Redefine your comfort zone. ™ | www.titus-hvac.com

Titus
Redefine your comfort zone.™

fan powered terminals

seismic certified | open ceiling | energy solutions

Table of Contents

FAN POWERED TERMINALS

OVERVIEW

SERIES FAN POWERED TERMINALS

LOW PROFILE SERIES TERMINALS

PARALLEL FAN POWERED TERMINAL

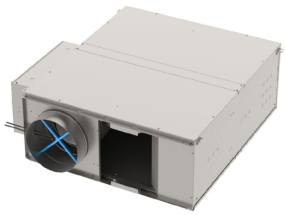
LOW PROFILE PARALLEL TERMINAL

ELECTRIC COILS

ICONS

series fan powered terminals

PAGES: N11-N56



TFS

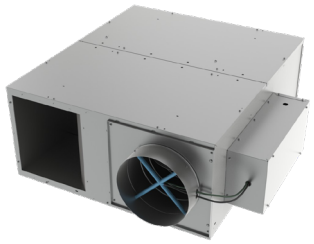
CONSTANT VOLUME TERMINAL

- Quiet, efficient operation
- Pressure independent airflow control
- 150-3800 cfm flow range

TFS-F Fantom

CONSTANT VOLUME TERMINAL

- Ultra quiet FAST™ attentuator system
- Pressure independent airflow control
- 350-2400 cfm flow range



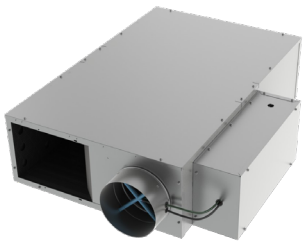
TQS

CONSTANT VOLUME TERMINAL

- Available with UltraLoc™ or with IAQ inlet
- Pressure independent airflow control
- 300-3200 cfm flow range

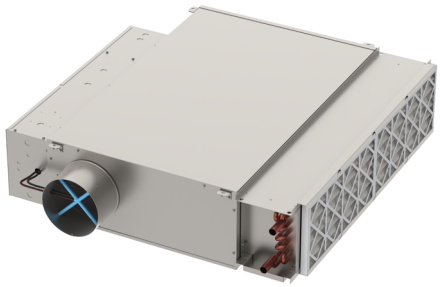
low profile series terminals

PAGES: N57-N93



FLS

CONSTANT VOLUME TERMINAL



DLSC

SENSIBLE COOLING TERMINAL

- Four low profile sizes for application on shallow ceiling plenums
- One standard height for high flow applications
- Pressure independent airflow control

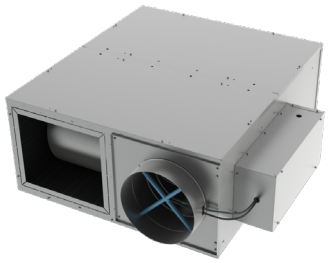
parallel fan powered terminals

PAGES: N94-N114

PFB

VARIABLE VOLUME TERMINAL

- Quiet, efficient operation
- Pressure independent airflow control
- 175-2325 cfm fan flow range



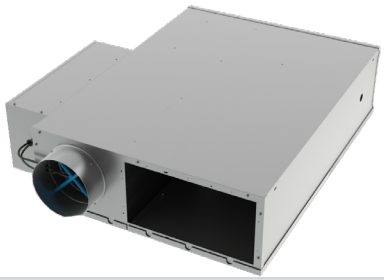
TQP

VARIABLE VOLUME TERMINAL

- Quiet, efficient operation
- Pressure independent airflow control
- 300-2000 cfm fan flow range

low profile parallel terminals

PAGES: N115-N123



FLP

VARIABLE VOLUME TERMINAL

- 10 ½" overall unit height
- Pressure independent airflow control
- 200-900 cfm flow range

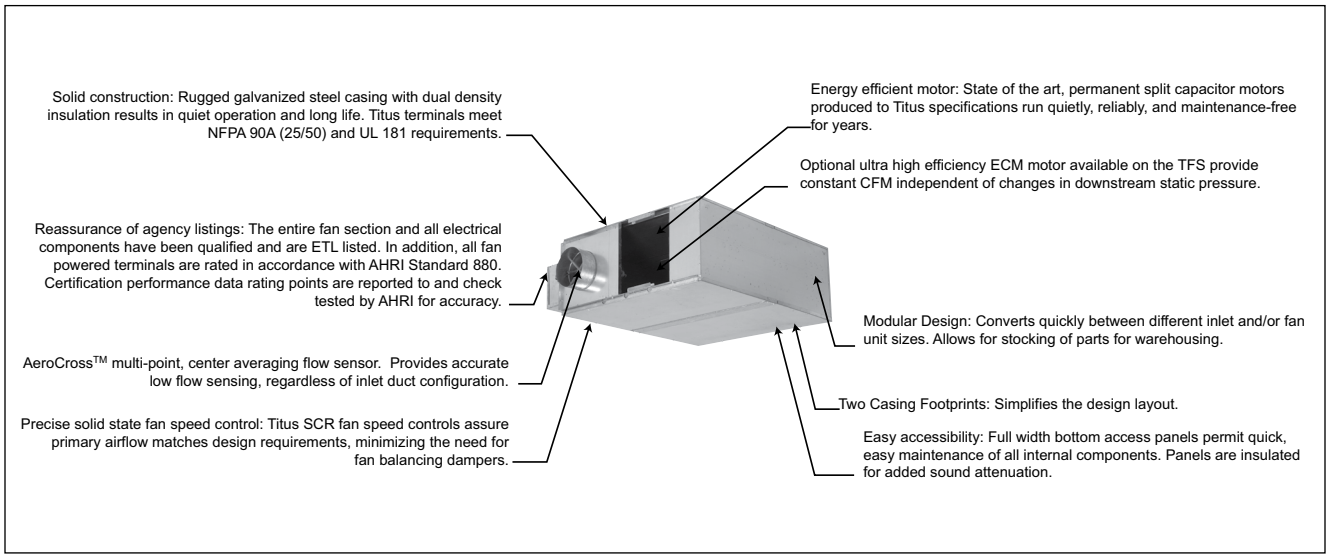
LEADING THE INDUSTRY: TITUS FAN POWERED TERMINALS

Titus continues to lead the industry with the broadest line of fan powered terminals available today. Whether your application requires series or parallel flow, Titus fan powered terminals outperform and outlast other industry offerings.

Titus' line of fan powered terminals include the series flow TFS for quiet applications and the parallel flow TQP for standard plenum height designs.

In those applications with exceptionally limited plenum space, the Titus FLS and FLP low profile units provide the widest airflow range available in the industry.

Titus fan terminals are available from 150 to 3800 cfm, providing the utmost in flexibility for the system designer. All Titus fan terminals are designed for maximum performance with matched motor/blower combinations, rugged construction, and energy-efficient fan motors produced to our specifications for reliable operation. Additionally, all Titus fan powered terminals are agency listed, providing the assurance that Titus units meet today's safety standards. For high performance, quality and dependability, specify the Titus fan powered terminal!



Additionally, all Titus fan powered terminals are complete with these time/cost saving, field-friendly features:

- Titus reduces field balancing and start-up labor by taking extra steps to assure consistent quality and superior performance
- Maximum and minimum primary air quantities are factory set when controls are supplied by Titus
- Factory set pneumatic electric switches
- Fan motors and heaters are energized and checked for amperage
- Dielectric tests are performed on each terminal unit after assembly
- Quality audits are completed on each component
- Each terminal is run tested at the factory before shipment
- Select Titus fan powered terminals for improved system design
- Provide perimeter heating and cooling without reheat
- Lower operating costs as well as lower first cost
- All-metal control enclosure to protect controls in field and shipping
- Retrofit tight spaces with ease, using low-profile configurations

CHARACTERISTICS OF PARALLEL AND SERIES FLOW FAN POWERED TERMINALS

Select from two basic types of fan powered terminals:

- Parallel Flow (Variable Volume)
- Series Flow (Constant Volume)

GENERAL

Fan powered variable air volume (VAV) terminals are a popular choice for heating and cooling perimeter zones. In addition to the inherent VAV economies, fan powered terminals make use of the "free" heat that collects in the ceiling plenum after being emitted by lighting, people, and other equipment. Reasonable first cost, capacity for improved air motion, and low operating costs are additional reasons for the popularity of fan powered VAV terminals.

The table, "Summary of Fan Powered Terminal Characteristics" highlights both parallel and series fan terminals.

APPLICATION

Either parallel or series flow fan powered terminals can be installed in the ceiling plenum. Each type takes its return air from the ceiling plenum or else has its induction port connected to a duct from the occupied space. Each contains a VAV damper to modulate primary air, plus a fan-and-motor assembly.

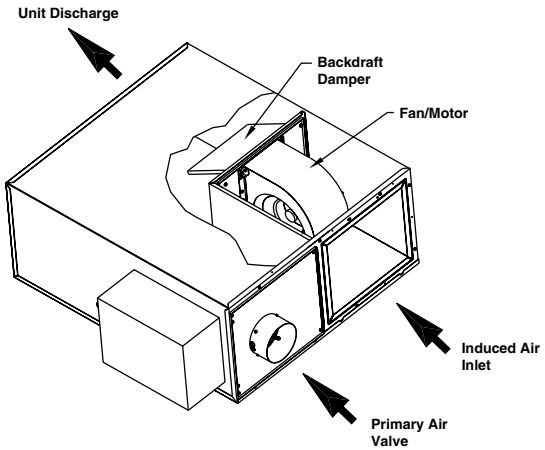
The basic difference in configuration of these terminals is shown in the figures, "Parallel Flow, Fan Powered Terminal" and "Series Flow, Fan Powered Terminal." In a parallel flow terminal, the fan is outside the primary airstream and runs intermittently, that is, when the primary air is off. In a series flow terminal, the fan is in the primary airstream and runs constantly when the zone is occupied.

While both types of fan powered terminals provide VAV energy savings at the central fan, they differ from each other in their inlet static pressure requirements.

SUMMARY OF FAN POWERED TERMINAL CHARACTERISTICS

FUNCTION	PARALLEL FAN POWERED TERMINALS	SERIES FAN POWERED TERMINALS
	Variable Volume Fan Powered VAV System	Constant Volume Fan Powered VAV System
Fan Operation	Intermittent. Runs only during heating and low cooling loads, or on night cycle.	Continuous. Runs during heating and cooling and on night cycle.
cfm delivery to the occupied space	Variable during mid to high cooling loads, or night cycle. Constant during heating and low cooling periods.	Constant. From fan and air handler.
Discharge air temperature	Constant during mid to high cooling loads. All air is from central fan. Variable during heating and low cooling loads. Supplemental heat raises temperature in stages.	Variable. Primary and plenum air mix in varying proportions during cooling. Supplemental heat raises temperature in stages.
Fan sizing	For design heating load (typically 60% of cooling) at reduced downstream static pressure due to reduced airflow.	For design cooling cfm (typically 100% of cooling) at medium downstream static pressure.
Minimum primary air inlet static pressure	Higher (0.4 to 0.7 inch wg) to overcome damper, downstream duct, and diffuser losses.	Lower (0.1 to 0.4 inch wg) to overcome damper pressure loss only.
Fan control	From thermostat signal. No central fan interlock required.	Interlock with central system fan to prevent over pressurizing.
Terminal fan	Cycles while in occupied and unoccupied heating modes.	Runs continuously during occupied mode, cycles during unoccupied.
Central fan	Static pressure to overcome damper, duct, and diffuser losses. Requires higher horsepower.	Static pressure to overcome damper pressure loss only. Requires lower horsepower.
Acoustics	Fan off during mid to high cooling. Similar to non-fan terminal. During heating and low cooling, fan cycling may be audible.	Fan operation and discharge sound are continuous during both heating and cooling.

Parallel Flow, Fan Powered Terminal



Parallel flow terminals, like non-fan terminals, require enough inlet static pressure to force the air through the primary air damper, casing, downstream ductwork, and diffusers. Typically, the resistance is 0.2 inch wg. for the damper and 0.3 inch wg. for ductwork and diffusers, or a total of 0.5 inch wg.

In series flow terminals the fan boosts the air through the discharge duct and diffusers, so the inlet static pressure must only overcome losses through the primary air damper. As a result, the central fan and duct system can be designed for less inlet static pressure, typically 0.1 to 0.2 inch wg.

PARALLEL FLOW TERMINALS

Parallel flow or variable volume fan powered terminals operate in two distinct modes:

1. variable volume, constant temperature when handling high cooling loads;
2. constant volume, variable temperature when heating or handling light cooling loads

The figure, "Parallel Flow Operation" illustrates the operating sequence of the parallel flow terminal.

During full cooling, the controls open the primary air damper for full airflow while the fan is off. As the cooling load decreases, less primary air is delivered to the zone. During this phase the primary air section acts like a nonfan terminal.

As cooling demand decreases still further, the fan starts. This boosts air delivery to the zone by inducing warm plenum air into the colder primary air. The total air volume delivered to the zone is now the constant volume provided by the fan plus the primary inlet. The primary air damper may be set to some minimum position or else fully closed. The delivered air temperature approaches that of the plenum, taking advantage of heat captured in the plenum from lights, occupants, and equipment.

As the zone temperature drops further, the thermostat automatically energizes supplemental electric or hot water heating coils (optional equipment on the terminal). The discharge air temperature increases as heat is added. A call for cooling reverses the sequence.

SERIES FLOW TERMINALS

Designers choose series flow terminals for their characteristics of constant air delivery and temperature blending. Nevertheless, these terminals maintain the VAV energy savings at the central fan.

Series flow or constant volume terminals are often selected for their acoustical qualities. The sound level is nearly constant as the fan runs continuously (with parallel flow terminals, on-off fan operation can cause noticeable changes in sound levels in the occupied space). Low temperature and ice storage applications capitalize on the temperature blending characteristic of series flow terminals. Models with low temperature liner mix cold supply air with warm plenum air to deliver the required air temperature to the zone. The low supply air temperature permits downsizing the central air handling system, branch ducts, and primary air valve.

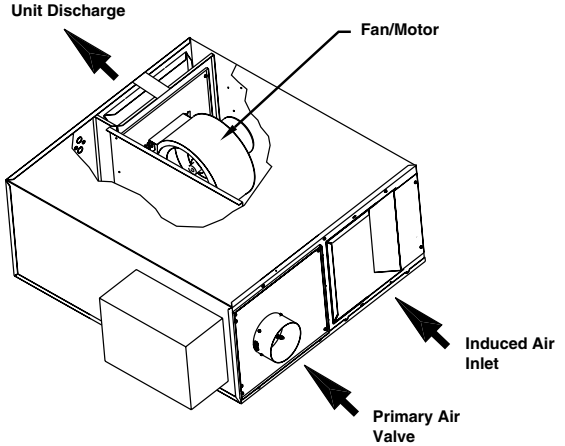
Series flow terminals are also selected where it is desirable to maintain a constant cfm, regardless of load. Such areas include lobbies, hallways, restrooms, atriums, and conference rooms.

The figure, "Series Flow Operation" shows the operating sequence of the series flow terminal. The terminal fan starts whenever the zone is occupied. It delivers design cfm at all times. Pressure independent controls modulate the primary air damper to maintain the volume called for by the thermostat, regardless of changes in inlet static pressure.

