	12	35
HC 63	18-1/2	21-1/2	8-3/4	7-3/4	12	15	3-5/8	6	14	3/4	12	48
HC 86	18-1/2	21-1/2	8-3/4	7-3/4	12	15	3-5/8	6	14	3/4	14	52
HC 108	22-1/2	25-1/2	9-1/2	6-3/4	13-1/4	18	3-5/8	6-3/8	18	3/4	18	74
HC 121	22-1/2	25-1/2	9-1/2	6-3/4	13-1/4	18	3-5/8	6-3/8	18	3/4	18	76
HC 165	26-1/2	29-1/2	9-1/4	8-1/2	14	21-1/4	3-5/8	6-3/8	22	3/4	22	92
HC 193	30-1/2	32-1/2	9-1/4	8-1/2	14	21-1/4	3-5/8	4-3/4	26	1-1/4	22	98
HC 258	38-1/2	38-1/2	12-1/2	10	15	18-1/2	3-5/8	8	34	1-1/4	22	163
HC 290	38-1/2	38-1/2	12-1/2	10	15	18-1/2	3-5/8	8	34	1-1/4	24	168
HC 340	38-1/2	44-1/2	12-1/2	10	15	18-1/2	3-5/8	8	34	1-1/4	24	176

② All dimensions in inches.

③ Dimensions shown are for Standard and Low Outlet Temperature Models.

Dimensions - Vertical Air Delivery Models

Figure 25.1 - Model V/VN and PT/PTN Dimensions

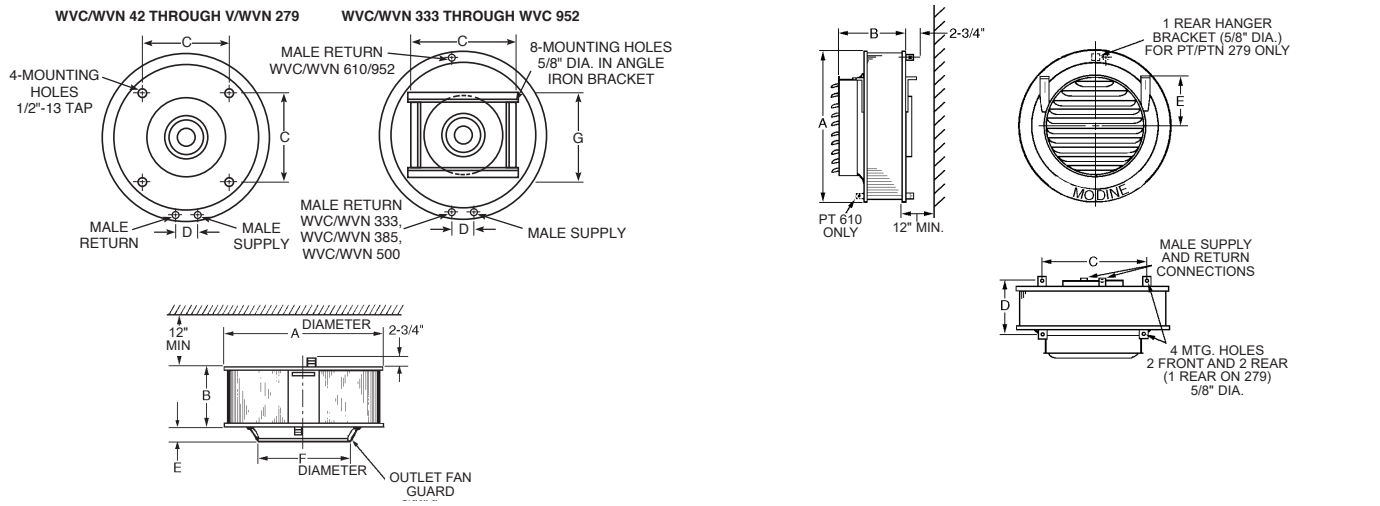


Table 25.1 - Model V/VN and PT/PTN Dimensions ①②③

Model Number	A	B	C	D	E	F	G	Fan Diameter	Male Connections NPT Shipping Top	Male Connections NPT Shipping Bottom	Approx. Wt. (lb.)
V/VN 42	24-3/4	3-5/8	11-3/8	2-1/8	4-3/8	14-1/2	-	14	1-1/4	1-1/4	36
V/VN 59	24-3/4	5-1/8	11-3/8	2-1/8	4-3/8	14-1/2	-	14	1-1/4	1-1/4	42
V/VN 78	24-3/4	6-5/8	11-3/8	2-1/8	2-5/8	16-1/2	-	16	1-1/4	1-1/4	46
V/VN 95	24-3/4	8-1/8	11-3/8	2-1/8	2-5/8	16-1/2	-	16	1-1/4	1-1/4	48
V/VN 139	34-3/4	6-7/8	18-3/8	2-1/8	3	19-1/2	-	19	1-1/2	1	70
V/VN 161	34-3/4	8-3/8	18-3/8	2-1/8	3	19-1/2	-	19	1-1/2	1	80
V/VN 193	34-3/4	9-7/8	18-3/8	2-1/8	3	19-1/2	-	19	1-1/2	1	86
V/VN 212	34-3/4	12-7/8	18-3/8	2-1/2	3	19-1/2	-	19	2	1-1/4	94
V/VN 247	34-3/4	12-7/8	18-3/8	2-1/2	3	21-1/2	-	21	2	1-1/4	108
V/VN 279	34-3/4	14-3/8	18-3/8	2-1/2	3	21-1/2	-	21	2	1-1/4	112
V/VN 333	43-1/4	14-5/8	31-1/2	2-7/8	3-1/8	22-1/2	18-1/5	22	2-1/2	1-1/2	166
V/VN 385	43-1/4	14-1/2	31-1/2	2-7/8	3-1/2	27-1/2	18-1/5	27	2-1/2	1-1/2	168
V/VN 500	43-1/4	19	31-1/2	2-7/8	3-1/2	27-1/2	18-1/5	27	2-1/2	1-1/2	360
V/VN 610	51-1/2	19-1/8	31-3/8	-	3-3/4	30-1/2	31-3/8	30	2-1/2	1-1/2	450
V 952	53-3/4	21-1/8	30	-	3-1/2	31	30	30	3	3	487
PT/PTN 279	34-3/4	22-5/8	25-1/4	16-3/4	16-3/4	-	-	21	2	1-1/4	122
PT/PTN 333	43-1/4	23-7/8	30	15-3/4	14-3/8	-	-	22	2-1/2	1-1/2	176
PT/PTN 385	43-1/4	25-3/4	30	15-3/4	14-3/8	-	-	27	2-1/2	1-1/2	184
PT/PTN 500	43-1/4	29	30	20-1/4	14-3/8	-	-	27	2-1/2	1-1/2	376
PT/PTN 610	51-1/2	29-5/8	30	20-3/8	21	-	-	30	2-1/2	1-1/2	472
PT 952	53-3/4	26-3/8	30	23-1/8	26-7/8	-	-	30	3	3	487

① All dimensions in inches.
② Dimensions shown are for Standard and Low Outlet Temperature Models.
③ See page 23 for optional air outlet accessory dimensions.

Model Identification

Figure 26.1
Model Number Designation

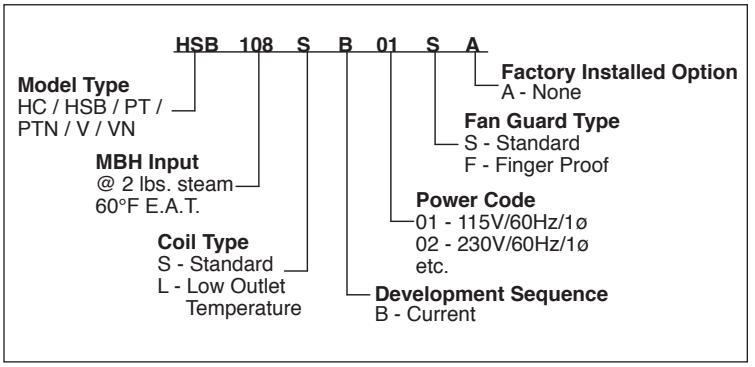


Figure 26.2
Serial Number Designation

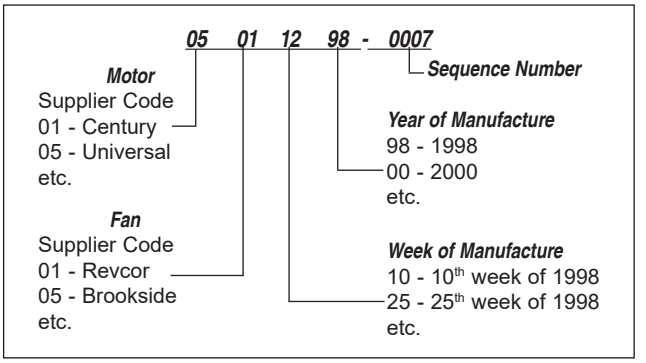
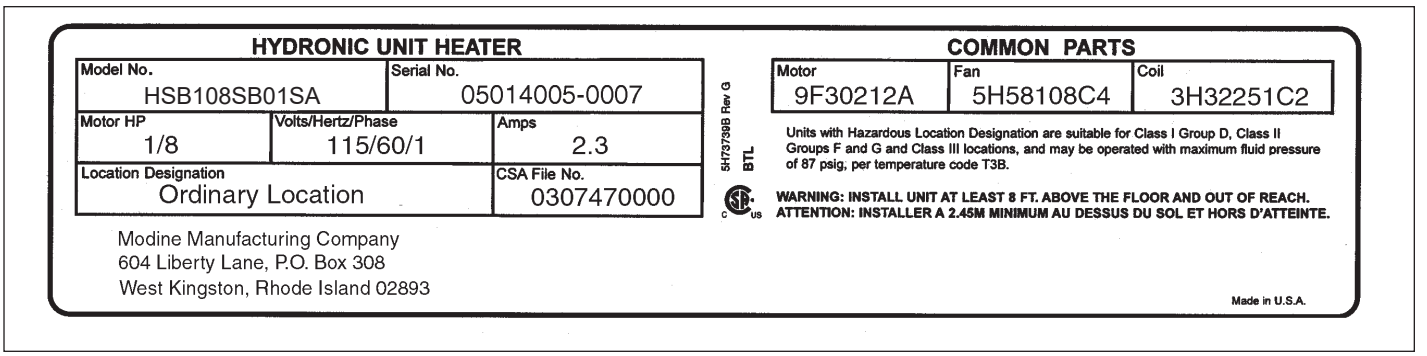


Figure 26.3
Model Identification Plate



Specification for Horizontal, Vertical and Power-Throw™ Models

General

Contractor shall furnish and install steam/hot water unit heater model _____. Performance shall be as indicated on the equipment schedule in the plans. Units shall be listed by CSA as certified to CAN/CSA-C22.2 No. 236-05 “Heating and Cooling Equipment” and UL Std. No. 1995 “Heating and Cooling Equipment.” Additionally for Canada, the units shall have CRN registered heat exchangers.

Casing

HSB and HC Models - Casings on model sizes 18 through 86 are 20 gauge steel (18 gauge on all other models) and consist of front and back halves. Both halves are joined together at the top and bottom utilizing the condenser mounting screws. Casing top is provided with threaded hanger connections for unit suspension (except for HSB 18 and HSB 24 which are directly mounted to the supply and return piping). Fan venturi is formed in casing back half.

Vertical and Power-Throw™ Models - Casings consist of two circular 18 gauge steel covers. With the coil in between, the covers are securely bolted together to form a single unit. The bottom cover has a die-formed fan venturi. The top cover incorporates a motor cooling cone, which shields the motor from coil heat therefore prolonging motor life. An opening is also provided for circulation of motor cooling air.

All Models - Casing shall be treated to prevent corrosion and painted with a corrosion resistant, baked, polyester powdercoat gray-green finish.

Condenser

Condenser coils are of the extended surface type, utilizing aluminum fins and DLP-type copper tubes with malleable iron supply and return connections for HSB units, cast bronze connections for HC models and Schedule 40 steel pipe for V/PT models. Tubes are mechanically bonded to the collars of the fins. The condensers are warranted for operation at steam or hot water pressures and temperatures up to 150 psig and 375°F for copper coils and 250 psig and 400°F for 90/10 cupro-nickel coils.

Fins are continuous across the width and depth of the condenser and are vertically oriented to minimize the collection of dirt and dust.

Canadian Standards Association (CSA) requirements state that explosion-proof units (Power Codes 06 and 09) may not be used with fluid temperatures in excess of 329°F or pressures in excess of 87 psig and still maintain their explosion-proof rating for National Electric Code ignition temperature rating T3B for grain dust.

All coils are leak tested at 165 to 200 psig, air under water.

Horizontal Models - Coils are of serpentine design with horizontal tubes, vertical fins and center supply and return connections at top and bottom of unit (except HC models, which have side connections). All tube bends are brazed. All tubes have individual expansion bends. Copper tubes are 1" O.D. with 0.030" wall thickness (except HSB/HC 18 and 24 which are 5/8" O.D. with 0.028" wall thickness).

Vertical and Power-Throw™ Models - Coils are circular, providing for natural expansion. Each tube is continuous between supply and return header. All tube joints are silver soldered. Copper tubes are 5/8" O.D. with 0.028" wall thickness.

Motors - See page 8 for Power Code and motor descriptions and page 23 for motor amp draw information. Motors are designed for continuous duty and can operate in a maximum ambient temperature of 104°F(40°C).

Fans/Fan Guards - Fans are aluminum on all units and are secured to a steel hub. Each fan is balanced and is designed specifically for the unit heater on which it is installed. Horizontal units are equipped with a combination fan guard/motor-mounting bracket. The guard is constructed of steel rod. Vertical units are supplied with an outlet fan guard covering the opening in the bottom of the unit.

Air Deflectors - Horizontal units, including the Power-Throw™ units, are furnished with horizontal air deflectors as standard. The deflectors are adjustable to almost any desired position for downward, straight or upward airflow. Vertical deflectors are available as an accessory for HSB/HC models through size 193, standard on model sizes 258-340. See page 22 for air outlet accessories for vertical models.

Products from Modine are designed to provide indoor air-comfort and ventilation solutions for residential, commercial, institutional and industrial applications. Whatever your heating, ventilating and air conditioning requirements, Modine has the product to satisfy your needs, including:

HVAC

- Unit Heaters:
  - Gas
  - Hydronic
  - Electric
  - Oil
- Ceiling Cassettes
- Duct Furnaces
- Hydronic Cabinet Unit Heaters, Fin Tube, Convectors
- Infrared Heaters
- Make-up Air Systems
- Unit Ventilators

Ventilation

- Packaged Rooftop Ventilation

School Products

- Vertical Packaged Classroom HVAC:
  - DX Cooling/Heat Pump
  - Water/Ground Source Heat Pump
  - Horizontal/Vertical Unit Ventilators

Specific catalogs are available for each product. Catalogs 75-136 and 75-137 provide details on all Modine HVAC equipment.

Modine Manufacturing Company

1500 DeKoven Avenue
Racine, Wisconsin 53403-2552
Phone: 1.800.828.4328 (HEAT)
www.modinehvac.com

Job Name: ESD-435-42x16 Cut Sheet
Tag: MK-1
Quantity: 1
Printed Date: April 18, 2023

Model: ESD-435-42x16

4 in. Drainable Blade Louver

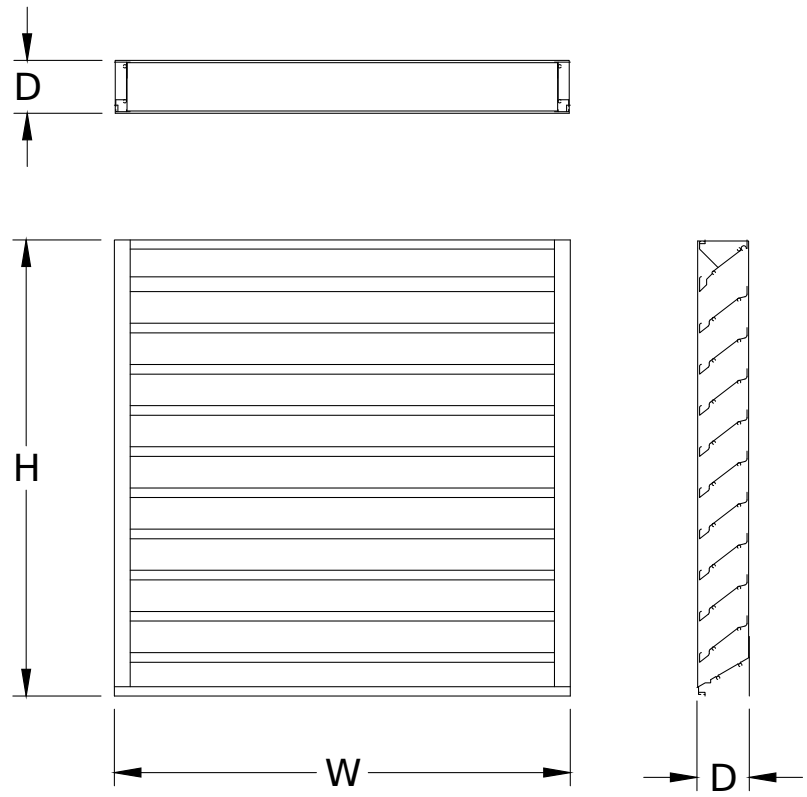
Certifications/special requirements: AMCA-500-L (Air), AMCA-500-L (Water)

Construction	
Material	All
Blade Type	All
Blade Orientation	Horizontal
Weight (lbs)	16
Mullion Type	No Preference

Dimensional	
Nominal Width (in)	42
Nominal Height (in)	16
Actual Width (in)	41.75
Actual Height (in)	15.75
Blade Depth (in)	4
Sections Wide	1
Sections High	1

Performance	
Application	Exhaust
Volume (CFM)	840
Pressure Drop (in. wg)	0.03
Free Area Velocity (ft/min)	459
Free Area (ft^2)	1.8
Air Density (lbs/ft^3)	0.075

*Louvers are tested to figure 5.5-6.5
*Sections wide x high are as configured with a base mill finish channel frame product and may vary depending on options selected.



Greenheck Fan Corporation certifies that the louver shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air performance and water penetration ratings.

Model: EDJ-401-24x20

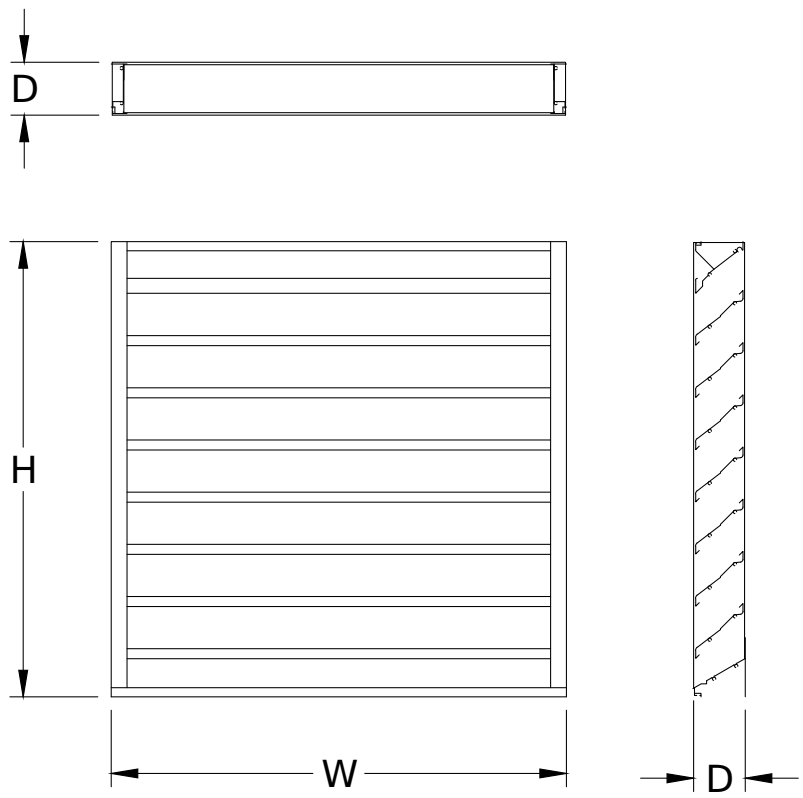
4 in. Drainable Head, J Blade Louver

Certifications/special requirements: AMCA-500-L (Air), AMCA-500-L (Water)

Construction	
Material	Aluminum
Blade Type	All
Blade Orientation	Horizontal
Weight (lbs)	10
Mullion Type	No Preference

Dimensional	
Nominal Width (in)	24
Nominal Height (in)	20
Actual Width (in)	23.75
Actual Height (in)	19.75
Blade Depth (in)	4
Sections Wide	1
Sections High	1

Performance	
Application	Exhaust
Volume (CFM)	450
Pressure Drop (in. wg)	0.02
Free Area Velocity (ft/min)	337
Free Area (ft^2)	1.3
Air Density (lbs/ft^3)	0.075



*Louvers are tested to figure 5.5-6.5
*Sections wide x high are as configured with a base mill finish channel frame product and may vary depending on options selected.

Greenheck Fan Corporation certifies that the louver shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air performance and water penetration ratings.

Job Name: 19.25
Tag: LVR-3
Quantity: 1
Printed Date: July 21, 2022

Model: ESJ-602-40x26

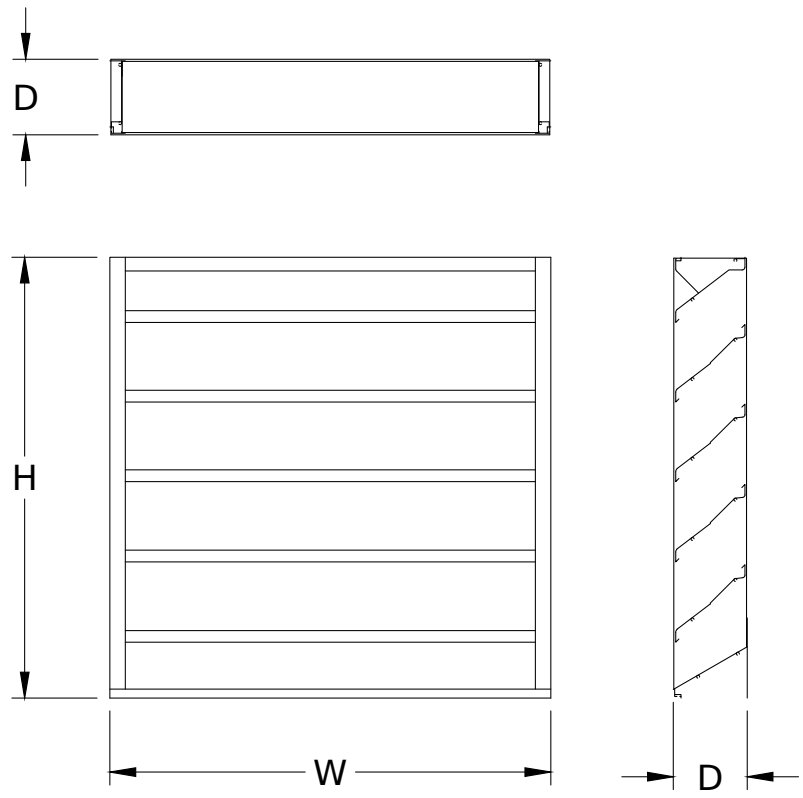
6 in. J Blade Louver

Certifications/special requirements: AMCA-500-L (Air), AMCA-500-L (Water)

Construction	
Material	Aluminum
Blade Type	All
Blade Orientation	Horizontal
Weight (lbs)	22
Mullion Type	No Preference

Dimensional	
Nominal Width (in)	40
Nominal Height (in)	26
Actual Width (in)	39.75
Actual Height (in)	25.75
Blade Depth (in)	6
Sections Wide	1
Sections High	1

Performance	
Application	Exhaust
Volume (CFM)	2,070
Pressure Drop (in. wg)	0.06
Free Area Velocity (ft/min)	592
Free Area (ft^2)	3.5
Air Density (lbs/ft^3)	0.075



*Louvers are tested to figure 5.5-6.5
*Sections wide x high are as configured with a base mill finish channel frame product and may vary depending on options selected.

Greenheck Fan Corporation certifies that the louver shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air performance and water penetration ratings.

Job Name: 19.25
Tag: LVR-4
Quantity: 1
Printed Date: July 21, 2022

Model: ESD-635HP-36x26

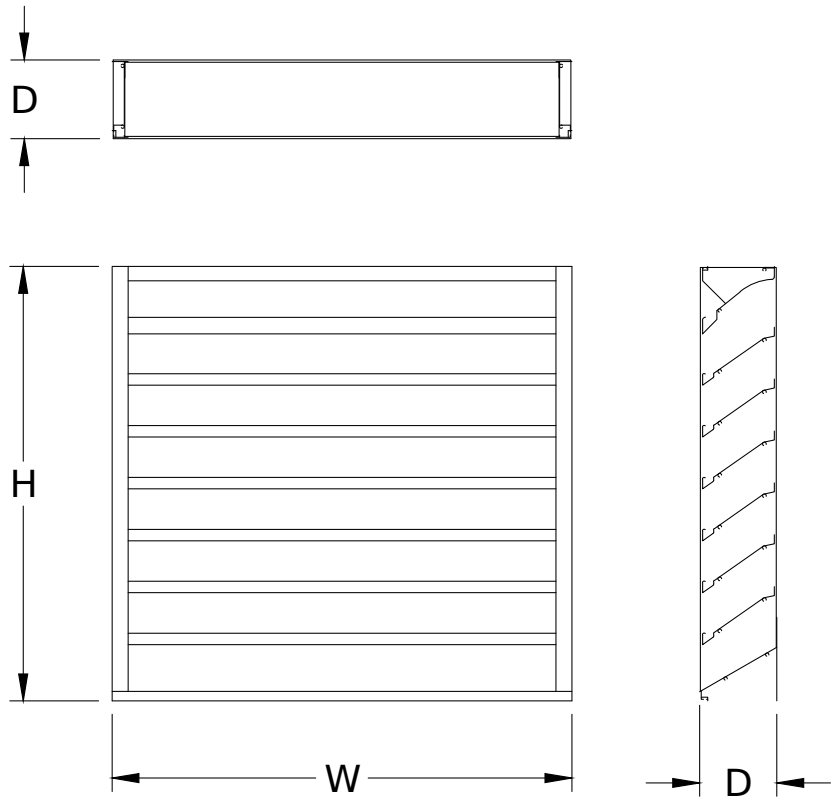
6 in. Drainable Blade Louver

Certifications/special requirements: AMCA-500-L (Air), AMCA-500-L (Water)

Construction	
Material	Aluminum
Blade Type	All
Blade Orientation	Horizontal
Weight (lbs)	23
Mullion Type	No Preference

Dimensional	
Nominal Width (in)	36
Nominal Height (in)	26
Actual Width (in)	35.75
Actual Height (in)	25.75
Blade Depth (in)	6
Sections Wide	1
Sections High	1

Performance	
Application	Exhaust
Volume (CFM)	1,150
Pressure Drop (in. wg)	0.02
Free Area Velocity (ft/min)	346
Free Area (ft^2)	3.3
Air Density (lbs/ft^3)	0.075



*Louvers are tested to figure 5.5-6.5
*Sections wide x high are as configured with a base mill finish channel frame product and may vary depending on options selected.

Greenheck Fan Corporation certifies that the louver shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air performance and water penetration ratings.

