Titus
Redefine your comfort zone.™

blower coils

V

DESIGNED FOR MAXIMUM FLEXIBILITY

Both Horizontal and Vertical Belt Drive Blower Coils are designed to maximize flexibility of selection and installation.

The units will exceed the stringent quality standards of the institutional market, while remaining cost competitive in the light commercial segment of the market.

COMPONENT OPTIONS

The extensive variety of standard options available on the TBH & TBV units are where you find the versatility to fit any HVAC system designer's needs.

Options include mixing boxes with standard low leak dampers, high efficiency filter sections for 2" prefilter and 4" final filter and blow-thru electric heat with single point power connection. All Electric Heat units are listed with ETL as an assembly and carry the cETL label.

High Efficiency motors, starters, disconnects and fusing mean easier coordination between mechanical and electrical trades.

All TBH and TBV belt drive blower coils have the option of foil faced insulation.

COIL OPTIONS

Coil options allow for 4 or 6 row cooling coils. Water coils have optional circuiting that can be used to reduce Water Pressure Drop, which may also allow for pipe size reductions and lower material cost. Hot Water or Standard Steam coils may be placed in the Preheat or Reheat position.

QUALITY PRODUCT

TBH and TBV belt drive blower coils are built from 18 gauge galvanized steel. This metal surpasses the ASTM 125 hour salt spray test for corrosion and rust. Standard insulation is 1 inch thick fiberglass, complying with UL 181 and NFPA 90A. All units, with or without Electric Heat, are cETL listed and labeled. All wiring is in compliance with NEC, assuring safety and quality for the owner.

LOWER INSTALLED COST

All TBH or TBV belt drive blower coils are shipped completely assembled, reducing field installation time and labor. All units are thoroughly inspected and tested prior to shipment, eliminating potential problems at startup. Motor wiring is brought to a junction box on the outside of the unit casing, reducing electrical hook-up time. A wide variety of fan discharge configurations allow for increased flexibility and easier installation on the jobsite, resulting in cost reductions by eliminating expensive elbows, etc.

MODEL TBH
DESCRIPTION

MODEL TBV
DESCRIPTION

APPLICATION CONSIDERATIONS

Models TBH & TBV Belt Drive Blower Coils offer a wide range of application flexibility, while maintaining a simple, easy to install unit design. These units are intended to provide comfort cooling and heating within a small footprint. They may be applied in many types of building structures including schools, office buildings, hospitals, condominiums, assisted living facilities, apartments or stores. Applications can be constant or variable volume.

There are many applications the TBH & TBV product can be utilized. Some examples are listed below.

Constant volume applications:

- Two-pipe hydronic system for cooling and/or heating
- Two-pipe hydronic cooling system with electric heat
- Four-pipe system with dedicated heating and cooling coils
- Direct Expansion (DX) split systems with hydronic heat
- Direct Expansion (DX) split systems with electric heat

Variable volume applications:

- Two-pipe hydronic system for cooling and/or heating
- Two-pipe hydronic cooling system with electric heat
- Four-pipe system with dedicated heating and cooling coils

ACOUSTICS

Control of noise within both occupied and unoccupied spaces has become increasingly important to designers and building owners/occupants. Proper consideration must be given to placement of indoor air conditioning units, particularly in the occupied space. Inherent flexibility of the fan and coil combination in the vertical configuration allows application in sound-sensitive areas. In such instances, a fan running at a low speed with a high capacity coil normally yields satisfactory results. It also may be desirable to select a larger nominal capacity unit and operate it at a less than nominal airflow for further acoustic benefit.

Three phase motors are recommended for sound-sensitive applications to avoid potential single phase motor hum. Unit operation in the stall region of the fan curve is not recommended since it may cause unsatisfactory noise levels and excessive unit vibration.

INSTALLATION

These floor mounted or ceiling hung units can be installed with external vibration isolation on a base rail (TBH or TBV) or hanger rods (TBH only) at the corner points. This requires flex connections at the corner brackets, ductwork, electrical connections and piping connections. One of the most important and basic IAQ issues is condensate management. The first step to trouble-free operation is proper installation. It is very important that the unit be mounted high enough so that the condensate drain from the unit may be properly trapped. Please refer to the TBH & TBV IOM Manual at www.titus-hvac.com for specifics on this issue. As with all HVAC systems, these units should be installed according to all applicable ASHRAE standards, SMACNA and local code requirements.

OPERATING LIMITATIONS

Units must not be operated above maximum fan speed or unit airflow as listed in the Fan Performance section of this catalog. Unit operation at greater than maximum fan speed could drastically reduce bearing life and may result in a catastrophic wheel failure. Operating at greater than the maximum allowable airflow in the cooling mode may result in unsatisfactory operation due to moisture carry over from the coil. In addition, it is often not economical to operate a unit at its maximum fan speed due to the greater motor power requirements.

Units with electric heat should not be operated with leaving air temperature greater than 104°F (40°C), to prevent excessive leaving air temperatures and electric heat limit trips. A hydronic (or steam) coil and electric heat should not be operated simultaneously to prevent excessive leaving air temperatures and limit trips. Electric heat units are equipped with a high limit lockout switch that disables the electric heater if the temperature of the hydronic coil is greater than 104°F (40°C).

Water coils must not be operated above a fluid velocity of 8 ft./sec. to reduce the possibility of velocity induced erosion and flow noise. Water coils must not be operated below a fluid velocity of 1 ft./sec. to prevent degraded coil performance caused by laminar flow. These high or low fluid flow rates may not be included in the AHRI coil certification.

TBH

- Mixing boxes with standard low-leak dampers, high-efficiency filter sections for 2" prefilter and 4" final filter
- Fiberglass-insulated cabinets, main incoming-power disconnect (non-fused), fusing (main), magnetic contractors, and fan control package with heater interlock contacts
- Blow-through electric heat with single-point power connection
- Meets all N.E.C. requirements and is cETL listed in compliance with UL/ANSI Std. 1995
- Hot water, chilled water and direct expansion coils, steam, cold water/hot water changeover available for all models
- 800 - 4000 cfm nominal airflows

TBH

MODEL:

TBH

OVERVIEW

Titus horizontal belt drive blower coils offer a wide range of application flexibility, while maintaining a simple, easy to install unit design. These units are intended to provide comfort cooling and heating within a small footprint. They may be applied in many types of building structures including schools, office buildings, hospitals, condominiums, assisted living facilities, apartments and stores. Applications can be constant or variable volume.

OPTIONAL FEATURES INCLUDE:

Construction

- IAQ (sloped) stainless steel drain pan with 1" MPT galvanized pipe outlet
- Galvanized steel drain pan
- External rubber-in-shear or spring type vibration isolators, hangers or floor mount
- Fan discharge arrangements
- Scrim reinforced foil faced insulation
- EcoShield 1" insulation
- Hinged access panels with lift and turn fasteners
- Base rails with rigging slots factory assembled and installed
- Auxiliary (secondary) drain connections

Fan Motor and Drive

- High efficiency motors
- TEFC motors

See website for Specifications

Coils

- 3, 4 and 6 row chilled water or DX coils
- 1 and 2 row hot water or standard steam coils
- Heating coil in preheat or reheat position
- Coil connections opposite handing
- Stainless steel coil casings
- Automatic air vents on water coils
- Heat pump compatible cooling coils
- 0.025" tube wall thickness

Filters

- 2" pleated filter
- Spare throwaway or pleated filters
- High efficiency filter rack with 2" and 4" filters

Inlet Damper Section

- Factory assembled and installed
- Heavy gauge galvanized steel formed blade dampers
- Low leak dampers with extruded vinyl blade seals and flexible metal jamb seals
- Parallel blade operation
- Interconnecting damper linkage

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Central Station Air-Handlers
AHRI Standard 430

A Participating Corporation in the AHRI 430 Certification Program

Electrical

- Motor wiring on conduit
- Motor starter (contactor with overload for three phase; contactor for single phase), factory installed (mounted and wired)
- Door interlocking disconnect switch (non-fused)
- Hand off auto switch (HOA)
- Main fusing

Electric Heat Section

- Factory mounted electric heater with single point power connection, cETL listed as an assembly

TBV

- Mixing boxes with standard low-leak dampers, high-efficiency filter sections for 2" prefilter and 4" final filter
- Fiberglass-insulated cabinets, main incoming-power disconnect (non-fused), fusing (main), magnetic contractors, and fan control package with heater interlock contacts
- Blow-through electric heat with single-point power connection
- Meets all N.E.C. requirements and is cETL listed in compliance with UL/ANSI Std. 1995
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- TEFC motors

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- Hand off auto switch (HOA)
- Main fusing

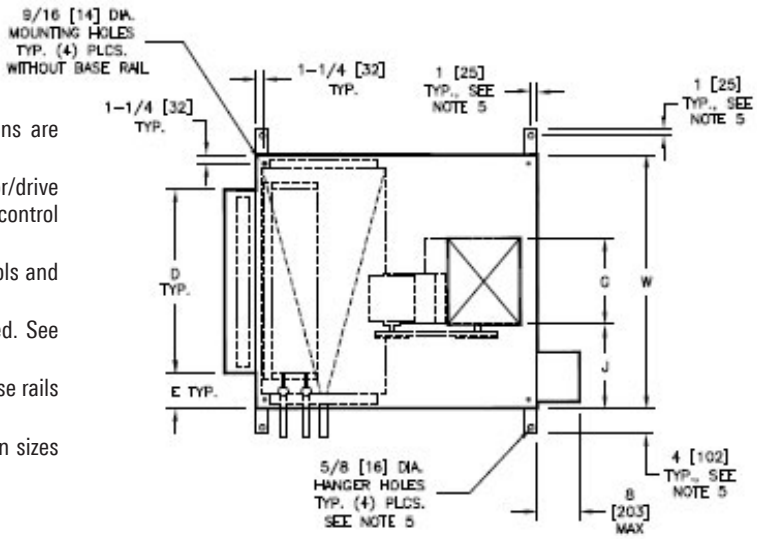
Electric Heat Section

- Factory mounted electric heater with single point power connection, cETL listed as an assembly

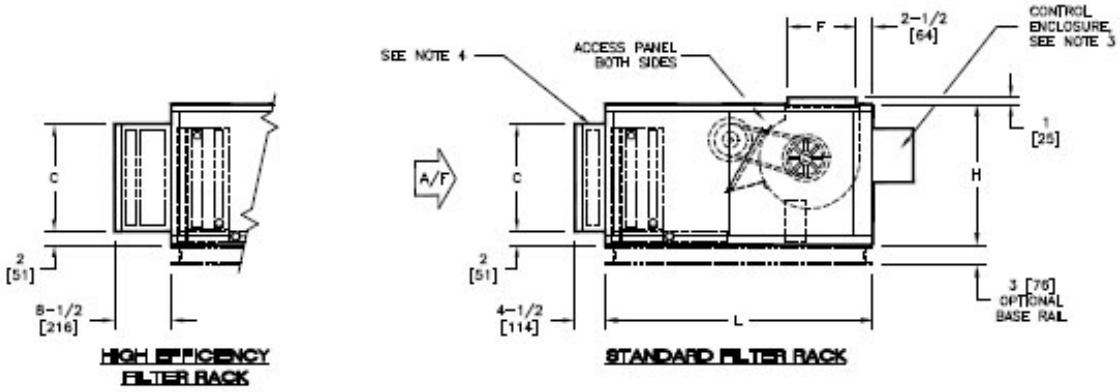
TBH UNIT DIMENSIONS / DISCHARGE ARRANGEMENT 2

Notes:

1. All dimensions are inches [millimeters]. All dimensions are ±¼" [6mm]. Metric values are soft conversion.
2. Right hand unit shown, left hand unit opposite. Motor/drive location may be specified Left or Right Hand. Standard control enclosure location matches motor/drive position.
3. Provide sufficient clearance to permit access to controls and comply with applicable codes and ordinances
4. Flat filter rack may be located at unit inlet as required. See drawing for filter rack details.
5. Base rail is optional on the base unit. See drawing. Base rails must be used with mixing box.
6. See coil connection detail drawings for coil connection sizes and locations



TOP VIEW



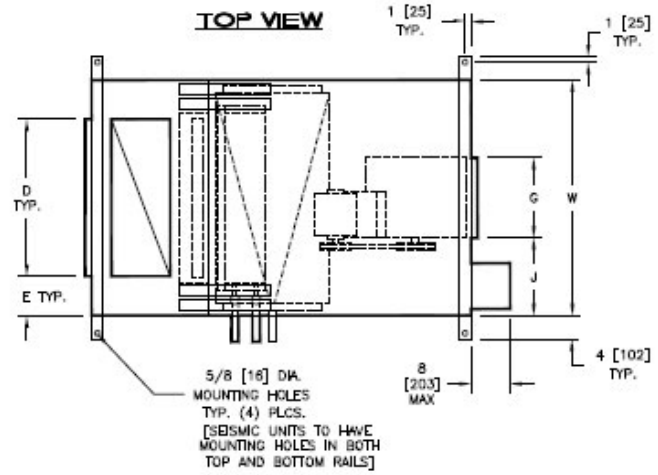
SIDE VIEWS

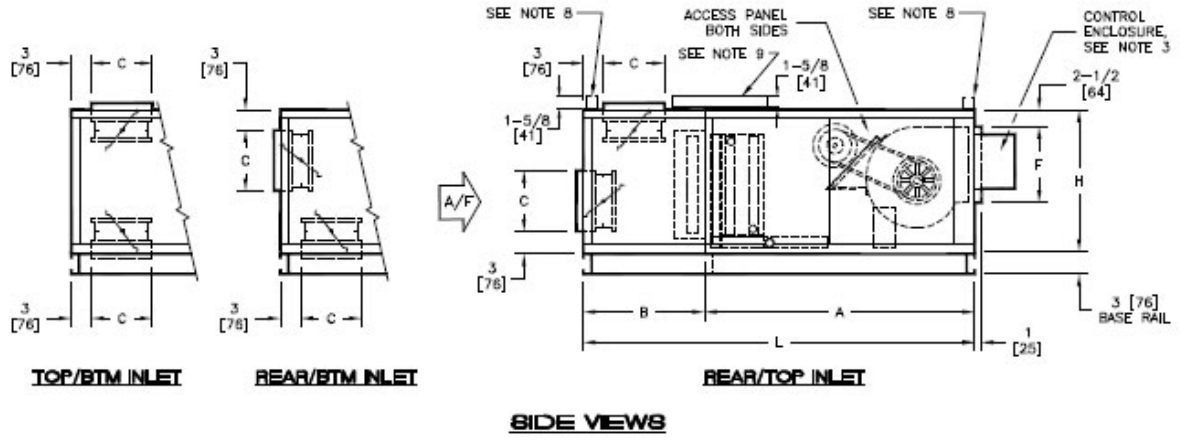
Dimensions								
Unit Size	Fan Size	W	C	D	E	F	G	J
08	9 x 4 [229 x 102]	30 [762]	16 [406]	20 [508]	5 [127]	10 ¼ [260]	6 ⅞ [175]	11 9/16 [294]
12	9 x 6 [229 x 152]	36 [914]	16 [406]	25 [635]	5 ½ [140]	11 ¼ [286]	8 ¼ [210]	13 ⅞ [352]
16	10 x 8 [254 x 203]	44 [1118]	16 [406]	39 ½ [1003]	2 ¼ [57]	13 ½ [343]	10 ¼ [260]	16 ⅞ [429]
20	10 x 10 [254 x 254]	50 [1270]	16 [406]	44 ½ [1130]	2 ¾ [70]	13 ½ [343]	13 ¼ [337]	18 ⅜ [467]
30	15 x 9 [381 x 229]	59 [1499]	25 [635]	51 [1295]	4 [102]	16 [406]	13 ¼ [337]	22 ⅞ [581]
40	15 x 11 [381 x 279]	68 [1727]	25 [635]	59 [1499]	4 ½ [114]	16 [406]	15 [381]	26 ½ [673]