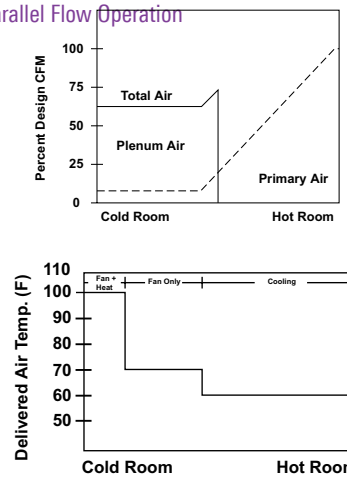
As the cooling load decreases, the controls throttle the primary air. The terminal fan makes up the difference by taking more return air from the plenum.

This causes the air temperature to vary with the load. At low cooling loads, the primary air damper may close or go to a minimum ventilation setting. As the zone temperature decreases, the zone thermostat energizes stages of optional supplemental heat. The sequence reverses when the load is increased. CAUTION: The series flow fan must be adjusted to handle the maximum primary air volume. If the primary air exceeds the fan cfm, it will spill into the return air plenum and waste energy. The SCR fan speed control provides this adjustment. The minimum voltage stop should be set at 50 percent of rated voltage.

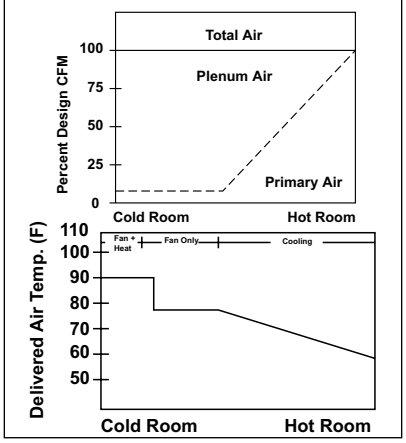
Series Flow, Fan Powered Terminal



Parallel Flow Operation



Series Flow Operation



ACOUSTICS

Series flow terminals may produce a slightly higher overall sound level in the occupied space than do parallel flow terminals. Both the primary air damper and the terminal fan act as sound sources; each generates both discharge (airborne) and radiated sound. Usually, it is the radiated sound that predominates in a room.

Radiated fan sound differs between types of terminals because of different air volume requirements. Series flow terminal fans must be sized to deliver design cooling volume, while parallel flow terminal fans can be downsized to deliver a smaller volume, generally 50 to 65 percent of design cooling cfm. As a result, parallel flow terminals normally can have smaller fans with lower sound levels.

Room noise arising from parallel flow terminals may change with airflow. The intermittent fan operation causes a change in radiated sound as the fan motor starts and stops. This change may be more discernible than a constant sound, even if the constant sound is at a higher level.

SYSTEM CONSIDERATIONS

Series terminal fans should be interlocked to be energized ahead of the central fan to prevent backflow of primary air into the ceiling plenum and to prevent backward rotation of the terminal fan.

The interlock can be electrical, by means of an auxiliary contact in the central fan starter for line voltage or a 24 VAC loop for analog electronic controls; pneumatic, using a PE switch; or direct digital, with coordinated start times of terminals and central fans on a communicating digital network.

ENERGY CONSUMPTION

An energy consumption analysis should include terminals as well as the central equipment. The energy used by the terminal fan is a function of the operating hours and fan loading. These will vary by terminal type — parallel flow (variable volume) or series flow (constant volume).

Series flow terminal fans run during all occupied, and some unoccupied periods, ranging from 3,000 to 4,000 hours annually. Parallel flow terminal fans run during periods of heating and low-load cooling with operating times ranging from 500 to 2,000 hours annually, depending upon the climate and other factors.

Series flow terminal fans are selected to deliver design cooling cfm, while parallel flow fans are selected to deliver design heating cfm. Typically, this ranges from 50 to 65 percent of cooling design cfm.

For example, a series flow terminal might be selected for 1,000 cfm. A parallel flow terminal fan selected for the same duct system might be selected for 60 percent of this airflow or 600 cfm. Note that the lower airflow requirements will also result in reduced downstream static pressure, falling in this case from 0.55 inch down to 0.20 inch wg.

With fewer hours of operation and lower airflow requirements, a parallel flow terminal consumes less energy than a series flow terminal. Series flow fan powered terminals, however, reduce the pressure a central air handler must operate under.

With parallel flow fan terminals, the central fan must overcome the terminal damper, downstream duct work, and the diffuser. With series flow fan terminals, the central fan only needs to overcome the terminal damper. The terminal fan addresses the downstream duct work and diffuser.

A comparison between the two types of fan powered VAV systems, the energy savings at the central fan must be credited to the series flow fan terminal.

The table, Fan Powered Terminal Operating Costs is a comparison of a series flow and parallel flow system. This comparison is typical of the "standard" terminals on the market. By using quieter, more efficient series flow terminals such as the Titus DTFS, the system could be designed with larger zones and the same NC. This would lower first costs and narrow (or possibly eliminate) the cost differential between the two systems.

AVAILABLE CONTROLS TYPES

Titus offers three types of available controls, they are as follows.

- Pneumatic, Pressure Independent Models: PTFS, PTQS, PFLS, PTQP, and PFLP
- Analog Electronic, Pressure Independent Models: ATFS, ATQS, AFLS, ATQP, and AFLP
- Digital Electronic, Pressure Independent Models: DTFS, DTQS, DFLS, DLSC, DTQP, and DFLP

A schematic for each type of control appears on the next page.

Fan Powered Terminal Operating Costs		
Central Fan	Series Flow	Parallel Flow
Fan cfm	30,000	30,000
Annual operating hours	4,000	4,000
Static Pressure (wg.)	2.6	3.0
kW demand	10.7	12.5
kWh consumption	42,900	50,000
Elec. cost/kWh	$0.07	$0.07
Monthly demand chg/kW	$12.00	$12.00
Elec. consump. cost	$2,996.00	$3,500.00
Demand charge	$1,540.80	$1,800.00
Total fan operating cost	$4,536.80	$5,300.00

Terminals	Series Flow	Parallel Flow
Number of zones	30	30
Fan cfm/zone	1,000	2,000
Annual operating hours	4,000	2,000
Watts demand/ terminal	424	245
Total kW demand	12.72	7.35
Total kWh comsunption	50,880	14,770
Elec. cost/kW	$0.07	$0.07
Monthly demand chg/kW	$12.00	$12.00
Elec. consump. cost	$3,561.60	$1,029.00
Demand charge	$1,831.68	$1,058.40
Total terminal operating cost	$5,393.28	$2,087.40
Total system operating cost	$9,930.00	$7,387.40

ECM MOTOR TECHNOLOGY - THE ULTIMATE IN ENERGY SAVINGS!

A substantial energy savings can be realized when using an ECM motor in a series flow fan terminal compared to using conventional induction motors. The ECM motor is an ultra-high efficiency, brushless DC motor with a unique microprocessor based motor controller. Motor efficiencies of 70 percent or better across the entire operating range of the motor saves considerable electrical energy when compared to conventional induction motors. The motor controller, tuned to a Titus fan powered terminal, provides a large turn down ratio and constant volume airflow regardless of changes in downstream static pressure operating against the fan.

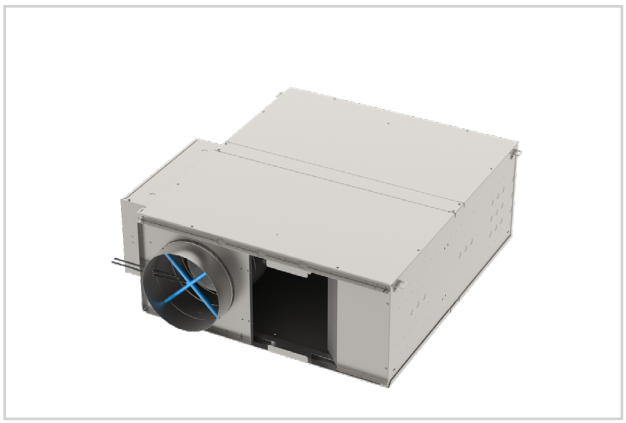
Features and related benefits of the ECM motor in a Titus fan powered terminal are:

- 70 percent motor efficiency across the entire operating range of the motor yields substantial electrical savings/payback in less than two years
- Microprocessor based internal motor control maintains constant airflow regardless of changes in downstream static pressure
- Motor operates efficiently down to 300 rpm providing a wide operating range covering most applications
- Simplify design layout with fewer models to choose from due to increased fan range
- Increased application flexibility due to larger operating range
- Unique fan speed control provides simple manual or remote adjustment through the unit direct digital controls (DDC)
- Factory preset fan airflows minimize fan terminal balancing efforts
- Ball bearing design and low heat rise characteristics substantially increase motor life

See the section, Engineering Guidelines and the topic 'ECM Motors - Fan Powered Terminals' for additional information. See specific models for ECM performance data.

TFS / TFS-S

- Two casings for easy design layout
- Pressure independent primary airflow control
- AeroCross™ multi-point inlet velocity sensor with center averaging
- Energy-efficient fan motor, permanent split capacitor type, mounted with vibration isolators
- Optional TITAN™ programmed ECM brushless DC motor provides ultra-high efficiency, pressure independent operation
- Adjustable SCR fan speed control with minimum voltage stop
- Single point electrical, pneumatic main, and thermostat connections
- 20-gauge galvanized steel casing
- Centered, rectangular discharge opening is designed for flanged duct connections
- Top and bottom access panels can be removed for service
- OSP & IBC seismic certifications available for TFS-S units with Titus pneumatic, analog, and digital controls



TFS / TFS-S

seismic certified | energy solutions | open ceiling

See website for Specifications

MODELS:

PTFS / Pneumatic Control
ATFS / Analog Control
DTFS / Digital Control
TFS-S / Seismic Option

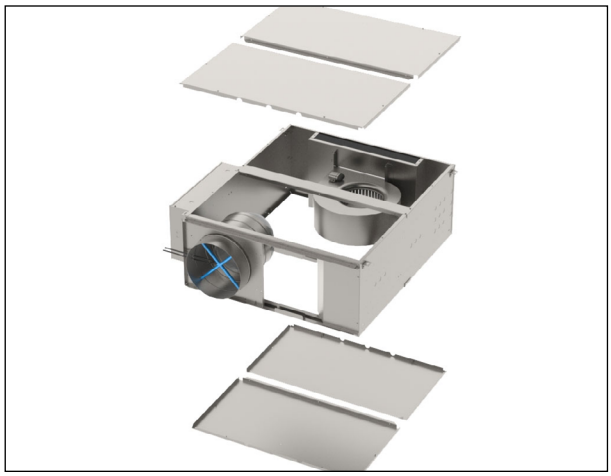
OVERVIEW

Quiet Operation

Designers choose Series flow terminals for their characteristics of constant air delivery and temperature blending. Nevertheless, these terminals maintain the VAV energy savings at the central fan.

ADDITIONAL FEATURES

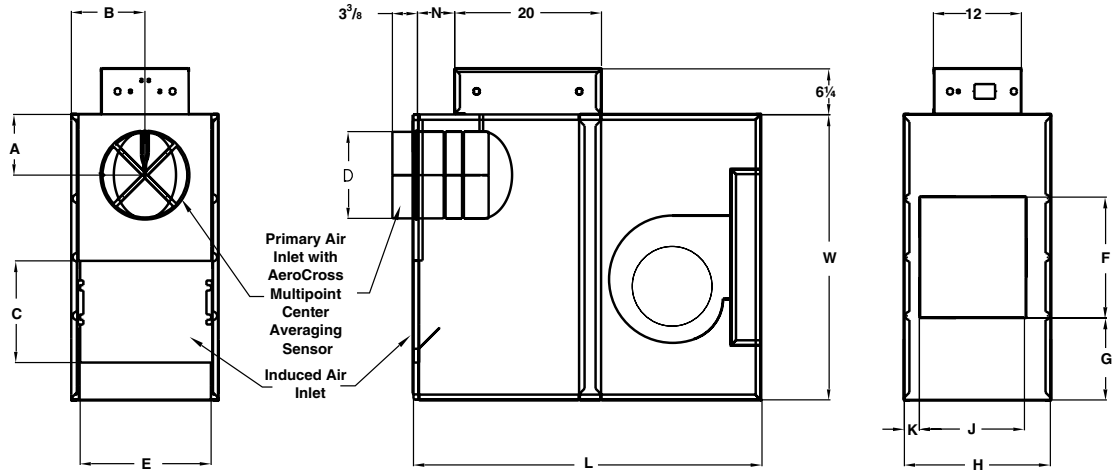
- Rectangular discharge opening is designed for flanged duct connections
- Dual density insulation, coated to prevent air erosion, meet requirements of NFPA 90A and UL 181



Exploded view of components that make up the TFS terminal unit

TFS UNIT DIMENSIONS

TFS / Sizes B-E



TFS Series Unit															
Size	Unit	A	B	C	D	E	F	G	H	J	K	L	N	W	Filter Size
B	6	6	8	12½	5 7/8	14¼	14 1/8	11½	16	11 1/8	2¼	43	2 7/8	37	16 x 14
	8	6			7 7/8								2 7/8		
	10	7			9 7/8								4 7/8		
	12	8			11 7/8								4 7/8		
C	6	6			5 7/8								2 7/8		
	8	6			7 7/8								2 7/8		
	10	7			9 7/8								4 7/8		
	12	8			11 7/8								4 7/8		
D	10	7	10	1 2	9 7/8	18¼	16½	11¼	20	14 5/8	2	47½	4 7/8	39	14 x 18
	12	8			11 7/8								4 7/8		
	14	10			13 7/8								6 7/8		
	16	11			15 7/8								6 7/8		
E	12	8			11 7/8								4 7/8		
	14	10			13 7/8								6 7/8		
	16	11			15 7/8								6 7/8		

All dimensions are in inches

HOT WATER COIL SECTION

STANDARD FEATURES

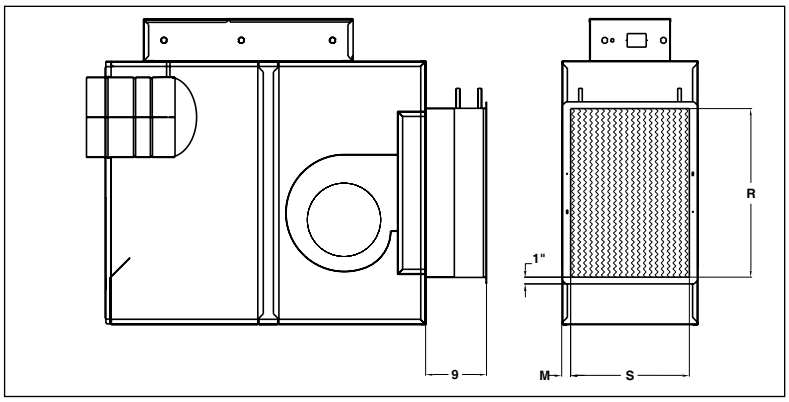
- ½" copper tubes
- Aluminum ripple fins
- Connections: Male solder $^{5}/_{8}$" for both 1- and 2-row. Left or right hand connections.
- Galvanized steel casing
- Flanged duct connection
- Coil is installed at discharge of unit

COIL ROWS

- 1-Row
- 2-Row

SUPPLY VOLTAGE

- 120V, 1 ph, 60 Hz.
- 208/240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.