Job Name: ESD-435-28x16 Cut Sheet
Tag: MK-1
Quantity: 1
Printed Date: April 18, 2023

Model: ESD-435-28x16

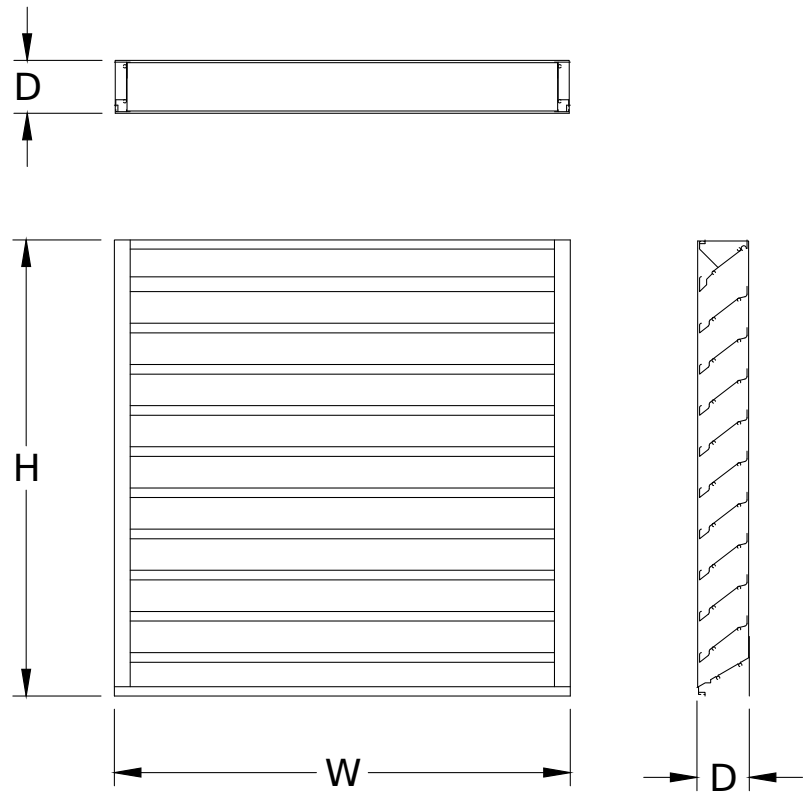
4 in. Drainable Blade Louver

Certifications/special requirements: AMCA-500-L (Air), AMCA-500-L (Water)

Construction	
Material	All
Blade Type	All
Blade Orientation	Horizontal
Weight (lbs)	11
Mullion Type	No Preference

Dimensional	
Nominal Width (in)	28
Nominal Height (in)	16
Actual Width (in)	27.75
Actual Height (in)	15.75
Blade Depth (in)	4
Sections Wide	1
Sections High	1

Performance	
Application	Exhaust
Volume (CFM)	610
Pressure Drop (in. wg)	0.04
Free Area Velocity (ft/min)	518
Free Area (ft^2)	1.2
Air Density (lbs/ft^3)	0.075



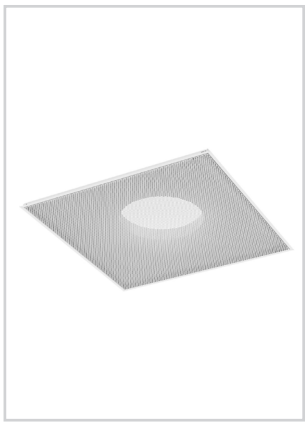
*Louvers are tested to figure 5.5-6.5
*Sections wide x high are as configured with a base mill finish channel frame product and may vary depending on options selected.

Greenheck Fan Corporation certifies that the louver shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air performance and water penetration ratings.

PAS / PAR / PDS / PDR

- Titus perforated ceiling diffusers are designed for both heating and cooling applications
- Excellent performance in variable air volume systems
- A tight, uniform, horizontal blanket of air protects the ceiling against smudging
- Return models have the same face and border construction as the supply models, for harmonious appearance in the room
- Discharge pattern (supply models) can be adjusted to vertical as well as to 1-, 2-, 3- or 4-way horizontal. Can be adjusted before or after installation.
- Discharge pattern is easily adjusted by unlatching and dropping the perforated face, then rotating the pattern controllers
- Dropping the perforated face also gives access to the optional damper

PAS



PAR

metric sizes

See website for Specifications

MODELS:

Steel Models:
PAS / Supply / Flush Face
PAR / Return / Flush Face
PDS / Supply / Drop Face
PDR / Return / Drop Face

Aluminum Models:
PAS-AA / Supply / Flush Face
PAR-AA / Return / Flush Face

FINISH:

Standard Finish - #26 White

OVERVIEW

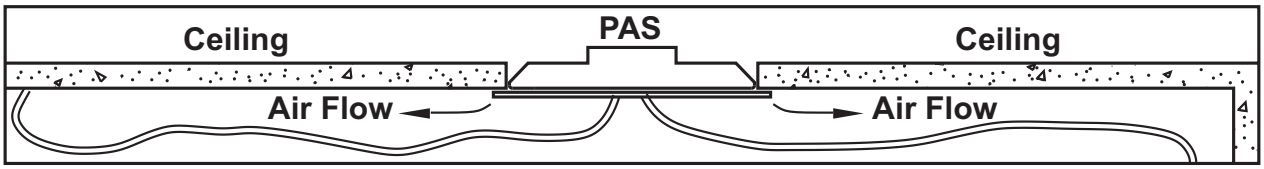
1-, 2-, 3-, or 4-Way Discharge Pattern

Perforated ceiling diffusers are typically selected to meet architectural demands for air outlets that blend into the ceiling plane. Titus perforated diffusers can be selected for a round pattern to maximize capacity or star pattern to maximize throw.

ADDITIONAL FEATURES

- Perforated face has $^{3}/_{16}$" diameter holes on ¼" staggered centers
- Inlet collar (neck) has ample depth for easy duct connection
- Material is heavy gauge steel backpan; steel or aluminum perforated face according to the model selected
- Optional factory-installed R-6 foil-backed insulation available for 24 x 24" full face models, neck sizes 6-16, borders 1, 2, 3 and 4

TYPICAL DISCHARGE PATTERN - ELEVATION



Nominal Duct Size D	Face or Ceiling Module Size					
	12x12	24x12	16x16	20x20	24x24	48x24
6 x 6	●/❑	●	●	●	●/❑	●
8 x 8			●	●	●/❑	●
10 x 10	❑			●	●/❑	●
12 x 12					●/❑	●
14 x 14			❑			
15 x 15					●/❑	●
18 x 6		●				
18 x 18				❑	❑	
22 x 10		❑				
22 x 22					❑	
46 x 22						❑
6" Dia.	●/❑	●	●	●	●/❑	●
8" Dia.			●	●	●/❑	●
10" Dia.			●	●	●/❑	●
12" Dia.				●	●/❑	●
14" Dia.				●	●/❑	●
16" Dia.					●/❑	●

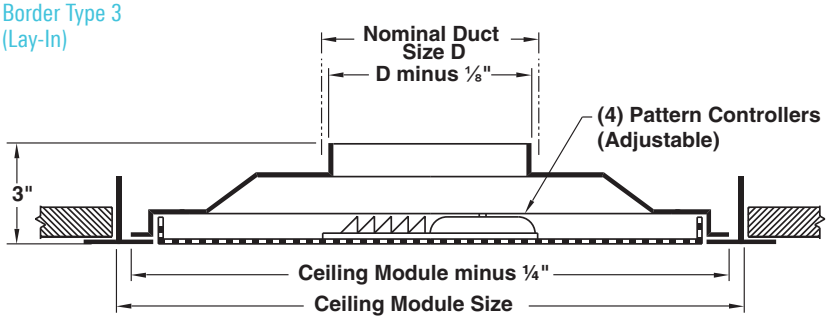
● Available in supply models and return models

❑ Available in return models only

●/❑ Shaded areas indicate sizes available with aluminum face

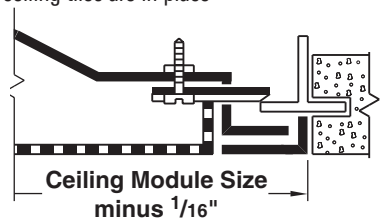
MODELS PAS / PAS-AA / SUPPLY

Border Type 3
(Lay-In)

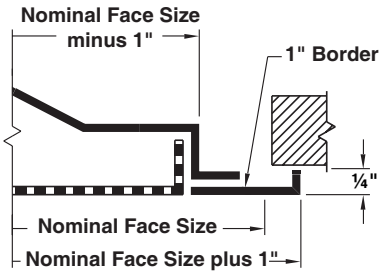


Border Type 4SL
(Spline Side Lock)

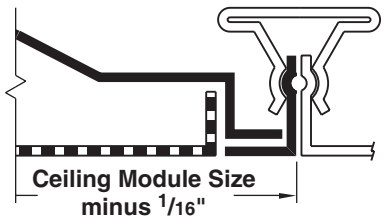
Note: 4SL can be installed after ceiling tiles are in place



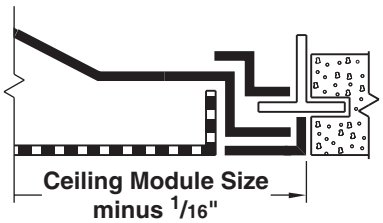
Border Type 1
(Surface Mount)



Border Type 2
(Snap-In)

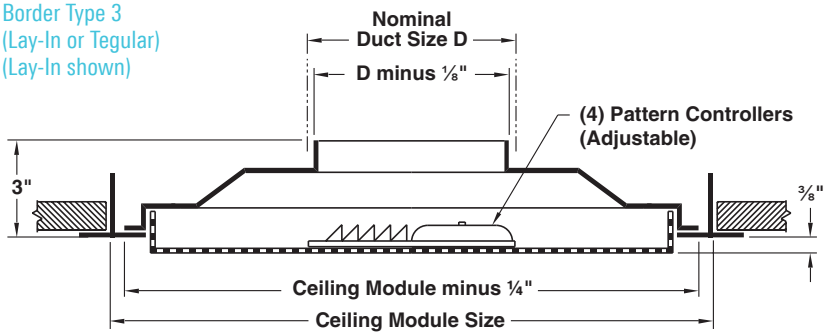


Border Type 4
(Spline)



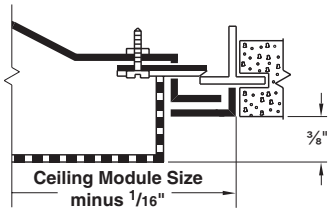
MODEL PDS - SUPPLY

Border Type 3
(Lay-In or Tegular)
(Lay-In shown)

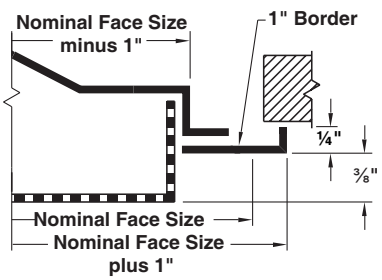


Border Type 4SL
(Spline Side Lock)

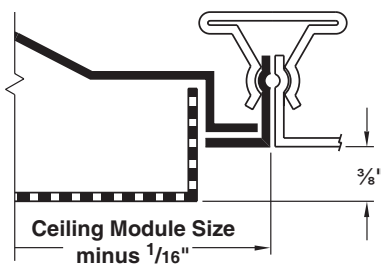
Note: 4SL can be installed after ceiling tiles are in place.



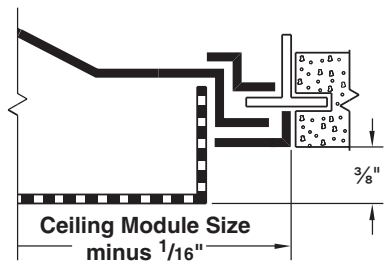
Border Type 1
(Surface Mount)



Border Type 2
(Snap-In)



Border Type 4
(Spline)



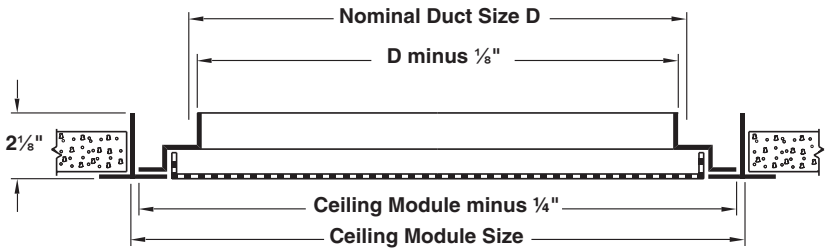
All dimensions are in inches

OPTIONAL MOLDED INSULATION BLANKET

Insulation is R-6 where blanket has the most depth. One" clearance on each side of neck is left for insulated duct connection. 24 x 24" module size only. Blanket is factory installed.

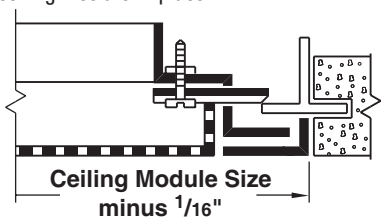
MODELS PAR, PAR-AA - RETURN

Border Type 3
(Lay-In when duct size = module size - 2)

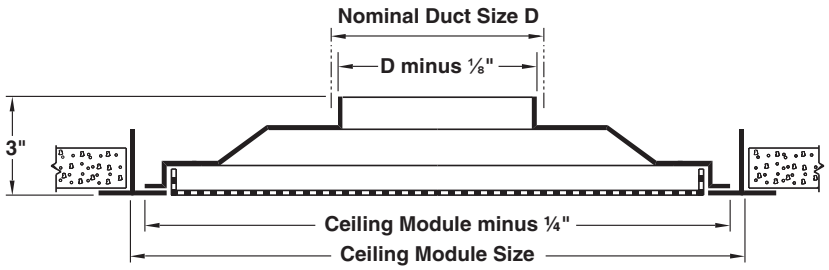


Border Type 4SL
(Spline Side Lock)

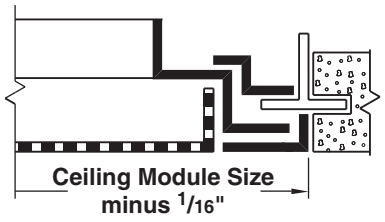
Note: 4SL can be installed after ceiling tiles are in place



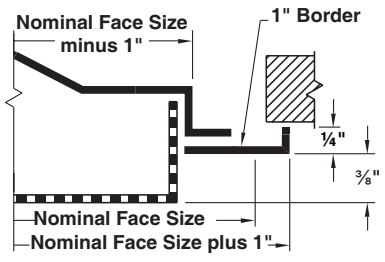
Border Type 3
(Lay-In for other standard duct sizes)



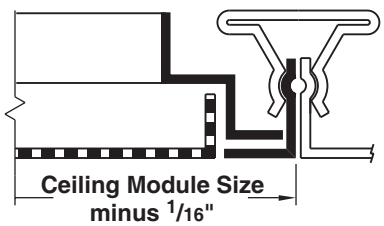
Border Type 4
(Spline)



Border Type 1
(Surface Mount)

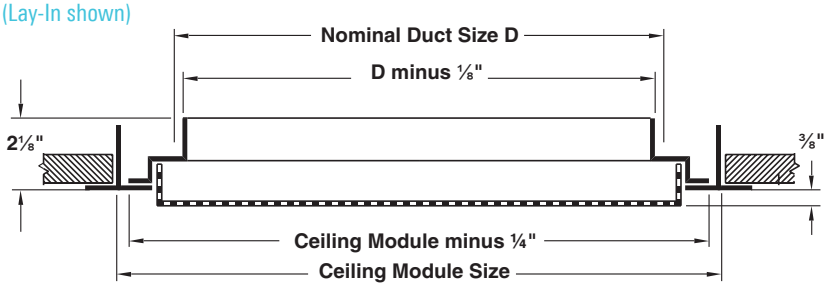


Border Type 2
(Snap-In)



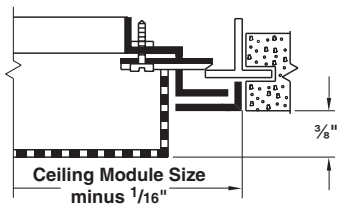
MODEL PDR - RETURN

Border Type 3
(Lay-In or Tegular when duct size = module size - 2)
(Lay-In shown)

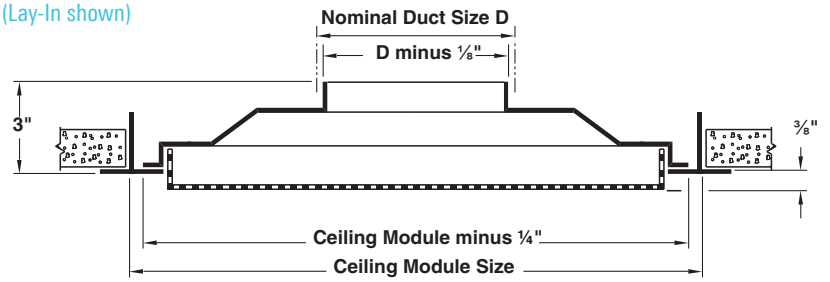


Border Type 4SL
(Spline Side Lock)

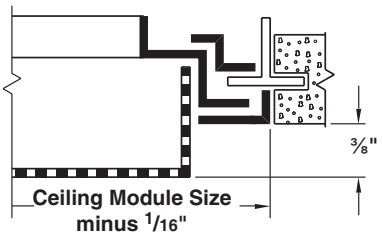
Note: 4SL can be installed after ceiling tiles are in place



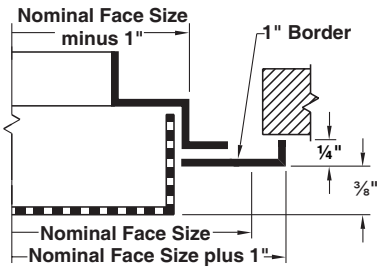
Border Type 3
(Lay-In or Tegular for other standard duct sizes)
(Lay-In shown)



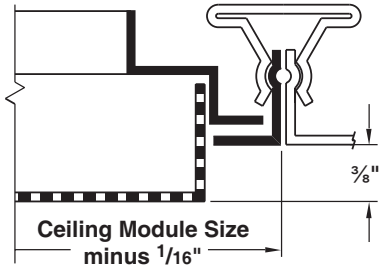
Border Type 4
(Spline)



Border Type 1
(Surface Mount)



Border Type 2
(Snap-In)



All dimensions are in inches

PAS FLUSH FACE / SUPPLY / STEEL / ADJUSTABLE

		Neck Velocity	300	400	500	600	700	800	1000	1200	1400
		Velocity Pressure	0.006	0.010	0.016	0.022	0.031	0.040	0.062	0.090	0.122
12 x 12 Module	6" Dia.	Airflow, cfm	59	79	98	118	137	157	196	236	275
		Total Pressure	0.016	0.028	0.044	0.064	0.087	0.113	0.177	0.255	0.347
		NC (Noise Criteria)	-	-	-	16	21	25	32	38	43
		1-Way - Horizontal Throw	1-2-7	2-4-10	2-6-12	4-7-15	5-9-17	6-10-18	8-12-20	10-15-22	11-17-23
		2-Way - Horizontal Throw	1-2-5	2-4-7	2-4-9	4-5-11	4-6-12	5-7-14	6-9-17	7-11-18	8-12-20
		3-Way - Horizontal Throw	1-2-5	2-3-6	3-4-8	3-5-9	4-5-11	4-6-12	5-8-14	6-9-15	7-11-16
		4-Way - Horizontal Throw	1-2-3	1-2-5	2-3-6	2-3-7	3-4-8	3-5-9	4-6-11	5-7-12	5-8-13
	6 x 6 Neck	Airflow, cfm	75	100	125	150	175	200	250	300	350
		Total Pressure	0.017	0.029	0.046	0.066	0.090	0.118	0.184	0.265	0.360
		NC (Noise Criteria)	-	-	13	19	23	28	35	41	45
		1-Way - Horizontal Throw	1-2-8	2-4-11	3-6-14	4-8-17	5-10-19	7-11-20	9-14-22	11-17-24	13-19-26
		2-Way - Horizontal Throw	1-2-6	2-4-8	3-5-10	4-6-12	5-7-14	5-8-16	7-10-19	8-12-21	9-14-22
		3-Way - Horizontal Throw	1-3-5	2-3-7	3-4-9	3-5-10	4-6-12	5-7-14	6-9-16	7-10-17	8-12-19
		4-Way - Horizontal Throw	1-2-4	1-3-5	2-3-7	3-4-8	3-5-9	3-5-10	4-7-12	5-8-13	6-9-15
24 x 12 Module	6" Dia.	Airflow, cfm	59	79	98	118	137	157	196	236	275
		Total Pressure	0.016	0.028	0.044	0.064	0.087	0.113	0.177	0.255	0.347
		NC (Noise Criteria)	-	-	-	16	21	25	32	38	43
		1-Way - Horizontal Throw	1-2-7	2-4-10	2-6-12	4-7-15	5-9-17	6-10-18	8-12-20	10-15-22	11-17-23
		2-Way - Horizontal Throw	1-2-5	2-4-7	2-4-9	4-5-11	4-6-12	5-7-14	6-9-17	7-11-18	8-12-20
		3-Way - Horizontal Throw	1-2-5	2-3-6	3-4-8	3-5-9	4-5-11	4-6-12	5-8-14	6-9-15	7-11-16
		4-Way - Horizontal Throw	1-2-3	1-2-5	2-3-6	2-3-7	3-4-8	3-5-9	4-6-11	5-7-12	5-8-13
	6 x 6 Neck	Airflow, cfm	75	100	125	150	175	200	250	300	350
		Total Pressure	0.017	0.029	0.046	0.066	0.090	0.118	0.184	0.265	0.360
		NC (Noise Criteria)	-	-	13	19	23	28	35	41	45
		1-Way - Horizontal Throw	1-2-8	2-4-11	3-6-14	4-8-17	5-10-19	7-11-20	9-14-22	11-17-24	13-19-26
		2-Way - Horizontal Throw	1-2-6	2-4-8	3-5-10	4-6-12	5-7-14	5-8-16	7-10-19	8-12-21	9-14-22
		3-Way - Horizontal Throw	1-3-5	2-3-7	3-4-9	3-5-10	4-6-12	5-7-14	6-9-16	7-10-17	8-12-19
		4-Way - Horizontal Throw	1-2-4	1-3-5	2-3-7	3-4-8	3-5-9	3-5-10	4-7-12	5-8-13	6-9-15
16 x 16 Module	6" Dia.	Airflow, cfm	59	79	98	118	137	157	196	236	275
		Total Pressure	0.016	0.028	0.044	0.064	0.087	0.113	0.177	0.255	0.347
		NC (Noise Criteria)	-	-	-	16	21	25	32	38	43
		1-Way - Horizontal Throw	1-2-8	2-4-10	3-7-13	4-8-15	6-9-17	7-10-18	9-13-20	10-15-22	12-17-23
		2-Way - Horizontal Throw	1-2-6	2-4-8	3-5-10	4-6-11	4-7-13	5-8-15	6-10-17	8-11-18	9-13-20
		3-Way - Horizontal Throw	1-2-5	2-3-6	3-4-8	3-5-10	4-6-11	4-6-12	5-8-14	6-10-15	8-11-16
		4-Way - Horizontal Throw	1-2-4	2-2-5	2-3-6	2-4-7	3-4-9	3-5-10	4-6-11	5-7-12	6-9-13
	6 x 6 Neck	Airflow, cfm	75	100	125	150	175	200	250	300	350
		Total Pressure	0.017	0.029	0.046	0.066	0.090	0.118	0.184	0.265	0.360
		NC (Noise Criteria)	-	-	13	19	23	28	35	41	45
		1-Way - Horizontal Throw	1-3-9	2-5-12	3-7-15	5-9-17	7-10-19	8-12-20	10-15-22	12-17-24	14-19-26
		2-Way - Horizontal Throw	1-3-6	2-4-9	3-5-11	4-6-13	5-8-15	6-9-17	7-11-19	9-13-21	10-15-22
		3-Way - Horizontal Throw	1-3-5	2-4-7	3-5-9	4-5-11	4-6-13	5-7-14	6-9-16	7-11-17	9-13-19
		4-Way - Horizontal Throw	1-2-4	2-3-6	2-3-7	3-4-8	3-5-10	4-6-11	5-7-12	6-8-13	7-10-15
	8" Dia.	Airflow, cfm	105	140	175	209	244	279	349	419	489
		Total Pressure	0.018	0.032	0.049	0.071	0.097	0.126	0.197	0.284	0.386
		NC (Noise Criteria)	-	-	16	22	27	31	38	44	49
		1-Way - Horizontal Throw	1-3-10	3-6-14	4-9-17	6-10-20	8-12-22	9-14-24	12-17-26	14-20-29	16-22-31
		2-Way - Horizontal Throw	1-3-8	3-5-10	4-6-13	5-8-15	6-9-18	7-10-20	8-13-22	10-15-25	12-18-27
		3-Way - Horizontal Throw	2-3-6	3-4-9	4-5-11	4-6-13	5-8-15	6-9-17	7-11-18	9-13-20	10-15-22
		4-Way - Horizontal Throw	1-2-5	2-3-7	3-4-8	3-5-10	4-6-12	4-7-13	5-8-15	7-10-16	8-12-17
	8 x 8 Neck	Airflow, cfm	133	178	222	267	311	356	444	533	622
		Total Pressure	0.019	0.034	0.052	0.075	0.103	0.134	0.210	0.302	0.411
		NC (Noise Criteria)	-	12	19	25	29	34	41	47	51
		1-Way - Horizontal Throw	2-4-12	3-7-16	5-10-20	7-12-23	9-14-25	10-16-27	13-20-30	16-23-33	18-25-35
		2-Way - Horizontal Throw	2-4-9	3-6-11	5-7-14	6-9-17	7-10-20	8-11-23	10-14-25	11-17-28	13-20-30
		3-Way - Horizontal Throw	2-4-7	3-5-10	4-6-12	5-7-15	6-9-17	6-10-19	8-12-21	10-15-23	11-17-25
		4-Way - Horizontal Throw	1-3-6	2-4-7	3-5-9	4-6-11	4-7-13	5-7-15	6-9-16	7-11-18	9-13-19
	10" Dia.	Airflow, cfm	164	218	273	327	382	436	545	654	764
		Total Pressure	0.020	0.036	0.056	0.080	0.109	0.143	0.223	0.321	0.437
		NC (Noise Criteria)	-	14	21	27	32	36	43	49	54
		1-Way - Horizontal Throw	2-4-13	3-7-17	5-11-22	7-13-26	10-15-28	12-17-30	15-22-33	17-26-36	20-28-39
		2-Way - Horizontal Throw	2-4-10	3-6-13	5-8-16	6-10-19	7-11-22	8-13-25	11-16-28	13-19-31	15-22-33
		3-Way - Horizontal Throw	2-4-8	4-5-11	4-7-13	5-8-16	6-9-19	7-11-21	9-13-23	11-16-25	13-19-27
		4-Way - Horizontal Throw	1-3-6	3-4-8	3-5-10	4-6-12	5-7-14	5-8-16	7-10-18	8-12-20	10-14-21