TBH UNIT DIMENSIONS / DISCHARGE ARRANGEMENT WITH MIXING BOX

Notes:

1. All dimensions are inches [millimeters]. All dimensions are ±¼" [6mm]. Metric values are soft conversion.
2. Right hand unit shown, left hand unit opposite. Motor/drive location may be specified Left or Right Hand. Standard control enclosure location matches motor/drive position.
3. Provide sufficient clearance to permit access to controls and comply with applicable codes and ordinances
4. Outside and return air damper linkage is optional
5. See coil connection detail drawings for coil connection sizes and locations
6. High efficiency filter rack not available with mixing box
7. Top rails provided with seismic certified option (Add 1⅝" to "H" dimension).
8. Top rails provided on size 30 & 40 units with mixing box and seismic certified option





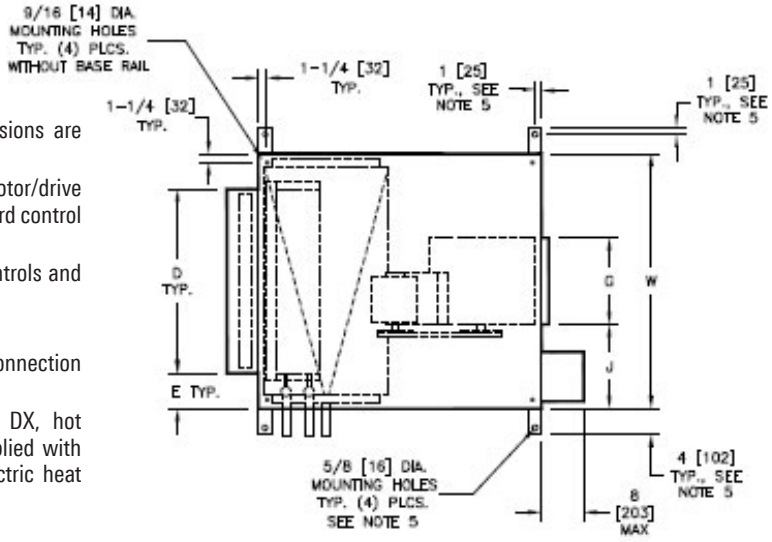
Dimensions												
Unit Size	Fan Size	L	W	H	A	B	C	D	E	F	G	J
08	9 x 4 [229 x 102]	58 [1473]	30 [762]	21 [533]	40 [1016]	18 [457]	9 [229]	18 [457]	6 [152]	10 ¼ [260]	6 ⅞ [175]	11 9/16 [294]
12	9 x 6 [229 x 152]	58 [1473]	36 [914]	21 [533]	40 [1016]	18 [457]	9 [229]	24 [610]	6 [152]	11 ¼ [286]	8 ¼ [210]	13 ⅞ [352]
16	10 x 8 [254 x 203]	58 [1473]	44 [1118]	21 [533]	40 [1016]	18 [457]	9 [229]	30 [762]	7 [178]	11 ⅜ [289]	10 ¼ [260]	16 ⅞ [429]
20	10 x 10 [254 x 254]	61 [1549]	50 [1270]	21 [533]	40 [1016]	21 [533]	12 [305]	36 [914]	7 [178]	11 ⅜ [289]	13 ¼ [337]	18 ⅜ [467]
30	15 x 9 [381 x 229]	67 [1702]	59 [1499]	30 [762]	46 [1168]	21 [533]	12 [305]	45 [1143]	7 [178]	16 [406]	13 ¼ [337]	22 ⅞ [581]
40	15 x 11 [381 x 279]	70 [1778]	68 [1727]	30 [762]	46 [1168]	24 [610]	15 [381]	48 [1219]	10 [254]	16 [406]	15 [381]	26 ½ [673]

All dimensions are in inches

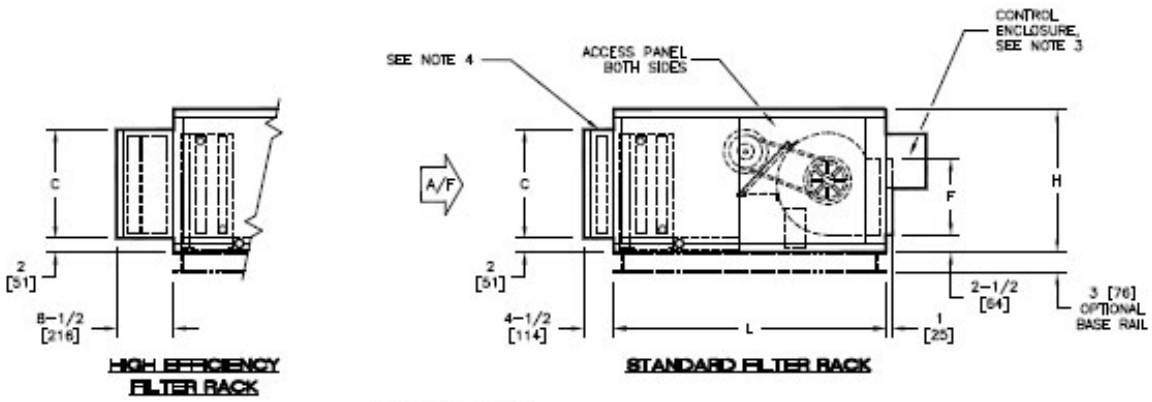
TBH UNIT DIMENSIONS / DISCHARGE ARRANGEMENT 4

Notes:

1. All dimensions are inches [millimeters]. All dimensions are ±¼" [6mm]. Metric values are soft conversion.
2. Right hand unit shown, left hand unit opposite. Motor/drive location may be specified Left or Right Hand. Standard control enclosure location matches motor/drive position.
3. Provide sufficient clearance to permit access to controls and comply with applicable codes and ordinances
4. Outside and return air damper linkage is optional
5. See coil connection submittal drawings for coil connection sizes and locations
6. Units with electric heat only (no chilled water, DX, hot water or steam coils) and a drain pan will be supplied with condensate drain outlet the same side as the electric heat control enclosure



TOP VIEW

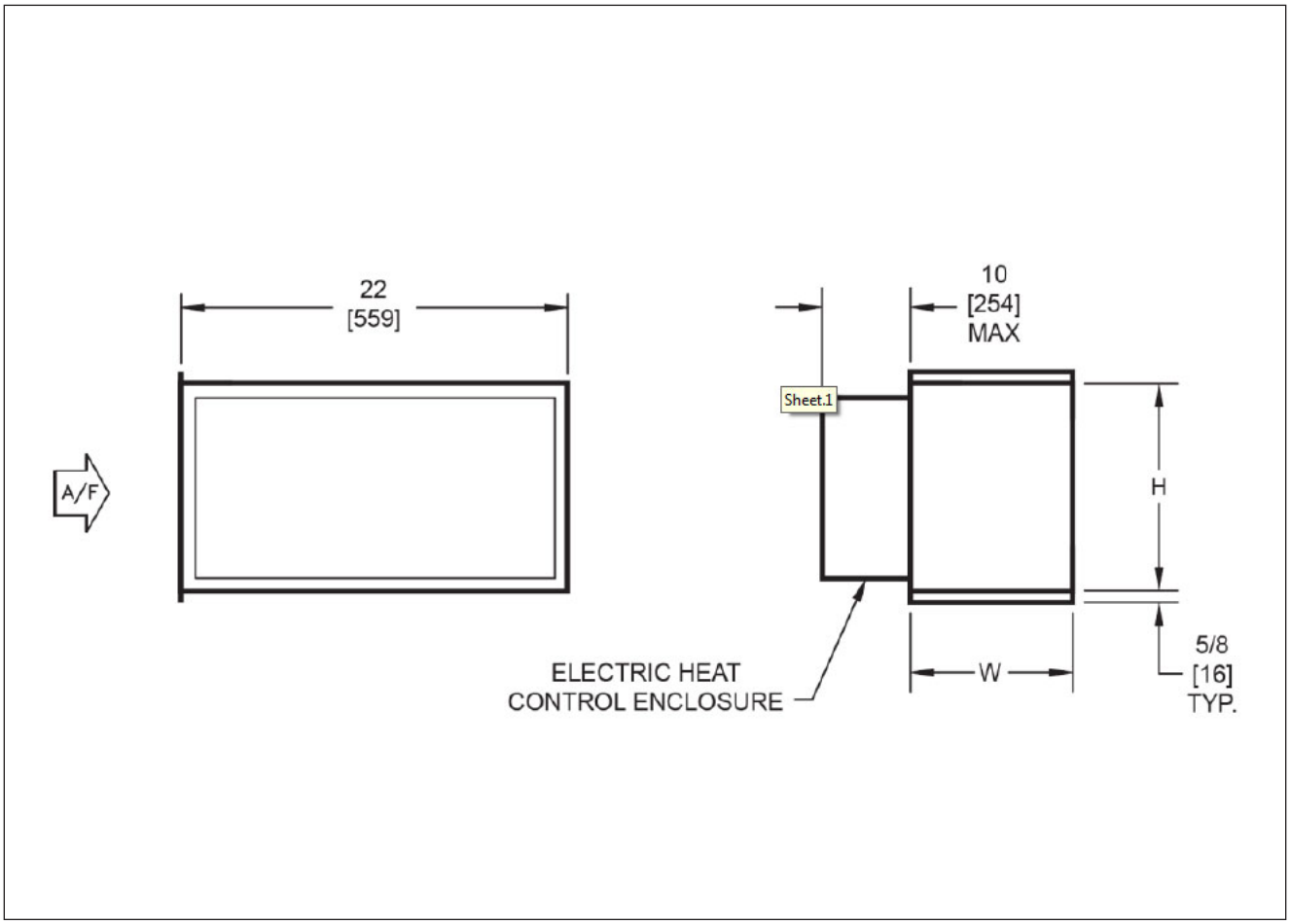


SIDE VIEWS

Dimensions										
Unit Size	Fan Size	L	W	H	C	D	E	F	G	J
08	9 x 4 [229 x 102]	40 [1016]	30 [762]	21 [533]	16 [406]	20 [508]	5 [127]	11 7/8 [302]	8 7/8 [225]	10 9/16 [268]
12	9 x 6 [229 x 152]	40 [1016]	36 [914]	21 [533]	16 [406]	25 [635]	5 ½ [140]	11 7/8 [302]	8 7/8 [225]	13 9/16 [344]
16	10 x 8 [254 x 203]	40 [1016]	44 [1118]	21 [533]	16 [406]	39 ½ [1003]	2 ¼ [57]	12 [305]	10 7/8 [276]	16 9/16 [421]
20	10 x 10 [254 x 254]	40 [1016]	50 [1270]	21 [533]	16 [406]	44 ½ [1130]	2 ¾ [70]	12 [305]	13 7/8 [352]	18 1/16 [459]
30	15 x 9 [381 x 229]	46 [1168]	59 [1499]	30 [762]	25 [635]	51 [1295]	4 [102]	16 5/8 [1143]	13 7/8 [352]	22 9/16 [573]
40	15 x 11 [381 x 279]	46 [1168]	68 [1727]	30 [762]	25 [635]	59 [1499]	4 ½ [114]	16 5/8 [1143]	15 5/8 [397]	21 11/16 [551]

All dimensions are in inches

TBH / TBV, BLOW-THRU ELECTRIC HEAT



Notes:

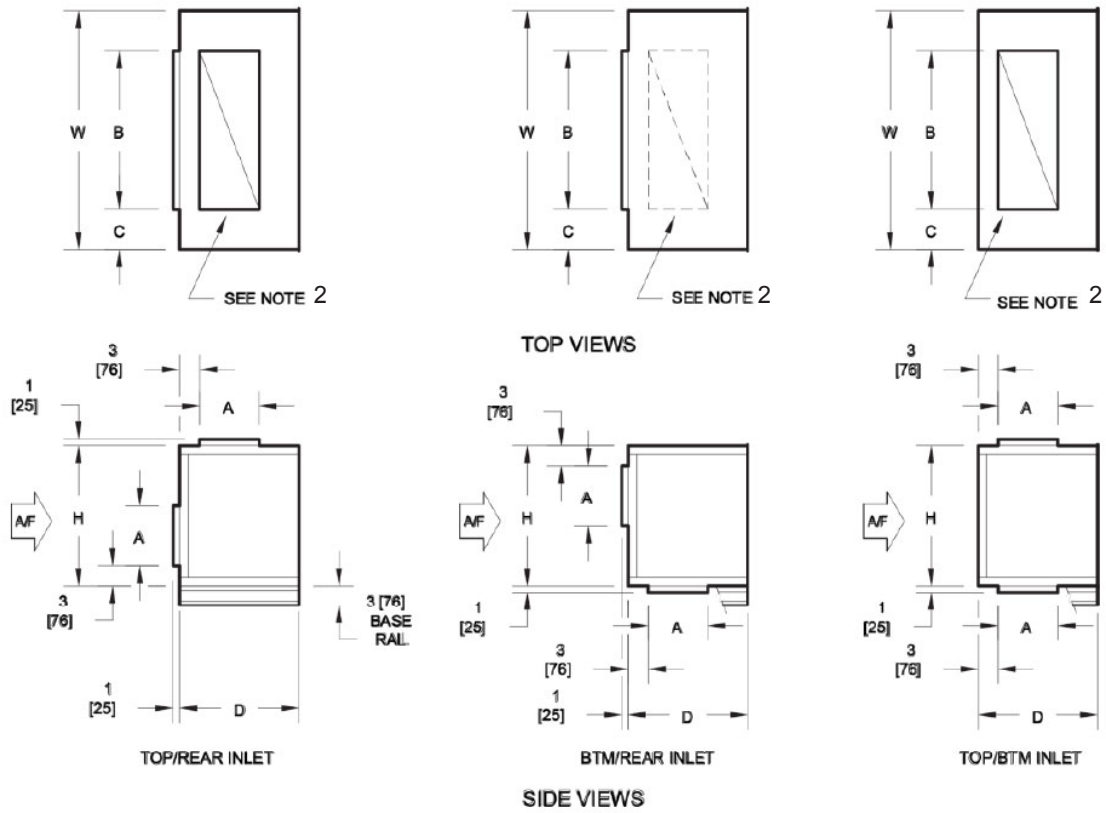
1. All dimensions are inches [millimeters]. All dimensions are ±¼" [6mm]. Metric values are soft conversion.
2. Motor/drive location may be specified Left or Right Hand. Standard control enclosure location matches motor/drive position
3. Provide sufficient clearance to permit access to controls and comply with applicable codes and ordinances
4. Available for horizontal discharge only