Hot Water Coil Section (Discharge Mounted)				
Unit Size	M (1-Row)	M (2-Row)	R	S
B, C	1	1	20½	12½
D, E	1	1¼	25	17½

Note: R and S are inside dimensions

ELECTRIC COIL SECTION

STANDARD FEATURES

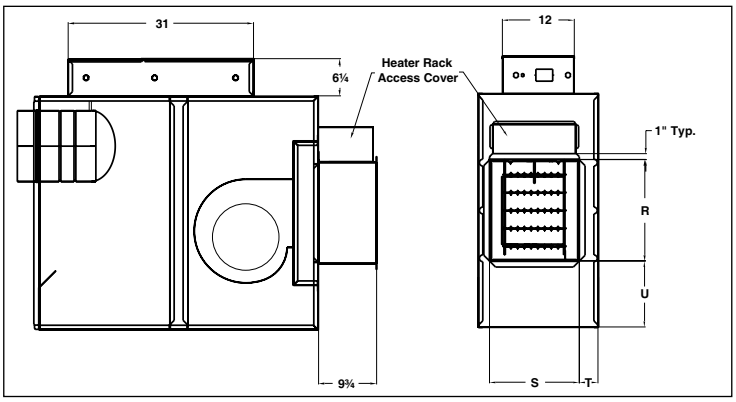
- Auto reset thermal cutouts (one per element)
- 80/20 Nickel chrome heating elements
- Magnetic contactors, where required, on pneumatic units
- Airflow safety switch
- Line terminal block (277/1∅, 208/240/3∅, or 480/3∅ 4 wire)
- Flanged connection
- Control transformer for DDC or Analog electronic controls
- Pneumatic electric switch for pneumatic parallel fan terminals only
- Fan relay for DDC fan terminals
- Magnetic contactor per step on terminals with DDC or analog electronic controls

OPTIONS

- Interlocking disconnect
- Main power supply fuses
- Mercury contactors
- Manual reset thermal cutout
- Dust-tight construction
- Optional Lynergy Comfort Controlled SSR Electric Heat available

SUPPLY VOLTAGE

- 208V, 1 ph, 60 Hz.
- 240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.
- 208V, 3 ph, 60 Hz.
- 480V, 3 ph, 60 Hz. (4 wire wye only)



Electric Coil Section (Discharge Mounted)				
Unit Size	U	R	S	T
B, C	$11^{3}/_{8}$	14½	11½	$2^{3}/_{8}$
D, E	11	17	15	$3^{1}/_{8}$

Note: R and S are inside dimensions

See Electric Heat Coils in Section O for more information

ADDITIONAL ACCESSORIES

(OPTIONAL)

- Induced air filter, 1" thick disposable construction type
- Fan disconnect switch (not available on units with optional electric coils)
- 1" Liner
- Fibre-Free Liner
- SteriLoc Liner
- EcoShield liner
- Fan unit fusing
- Hanger brackets
- Camlocks on fan access door

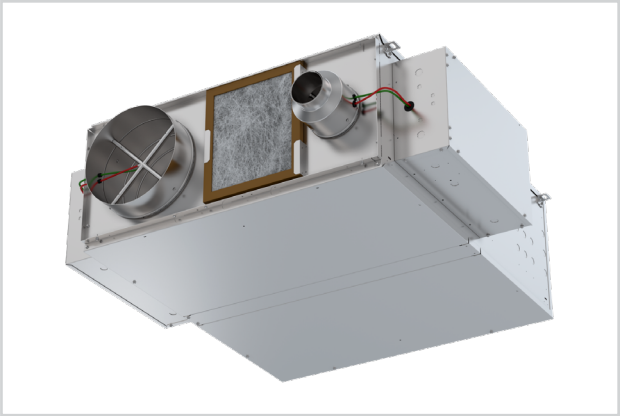
Electrical Data				
Unit Size	Motor HP	120V	208/240V	277V
		FLA	FLA	FLA
B	$^{1}/_{6}$	3.0	1.4	1.0
C	$^{1}/_{4}$	3.9	1.7	1.5
D	$^{1}/_{3}$	7.4	3.0	2.6
E	$^{3}/_{4}$	11.2	5.3	4.5

All motors are single phase, 60(Hz).
FLA = Full Load Amperage, as tested in accordance with UL 60335
All fan motors are same voltage as electric coil (when supplied), with exception that 277V motors are used with 480V 3 Phase coils (four wire wye)

For ECM electrical data see page N27

TFS with IAQ

- TFS with added outside air inlet
- Allows outside air directly into terminal unit
- Mixes outside air with recirculated inside air to improve indoor air quality
- Dilution of indoor air reduces level of contaminants
- Available on digital controller model sizes B,C,D, and E
- Two casings for easy design layout
- Pressure independent primary airflow control
- AeroCross™ multi-point inlet velocity sensor with center averaging
- Energy-efficient fan motor, permanent split capacitor type, mounted with vibration isolators
- Optional TITAN™ programmed ECM brushless DC motor provides ultra-high efficiency, pressure independent operation
- Adjustable SCR fan speed control with minimum voltage stop
- Single point electrical, pneumatic main, and thermostat connections



TFS WITH IAQ

- 20 gauge, galvanized steel casing
- Centered, rectangular discharge opening is designed for flanged duct connections
- Top and bottom access panels can be removed for service

See website for Specifications

MODELS:

DTFS / Digital Control

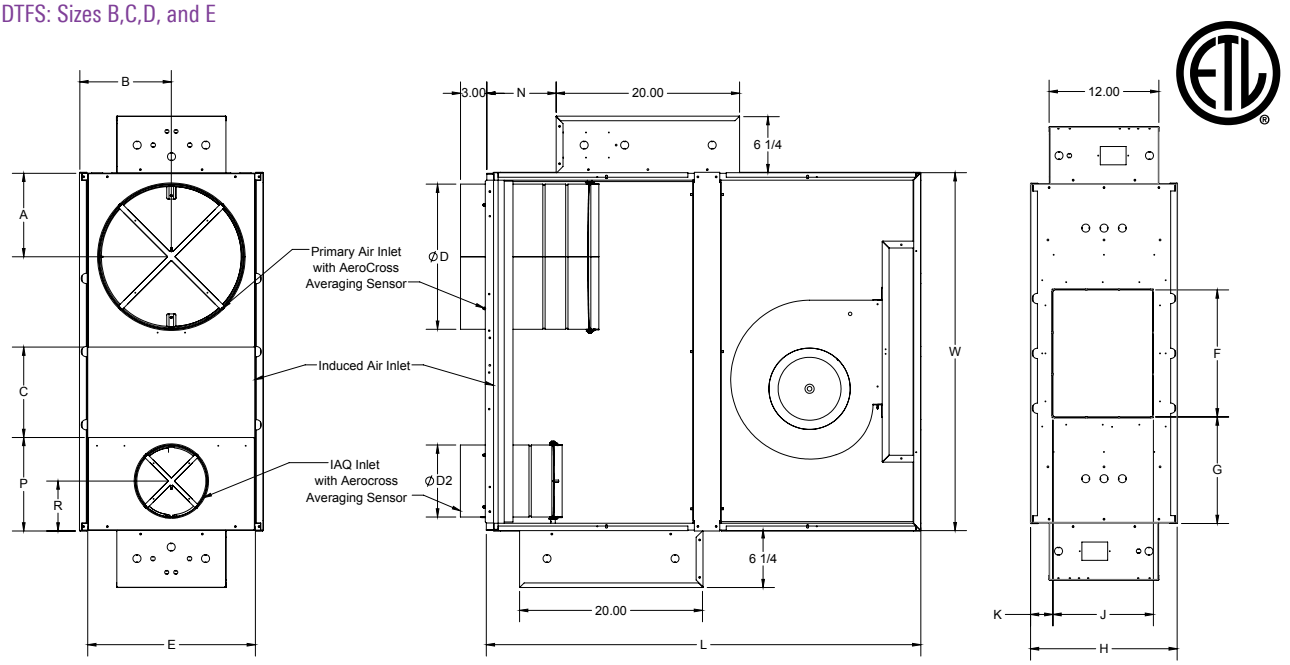
OVERVIEW

Improve Zone Air Quality/with IAQ Inlet

The outside air provided by a central air handling unit may not meet the air quality requirements for each zone. With the IAQ air inlet, outside air can be routed directly to this terminal unit to satisfy the requirements of a given zone.

TFS WITH IAQ UNIT DIMENSIONS

DTFS: Sizes B,C,D, and E



TFS Series Unit with IAQ Inlet																			
Size	Primary Inlet Size	IAQ Inlet Size	A	B	C	D	D2	E	F	G	H	J	K	L	N	W	P	R	Filter Size
B	6 8 10 12	4 5 6	6 6 7 8	8	9 9/10	5 7/8 7 7/8 9 7/8 11 7/8	3 7/8 4 7/8 5 7/8	14 1/4	14 1/8	11 1/2	16	11 1/8	2 1/4	43	2 7/8 2 7/8 4 7/8 4 7/8	37	10 1/5	4 5/7	12 X 14
C	6 8 10 12		6 6 7 8			5 7/8 7 7/8 9 7/8 11 7/8									2 7/8 2 7/8 4 7/8 4 7/8				
D	10 12 14 16	7 8	7 8 10 11	10	9 7/8	9 7/8 11 7/8 13 7/8 15 7/8	6 7/8 7 7/8	18 1/4	16 1/2	11 1/4	20	14 5/8	2	47 1/2	4 7/8 4 7/8 6 7/8 6 7/8	39	10 1/5	4 5/7	12 X 18
E	12 14 16		8 10 11			11 7/8 13 7/8 15 7/8									4 7/8 6 7/8 6 7/8				

All dimensions are in inches

HOT WATER COIL SECTION

STANDARD FEATURES

- ½" copper tubes
- Aluminum ripple fins
- Connections: Male solder 5/8" for both 1- and 2-row. Left or right hand connections.
- Galvanized steel casing
- Flanged duct connection
- Coil is installed at discharge of unit

COIL ROWS

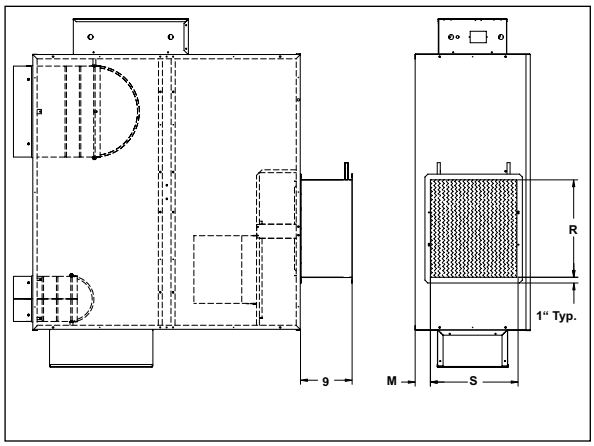
- 1-Row
- 2-Row

Hot Water Coil Section (Discharge Mounted)				
Unit Size	M (1-Row)	M (2-Row)	R	S
3, 4	1	1¼	17	15
5, 6, 7	1	1¼	25	17½

Note: R and S are inside dimensions

SUPPLY VOLTAGE

- 120V, 1 ph, 60 Hz.
- 208/240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.



ELECTRIC COIL SECTION

STANDARD FEATURES

- Auto reset thermal cutouts (one per element).
- 80/20 Nickel chrome heating elements.
- Magnetic contactors, where required, on pneumatic units
- Airflow safety switch
- Line terminal block (277/1∅, 208/240/3∅, or 480/3∅ 4 wire)
- Flanged connection
- Control transformer for DDC or Analog electronic controls
- Pneumatic electric switch for pneumatic parallel fan terminals only
- Fan relay for DDC fan terminals
- Magnetic contactor per step on terminals with DDC or analog electronic controls

OPTIONS

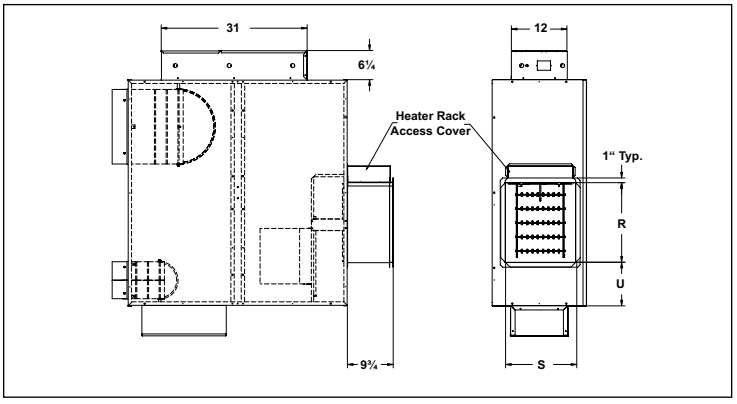
- Interlocking disconnect
- Main power supply fuses
- Mercury contactors
- Manual reset thermal cutout
- Dust-tight construction
- Optional Lynergy Comfort Controlled SSR Electric Heat available

SUPPLY VOLTAGE

- 208V, 1 ph, 60 Hz.
- 240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.
- 208V, 3 ph, 60 Hz.
- 480V, 3 ph, 60 Hz. (4 wire wye only)

Electric Coil Section (Discharge Mounted)				
Unit Size	U	R	S	T
3, 4	3½	14	11	2 7/8
5, 6, 7	9½	16½	14½	3 1/8

Note: R and S are inside dimensions
See Electric Heat Coils in Section O for more information



ADDITIONAL ACCESSORIES (OPTIONAL)

- Induced air filter, 1" thick disposable construction type
- Fan disconnect switch (not available on units with optional electric coils)
- Metal controller cover
- Fan P/E switch for night setback control. See Section O for additional control options
- 1" Liner
- Fibre-Free Liner
- SteriLoc Liner
- UltraLoc Liner
- EcoShield liner
- Fan unit fusing
- Hanger brackets
- Camlocks on fan access door

Electrical Data				
Unit Size	Motor HP	120V	208/240V	277V
		FLA	FLA	FLA
3	¼	7.0	3.0	2.4
4	⅓	9.8	4.1	2.9
5	⅓	10.0	4.3	3.3
6	¾	13.4	7.2	5.4
7	1	N/A	9.0	6.5

All motors are single phase, 60(Hz).
FLA = Full Load Amperage, as tested in accordance with UL 60335
All fan motors are same voltage as electric coil (when supplied), with exception that 277V motors are used with 480V 3 Phase coils (four wire wye)
For ECM electrical data see page N55

TFS WITH INDOOR AIR QUALITY (IAQ) INLET BACKGROUND

Titus offers the Indoor Air Quality Inlet for the TFS. The demand for fresh air inlets on series fan powered terminals has been growing to address the growing IAQ concerns. Titus introduces the IAQ inlet option on the TFS premiere fan powered terminal.

Building owners are becoming more aware of the health concerns related to poor IAQ. Indoor air is a combination of outside air and indoor air distributed throughout a building. Indoor air pollution is caused by an accumulation of contaminants that primarily come from inside the building.

ASHRAE Standard 62, Ventilation for Acceptable Indoor Air Quality, specifies the minimum ventilation rates and indoor air quality that will be acceptable to human occupants. The standard is intended to minimize the potential for adverse health effects.