Performance notes appear at end of performance data

PAS FLUSH FACE / SUPPLY / STEEL / ADJUSTABLE

		Neck Velocity	300	400	500	600	700	800	1000	1200	1400
		Velocity Pressure	0.006	0.010	0.016	0.022	0.031	0.040	0.062	0.090	0.122
20 x 20 Module	6" Dia.	Airflow, cfm	59	79	98	118	137	157	196	236	275
		Total Pressure	0.016	0.028	0.044	0.064	0.087	0.113	0.177	0.255	0.347
		NC (Noise Criteria)	-	-	-	16	21	25	32	38	43
		1-Way - Horizontal Throw	1-2-8	2-4-10	3-7-13	4-8-15	6-9-17	7-10-18	9-13-20	10-15-22	12-17-23
		2-Way - Horizontal Throw	1-2-6	2-4-8	3-5-10	4-6-11	4-7-13	5-8-15	6-10-17	8-11-18	9-13-20
		3-Way - Horizontal Throw	1-2-5	2-3-6	3-4-8	3-5-10	4-6-11	4-6-12	5-8-14	6-10-15	8-11-16
		4-Way - Horizontal Throw	1-2-4	2-2-5	2-3-6	2-4-7	3-4-9	3-5-10	4-6-11	5-7-12	6-9-13
	6 x 6 Neck	Airflow, cfm	75	100	125	150	175	200	250	300	350
		Total Pressure	0.017	0.029	0.046	0.066	0.090	0.118	0.184	0.265	0.360
		NC (Noise Criteria)	-	-	13	19	23	28	35	41	45
		1-Way - Horizontal Throw	1-3-9	2-5-12	3-7-15	5-9-17	7-10-19	8-12-20	10-15-22	12-17-24	14-19-26
		2-Way - Horizontal Throw	1-3-6	2-4-9	3-5-11	4-6-13	5-8-15	6-9-17	7-11-19	9-13-21	10-15-22
		3-Way - Horizontal Throw	1-3-5	2-4-7	3-5-9	4-5-11	4-6-13	5-7-14	6-9-16	7-11-17	9-13-19
		4-Way - Horizontal Throw	1-2-4	2-3-6	2-3-7	3-4-8	3-5-10	4-6-11	5-7-12	6-8-13	7-10-15
	8" Dia.	Airflow, cfm	105	140	175	209	244	279	349	419	489
		Total Pressure	0.018	0.032	0.049	0.071	0.097	0.126	0.197	0.284	0.386
		NC (Noise Criteria)	-	-	16	22	27	31	38	44	49
		1-Way - Horizontal Throw	1-3-10	3-6-14	4-9-17	6-10-20	8-12-22	9-14-24	12-17-26	14-20-29	16-22-31
		2-Way - Horizontal Throw	1-3-8	3-5-10	4-6-13	5-8-15	6-9-18	7-10-20	8-13-22	10-15-25	12-18-27
		3-Way - Horizontal Throw	2-3-6	3-4-9	4-5-11	4-6-13	5-8-15	6-9-17	7-11-18	9-13-20	10-15-22
		4-Way - Horizontal Throw	1-2-5	2-3-7	3-4-8	3-5-10	4-6-12	4-7-13	5-8-15	7-10-16	8-12-17
	8 x 8 Neck	Airflow, cfm	133	178	222	267	311	356	444	533	622
		Total Pressure	0.019	0.034	0.052	0.075	0.103	0.134	0.210	0.302	0.411
		NC (Noise Criteria)	-	12	19	25	29	34	41	47	51
		1-Way - Horizontal Throw	2-4-12	3-7-16	5-10-20	7-12-23	9-14-25	10-16-27	13-20-30	16-23-33	18-25-35
		2-Way - Horizontal Throw	2-4-9	3-6-11	5-7-14	6-9-17	7-10-20	8-11-23	10-14-25	11-17-28	13-20-30
		3-Way - Horizontal Throw	2-4-7	3-5-10	4-6-12	5-7-15	6-9-17	6-10-19	8-12-21	10-15-23	11-17-25
		4-Way - Horizontal Throw	1-3-6	2-4-7	3-5-9	4-6-11	4-7-13	5-7-15	6-9-16	7-11-18	9-13-19
	10" Dia.	Airflow, cfm	164	218	273	327	382	436	545	654	764
		Total Pressure	0.020	0.036	0.056	0.080	0.109	0.143	0.223	0.321	0.437
		NC (Noise Criteria)	-	14	21	27	32	36	43	49	54
		1-Way - Horizontal Throw	2-4-13	3-7-17	5-11-22	7-13-26	10-15-28	12-17-30	15-22-33	17-26-36	20-28-39
		2-Way - Horizontal Throw	2-4-10	3-6-13	5-8-16	6-10-19	7-11-22	8-13-25	11-16-28	13-19-31	15-22-33
		3-Way - Horizontal Throw	2-4-8	4-5-11	4-7-13	5-8-16	6-9-19	7-11-21	9-13-23	11-16-25	13-19-27
		4-Way - Horizontal Throw	1-3-6	3-4-8	3-5-10	4-6-12	5-7-14	5-8-16	7-10-18	8-12-20	10-14-21
	10 x 10 Neck	Airflow, cfm	208	278	347	417	486	556	694	833	972
		Total Pressure	0.022	0.039	0.061	0.087	0.119	0.155	0.243	0.349	0.476
		NC (Noise Criteria)	-	16	23	29	34	38	45	51	56
		1-Way - Horizontal Throw	2-5-15	4-8-20	6-12-25	8-15-29	11-17-31	13-20-33	16-25-37	20-29-41	23-31-44
		2-Way - Horizontal Throw	2-5-11	4-7-14	6-9-18	7-11-21	8-13-25	10-14-28	12-18-32	14-21-35	17-25-37
		3-Way - Horizontal Throw	2-5-9	4-6-12	5-8-15	6-9-18	7-11-21	8-12-23	10-15-26	12-18-29	14-21-31
		4-Way - Horizontal Throw	2-3-7	3-5-9	4-6-12	5-7-14	5-8-16	6-9-18	8-12-20	9-14-22	11-16-24
	12" Dia.	Airflow, cfm	236	314	393	471	550	628	785	942	1100
		Total Pressure	0.032	0.057	0.089	0.128	0.174	0.227	0.355	0.510	0.695
		NC (Noise Criteria)	-	18	25	30	35	40	47	52	57
		1-Way - Horizontal Throw	7-12-22	10-16-25	13-19-28	16-22-31	18-23-33	20-25-35	23-28-40	25-31-43	27-33-47
		2-Way - Horizontal Throw	6-8-17	8-11-21	9-14-24	11-17-26	13-20-28	15-21-30	19-24-34	21-26-37	23-28-40
		3-Way - Horizontal Throw	5-7-14	6-10-18	8-12-20	10-14-21	11-16-23	13-18-25	16-20-28	18-21-30	19-23-33
		4-Way - Horizontal Throw	4-6-11	5-7-14	6-9-15	7-11-17	9-13-18	10-14-19	12-15-22	14-17-24	15-18-26
	14" Dia.	Airflow, cfm	321	428	535	641	748	855	1069	1283	1497
		Total Pressure	0.034	0.060	0.093	0.135	0.183	0.239	0.374	0.538	0.733
		NC (Noise Criteria)	12	21	28	34	38	43	50	56	60
		1-Way - Horizontal Throw	8-14-25	12-18-29	15-23-33	18-25-36	21-27-39	24-29-41	27-33-46	29-36-51	32-39-55
		2-Way - Horizontal Throw	7-10-20	9-13-25	11-17-28	13-20-30	15-23-33	18-25-35	22-28-39	25-30-43	27-33-47
		3-Way - Horizontal Throw	6-8-17	7-11-20	9-14-23	11-17-25	13-19-27	15-20-29	19-23-32	20-25-35	22-27-38
		4-Way - Horizontal Throw	4-6-13	6-9-16	7-11-18	9-13-20	10-15-21	11-16-23	14-18-25	16-20-28	17-21-30

Performance notes appear at end of performance data

PAS FLUSH FACE / SUPPLY / STEEL / ADJUSTABLE

		Neck Velocity	300	400	500	600	700	800	1000	1200	1400
		Velocity Pressure	0.006	0.010	0.016	0.022	0.031	0.040	0.062	0.090	0.122
24 x 24 Module	6" Dia.	Airflow, cfm	59	79	98	118	137	157	196	236	275
		Total Pressure	0.016	0.028	0.044	0.064	0.087	0.113	0.177	0.255	0.347
		NC (Noise Criteria)	-	-	-	16	21	25	32	38	43
		1-Way - Horizontal Throw	1-2-8	2-4-10	3-7-13	4-8-15	6-9-17	7-10-18	9-13-20	10-15-22	12-17-23
		2-Way - Horizontal Throw	1-2-6	2-4-8	3-5-10	4-6-11	4-7-13	5-8-15	6-10-17	8-11-18	9-13-20
		3-Way - Horizontal Throw	1-2-5	2-3-6	3-4-8	3-5-10	4-6-11	4-6-12	5-8-14	6-10-15	8-11-16
		4-Way - Horizontal Throw	1-2-4	2-2-5	2-3-6	2-4-7	3-4-9	3-5-10	4-6-11	5-7-12	6-9-13
	6 x 6 Neck	Airflow, cfm	75	100	125	150	175	200	250	300	350
		Total Pressure	0.017	0.029	0.046	0.066	0.090	0.118	0.184	0.265	0.360
		NC (Noise Criteria)	-	-	13	19	23	28	35	41	45
		1-Way - Horizontal Throw	1-3-9	2-5-12	3-7-15	5-9-17	7-10-19	8-12-20	10-15-22	12-17-24	14-19-26
		2-Way - Horizontal Throw	1-3-6	2-4-9	3-5-11	4-6-13	5-8-15	6-9-17	7-11-19	9-13-21	10-15-22
		3-Way - Horizontal Throw	1-3-5	2-4-7	3-5-9	4-5-11	4-6-13	5-7-14	6-9-16	7-11-17	9-13-19
		4-Way - Horizontal Throw	1-2-4	2-3-6	2-3-7	3-4-8	3-5-10	4-6-11	5-7-12	6-8-13	7-10-15
	8" Dia.	Airflow, cfm	105	140	175	209	244	279	349	419	489
		Total Pressure	0.018	0.032	0.049	0.071	0.097	0.126	0.197	0.284	0.386
		NC (Noise Criteria)	-	-	16	22	27	31	38	44	49
		1-Way - Horizontal Throw	1-3-10	3-6-14	4-9-17	6-10-20	8-12-22	9-14-24	12-17-26	14-20-29	16-22-31
		2-Way - Horizontal Throw	1-3-8	3-5-10	4-6-13	5-8-15	6-9-18	7-10-20	8-13-22	10-15-25	12-18-27
		3-Way - Horizontal Throw	2-3-6	3-4-9	4-5-11	4-6-13	5-8-15	6-9-17	7-11-18	9-13-20	10-15-22
		4-Way - Horizontal Throw	1-2-5	2-3-7	3-4-8	3-5-10	4-6-12	4-7-13	5-8-15	7-10-16	8-12-17
	8 x 8 Neck	Airflow, cfm	133	178	222	267	311	356	444	533	622
		Total Pressure	0.019	0.034	0.052	0.075	0.103	0.134	0.210	0.302	0.411
		NC (Noise Criteria)	-	12	19	25	29	34	41	47	51
		1-Way - Horizontal Throw	2-4-12	3-7-16	5-10-20	7-12-23	9-14-25	10-16-27	13-20-30	16-23-33	18-25-35
		2-Way - Horizontal Throw	2-4-9	3-6-11	5-7-14	6-9-17	7-10-20	8-11-23	10-14-25	11-17-28	13-20-30
		3-Way - Horizontal Throw	2-4-7	3-5-10	4-6-12	5-7-15	6-9-17	6-10-19	8-12-21	10-15-23	11-17-25
		4-Way - Horizontal Throw	1-3-6	2-4-7	3-5-9	4-6-11	4-7-13	5-7-15	6-9-16	7-11-18	9-13-19
	10" Dia.	Airflow, cfm	164	218	273	327	382	436	545	654	764
		Total Pressure	0.020	0.036	0.056	0.080	0.109	0.143	0.223	0.321	0.437
		NC (Noise Criteria)	-	14	21	27	32	36	43	49	54
		1-Way - Horizontal Throw	2-4-13	3-7-17	5-11-22	7-13-26	10-15-28	12-17-30	15-22-33	17-26-36	20-28-39
		2-Way - Horizontal Throw	2-4-10	3-6-13	5-8-16	6-10-19	7-11-22	8-13-25	11-16-28	13-19-31	15-22-33
		3-Way - Horizontal Throw	2-4-8	4-5-11	4-7-13	5-8-16	6-9-19	7-11-21	9-13-23	11-16-25	13-19-27
		4-Way - Horizontal Throw	1-3-6	3-4-8	3-5-10	4-6-12	5-7-14	5-8-16	7-10-18	8-12-20	10-14-21
	10 x 10 Neck	Airflow, cfm	208	278	347	417	486	556	694	833	972
		Total Pressure	0.022	0.039	0.061	0.087	0.119	0.155	0.243	0.349	0.476
		NC (Noise Criteria)	-	16	23	29	34	38	45	51	56
		1-Way - Horizontal Throw	2-5-15	4-8-20	6-12-25	8-15-29	11-17-31	13-20-33	16-25-37	20-29-41	23-31-44
		2-Way - Horizontal Throw	2-5-11	4-7-14	6-9-18	7-11-21	8-13-25	10-14-28	12-18-32	14-21-35	17-25-37
		3-Way - Horizontal Throw	2-5-9	4-6-12	5-8-15	6-9-18	7-11-21	8-12-23	10-15-26	12-18-29	14-21-31
		4-Way - Horizontal Throw	2-3-7	3-5-9	4-6-12	5-7-14	5-8-16	6-9-18	8-12-20	9-14-22	11-16-24
	12" Dia.	Airflow, cfm	236	314	393	471	550	628	785	942	1100
		Total Pressure	0.032	0.057	0.089	0.128	0.174	0.227	0.355	0.510	0.695
		NC (Noise Criteria)	-	18	25	30	35	40	47	52	57
		1-Way - Horizontal Throw	7-12-22	10-16-25	13-19-28	16-22-31	18-23-33	20-25-35	23-28-40	25-31-43	27-33-47
		2-Way - Horizontal Throw	6-8-17	8-11-21	9-14-24	11-17-26	13-20-28	15-21-30	19-24-34	21-26-37	23-28-40
		3-Way - Horizontal Throw	5-7-14	6-10-18	8-12-20	10-14-21	11-16-23	13-18-25	16-20-28	18-21-30	19-23-33
		4-Way - Horizontal Throw	4-6-11	5-7-14	6-9-15	7-11-17	9-13-18	10-14-19	12-15-22	14-17-24	15-18-26
	12 x 12 Neck	Airflow, cfm	300	400	500	600	700	800	1000	1200	1400
		Total Pressure	0.033	0.059	0.092	0.133	0.181	0.236	0.369	0.531	0.723
		NC (Noise Criteria)	-	20	27	33	38	42	49	55	60
		1-Way - Horizontal Throw	8-13-24	12-18-28	15-22-32	18-24-35	20-26-37	23-28-40	26-32-45	28-35-49	31-37-53
		2-Way - Horizontal Throw	6-10-19	9-13-24	11-16-27	13-19-29	15-22-32	17-24-34	21-27-38	24-29-42	26-32-45
		3-Way - Horizontal Throw	5-8-16	7-11-20	9-14-22	11-16-24	13-19-26	14-20-28	18-22-31	20-24-34	21-26-37
		4-Way - Horizontal Throw	4-6-12	6-8-16	7-10-17	8-12-19	10-15-21	11-16-22	14-17-25	16-19-27	17-21-29
	14" Dia.	Airflow, cfm	321	428	535	641	748	855	1069	1283	1497
		Total Pressure	0.034	0.060	0.093	0.135	0.183	0.239	0.374	0.538	0.733
		NC (Noise Criteria)	12	21	28	34	38	43	50	56	60
		1-Way - Horizontal Throw	8-14-25	12-18-29	15-23-33	18-25-36	21-27-39	24-29-41	27-33-46	29-36-51	32-39-55
		2-Way - Horizontal Throw	7-10-20	9-13-25	11-17-28	13-20-30	15-23-33	18-25-35	22-28-39	25-30-43	27-33-47
		3-Way - Horizontal Throw	6-8-17	7-11-20	9-14-23	11-17-25	13-19-27	15-20-29	19-23-32	20-25-35	22-27-38
		4-Way - Horizontal Throw	4-6-13	6-9-16	7-11-18	9-13-20	10-15-21	11-16-23	14-18-25	16-20-28	17-21-30
	16" Dia.	Airflow, cfm	419	559	698	838	977	1117	1396	1676	1955
		Total Pressure	0.036	0.063	0.099	0.143	0.194	0.253	0.396	0.570	0.776
		NC (Noise Criteria)	14	23	31	36	41	45	53	58	63
		1-Way - Horizontal Throw	10-16-29	14-21-33	17-26-37	21-29-41	24-31-44	27-33-47	31-37-53	33-41-58	36-44-63
		2-Way - Horizontal Throw	8-11-23	10-15-28	13-19-32	15-23-35	18-26-38	20-28-40	25-32-45	28-35-49	31-38-53
		3-Way - Horizontal Throw	6-10-19	9-13-23	11-16-26	13-19-29	15-22-31	17-23-33	21-26-37	23-29-41	25-31-44
		4-Way - Horizontal Throw	5-7-15	7-10-18	8-12-21	10-15-23	11-17-24	13-18-26	16-21-29	18-23-32	20-24-34

Performance notes appear at end of performance data

PDS DROP FACE / SUPPLY / STEEL / ADJUSTABLE

		Neck Velocity	300	400	500	600	700	800	1000	1200	1400
		Velocity Pressure	0.006	0.010	0.016	0.022	0.031	0.040	0.062	0.090	0.122
12 x 12 Module	6" Dia.	Airflow, cfm	59	79	98	118	137	157	196	236	275
		Total Pressure	0.014	0.025	0.039	0.056	0.077	0.100	0.157	0.226	0.307
		NC (Noise Criteria)	-	-	-	13	18	22	30	35	40
		1-Way - Horizontal Throw	1-2-7	2-4-10	2-6-12	4-7-13	5-9-14	6-10-15	8-12-17	10-13-19	11-14-20
		2-Way - Horizontal Throw	1-2-5	2-4-7	2-4-9	4-5-11	4-6-12	5-7-13	6-9-15	7-11-16	8-12-18
		3-Way - Horizontal Throw	1-2-5	2-3-6	3-4-8	3-5-9	4-5-9	4-6-10	5-8-11	6-9-12	7-9-13
		4-Way - Horizontal Throw	1-2-3	1-2-5	2-3-6	2-3-7	3-4-8	3-5-8	4-6-9	5-7-10	5-8-11
	6 x 6 Neck	Airflow, cfm	75	100	125	150	175	200	250	300	350
		Total Pressure	0.015	0.026	0.041	0.059	0.080	0.105	0.164	0.236	0.321
		NC (Noise Criteria)	-	-	-	16	21	25	32	38	43
		1-Way - Horizontal Throw	1-2-8	2-4-11	3-6-14	4-8-15	5-10-16	7-11-17	9-14-19	11-15-21	13-16-23
		2-Way - Horizontal Throw	1-2-6	2-4-8	3-5-10	4-6-12	5-7-14	5-8-15	7-10-17	8-12-19	9-14-20
		3-Way - Horizontal Throw	1-3-5	2-3-7	3-4-9	3-5-10	4-6-10	5-7-11	6-9-13	7-10-14	8-10-15
		4-Way - Horizontal Throw	1-2-4	1-3-5	2-3-7	3-4-8	3-5-9	3-5-9	4-7-10	5-8-11	6-9-12
24 x 12 Module	6" Dia.	Airflow, cfm	59	79	98	118	137	157	196	236	275
		Total Pressure	0.014	0.025	0.039	0.056	0.077	0.100	0.157	0.226	0.307
		NC (Noise Criteria)	-	-	-	13	18	22	30	35	40
		1-Way - Horizontal Throw	1-2-7	2-4-10	2-6-12	4-7-13	5-9-14	6-10-15	8-12-17	10-13-19	11-14-20
		2-Way - Horizontal Throw	1-2-5	2-4-7	2-4-9	4-5-11	4-6-12	5-7-13	6-9-15	7-11-16	8-12-18
		3-Way - Horizontal Throw	1-2-5	2-3-6	3-4-8	3-5-9	4-5-9	4-6-10	5-8-11	6-9-12	7-9-13
		4-Way - Horizontal Throw	1-2-3	1-2-5	2-3-6	2-3-7	3-4-8	3-5-8	4-6-9	5-7-10	5-8-11
	6 x 6 Neck	Airflow, cfm	75	100	125	150	175	200	250	300	350
		Total Pressure	0.015	0.026	0.041	0.059	0.080	0.105	0.164	0.236	0.321
		NC (Noise Criteria)	-	-	-	16	21	25	32	38	43
		1-Way - Horizontal Throw	1-2-8	2-4-11	3-6-14	4-8-15	5-10-16	7-11-17	9-14-19	11-15-21	13-16-23
		2-Way - Horizontal Throw	1-2-6	2-4-8	3-5-10	4-6-12	5-7-14	5-8-15	7-10-17	8-12-19	9-14-20
		3-Way - Horizontal Throw	1-3-5	2-3-7	3-4-9	3-5-10	4-6-10	5-7-11	6-9-13	7-10-14	8-10-15
		4-Way - Horizontal Throw	1-2-4	1-3-5	2-3-7	3-4-8	3-5-9	3-5-9	4-7-10	5-8-11	6-9-12
16 x 16 Module	6" Dia.	Airflow, cfm	59	79	98	118	137	157	196	236	275
		Total Pressure	0.014	0.025	0.039	0.056	0.077	0.100	0.157	0.226	0.307
		NC (Noise Criteria)	-	-	-	13	18	22	30	35	40
		1-Way - Horizontal Throw	1-2-8	2-4-10	3-7-12	4-8-13	6-9-14	7-10-15	9-12-17	10-13-19	12-14-20
		2-Way - Horizontal Throw	1-2-6	2-4-8	3-5-10	4-6-11	4-7-13	5-8-13	6-10-15	8-11-16	9-13-18
		3-Way - Horizontal Throw	1-2-5	2-3-6	3-4-8	3-5-9	4-6-9	4-6-10	5-8-11	6-9-12	8-9-13
		4-Way - Horizontal Throw	1-2-4	2-2-5	2-3-6	2-4-7	3-4-8	3-5-8	4-6-9	5-7-10	6-8-11
	6 x 6 Neck	Airflow, cfm	75	100	125	150	175	200	250	300	350
		Total Pressure	0.015	0.026	0.041	0.059	0.080	0.105	0.164	0.236	0.321
		NC (Noise Criteria)	-	-	-	16	21	25	32	38	43
		1-Way - Horizontal Throw	1-3-9	2-5-12	3-7-14	5-9-15	7-10-16	8-12-17	10-14-19	12-15-21	13-16-23
		2-Way - Horizontal Throw	1-3-6	2-4-9	3-5-11	4-6-13	5-8-14	6-9-15	7-11-17	9-13-19	10-14-20
		3-Way - Horizontal Throw	1-3-5	2-4-7	3-5-9	4-5-10	4-6-10	5-7-11	6-9-13	7-10-14	9-10-15
		4-Way - Horizontal Throw	1-2-4	2-3-6	2-3-7	3-4-8	3-5-9	4-6-9	5-7-10	6-8-11	7-9-12
	8" Dia.	Airflow, cfm	105	140	175	209	244	279	349	419	489
		Total Pressure	0.016	0.028	0.044	0.064	0.087	0.113	0.177	0.255	0.347
		NC (Noise Criteria)	-	-	13	19	24	28	35	41	46
		1-Way - Horizontal Throw	1-3-10	3-6-14	4-9-16	6-10-18	8-12-19	9-14-20	12-16-23	14-18-25	16-19-27
		2-Way - Horizontal Throw	1-3-8	3-5-10	4-6-13	5-8-15	6-9-17	7-10-18	8-13-20	10-15-22	12-17-24
		3-Way - Horizontal Throw	2-3-6	3-4-9	4-5-10	4-6-11	5-8-12	6-9-13	7-10-15	9-11-16	10-12-18
		4-Way - Horizontal Throw	1-2-5	2-3-7	3-4-8	3-5-9	4-6-10	4-7-11	5-8-12	7-9-13	8-10-14
	8 x 8 Neck	Airflow, cfm	133	178	222	267	311	356	444	533	622
		Total Pressure	0.017	0.030	0.047	0.068	0.093	0.121	0.190	0.273	0.372
		NC (Noise Criteria)	-	-	16	22	27	31	38	44	49
		1-Way - Horizontal Throw	2-4-12	3-7-16	5-10-18	7-12-20	9-14-21	10-16-23	13-18-26	16-20-28	18-21-30
		2-Way - Horizontal Throw	2-4-9	3-6-11	5-7-14	6-9-17	7-10-19	8-11-20	10-14-23	11-17-25	13-19-27
		3-Way - Horizontal Throw	2-4-7	3-5-10	4-6-12	5-7-13	6-9-14	6-10-15	8-12-17	10-13-18	11-14-20
		4-Way - Horizontal Throw	1-3-6	2-4-7	3-5-9	4-6-11	4-7-11	5-7-12	6-9-14	7-11-15	9-11-16
	10" Dia.	Airflow, cfm	164	218	273	327	382	436	545	654	764
		Total Pressure	0.018	0.032	0.051	0.073	0.099	0.130	0.203	0.292	0.398
		NC (Noise Criteria)	-	-	18	24	29	33	40	46	51
		1-Way - Horizontal Throw	2-4-13	3-7-17	5-11-20	7-13-22	10-15-24	12-17-25	15-20-28	17-22-31	19-24-34
		2-Way - Horizontal Throw	2-4-10	3-6-13	5-8-16	6-10-19	7-11-21	8-13-22	11-16-25	13-19-27	15-21-30
		3-Way - Horizontal Throw	2-4-8	4-5-11	4-7-13	5-8-14	6-9-15	7-11-17	9-13-18	11-14-20	13-15-22
		4-Way - Horizontal Throw	1-3-6	3-4-8	3-5-10	4-6-12	5-7-13	5-8-14	7-10-15	8-12-17	10-13-18

Performance notes appear at end of performance data

PDS DROP FACE / SUPPLY / STEEL / ADJUSTABLE

		Neck Velocity	300	400	500	600	700	800	1000	1200	1400
		Velocity Pressure	0.006	0.010	0.016	0.022	0.031	0.040	0.062	0.090	0.122
20 x 20 Module	6" Dia.	Airflow, cfm	59	79	98	118	137	157	196	236	275
		Total Pressure	0.014	0.025	0.039	0.056	0.077	0.100	0.157	0.226	0.307
		NC (Noise Criteria)	-	-	-	13	18	22	30	35	40
		1-Way - Horizontal Throw	1-2-8	2-4-10	3-7-12	4-8-13	6-9-14	7-10-15	9-12-17	10-13-19	12-14-20
		2-Way - Horizontal Throw	1-2-6	2-4-8	3-5-10	4-6-11	4-7-13	5-8-13	6-10-15	8-11-16	9-13-18
		3-Way - Horizontal Throw	1-2-5	2-3-6	3-4-8	3-5-9	4-6-9	4-6-10	5-8-11	6-9-12	8-9-13
		4-Way - Horizontal Throw	1-2-4	2-2-5	2-3-6	2-4-7	3-4-8	3-5-8	4-6-9	5-7-10	6-8-11
	6 x 6 Neck	Airflow, cfm	75	100	125	150	175	200	250	300	350
		Total Pressure	0.015	0.026	0.041	0.059	0.080	0.105	0.164	0.236	0.321
		NC (Noise Criteria)	-	-	-	16	21	25	32	38	43
		1-Way - Horizontal Throw	1-3-9	2-5-12	3-7-14	5-9-15	7-10-16	8-12-17	10-14-19	12-15-21	13-16-23
		2-Way - Horizontal Throw	1-3-6	2-4-9	3-5-11	4-6-13	5-8-14	6-9-15	7-11-17	9-13-19	10-14-20
		3-Way - Horizontal Throw	1-3-5	2-4-7	3-5-9	4-5-10	4-6-10	5-7-11	6-9-13	7-10-14	9-10-15
		4-Way - Horizontal Throw	1-2-4	2-3-6	2-3-7	3-4-8	3-5-9	4-6-9	5-7-10	6-8-11	7-9-12
	8" Dia.	Airflow, cfm	105	140	175	209	244	279	349	419	489
		Total Pressure	0.016	0.028	0.044	0.064	0.087	0.113	0.177	0.255	0.347
		NC (Noise Criteria)	-	-	13	19	24	28	35	41	46
		1-Way - Horizontal Throw	1-3-10	3-6-14	4-9-16	6-10-18	8-12-19	9-14-20	12-16-23	14-18-25	16-19-27
		2-Way - Horizontal Throw	1-3-8	3-5-10	4-6-13	5-8-15	6-9-17	7-10-18	8-13-20	10-15-22	12-17-24
		3-Way - Horizontal Throw	2-3-6	3-4-9	4-5-10	4-6-11	5-8-12	6-9-13	7-10-15	9-11-16	10-12-18
		4-Way - Horizontal Throw	1-2-5	2-3-7	3-4-8	3-5-9	4-6-10	4-7-11	5-8-12	7-9-13	8-10-14
	8 x 8 Neck	Airflow, cfm	133	178	222	267	311	356	444	533	622
		Total Pressure	0.017	0.030	0.047	0.068	0.093	0.121	0.190	0.273	0.372
		NC (Noise Criteria)	-	-	16	22	27	31	38	44	49
		1-Way - Horizontal Throw	2-4-12	3-7-16	5-10-18	7-12-20	9-14-21	10-16-23	13-18-26	16-20-28	18-21-30
		2-Way - Horizontal Throw	2-4-9	3-6-11	5-7-14	6-9-17	7-10-19	8-11-20	10-14-23	11-17-25	13-19-27
		3-Way - Horizontal Throw	2-4-7	3-5-10	4-6-12	5-7-13	6-9-14	6-10-15	8-12-17	10-13-18	11-14-20
		4-Way - Horizontal Throw	1-3-6	2-4-7	3-5-9	4-6-11	4-7-11	5-7-12	6-9-14	7-11-15	9-11-16
	10" Dia.	Airflow, cfm	164	218	273	327	382	436	545	654	764
		Total Pressure	0.018	0.032	0.051	0.073	0.099	0.130	0.203	0.292	0.398
		NC (Noise Criteria)	-	-	18	24	29	33	40	46	51
		1-Way - Horizontal Throw	2-4-13	3-7-17	5-11-20	7-13-22	10-15-24	12-17-25	15-20-28	17-22-31	19-24-34
		2-Way - Horizontal Throw	2-4-10	3-6-13	5-8-16	6-10-19	7-11-21	8-13-22	11-16-25	13-19-27	15-21-30
		3-Way - Horizontal Throw	2-4-8	4-5-11	4-7-13	5-8-14	6-9-15	7-11-17	9-13-18	11-14-20	13-15-22
		4-Way - Horizontal Throw	1-3-6	3-4-8	3-5-10	4-6-12	5-7-13	5-8-14	7-10-15	8-12-17	10-13-18
	10 x 10 Neck	Airflow, cfm	208	278	347	417	486	556	694	833	972
		Total Pressure	0.020	0.036	0.056	0.080	0.109	0.143	0.223	0.321	0.437
		NC (Noise Criteria)	-	13	21	26	31	35	43	48	53
		1-Way - Horizontal Throw	2-5-15	4-8-20	6-12-23	8-15-25	11-17-27	13-20-29	16-23-32	20-25-35	22-27-38
		2-Way - Horizontal Throw	2-5-11	4-7-14	6-9-18	7-11-21	8-13-24	10-14-25	12-18-28	14-21-31	17-24-34
		3-Way - Horizontal Throw	2-5-9	4-6-12	5-8-15	6-9-16	7-11-17	8-12-19	10-15-21	12-16-23	14-17-25
		4-Way - Horizontal Throw	2-3-7	3-5-9	4-6-12	5-7-13	5-8-14	6-9-15	8-12-17	9-13-19	11-14-20
	12" Dia.	Airflow, cfm	236	314	393	471	550	628	785	942	1100
		Total Pressure	0.027	0.048	0.076	0.109	0.148	0.194	0.303	0.436	0.593
		NC (Noise Criteria)	-	15	22	28	33	37	44	50	55
		1-Way - Horizontal Throw	7-12-19	10-15-22	13-17-24	15-19-26	16-20-29	18-22-30	20-24-34	22-26-37	23-29-40
		2-Way - Horizontal Throw	6-8-16	8-11-19	9-14-21	11-16-23	13-18-25	15-19-27	17-21-30	19-23-33	21-25-36
		3-Way - Horizontal Throw	5-7-12	6-10-14	8-11-16	10-12-17	11-13-19	11-14-20	13-16-22	14-17-24	15-19-26
		4-Way - Horizontal Throw	4-6-10	5-7-12	6-9-13	7-10-14	9-11-15	9-12-16	11-13-18	12-14-20	12-15-22
	14" Dia.	Airflow, cfm	321	428	535	641	748	855	1069	1283	1497
		Total Pressure	0.029	0.052	0.081	0.116	0.158	0.206	0.322	0.464	0.631
		NC (Noise Criteria)	-	18	25	31	36	40	47	53	58
		1-Way - Horizontal Throw	8-14-22	12-18-25	15-20-28	18-22-31	19-24-33	21-25-36	23-28-40	25-31-44	27-33-47
		2-Way - Horizontal Throw	7-10-19	9-13-22	11-17-25	13-19-27	15-21-29	18-22-31	20-25-35	22-27-38	24-29-42
		3-Way - Horizontal Throw	6-8-14	7-11-16	9-13-18	11-14-20	13-15-22	13-16-23	15-18-26	16-20-28	18-22-31
		4-Way - Horizontal Throw	4-6-12	6-9-13	7-11-15	9-12-16	10-13-18	11-13-19	12-15-21	13-16-23	15-18-25