BLOW-THRU ELECTRIC HEAT SECTION

Unit Size	H	W	Weight lbs [kg]
08	11 7/8 [302]	8 7/8 [225]	42 [19]
12	11 7/8 [302]	8 7/8[225]	42 [19]
16	12 [305]	10 7/8 [278]	42 [19]
20	12 [305]	13 7/8 [352]	50 [23]
30	16 5/8 [422]	13 7/8 [352]	55 [25]
40	16 5/8 [422]	15 7/8 [397]	55 [25]

All dimensions are in inches

TBH / TBV STANDARD MIXING BOX



Notes:

1. All dimensions are inches [millimeters]. All dimensions are ±¼" [6mm]. Metric values are soft conversion.
2. Damper drive rods are internal, located on both sides of unit
3. Mixing box includes space for standard flat filter rack
4. Base rails are including with mixing box

Dimensions						
Unit Size	H	W	A	B	C	D
08	21 [533]	30 [762]	9 [229]	18 [457]	6 [152]	18 [457]
12	21 [533]	36 [914]	9 [229]	24 [610]	6 [152]	18 [457]
16	21 [533]	44 [1118]	9 [229]	30 [762]	7 [178]	18 [457]
20	21 [533]	50 [1270]	12 [305]	36 [914]	7 [178]	21 [533]
30	30 [762]	59 [1499]	12 [305]	45 [1143]	7 [178]	21 [533]
40	30 [762]	68 [1727]	15 [381]	48 [1219]	10 [254]	24 [610]

All dimensions are in inches

Coil and Filter Data

COIL AND FILTER DATA

Unit Size	Coil Face Area	2" Flat Filters (Quantity) and Size	Filter Face Area
08	2.1 [0.20]	(1) 16 x 20 x 2 [406 x 508 x 51]	2.2 [0.20]
12	2.7 [0.25]	(1) 16 x 25 x 2 [406 x 635 x 51]	2.8 [0.26]
16	3.5 [0.33]	(2) 16 x 20 x 2 [406 x 508 x 51]	4.4 [0.41]
20	4.9 [0.46]	(1) 16 x 20 x 2 [406 x 508 x 51] (1) 16 x 25 x 2 [406 x 635 x 51]	5.0 [0.46]
30	6.5 [0.60]	(2) 16 x 25 x 2 [406 x 635 x 51] (1) 20 x 25 x 2 [508 x 635 x 51]	9.0 [0.84]
40	8.4 [0.78]	(3) 20 x 25 x 2 [508 x 635 x 51]	10.4 [0.97]

Notes:
1. Standard filters are 2" throwaway
2. Filter sizes are nominal and standard size, measured in inches [millimeters]
3. Coil and filter face areas are measured in square feet [square meters]
4. Cooling and heating coils have same face area

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NOMINAL COIL CONNECTION SIZES

Unit Size	Coil Type															
	Water					Steam				Refrigerant						
	1 Row	2 Row	3 Row	4 Row	6 Row	1 Row		2 Row		3 Row		4 Row		6 Row	
						STM.	COND.	STM.	COND.	Liquid	Suction	Liquid	Suction	Liquid	Suction
08	5/8 [16]	5/8 [16]	7/8 [22]	7/8 [22]	7/8 [22]	1 1/8 [29]	7/8 [22]	1 1/8 [29]	7/8 [22]	5/8 [16]	5/8 [16]	5/8 [16]	5/8 [16]	5/8 [16]	5/8 [16]
12	5/8 [16]	5/8 [16]	7/8 [22]	7/8 [22]	7/8 [22]	1 1/8 [29]	7/8 [22]	1 1/8 [29]	7/8 [22]	5/8 [16]	7/8 [22]	5/8 [16]	7/8 [22]	5/8 [16]	7/8 [22]
16	5/8 [16]	7/8 [22]	7/8 [22]	7/8 [22]	1 1/8 [29]	1 1/8 [29]	7/8 [22]	1 3/8 [35]	1 1/8 [29]	5/8 [16]	7/8 [22]	5/8 [16]	7/8 [22]	5/8 [16]	7/8 [22]
20	5/8 [16]	7/8 [22]	1 1/8 [29]	1 1/8 [29]	1 1/8 [29]	1 3/8 [35]	1 1/8 [29]	1 3/8 [35]	1 1/8 [29]	5/8 [16]	7/8 [22]	5/8 [16]	7/8 [22]	5/8 [16]	7/8 [22]
30	7/8 [22]	1 1/8 [29]	1 1/8 [29]	1 1/8 [29]	1 3/8 [35]	1 5/8 [41]	1 1/8 [29]	1 5/8 [41]	1 1/8 [29]	5/8 [16]	1 1/8 [29]	5/8 [16]	1 1/8 [29]	5/8 [16]	1 1/8 [29]
40	1 1/8 [29]	1 3/8 [35]	1 3/8 [35]	1 3/8 [35]	1 5/8 [41]	2 1/8 [54]	1 3/8 [35]	2 1/8 [54]	1 3/8 [35]	5/8 [16]	1 1/8 [29]	5/8 [16]	1 1/8 [29]	7/8 [22]	1 3/8 [35]

Notes:
1. Water coils are based on Standard GPM Circuiting. Consult Titus Representative for applications requiring special circuiting.
2. For other selections, refer to TEAMS
3. Refrigerant coil connection sizes for single circuit coils and may vary with application. Contact Titus for double circuit coils.
4. All dimensional data is outside diameter (O.D.), measured in inches [millimeters]

COILS AND STATIC PRESSURE DATA

COILS

Titus manufactures hot water, chilled water and direct expansion (DX) coils for specific application with all Model TBH and TBV blower coils. AHRI 410 certified and labeled, and strict on-site inspection before, during, and after installation guarantees the highest quality and performance available.

Standard Features

- Designed, manufactured and tested by Titus
- AHRI 410 certified and labeled
- ½" O.D. seamless copper tubes
- High efficiency aluminum fin surface for optimizing heat transfer, pressure drop and carryover
- Mechanically expanded copper tubes leak tested to a minimum 450 PSIG air pressure under water
- Manual air vent plug on all water coils
- Copper ODM sweat connections
- 450 PSIG working pressure at 200°F
- Evaporator coils are factory sealed and charged with a minimum of 5 PSIG nitrogen or refrigerated dry air
- Steam coils rated at 15 PSIG maximum operating pressure at about 35°F
- 0.016" tube wall thickness (0.025" on steam)

Optional Features

- Stainless steel coil casings
- Automatic air vents on water coils
- Heat pump compatible cooling coils
- 0.025" tube wall thickness

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Air-Cooling and Air-Heating Coils
AHRI Standard 410

COMPONENT STATIC PRESSURE LOSS – INCHES W.G.

Unit Size	Nominal CFM	Cabinet	Filter (2" T/A)	Coil					Inlet Damper Section	Electric Heat Section
				1 Row	2 Row	3 Row	4 Row	6 Row		
08	800	0.09	0.25	0.05	0.10	0.23	0.31	0.47	0.04	0.05
12	1200	0.09	0.25	0.06	0.12	0.29	0.39	0.58	0.06	0.05
16	1600	0.10	0.25	0.06	0.13	0.30	0.40	0.60	0.09	0.05
20	2000	0.11	0.25	0.06	0.11	0.26	0.35	0.52	0.05	0.05
30	3000	0.14	0.25	0.07	0.13	0.31	0.41	0.61	0.08	0.05
40	4000	0.16	0.25	0.07	0.14	0.32	0.43	0.64	0.07	0.05

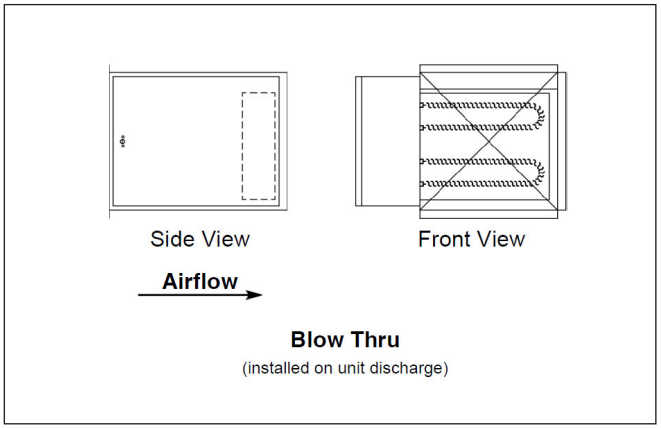
Notes:

1. All static pressures are at nominal CFM
2. Coil static pressure for standard coil, 10FPI at 80/67 EAT and 45° EWT with 10° rise
3. For 8, 12 or 14 FPI, refer to TEAMS
4. Filter static pressure based on 50% loaded filter
5. If pleated filters are used in lieu of throwaway, the filter static pressure loss is 0.35

Electric Heat

Standard Features

- Flanged construction for direct unit mounting, in blow-thru configuration
- Listed for zero clearance installation
- Meets National Electrical Code requirements
- Ni-Chrome wire in ceramic insulators
- Stainless steel element terminals and hardware
- Element support brackets on maximum 3 ½" centers
- Solid cover with continuous full height hinge
- Overtemperature protection
- All internal wiring rated for 105°C minimum
- Airflow switch
- Incoming line power distribution block
- cETL Listed in compliance with UL/ANSI Standard 1995
- Single point power connection
- Heater factory mounted to unit with cETL listing as an assembly



Optional Features

- Main incoming power disconnect (non-fused)
- Fusing (main)
- Magnetic contactors wired for disconnecting operation
- Fan control package with heater interlock contacts (required for single point power connection)

Heater AMP Calculation	
Voltage	AMPs per kW
115/1	8.70
208/1	4.81
230/1	4.35
277/1	3.61
208/3	2.78
230/3	2.51
460/3	1.26
575/3	1.00

Electrical Calculations Information

1. Contact your local Titus sales office
2. Non-Fused Door Interlock Disconnect Switch shall be sized according to MCA
3. Main Fusing shall be sized according to MOP

Unit Voltage And Phase			Electric Heat KW Limits											
			Unit Size											
			08		12		16		20		30		40	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Single Phase	115	kW	3	5	3	5	3	5	4	5				
		AMPs	26.1	43.5	26.1	43.5	26.1	43.5	34.8	43.5				
	208	kW	3	9	3	9	3	9	4	9	6	9	7	9
		AMPs	14.4	43.3	14.4	43.3	14.4	43.3	19.2	43.3	28.8	43.3	33.7	43.3
	230	kW	3	11	3	11	3	11	4	11	6	11	7	11
		AMPs	13.0	47.8	13.0	47.8	13.0	47.8	17.4	47.8	26.1	47.8	30.4	47.8
	277	kW	3	13	3	13	3	13	4	13	6	13	7	13
		AMPs	10.8	46.9	10.8	46.9	10.8	46.9	14.4	46.9	21.7	46.9	25.3	46.9
Three Phase	208	kW	3	13	3	16	3	16	4	16	4	16	7	16
		AMPs	8.3	36.1	8.3	44.4	8.3	44.4	11.1	44.4	11.1	44.4	19.4	44.4
	230	kW	3	13	3	18	3	18	4	18	4	18	7	18
		AMPs	7.5	32.6	7.5	45.2	7.5	45.2	10.0	45.2	10.0	45.2	17.6	45.2
	460	kW	3	13	3	20	3	20	4	26	4	26	7	38
		AMPs	3.8	16.3	3.8	25.1	3.8	25.1	5.0	32.6	5.0	32.6	8.8	47.7
	575	kW	3	13	3	20	3	20	4	26	4	26	7	46
		AMPs	3.0	13.1	3.0	20.1	3.0	20.1	4.0	26.1	4.0	26.1	7.0	46.2

Notes:

1. Factory certified submittals available upon request
2. Standard heater kW limits are maximum per unit size and voltage
3. Heater should be sized for a maximum leaving air temperature of 104°F

FORWARD CURVED FAN PERFORMANCE DATA

TSP [in-wg]	Unit Size	08					12					16				
	Actual CFM	600	700	800	900	1000	1000	1100	1200	1300	1400	1400	1500	1600	1700	1800
2.4	RPM	-	-	-	-	1746	-	-	-	-	1710	-	-	-	-	-
	BHP	-	-	-	-	0.70	-	-	-	-	1.02	-	-	-	-	-
2.2	RPM	-	-	-	1670	1674	-	-	-	1638	1638	-	-	-	-	1415
	BHP	-	-	-	0.57	0.65	-	-	-	0.87	0.95	-	-	-	-	1.08
2.0	RPM	-	-	-	1594	1598	-	-	-	1561	1568	-	-	-	1349	1353
	BHP	-	-	-	0.52	0.59	-	-	-	0.79	0.88	-	-	-	0.92	0.99
1.8	RPM	-	-	1510	1514	1524	-	-	1481	1485	1494	-	-	1279	1283	1287
	BHP	-	-	0.41	0.47	0.55	-	-	0.66	0.73	0.81	-	-	0.78	0.84	0.91
1.6	RPM	-	-	1425	1430	1446	-	1397	1397	1406	1415	-	1206	1210	1214	1218
	BHP	-	-	0.37	0.43	0.50	-	0.53	0.59	0.66	0.74	-	0.65	0.70	0.76	0.82
1.4	RPM	-	1331	1335	1347	1366	-	1306	1314	1323	1335	1128	1132	1136	1140	1149
	BHP	-	0.28	0.33	0.39	0.45	-	0.47	0.53	0.60	0.67	0.53	0.58	0.63	0.68	0.75
1.2	RPM	-	1235	1242	1259	1283	1209	1216	1225	1236	1249	1048	1052	1057	1067	1077
	BHP	-	0.24	0.29	0.34	0.40	0.37	0.42	0.47	0.53	0.59	0.46	0.51	0.55	0.61	0.67
1.0	RPM	1125	1129	1145	1168	1200	1109	1118	1130	1144	1163	962	969	979	988	1002
	BHP	0.17	0.21	0.25	0.30	0.36	0.32	0.36	0.41	0.47	0.53	0.40	0.44	0.49	0.54	0.60
0.8	RPM	1009	1022	1044	1075	1113	1002	1014	1030	1049	1073	872	882	895	909	923
	BHP	0.14	0.17	0.21	0.26	0.32	0.26	0.31	0.35	0.40	0.47	0.34	0.38	0.42	0.47	0.52
0.6	RPM	884	906	939	979	1024	885	903	926	951	984	777	791	806	822	838
	BHP	0.11	0.14	0.18	0.22	0.28	0.21	0.25	0.30	0.35	0.41	0.28	0.32	0.36	0.40	0.45
Fan Size		0904R					0906R					1008R				
Coil Face Area		2.1					2.7					3.5				
FPM @ CFM		286	333	381	429	476	370	407	444	481	519	400	429	457	486	514