Standard 62 defines the outdoor air quality acceptable for ventilation, outdoor air treatment when necessary, ventilation rates for residential, commercial, institutional, vehicular, and industrial spaces, the criteria for reduction of outdoor air quantities when recirculated air is treated by contaminant-removal equipment, and the criteria for variable ventilation when the air volume in the space can be used as a reservoir to dilute contaminants.

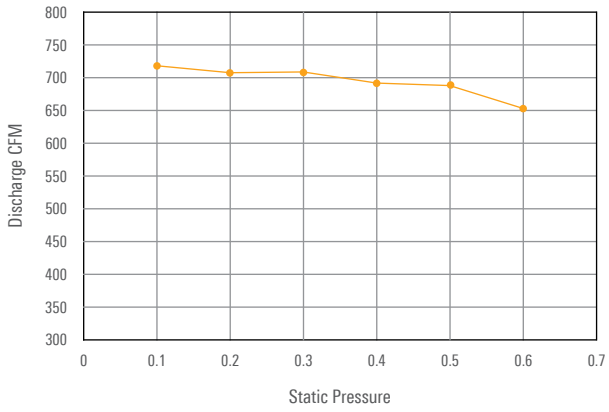
In January 2000, the Environmental Protection Agency (EPA) released a report on the Energy Costs and IAQ Performance of Ventilation Systems and Controls. The study discusses the benefits (thermal and economic) of the various systems in the three climates, most of these issues will not be discussed in this catalog.

The study found that core zones consistently received less outdoor air than the perimeter zones. The core of a building is typically the zone with the largest occupancy levels and therefore would require more outdoor air than the perimeters.

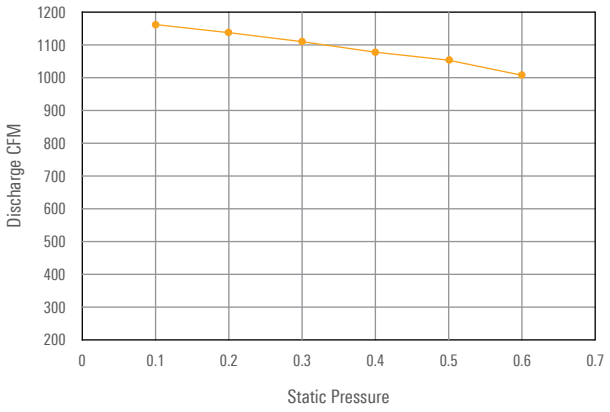
Outside air control is typically handled by the central air handling unit. Due to varying conditions in individual zones, the outside air supplied by the air handler may not meet the minimum requirement for the zone. By supplying outside air directly to the zone using the TFS with IAQ inlet, the minimum ventilation requirement for the zone can be maintained.

DTFS WITH IAQ / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE

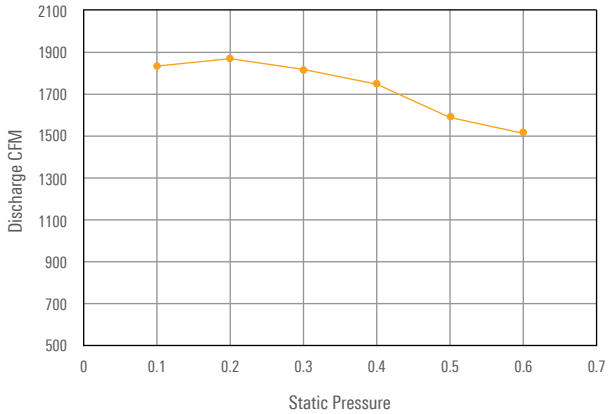
TFS-B with IAQ Performance



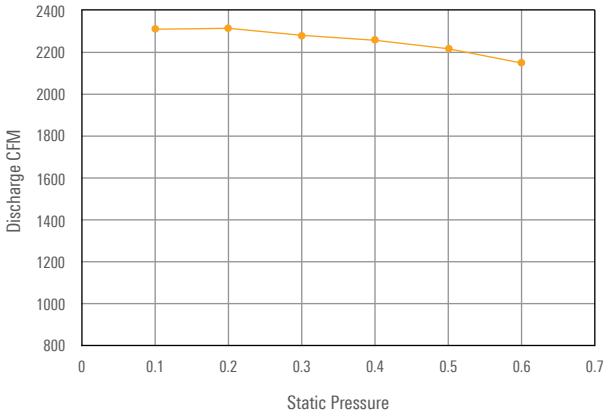
TFS-C with IAQ Performance



TFS-D with IAQ Performance

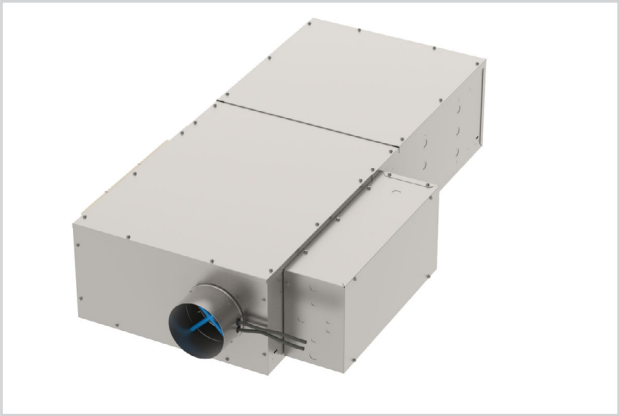


TFS-E with IAQ Performance



TFS-A

- Two casings for easy design layout
- Pressure independent primary airflow control
- AeroCross™ multi-point inlet velocity sensor with center averaging
- Energy-efficient fan motor, permanent split capacitor type, mounted with vibration isolators
- Optional TITAN™ programmed ECM brushless DC motor provides ultra-high efficiency, pressure independent operation
- Adjustable SCR fan speed control with minimum voltage stop
- Single point electrical, pneumatic main, and thermostat connections
- 20-gauge galvanized steel casing
- Centered, rectangular discharge opening is designed for flanged duct connections
- Bottom access panels can be removed for service



TFS-A

See website for Specifications

MODELS:

PTFS-A / Pneumatic Control
ATFS-A / Analog Control
DTFS-A / Digital Control

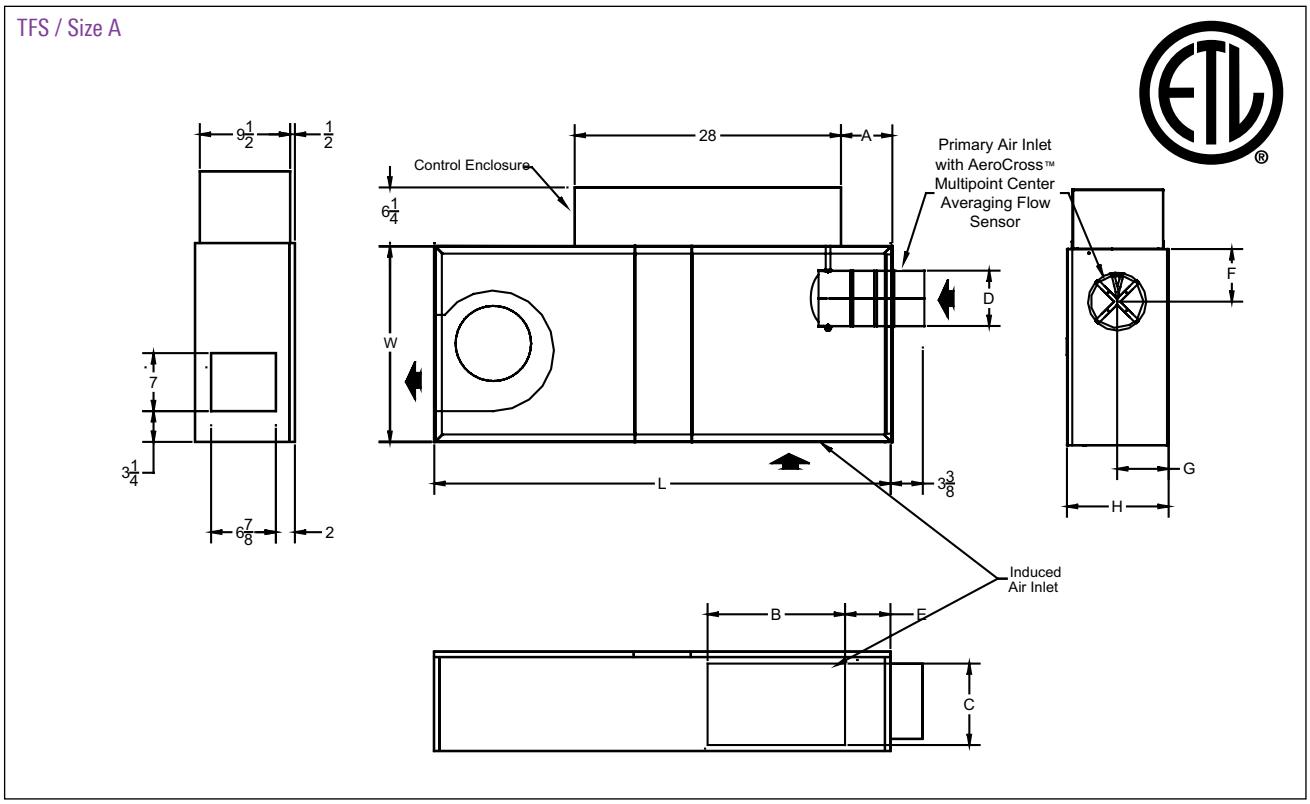
OVERVIEW

Quiet Operation

Designers choose Series flow terminals for their characteristics of constant air delivery and temperature blending. Nevertheless, these terminals maintain the VAV energy savings at the central fan.

TFS-A UNIT DIMENSIONS

TFS / Size A



Unit Size	Inlet Size	A	B	C	D	E	F	G	H	L	W	Filter Size
A	6" Diameter	6	14	8	5 7/8	3	5 5/8	5 1/4	10 1/2	48	21	10 x 16

All dimensions are in inches

HOT WATER COIL SECTION

STANDARD FEATURES

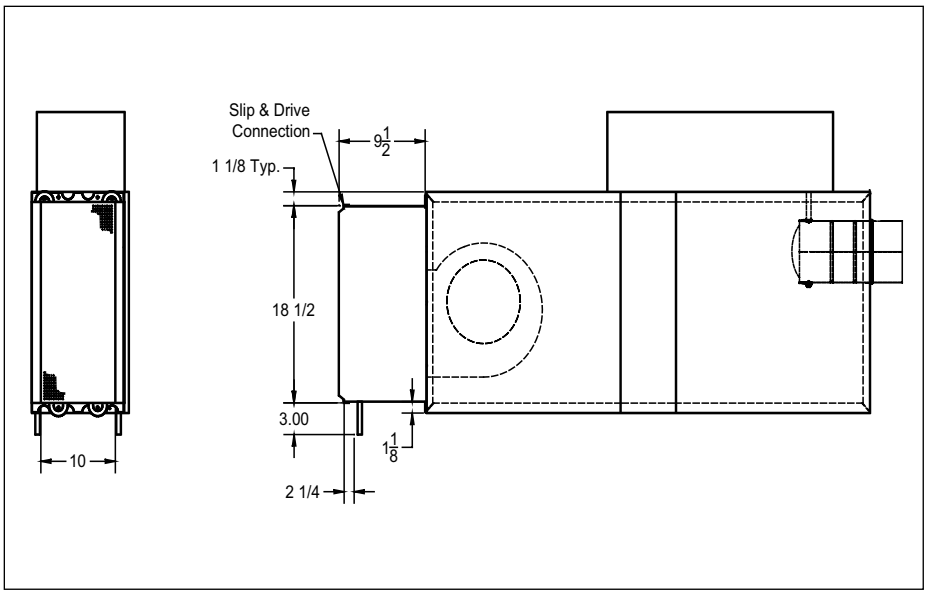
- ½" copper tubes
- Aluminum ripple fins, 10 per inch
- Connections: Male solder $^{5}/_{8}$" for both 1- and 2-row. Left or right hand connections.
- Galvanized steel casing
- Flanged duct connection
- Coil is installed at discharge of unit

COIL ROWS

- 1-Row
- 2-Row

SUPPLY VOLTAGE

- 120V, 1 ph, 60 Hz.
- 208/240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.



ELECTRIC COIL SECTION

STANDARD FEATURES

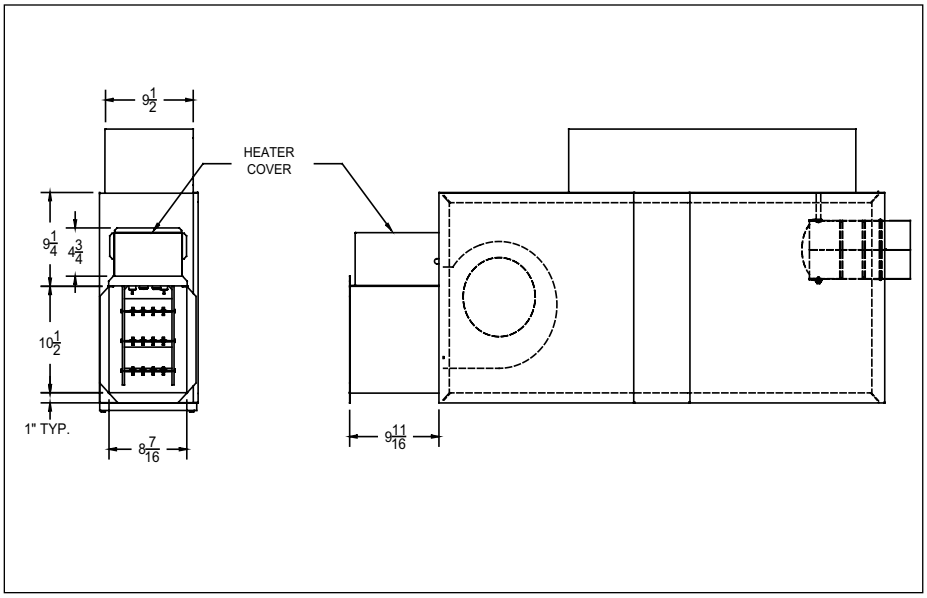
- Auto reset thermal cutouts (one per element)
- Single point electrical connection for entire unit
- Positive pressure flow switch
- Transformer

OPTIONS

- Fuse Block
- Disconnect switch, door interlock type
- Manual reset cutout

SUPPLY VOLTAGE

- 208V, 1 ph, 60 Hz.
- 240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.
- 208V, 3 ph, 60 Hz.
- 480V, 3 ph, 60 Hz. (4 wire wye only)



ADDITIONAL ACCESSORIES (OPTIONAL)

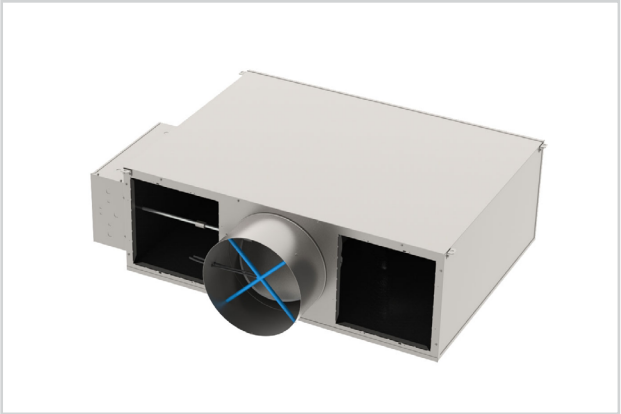
- Induced air filter, 1" thick disposable construction type
- Fan disconnect switch (not available on units with optional electric coils)
- Fibre-Free Liner
- Fan unit fusing
- Hanger brackets
- Camlocks on fan access door
- EcoShield Liner