Performance notes appear at end of performance data

PDS DROP FACE / SUPPLY / STEEL / ADJUSTABLE

		Neck Velocity	300	400	500	600	700	800	1000	1200	1400
		Velocity Pressure	0.006	0.010	0.016	0.022	0.031	0.040	0.062	0.090	0.122
24 x 24 Module	6" Dia.	Airflow, cfm	59	79	98	118	137	157	196	236	275
		Total Pressure	0.014	0.025	0.039	0.056	0.077	0.100	0.157	0.226	0.307
		NC (Noise Criteria)	-	-	-	13	18	22	30	35	40
		1-Way - Horizontal Throw	1-2-8	2-4-10	3-7-12	4-8-13	6-9-14	7-10-15	9-12-17	10-13-19	12-14-20
		2-Way - Horizontal Throw	1-2-6	2-4-8	3-5-10	4-6-11	4-7-13	5-8-13	6-10-15	8-11-16	9-13-18
		3-Way - Horizontal Throw	1-2-5	2-3-6	3-4-8	3-5-9	4-6-9	4-6-10	5-8-11	6-9-12	8-9-13
		4-Way - Horizontal Throw	1-2-4	2-2-5	2-3-6	2-4-7	3-4-8	3-5-8	4-6-9	5-7-10	6-8-11
	6 x 6 Neck	Airflow, cfm	75	100	125	150	175	200	250	300	350
		Total Pressure	0.015	0.026	0.041	0.059	0.080	0.105	0.164	0.236	0.321
		NC (Noise Criteria)	-	-	-	16	21	25	32	38	43
		1-Way - Horizontal Throw	1-3-9	2-5-12	3-7-14	5-9-15	7-10-16	8-12-17	10-14-19	12-15-21	13-16-23
		2-Way - Horizontal Throw	1-3-6	2-4-9	3-5-11	4-6-13	5-8-14	6-9-15	7-11-17	9-13-19	10-14-20
		3-Way - Horizontal Throw	1-3-5	2-4-7	3-5-9	4-5-10	4-6-10	5-7-11	6-9-13	7-10-14	9-10-15
		4-Way - Horizontal Throw	1-2-4	2-3-6	2-3-7	3-4-8	3-5-9	4-6-9	5-7-10	6-8-11	7-9-12
	8" Dia.	Airflow, cfm	105	140	175	209	244	279	349	419	489
		Total Pressure	0.016	0.028	0.044	0.064	0.087	0.113	0.177	0.255	0.347
		NC (Noise Criteria)	-	-	13	19	24	28	35	41	46
		1-Way - Horizontal Throw	1-3-10	3-6-14	4-9-16	6-10-18	8-12-19	9-14-20	12-16-23	14-18-25	16-19-27
		2-Way - Horizontal Throw	1-3-8	3-5-10	4-6-13	5-8-15	6-9-17	7-10-18	8-13-20	10-15-22	12-17-24
		3-Way - Horizontal Throw	2-3-6	3-4-9	4-5-10	4-6-11	5-8-12	6-9-13	7-10-15	9-11-16	10-12-18
		4-Way - Horizontal Throw	1-2-5	2-3-7	3-4-8	3-5-9	4-6-10	4-7-11	5-8-12	7-9-13	8-10-14
	8 x 8 Neck	Airflow, cfm	133	178	222	267	311	356	444	533	622
		Total Pressure	0.017	0.030	0.047	0.068	0.093	0.121	0.190	0.273	0.372
		NC (Noise Criteria)	-	-	16	22	27	31	38	44	49
		1-Way - Horizontal Throw	2-4-12	3-7-16	5-10-18	7-12-20	9-14-21	10-16-23	13-18-26	16-20-28	18-21-30
		2-Way - Horizontal Throw	2-4-9	3-6-11	5-7-14	6-9-17	7-10-19	8-11-20	10-14-23	11-17-25	13-19-27
		3-Way - Horizontal Throw	2-4-7	3-5-10	4-6-12	5-7-13	6-9-14	6-10-15	8-12-17	10-13-18	11-14-20
		4-Way - Horizontal Throw	1-3-6	2-4-7	3-5-9	4-6-11	4-7-11	5-7-12	6-9-14	7-11-15	9-11-16
	10" Dia.	Airflow, cfm	164	218	273	327	382	436	545	654	764
		Total Pressure	0.018	0.032	0.051	0.073	0.099	0.130	0.203	0.292	0.398
		NC (Noise Criteria)	-	-	18	24	29	33	40	46	51
		1-Way - Horizontal Throw	2-4-13	3-7-17	5-11-20	7-13-22	10-15-24	12-17-25	15-20-28	17-22-31	19-24-34
		2-Way - Horizontal Throw	2-4-10	3-6-13	5-8-16	6-10-19	7-11-21	8-13-22	11-16-25	13-19-27	15-21-30
		3-Way - Horizontal Throw	2-4-8	4-5-11	4-7-13	5-8-14	6-9-15	7-11-17	9-13-18	11-14-20	13-15-22
		4-Way - Horizontal Throw	1-3-6	3-4-8	3-5-10	4-6-12	5-7-13	5-8-14	7-10-15	8-12-17	10-13-18
	10 x 10 Neck	Airflow, cfm	208	278	347	417	486	556	694	833	972
		Total Pressure	0.020	0.036	0.056	0.080	0.109	0.143	0.223	0.321	0.437
		NC (Noise Criteria)	-	13	21	26	31	35	43	48	53
		1-Way - Horizontal Throw	2-5-15	4-8-20	6-12-23	8-15-25	11-17-27	13-20-29	16-23-32	20-25-35	22-27-38
		2-Way - Horizontal Throw	2-5-11	4-7-14	6-9-18	7-11-21	8-13-24	10-14-25	12-18-28	14-21-31	17-24-34
		3-Way - Horizontal Throw	2-5-9	4-6-12	5-8-15	6-9-16	7-11-17	8-12-19	10-15-21	12-16-23	14-17-25
		4-Way - Horizontal Throw	2-3-7	3-5-9	4-6-12	5-7-13	5-8-14	6-9-15	8-12-17	9-13-19	11-14-20
	12" Dia.	Airflow, cfm	236	314	393	471	550	628	785	942	1100
		Total Pressure	0.027	0.048	0.076	0.109	0.148	0.194	0.303	0.436	0.593
		NC (Noise Criteria)	-	15	22	28	33	37	44	50	55
		1-Way - Horizontal Throw	7-12-19	10-15-22	13-17-24	15-19-26	16-20-29	18-22-30	20-24-34	22-26-37	23-29-40
		2-Way - Horizontal Throw	6-8-16	8-11-19	9-14-21	11-16-23	13-18-25	15-19-27	17-21-30	19-23-33	21-25-36
		3-Way - Horizontal Throw	5-7-12	6-10-14	8-11-16	10-12-17	11-13-19	11-14-20	13-16-22	14-17-24	15-19-26
		4-Way - Horizontal Throw	4-6-10	5-7-12	6-9-13	7-10-14	9-11-15	9-12-16	11-13-18	12-14-20	12-15-22
	12 x 12 Neck	Airflow, cfm	300	400	500	600	700	800	1000	1200	1400
		Total Pressure	0.029	0.051	0.079	0.114	0.156	0.203	0.317	0.457	0.622
		NC (Noise Criteria)	-	17	24	30	35	39	46	52	57
		1-Way - Horizontal Throw	8-13-21	12-17-24	15-19-27	17-21-30	19-23-32	20-24-34	22-27-38	24-30-42	26-32-46
		2-Way - Horizontal Throw	6-10-19	9-13-21	11-16-24	13-19-26	15-20-28	17-21-30	20-24-34	21-26-37	23-28-40
		3-Way - Horizontal Throw	5-8-14	7-11-16	9-13-18	11-14-19	12-15-21	13-16-22	14-18-25	16-19-27	17-21-30
		4-Way - Horizontal Throw	4-6-11	6-8-13	7-10-15	8-11-16	10-12-17	11-13-18	12-15-21	13-16-23	14-17-24
	14" Dia.	Airflow, cfm	321	428	535	641	748	855	1069	1283	1497
		Total Pressure	0.029	0.052	0.081	0.116	0.158	0.206	0.322	0.464	0.631
		NC (Noise Criteria)	-	18	25	31	36	40	47	53	58
		1-Way - Horizontal Throw	8-14-22	12-18-25	15-20-28	18-22-31	19-24-33	21-25-36	23-28-40	25-31-44	27-33-47
		2-Way - Horizontal Throw	7-10-19	9-13-22	11-17-25	13-19-27	15-21-29	18-22-31	20-25-35	22-27-38	24-29-42
		3-Way - Horizontal Throw	6-8-14	7-11-16	9-13-18	11-14-20	13-15-22	13-16-23	15-18-26	16-20-28	18-22-31
		4-Way - Horizontal Throw	4-6-12	6-9-13	7-11-15	9-12-16	10-13-18	11-13-19	12-15-21	13-16-23	15-18-25
	16" Dia.	Airflow, cfm	419	559	698	838	977	1117	1396	1676	1955
		Total Pressure	0.031	0.055	0.086	0.124	0.169	0.220	0.344	0.496	0.675
		NC (Noise Criteria)	12	21	28	34	38	43	50	56	60
		1-Way - Horizontal Throw	10-16-25	14-20-29	17-23-32	20-25-35	22-27-38	23-29-41	26-32-45	29-35-50	31-38-54
		2-Way - Horizontal Throw	8-11-22	10-15-25	13-19-28	15-22-31	18-24-34	20-25-36	23-28-40	25-31-44	27-34-48
		3-Way - Horizontal Throw	6-10-16	9-13-19	11-15-21	13-16-23	14-18-25	15-19-26	17-21-30	19-23-32	20-25-35
		4-Way - Horizontal Throw	5-7-13	7-10-15	8-12-17	10-13-19	11-14-20	13-15-22	14-17-24	15-19-27	17-20-29

Performance notes appear at end of performance data

- Data obtained from tests conducted in accordance with ANSI / ASHRAE Standard 70-2006. Actual performance, with flexible duct inlet, may vary in the field. See the Engineering Guidelines section of this catalog for additional information.
- Throw values given are for terminal velocities of 150, 100 and 50 fpm and for isothermal conditions
- For an explanation of catalog throw data, see the section, Engineering Guidelines
- NC values based on octave band 2 to 7 sound power levels minus a room absorption of 10 dB
- Each NC value represents the noise criteria curve that will not be exceeded by the sound pressure in any of the octave bands, 2 through 7, with a room absorption of 10 dB, re 10^{-12} watts
- Dash (-) in space denotes an NC value of less than 10
- All pressures are given in inches of water
- To obtain static pressure, subtract the velocity pressure from the total pressure

PAR, PXP, PMR, PXP–DR, PDR PERFORMANCE DATA

PAR, PXP, PMR - FLUSH FACE - RETURN; PXP-DR, PDR - DROP FACE - RETURN

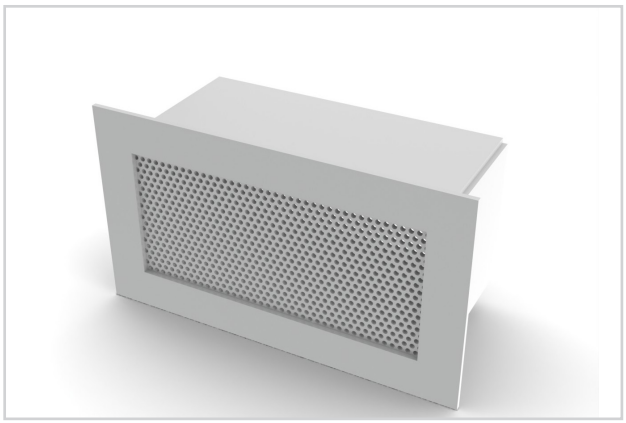
12 x 12 Face	Neck Size	Neck Vel, fpm	300	400	500	600	700	800	1000	1200	1400
		Vp, in. Wg	0.01	0.01	0.02	0.02	0.03	0.04	0.06	0.09	0.12
		Ps (-), in. Wg	0.03	0.06	0.09	0.13	0.17	0.23	0.36	0.51	0.70
	6 Dia. *	Flow Rate, cfm	59	78	98	118	137	157	196	235	275
		Room NC	-	-	-	14	18	21	27	32	36
	6 x 6 Neck *	Flow Rate, cfm	75	100	125	150	175	200	250	300	350
		Room NC	-	-	12	17	21	24	30	35	39
	10 x 10 Neck	Flow Rate, cfm	208	278	347	417	486	556	694	833	972
		Room NC	15	23	29	33	37	41	47	51	55
24 x 24 Face	Neck Size	Neck Vel, fpm	300	400	500	600	700	800	1000	1200	1400
		Vp, in. Wg	0.01	0.01	0.02	0.02	0.03	0.04	0.06	0.09	0.12
		Ps (-), in. Wg	0.03	0.06	0.09	0.13	0.18	0.24	0.37	0.54	0.73
	6 Dia. *	Flow Rate, cfm	59	78	98	118	137	157	196	235	275
		Room NC	-	-	-	13	17	20	26	31	34
	6 x 6 Neck *	Flow Rate, cfm	75	100	125	150	175	200	250	300	350
		Room NC	-	-	-	14	18	21	27	32	35
	8 Dia. *	Flow Rate, cfm	105	140	174	209	244	279	349	419	488
		Room NC	-	-	13	17	21	24	30	35	38
	8 x 8 Neck *	Flow Rate, cfm	133	178	222	267	311	356	444	533	622
		Room NC	-	-	14	18	22	25	31	36	39
	10 Dia.*	Flow Rate, cfm	164	218	273	327	382	436	545	654	763
		Room NC	-	-	16	20	24	27	33	38	41
	10 x 10 Neck *	Flow Rate, cfm	208	278	347	417	486	556	694	833	972
		Room NC	-	11	17	21	25	28	34	39	42
	12 Dia. *	Flow Rate, cfm	235	314	392	471	549	628	785	942	1099
		Room NC	-	12	17	22	26	29	34	39	43
	12 x 12 Neck *	Flow Rate, cfm	300	400	500	600	700	800	1000	1200	1400
		Room NC	-	14	20	24	28	31	37	42	45
	14 Dia. *	Flow Rate, cfm	320	427	534	641	748	855	1068	1282	1495
		Room NC	-	15	21	25	29	32	38	43	46
	15 x 15 Neck *	Flow Rate, cfm	469	625	781	938	1094	1250	1563	1875	2188
		Room NC	-	16	22	26	30	33	39	44	47
	16 Dia. *	Flow Rate, cfm	419	558	698	837	977	1116	1395	1674	1953
		Room NC	11	18	24	28	32	35	41	46	49
	18 x 18 Neck *	Flow Rate, cfm	675	900	1125	1350	1575	1800	2250	2700	3150
		Room NC	11	18	24	28	32	36	41	46	49
	22 x 22 Neck	Flow Rate, cfm	1008	1344	1681	2017	2353	2689	3361	4033	4706
		Room NC	13	20	26	30	34	37	43	47	51
Other Sizes	Neck Size	Neck Vel, fpm	300	400	500	600	700	800	1000	1200	1400
		Vp, in. Wg	0.01	0.01	0.02	0.02	0.03	0.04	0.06	0.09	0.12
		Ps (-), in. Wg	0.03	0.06	0.09	0.13	0.17	0.23	0.36	0.51	0.70
	10 x 22 (12 x 24 Face)	Flow Rate, cfm	458	611	764	917	1069	1222	1528	1833	2139
		Room NC	-	-	-	14	18	21	27	32	36
	14 x 14 (16 x 16 Face)	Flow Rate, cfm	408	544	681	817	953	1089	1361	1633	1906
		Room NC	-	-	12	17	21	24	30	35	39
	18 x 18 (20 x 20 Face)	Flow Rate, cfm	675	900	1125	1350	1575	1800	2250	2700	3150
		Room NC	-	11	17	22	26	29	35	40	44
	22 x 46 (24 x 48 Face)	Flow Rate, cfm	2108	2811	3514	4217	4919	5622	7028	8433	9839
		Room NC	12	20	25	30	34	38	43	48	52

PAR, PXP, PMR, PXP-DR, PDR PERFORMANCE NOTES

- Supply unit with deflectors removed
- Static pressures are negative, in inches of water, measured per ANSI/ASHRAE Standard 70-2006
- Noise Criteria (NC) based on a room absorption of 10 dB, re 10^{-12} watts, measured per ANSI/ASHRAE Standard 70-2006
- These products have been tested per ANSI/ASHRAE Standard 70-2006. Actual performance, with flexible duct inlet, may vary in the field.
- See the section, Engineering Guidelines for additional information

SG-SD

- Face plate: 3/16" steel with 3/16" diameter holes on 9/32" staggered centers and 1" border
- Sleeve: 3/16" steel
- All welded construction



SG-SD

Complies with NIC Guidelines for Suicide Prevention and California Title 24

metric sizes | suicide deterrent | maximum security

See website for Specifications

MODELS:

SG-SD / Steel
SG-SD-SS / Stainless Steel

FINISHES:

Standard Finish - #26 White
Optional Finish - #04 Mill

OVERVIEW

Suicide Deterrent

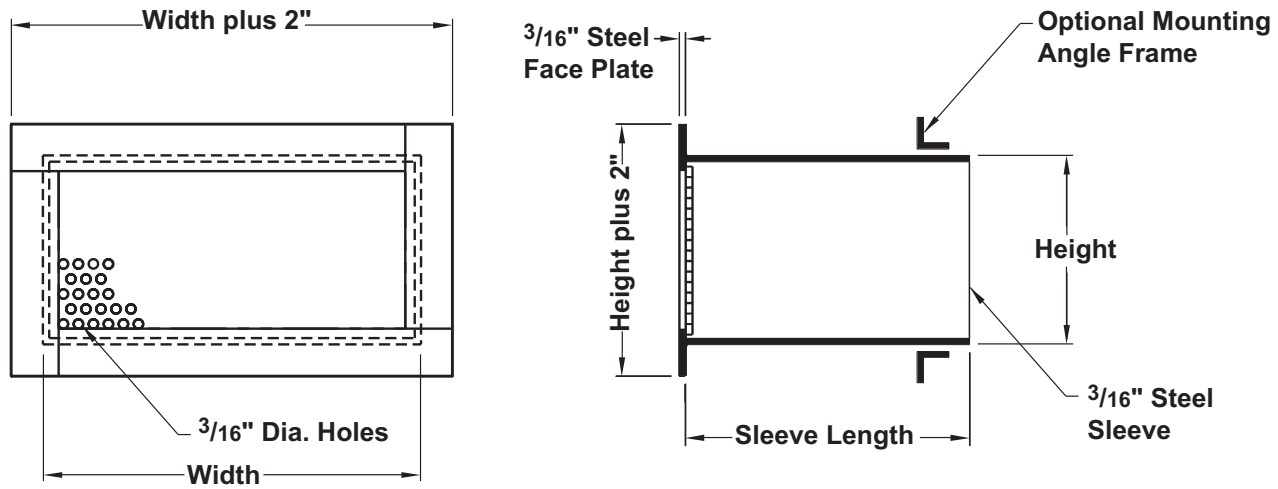
The SG-SD is a maximum security grille. The design of this grille allows a greater effective free area and superior airflow without compromising security and safety. The SG-SD complies with National Institute of Corrections guidelines for suicide prevention and California Title 24.

OPTIONS

- Angle Frame - 1½" x 1½" x 3/16" steel angle iron shipped loose for field wielding. Frame is mill finish.
- Anchor Bars - ¾" diameter steel bars, 3" in height. Positioned 3" from back of face plate on top and bottom of sleeve
- Rear Operated Damper - AG-15 steel opposed blade damper. Slot operated from rear of the grille.
- Sleeve Barrier Grille - constructed of ¾" diameter steel bars with maximum 6" opening

SG-SD UNIT DIMENSIONS

SG-SD



Notes:

For standard product, width and height should be specified in even 1" increments.

Typical mounting is accomplished by using an angle frame ($1^1/_2$" x $1^1/_2$" x $^3/_{16}$") shipped loose for field welding.

Dimensions Available	
Width: Height: Sleeve Length:	6 to 30" 4 to 30" 4 to 18" in 1" increments

Disclaimer:

The SG-SD is designed to increase inmate safety through compliance with the most recent known industry guidelines and design practices for products of its type. This is not meant to imply that the product cannot be used to inflict harm or is "suicide proof". Titus warrants only the construction and airflow performance of the product as cataloged.

All dimensions are in inches

SG-SD

Neck Size (in)	Neck Area (Sq. ft)	Area Factor Ak	Neck Velocity, fpm	100	150	200	250	300	350	400	450	500
			Velocity Pressure	0.001	0.001	0.003	0.004	0.006	0.008	0.010	0.013	0.016
6x6	0.250	0.088	Airflow, cfm	25	38	50	63	75	88	100	113	125
			Face Velocity, fpm	225	338	451	564	676	789	902	1014	1127
			Total Pressure	0.005	0.012	0.022	0.034	0.049	0.066	0.086	0.109	0.135
			Noise Criteria	-	-	-	-	-	-	11	14	18
			Throw, FT	1-2-8	2-4-13	3-8-17	5-11-21	8-13-23	10-15-25	11-17-27	13-19-28	14-21-30
8x8	0.444	0.164	Airflow, cfm	44	67	89	111	133	155	178	200	222
			Face Velocity, fpm	212	318	424	530	636	742	848	953	1059
			Total Pressure	0.005	0.011	0.020	0.031	0.045	0.062	0.080	0.102	0.126
			Noise Criteria	-	-	-	-	-	-	13	17	21
			Throw, FT	1-2-9	2-5-16	4-9-22	7-14-27	9-16-31	13-19-33	15-22-36	16-24-38	18-27-40
10x10	0.694	0.265	Airflow, cfm	69	104	139	174	208	243	278	312	347
			Face Velocity, fpm	202	303	404	505	606	707	808	909	1009
			Total Pressure	0.005	0.011	0.019	0.030	0.043	0.058	0.076	0.096	0.119
			Noise Criteria	-	-	-	-	-	11	16	20	23
			Throw, FT	1-3-11	3-6-20	5-11-27	8-17-33	11-20-39	15-23-42	18-27-45	20-30-47	22-33-50
12x12	1.000	0.392	Airflow, cfm	100	150	200	250	300	350	400	450	500
			Face Velocity, fpm	194	291	388	485	582	679	776	873	970
			Total Pressure	0.005	0.010	0.018	0.028	0.041	0.055	0.072	0.092	0.113
			Noise Criteria	-	-	-	-	-	13	18	22	25
			Throw, FT	1-3-12	3-7-23	6-12-31	9-19-39	12-23-46	17-27-50	21-31-53	23-35-57	26-39-60
18x18	2.250	0.936	Airflow, cfm	225	338	450	563	675	788	900	1013	1125
			Face Velocity, fpm	178	267	356	445	533	622	711	800	889
			Total Pressure	0.004	0.009	0.016	0.026	0.037	0.050	0.065	0.083	0.102
			Noise Criteria	-	-	-	-	12	17	22	26	29
			Throw, FT	2-4-16	4-9-34	7-16-45	11-25-56	16-34-67	22-39-75	29-45-80	34-51-85	37-56-90
24x24	4.000	1.736	Airflow, cfm	400	600	800	1000	1200	1400	1600	1800	2000
			Face Velocity, fpm	167	251	334	418	501	585	668	752	836
			Total Pressure	0.004	0.009	0.015	0.024	0.034	0.046	0.061	0.077	0.095
			Noise Criteria	-	-	-	-	15	20	25	29	32
			Throw, FT	2-5-20	5-11-44	9-20-58	14-31-73	20-44-87	27-51-100	35-58-107	44-65-113	48-73-120
30x30	6.250	2.804	Airflow, cfm	625	938	1250	1563	1875	2188	2500	2813	3125
			Face Velocity, fpm	159	239	318	398	478	557	637	717	796
			Total Pressure	0.004	0.008	0.014	0.022	0.032	0.044	0.057	0.073	0.090
			Noise Criteria	-	-	-	12	18	23	27	31	34
			Throw, FT	3-6-23	6-13-52	10-23-71	16-36-89	23-52-106	31-62-124	41-71-134	52-80-142	59-89-149

- Data obtained from tests conducted in accordance with ANSI/ ASHRAE Standard 70-2006
- All data based upon supply performance
- All pressures are in inches of water
- The negative static pressure for return performance is equal to the total pressure of supply at the same cfm
- Throw values are for terminal velocities of 150, 100 and 50 fpm under isothermal conditions. See the section, Engineering Guidelines, in this catalog for throw information.
- Noise Criteria values are based on a room absorption of 10 dB
- Dash (-) in space indicates NC value less than 10
- Return NC is 2 NC higher than supply NC at the same cfm

TPKA0A0361KA70A & TRUYA0361KA70(N/B)A
36,000 BTU/H WALL-MOUNTED INDOOR UNIT
36,000 BTU/H COOLING ONLY OUTDOOR

Job Name:

System Reference: Date:

Indoor Unit TPKA0A0361KA70A

Outdoor Unit
- ☐ Standard Model TRUYA0361KA70NA
- ☐ Seacoast Model TRUYA0361KA70BA

INDOOR UNIT FEATURES
- Sleek, compact design
- Simple installation
- Vane setting for air flow direction control
- Auto fan speed mode
- Ideal for spaces such as server rooms, daycare centers, classrooms, churches, small offices, and more
- Multiple control options available:
  - kumo cloud® smart device app for remote access
  - Third-party interface options
  - Wired or wireless controllers

OUTDOOR UNIT FEATURES
- Variable speed INVERTER-driven compressor
- Power receiver pre-charged with refrigerant volume for piping length up to 100 ft
- Low ambient cooling down to -40°F providing 100% capacity (with wind baffles)
- 24-hour continuous operation (cooling mode)
- High pressure protection
- Fast restart
- Superior energy and operational efficiency

SPECIFICATIONS: TPKA0A0361KA70A & TRUYA0361KA70(N/B)A

Cooling at 95°F[1]	Maximum Capacity	BTU/H	36,000
	Rated Capacity	BTU/H	36,000
	Minimum Capacity	BTU/H	16,000
	Maximum Power Input	W	3,330
	Rated Power Input	W	3,330
	Moisture Removal	Pints/h	9.7
	Sensible Heat Factor		0.70
	Power Factor	%	96.5/96.5
Efficiency	SEER		18.8
	EER[1]		10.8
	ENERGY STAR® Certified		No
Electrical	Voltage, Phase, Frequency		208/230, 1, 60
	Guaranteed Voltage Range	V AC	198 - 253
	Voltage: Indoor - Outdoor, S1-S2	V AC	208/230
	Voltage: Indoor - Outdoor, S2-S3	V DC	24
	Short-circuit Current Rating [SCCR]	kA	5
	Recommended Fuse/Breaker Size (Oudoor)	A	30
	Recommended Wire Size [Indoor - Outdoor]	AWG	14
	Power Supply		Indoor unit is powered by the outdoor unit
Indoor Unit	MCA	A	1.0
	Fan Motor Full Load Amperage	A	0.57
	Fan Motor Output	W	56
	Fan Motor Type		DC Motor
	Airflow Rate at Cooling, Dry	CFM	705–810–920
	Airflow Rate at Cooling, Wet	CFM	635–730–830
	Sound Pressure Level [Cooling]	dB[A]	43–46–49
	Drain Pipe Size	In. [mm]	5/8 [16]
	Coating on Heat Exchanger		—
	External Finish Color		White Munsell 1.0Y 9.2/0.2
	Unit Dimensions	W x D x H: In. [mm]	46-1/16 x 11-5/8 x 14-3/8 [1170 x 295 x 365]
	Package Dimensions	W x D x H: In. [mm]	51 x 14-1/4 x 18-1/2 [1295 x 362 x 470]
	Unit Weight	Lbs. [kg]	46 [21]
	Package Weight	Lbs. [kg]	53 [24]
Indoor Unit Operating Temperature Range	Cooling Intake Air Temp [Maximum / Minimum]*	°F	90 DB, 72 WB / 66 DB, 61 WB
	Heating Intake Air Temp [Maximum / Minimum]	°F	77 DB / 59 DB
Outdoor Unit	MCA	A	25.0
	MOCP	A	31
	Fan Motor Full Load Amperage	A	0.5 + 0.5
	Fan Motor Output	W	74
	Airflow Rate	CFM	3880
	Refrigerant Control		LEV
	Defrost Method		Reverse Cycle
	Coating on Heat Exchanger		Blue Fin Coating (BS Model only)
	Sound Pressure Level, Cooling[1]	dB(A)	52
	Compressor Type		INVERTER-driven twin rotary
	Compressor Model		MNB33FBRMC-L
	Compressor Rated Load Amps	A	8
	Compressor Locked Rotor Amps	A	13.0
	Compressor Oil Type // Charge	oz.	FV50S // 45
	External Finish Color		Ivory Munsell 3Y 7.8/1.1
	Base Pan Heater		N/A
	Unit Dimensions	W x D x H: In. [mm]	41-5/16 x 13 (+1-3/16) x 52-11/16 [1050 x 330 (+30) x 1338]
	Package Dimensions	W x D x H: In. [mm]	42-15/16 x 17-11/16 x 56-4/16 [1091 x 450 x 1429]
	Unit Weight	Lbs. [kg]	211 [96]
	Package Weight	Lbs. [kg]	243 [110]
Outdoor Unit Operating Temperature Range	Cooling Air Temp [Maximum / Minimum]*	°F	115 DB / -40 DB
Refrigerant	Type		R410A
	Charge	Lbs, oz	10, 6.0
	Chargeless Piping Length	Ft. [m]	0.0 [30.0]
	Additional Refrigerant Charge Per Additional Piping Length	oz./Ft. [g/m]	0.3 [22.5]

NOTES:
AHRI Rated Conditions
(Rated data is determined at a fixed compressor speed) [1]Cooling (Indoor // Outdoor) °F 80 DB, 67 WB // 95 DB, 75 WB

*Outdoor Unit Operating Temperature Range (Cooling Air Temp (Maximum / Minimum)):
- Wind baffles required to operate below 23°F DB in cooling mode.
- Cooling-only system with advanced wind baffle: -40°F - 115°F.
- Refer to wind baffle documentation for further information.