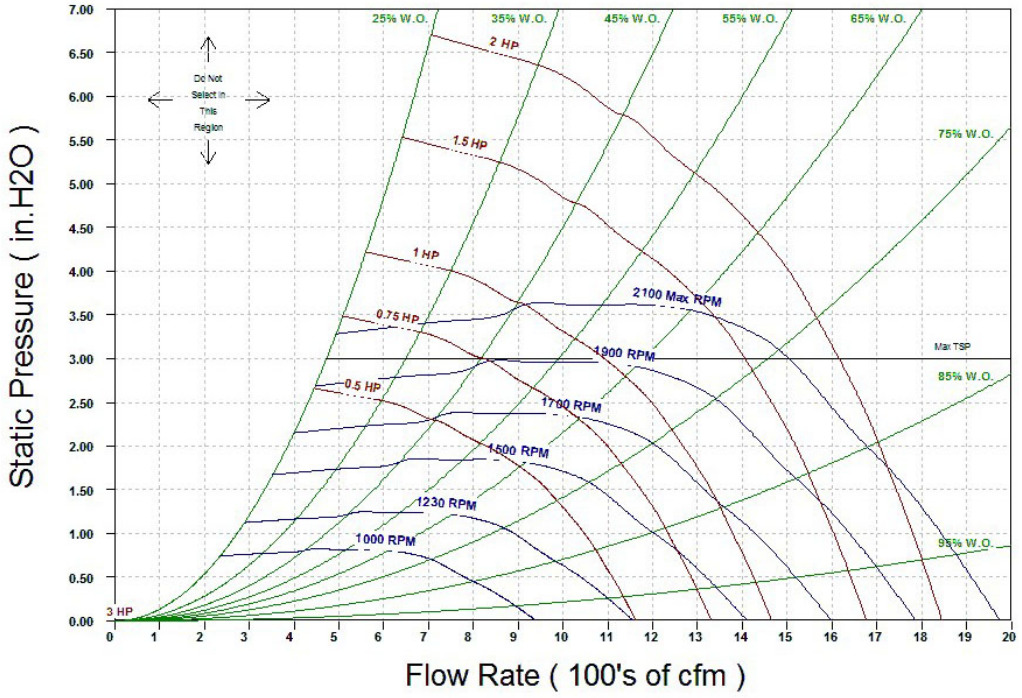
TSP [in-wg]	Unit Size	20					30					40				
	Actual CFM	1800	1950	2100	2250	2400	2600	2800	3000	3200	3400	3600	3800	4000	4200	4400
2.4	RPM	-	-	-	-	1507	-	-	-	1034	1037	-	-	-	1021	1023
	BHP	-	-	-	-	1.60	-	-	-	2.01	2.20	-	-	-	2.00	2.15
2.2	RPM	-	-	-	1441	1446	-	-	-	992	996	-	-	977	979	980
	BHP	-	-	-	1.37	1.49	-	-	-	1.88	2.06	-	-	1.72	1.86	1.99
2.0	RPM	-	-	1373	1377	1382	-	-	945	949	952	-	932	933	934	937
	BHP	-	-	1.15	1.26	1.37	-	-	1.59	1.75	1.91	-	1.46	1.58	1.71	1.85
1.8	RPM	-	-	1305	1310	1315	-	896	899	903	906	-	885	886	888	892
	BHP	-	-	1.05	1.15	1.25	-	1.33	1.47	1.61	1.76	-	1.33	1.44	1.57	1.71
1.6	RPM	-	1230	1234	1239	1251	844	847	851	854	858	834	835	837	841	844
	BHP	-	0.87	0.95	1.04	1.16	1.09	1.21	1.34	1.47	1.60	1.10	1.20	1.31	1.43	1.56
1.4	RPM	1150	1154	1159	1170	1182	792	796	799	803	810	781	783	787	790	794
	BHP	0.70	0.77	0.85	0.95	1.05	0.98	1.09	1.21	1.32	1.46	0.98	1.08	1.18	1.29	1.41
1.2	RPM	1068	1073	1085	1097	1114	737	741	745	752	759	726	729	732	737	743
	BHP	0.61	0.68	0.76	0.85	0.96	0.87	0.97	1.07	1.19	1.31	0.86	0.96	1.05	1.16	1.27
1.0	RPM	981	993	1006	1024	1042	677	682	689	697	705	666	670	676	681	687
	BHP	0.52	0.60	0.67	0.76	0.86	0.75	0.84	0.95	1.05	1.17	0.75	0.83	0.93	1.02	1.12
0.8	RPM	892	908	926	947	969	613	621	629	637	648	602	608	614	622	631
	BHP	0.45	0.52	0.59	0.68	0.77	0.64	0.72	0.82	0.92	1.03	0.64	0.72	0.79	0.89	0.99
0.6	RPM	800	820	842	865	889	544	553	564	576	590	532	541	550	559	570
	BHP	0.38	0.44	0.51	0.59	0.68	0.53	0.61	0.70	0.79	0.90	0.52	0.60	0.67	0.76	0.85
Fan Size		1010R					1509R					1511R				
Coil Face Area		4.9					6.5					8.4				
FPM @ CFM		367	398	428.6	459.2	489.8	400	431	462	492	523	429	452	476	500	524

Notes:

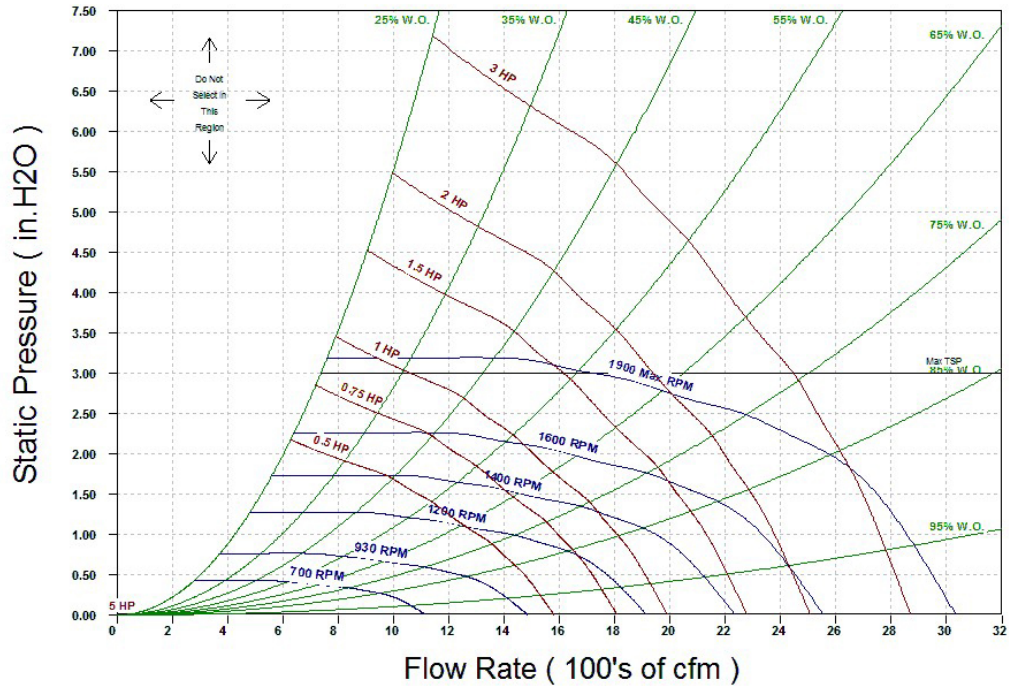
1. Consult Titus for applications at operating conditions not shown above
2. Fan motor voltage, fan rotation, and fan RPM may require field setting/adjustment
3. Drive losses not included in fan performance

Fan Performance Curves

UNIT SIZE 08 (FAN 0904R)

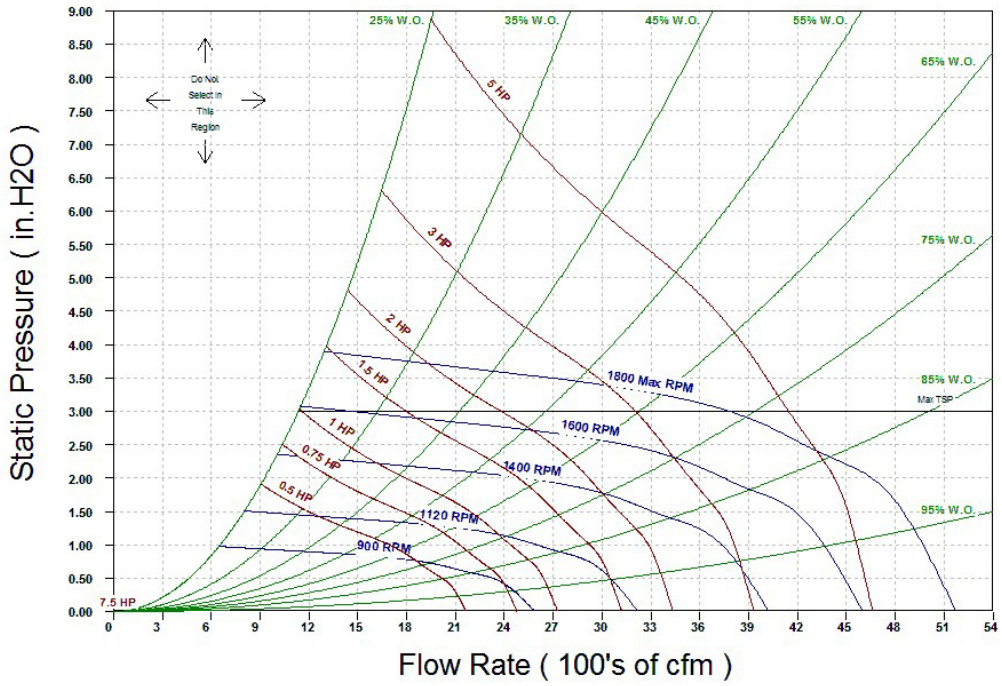


UNIT SIZE 12 (FAN 0906R)

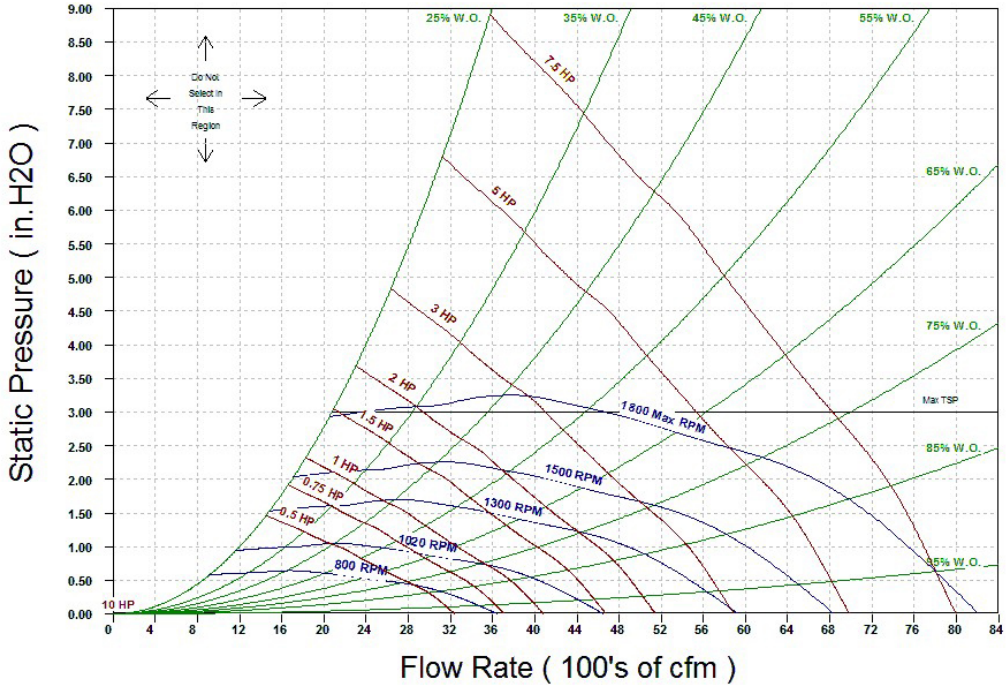


FAN CURVES

UNIT SIZE 16 (FAN 1008R)