Electrical Data				
Unit Size	Motor HP	120V	208/240/1/60V	277/1/60V
		FLA	FLA	FLA
A	1/10	1.6	0.6	0.55

All motors are single phase, 60(Hz).
FLA = Full Load Amperage, as tested in accordance with UL 60335.
All fan motors are same voltage as electric coil (when supplied), with exception that 277V motors are used with 480V 3 Phase coils (four wire wye).
For ECM electrical data see page N27

TFS-G

- Two casings for easy design layout
- Pressure independent primary airflow control
- AeroCross™ multi-point inlet velocity sensor with center averaging
- Energy-efficient fan motor, permanent split capacitor type, mounted with vibration isolators
- Optional TITAN™ programmed ECM brushless DC motor provides ultra-high efficiency, pressure independent operation
- Adjustable SCR fan speed control with minimum voltage stop
- Single point electrical, pneumatic main, and thermostat connections
- 20-gauge galvanized steel casing
- Centered, rectangular discharge opening is designed for flanged duct connections
- Bottom access panels can be removed for service



TFS-G

See website for Specifications

MODELS:

PTFS-G / Pneumatic Control
ATFS-G / Analog Control
DTFS-G / Digital Control

OVERVIEW

Quiet Operation

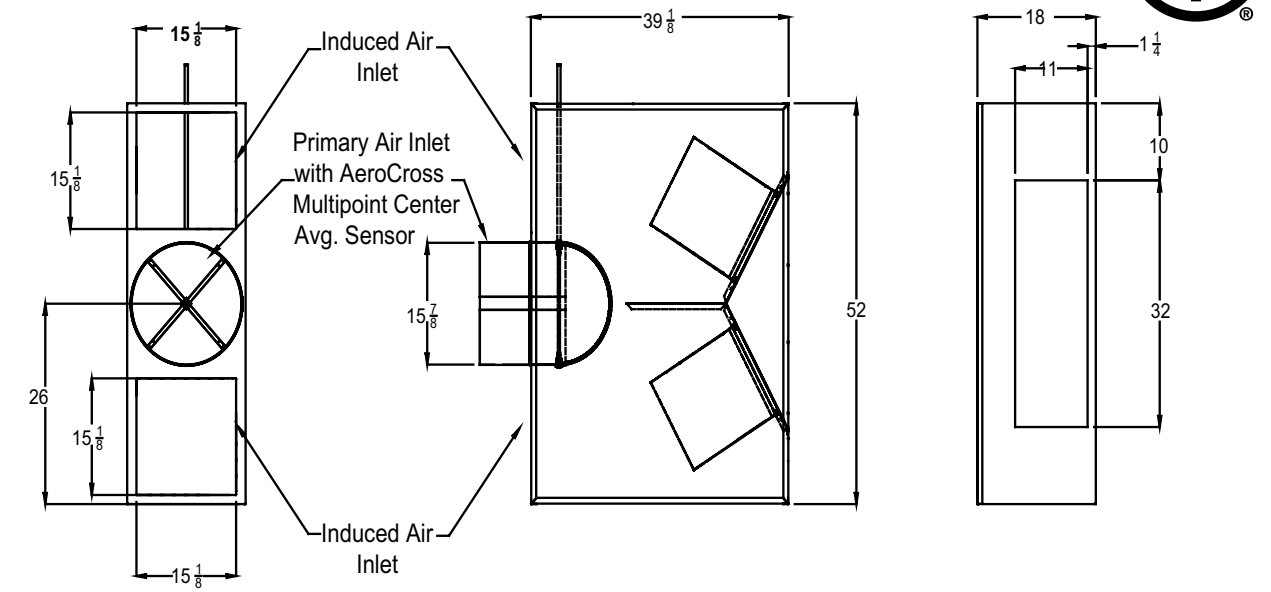
Designers choose Series flow terminals for their characteristics of constant air delivery and temperature blending. Nevertheless, these terminals maintain the VAV energy savings at the central fan.

ADDITIONAL FEATURES

- Rectangular discharge opening is designed for flanged duct connections
- Dual density insulation, coated to prevent air erosion, meet requirements of NFPA 90A and UL 181

TFS-G UNIT DIMENSIONS

TFS / Size G



Left hand unit, top view shown

Unit Size	Inlet Size	Filter Size
G	16	17 x 17

HOT WATER COIL SECTION

STANDARD FEATURES

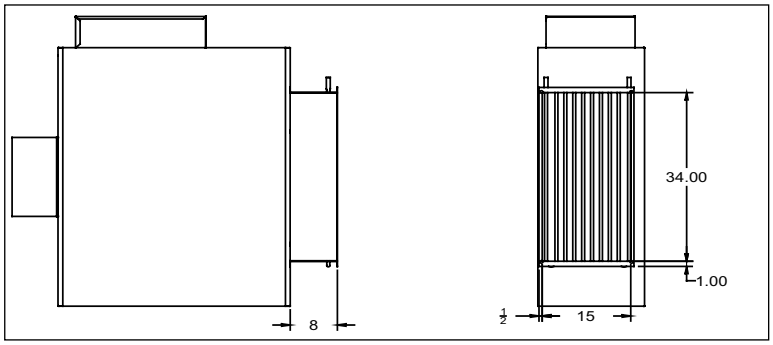
- ½" copper tubes
- Aluminum ripple fins, 10 per inch
- Connections: Male solder.
  " for both 1-row and 2-row. Left or right hand connections.
- Galvanized steel casing
- Flanged duct connection
- Coil is installed at discharge of unit

COIL ROWS

- 1-Row
- 2-Row

SUPPLY VOLTAGE

- 120V, 1 ph, 60 Hz.
- 208/240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.



ELECTRIC COIL SECTION

STANDARD FEATURES

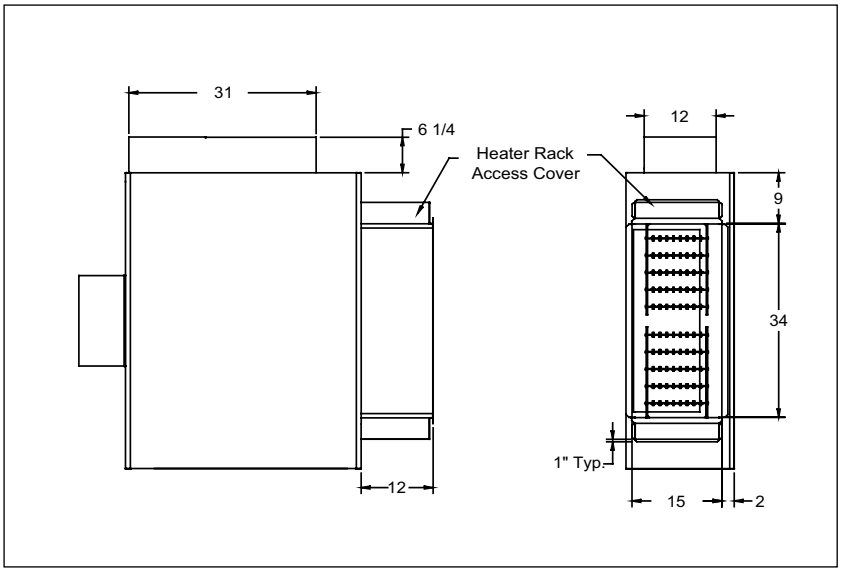
- Single side access to low and high voltage and electric heater controls
- Auto reset thermal cutouts (one per element)
- Single point electrical connection for entire unit
- Positive pressure flow switch
- Flanged duct connection
- Coil is installed at discharge of unit
- Transformer

OPTIONS

- Fuse Block
- Disconnect switch, door interlock type
- Manual reset cutout
- Dust tight construction
- Mercury contactors

SUPPLY VOLTAGE

- 208V, 1 ph, 60 Hz.
- 240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.
- 208V, 3 ph, 60 Hz.
- 480V, 3 ph, 60 Hz. (4 wire wye only)



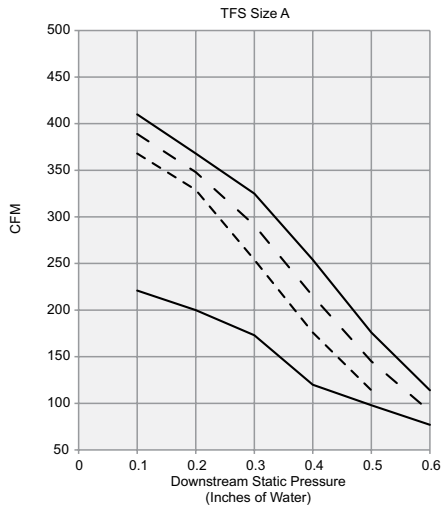
ADDITIONAL ACCESSORIES (OPTIONAL)

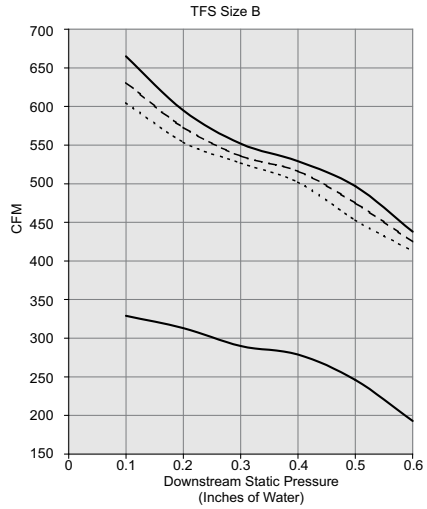
- Induced air filter, 1" thick disposable construction type
- Fan disconnect switch (not available on units with optional electric coils)
- 1" Liner
- Fibre-Free Liner
- SteriLoc Liner
- EcoShield liner
- Fan unit fusing
- Hanger brackets
- Camlocks on fan access door

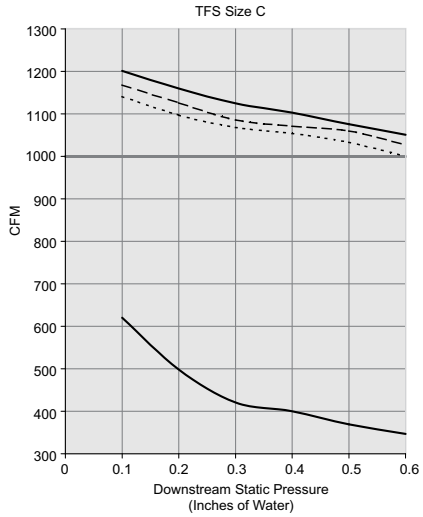
Electrical Data			
Unit Size	Motor HP	208/240/1/60V	277/1/60V
		FLA	FLA
G	(2) 3/4	10.2	8.4

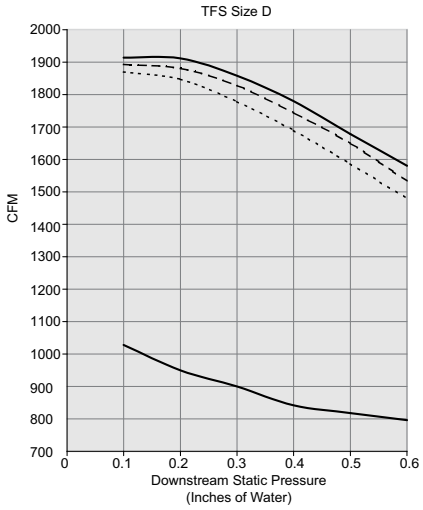
FLA = Full Load Amperage, as tested in accordance with UL 60335
All fan motors are same voltage as electric coil (when supplied), with exception that 277V motors are used with 480V 3 Phase coils (four wire wye)
For ECM electrical data see page N27

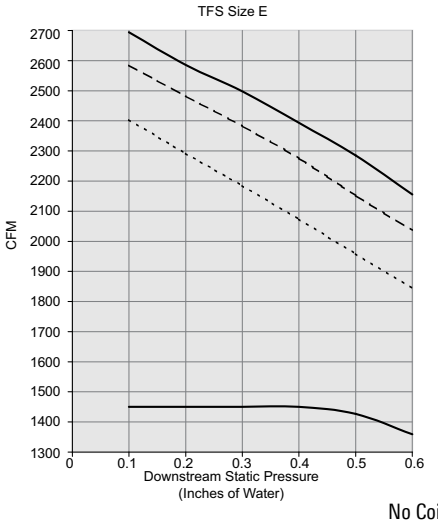
PTFS, ATFS, DTFS / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE

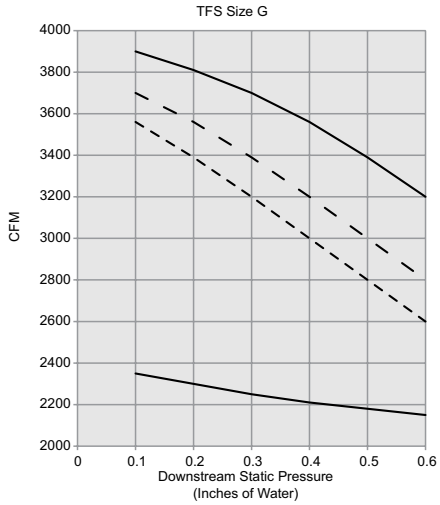








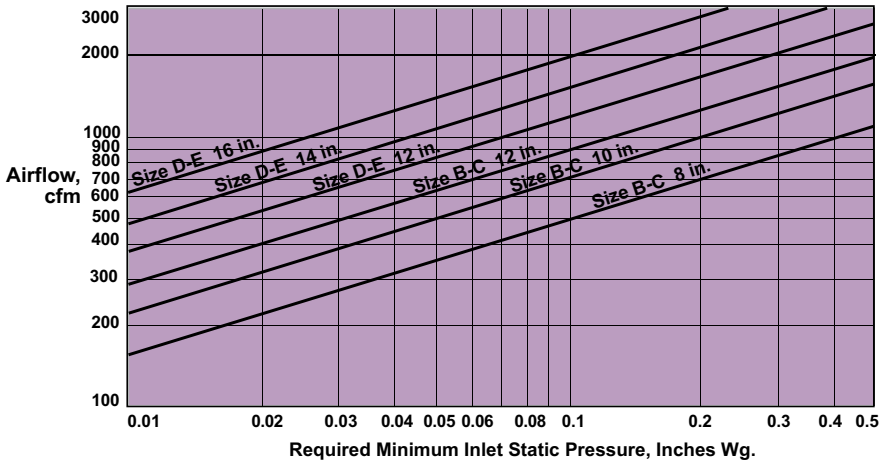




No Coil or with Electric Coil
1 Row Water Coil
2 Row Water Coil

PTFS, ATFS, DTFS / PRIMARY AIR INLET PRESSURE

PRIMARY AIR INLET PRESSURE / PTFS, ATFS, DTFS



Note: For selection procedure, see the Engineering Guidelines and the topic, 'Sizing Basic Terminals from Capacity Tables'.