**Outdoor Unit Operating Temperature Range (Cooling Thermal Lock-out / Re-start Temperatures; Heating Thermal Lock-out / Re-start Temperatures):
- System cuts out in heating mode to avoid thermistor error and automatically restarts at these temperatures.

SEACOAST PROTECTION (TRU*A0*******BA MODELS)
- External Outer Panel: Phosphate coating + Acrylic-Enamel coating
- Fan Motor Support: Epoxy resin coating (at edge face)
- Separator Assembly Valve Bed: Epoxy resin coating (at edge face)
- Blue Fin treatment is an anti-corrosion treatment that is applied to the condenser coil to protect it against airborne contaminants.

SPECIFICATIONS: TPKA0A0361KA70A & TRUYA0361KA70(N/B)A

Piping	Gas Pipe Size O.D. [Flared]	In.[mm]	5/8 [15.88]
	Liquid Pipe Size O.D. [Flared]	In.[mm]	3/8 [9.52]
	Maximum Piping Length	Ft. [m]	225 [68]
	Maximum Height Difference	Ft. [m]	100 [30]
	Maximum Number of Bends		15

NOTES:
AHRI Rated Conditions
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INDOOR UNIT ACCESSORIES: TPKA0A0361KA70A

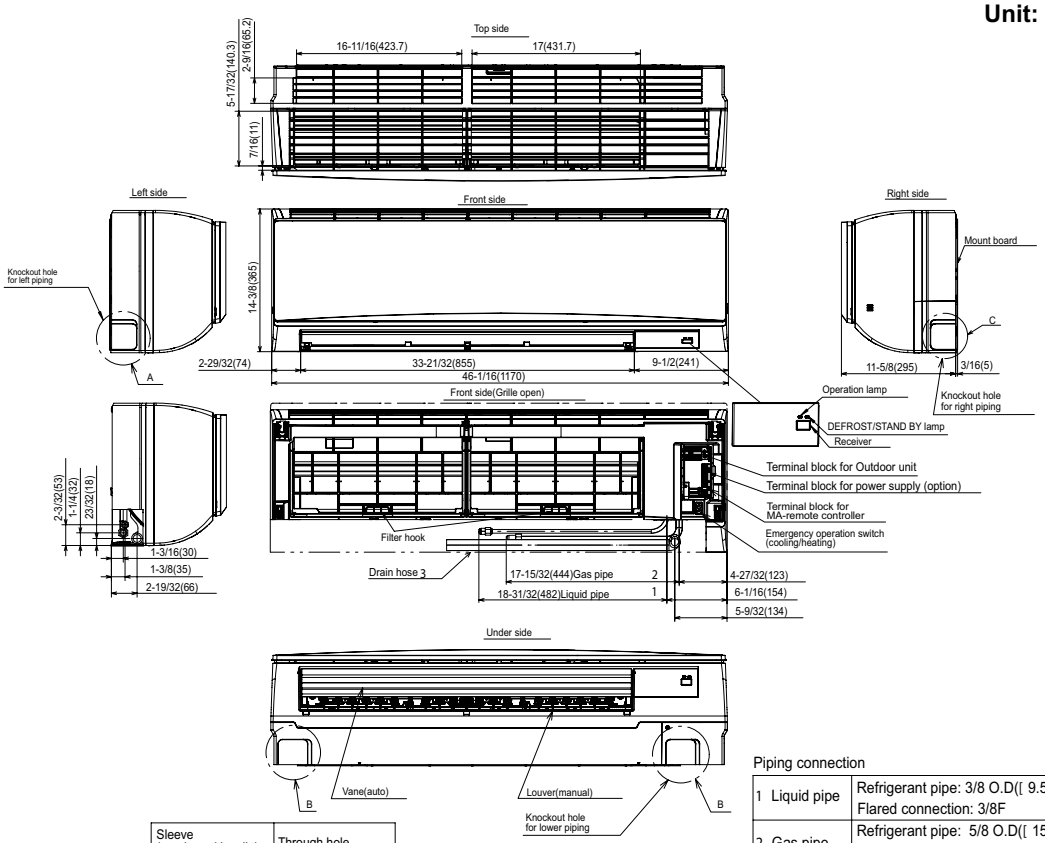
Control Interface	3-Pin Connector	☐ PAC-715AD
	BACnet® and Modbus® Interface	☐ PAC-UKPRC001-CN-1
	IT Extender	☐ PAC-WHS01IE-E
	kumo station® for kumo cloud®	☐ TAC-WHS01HC-E
	Lockdown bracket for remote controller	☐ RCMKP1CB
	Thermostat Interface	☐ PAC-US444CN-1
	USNAP Adapter	☐ PAC-WHS01UP-E
	Wireless Interface for kumo cloud®	☐ PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Temperature Sensor	☐ PAC-USSEN001-FM-1
	Remote Temperature Sensor	☐ PAC-SE41TS-E
	Wireless temperature and humitity sensor for kumo cloud®	☐ PAC-USWHS003-TH-1
Wired Remote Controller	Deluxe Wired MA Remote Controller†	☐ TAR-40MAAU
	Simple MA Remote Controller†	☐ TAC-YT53CRAU-J
	Touch MA Controller†	☐ TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	☐ MHK2
	Wireless MA Controller	☐ PAR-SR32MA-E
	Wireless MA Remote Controller	☐ TAR-FL32MA-E
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	☐ X87-721
	Blue Diamond (MegaBlue Advanced) Condensate Pump w/ Reservoir & Sensor	☐ X87-835
	Blue Diamond Sensor Extension Cable — 15 Ft.	☐ C13-103
	Drain Pan Level Sensor/Control	☐ SS610E
	Sauermann Condensate Pump	☐ SI30-230
Disconnect Switch	(30A/600V/UL) [fits 2” X 4” utility box] - Black	☐ TAZ-MS303
	(30A/600V/UL) [fits 2” X 4” utility box] - White	☐ TAZ-MS303W
Lineset	10’ x 3/8” x 10’ x 5/8” Lineset (Twin-Tube Insulation)††	☐ MPLS385812T-10
	100’ x 3/8” x 100’ x 5/8” Lineset (Twin-Tube Insulation)††	☐ MPLS385812T-100
	15’ x 3/8” x 15’ x 5/8” Lineset (Twin-Tube Insulation)††	☐ MPLS385812T-15
	30’ x 3/8” x 30’ x 5/8” Lineset (Twin-Tube Insulation)††	☐ MPLS385812T-30
	50’ x 3/8” x 50’ x 5/8” Lineset (Twin-Tube Insulation)††	☐ MPLS385812T-50
	65’ x 3/8” x 65’ x 5/8” Lineset (Twin-Tube Insulation)††	☐ MPLS385812T-65

OUTDOOR UNIT ACCESSORIES: TRUYA0361KA70(N/B)A

Air Outlet Guide	Air Outlet Guide (1 Piece)	☐ PAC-ADG096AA-E (two pieces are required)
Control/Service Tool	Control/Service Tool	☐ PAC-SK52ST
	M- & P-Series Maintenance Tool Cable Set	☐ M21EC0397
	USB/UART Conversion Cable (Required for all laptop connection)	☐ M21EC1397
Distribution pipe	Twinning Distribution Pipe (50:50)††	☐ MSDD-50TR-E
Drain Socket	Drain Socket	☐ PAC-SG61DS-E
M-NET Converter	M-NET Converter	☐ PAC-SJ85MA-E
	M-NET Converter	☐ PAC-SJ95MA-E
Mini-Split Wire	14 Gauge, 4 wire MiniSplit Cable—250 ft. roll	☐ S144-250
	14 Gauge, 4 wire MiniSplit Cable—50 ft. roll	☐ S144-50
	16 Gauge, 4 wire MiniSplit Cable—250 ft. roll	☐ S164-250
	16 Gauge, 4 wire MiniSplit Cable—50 ft. roll	☐ S164-50
Mounting Pad	Condensing Unit Mounting Pad: 24” x 42” x 3”	☐ ULTRILITE2
Stand	18” Dual Fan Stand	☐ QSMS1802M
	24” Dual Fan Stand	☐ QSMS2402M
	Condenser Wall Bracket	☐ QSWB2000M-1
	Condenser Wall Bracket -Stainless Steel Finish	☐ QSWBSS
	Outdoor Unit Stand — 12” High	☐ QSMS1202M
Wind Baffle	Front Wind Baffle	☐ WB-PA3 (two pieces are required)
	Rear Wind Baffle	☐ WB-RE6
	Side Advanced Wind Baffle	☐ WB-SD6

INDOOR UNIT DIMENSIONS: TPKA0A0361KA70A

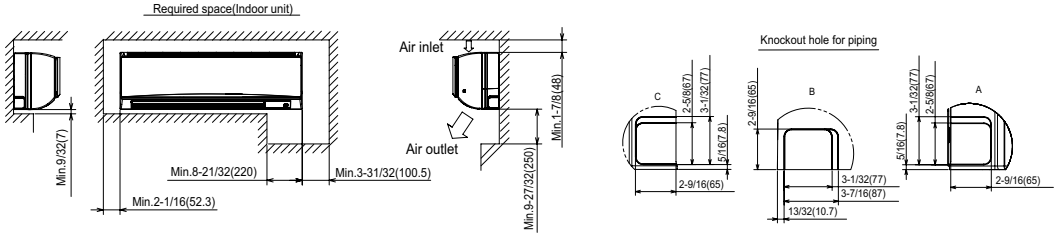
Unit: inch (mm)

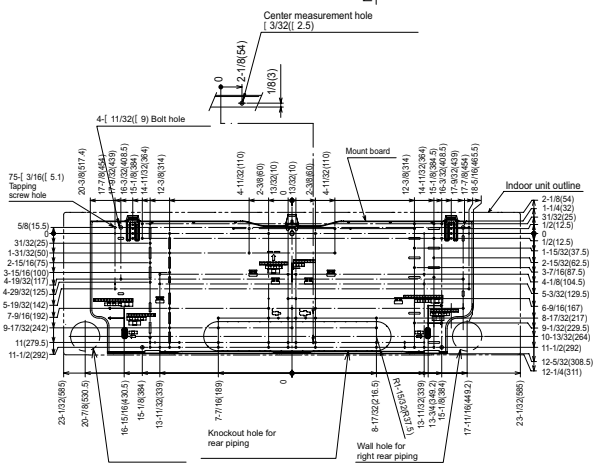


Sleeve (purchased locally)	Through hole
[2-15/16 ([75)	[2-15/16~[3-5/32 ([75~[80)

Piping connection

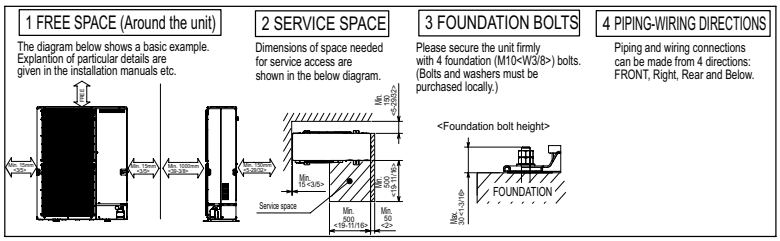
1 Liquid pipe	Refrigerant pipe: 3/8 O.D([9.52) Flared connection: 3/8F
2 Gas pipe	Refrigerant pipe: 5/8 O.D([15.88) Flared connection: 5/8F
3 Drain hose	5/8([16) O.D Effective length: 23-1/32 (585)

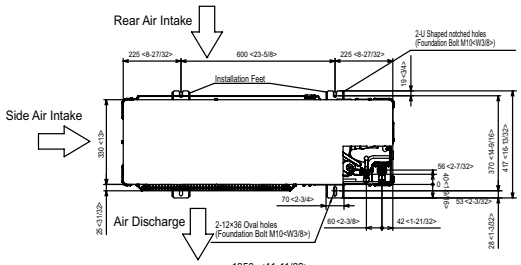




OUTDOOR UNIT DIMENSIONS: TRUYA0361KA70(N/B)A

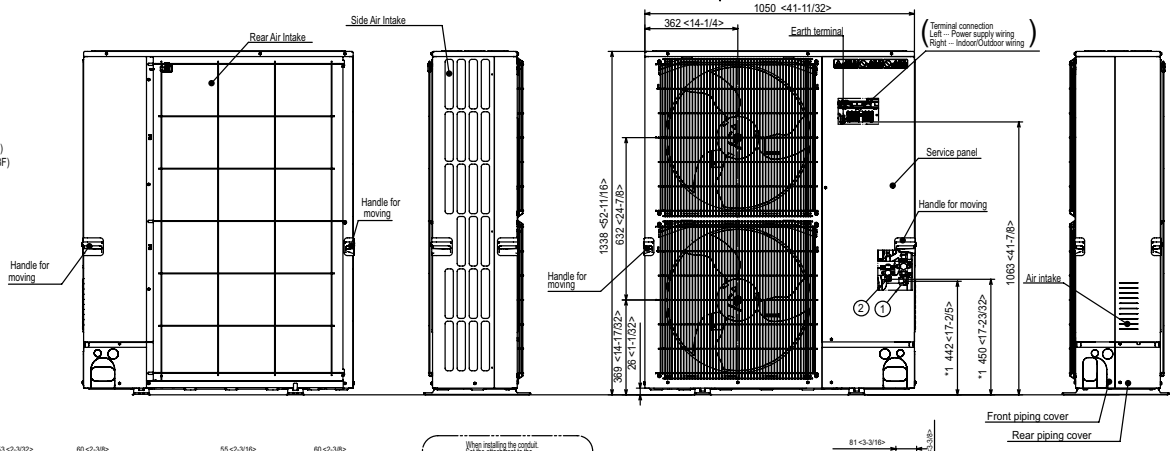
Unit: mm<in>



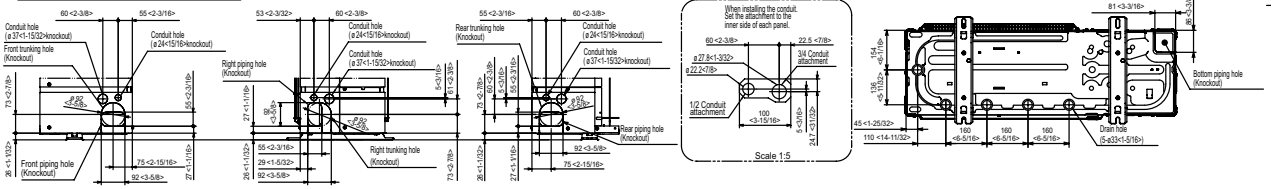


Example of Notes

① ··· Refrigerant GAS pipe connection (FLARE) ø15.88(5/8F)
② ··· Refrigerant LIQUID pipe connection (FLARE) ø9.52(3/8F)
*1 ··· Indication of STOP VALVE connection location.



Piping Knockout Hole Details



FORM# TPKA0A0361KA70A & TRUYA0361KA70(N/B)A - 202108

Project: **9th Floor** Tag: **17-TU-1A**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	08	12x10	510	340	350	1	0.25	0.19	19	27

Notes: 1. See below for PWL calculations used to obtain Max NC rating.

2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.

3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
13.6	350	55	91	0.18	0.6	180.0	134.3	0.10	2	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows

Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	915
Design CFM :	510
Safety Factor:	44%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 10 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	58	49	43	39	37	32	*	73	62	55	51	48	41	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	40	30	23	13	-	-	19	46	33	16	-	-	-	27

Notes: 1. Selections are based on Titus as Manufacturer.

2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.

3. All NC levels determined using AHRI 885-2008 Appendix E.

4. All airflow, pressure losses and heating performance values have been corrected for altitude.

5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).

6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **17-TU-1B**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

		Size		CFM			Static			Max NC Levels	
Quantity	Model	Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	10	14x12.5	1110	1070	1090	1	0.25	0.35	23	28

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
35.1	1090	55	85	0.34	1.8	180.0	139.4	0.22	2	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	1423
Design CFM :	1110
Safety Factor:	22%
Controls:	DDC
Unit L x W x H:	15.5 X 14 X 13 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

	Radiated Sound PWL							Discharge Sound PWL						
Sound Description	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	61	52	48	47	44	32	*	76	64	59	57	51	45	*
Total Attenuation per	18	19	20	26	31	36	*	29	30	41	51	52	39	*
Room Sound Level	43	33	28	21	13	-	23	47	34	18	-	-	-	28

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **17-TU-2**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	08	12x10	830	200	210	1	0.25	0.22	24	28

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
7.5	210	55	88	0.19	0.5	180.0	151.3	0.20	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	915
Design CFM :	830
Safety Factor:	9%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 10 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	62	55	48	44	42	36	*	76	68	59	56	51	44	*
Total Attenuation per	18	19	20	26	31	36	*	29	30	41	51	52	39	*
Room Sound Level	44	36	28	18	11	-	24	47	38	18	-	-	-	28

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **17-TU-3**

Project Location:
Altitude: 990 Feet
User:

File: 19.25 Titus.tw2
Room:
AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	04	12x8	60	60	60	1	0.25	0.01	-	20

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
3.2	60	55	104	0.00	0.3	180.0	158.7	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 229
Design CFM : 60
Safety Factor: 74%
Controls: DDC
Unit L x W x H: 15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet
Lining: 1 in. EcoShield
Heating Coil: Hot Water
Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	42	38	32	30	29	26	*	65	50	43	39	40	35	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	24	19	12	-	-	-	-	41	22	-	-	-	-	20

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **17-TU-4**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	04	12x8	60	60	60	1	0.25	0.01	-	20

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
3.2	60	55	104	0.00	0.3	180.0	158.7	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 229

Design CFM : 60

Safety Factor: 74%

Controls: DDC

Unit L x W x H: 15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	42	38	32	30	29	26	*	65	50	43	39	40	35	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	24	19	12	-	-	-	-	41	22	-	-	-	-	20

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **17-TU-5**

Project Location:
Altitude: 990 Feet
User:

File: 19.25 Titus.tw2
Room:
AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	04	12x8	60	60	60	1	0.25	0.01	-	20

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
3.2	60	55	104	0.00	0.3	180.0	158.7	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	229
Design CFM :	60
Safety Factor:	74%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet
Lining: 1 in. EcoShield
Heating Coil: Hot Water
Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	42	38	32	30	29	26	*	65	50	43	39	40	35	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	24	19	12	-	-	-	-	41	22	-	-	-	-	20

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **17-TU-6**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	04	12x8	60	60	60	1	0.25	0.01	-	20

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
3.2	60	55	104	0.00	0.3	180.0	158.7	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 229

Design CFM : 60

Safety Factor: 74%

Controls: DDC

Unit L x W x H: 15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	42	38	32	30	29	26	*	65	50	43	39	40	35	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	24	19	12	-	-	-	-	41	22	-	-	-	-	20

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **17-TU-7**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	08	12x10	720	270	320	1	0.25	0.17	23	27

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
10.3	320	55	85	0.15	1.2	180.0	161.6	0.74	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	915
Design CFM :	720
Safety Factor:	21%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 10 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	61	54	47	43	41	36	*	75	67	59	55	50	43	*
Total Attenuation per	18	19	20	26	31	36	*	29	30	41	51	52	39	*
Room Sound Level	43	35	27	17	10	-	23	46	37	18	-	-	-	27

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **17-TU-8**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	08	12x10	700	10	140	1	0.25	0.17	23	29

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
5.2	140	55	90	0.15	0.3	180.0	144.8	0.10	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	915
Design CFM :	700
Safety Factor:	23%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 10 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	61	54	47	43	41	35	*	75	67	58	55	50	43	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	43	35	27	17	10	-	23	48	38	19	-	-	-	29

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-1**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	410	240	240	1	0.25	0.23	24	25

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
7.7	240	55	85	0.10	1.0	180.0	164.2	0.44	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	410
Safety Factor:	19%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	59	56	46	40	37	32	*	72	66	59	56	50	44	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	41	37	26	14	-	-	24	45	37	20	-	-	-	25

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-10**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	260	240	240	1	0.25	0.1	17	24

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
7.7	240	55	85	0.05	1.0	180.0	164.2	0.44	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 508

Design CFM : 260

Safety Factor: 49%

Controls: DDC

Unit L x W x H: 15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	56	50	41	35	33	29	*	68	61	55	51	47	41	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	38	31	21	-	-	-	17	44	33	17	-	-	-	24

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-11**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	08	12x10	600	580	600	1	0.25	0.24	20	27

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
19.3	600	55	85	0.23	0.9	180.0	134.0	0.17	2	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	915
Design CFM :	600
Safety Factor:	34%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 10 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	59	51	44	40	38	32	*	73	64	56	52	48	41	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	41	32	24	14	-	-	20	46	35	17	-	-	-	27

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-12**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

		Size		CFM			Static			Max NC Levels	
Quantity	Model	Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	350	270	270	1	0.25	0.17	22	24

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
8.7	270	55	85	0.08	1.8	180.0	170.0	1.29	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 508

Design CFM : 350

Safety Factor: 31%

Controls: DDC

Unit L x W x H: 15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

	Radiated Sound PWL							Discharge Sound PWL						
Sound Description	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	58	54	44	38	36	31	*	71	64	58	54	49	43	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	40	35	24	12	-	-	22	44	35	19	-	-	-	24

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-13**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	390	290	290	1	0.25	0.21	23	25

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
9.4	290	55	85	0.09	3.0	180.0	173.6	3.45	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	390
Safety Factor:	23%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	59	55	46	40	37	32	*	72	66	59	55	50	44	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	41	36	26	14	-	-	23	45	37	20	-	-	-	25

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-14**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	310	300	300	1	0.25	0.13	20	23

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
9.7	300	55	85	0.06	4.2	180.0	175.3	6.70	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	310
Safety Factor:	39%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	57	52	43	37	35	30	*	70	63	57	53	48	42	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	39	33	23	11	-	-	20	43	34	18	-	-	-	23

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-15**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	280	270	270	1	0.25	0.11	18	25

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
8.7	270	55	85	0.05	1.8	180.0	170.0	1.29	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 508

Design CFM : 280

Safety Factor: 45%

Controls: DDC

Unit L x W x H: 15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	56	51	42	36	34	30	*	69	62	55	51	47	42	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	38	32	22	10	-	-	18	45	34	17	-	-	-	25

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-16**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	270	130	130	1	0.25	0.11	17	25

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
4.5	130	55	87	0.05	0.3	180.0	150.1	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	270
Safety Factor:	47%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	56	50	42	35	33	29	*	69	61	55	51	47	41	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	38	31	22	-	-	-	17	45	33	17	-	-	-	25

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-17**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	04	12x8	120	90	100	1	0.25	0.04	17	29

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
4.0	100	55	92	0.01	0.3	180.0	153.0	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	229
Design CFM :	120
Safety Factor:	48%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	53	50	40	37	34	30	*	72	61	52	47	46	39	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	35	31	20	11	-	-	17	48	33	14	-	-	-	29

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-18**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	04	12x8	190	100	110	1	0.25	0.1	27	34

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
4.2	110	55	90	0.03	0.3	180.0	152.0	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	229
Design CFM :	190
Safety Factor:	17%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	61	58	45	41	38	33	*	76	68	58	52	49	42	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	43	39	25	15	-	-	27	52	40	20	-	-	-	34

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-19**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	380	210	220	1	0.25	0.2	23	25

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
7.1	220	55	85	0.09	0.7	180.0	160.1	0.24	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	380
Safety Factor:	25%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	59	55	45	39	36	32	*	72	65	59	55	50	44	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	41	36	25	13	-	-	23	45	36	20	-	-	-	25

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-2**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	320	200	200	1	0.25	0.15	21	23

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
7.6	200	55	90	0.07	1.9	180.0	171.6	1.39	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	320
Safety Factor:	37%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	57	53	43	37	35	31	*	70	63	57	53	48	42	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	39	34	23	11	-	-	21	43	34	18	-	-	-	23

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-20**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	380	210	220	1	0.25	0.29	22	24

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
13.6	220	55	113	0.18	1.9	180.0	165.2	0.39	2	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	380
Safety Factor:	25%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	58	54	44	39	36	31	*	71	64	58	54	49	42	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	40	35	24	13	-	-	22	44	35	19	-	-	-	24

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-21**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	310	110	180	1	0.25	0.13	20	23

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
6.4	180	55	88	0.06	0.7	180.0	160.2	0.20	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	310
Safety Factor:	39%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	57	52	43	37	35	30	*	70	63	57	53	48	42	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	39	33	23	11	-	-	20	43	34	18	-	-	-	23

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-22**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	08	12x10	550	550	550	1	0.25	0.11	20	28

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
11.3	550	55	74	0.10	0.7	180.0	145.7	0.27	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	915
Design CFM :	550
Safety Factor:	40%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 10 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	59	51	45	40	39	34	*	74	64	56	52	49	42	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	41	32	25	14	-	-	20	47	35	17	-	-	-	28

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-3**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	180	130	130	1	0.25	0.05	13	20

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
4.5	130	55	87	0.03	0.3	180.0	150.1	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	180
Safety Factor:	65%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	53	45	37	30	30	26	*	65	56	50	46	44	38	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	35	26	17	-	-	-	13	41	28	12	-	-	-	20

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-4**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	320	200	200	1	0.25	0.15	21	23

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
6.5	200	55	85	0.07	0.6	180.0	156.0	0.15	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 508

Design CFM : 320

Safety Factor: 37%

Controls: DDC

Unit L x W x H: 15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	57	53	43	37	35	31	*	70	63	57	53	48	42	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	39	34	23	11	-	-	21	43	34	18	-	-	-	23

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-5**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	08	12x10	520	280	280	1	0.25	0.1	20	28

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
9.0	280	55	85	0.09	0.7	180.0	154.7	0.31	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 915

Design CFM : 520

Safety Factor: 43%

Controls: DDC

Unit L x W x H: 15.5 X 12 X 10 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	59	50	44	40	39	33	*	74	64	56	52	49	42	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	41	31	24	14	-	-	20	47	35	17	-	-	-	28

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-6**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	250	80	90	1	0.25	0.1	17	24

Notes: 1. See below for PWL calculations used to obtain Max NC rating.