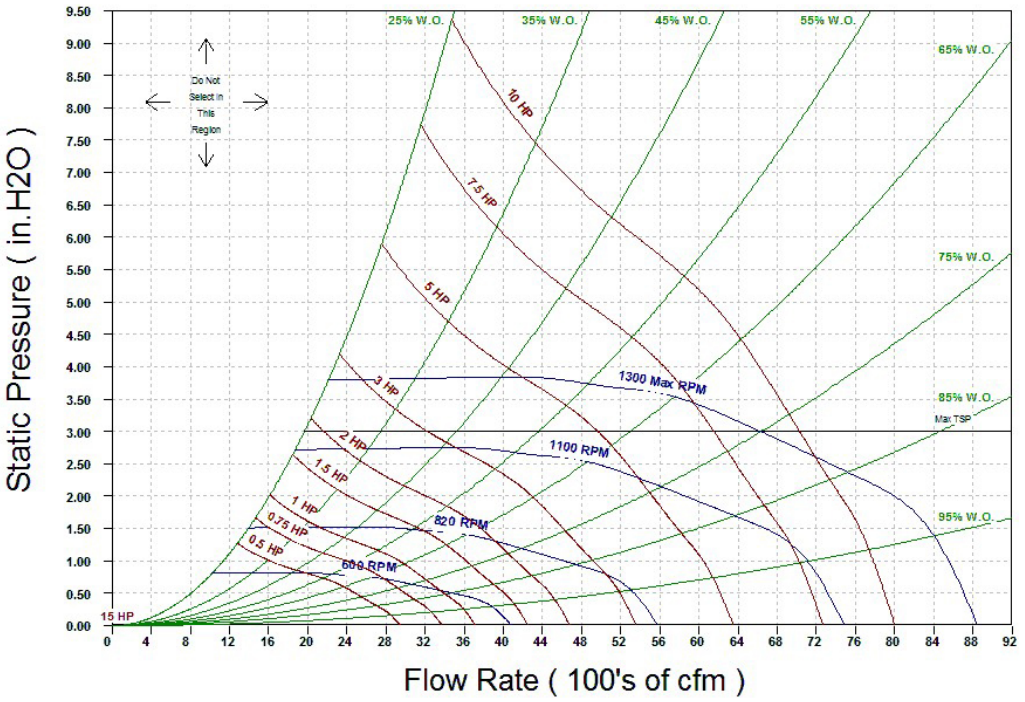


UNIT SIZE 20 (FAN 1010R)

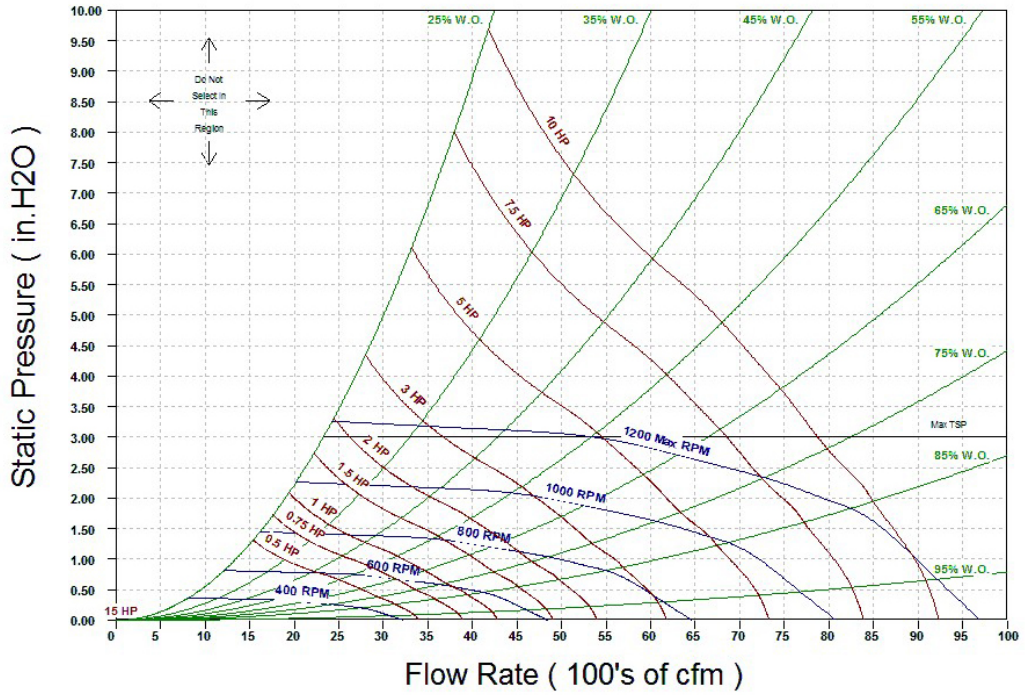


FAN CURVES

UNIT SIZE 30 (FAN 1509R)



UNIT SIZE 40 (FAN 1511R)



DESIGNED FLEXIBILITY

Titus TBL/TBS Belt Drive Blower Coils give maximum flexibility for selection and installation where extreme space restrictions exist. The units are designed with a slant coil and all front access to minimize the space used for installation.

The units are designed to exceed the stringent quality standards of the institutional market, while remaining cost competitive in the light commercial segment of the market.

Titus Belt Drive Blower Coils set the new standards for quality, flexibility, and competitive pricing.

OPTIONAL COMPONENTS

The extensive variety of standard options available on the TBL/TBS units are where you find the versatility to fit any HVAC system designer's needs.

Options include: Mixing boxes with standard low-leak dampers, blow-thru electric heat with or without single point power connection. All electric heat units are listed with ETL as an assembly and carry the cETL label.

High efficiency motors, starters, disconnects and fusing mean easier coordination between mechanical and electrical trades.

Coil options allow for 4 or 6 row cooling coils.

LOWER INSTALLATION COST

All TBL/TBS model blower coils are shipped completely assembled, reducing field installation time and labor. All units are thoroughly inspected and tested prior to shipment, eliminating potential problems at startup. Motor wiring is brought to a junction box and terminated. The junction box is located on the outside of the unit casing, reducing electrical hook-up time.

A wide variety of fan discharge configurations allow for increased flexibility and easier installation on the jobsite, resulting in cost reductions by eliminating expensive elbows, etc.

QUALITY PRODUCT

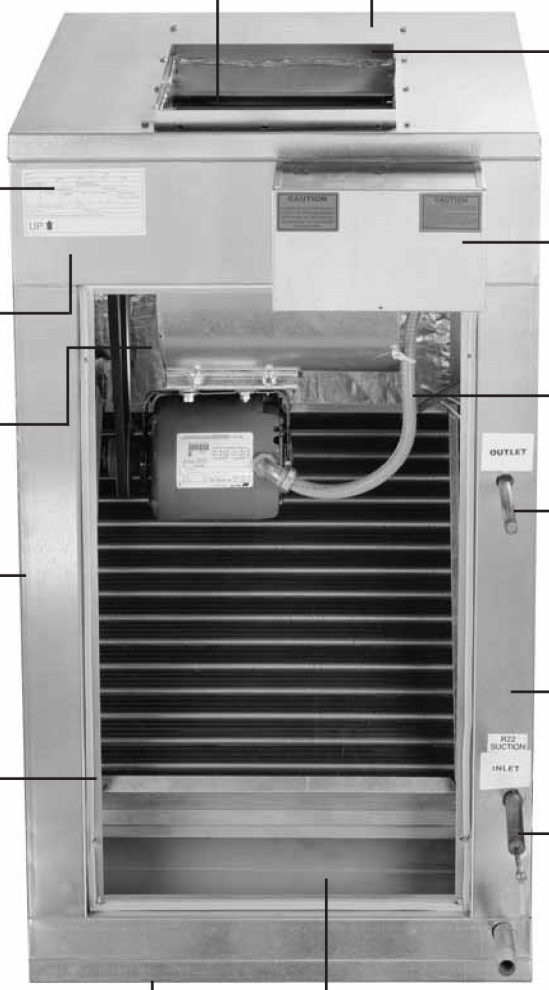
TBL/TBS model blower coils are constructed from 18 gauge galvanized steel. This metal surpasses the ASTM 125 hour salt spray test for corrosion and rust. Insulation is 1 inch thick, 1.6 pound per cubic foot scrim reinforced foil faced insulation, which is glued, pinned and taped for maximum positive adhesion. Insulation complies with UL 181, ASTM-C1071, NFPA 90A and 90B and meets bacteriological standard ASTM-C665 and C1136 for mold, mildew and humidity resistance.

All units, with or without Electric Heat, are cETL listed and labeled. All wiring is in compliance with NEC, assuring safety and quality for the owner.

MODELS - TBL / TBS

TBS SHOWN

Models TBL and TBS blower coils have many standard and optional features which are unique to the industry



Forward curved fan

18 gauge galvanized steel casing withstanding 125 hour salt spray test per ASTM B-117

1" duct collar allows for quick field connection of duct work

Product label including tagging, airflow and electrical information

ETL label (not shown)

NEMA 1 control enclosure houses optional starter, disconnect, fusing, relays, and other electrical options

Scrim reinforced foil faced insulation, glued and pinned in place

Motor wiring in optional conduit

Coil stubouts extend through unit casing front, reducing space required for installation

TBS filter access from top (not shown) reduces space required for installation

Multi-bend construction for optimum strength and rigidity

Full size front access panel reduces space required for installation

Heating and cooling coil stubouts on opposite sides

TBL filter access from front (not shown) reduces space required for installation

Optional stainless steel drain pan

APPLICATION CONSIDERATIONS

Models TBL & TBS Belt Drive Blower Coils offer a wide range of application flexibility, while maintaining a simple, easy to install unit design. These units are intended to provide comfort cooling and heating within a small footprint. They may be applied in many types of building structures including schools, office buildings, hospitals, condominiums, assisted living facilities, apartments or stores. Applications can be constant or variable volume.

There are many applications the TBL & TBS product can be utilized. Some examples are listed below.

Constant volume applications:

- Two-pipe hydronic system for cooling and/or heating
- Two-pipe hydronic cooling system with electric heat
- Four-pipe system with dedicated heating and cooling coils
- Direct Expansion (DX) split systems with hydronic heat
- Direct Expansion (DX) split systems with electric heat

Variable volume applications:

- Two-pipe hydronic system for cooling and/or heating
- Two-pipe hydronic cooling system with electric heat
- Four-pipe system with dedicated heating and cooling coils

ACOUSTICS

Control of noise within both occupied and unoccupied spaces has become increasingly important to designers and building owners/occupants. Proper consideration must be given to placement of indoor air conditioning units, particularly in the occupied space. Inherent flexibility of the fan and coil combination in the vertical configuration allows application in sound-sensitive areas. In such instances, a fan running at a low speed with a high capacity coil normally yields satisfactory results. It also may be desirable to select a larger nominal capacity unit and operate it at a less than nominal airflow for further acoustic benefit.

Three phase motors are recommended for sound sensitive applications to avoid potential single phase motor hum. Unit operation in the stall region of the fan curve is not recommended since it may cause unsatisfactory noise levels and excessive unit vibration.

INSTALLATION

These floor mounted units can be installed with external vibration isolation on a base rail (TBS) or on a return plenum (TBL) at the corner points. This requires flex connections at the corner brackets, ductwork, electrical connections and piping connections. One of the most important and basic IAQ issues is condensate management. The first step to ensure trouble-free operation is proper installation. It is very important that the unit be mounted high enough so that the condensate drain from the unit may be properly trapped. Please refer to the TBL/TBS IOM Manual for specifics on this issue. As with all HVAC systems, these units should be installed according to all applicable ASHRAE standards, SMACNA and local code requirements.

OPERATING LIMITATIONS

Units must not be operated above maximum fan speed or unit airflow as listed in the Fan Performance section of this catalog. Unit operation at greater than maximum fan speed could drastically reduce bearing life and may result in a catastrophic wheel failure. Operating at greater than the maximum allowable airflow in the cooling mode may result in unsatisfactory operation due to moisture carry over from the coil. In addition, it is often not economical to operate a unit at its maximum fan speed due to the greater motor power requirements.

Units with electric heat should not be operated with leaving air temperature greater than 104°F (40°C), to prevent excessive leaving air temperatures and electric heat limit trips. A hydronic (or steam) coil and electric heat should not be operated simultaneously to prevent excessive leaving air temperatures and limit trips. Electric heat units are equipped with a high limit lockout switch that disables the electric heater if the temperature of the hydronic coil is greater than 104°F (40°C).

Water coils must not be operated above a fluid velocity of 8 ft./sec. to reduce the possibility of velocity induced erosion and flow noise. Water coils must not be operated below a fluid velocity of 1 ft./sec. to prevent degraded coil performance caused by laminar flow. These high or low fluid flow rates may not be included in the AHRI coil certification.

TBL

- Low-leak dampers with 2" filters
- Maximum flexibility for selection and installation where extreme space restrictions exist
- Foil faced fiberglass-insulated cabinets, main incoming-power disconnect (non-fused), fusing (main), magnetic contractors, and fan control package with heater interlock contacts
- Blow-thru electric heat with single-point power connection
- Meets all N.E.C. requirements and is cETL listed in compliance with UL/ANSI Std. 1995
- Hot water, chilled water, steam, and direct expansion coils; cold water/hot water changeover available for all models
- Inherent flexibility of the fan and coil combination for sound-sensitive areas
- 800 - 3000 CFM nominal airflows

TBL

MODEL:

TBL

OVERVIEW

Titus bottom return belt drive blower coils offer a wide range of application flexibility, while maintaining a simple, easy to install unit design. These units are intended to provide comfort cooling and heating with a small footprint. They may be applied in many types of building structures including schools, office buildings, hospitals, condominiums, assisted living facilities, apartments or stores. Applications can be constant or variable volume.