PTFS, ATFS, DTFS / WATER COIL HEATING CAPACITY (MBH)

Unit Size	Rows	gpm	Head Loss	Airflow, cfm								
				100	140	180	220	260	300	340	380	420
A	One Row	1.0	0.13	6.7	8.1	9.2	10.2	11.0	11.6	12.2	12.8	13.3
		2.0	0.42	7.2	8.8	10.2	11.4	12.4	13.3	14.1	14.8	15.4
		4.0	1.53	7.5	9.3	10.8	12.1	13.2	14.2	15.2	16.0	16.8
		6.0	3.33	7.6	9.4	11.0	12.3	13.5	14.6	15.6	16.5	17.3
		Airside ΔPs		0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02
	Two Row	1.0	0.25	9.4	11.8	13.9	15.6	17.1	18.4	19.4	20.5	21.4
		2.0	0.78	9.9	12.8	15.3	17.5	19.5	21.3	22.9	24.3	25.7
		4.0	2.85	10.1	13.2	16.0	18.5	20.8	22.9	24.9	26.6	28.2
		6.0	6.17	10.2	13.4	16.3	18.9	21.3	23.4	25.5	27.4	29.1
		Airside ΔPs		0.01	0.01	0.01	0.02	0.03	0.03	0.04	0.05	0.06

Unit Size	Rows	gpm	Head Loss	Airflow, cfm								
				350	385	425	460	500	535	575	610	650
B	One Row	1.0	0.16	14.3	14.8	15.4	15.9	16.3	16.7	17.1	17.5	17.8
		2.0	0.50	16.4	17.2	18.0	18.6	19.3	19.9	20.5	21.0	21.6
		4.0	1.83	17.7	18.6	19.6	20.4	21.2	21.9	22.6	23.3	23.9
		6.0	3.95	18.2	19.2	20.2	21.0	21.9	22.7	23.5	24.1	24.9
		Airside ΔPs		0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03
	Two Row	1.0	0.14	20.4	21.3	22.1	22.8	23.5	24.1	24.7	25.1	25.6
		2.0	0.33	25.0	26.4	27.9	29.1	30.4	31.5	32.6	33.5	34.5
		4.0	1.19	27.4	29.1	31.0	32.6	34.2	35.6	37.1	38.4	39.7
		6.0	2.56	28.2	30.1	32.1	33.8	35.6	37.2	38.8	40.2	41.7
		Airside ΔPs		0.03	0.03	0.04	0.04	0.05	0.05	0.06	0.07	0.07

Unit Size	Rows	gpm	Head Loss	Airflow, cfm								
				400	490	580	670	760	850	940	1030	1100
C	One Row	1.0	0.16	14.5	15.7	16.7	17.5	18.3	18.9	19.5	20.0	20.4
		2.0	0.50	16.4	18.1	19.5	20.7	21.8	22.8	23.6	24.4	25.0
		4.0	1.87	17.6	19.5	21.2	22.6	24.0	25.1	26.2	27.2	28.0
		6.0	4.05	18.0	20.0	21.8	23.4	24.8	26.1	27.2	28.2	29.1
		Airside ΔPs		0.02	0.03	0.03	0.04	0.05	0.06	0.07	0.08	0.09
	Two Row	1.0	0.13	21.5	23.4	24.9	26.2	27.3	28.2	29.0	29.6	30.1
		2.0	0.33	26.4	29.5	32.2	34.5	36.6	38.4	40.0	41.4	42.4
		4.0	1.21	28.9	32.8	36.2	39.3	42.0	44.5	46.8	48.8	50.3
		6.0	2.61	29.8	34.0	37.8	41.1	44.2	46.9	49.5	51.8	53.5
		Airside ΔPs		0.04	0.05	0.07	0.08	0.10	0.12	0.14	0.16	0.18

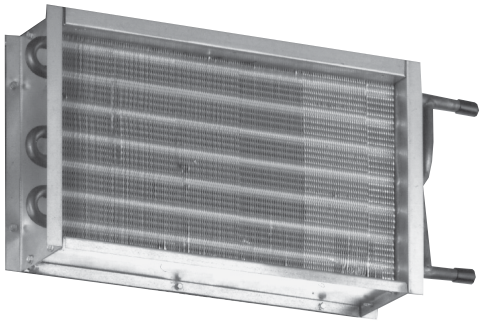
Unit Size	Rows	gpm	Head Loss	Airflow, cfm								
				800	925	1050	1175	1300	1425	1550	1675	1800
D	One Row	1.0	0.25	23.7	24.9	25.9	26.8	27.5	28.2	28.8	29.4	29.9
		2.0	0.78	28.7	30.5	32.1	33.5	34.8	36.0	37.0	38.0	38.9
		4.0	2.86	31.7	33.9	36.0	37.8	39.5	41.0	42.5	43.8	45.0
		6.0	6.20	32.8	35.3	37.5	39.5	41.3	43.0	44.6	46.1	47.5
		Airside ΔPs		0.02	0.03	0.04	0.04	0.05	0.06	0.07	0.08	0.09
	Two Row	1.0	0.52	35.9	37.6	38.8	40.2	41.2	42.1	42.9	43.5	44.1
		2.0	1.49	46.5	49.8	52.2	55.3	57.2	59.6	61.4	63.0	64.5
		4.0	5.48	53.0	57.7	61.0	65.6	69.0	72.2	75.0	77.7	80.2
		6.0	5.48	53.0	57.7	61.0	65.6	69.0	72.2	75.0	77.7	80.2
		Airside ΔPs		0.05	0.06	0.07	0.09	0.10	0.12	0.13	0.15	0.17

Unit Size	Rows	gpm	Head Loss	Airflow, cfm								
				1400	1525	1650	1775	1900	2025	2150	2275	2320
E	One Row	1.0	0.26	28.1	28.7	29.3	29.8	30.2	30.7	31.1	31.4	31.5
		2.0	0.77	35.7	36.8	37.8	38.7	39.6	40.4	41.1	41.8	42.0
		4.0	2.86	40.8	42.2	43.5	44.8	46.0	47.0	48.1	49.1	49.4
		6.0	6.19	42.7	44.3	45.8	47.2	48.5	49.7	50.9	52.0	52.4
		Airside ΔPs		0.06	0.07	0.07	0.08	0.09	0.10	0.11	0.12	0.13
	Two Row	1.0	0.53	41.9	42.7	43.4	44.0	44.5	45.0	45.4	45.8	46.0
		2.0	1.49	59.2	61.0	62.7	64.2	65.6	66.9	68.1	69.1	69.5
		4.0	5.46	71.5	74.5	77.2	79.7	82.0	84.2	86.3	88.2	88.8
		6.0	5.46	71.5	74.5	77.2	79.7	82.0	84.2	86.3	88.2	88.8
		Airside ΔPs		0.11	0.13	0.15	0.17	0.19	0.21	0.23	0.25	0.26

PTFS, ATFS, DTFS / WATER COIL HEATING CAPACITY (MBH)

Unit Size	Rows	gpm	Head Loss	Airflow, cfm								
				2300	2425	2550	2675	2800	2925	3050	3175	3300
G	One Row	1.0	0.27	33.6	34.0	34.3	34.6	34.9	35.1	35.4	35.6	35.9
		2.0	0.83	45.2	45.9	46.5	47.2	47.8	48.3	48.9	49.4	49.9
		4.0	3.05	53.4	54.4	55.3	56.3	57.1	58.0	58.8	59.6	60.3
		6.0	6.63	56.7	57.9	59.0	60.0	61.0	62.0	62.9	63.8	64.7
		Airside ΔPs		0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18
	Two Row	1.0	0.55	47.6	48.0	48.3	48.6	48.9	49.1	49.3	49.5	49.7
		2.0	1.61	72.9	74.0	75.0	75.9	76.7	77.5	78.3	79.0	79.6
		4.0	5.83	94.1	96.0	97.9	99.6	101.3	102.8	104.3	105.7	107.1
		6.0	5.83	94.1	96.0	97.9	99.6	101.3	102.8	104.3	105.7	107.1
		Airside ΔPs		0.22	0.22	0.23	0.25	0.27	0.29	0.31	0.33	0.35

- All coil performance in accordance with AHRI 410-2001
- Heating capacities are in MBH
- Data based on 180°F entering water and 65°F entering air
- For temperature differentials other than 115°, multiply MBH by correction factors below
- Head loss is in feet of water
- Always supply water to lowest connection pipe to prevent air entrapment
- Air temperature rise = 927 x MBH/cfm
- Water temperature drop = 2.04 x MBH/gpm
- Connection size is $^{5}/_{8}$" OD male solder
- Coils are not intended for steam applications and are labeled for a maximum water temperature of 200°F
- Coils are tested for leakage at test pressure of 500 psi
- Water volumes less than those shown may result in laminar flow and reduced heating capacity. If possible reduce the number of coil rows to increase water velocity into turbulent range.



Correction factors for other entering conditions:

ΔT	50	60	70	80	90	100	115	125	140	150
Factor	0.44	0.52	0.61	0.70	0.79	0.88	1.00	1.07	1.20	1.30

PTFS, ATFS, DTFS / RADIATED SOUND PERFORMANCE

Size	CFM	Discharge Ps	Min ΔPs	Octave Band Sound Power, Lw																									
				Fan Only							0.5" ΔPs							1.0" ΔPs							1.5" ΔPs						
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
A06	200	0.25	0.01	57	48	47	40	33	24	21	62	53	48	44	40	34	24	63	55	49	45	42	37	25	64	56	50	46	44	39	27
	250		0.01	59	50	48	42	36	28	22	65	57	50	46	42	37	28	66	58	52	48	45	40	29	67	59	52	49	46	42	31
	275		0.01	60	51	48	44	38	30	22	66	58	51	47	43	38	29	68	60	52	49	46	41	32	69	60	53	50	47	43	33
	300		0.01	60	52	48	45	39	32	22	68	59	52	48	44	39	32	69	61	53	50	46	43	33	70	62	54	51	48	44	34
	350		0.01	62	54	49	47	41	35	24	70	62	53	50	46	41	34	71	63	55	51	48	44	36	72	64	56	52	49	46	37
B08	350	0.25	0.03	58	54	51	46	36	33	25	57	52	51	48	38	37	25	58	55	54	49	42	42	28	59	57	55	50	44	45	29
	400		0.04	60	56	52	48	38	37	27	58	54	53	49	40	38	27	60	57	55	51	44	43	29	61	59	56	52	46	46	30
	450		0.05	62	58	53	50	41	39	28	59	56	54	51	41	40	28	61	59	56	52	45	45	30	62	60	58	53	47	47	32
	500		0.06	64	59	55	52	43	42	30	61	57	55	52	43	41	29	62	60	57	54	46	46	31	63	62	59	55	48	49	34
	550		0.07	66	61	56	53	44	44	31	62	58	56	54	44	42	30	64	61	58	55	47	47	32	65	63	60	56	49	50	35
C10	550	0.25	0.04	61	49	50	46	36	32	24	61	53	52	48	40	37	26	64	58	55	51	44	43	29	66	61	57	53	47	46	31
	650		0.06	62	52	52	49	39	36	27	63	55	54	50	42	39	28	66	60	57	53	46	45	31	68	63	59	55	49	48	34
	800		0.09	64	54	55	52	43	42	30	65	57	56	53	44	42	30	68	62	60	56	49	47	35	70	65	62	58	51	50	37
	950		0.12	65	57	57	55	47	46	32	66	59	58	55	46	44	32	70	64	62	58	51	49	37	71	67	64	60	53	53	39
	1100		0.16	66	59	59	58	49	50	34	68	60	60	57	48	46	35	71	65	63	60	52	51	38	73	68	65	62	55	54	40
D12	1000	0.25	0.03	59	54	51	47	42	39	25	65	58	56	53	46	42	30	67	61	58	56	50	45	32	68	62	59	57	53	47	34
	1150		0.05	62	56	54	50	45	42	29	67	60	58	55	48	44	32	69	63	60	57	52	47	35	70	64	61	59	55	49	36
	1300		0.06	64	58	56	53	47	45	31	68	62	59	56	49	46	34	71	65	61	59	53	49	36	72	66	62	61	56	51	37
	1450		0.07	66	60	58	55	50	48	33	70	64	61	58	50	48	36	72	66	63	60	55	51	38	74	68	64	62	57	53	40
	1600		0.09	68	62	60	57	52	50	35	71	65	62	59	51	50	37	74	68	64	62	56	53	40	75	69	65	63	58	55	41
E14	1500	0.25	0.04	68	62	60	56	48	44	35	70	64	62	58	50	46	37	72	66	63	60	53	49	38	73	67	64	61	55	50	39
	1650		0.05	70	63	61	58	50	46	36	72	66	63	59	51	48	38	74	68	64	61	55	50	40	75	69	65	62	57	52	41
	1800		0.06	72	64	62	59	52	49	38	74	67	64	61	52	49	40	76	69	66	63	56	52	42	77	70	66	64	58	54	43
	1950		0.08	73	66	63	61	54	51	39	76	69	65	62	53	51	42	77	71	67	64	57	54	43	78	72	67	65	59	55	45
	2100		0.09	74	67	64	62	56	53	40	77	70	66	63	54	52	43	79	72	68	65	58	55	46	80	73	69	66	60	57	47
G16	2400	0.25	0.07	68	66	61	58	52	50	37	71	67	62	58	55	51	37	75	72	67	63	59	56	43	77	75	70	66	62	58	47
	2500		0.08	69	66	62	58	53	50	38	71	68	63	58	55	52	38	75	73	68	63	60	56	44	77	76	71	67	62	59	48
	2600		0.09	69	67	62	59	54	51	38	72	68	63	59	56	52	38	76	73	68	64	60	57	44	78	76	71	67	63	59	48
	2700		0.09	70	67	63	60	54	52	39	72	69	64	59	56	53	40	76	74	69	64	60	57	45	78	76	72	67	63	60	48
	2800		0.10	71	68	64	60	55	53	40	72	69	64	59	56	53	40	76	74	69	64	61	58	45	79	77	72	67	63	60	49

- Radiated sound is the noise transmitted through the unit casing and emitted from the induction port
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N41 for AHRI Certified Performance Listings.