2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.

3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
3.8	90	55	95	0.05	0.3	180.0	154.2	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows

Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 508

Design CFM : 250

Safety Factor: 51%

Controls: DDC

Unit L x W x H: 15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	56	49	41	34	33	29	*	68	60	54	50	46	41	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	38	30	21	-	-	-	17	44	32	16	-	-	-	24

Notes: 1. Selections are based on Titus as Manufacturer.

2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.

3. All NC levels determined using AHRI 885-2008 Appendix E.

4. All airflow, pressure losses and heating performance values have been corrected for altitude.

5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).

6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-7**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	310	80	90	1	0.25	0.13	20	23

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
3.8	90	55	95	0.06	0.3	180.0	154.2	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	310
Safety Factor:	39%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	57	52	43	37	35	30	*	70	63	57	53	48	42	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	39	33	23	11	-	-	20	43	34	18	-	-	-	23

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-8**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	390	250	250	1	0.25	0.21	23	25

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
8.1	250	55	85	0.09	1.2	180.0	166.1	0.60	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	390
Safety Factor:	23%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	59	55	46	40	37	32	*	72	66	59	55	50	44	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	41	36	26	14	-	-	23	45	37	20	-	-	-	25

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-12-9**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	330	270	270	1	0.25	0.15	21	23

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
8.7	270	55	85	0.07	1.8	180.0	170.0	1.29	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 508

Design CFM : 330

Safety Factor: 35%

Controls: DDC

Unit L x W x H: 15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	58	53	44	38	35	31	*	70	64	57	53	49	43	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	40	34	24	12	-	-	21	43	35	18	-	-	-	23

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-1**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	400	130	130	1	0.25	0.22	23	25

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
4.5	130	55	87	0.10	0.3	180.0	150.1	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	400
Safety Factor:	21%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	59	55	46	40	37	32	*	72	66	59	55	50	44	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	41	36	26	14	-	-	23	45	37	20	-	-	-	25

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-10**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	400	280	280	1	0.25	0.22	23	25

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
9.0	280	55	85	0.10	2.3	180.0	171.8	2.02	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	400
Safety Factor:	21%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	59	55	46	40	37	32	*	72	66	59	55	50	44	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	41	36	26	14	-	-	23	45	37	20	-	-	-	25

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-11**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	09	14x12.5	1050	870	890	1	0.25	0.21	23	28

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
15.4	890	55	71	0.15	0.9	180.0	144.8	0.12	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	1067
Design CFM :	1050
Safety Factor:	2%
Controls:	DDC
Unit L x W x H:	15.5 X 14 X 13 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	61	52	46	40	38	33	*	76	66	60	56	52	46	*
Total Attenuation per	18	19	20	26	31	36	*	29	30	41	51	52	39	*
Room Sound Level	43	33	26	14	-	-	23	47	36	19	-	-	-	28

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-12**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	440	90	110	1	0.25	0.26	25	27

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
4.2	110	55	91	0.11	0.3	180.0	152.3	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	440
Safety Factor:	13%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	60	57	47	41	38	33	*	73	67	60	57	51	45	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	42	38	27	15	-	-	25	46	38	21	-	-	-	27

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-13**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	440	280	280	1	0.25	0.26	25	27

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
9.0	280	55	85	0.11	2.3	180.0	171.8	2.02	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	440
Safety Factor:	13%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	60	57	47	41	38	33	*	73	67	60	57	51	45	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	42	38	27	15	-	-	25	46	38	21	-	-	-	27

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-14**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	08	12x10	830	410	410	1	0.25	0.42	24	27

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
14.3	410	55	87	0.39	0.6	180.0	131.9	0.10	2	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	915
Design CFM :	830
Safety Factor:	9%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 10 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	62	55	47	44	42	35	*	75	67	59	56	50	43	*
Total Attenuation per	18	19	20	26	31	36	*	29	30	41	51	52	39	*
Room Sound Level	44	36	27	18	11	-	24	46	37	18	-	-	-	27

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-15**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	08	12x10	660	41	410	1	0.25	0.29	22	28

Notes: 1. See below for PWL calculations used to obtain Max NC rating.

2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.

3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
14.3	410	55	87	0.27	0.6	180.0	131.9	0.10	2	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows

Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	915
Design CFM :	660
Safety Factor:	28%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 10 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	60	52	45	41	39	33	*	74	65	57	53	49	41	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	42	33	25	15	-	-	22	47	36	18	-	-	-	28

Notes: 1. Selections are based on Titus as Manufacturer.

2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.

3. All NC levels determined using AHRI 885-2008 Appendix E.

4. All airflow, pressure losses and heating performance values have been corrected for altitude.

5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).

6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-16**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	04	12x8	160	130	130	1	0.25	0.07	23	32

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
4.5	130	55	87	0.02	0.3	180.0	150.1	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	229
Design CFM :	160
Safety Factor:	30%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	58	55	43	39	36	32	*	74	66	56	50	48	41	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	40	36	23	13	-	-	23	50	38	18	-	-	-	32

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-17**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	04	12x8	120	120	120	1	0.25	0.04	17	29

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
4.3	120	55	89	0.01	0.3	180.0	151.0	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	229
Design CFM :	120
Safety Factor:	48%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	53	50	40	37	34	30	*	72	61	52	47	46	39	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	35	31	20	11	-	-	17	48	33	14	-	-	-	29

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-18**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	04	12x8	100	60	60	1	0.25	0.03	14	27

Notes: 1. See below for PWL calculations used to obtain Max NC rating.

2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.

3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
3.2	60	55	104	0.01	0.3	180.0	158.7	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows

Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	229
Design CFM :	100
Safety Factor:	56%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	50	47	38	35	33	29	*	70	58	50	45	44	38	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	32	28	18	-	-	-	14	46	30	12	-	-	-	27

Notes: 1. Selections are based on Titus as Manufacturer.

2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.

3. All NC levels determined using AHRI 885-2008 Appendix E.

4. All airflow, pressure losses and heating performance values have been corrected for altitude.

5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).

6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-19**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	320	310	310	1	0.25	0.15	21	23

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
9.9	310	55	85	0.07	9.0	180.0	176.1	9.87	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	320
Safety Factor:	37%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	57	53	43	37	35	31	*	70	63	57	53	48	42	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	39	34	23	11	-	-	21	43	34	18	-	-	-	23

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-2**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	340	90	110	1	0.25	0.16	21	24

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
4.2	110	55	90	0.07	0.3	180.0	152.0	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	340
Safety Factor:	33%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	58	53	44	38	35	31	*	71	64	58	54	49	43	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	40	34	24	12	-	-	21	44	35	19	-	-	-	24

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-20**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	290	280	280	1	0.25	0.12	18	25

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
9.0	280	55	85	0.06	2.3	180.0	171.8	2.02	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	290
Safety Factor:	43%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	57	51	42	36	34	30	*	69	62	56	52	48	42	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	39	32	22	10	-	-	18	45	34	18	-	-	-	25

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-21**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	300	300	300	1	0.25	0.13	20	23

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
9.7	300	55	85	0.06	4.2	180.0	175.3	6.70	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	300
Safety Factor:	41%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	57	52	43	37	34	30	*	70	63	56	52	48	42	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	39	33	23	11	-	-	20	43	34	17	-	-	-	23

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-22**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	09	14x12.5	1000	280	280	1	0.25	0.2	23	28

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
9.0	280	55	85	0.14	0.6	180.0	149.6	0.07	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	1067
Design CFM :	1000
Safety Factor:	6%
Controls:	DDC
Unit L x W x H:	15.5 X 14 X 13 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	61	52	46	40	38	33	*	76	66	59	56	52	46	*
Total Attenuation per	18	19	20	26	31	36	*	29	30	41	51	52	39	*
Room Sound Level	43	33	26	14	-	-	23	47	36	18	-	-	-	28

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-23**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	08	12x10	660	140	140	1	0.25	0.15	23	29

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
5.2	140	55	90	0.13	0.3	180.0	144.8	0.10	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	915
Design CFM :	660
Safety Factor:	28%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 10 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	61	53	46	42	41	35	*	75	66	58	54	50	43	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	43	34	26	16	10	-	23	48	37	19	-	-	-	29

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-24**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	04	12x8	190	160	160	1	0.25	0.1	27	34

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
5.2	160	55	85	0.03	0.4	180.0	150.9	0.10	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 229

Design CFM : 190

Safety Factor: 17%

Controls: DDC

Unit L x W x H: 15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	61	58	45	41	38	33	*	76	68	58	52	49	42	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	43	39	25	15	-	-	27	52	40	20	-	-	-	34

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-25**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	290	260	280	1	0.25	0.12	18	25

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
9.0	280	55	85	0.06	2.3	180.0	171.8	2.02	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	290
Safety Factor:	43%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	57	51	42	36	34	30	*	69	62	56	52	48	42	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	39	32	22	10	-	-	18	45	34	18	-	-	-	25

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-26**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

		Size		CFM			Static			Max NC Levels	
Quantity	Model	Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	350	10	10	1	0.25	0.17	22	24

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
1.0	10	55	148	0.08	0.3	180.0	173.3	0.07	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	350
Safety Factor:	31%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

	Radiated Sound PWL							Discharge Sound PWL						
Sound Description	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	58	54	44	38	36	31	*	71	64	58	54	49	43	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	40	35	24	12	-	-	22	44	35	19	-	-	-	24

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-27**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	04	12x8	190	110	110	1	0.25	0.1	27	34

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
4.2	110	55	90	0.03	0.3	180.0	152.0	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 229

Design CFM : 190

Safety Factor: 17%

Controls: DDC

Unit L x W x H: 15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	61	58	45	41	38	33	*	76	68	58	52	49	42	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	43	39	25	15	-	-	27	52	40	20	-	-	-	34

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-28**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

		Size		CFM			Static			Max NC Levels	
Quantity	Model	Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	04	12x8	110	110	110	1	0.25	0.03	15	28

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
4.2	110	55	90	0.01	0.3	180.0	152.0	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	229
Design CFM :	110
Safety Factor:	52%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

	Radiated Sound PWL							Discharge Sound PWL						
Sound Description	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	52	48	39	36	34	29	*	71	60	51	46	45	39	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	34	29	19	10	-	-	15	47	32	13	-	-	-	28

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-29**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	310	80	80	1	0.25	0.13	20	23

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
3.6	80	55	97	0.06	0.3	180.0	155.6	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	310
Safety Factor:	39%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	57	52	43	37	35	30	*	70	63	57	53	48	42	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	39	33	23	11	-	-	20	43	34	18	-	-	-	23

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-3**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

		Size		CFM			Static			Max NC Levels	
Quantity	Model	Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	10	14x12.5	990	360	420	1	0.25	0.15	24	28

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
13.5	420	55	85	0.14	1.4	180.0	159.5	0.20	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 1423

Design CFM : 990

Safety Factor: 30%

Controls: DDC

Unit L x W x H: 15.5 X 14 X 13 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

	Radiated Sound PWL							Discharge Sound PWL						
Sound Description	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	61	53	50	48	45	33	*	76	64	60	57	52	46	*
Total Attenuation per	18	19	20	26	31	36	*	29	30	41	51	52	39	*
Room Sound Level	43	34	30	22	14	-	24	47	34	19	-	-	-	28

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-30**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	12	16x15	1590	460	470	1	0.25	0.19	25	27

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
15.2	470	55	85	0.18	1.0	180.0	147.6	0.16	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	2033
Design CFM :	1590
Safety Factor:	22%
Controls:	DDC
Unit L x W x H:	15.5 X 16 X 15 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	61	54	51	44	41	35	*	75	67	63	58	56	49	*
Total Attenuation per	18	19	20	26	31	36	*	29	30	41	51	52	39	*
Room Sound Level	43	35	31	18	10	-	25	46	37	22	-	-	10	27

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-31**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	04	12x8	120	120	120	1	0.25	0.04	17	29

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
4.3	120	55	89	0.01	0.3	180.0	151.0	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	229
Design CFM :	120
Safety Factor:	48%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	53	50	40	37	34	30	*	72	61	52	47	46	39	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	35	31	20	11	-	-	17	48	33	14	-	-	-	29

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-32**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	360	110	110	1	0.25	0.18	22	24

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
4.2	110	55	90	0.08	0.3	180.0	152.0	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	360
Safety Factor:	29%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	58	54	45	39	36	31	*	71	65	58	54	49	43	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	40	35	25	13	-	-	22	44	36	19	-	-	-	24

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-33**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	04	12x8	140	120	120	1	0.25	0.06	20	31

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
4.3	120	55	89	0.02	0.3	180.0	151.0	0.08	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	229
Design CFM :	140
Safety Factor:	39%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	56	52	42	38	35	31	*	73	64	54	49	47	40	*
Total Attenuation per	18	19	20	26	31	36	*	24	28	38	53	59	40	*
Room Sound Level	38	33	22	12	-	-	20	49	36	16	-	-	-	31

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-34**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	08	12x10	620	620	620	1	0.25	0.14	22	28

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
8.0	620	55	67	0.12	0.3	180.0	126.5	0.10	1	10	RH	0

Coil Selection Method: MBH - Solve for GPM at desired MBH, Rows
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	915
Design CFM :	620
Safety Factor:	32%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 10 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	60	52	46	41	40	35	*	74	66	57	54	50	43	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	42	33	26	15	-	-	22	47	37	18	-	-	-	28

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-4**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	08	12x10	540	200	220	1	0.25	0.11	20	28

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
7.1	220	55	85	0.10	0.4	180.0	145.9	0.16	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	915
Design CFM :	540
Safety Factor:	41%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 10 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	59	51	44	40	39	34	*	74	64	56	52	49	42	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	41	32	24	14	-	-	20	47	35	17	-	-	-	28

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-5**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	08	12x10	750	500	500	1	0.25	0.35	23	25

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
16.1	500	55	85	0.33	0.7	180.0	131.3	0.12	2	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	915
Design CFM :	750
Safety Factor:	18%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 10 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	61	53	46	43	41	34	*	74	66	58	55	49	42	*
Total Attenuation per	18	19	20	26	31	36	*	29	30	41	51	52	39	*
Room Sound Level	43	34	26	17	10	-	23	45	36	17	-	-	-	25

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-6**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	390	290	290	1	0.25	0.21	23	25

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
9.4	290	55	85	0.09	3.0	180.0	173.6	3.45	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	390
Safety Factor:	23%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	59	55	46	40	37	32	*	72	66	59	55	50	44	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	41	36	26	14	-	-	23	45	37	20	-	-	-	25

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-7**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	370	280	280	1	0.25	0.18	22	24

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
9.0	280	55	85	0.08	2.3	180.0	171.8	2.02	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM :	508
Design CFM :	370
Safety Factor:	27%
Controls:	DDC
Unit L x W x H:	15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	59	54	45	39	36	32	*	71	65	58	55	50	44	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	41	35	25	13	-	-	22	44	36	19	-	-	-	24

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-8**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	370	270	270	1	0.25	0.18	22	24

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
8.7	270	55	85	0.08	1.8	180.0	170.0	1.29	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 508

Design CFM : 370

Safety Factor: 27%

Controls: DDC

Unit L x W x H: 15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	59	54	45	39	36	32	*	71	65	58	55	50	44	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	41	35	25	13	-	-	22	44	36	19	-	-	-	24

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Project: **9th Floor** Tag: **TU-13-9**

Project Location: File: 19.25 Titus.tw2

Altitude: 990 Feet Room:

User: AHU:

Selection

Quantity	Model	Size		CFM			Static			Max NC Levels	
		Unit	Outlet	Max.	Min.	Heating	Inlet	Down	Min.	Rad.	Disch.
1	DESV	06	12x8	450	210	210	1	0.25	0.27	25	27

Notes: 1. See below for PWL calculations used to obtain Max NC rating.
2. Outlet size is approximate and does not include coil dimensions. See submittal drawings for exact dimensions.
3. Inlet static pressure includes downstream pressure drop.

Hot Water Heating Coil Performance

MBH	Coil CFM	EAT	LAT	APd	GPM	EWT	LWT	WPd	Rows	FPI	Conn.	% Glycol
6.8	210	55	85	0.12	0.6	180.0	158.1	0.19	1	10	RH	0

Coil Selection Method: LAT - Solve for GPM at desired LAT and max water flow
Water pressure drop (WPd) is in ft. water.

Other Information

Maximum CFM : 508

Design CFM : 450

Safety Factor: 11%

Controls: DDC

Unit L x W x H: 15.5 X 12 X 8 in.

Accessories

Outlet: Standard Outlet

Lining: 1 in. EcoShield

Heating Coil: Hot Water

Attenuator: No

Acoustic Summary

Sound Description	Radiated Sound PWL							Discharge Sound PWL						
	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
Primary Sound	60	57	47	41	38	33	*	73	67	60	57	51	45	*
Total Attenuation per	18	19	20	26	31	36	*	27	29	39	51	53	39	*
Room Sound Level	42	38	27	15	-	-	25	46	38	21	-	-	-	27

Notes: 1. Selections are based on Titus as Manufacturer.
2. All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011.
3. All NC levels determined using AHRI 885-2008 Appendix E.
4. All airflow, pressure losses and heating performance values have been corrected for altitude.
5. Units of measure: dimensions (in), airflow (cfm), water flow (gpm), air pressure (in wg), water head losses (ft) and temperatures (degF).
6. Water pressure drop (WPd) units is in ft. water.

Job Name: 19.25 Renovate 9th Floor
Tag: RF-12
Quantity: 1
Printed Date: January 25, 2023

Model: AX-54-190-0415

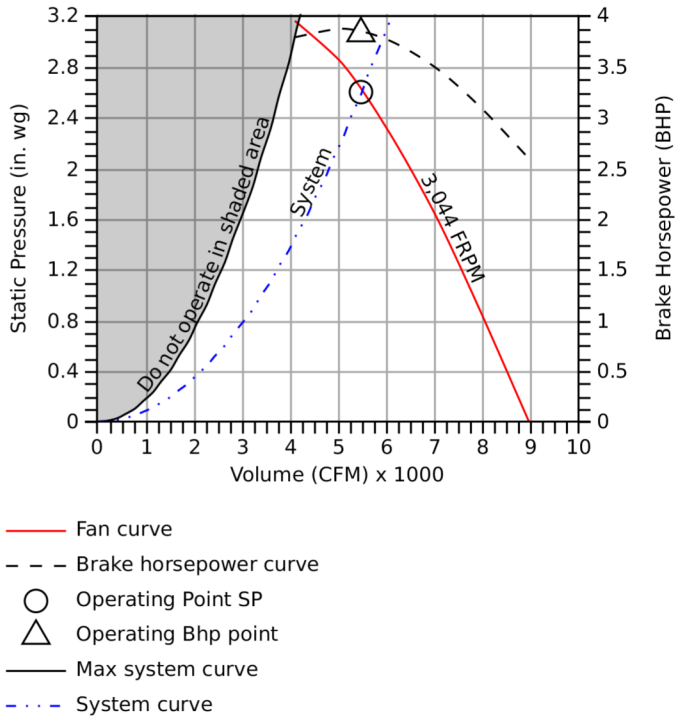
Tube Axial Direct Drive Inline Fan

Standard Construction Features: Tubular painted steel housing. Axial propeller, cast aluminum. Direct driven motor in the airstream.

Fan Configuration	
Drive type	Direct

Performance	
Requested Volume (CFM)	5,480
Actual Volume (CFM)	5,480
Total External SP (in. wg)	2.6
Operating frequency (Hz)	52
Fan RPM	3,044
Operating Power (bhp)	3.8
Startup Power (bhp)	5.8
FEI	1.16
Air Stream Temp (F)	70
Start-up Temp (F)	70
Air Density (lbs/ft^3)	0.074
Elevation (ft)	525
Static Efficiency (%)	59
Outlet Velocity (ft/min)	2,199

Motor	
Size (hp)	7-1/2
V/C/P	208/60/3
NEC FLA (Amps)	24.2

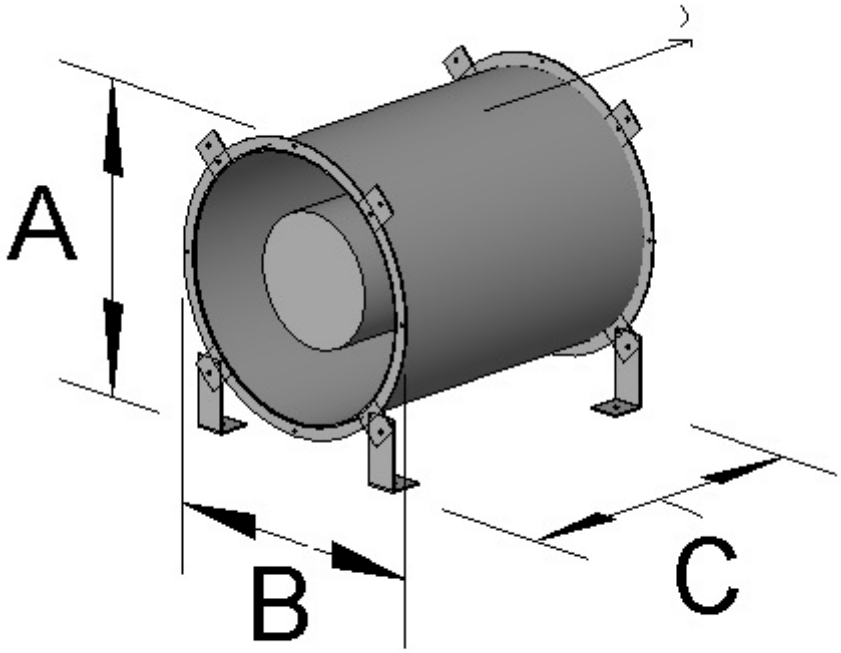


Sound

	Octave Bands (hz)								LwA	dBA	Sones
	62.5	125	250	500	1000	2000	4000	8000			
Inlet	94	97	98	93	91	86	81	76	96	85	44

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and comply with the requirements of the AMCA Certified Ratings ProgramThe AMCA certified ratings seal applies to air performance and FEI ratings only.Performance certified is for installation type B: Free inlet, ducted outlet.Power rating does not include transmission losses.Performance ratings do not include the effects of appurtenances.The AMCA licensed air and/or sound performance data has been modified for installation, appurtenances, etc. not included in the certified data. The modified performance is not AMCA licensed but is provided to aid in selection and applications of the product.

Dimensions and Weights		
Label	**Value**	**Description**
-	218	Weight w/o accessories (lbs)
A	27	Overall Height (in)
B	25	Overall Width (in)
C	29	Overall Length (in)
-	21.38	Inlet Diameter (in)
-	21.38	Outlet Diameter (in)



*All dimensions are in inches.

Model: AX-72-190-0415

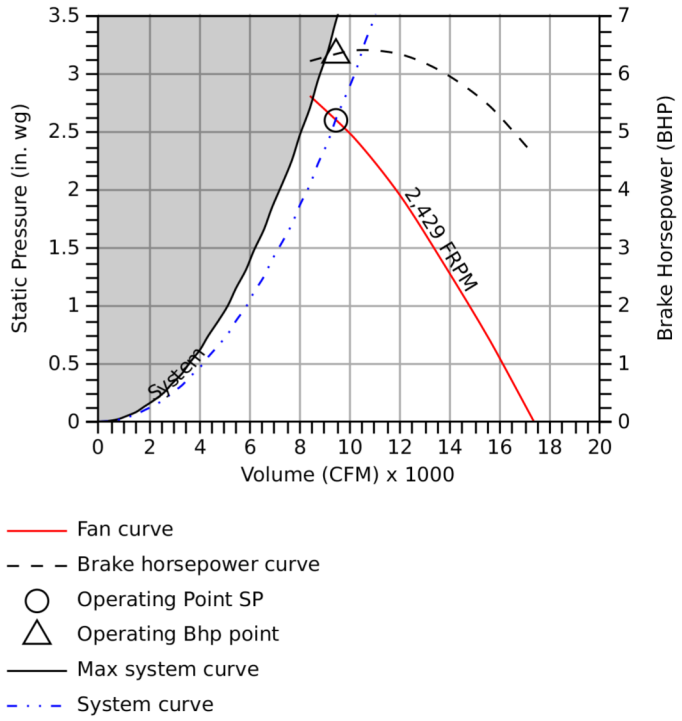
Tube Axial Direct Drive Inline Fan

Standard Construction Features: Tubular painted steel housing. Axial propeller, cast aluminum. Direct driven motor in the airstream.

Fan Configuration	
Drive type	Direct

Performance	
Requested Volume (CFM)	9,460
Actual Volume (CFM)	9,460
Total External SP (in. wg)	2.6
Operating frequency (Hz)	82
Fan RPM	2,429
Operating Power (bhp)	6.3
Startup Power (bhp)	6.3
FEI	1.2
Air Stream Temp (F)	70
Start-up Temp (F)	70
Air Density (lbs/ft^3)	0.074
Elevation (ft)	525
Static Efficiency (%)	61
Outlet Velocity (ft/min)	2,154

Motor	
Size (hp)	10
V/C/P	208/60/3
NEC FLA (Amps)	30.8

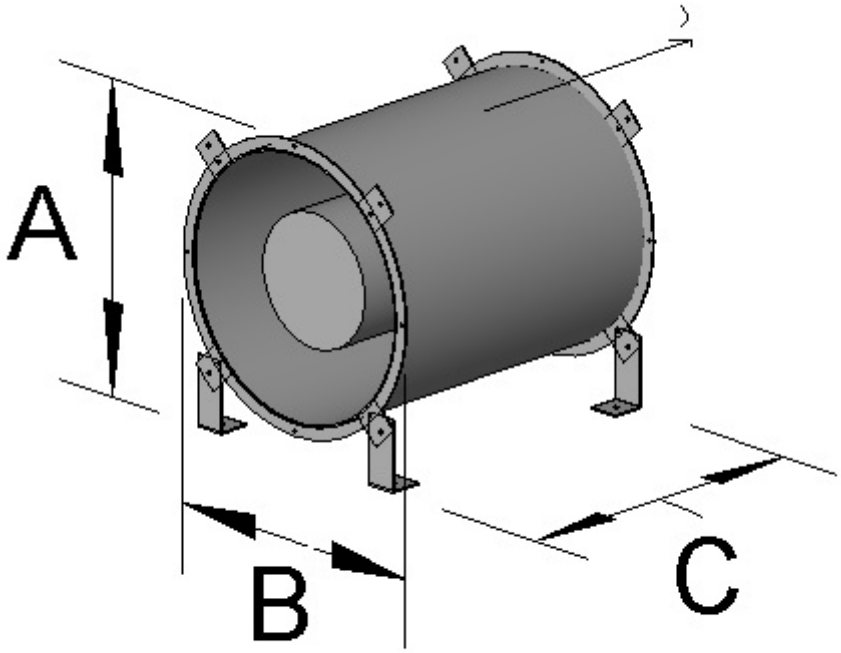


Sound

	Octave Bands (hz)								LwA	dBA	Sones
	62.5	125	250	500	1000	2000	4000	8000			
Inlet	96	100	95	96	98	93	86	81	101	89	59

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and comply with the requirements of the AMCA Certified Ratings ProgramThe AMCA certified ratings seal applies to air performance and FEI ratings only.Performance certified is for installation type B: Free inlet, ducted outlet.Power rating does not include transmission losses.Performance ratings do not include the effects of appurtenances.The AMCA licensed air and/or sound performance data has been modified for installation, appurtenances, etc. not included in the certified data. The modified performance is not AMCA licensed but is provided to aid in selection and applications of the product.

Dimensions and Weights		
Label	**Value**	**Description**
-	369	Weight w/o accessories (lbs)
A	33	Overall Height (in)
B	32	Overall Width (in)
C	34	Overall Length (in)
-	28.38	Inlet Diameter (in)
-	28.38	Outlet Diameter (in)



*All dimensions are in inches.