OPTIONAL FEATURES INCLUDE:

Construction

» Stainless steel drain pan with 1" MPT galvanized pipe outlet
» External rubber-in-shear or spring type vibration isolators, floor mount
» Fan discharge arrangements
» Discharge plenum w/ double deflection discharge grille
» Access panel with lift and turn fasteners
» Double wall access panel w/lift and turn fasteners
» Return plenum with removable panels (TBL only)
» Base rails with rigging slots factory assembled and installed
» EcoShield 1" insulation

Fan Motor and Drive

» High efficiency motors
» TEFC motors

Coils

» 4 and 6 row chilled water or R410 DX coils
» 1 and 2 row hot water coils

See website for Specifications

» 1 and 2 row hot water or standard steam coils in discharge coil section only
» Hot water coil in preheat or reheat position
» Stainless steel coil casings
» 0.025" tube wall on water and evaporator coils
» Auto air vents on water coils

Filters and Filter Rack

» 2" pleated filter
» Spare throwaway or pleated filters

Electrical

» Motor wiring in conduit
» Motor starter (contactor with overload for three phase; contactor for single phase), factory installed (mounted and wired)
» Door interlocking disconnect switch (non-fused) (with main fusing)
» Hand off auto switch (HOA)
» Main fusing

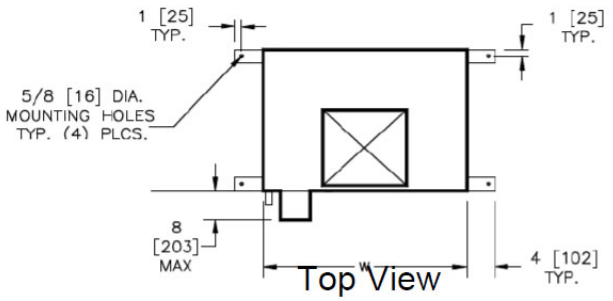
Electric Heat Section

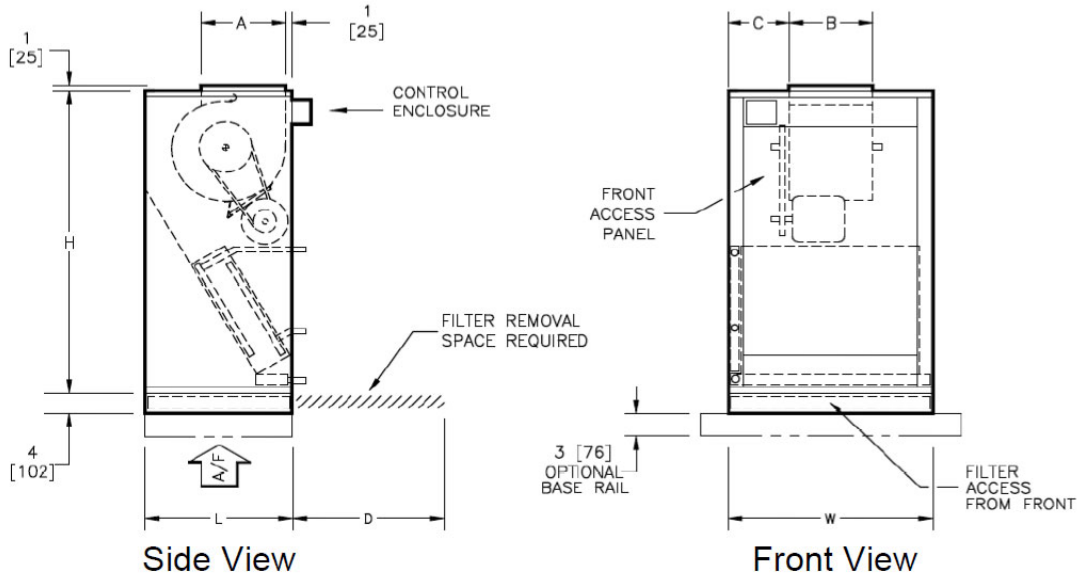
» Factory mounted electric heater with single point power connection, ETL listed as an assembly

TBL UNIT DIMENSIONS / DISCHARGE ARRANGEMENT 2

Notes:

1. All dimensions are inches [millimeters] +/- ¼" [6mm]. Metric values are soft conversions.
2. Motor/drive location may be specified Left or Right Hand. Standard control enclosure location matches motor/drive position.
3. Provide sufficient clearance to access electrical control and comply with all applicable codes and ordinances
4. Maximum total internal coil rows: 6
5. All drawings subject to change without prior notice
6. Left hand unit shown; right hand unit has CW and HW piping connections mirrored
7. Filter assembly runs the full length of the unit size
8. Drawings not for installation purposes



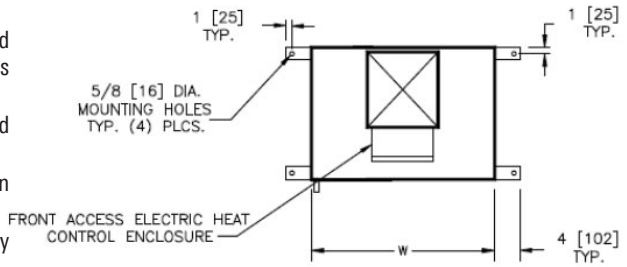


Dimensions									
Unit Size	Filter Size	Qty	H	W	L	A	B	C	D
08	16 x 20 x 2 [406 x 508 x 51]	1	46 [1168]	26 [660]	19 [483]	6 ½ [165]	6 7/8 [175]	9 9/16 [243]	16 [406]
12	20 x 20 x 2 [508 x 508 x 51]	1	46 [1168]	26 [660]	21 [533]	7 ½ [190]	8 ¼ [210]	8 7/8 [225]	20 [508]
16	24 x 24 x 2 [610 x 610 x 51]	1	54 [1372]	29 [737]	25 [635]	7 ½ [190]	10 ¼ [260]	9 3/8 [238]	24 [610]
20	24 x 24 x 2 [610 x 610 x 51]	1	54 [1372]	29 [737]	28 [711]	11 3/8 [289]	13 ¼ [337]	7 7/8 [200]	24 [610]
25	24 x 24 x 2 [610 x 610 x 51]	1 Each	60 [1524]	39 [991]	28 [711]	13 ½ [343]	12 7/8 [327]	13 1/16 [332]	24 [610]
30	12 x 24 x 2 [305 x 610 x 51]	1 Each	60 [1524]	39 [991]	28 [711]	15 ¼ [387]	15 [381]	12 [305]	24 [610]

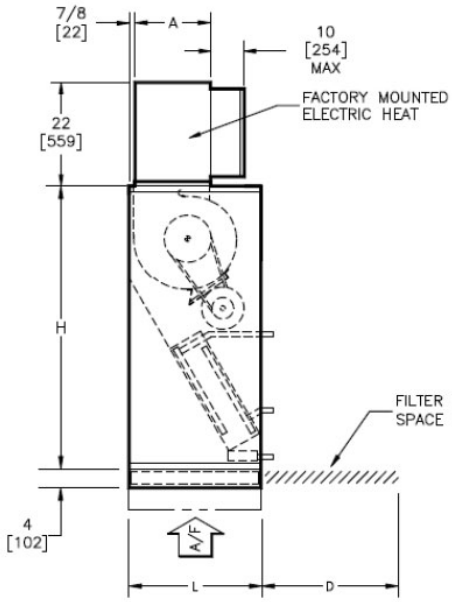
TBL UNIT DIMENSIONS / BLOW-THRU ELECTRIC HEAT

Notes:

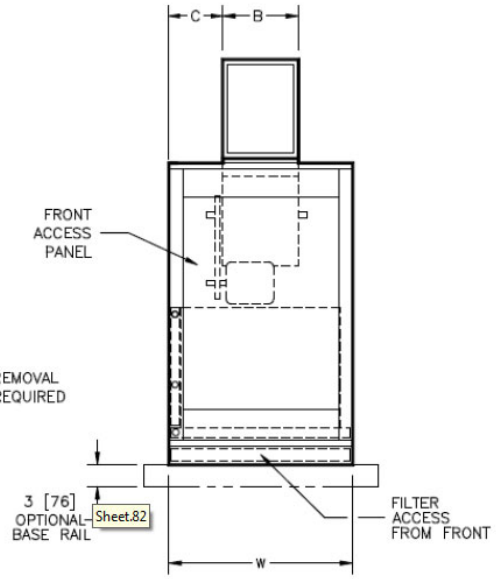
1. All dimensions are inches [millimeters] +/- ¼" [6mm]. Metric values are soft conversions.
2. Left hand unit shown. Motor/drive location may be specified Left or Right Hand. Standard control enclosure location matches motor/drive position
3. Provide sufficient clearance to access electrical controls and comply with all applicable codes and ordinances
4. Optional base rail designed for use with floor mount vibration isolators
5. Blow-thru electric heat may not be combined with supply plenum or discharge section



Top View



Side View



Front View

Dimensions									
Unit Size	Filter Size	Qty	H	W	L	A	B	C	D
08	16 x 20 x 2 [406 x 508 x 51]	1	46 [1168]	26 [660]	19 [483]	8 7/8 [226]	11 7/8 [302]	7 1/16 [180]	16 [406]
12	20 x 20 x 2 [508 x 508 x 51]	1	46 [1168]	26 [660]	21 [533]	8 7/8 [226]	11 7/8 [302]	7 1/16 [180]	20 [508]
16	24 x 24 x 2 [610 x 610 x 51]	1	54 [1372]	29 [737]	25 [635]	10 7/8 [277]	12 [305]	8 ½ [216]	24 [610]
20	24 x 24 x 2 [610 x 610 x 51]	1	54 [1372]	29 [737]	28 [711]	13 7/8 [353]	14 [356]	7 ½ [190]	24 [610]
25	24 x 24 x 2 [610 x 610 x 51]	1 Each	60 [1524]	39 [991]	28 [711]	13 7/8 [353]	16 5/8 [422]	11 1/16 [281]	24 [610]
30	12 x 24 x 2 [305 x 610 x 51]	1 Each	60 [1524]	39 [991]	28 [711]	15 5/8 [397]	16 5/8 [422]	11 1/16 [281]	24 [610]

All dimensions are in inches

TBS

- Low-leak dampers with 2" filters
- Floor-mounted unit with external vibration isolation on a base rail
- Maximum flexibility for selection and installation where extreme space restrictions exist
- Foil faced fiberglass-insulated cabinets, main incoming-power disconnect (non-fused), fusing (main), magnetic contractors, and fan control package with heater interlock contacts
- Blow-thru electric heat with single-point power connection
- Meets all N.E.C. requirements and is cETL listed in compliance with UL/ANSI Std. 1995
- Hot water, chilled water, steam, and direct expansion coils; cold water/hot water changeover available for all models
- Inherent flexibility of the fan and coil combination for sound-sensitive areas
- 800 - 3000 CFM nominal airflows

TBS

See website for Specifications

MODEL:

TBS

OVERVIEW

Titus rear return belt drive blower coils offer a wide range of application flexibility, while maintaining a simple, easy to install unit design. These units are intended to provide comfort cooling and heating with a small footprint. They may be applied in many types of building structures including schools, office buildings, hospitals, condominiums, assisted living facilities, apartments or stores. Applications can be constant or variable volume.

OPTIONAL FEATURES INCLUDE:

Construction

- Stainless steel drain pan with 1" MPT galvanized pipe outlet
- External rubber-in-shear or spring type vibration isolators, floor mount
- Fan discharge arrangements
- Discharge plenum w/ double deflection discharge grille
- Access panel with lift and turn fasteners
- Double wall access panel w/lift and turn fasteners
- EcoShield 1" insulation
- Base rails with rigging slots factory assembled and installed

Fan Motor and Drive

- High efficiency motors
- TEFC motors

Coils

- 4 and 6 row chilled water or DX coils
- 1 and 2 row hot water coils
- 1 and 2 row hot water or standard steam coils in discharge coil section only
- Hot water coil in preheat or reheat position
- Stainless steel coil casings
- 0.025" tube wall on water and evaporator coils
- Auto air vents on water coils

Filters and Filter Rack

- Side access filter rack
- 2" pleated filter
- Spare throwaway or pleated filters

Inlet Damper Section

- Factory assembled and installed
- Heavy gauge galvanized steel formed blade dampers
- Low-leak dampers with extruded vinyl blade seals and flexible metal jamb seals
- Parallel blade operation
- Interconnecting damper linkage

Electrical

- Motor wiring in conduit
- Motor starter (contactor with overload for three phase; contactor for single phase), factory installed (mounted and wired)
- Door interlocking disconnect switch (non-fused) (with main fusing)
- Hand off auto switch (HOA)
- Main fusing

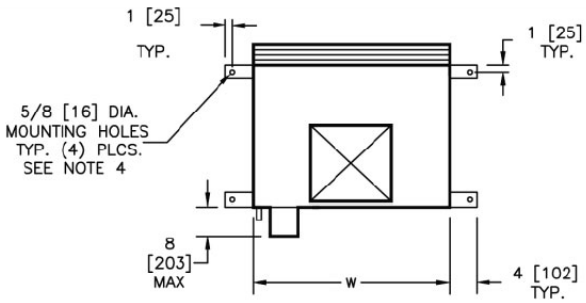
Electric Heat Section

- Factory mounted electric heater with single point power connection, ETL listed as an assembly

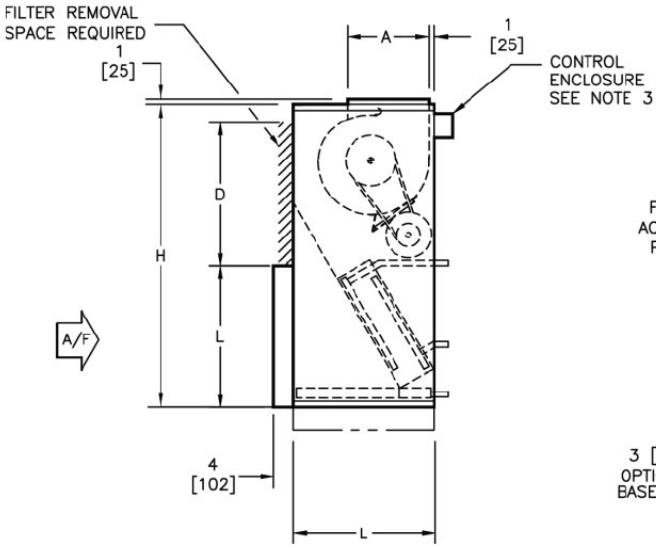
TBS UNIT DIMENSIONS / DISCHARGE ARRANGEMENT 2

Notes:

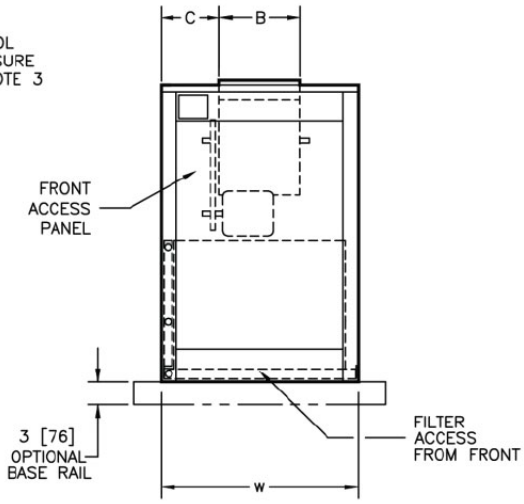
1. All dimensions are inches [millimeters] +/- ¼" [6mm]. Metric values are soft conversions.
2. Motor/drive location may be specified Left or Right Hand. Standard control enclosure location matches motor/drive position.
3. Provide sufficient clearance to access electrical control and comply with all applicable codes and ordinances
4. Maximum total internal coil rows: 6
5. All drawings subject to change without prior notice
6. Left hand unit shown; right hand unit has CW and HW piping connections mirrored
7. Filter assembly runs the full length of the unit size
8. Drawings not for installation purposes