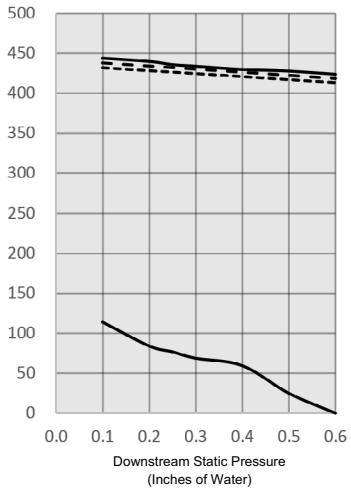
PTFS, ATFS, DTFS / DISCHARGE SOUND PERFORMANCE

Size	CFM	Discharge Ps	Min ΔPs	Octave Band Sound Power, Lw																									
				Fan Only							0.5" ΔPs							1.0" ΔPs							1.5" ΔPs						
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
A06	200	0.25	0.01	66	57	56	52	51	45	**22**	68	59	58	55	53	48	**25**	68	60	58	55	53	49	**25**	68	60	59	55	53	49	**25**
	250		0.01	67	59	58	56	54	50	**24**	70	62	61	58	56	52	**28**	70	63	61	58	57	53	**28**	70	63	61	58	57	53	**28**
	275		0.01	67	60	60	57	56	52	**24**	70	63	62	59	58	54	**28**	71	64	62	59	58	55	**29**	71	64	62	59	58	55	**29**
	300		0.01	68	61	60	59	57	54	**21**	71	64	63	61	59	54	**25**	72	65	63	61	60	56	**26**	72	66	63	61	60	57	**26**
	350		0.01	69	63	62	61	60	57	**22**	73	66	65	63	62	57	**28**	73	67	65	63	62	59	**28**	74	68	65	63	62	60	**29**
B08	350	0.25	0.03	68	56	52	53	52	49	**21**	69	58	54	55	55	53	**22**	71	59	54	55	55	53	**25**	72	60	54	54	55	53	**26**
	400		0.04	71	59	54	55	54	52	**25**	70	60	55	56	57	55	**24**	72	61	56	56	57	55	**26**	73	62	56	56	57	55	**28**
	450		0.05	73	61	55	57	56	54	**28**	72	61	57	58	59	57	**26**	73	62	57	58	59	57	**28**	74	63	57	58	58	57	**29**
	500		0.06	75	64	57	58	58	56	**30**	73	62	58	59	60	59	**28**	74	64	58	59	60	58	**29**	75	64	58	59	60	58	**30**
	550		0.07	77	65	58	60	60	58	**33**	74	63	59	61	61	60	**29**	75	65	59	60	61	60	**30**	76	65	59	60	61	60	**31**
C10	550	0.25	0.04	77	55	52	50	50	49	**33**	78	58	55	54	53	52	**34**	79	60	55	54	54	53	**35**	79	60	56	54	54	53	**35**
	650		0.06	77	58	55	54	54	53	**33**	79	61	57	57	57	56	**35**	79	62	58	57	57	57	**35**	79	63	58	57	57	57	**35**
	800		0.09	78	62	58	59	59	58	**31**	80	64	60	61	61	61	**34**	80	66	61	61	61	61	**34**	80	67	61	61	61	61	**34**
	950		0.12	78	65	61	63	63	62	**31**	80	67	63	64	64	64	**34**	81	69	63	64	65	65	**35**	81	69	63	64	65	65	**35**
	1100		0.16	79	68	63	66	66	66	**33**	81	69	65	67	67	67	**35**	81	71	65	67	68	68	**35**	82	72	65	67	68	68	**36**
D12	1000	0.25	0.03	76	64	57	60	65	63	**29**	82	68	62	64	67	67	**36**	83	69	63	66	64	65	**38**	83	70	63	67	62	63	**38**
	1150		0.05	78	67	59	63	66	65	**31**	84	70	64	65	68	68	**39**	85	71	65	67	65	66	**40**	85	71	65	68	63	64	**40**
	1300		0.06	79	68	61	64	68	67	**33**	85	72	66	67	70	70	**40**	86	73	66	68	66	67	**42**	87	73	67	69	64	66	**43**
	1450		0.07	80	70	63	66	69	68	**34**	87	73	67	68	71	70	**43**	88	74	68	70	67	68	**44**	88	75	68	71	66	67	**44**
	1600		0.09	81	71	65	68	70	69	**35**	88	74	69	69	72	71	**44**	89	75	69	71	69	69	**45**	89	76	69	72	67	67	**45**
E14	1500	0.25	0.04	82	74	64	67	69	66	**36**	89	77	69	68	71	70	**45**	90	78	70	71	71	71	**47**	91	78	71	73	71	71	**48**
	1650		0.05	83	75	66	69	70	68	**38**	90	79	70	69	72	71	**47**	91	79	71	72	72	71	**48**	92	79	72	74	72	72	**49**
	1800		0.06	84	76	67	71	72	70	**39**	92	80	71	70	73	72	**49**	93	80	72	73	73	72	**51**	93	81	73	75	72	72	**51**
	1950		0.08	85	78	69	72	73	72	**40**	93	81	72	72	74	73	**51**	94	82	74	74	73	73	**52**	94	82	74	76	73	73	**52**
	2100		0.09	86	79	70	74	75	74	**42**	94	82	73	73	75	73	**52**	95	83	75	76	74	74	**53**	96	83	75	77	74	74	**54**
G16	2400	0.25	0.07	74	70	68	66	64	63	**28**	74	70	68	66	64	63	**28**	76	70	70	68	66	65	**29**	76	72	71	69	67	65	**31**
	2500		0.08	74	71	69	67	65	64	**30**	74	73	69	67	65	64	**32**	74	73	71	69	67	64	**32**	76	73	71	70	68	66	**32**
	2600		0.09	75	71	69	67	66	65	**30**	75	71	69	67	66	65	**30**	77	73	71	70	68	67	**32**	77	73	72	70	68	67	**32**
	2700		0.09	75	72	70	68	66	65	**31**	75	72	70	68	66	65	**31**	77	72	72	71	68	67	**31**	77	74	73	71	69	68	**33**
	2800		0.10	76	72	70	69	67	66	**31**	76	72	71	69	69	66	**31**	78	74	73	71	69	68	**31**	78	74	73	72	70	68	**33**

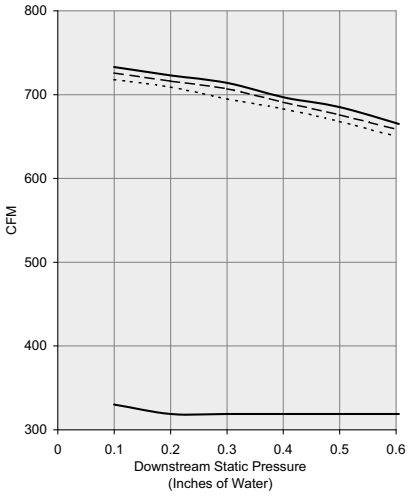
- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N41 for AHRI Certified Performance Listings.

PTFS, ATFS, DTFS WITH ECM MOTOR / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE

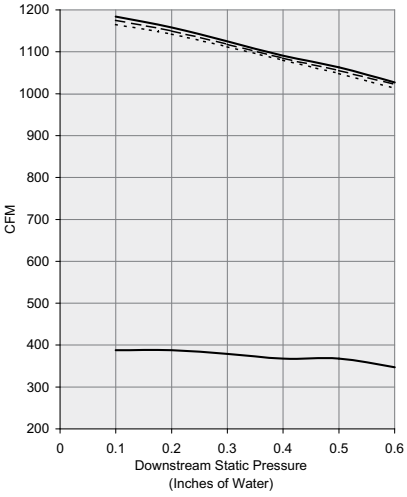
TFS w /ECM Size A



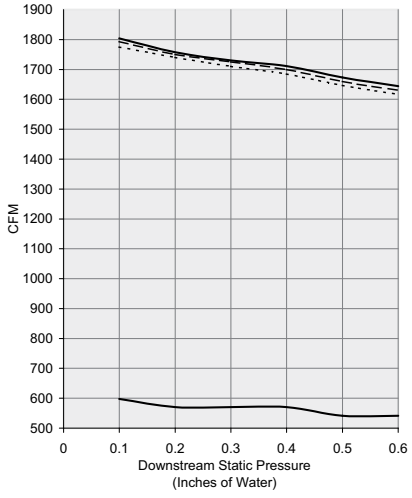
TFS w/ECM Size B



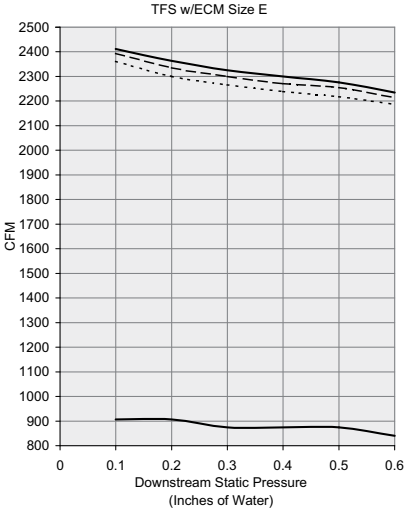
TFS w/ECM Size C



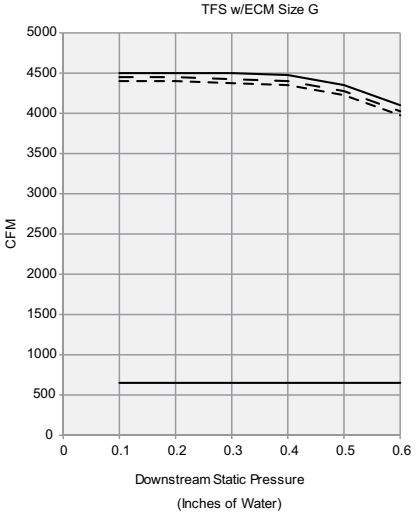
TFS w/ECM Size D



TFS w/ECM Size E



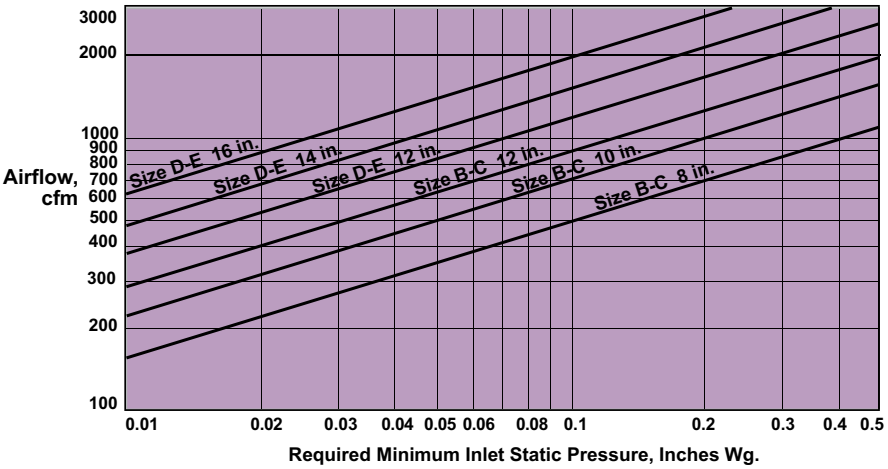
TFS w/ECM Size G



No Coil or with Electric Coil
1 Row Water Coil
2 Row Water Coil

PTFS, ATFS, DTFS WITH ECM MOTOR / PRIMARY AIR INLET PRESSURE

PRIMARY AIR INLET PRESSURE / PTFS, ATFS, DTFS



Note: For selection procedure, See the section Engineering Guidelines and the topic 'ECM Motors - Fan Powered Terminals' for additional information.

ECM ELECTRICAL DATA

Unit Size	Motor HP	120V	208/240V	277V
A	1/3	5.0	2.8	2.6
B	1/3	5.0	2.8	2.6
C	1/3	5.0	2.8	2.6
D	1/2	7.7	4.3	4.1
E	3/4	9.6	6.8	5.5
G	(2) 1	25.6	18.2	13.8

PTFS, ATFS, DTFS WITH ECM / RADIATED SOUND PERFORMANCE

Size	CFM	Discharge Ps	Min ΔPs	Octave Band Sound Power, Lw																									
				Fan Only							0.5" ΔPs							1.0" ΔPs							1.5" ΔPs					
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
A06	150	0.25	0.01	48	42	38	34	27	17	**11**	57	49	43	41	38	31	**18**	58	51	45	43	40	35	**19**	59	52	46	44	41	37	**20**
	200		0.01	53	46	42	39	32	24	**16**	61	54	47	44	41	35	**23**	62	55	48	46	43	38	**24**	63	56	49	47	44	40	**25**
	250		0.01	57	49	45	43	37	30	**19**	64	57	50	47	43	38	**27**	66	59	51	48	45	41	**29**	67	60	52	49	46	43	**31**
	300		0.01	60	52	48	46	40	34	**22**	67	60	52	49	45	40	**31**	69	61	54	50	47	43	**33**	69	62	55	51	48	45	**33**
	350		0.01	63	54	50	48	43	38	**26**	69	62	54	51	46	42	**33**	71	64	56	52	48	45	**36**	72	65	56	53	49	47	**37**
B08	400	0.25	0.04	60	56	51	49	40	38	**25**	58	55	51	49	40	38	**25**	59	57	54	51	44	43	**28**	60	59	56	52	46	46	**30**
	475		0.05	63	59	54	52	43	41	**29**	60	57	53	51	42	40	**27**	62	60	56	53	46	45	**30**	63	62	58	54	48	48	**32**
	550		0.07	65	61	55	54	45	44	**31**	62	59	55	53	44	42	**29**	64	62	58	55	48	47	**32**	65	64	60	56	50	50	**35**
	625		0.09	68	63	57	55	47	47	**33**	64	61	57	55	45	44	**31**	66	64	59	57	49	49	**34**	67	66	61	58	51	52	**36**
	700		0.11	69	65	59	57	49	49	**36**	66	63	58	56	46	45	**33**	68	66	61	58	50	50	**36**	69	67	63	59	52	53	**38**
C10	500	0.25	0.03	46	42	47	43	34	30	**21**	56	52	50	46	38	36	**24**	60	57	53	49	43	41	**27**	62	60	56	51	46	44	**30**
	650		0.06	53	49	52	48	39	37	**27**	59	54	53	49	41	39	**27**	63	59	56	52	46	44	**30**	66	63	59	54	48	47	**34**
	800		0.09	59	55	55	52	44	42	**30**	62	56	55	52	43	41	**29**	66	61	59	55	48	47	**34**	68	64	61	56	51	50	**36**
	950		0.12	64	59	58	55	47	47	**33**	64	58	57	54	45	43	**31**	68	63	61	57	50	49	**36**	70	66	63	59	53	52	**38**
	1100		0.16	69	64	61	58	51	50	**36**	65	59	59	56	47	45	**34**	69	64	62	59	52	50	**37**	72	67	64	60	54	54	**39**
D12	800	0.25	0.02	57	51	49	46	39	35	**23**	60	55	53	50	43	39	**27**	62	58	55	53	48	43	**29**	64	59	57	55	51	44	**31**
	1000		0.03	60	55	53	49	43	40	**28**	63	58	56	53	46	43	**30**	65	61	58	56	50	46	**32**	67	62	60	58	53	48	**35**
	1200		0.05	63	57	56	52	47	44	**31**	65	61	59	55	48	45	**34**	68	64	61	58	52	48	**36**	70	65	62	60	55	50	**37**
	1400		0.07	65	60	58	55	49	48	**33**	68	63	61	57	49	48	**36**	70	66	63	60	54	51	**38**	72	68	64	62	57	53	**39**
	1600		0.09	67	62	60	57	52	51	**35**	70	65	63	59	51	49	**38**	72	68	65	62	55	53	**40**	74	70	66	63	58	55	**41**
E14	1000	0.25	0.02	56	57	50	48	38	33	**26**	62	55	54	52	44	38	**28**	64	58	56	54	48	41	**30**	65	59	57	56	51	43	**31**
	1200		0.03	60	54	53	51	42	38	**28**	66	59	57	54	46	41	**31**	68	61	59	57	51	45	**34**	69	63	60	58	53	47	**35**
	1500		0.04	65	59	57	55	47	44	**32**	70	63	60	58	49	45	**35**	72	65	62	60	53	49	**37**	73	67	63	61	56	51	**38**
	1800		0.06	69	63	61	59	52	48	**36**	74	66	63	60	52	49	**40**	76	69	65	63	56	52	**42**	77	70	66	64	58	54	**43**
	2100		0.09	72	66	64	61	55	53	**40**	77	69	66	62	54	51	**43**	79	72	68	65	58	55	**46**	80	73	69	66	60	57	**47**
G16	2000	0.25	0.05	65	63	58	54	49	46	**33**	69	65	60	56	53	49	**35**	73	70	66	62	57	53	**41**	75	73	69	65	60	56	**44**
	2200		0.06	67	64	60	56	51	48	**35**	70	66	61	57	54	50	**36**	74	71	67	62	58	54	**42**	76	74	70	65	61	57	**46**
	2400		0.07	68	66	61	58	52	50	**37**	71	67	62	58	55	51	**37**	75	72	67	63	59	56	**43**	77	75	70	66	62	58	**47**
	2600		0.09	69	67	62	59	54	51	**38**	72	68	63	59	56	52	**38**	76	73	68	64	60	57	**44**	78	76	71	67	63	59	**48**
	2800		0.10	71	68	64	60	55	53	**40**	72	69	64	59	56	53	**40**	76	74	69	64	61	58	**45**	79	77	72	67	63	60	**49**

- Radiated sound is the noise transmitted through the unit casing and emitted from the induction port
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N41 for AHRI Certified Performance Listings.