Job Name: FGR-30x48 Cut Sheet
Tag: MK-1
Quantity: 1
Printed Date: January 23, 2023

Model: FGR-30x48

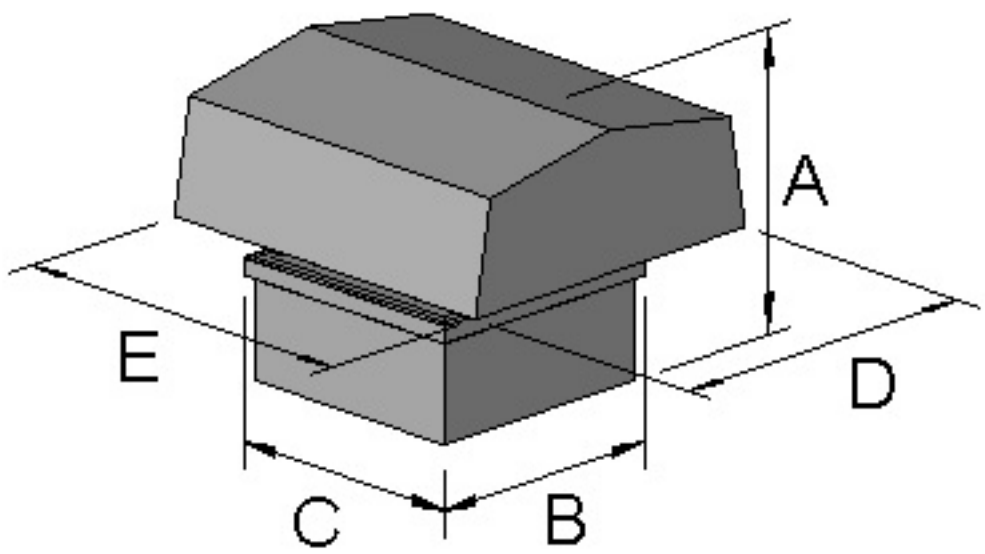
Hooded Gravity Relief Ventilator

Standard Construction Features: Fabra hood design (standing seam) galvanized hood (optional aluminum). Larger sizes require field assembly.

Performance	
Application	Relief
Volume (CFM)	10,000
Pressure Drop (in. wg)	0.24
Throat Velocity (ft/min)	1000
Throat Area (ft^2)	10
Installation Type	Non Ducted

Fan Configuration	
Mounting	Curb Cap
Shipped Assembled	Yes

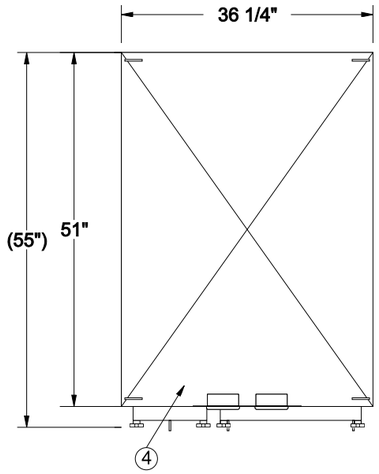
Dimensions and Weights		
Label	**Value**	**Description**
-	116	Weight w/o accessories (lbs)
A	31	Overall Height (in)
E	63	Overall Length (in)
D	52	Overall Width (in)
B	36	Curb Cap Width (in)
C	54	Curb Cap Length (in)
-	30	Throat Width (in)
-	48	Throat Length (in)
-	32.5	Roof Opening Width (in)
-	50.5	Roof Opening Length (in)



Input Field	Value
System Tag#	5700
Biological Application	No
Airflow (CFM)	5700
Airflow (l/sec)	2684.7
Airflow (CMH)	9684.3
Containment Housing Type	Non-Bag-In/Bag-Out
Insulation Required	Yes
Leak Testing	Standard Leak Test
Temp (°F)	70
Temp (°C)	21
Inch W.G.	10
PSIG	0.361
Inch Mercury	0.735
Pascals	2490
Material	T-304 SST
Section Layout Options	PRE-HEPA
Primary Filter Seal	Gasket Seal
HEPA/Primary Filter Size	24x24x11½ (Actual)
Prefilter Size	24x24x2 (Nominal)
Filter Arrangement	2 H x 2 W
Flow Rate (FPM)	356
Flow Rate (m/sec)	1.8085
Include Initial set of Filters?	No
Include Initial set of Filters	
Door Side	Right Side Only
Arrangement Split - Left Segment	2 H x 2 W
Arrangement Split - Right Segment	Not Available
Section 1 Type	Prefilter and HEPA
Prefilter/Primary Doors	Separate Access
Section 1 Depth	
Inlet Damper	No
Damper Type	No Damper
Outlet Damper	No
Outlet Damper Type	No Damper
Inlet Transition	No
Outlet Transition	No
Pressure Gage - Prefilter	Yes
Pressure Gage - HEPA/Primary Filter	Yes
Pressure Gage - Postfilter	No
Pressure Gage - Overall	No

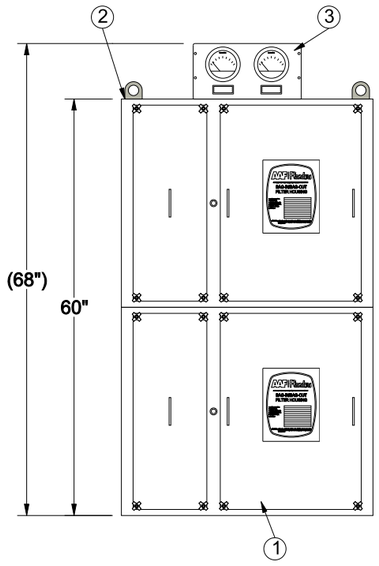
Input Field	Value
Static Pressure Tap Qty	3
Tap Configuration	Individual Filters
Tap Location	Top
Door/Flange Gasket Material	Neoprene
Decontamination Ports	None
Door Latch Type	Standard Latch
Locking Mechanism Material	Standard Brass Pivot Block
Weather Caps	Yes
Mounting Option	None
Moisture Drain	None
Moisture Drain Size	None
Lifting Lugs	Yes
Number of Gages	2
Installation	Mounted
Type	Differential Pressure Gage
Model	0-5" W.G.
Type	Differential Pressure Gage
Model	0-2" W.G.
Installation Hardware	Brass Gage Fittings and Copper Tubing
Gage Tubing Options	Not Available
Damper Arrangement	1 H x 1 W
Filter System Flange Option - Inlet	Butt Weld Flange
Filter System Flange Option - Outlet	Butt Weld Flange
Seal Location	Upstream
Comments	NA
Override Title Block Information	No
Quote / Job Number:	
Revision Number	
Specification Required	No
Sets Of Bag and Straps	1
Airflow (CFM) 2	
Airflow (CFM) 1	

( ) = REFERENCE DIMENSION



PLAN VIEW

AIR FLOW



ACCESS VIEW

SPECIFICATIONS

- The filter system airflow shall be 5700 CFM.
- The filter system shall be designed to withstand a pressure 10 inches water gage.
- The direction of air flow shall be right side door access.
- The pre/post filters and medium efficiency filter sections incorporate a slide-in design which does not require a locking mechanism.
- The primary filter section shall be equipped with a crank operated gasket seal filter clamping mechanism. Pressure bars with pre-loaded springs shall exert a minimum sealing surface of 1,400 lbs. to the gasket along the perimeter of the filter. The mechanism shall be welded in place and shall be constructed of 300-series stainless steel except for brass threaded blocks.
- The filter housing shall be constructed from T-304 11 ga. and 14 ga. stainless steel sheet metal. All pressure retaining joints shall be continuously welded. At a minimum all welds shall be wire brushed and or buffed to remove heat discoloration and any sharp edges.
- A minimum of 4 feet of clearance in front of the filter system is required for filter change-out.
- A replaceable neoprene gasket shall be installed around the perimeter of the filter access doors. Each door shall be secured in place using a standard door bolt with aluminum star knobs.
- Weathercaps shall be constructed from 14 ga. stainless steel metal and shall be installed to prevent the accumulation of water and debris on top of the filter system.
- Static pressure taps shall be located on the top of the filter system. Taps shall be 1/4" NPT stainless steel pipe nipples.
- The filter system shall be tested in accordance with ANSI/ASME NQA-1 "Quality Assurance Program Requirements for Nuclear Facilities". Housing shall be tested for filter fit, operation of filter clamping mechanism, seal surface flatness, and leak tightness. Both the overall system and the filter sealing surface shall be leak tested by the "pressure decay" method in accordance with AG-1, 2012 mandatory appendix TA-III, Article TAA-III-4200 and shall have a maximum leak rate of .0005 CFM per cubic foot of housing volume for 15 minutes.
- The filter system shall be double wall constructed using rigid fiberglass boards as insulation and 14 ga. stainless sheet metal for the outer skins. 2" thick insulation shall be installed on the top and bottom of the filter housing, and 1" thick insulation shall be installed on the front and back of the housing and transitions.

TEST PORTS (SHIPPED LOOSE)	
Upstream Injection	3/4" Half Coupling
Downstream Sample	3/8" Half Coupling

GAGE SCHEDULE (MOUNTED)		
PREFILTER	Differential Pressure Gage	0-2" W.G.
HEPA	Differential Pressure Gage	0-5" W.G.

SYSTEM COMPONENT SCHEDULE:	
1	KG1-2H2W-2GGF-304-D3 Housing Section
2	Lifting Lug
3	Gage Panel, see Gage Schedule for gage details
4	Weathercap

THIS DRAWING IS SUBJECT TO CHANGE WITHOUT NOTICE. PLEASE CONTACT FACTORY FOR CERTIFIED DRAWINGS.

CUSTOMER APPROVAL

DRAWINGS MUST BE SIGNED IN ORDER TO PROCEED WITH PRODUCTION
[ ] APPROVED [ ] APPROVED AS NOTED [ ] NOT APPROVED

SIGNATURE: _____ DATE: _____

COMMENTS: _____

CUSTOMER:

PROJECT NAME: 19.25 Wilkes

CONFIGURATION NAME: 5700

QUOTE / JOB NO.:

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS X/X ± 1/4
DECIMALS X.XX ± 0.25
X.XXX ±0.125
ANGLES ± . 5 °

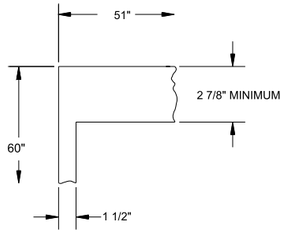
TOTAL WEIGHT: Approx. 880 lbs

AAF Flanders

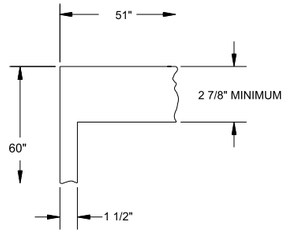
TITLE: KG1-2H2W
Gasket Seal System
Tag: 5700

DRAWN BY	CHECKED BY	APPROVED BY	SHEET	SHEET SIZE	SCALE
Thomas Caranese			1 OF 2	11 X 17	NTS
DATE 06/14/2022	DATE	DATE			

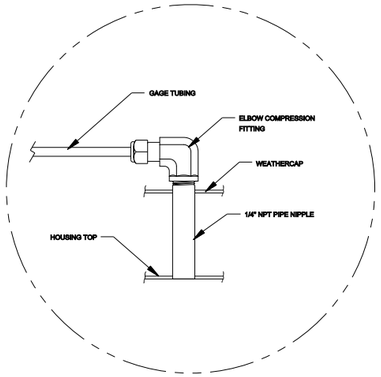
DRAWING NUMBER C-40523 REV 0



INLET DUCT CONNECTION FLANGE



OUTLET DUCT CONNECTION FLANGE



STATIC PRESSURE TAP DETAIL

(TOP INSTALLATION)

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CUSTOMER APPROVAL

DRAWINGS MUST BE SIGNED IN ORDER TO PROCEED WITH PRODUCTION
[ ] APPROVED [ ] APPROVED AS NOTED [ ] NOT APPROVED

SIGNATURE: _____ DATE: _____

COMMENTS: _____

CUSTOMER:	CFM Company
PROJECT NAME:	19.25 Wilkes
CONFIGURATION NAME:	5700
QUOTE / JOB NO.:	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS X/X ± 1/4
DECIMALS X.XX ± 0.25
X.XXX ±0.125
ANGLES ± . 5 °

TOTAL WEIGHT:
Approx.
880 lbs

AAF Flanders

TITLE: KG1-2H2W
Gasket Seal System
Tag: 5700

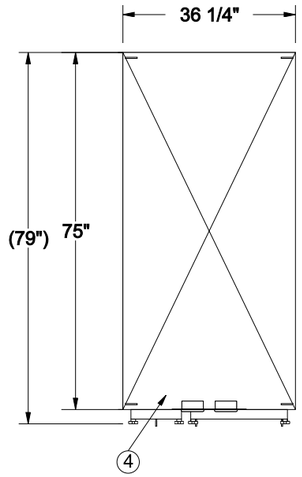
DRAWN BY	CHECKED BY	APPROVED BY	SHEET	SHEET SIZE	SCALE
Thomas Caranese			2 OF 2	11 X 17	NTS
DATE 06/14/2022	DATE	DATE			

DRAWING NUMBER C-40523 REV 0

Input Field	Value
System Tag#	11600
Biological Application	No
Airflow (CFM)	11600
Airflow (l/sec)	5463.6
Airflow (CMH)	19708.4
Containment Housing Type	Non-Bag-In/Bag-Out
Insulation Required	Yes
Leak Testing	Standard Leak Test
Temp (°F)	70
Temp (°C)	21
Inch W.G.	10
PSIG	0.361
Inch Mercury	0.735
Pascals	2490
Material	T-304 SST
Section Layout Options	PRE-HEPA
Primary Filter Seal	Gasket Seal
HEPA/Primary Filter Size	24x24x11½ (Actual)
Prefilter Size	24x24x2 (Nominal)
Filter Arrangement	3 H x 3 W
Flow Rate (FPM)	322
Flow Rate (m/sec)	1.6358
Include Initial set of Filters?	No
Include Initial set of Filters	
Door Side	Right Side Only
Arrangement Split - Left Segment	3 H x 3 W
Arrangement Split - Right Segment	Not Available
Section 1 Type	Prefilter and HEPA
Prefilter/Primary Doors	Separate Access
Section 1 Depth	
Inlet Damper	No
Damper Type	No Damper
Outlet Damper	No
Outlet Damper Type	No Damper
Inlet Transition	No
Outlet Transition	No
Pressure Gage - Prefilter	Yes
Pressure Gage - HEPA/Primary Filter	Yes
Pressure Gage - Postfilter	No
Pressure Gage - Overall	No

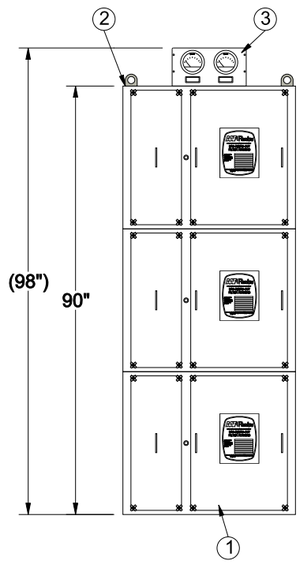
Input Field	Value
Static Pressure Tap Qty	3
Tap Configuration	Individual Filters
Tap Location	Top
Door/Flange Gasket Material	Neoprene
Decontamination Ports	None
Door Latch Type	Standard Latch
Locking Mechanism Material	Standard Brass Pivot Block
Weather Caps	Yes
Mounting Option	None
Moisture Drain	None
Moisture Drain Size	None
Lifting Lugs	Yes
Number of Gages	2
Installation	Mounted
Type	Differential Pressure Gage
Model	0-5" W.G.
Type	Differential Pressure Gage
Model	0-2" W.G.
Installation Hardware	Brass Gage Fittings and Copper Tubing
Gage Tubing Options	Not Available
Damper Arrangement	1 H x 1 W
Filter System Flange Option - Inlet	Butt Weld Flange
Filter System Flange Option - Outlet	Butt Weld Flange
Seal Location	Upstream
Comments	NA
Override Title Block Information	No
Quote / Job Number:	
Revision Number	
Specification Required	No
Sets Of Bag and Straps	1
Airflow (CFM) 2	
Airflow (CFM) 1	

( ) = REFERENCE DIMENSION



PLAN VIEW

AIR FLOW



ACCESS VIEW

SPECIFICATIONS

- The filter system airflow shall be 11600 CFM.
- The filter system shall be designed to withstand a pressure 10 inches water gage.
- The direction of air flow shall be right side door access.
- The pre/post filters and medium efficiency filter sections incorporate a slide-in design which does not require a locking mechanism.
- The primary filter section shall be equipped with a crank operated gasket seal filter clamping mechanism. Pressure bars with pre-loaded springs shall exert a minimum sealing surface of 1,400 lbs. to the gasket along the perimeter of the filter. The mechanism shall be welded in place and shall be constructed of 300-series stainless steel except for brass threaded blocks.
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- A replaceable neoprene gasket shall be installed around the perimeter of the filter access doors. Each door shall be secured in place using a standard door bolt with aluminum star knobs.
- Weathercaps shall be constructed from 14 ga. stainless steel metal and shall be installed to prevent the accumulation of water and debris on top of the filter system.
- Static pressure taps shall be located on the top of the filter system. Taps shall be 1/4" NPT stainless steel pipe nipples.
- The filter system shall be tested in accordance with ANSI/ASME NQA-1 "Quality Assurance Program Requirements for Nuclear Facilities". Housing shall be tested for filter fit, operation of filter clamping mechanism, seal surface flatness, and leak tightness. Both the overall system and the filter sealing surface shall be leak tested by the "pressure decay" method in accordance with AG-1, 2012 mandatory appendix TA-III, Article TAA-III-4200 and shall have a maximum leak rate of .0005 CFM per cubic foot of housing volume for 15 minutes.
- The filter system shall be double wall constructed using rigid fiberglass boards as insulation and 14 ga. stainless sheet metal for the outer skins. 2" thick insulation shall be installed on the top and bottom of the filter housing, and 1" thick insulation shall be installed on the front and back of the housing and transitions.

TEST PORTS (SHIPPED LOOSE)	
Upstream Injection	3/4" Half Coupling
Downstream Sample	3/8" Half Coupling

GAGE SCHEDULE (MOUNTED)		
PREFILTER	Differential Pressure Gage	0-2" W.G.
HEPA	Differential Pressure Gage	0-5" W.G.

SYSTEM COMPONENT SCHEDULE:	
1	KG1-3H3W-2GGF-304-D3 Housing Section
2	Lifting Lug
3	Gage Panel, see Gage Schedule for gage details
4	Weathercap

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CUSTOMER APPROVAL

DRAWINGS MUST BE SIGNED IN ORDER TO PROCEED WITH PRODUCTION
[ ] APPROVED [ ] APPROVED AS NOTED [ ] NOT APPROVED

SIGNATURE: _____ DATE: _____

COMMENTS: _____

CUSTOMER:

PROJECT NAME: 19.25 Wilkes

CONFIGURATION NAME: 19.25 Wilkes

QUOTE / JOB NO.:

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS X/X ± 1/4
DECIMALS X.XX ± 0.25
X.XXX ±0.125
ANGLES ± . 5 °

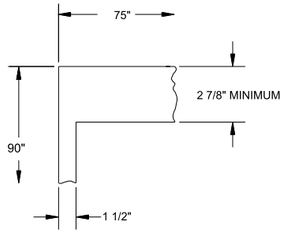
TOTAL WEIGHT:
Approx.
1480 lbs

AAF Flanders

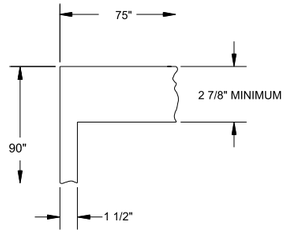
TITLE: KG1-3H3W
Gasket Seal System
Tag: 11600

DRAWN BY	CHECKED BY	APPROVED BY	SHEET	SHEET SIZE	SCALE
Thomas Caranese			1 OF 2	11 X 17	NTS
DATE 06/14/2022	DATE	DATE			

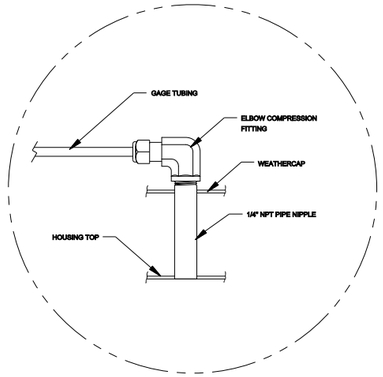
DRAWING NUMBER C-40522 REV 0



INLET DUCT CONNECTION FLANGE



OUTLET DUCT CONNECTION FLANGE



STATIC PRESSURE TAP DETAIL

(TOP INSTALLATION)

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CUSTOMER APPROVAL

DRAWINGS MUST BE SIGNED IN ORDER TO PROCEED WITH PRODUCTION
[ ] APPROVED [ ] APPROVED AS NOTED [ ] NOT APPROVED

SIGNATURE: _____ DATE: _____

COMMENTS: _____

CUSTOMER: CFM Company
PROJECT NAME: 19.25 Wilkes
CONFIGURATION NAME: 19.25 Wilkes
QUOTE / JOB NO.:

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS X/X ± 1/4
DECIMALS X.XX ± 0.25
X.XXX ±0.125
ANGLES ± . 5 °

TOTAL WEIGHT:
Approx.
1480 lbs

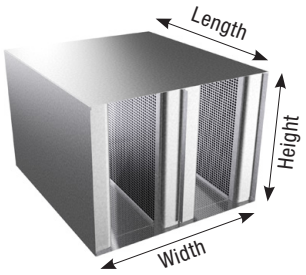
AAF Flanders

TITLE: KG1-3H3W
Gasket Seal System
Tag: 11600

DRAWN BY	CHECKED BY	APPROVED BY	SHEET	SHEET SIZE	SCALE
Thomas Caranese			2 OF 2	11 X 17	NTS
DATE 06/14/2022	DATE	DATE			

DRAWING NUMBER C-40522 REV 0

RSP
Rectangular Silencer Packless



PERFORMANCE DATA

Width (in.): 24

Percentage Free Area: 50

Modules: 2

Dynamic Insertion Loss (DIL)

Length (in.)	Weight (lbs)	Face Velocity (FPM)	Pressure Drop (in. w.g.)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
36	80	+1250	0.1	2	2	4	11	12	8	6	4
		+750	0.04	3	2	4	10	11	8	7	4
		0	0	3	2	4	11	12	8	7	4
		-750	0.04	3	3	4	11	12	8	7	4
		-1250	0.1	4	4	5	12	12	8	7	4
60	133	+1250	0.11	5	4	6	14	16	10	8	4
		+750	0.04	5	4	5	13	15	9	8	4
		0	0	5	4	5	13	15	10	8	4
		-750	0.04	5	5	6	13	15	10	8	3
		-1250	0.11	6	6	7	15	16	11	8	3
84	187	+1250	0.14	6	6	8	16	16	9	8	7
		+750	0.06	6	5	7	14	16	9	7	7
		0	0	6	4	6	14	15	9	7	7
		-750	0.06	7	5	7	14	16	9	7	7
		-1250	0.14	8	6	8	16	16	9	8	7
108	240	+1250	0.18	10	6	9	17	20	11	9	8
		+750	0.06	10	5	7	16	19	11	9	8
		0	0	10	4	6	16	19	11	9	7
		-750	0.06	10	5	8	17	20	12	9	6
		-1250	0.18	12	7	11	19	22	12	9	7

Generated Noise(GN)

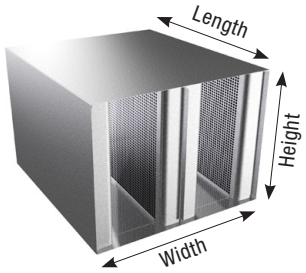
Length (in.)	Face Velocity (fpm)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	+1250	44	32	30	35	45	47	40	30
	+750	30	25	20	24	38	37	22	10
	0	30	25	20	15	10	10	10	10
	-750	34	25	29	39	42	43	29	10
	-1250	44	25	36	44	48	51	45	29

Generated Noise Correction Factors

Face Area (sq. ft.)	0.5	1	2	4	8	16	32	64	128
dB	-9	-6	-3	0	+3	+6	+9	+12	+15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 24 x 24 component.



PERFORMANCE DATA

Width (in.): 24
Percentage Free Area: 37.5
Modules: 2

Dynamic Insertion Loss (DIL)

Length (in.)	Weight (lbs)	Face Velocity (FPM)	Pressure Drop (in. w.g.)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
36	82	+1250	0.2	3	3	7	14	16	9	7	8
		+750	0.07	3	3	7	14	14	8	7	8
		0	0	3	3	6	13	13	8	7	7
		-750	0.07	4	5	8	14	14	8	7	8
		-1250	0.2	5	5	9	15	16	8	7	8
60	137	+1250	0.23	5	5	10	17	19	11	9	8
		+750	0.08	5	5	9	16	16	11	9	8
		0	0	5	5	8	16	16	11	10	7
		-750	0.08	7	7	11	18	17	11	9	6
		-1250	0.23	8	8	13	20	20	12	9	6
84	191	+1250	0.26	8	7	13	20	22	13	11	13
		+750	0.1	9	7	12	19	19	12	11	13
		0	0	8	6	10	18	19	13	13	14
		-750	0.1	11	9	14	21	21	14	12	13
		-1250	0.26	12	11	17	23	25	14	12	13
108	246	+1250	0.29	10	8	16	22	25	13	10	8
		+750	0.11	10	7	13	19	21	12	9	7
		0	0	9	5	10	18	20	12	9	6
		-750	0.11	11	8	14	21	22	14	10	7
		-1250	0.29	14	11	19	23	24	14	9	5

Generated Noise(GN)

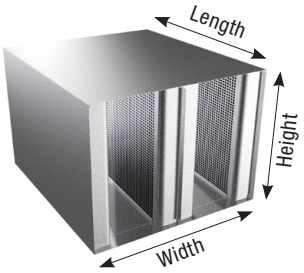
Length (in.)	Face Velocity (fpm)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	+1250	54	42	39	42	49	53	50	42
	+750	36	25	23	30	42	42	32	21
	0	30	25	20	15	10	10	10	10
	-750	40	25	33	42	45	48	38	19
	-1250	50	33	40	47	51	56	54	41

Generated Noise Correction Factors

Face Area (sq. ft.)	0.5	1	2	4	8	16	32	64	128
dB	-9	-6	-3	0	+3	+6	+9	+12	+15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 24 x 24 component.



PERFORMANCE DATA

Width (in.): 24

Percentage Free Area: 25

Modules: 2

Dynamic Insertion Loss (DIL)

Length (in.)	Weight (lbs)	Face Velocity (FPM)	Pressure Drop (in. w.g.)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
36	80	+1250	0.66	5	5	11	15	19	13	10	10
		+750	0.25	4	5	11	14	17	11	10	10
		0	0	4	4	9	12	15	10	9	9
		-750	0.25	6	7	12	14	18	11	9	10
		-1250	0.66	8	8	14	16	18	12	9	9
60	133	+1250	0.76	7	7	18	22	30	20	13	8
		+750	0.28	7	7	16	20	27	17	13	8
		0	0	7	6	13	19	24	16	13	8
		-750	0.28	10	10	18	22	27	17	12	7
		-1250	0.76	15	12	22	24	30	19	11	6
84	187	+1250	0.86	9	10	20	24	31	19	13	13
		+750	0.31	9	9	17	21	26	16	14	13
		0	0	9	7	14	20	24	15	13	12
		-750	0.31	11	11	20	23	27	16	13	12
		-1250	0.86	15	14	24	27	32	18	12	11
108	240	+1250	0.95	14	12	23	26	34	21	16	15
		+750	0.34	13	11	20	23	29	18	16	15
		0	0	13	8	16	21	27	18	16	13
		-750	0.34	15	13	22	25	29	19	15	13
		-1250	0.95	16	16	27	29	34	22	14	12

Generated Noise(GN)

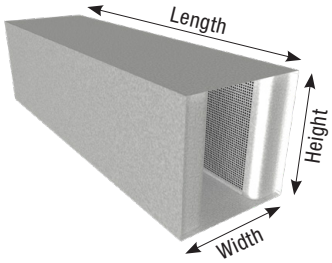
Length (in.)	Face Velocity (fpm)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	+1250	68	55	52	51	55	61	65	58
	+750	50	38	35	40	48	51	47	37
	0	30	25	20	15	10	10	10	10
	-750	48	30	39	46	50	54	51	36
	-1250	57	44	46	50	56	63	67	58

Generated Noise Correction Factors

Face Area (sq. ft.)	0.5	1	2	4	8	16	32	64	128
dB	-9	-6	-3	0	+3	+6	+9	+12	+15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 24 x 24 component.