Top View



Side View



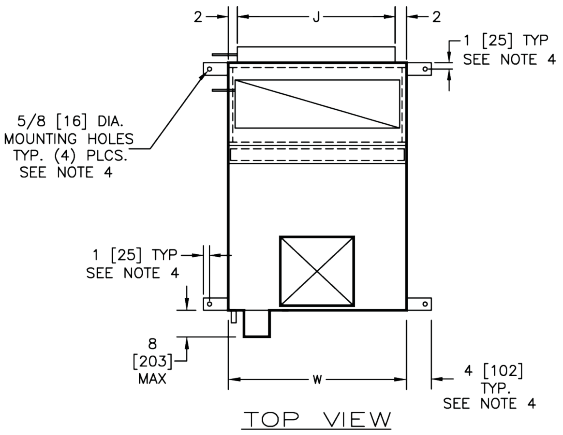
Front View

Dimensions									
Unit Size	Filter Size	Qty	H	W	L	A	B	C	D
08	16 x 20 x 2 [406 x 508 x 51]	1	46 [1168]	26 [660]	19 [483]	6 ½ [165]	6 7/8 [175]	9 9/16 [243]	16 [406]
12	20 x 20 x 2 [508 x 508 x 51]	1	46 [1168]	26 [660]	21 [533]	7 ½ [190]	8 ¼ [210]	8 7/8 [225]	20 [508]
16	24 x 24 x 2 [610 x 610 x 51]	1	54 [1372]	29 [737]	25 [635]	7 ½ [190]	10 ¼ [260]	9 3/8 [238]	24 [610]
20	24 x 24 x 2 [610 x 610 x 51]	1	54 [1372]	29 [737]	28 [711]	11 3/8 [289]	13 ¼ [337]	7 7/8 [200]	24 [610]
25	24 x 24 x 2 [610 x 610 x 51]	1 Each	60 [1524]	39 [991]	28 [711]	16 [406]	12 7/8 [327]	13 1/16 [332]	24 [610]
30	12 x 24 x 2 [305 x 610 x 51]	1 Each	60 [1524]	39 [991]	28 [711]	16 [406]	15 [381]	12 [305]	24 [610]

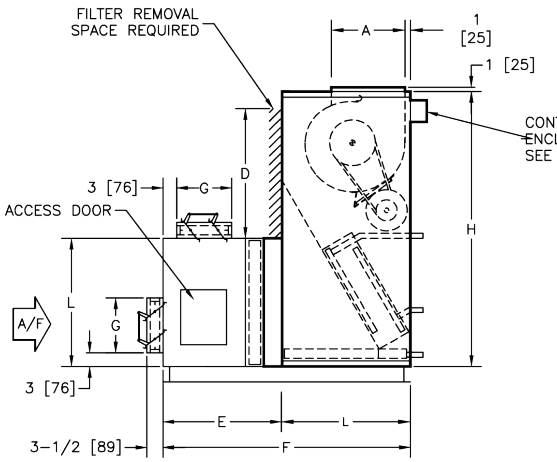
TBS UNIT DIMENSIONS / INLET DAMPER SECTION / DISCHARGE ARRANGEMENT 2

Notes:

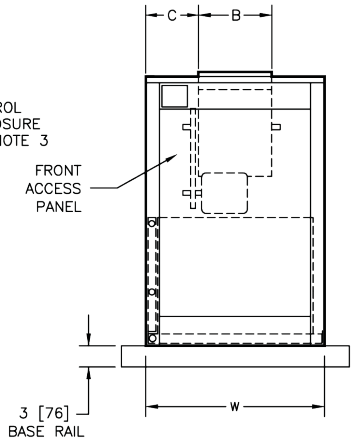
1. All dimensions are inches [millimeters] +/- ¼" [6mm]. Metric values are soft conversions.
2. Left hand unit shown. Right hand unit opposite. Motor/drive location may be specified Left or Right Hand. Standard control enclosure location matches motor/drive position.
3. Provide sufficient clearance to access electrical controls and comply with all applicable codes and ordinances
4. Base rail designed for use with floor mount vibration isolators. See submittal for base rail details.



TOP VIEW



SIDE VIEW



FRONT VIEW

Dimensions									
Unit Size	Filter Size	Qty	H	W	L	A	B	C	D
08	16 x 20 x 2 [406 x 508 x 51]	1	46 [1168]	26 [660]	19 [483]	8 7/8 [226]	11 7/8 [302]	7 1/16 [180]	16 [406]
12	20 x 20 x 2 [508 x 508 x 51]	1	46 [1168]	26 [660]	21 [533]	8 7/8 [226]	11 7/8 [302]	7 1/16 [180]	20 [508]
16	24 x 24 x 2 [610 x 610 x 51]	1	54 [1372]	29 [737]	25 [635]	10 7/8 [277]	12 [305]	8 ½ [216]	24 [610]
20	24 x 24 x 2 [610 x 610 x 51]	1	54 [1372]	29 [737]	28 [711]	13 7/8 [353]	14 [356]	7 ½ [190]	24 [610]
25	24 x 24 x 2 [610 x 610 x 51]	1 Each	60 [1524]	39 [991]	28 [711]	13 7/8 [353]	16 5/8 [422]	11 1/16 [281]	24 [610]
30	12 x 24 x 2 [305 x 610 x 51]	1 Each	60 [1524]	39 [991]	28 [711]	15 5/8 [397]	16 5/8 [422]	11 1/16 [281]	24 [610]

All dimensions are in inches

Coil and Filter Data

COIL FACE AREA AND FILTER DATA

Unit Size	Internal Cooling And Heating Coils	Discharge Section Heating Coil	2" Filters (Quantity) and Size	Filter Face Area
08	2.1 [0.20]	2.1 [0.20]	(1) 16 x 20 x 2 [406 x 508 x 51]	2.2 [0.20]
12	2.8 [0.26]	2.1 [0.20]	(1) 20 x 20 x 2 [508 x 508 x 51]	2.8 [0.26]
16	3.6 [0.33]	3.2 [0.30]	(1) 24 x 24 x 2 [610 x 610 x 51]	4.0 [0.37]
20	4.8 [0.45]	3.2 [0.30]	(1) 24 x 24 x 2 [610 x 610 x 51]	4.0 [0.37]
25	5.7 [0.53]	4.6 [0.43]	(1) 24 x 24 x 2 [610 x 610 x 51] (1) 12 x 24 x 2 [305 x 610 x 51]	6.0 [0.56]
30	6.8 [0.63]	5.7 [0.53]	(1) 24 x 24 x 2 [610 x 610 x 51] (1) 12 x 24 x 2 [305 x 610 x 51]	6.0 [0.56]

Notes:
1. Standard filters are 2" throwaway; optional filters are 2" pleated
2. Filter sizes are nominal and standard size, measured in inches [millimeters]
3. Coil and filter face areas are measured in square feet [square meters]

NOMINAL COIL CONNECTION SIZES

Unit Size	Coil Type											
	Water				Steam				Refrigerant			
	1 Row	2 Row	4 Row	6 Row	1 Row		2 Row		4 Row		6 Row	
					STM.	COND.	STM.	COND.	Liquid	Suction	Liquid	Suction
08	5/8 [16]	5/8 [16]	7/8 [22]	7/8 [22]	1 1/8 [29]	7/8 [22]	1 1/8 [29]	7/8 [22]	5/8 [16]	5/8 [16]	5/8 [16]	5/8 [16]
12	5/8 [16]	5/8 [16]	7/8 [22]	7/8 [22]	1 1/8 [29]	7/8 [22]	1 1/8 [29]	7/8 [22]	5/8 [16]	7/8 [22]	5/8 [16]	7/8 [22]
16	5/8 [16]	5/8 [16]	7/8 [22]	1 1/8 [29]	1 1/8 [29]	7/8 [22]	1 3/8 [35]	1 1/8 [29]	5/8 [16]	7/8 [22]	5/8 [16]	7/8 [22]
20	5/8 [16]	5/8 [16]	7/8 [22]	1 1/8 [29]	1 3/8 [35]	1 1/8 [29]	1 3/8 [35]	1 1/8 [29]	5/8 [16]	7/8 [22]	5/8 [16]	7/8 [22]
25	5/8 [16]	7/8 [22]	1 1/8 [29]	1 3/8 [35]	1 3/8 [35]	1 1/8 [29]	1 5/8 [41]	1 1/8 [29]	5/8 [16]	7/8 [22]	5/8 [16]	1 1/8 [29]
30	7/8 [22]	7/8 [22]	1 1/8 [29]	1 3/8 [35]	1 5/8 [41]	1 1/8 [29]	1 5/8 [41]	1 1/8 [29]	5/8 [16]	1 1/8 [29]	5/8 [16]	1 1/8 [29]

Notes:
1. Water coils are based on Standard GPM Circuiting. Consult Titus for applications requiring special circuiting
2. For other selections, refer to TEAMS
3. Refrigerant coil connection sizes for single circuit coils and may vary with application. Contact Titus for double circuit coils
4. All dimensional data is outside diameter (O.D.), measured in inches [millimeters]

COIL DATA

COILS

Titus manufactures hot water, chilled water, direct expansion (DX), and standard steam coils for specific application with all Model TBL/TBS blower coils. AHRI 410 certified and labeled, and strict on-site inspection before, during, and after installation guarantees the highest quality and performance available.

Standard Features

- Designed, manufactured and tested by Titus
- AHRI 410 certified and labeled
- ½" O.D. seamless copper tubes
- High efficiency aluminum fin surface for optimizing heat transfer, pressure drop and carryover
- Mechanically expanded copper tubes leak tested to a minimum 450 PSIG air pressure under water
- Manual air vent plug on all water coils
- Copper ODM sweat connections
- 450 PSIG working pressure at 200°F
- Evaporator coils are factory sealed and charged with a minimum of 5 PSIG nitrogen or refrigerated dry air
- Steam coils rated at 15 PSIG maximum operating pressure at above 35°F
- 0.016" tube wall thickness (0.025" on steam)

Optional Features

- Stainless steel coil casings
- Automatic air vents on water coils
- Elevated working pressure ratings
- Heat pump compatible cooling coils
- Double circuit DX coils (intertwined with 50-50 split)
- 0.025" tube wall thickness

COMPONENT STATIC PRESSURE LOSS – INCHES W.G.

Unit Size	Nominal CFM	Cabinet	Filter (2" T/A)	Coil						Inlet Damper Section	Electric Heat Section
				Internal				External			
				1 Row	2 Row	4 Row	6 Row	1 Row	2 Row		
08	800	0.09	0.25	0.05	0.10	0.31	0.46	0.05	0.10	0.04	0.05
12	1200	0.09	0.25	0.06	0.12	0.37	0.55	0.10	0.19	0.06	0.05
16	1600	0.10	0.25	0.06	0.12	0.38	0.58	0.08	0.15	0.09	0.05
20	2000	0.11	0.25	0.06	0.11	0.35	0.52	0.11	0.22	0.05	0.05
25	2500	0.12	0.25	0.06	0.12	0.38	0.57	0.09	0.17	0.06	0.05
30	3000	0.14	0.25	0.06	0.12	0.38	0.57	0.08	0.16	0.08	0.05

Notes:

1. All static pressures are at nominal CFM
2. Coil static pressure for standard coil, 10FPI at 80/67 EAT and 45° EWT with 10° rise
3. For 12FPI, refer to TEAMS
4. Filter static pressure based on 50% loaded filter
5. If pleated filters are used in lieu of throwaway, the filter static pressure loss is 0.35

Electric Heat

Standard Features

- Galvanized steel casing
- Flanged construction for direct unit mounting, in blow-thru configuration
- Listed for zero clearance installation
- Meets National Electrical Code requirements
- Ni-Chrome wire in ceramic insulators
- Stainless steel element terminals and hardware
- Element support brackets on maximum 3 ½" centers
- Solid cover with continuous full height hinge
- Overtemperature protection
- All internal wiring rated for 105°C minimum
- Airflow switch
- Incoming line power distribution block
- ETL Listed in compliance with UL/ANSI Standard 1995
- Single point power connection
- Heater factory mounted to unit with ETL listing as an assembly

Optional Features

- Door interlocking disconnect switch
- Fusing (main) (per stage)
- Magnetic contactors wired for disconnecting operation
- Fan control package with heater interlock contacts (required for single point power connection)

Heater AMP Calculation	
Voltage	AMPs per kW
115/1	8.70
208/1	4.81
230/1	4.35
277/1	3.61
208/3	2.78
230/3	2.51
460/3	1.26
575/3	1.00

Electrical Calculations Information

1. Contact Titus for MCA and/or MOP calculations
2. Non-Fused Door Interlock Disconnect Switch shall be sized according to MCA
3. Fused Door Interlock Disconnect Switch and Main Fusing shall be sized according to MOP

Unit Voltage And Phase			Electric Heat KW Limits											
			Unit Size											
			08		12		16		20		25		30	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Single Phase	115	kW	3	5	3	5	3	5	4	5				
		AMPs	26.1	43.5	26.1	43.5	26.1	43.5	34.8	43.5				
	208	kW	3	9	3	9	3	9	4	9	6	9	6	9
		AMPs	14.4	43.3	14.4	43.3	14.4	43.3	19.2	43.3	28.8	43.3	28.8	43.3
	230	kW	3	11	3	11	3	11	4	11	6	11	6	11
		AMPs	13.0	47.8	13.0	47.8	13.0	47.8	17.4	47.8	26.1	47.8	26.1	47.8
	277	kW	3	13	3	13	3	13	4	13	6	13	6	13
		AMPs	10.8	46.9	10.8	46.9	10.8	46.9	14.4	46.9	21.7	46.9	21.7	46.9
Three Phase	208	kW	3	13	3	16	3	16	4	16	4	16	4	16
		AMPs	8.3	36.1	8.3	44.4	8.3	44.4	11.1	44.4	11.1	44.4	11.1	44.4
	230	kW	3	13	3	18	3	18	4	18	4	18	4	18
		AMPs	7.5	32.6	7.5	45.2	7.5	45.2	10.0	45.2	10.0	45.2	10.0	45.2
	460	kW	3	13	3	20	3	20	4	26	4	26	4	26
		AMPs	3.8	16.3	3.8	25.1	3.8	25.1	5.0	32.6	5.0	32.6	5.0	32.6
	575	kW	3	13	3	20	3	20	4	26	4	26	4	26
		AMPs	3.0	13.1	3.0	20.1	3.0	20.1	4.0	26.1	4.0	26.1	4.0	26.1

Notes:

1. Electric heat sections may be shipped separate for field installation to unit
2. Factory certified submittals available upon request
3. Standard heater kW limits are maximum per unit size and voltage
4. Heater should be sized for a maximum leaving air temperature of 104°F

ELECTRIC DATA

MOTOR ELECTRICAL DATA

Horsepower	Maximum Motor Amperage							
	Voltage							
	115/1	208/1	230/1	277/1	208/3	230/3	460/3	575/3
1/3	6.3	3.5	3.2	2.6	1.7	1.5	0.8	-
1/2	7.8	4.3	3.9	3.6	2.2	2.1	1.1	0.9
3/4	10.6	5.4	5.3	5.0	3.2	3.0	1.5	1.2
1	15.0	8.3	7.5	5.5	4.0	3.6	1.8	1.4
1 1/2	-	-	-	-	5.3	5.0	2.5	1.9
2	-	-	-	-	7.0	6.4	3.2	2.5
3	-	-	-	-	9.1	9.0	4.5	3.2

Notes:
1. Actual motor nameplate AMPs may vary, but will not exceed values shown
2. Consult Titus for applications requiring special motors

UNIT WEIGHT DATA

Component							
		08	12	16	20	25	30
Base Unit		125 [57]	131 [60]	160 [73]	167 [76]	231 [105]	236 [107]
Damper Section		42 [19]	53 [24]	59 [27]	73 [33]	91 [41]	91 [41]
Blow-thru Electric Heater		42 [19]	42 [19]	42 [19]	50 [23]	55 [25]	55 [25]
Discharge Coil Section		35 [16]	37 [17]	49 [22]	53 [24]	76 [35]	80 [36]
Supply Plenum		22 [10]	26 [12]	35 [16]	38 [17]	76 [35]	76 [35]
Return Plenum (TBL)		29 [13]	30 [14]	33 [15]	35 [16]	44 [20]	44 [20]
Coil Rows	1 Row - Dry	12 [5]	14 [6]	17 [8]	21 [10]	23 [10]	27 [12]
	1 Row - Wet	14 [6]	17 [8]	21 [10]	26 [12]	28 [13]	34 [15]
	2 Row - Dry	17 [8]	21 [10]	26 [12]	32 [15]	37 [17]	43 [20]
	2 Row - Wet	21 [10]	27 [12]	33 [15]	42 [19]	48 [22]	56 [25]
	4 Row - Dry	29 [13]	36 [16]	45 [20]	57 [26]	65 [30]	76 [35]
	4 Row - Wet	37 [17]	47 [21]	58 [26]	75 [34]	86 [39]	101 [46]
	6 Row - Dry	40 [18]	51 [23]	64 [29]	81 [37]	93 [42]	109 [50]
	6 Row - Wet	52 [24]	66 [30]	84 [38]	109 [50]	124 [56]	146 [66]

Notes:
1. Unit weight data is shipping weight in pounds [kilograms]
2. Discharge section includes a 2 row coil

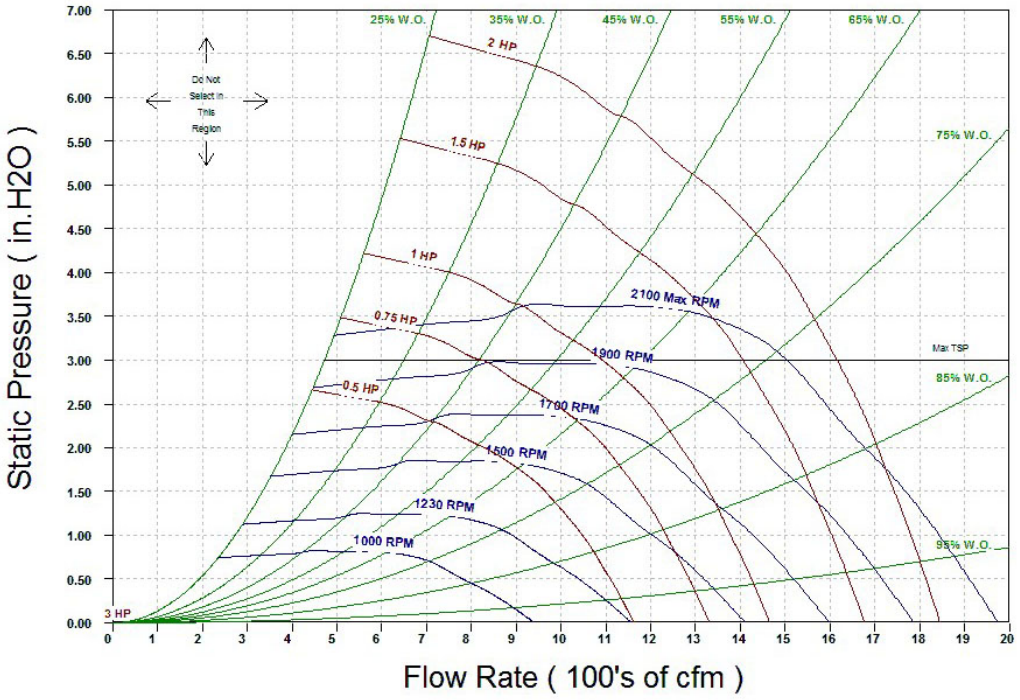
MOTOR/DRIVE WEIGHT DATA

Type	Motor HP						
	1/3	1/2	3/4	1	1 1/2	2	3
Single Phase	37 [17]	37 [17]	45 [20]	47 [21]	-	-	-
Three Phase	34 [15]	34 [15]	40 [18]	43 [20]	46 [21]	53 [24]	81 [37]

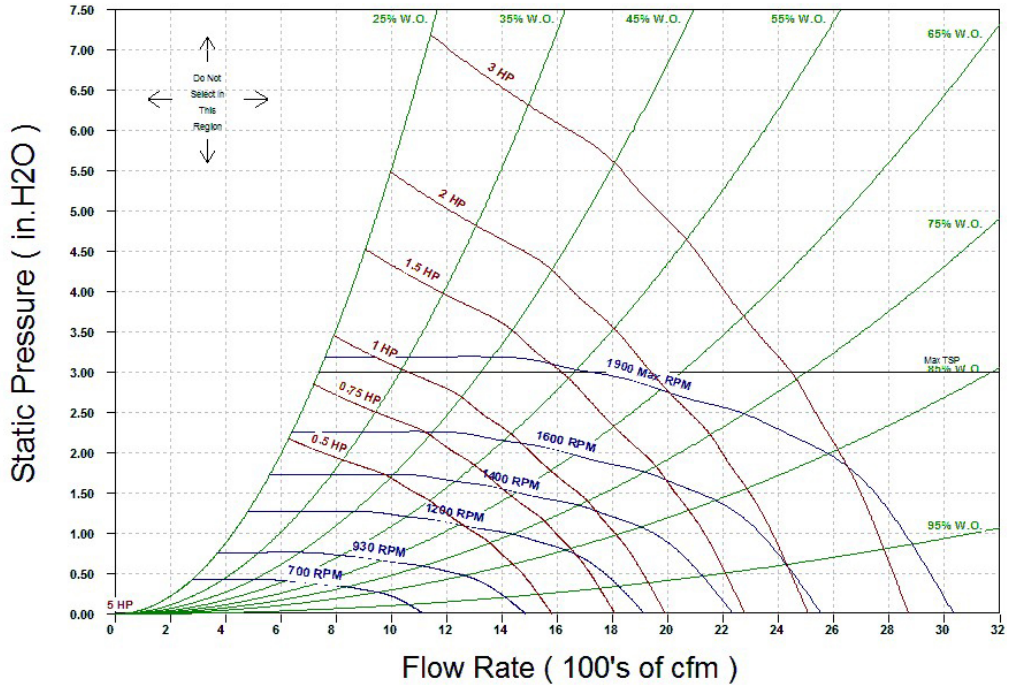
Notes:
1. Includes motor, pulleys, belts, and motor base
2. Motor/drive weight data is shipping weight in pounds [kilograms]

Fan Performance Curves

UNIT SIZE 08 (FAN 0904R)

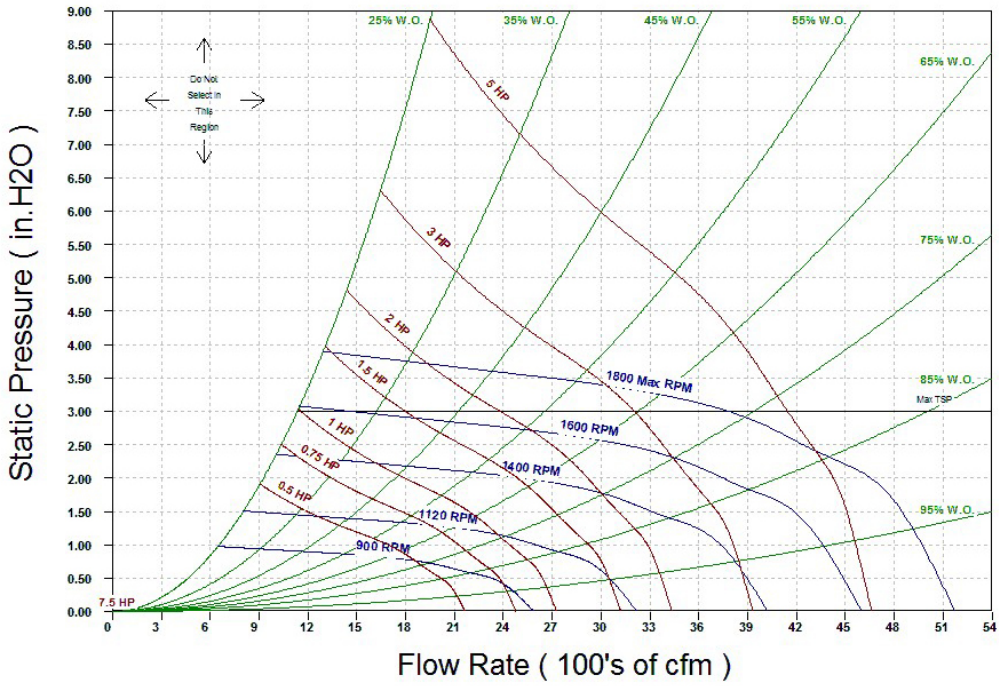


UNIT SIZE 12 (FAN 0906R)

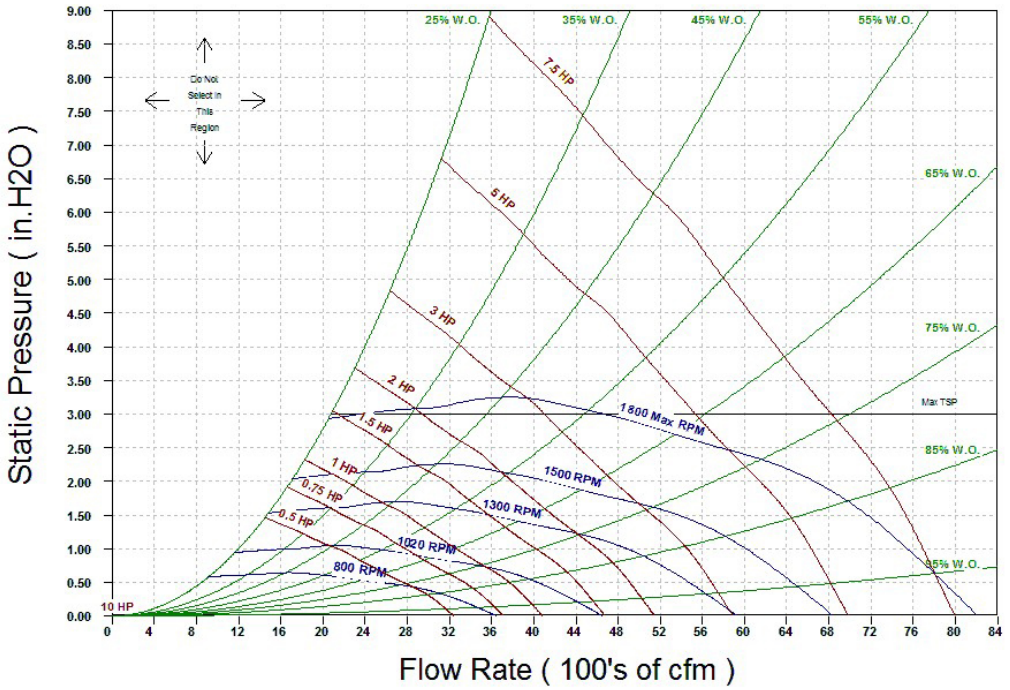


FAN CURVES

UNIT SIZE 16 (FAN 1008R)

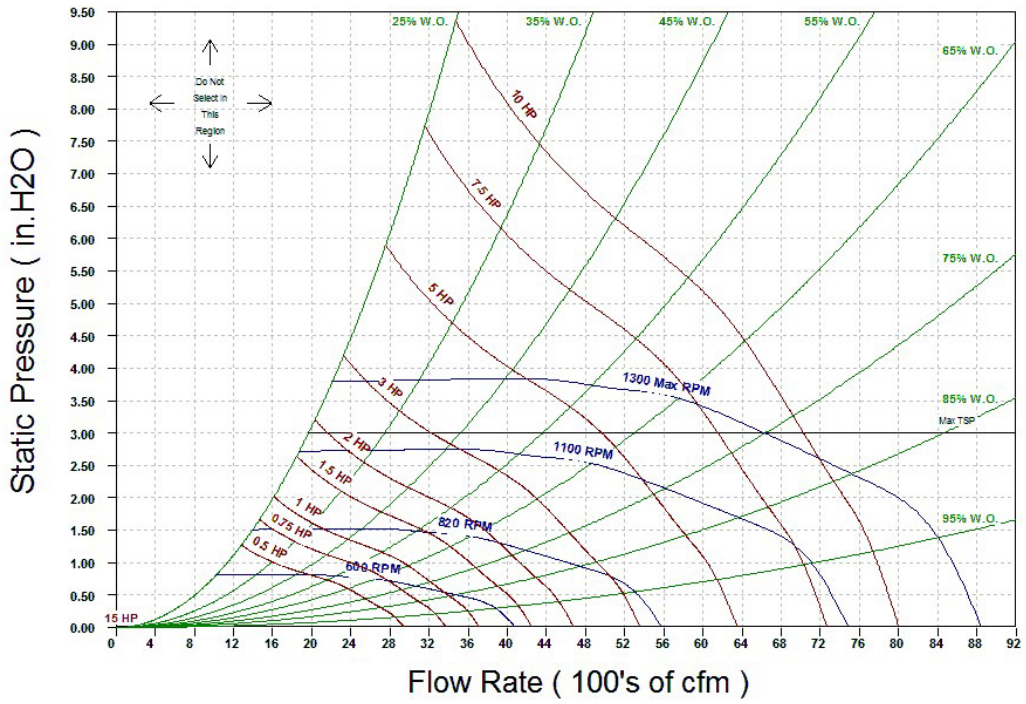


UNIT SIZE 20 (FAN 1010R)



FAN CURVES

UNIT SIZE 25 (FAN 1509R)



UNIT SIZE 30 (FAN 1511R)