PERFORMANCE DATA

Width (in.): 24
Percentage Free Area: 50
Modules: 1

Dynamic Insertion Loss (DIL)

Length (in.)	Weight (lbs)	Face Velocity (FPM)	Pressure Drop (in. w.g.)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
36	58	+1250	0.07	3	3	6	11	7	5	4	5
		+750	0.03	3	3	5	11	6	4	4	5
		0	0	3	3	6	11	6	4	4	5
		-750	0.03	3	3	6	11	6	4	4	5
		-1250	0.07	5	4	7	11	6	4	4	6
60	97	+1250	0.12	5	4	8	17	10	8	5	1
		+750	0.05	5	4	8	16	9	8	6	1
		0	0	5	4	8	16	10	9	6	1
		-750	0.03	6	5	9	17	10	8	6	1
		-1250	0.08	6	6	10	18	11	9	6	1
84	135	+1250	0.1	6	7	10	19	9	8	7	9
		+750	0.04	6	6	9	17	9	8	7	9
		0	0	5	6	9	18	9	8	9	10
		-750	0.04	7	8	10	18	10	8	9	10
		-1250	0.1	7	9	12	20	11	8	8	10
108	174	+1250	0.12	7	7	11	19	9	8	7	7
		+750	0.04	7	7	9	17	8	7	6	6
		0	0	8	6	8	18	9	8	7	6
		-750	0.04	9	7	10	18	9	7	6	5
		-1250	0.12	9	9	12	19	10	7	7	5

Generated Noise(GN)

Length (in.)	Face Velocity (fpm)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	+1250	44	32	30	35	45	47	40	30
	+750	30	25	20	24	38	37	22	10
	0	30	25	20	15	10	10	10	10
	-750	34	25	29	39	42	43	29	10
	-1250	44	25	36	44	48	51	45	29

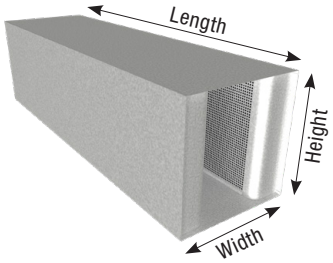
Generated Noise Correction Factors

Face Area (sq. ft.)	0.5	1	2	4	8	16	32	64	128
dB	-9	-6	-3	0	+3	+6	+9	+12	+15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 24 x 24 component.

RSP
Rectangular Silencer Packless



PERFORMANCE DATA

Width (in.): 24

Percentage Free Area: 37.5

Modules: 1

Dynamic Insertion Loss (DIL)

Length (in.)	Weight (lbs)	Face Velocity (FPM)	Pressure Drop (in. w.g.)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
36	59	+1250	0.14	3	4	9	14	9	6	5	7
		+750	0.05	4	4	9	14	8	6	5	7
		0	0	4	4	8	14	7	5	5	6
		-750	0.05	5	5	10	14	8	6	6	7
		-1250	0.14	6	6	11	15	9	7	6	7
60	98	+1250	0.2	5	6	12	21	12	11	6	2
		+750	0.08	6	6	11	19	11	10	7	2
		0	0	5	6	10	18	11	10	7	1
		-750	0.08	7	7	12	20	12	11	9	3
		-1250	0.2	8	8	14	22	14	12	9	4
84	138	+1250	0.22	9	7	14	23	11	9	7	7
		+750	0.08	9	7	13	21	10	9	7	6
		0	0	9	7	12	21	10	9	7	5
		-750	0.08	10	8	14	22	11	9	8	6
		-1250	0.22	12	10	17	25	12	10	9	8
108	177	+1250	0.24	13	8	17	24	11	9	8	11
		+750	0.09	13	7	14	21	9	8	8	10
		0	0	13	6	11	20	9	7	7	7
		-750	0.09	15	8	14	21	10	8	8	8
		-1250	0.24	15	10	18	24	11	10	9	9

Generated Noise(GN)

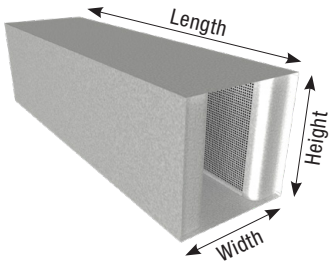
Length (in.)	Face Velocity (fpm)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	+1250	54	42	39	42	49	53	50	42
	+750	36	25	23	30	42	42	32	21
	0	30	25	20	15	10	10	10	10
	-750	40	25	33	42	45	48	38	19
	-1250	50	33	40	47	51	56	54	41

Generated Noise Correction Factors

Face Area (sq. ft.)	0.5	1	2	4	8	16	32	64	128
dB	-9	-6	-3	0	+3	+6	+9	+12	+15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 24 x 24 component.



PERFORMANCE DATA

Width (in.): 24

Percentage Free Area: 25

Modules: 1

Dynamic Insertion Loss (DIL)

Length (in.)	Weight (lbs)	Face Velocity (FPM)	Pressure Drop (in. w.g.)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
36	61	+1250	0.51	6	6	14	17	12	9	7	8
		+750	0.18	6	5	14	17	11	9	7	8
		0	0	5	5	13	16	10	8	6	8
		-750	0.18	8	7	15	18	11	10	9	9
		-1250	0.51	10	9	17	18	13	9	8	9
60	102	+1250	0.66	9	9	20	28	15	13	11	11
		+750	0.24	10	9	19	26	13	12	11	11
		0	0	10	7	16	23	11	10	11	10
		-750	0.24	12	10	21	28	14	13	11	10
		-1250	0.66	13	11	23	30	17	12	10	10
84	142	+1250	0.72	13	9	22	29	18	13	9	10
		+750	0.27	13	9	19	26	15	12	9	10
		0	0	12	8	17	24	14	11	9	8
		-750	0.27	14	10	21	27	15	13	11	11
		-1250	0.72	18	13	25	31	19	13	9	8
108	183	+1250	0.79	16	11	26	32	20	15	11	12
		+750	0.29	17	10	23	28	18	13	11	11
		0	0	16	9	19	26	17	13	11	9
		-750	0.29	18	12	25	30	18	15	13	12
		-1250	0.79	21	15	29	34	21	15	11	10

Generated Noise(GN)

Length (in.)	Face Velocity (fpm)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	+1250	68	55	52	51	55	61	65	58
	+750	50	38	35	40	48	51	47	37
	0	30	25	20	15	10	10	10	10
	-750	48	30	39	46	50	54	51	36
	-1250	57	44	46	50	56	63	67	58

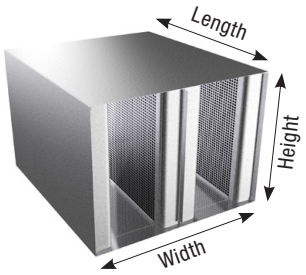
Generated Noise Correction Factors

Face Area (sq. ft.)	0.5	1	2	4	8	16	32	64	128
dB	-9	-6	-3	0	+3	+6	+9	+12	+15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 24 x 24 component.

RSP
Rectangular Silencer Packless



PERFORMANCE DATA

Width (in.): 24

Percentage Free Area: 50

Modules: 2

Dynamic Insertion Loss (DIL)

Length (in.)	Weight (lbs)	Face Velocity (FPM)	Pressure Drop (in. w.g.)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
36	80	+1250	0.1	2	2	4	11	12	8	6	4
		+750	0.04	3	2	4	10	11	8	7	4
		0	0	3	2	4	11	12	8	7	4
		-750	0.04	3	3	4	11	12	8	7	4
		-1250	0.1	4	4	5	12	12	8	7	4
60	133	+1250	0.11	5	4	6	14	16	10	8	4
		+750	0.04	5	4	5	13	15	9	8	4
		0	0	5	4	5	13	15	10	8	4
		-750	0.04	5	5	6	13	15	10	8	3
		-1250	0.11	6	6	7	15	16	11	8	3
84	187	+1250	0.14	6	6	8	16	16	9	8	7
		+750	0.06	6	5	7	14	16	9	7	7
		0	0	6	4	6	14	15	9	7	7
		-750	0.06	7	5	7	14	16	9	7	7
		-1250	0.14	8	6	8	16	16	9	8	7
108	240	+1250	0.18	10	6	9	17	20	11	9	8
		+750	0.06	10	5	7	16	19	11	9	8
		0	0	10	4	6	16	19	11	9	7
		-750	0.06	10	5	8	17	20	12	9	6
		-1250	0.18	12	7	11	19	22	12	9	7

Generated Noise(GN)

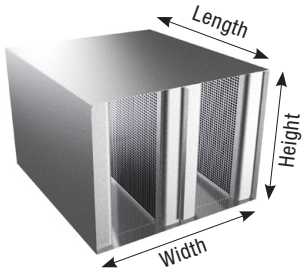
Length (in.)	Face Velocity (fpm)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	+1250	44	32	30	35	45	47	40	30
	+750	30	25	20	24	38	37	22	10
	0	30	25	20	15	10	10	10	10
	-750	34	25	29	39	42	43	29	10
	-1250	44	25	36	44	48	51	45	29

Generated Noise Correction Factors

Face Area (sq. ft.)	0.5	1	2	4	8	16	32	64	128
dB	-9	-6	-3	0	+3	+6	+9	+12	+15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 24 x 24 component.



PERFORMANCE DATA

Width (in.): 24
Percentage Free Area: 37.5
Modules: 2

Dynamic Insertion Loss (DIL)

Length (in.)	Weight (lbs)	Face Velocity (FPM)	Pressure Drop (in. w.g.)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
36	82	+1250	0.2	3	3	7	14	16	9	7	8
		+750	0.07	3	3	7	14	14	8	7	8
		0	0	3	3	6	13	13	8	7	7
		-750	0.07	4	5	8	14	14	8	7	8
		-1250	0.2	5	5	9	15	16	8	7	8
60	137	+1250	0.23	5	5	10	17	19	11	9	8
		+750	0.08	5	5	9	16	16	11	9	8
		0	0	5	5	8	16	16	11	10	7
		-750	0.08	7	7	11	18	17	11	9	6
		-1250	0.23	8	8	13	20	20	12	9	6
84	191	+1250	0.26	8	7	13	20	22	13	11	13
		+750	0.1	9	7	12	19	19	12	11	13
		0	0	8	6	10	18	19	13	13	14
		-750	0.1	11	9	14	21	21	14	12	13
		-1250	0.26	12	11	17	23	25	14	12	13
108	246	+1250	0.29	10	8	16	22	25	13	10	8
		+750	0.11	10	7	13	19	21	12	9	7
		0	0	9	5	10	18	20	12	9	6
		-750	0.11	11	8	14	21	22	14	10	7
		-1250	0.29	14	11	19	23	24	14	9	5

Generated Noise(GN)

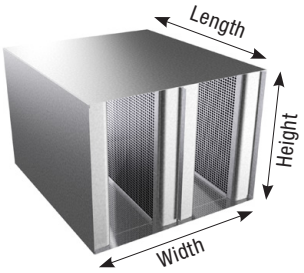
Length (in.)	Face Velocity (fpm)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	+1250	54	42	39	42	49	53	50	42
	+750	36	25	23	30	42	42	32	21
	0	30	25	20	15	10	10	10	10
	-750	40	25	33	42	45	48	38	19
	-1250	50	33	40	47	51	56	54	41

Generated Noise Correction Factors

Face Area (sq. ft.)	0.5	1	2	4	8	16	32	64	128
dB	-9	-6	-3	0	+3	+6	+9	+12	+15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 24 x 24 component.



PERFORMANCE DATA

Width (in.): 24

Percentage Free Area: 25

Modules: 2

Dynamic Insertion Loss (DIL)

Length (in.)	Weight (lbs)	Face Velocity (FPM)	Pressure Drop (in. w.g.)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
36	80	+1250	0.66	5	5	11	15	19	13	10	10
		+750	0.25	4	5	11	14	17	11	10	10
		0	0	4	4	9	12	15	10	9	9
		-750	0.25	6	7	12	14	18	11	9	10
		-1250	0.66	8	8	14	16	18	12	9	9
60	133	+1250	0.76	7	7	18	22	30	20	13	8
		+750	0.28	7	7	16	20	27	17	13	8
		0	0	7	6	13	19	24	16	13	8
		-750	0.28	10	10	18	22	27	17	12	7
		-1250	0.76	15	12	22	24	30	19	11	6
84	187	+1250	0.86	9	10	20	24	31	19	13	13
		+750	0.31	9	9	17	21	26	16	14	13
		0	0	9	7	14	20	24	15	13	12
		-750	0.31	11	11	20	23	27	16	13	12
		-1250	0.86	15	14	24	27	32	18	12	11
108	240	+1250	0.95	14	12	23	26	34	21	16	15
		+750	0.34	13	11	20	23	29	18	16	15
		0	0	13	8	16	21	27	18	16	13
		-750	0.34	15	13	22	25	29	19	15	13
		-1250	0.95	16	16	27	29	34	22	14	12

Generated Noise(GN)

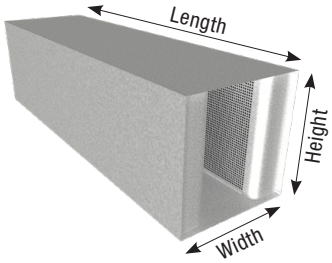
Length (in.)	Face Velocity (fpm)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	+1250	68	55	52	51	55	61	65	58
	+750	50	38	35	40	48	51	47	37
	0	30	25	20	15	10	10	10	10
	-750	48	30	39	46	50	54	51	36
	-1250	57	44	46	50	56	63	67	58

Generated Noise Correction Factors

Face Area (sq. ft.)	0.5	1	2	4	8	16	32	64	128
dB	-9	-6	-3	0	+3	+6	+9	+12	+15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 24 x 24 component.



PERFORMANCE DATA

Width (in.): 24
Percentage Free Area: 50
Modules: 1

Dynamic Insertion Loss (DIL)

Length (in.)	Weight (lbs)	Face Velocity (FPM)	Pressure Drop (in. w.g.)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
36	58	+1250	0.07	3	3	6	11	7	5	4	5
		+750	0.03	3	3	5	11	6	4	4	5
		0	0	3	3	6	11	6	4	4	5
		-750	0.03	3	3	6	11	6	4	4	5
		-1250	0.07	5	4	7	11	6	4	4	6
60	97	+1250	0.12	5	4	8	17	10	8	5	1
		+750	0.05	5	4	8	16	9	8	6	1
		0	0	5	4	8	16	10	9	6	1
		-750	0.03	6	5	9	17	10	8	6	1
		-1250	0.08	6	6	10	18	11	9	6	1
84	135	+1250	0.1	6	7	10	19	9	8	7	9
		+750	0.04	6	6	9	17	9	8	7	9
		0	0	5	6	9	18	9	8	9	10
		-750	0.04	7	8	10	18	10	8	9	10
		-1250	0.1	7	9	12	20	11	8	8	10
108	174	+1250	0.12	7	7	11	19	9	8	7	7
		+750	0.04	7	7	9	17	8	7	6	6
		0	0	8	6	8	18	9	8	7	6
		-750	0.04	9	7	10	18	9	7	6	5
		-1250	0.12	9	9	12	19	10	7	7	5

Generated Noise(GN)

Length (in.)	Face Velocity (fpm)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	+1250	44	32	30	35	45	47	40	30
	+750	30	25	20	24	38	37	22	10
	0	30	25	20	15	10	10	10	10
	-750	34	25	29	39	42	43	29	10
	-1250	44	25	36	44	48	51	45	29

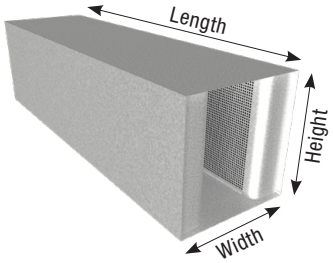
Generated Noise Correction Factors

Face Area (sq. ft.)	0.5	1	2	4	8	16	32	64	128
dB	-9	-6	-3	0	+3	+6	+9	+12	+15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 24 x 24 component.

RSP
Rectangular Silencer Packless



PERFORMANCE DATA

Width (in.): 24

Percentage Free Area: 37.5

Modules: 1

Dynamic Insertion Loss (DIL)

Length (in.)	Weight (lbs)	Face Velocity (FPM)	Pressure Drop (in. w.g.)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
36	59	+1250	0.14	3	4	9	14	9	6	5	7
		+750	0.05	4	4	9	14	8	6	5	7
		0	0	4	4	8	14	7	5	5	6
		-750	0.05	5	5	10	14	8	6	6	7
		-1250	0.14	6	6	11	15	9	7	6	7
60	98	+1250	0.2	5	6	12	21	12	11	6	2
		+750	0.08	6	6	11	19	11	10	7	2
		0	0	5	6	10	18	11	10	7	1
		-750	0.08	7	7	12	20	12	11	9	3
		-1250	0.2	8	8	14	22	14	12	9	4
84	138	+1250	0.22	9	7	14	23	11	9	7	7
		+750	0.08	9	7	13	21	10	9	7	6
		0	0	9	7	12	21	10	9	7	5
		-750	0.08	10	8	14	22	11	9	8	6
		-1250	0.22	12	10	17	25	12	10	9	8
108	177	+1250	0.24	13	8	17	24	11	9	8	11
		+750	0.09	13	7	14	21	9	8	8	10
		0	0	13	6	11	20	9	7	7	7
		-750	0.09	15	8	14	21	10	8	8	8
		-1250	0.24	15	10	18	24	11	10	9	9

Generated Noise(GN)

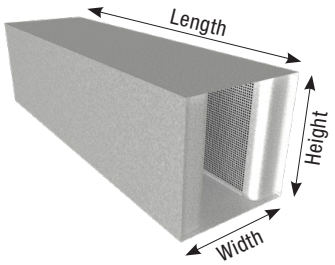
Length (in.)	Face Velocity (fpm)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	+1250	54	42	39	42	49	53	50	42
	+750	36	25	23	30	42	42	32	21
	0	30	25	20	15	10	10	10	10
	-750	40	25	33	42	45	48	38	19
	-1250	50	33	40	47	51	56	54	41

Generated Noise Correction Factors

Face Area (sq. ft.)	0.5	1	2	4	8	16	32	64	128
dB	-9	-6	-3	0	+3	+6	+9	+12	+15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 24 x 24 component.



PERFORMANCE DATA

Width (in.): 24

Percentage Free Area: 25

Modules: 1

Dynamic Insertion Loss (DIL)

Length (in.)	Weight (lbs)	Face Velocity (FPM)	Pressure Drop (in. w.g.)	Octave Band Dynamic Insertion Loss (dB)							
				63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
36	61	+1250	0.51	6	6	14	17	12	9	7	8
		+750	0.18	6	5	14	17	11	9	7	8
		0	0	5	5	13	16	10	8	6	8
		-750	0.18	8	7	15	18	11	10	9	9
		-1250	0.51	10	9	17	18	13	9	8	9
60	102	+1250	0.66	9	9	20	28	15	13	11	11
		+750	0.24	10	9	19	26	13	12	11	11
		0	0	10	7	16	23	11	10	11	10
		-750	0.24	12	10	21	28	14	13	11	10
		-1250	0.66	13	11	23	30	17	12	10	10
84	142	+1250	0.72	13	9	22	29	18	13	9	10
		+750	0.27	13	9	19	26	15	12	9	10
		0	0	12	8	17	24	14	11	9	8
		-750	0.27	14	10	21	27	15	13	11	11
		-1250	0.72	18	13	25	31	19	13	9	8
108	183	+1250	0.79	16	11	26	32	20	15	11	12
		+750	0.29	17	10	23	28	18	13	11	11
		0	0	16	9	19	26	17	13	11	9
		-750	0.29	18	12	25	30	18	15	13	12
		-1250	0.79	21	15	29	34	21	15	11	10

Generated Noise(GN)

Length (in.)	Face Velocity (fpm)	Octave Band Generated Noise (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
All Lengths	+1250	68	55	52	51	55	61	65	58
	+750	50	38	35	40	48	51	47	37
	0	30	25	20	15	10	10	10	10
	-750	48	30	39	46	50	54	51	36
	-1250	57	44	46	50	56	63	67	58

Generated Noise Correction Factors

Face Area (sq. ft.)	0.5	1	2	4	8	16	32	64	128
dB	-9	-6	-3	0	+3	+6	+9	+12	+15

Performance Notes:

1. Data tables are derived from test data in conformance with ASTM E477-20.
2. "+" indicates performance data for forward flow (supply) applications.
3. "-" indicates performance data for reverse flow (return) applications.
4. Dynamic Insertion Loss is limited to 55 dB due to flanking.
5. For performance data specific to a configuration not cataloged, please use Price AIO Selection Software.
6. The performance data above is based on a 24 x 24 component.

Outdoor Split System

Johnson Controls Split-System R-410A Outdoor

Project Name: **1925 Wiles DX** | Unit Model #: **J07YCC00A4QAE5**

Quantity: **1** | System: **J07YCC00A4QAE5**

Cooling Performance		
Total gross capacity	93.1	MBH
Sensible gross capacity	.0	MBH
Efficiency (at ARI)		EER
Ambient DB temp.	95.0	°F
Power input (w/o blower)	6.94	kW
Suction pressure	143	psig
Saturated suction temp.	50	°F

Refrigerant	
Refrigerant type	R-410A

Electrical Data		
Power supply	460-3-60	
Unit min circuit ampacity	22.6	Amps
Unit max over-current protection	30	Amps

Dimensions & Weight					
Hgt	45 in.	Len	59 in.	Wth	32 in.
Weight with factory installed options					390 lbs.

Clearances					
Right	30 in.	Front	36 in.	Rear	24 in.
Top	120 in.	Bottom	0 in.	Left	30 in.

Note: Please refer to the tech guide for listed maximum static pressures

Unit Features

- Single Stage Cooling
- Unit Cabinet Constructed of Powder Painted Steel, Certified At 750 Hours Salt Spray Test (ASTM B-117 Standards)
- Full Perimeter Base Rails with Built in Rigging Capabilities
- Scroll Compressors with Crankcase Heater
- Single Refrigeration Circuit (2 Pipe)
- Liquid Line Driers (Supplied for Field Installation)
- Aluminum Tube/ Aluminum Fin Microchannel Coils
- Back Seating Suction and Liquid Line Service Valves
- Inherently Protected Fan Motors
- Low Ambient to 40ºF
- Side or Bottom Single Point Power Connections
- Disconnect Switch
- Powered Convenience Outlet (110 VAC / 15 Amp)
- Phase Monitor
- Coil Guard
- Short Circuit Current: 5kA RMS Symmetrical

Standard Unit Controller: Smart Equipment Control Board

- Anti-Short Cycle Protection, Lead-Lag, Low Voltage Protection, On-Board Diagnostic and Fault Code Display
- Safety Monitoring - Monitors the High and Low-Pressure Switches. The Unit Control Board will Alarm on Compressor Lockouts and Repeated Limit Switch Trips.

Warranty

- One (1) Year Limited Warranty on All Other Parts
- Five (5) Year Limited Warranty on Compressors

Outdoor Split System

Johnson Controls Split-System R-410A Outdoor

Project Name: **1925 Wiles DX** Unit Model #: **J07YCC00A4QAE5**

Quantity: **1** System: **J07YCC00A4QAE5**

Piping & Connection

Piping and Electrical Connection Sizes (Inches)

MODEL	J07PC	J10PC	J07YC	J10YC	J10YD	J12YC	J12YD
No. Refrigeration Circuits	1	1	1	1	2	1	2
Suction Line OD (in.)	1 1/8	1 3/8	1 1/8	1 3/8	1 1/8	1 3/8	1 1/8
Liquid Line OD (in.)	5/8	7/8	5/8	7/8	5/8	7/8	5/8
Power Wiring Knockout	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8
Control Wiring Knockout	7/8	7/8	7/8	7/8	7/8	7/8	7/8

MODEL	J15PC	J15PD	J20PC	J20PD	J15YC	J15YD	J20YC	J20YD	J25YC
No. Refrigeration Circuits	1	2	1	2	1	2	1	2	1
Suction Line OD (in.)	1 5/8	1 3/8	1 5/8	1 3/8	1 5/8	1 3/8	1 5/8	1 3/8	1 5/8
Liquid Line OD (in.)	7/8	5/8	7/8	5/8	7/8	5/8	7/8	5/8	7/8
Power Wiring Knockout	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8
Control Wiring Knockout	7/8	7/8	7/8	7/8	7/8	7/8	7/8	7/8	7/8

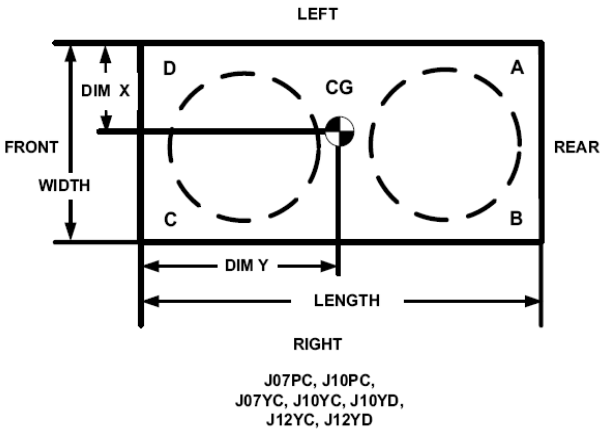
Outdoor Split System

Johnson Controls Split-System R-410A Outdoor

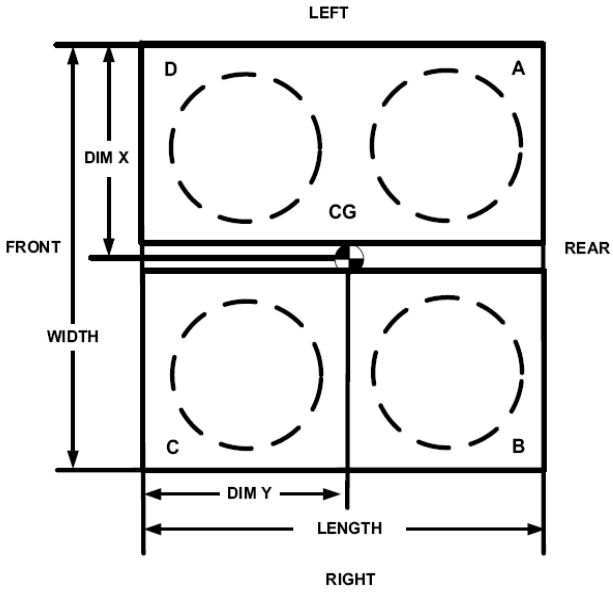
Project Name: **1925 Wiles DX** Unit Model #: **J07YCC00A4QAE5**

Quantity: **1** System: **J07YCC00A4QAE5**

Corner Weights & Center of Gravity



J07PC, J10PC,
J07YC, J10YC, J10YD,
J12YC, J12YD



J15PC, J15PD,
J20PC, J20PD,
J15YC, J15YD,
J20YC, J20YD
J25YC

NOTE: Front of unit is considered the side having the unit control box.

Corner Weights & Center of Gravity AC/HP Units

Model	Weight (lbs.)		Center of Gravity (in.)		4 Point Load Location (lbs.)			
	Shipping	Operating	X	Y	A	B	C	D
J07PC	421	430	17.3	33	110	130	103	87
J10PC	543	574	16.4	32.3	153	161	134	127
J15PC	947	968	32.5	33	266	274	217	211
J15PD	921	942	34	32.5	243	275	225	199
J20PC	1116	1152	32.1	30.8	300	301	276	275
J20PD	1090	1126	31.2	31.8	311	295	253	267
J07YC	390	387	17	32.3	99	113	94	82
J10YC	499	497	17.3	32.3	124	147	122	103
J10YD	493	490	17.4	32.5	123	147	120	100
J12YC	499	497	17	32.3	127	145	120	105
J12YD	493	490	17.4	32.5	123	147	120	100
J15YC	914	909	32.5	31.5	239	246	215	209
J15YD	899	894	32.5	31.5	235	242	212	206
J20YC	945	942	30.3	31.0	261	234	212	236
J20YD	930	927	32.7	31.8	244	255	218	210
J25YC	945	942	30.3	31.0	261	234	212	236

Armstrong Steam-A-ware™
Trap Schedule

Application

Project	**19.25 WILKES BARRE**
By	**JAD**
Date	**1/25/2023**
Company Name	**VEG**
Comments	

Selected Traps

Application	Trap ID No.	Type of Trap	Model No.	Orifice Size	Traps Req'd	Max. Oper. Pressure	Flow Direction	Conn. Size	Conn. Type	Options Selected	Comments/Special Instructions
Air Handling Units		Float & Thermostatic	CS6,-8	3/8"	1	180 psig	Horizontal	2"	NPT		ST-1 - AHU-13 STEAM TRAP
Air Handling Units		Float & Thermostatic	CS4,-5	5/16"	1	40 psig	Horizontal	1-1/4"	NPT		ST-2 - AHU-12 STEAM TRAP
Air Handling Units		Float & Thermostatic	CS2,-3	11/64"	1	75 psig	Horizontal	3/4"	NPT		ST-5 - AHU-1 STEAM TRAP

Contact Local Sales Office: http://www.armstronginternational.com/replocator

Armstrong International, Inc.
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Parc Industriel Des Hauts-Sarts, B-4040 Herstal/Liege, Belgium Phone (04) 2409090 Fax: (04) 2481361