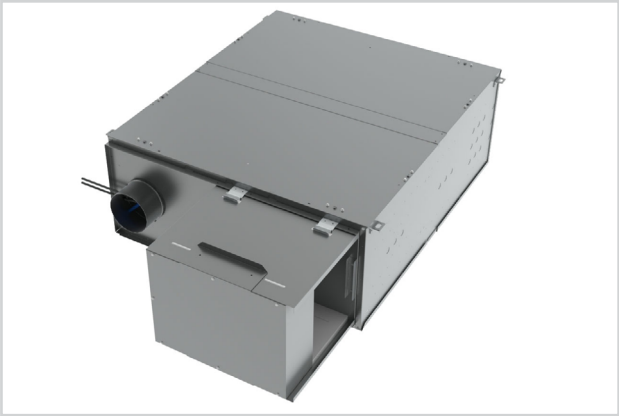
PTFS, ATFS, DTFS WITH ECM / DISCHARGE SOUND PERFORMANCE

Size	CFM	Discharge Ps	Min ΔPs	Octave Band Sound Power, Lw																									
				Fan Only							0.5" ΔPs							1.0" ΔPs							1.5" ΔPs					
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
A06	150	0.25	0.01	56	50	51	47	45	41	10	59	53	55	51	49	45	13	60	54	55	51	49	46	15	60	54	55	50	49	46	15
	200		0.01	60	54	55	52	50	47	15	63	57	58	55	53	50	19	64	58	58	55	53	51	20	64	59	58	55	53	51	20
	250		0.01	63	57	58	56	54	51	19	66	61	61	59	57	54	22	67	61	61	59	57	55	24	67	62	61	59	57	55	24
	300		0.01	65	59	60	59	57	54	18	69	63	63	62	60	57	22	69	64	63	62	60	58	23	70	64	63	62	60	58	24
	350		0.01	67	61	62	62	60	57	21	71	65	65	64	63	60	25	72	66	65	64	63	60	26	72	66	65	64	63	61	26
B08	400	0.25	0.04	74	63	58	59	58	57	29	67	57	51	53	54	51	20	68	57	52	54	54	51	21	68	58	52	54	54	51	21
	475		0.05	75	65	59	60	60	59	30	70	60	54	57	57	55	24	71	61	55	57	57	55	25	71	61	55	57	57	55	25
	550		0.07	76	66	60	62	61	60	31	73	63	57	59	60	59	28	74	64	57	60	60	59	29	74	64	57	60	60	59	29
	625		0.09	77	67	61	63	63	62	33	75	66	59	62	63	62	30	76	67	59	62	63	62	31	76	67	60	62	63	62	31
	700		0.11	77	68	62	64	64	63	33	78	68	61	64	65	64	34	78	69	61	64	65	64	34	79	69	61	64	65	64	35
C10	500	0.25	0.03	70	62	57	58	58	57	24	67	57	52	52	50	49	20	68	58	52	52	51	49	21	68	58	52	52	51	49	21
	650		0.06	72	64	59	60	61	59	26	70	62	56	57	56	55	24	71	62	56	57	56	55	25	72	63	56	57	56	55	26
	800		0.09	74	65	60	62	62	61	26	73	65	59	61	60	59	25	74	66	59	61	60	60	26	75	66	60	61	61	60	28
	950		0.12	75	67	61	63	64	63	28	76	68	62	64	64	63	29	77	69	62	64	64	64	30	77	69	62	64	64	64	30
	1100		0.16	76	68	62	64	65	64	29	78	71	64	67	67	67	31	79	72	64	67	67	67	33	79	72	65	67	67	67	33
D12	800	0.25	0.02	69	59	54	57	59	58	22	68	53	53	55	53	51	19	68	55	55	57	54	53	19	68	56	57	59	55	53	19
	1000		0.03	71	61	56	59	61	60	24	71	57	57	59	58	57	22	71	59	60	61	59	58	22	71	61	61	63	60	59	23
	1200		0.05	73	63	58	61	62	61	25	74	61	61	62	62	61	26	74	63	63	65	63	62	26	74	64	65	66	64	63	27
	1400		0.07	74	65	59	62	64	63	27	76	65	64	65	65	65	29	76	67	67	68	66	66	30	76	68	68	69	67	67	30
	1600		0.09	75	66	60	63	65	64	28	78	67	67	68	68	68	31	78	69	69	70	69	69	32	78	71	71	71	70	70	33
E14	1000	0.25	0.02	77	62	55	59	59	55	30	77	70	64	64	66	63	30	78	72	66	67	67	65	31	78	72	68	69	69	66	31
	1200		0.03	78	67	59	62	62	60	31	79	72	66	66	68	66	33	80	74	69	69	70	68	34	80	75	70	71	71	69	34
	1500		0.04	80	71	63	67	67	65	34	82	75	69	69	71	69	36	82	76	71	72	73	71	36	82	77	73	73	74	72	37
	1800		0.06	82	75	67	70	71	70	36	84	77	71	71	73	72	39	84	79	74	74	75	74	39	84	80	75	75	76	75	40
	2100		0.09	83	79	70	74	75	74	39	85	79	73	73	75	75	40	86	80	76	75	77	76	42	86	81	77	77	78	77	42
G16	2000	0.25	0.05	71	68	66	62	61	61	26	71	68	66	62	61	61	26	71	70	68	64	61	61	28	71	70	68	65	63	63	28
	2200		0.06	73	69	67	64	63	62	27	73	69	67	64	63	62	27	73	69	67	66	65	62	27	73	69	69	67	65	64	28
	2400		0.07	74	70	68	66	64	63	28	74	70	68	66	64	63	28	76	70	70	68	66	65	29	76	72	71	69	67	65	31
	2600		0.09	75	71	69	67	66	65	30	75	71	69	67	66	65	30	77	73	71	70	68	67	32	77	73	72	70	68	67	32
	2800		0.10	76	72	70	69	67	66	31	76	72	70	69	69	66	31	78	74	73	71	69	68	33	78	74	73	72	70	68	33

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N41 for AHRI Certified Performance Listings.

TFS-F FANTOM IQ™ / TFS-F-S

- Two casings for easy design layout
- Integral patent pending FAST™ attenuator system, has internal and external attenuator sections
- Pressure independent primary airflow control
- AeroCross™ multi-point inlet velocity sensor with center averaging
- Energy-efficient fan motor, permanent split capacitor type, mounted with vibration isolators
- Optional TITAN™ programmed ECM brushless DC motor provides ultra-high efficiency, pressure independent operation
- Adjustable SCR fan speed control with minimum voltage stop
- Single point electrical, pneumatic main, and thermostat connections
- 20-gauge galvanized steel casing
- Centered, rectangular discharge opening is designed for flanged duct connections
- Top and bottom access panels can be removed for service



TFS-F FANTOM IQ™ / TFS-F-S

- OSP & IBC seismic certifications available for TFS-F-S units with Titus pneumatic, analog, and digital controls

seismic certified | open ceiling | energy solutions

See website for Specifications

MODELS:

PTFS-F / Pneumatic Control
ATFS-F / Analog Control
DTFS-F / Digital Control
TFS-F-S / Seismic Option

OVERVIEW

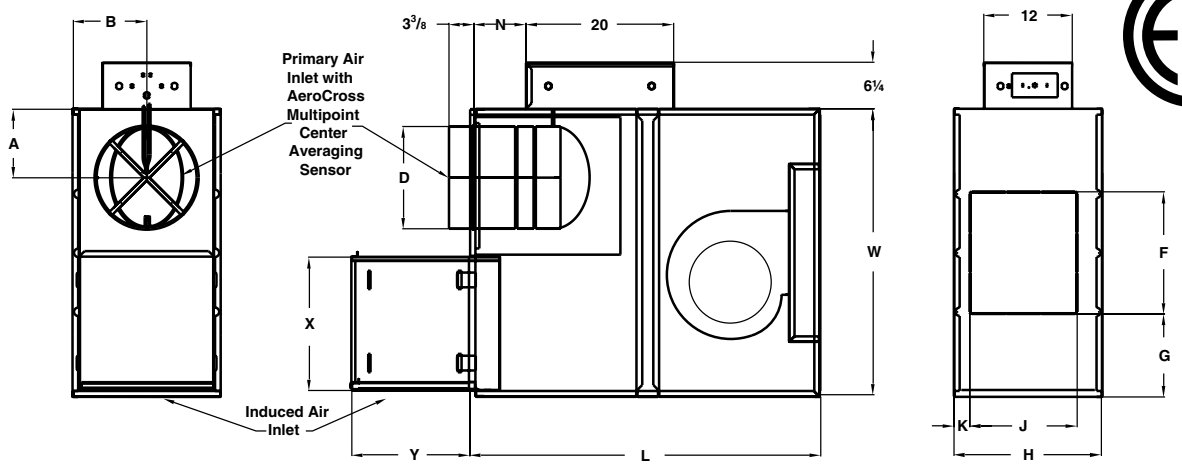
Quiet Operation

The quietest fan powered terminal in the market is the TFS-F Fantom IQ™. The Fantom IQ™ utilizes the patent pending FAST™ attenuator system that greatly reduces radiated sound power levels. The unique FAST™ attenuator is shipped completely assembled inside the casing, and is easily pulled out and snapped into place for operation.

The Titus TFS-F Fantom IQ™ terminal unit installed in an open ceiling environment of a corporate office

TFS-F FANTOM UNIT DIMENSIONS

TFS-F / Sizes B-E



TFS-F Fantom IQ™ Series Unit																	
Size	Unit	A	B	X	Y	D	Induced Air Inlet		F	G	H	J	K	L	N	W	Filter Size
							Height	Width									
B	6	6	8	19	13⅞	5⅞	12⅝	8¾	14	11½	16	11	2¼	43	2⅞	37	11 x 14
	8	6				7⅞									2⅞		
	10	7				9⅞									4⅞		
	12	8				11⅞									4⅞		
C	6	6				5⅞									2⅞		
	8	6				7⅞									2⅞		
	10	7				9⅞									4⅞		
	12	8				11⅞									4⅞		
D	10	7	10	18⅛	16⅞	9⅞	16⅝	15¾	16½	11¼	20	14⅝	2	46¾	4⅞	39	18 x 17
	12	8				11⅞									4⅞		
	14	10				13⅞									6⅞		
	16	11				15⅞									6⅞		
E	12	8				11⅞									4⅞		
	14	10				13⅞									6⅞		
	16	11				15⅞									6⅞		

All dimensions are in inches

HOT WATER COIL SECTION

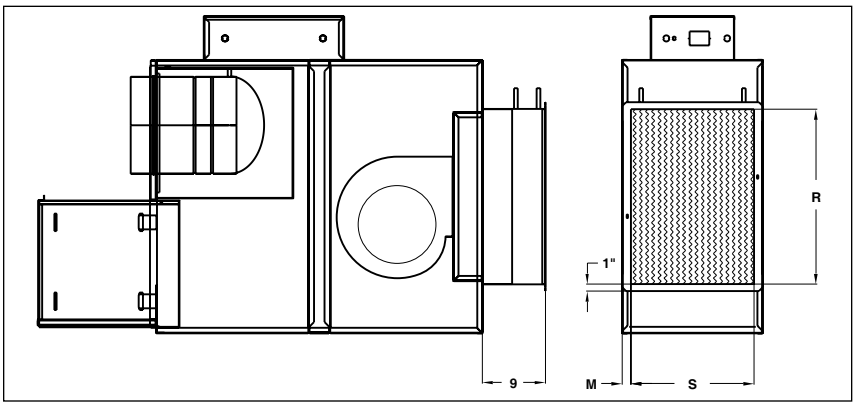
STANDARD FEATURES

- ½" copper tubes
- Aluminum ripple fins
- Connections: Male solder $^{5}/_{8}$" for both 1- and 2-row. Left or right hand connections.
- Galvanized steel casing
- Flanged duct connection
- Coil is installed at discharge of unit

COIL ROWS

- 1-Row
- 2-Row

Note: R and S are inside dimensions



Hot Water Coil Section (Discharge Mounted)				
Unit Size	M (1-Row)	M (2-Row)	R	S
B, C	1	1	20½	12½
D, E	1	1¼	25	17½

ELECTRIC COIL SECTION

STANDARD FEATURES

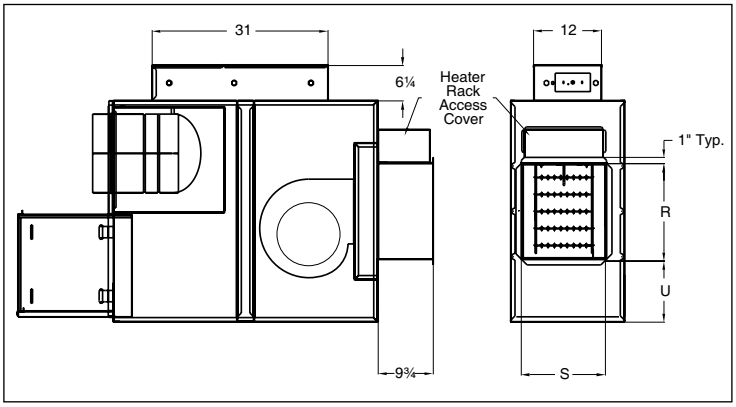
- Auto reset thermal cutouts (one per element)
- 80/20 Nickel chrome heating elements
- Magnetic contactors, where required, on pneumatic units
- Airflow safety switch
- Line terminal block (277/1∅, 208/240/3∅, or 480/3∅ 4 wire)
- Flanged connection
- Control transformer for DDC or Analog electronic controls
- Pneumatic electric switch for pneumatic parallel fan terminals only
- Fan relay for DDC fan terminals
- Magnetic contactor per step on terminals with DDC or analog electronic controls

OPTIONS

- Interlocking disconnect
- Main power supply fuses
- Mercury contactors
- Manual reset thermal cutout
- Dust-tight construction
- Optional Lynergy Comfort Controlled SSR Electric Heat available

SUPPLY VOLTAGE

- 208V, 1 ph, 60 Hz.
- 240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.
- 208V, 3 ph, 60 Hz.
- 480V, 3 ph, 60 Hz. (4 wire wye only)



Electric Coil Section (Discharge Mounted)				
Unit Size	U	R	S	T
B, C	$11^{3}/_{8}$	14½	11½	$2^{3}/_{8}$
D, E	11	17	15	$3^{1}/_{8}$

Note: R and S are inside dimensions.
See Electric Heat Coils in Section O for more information.

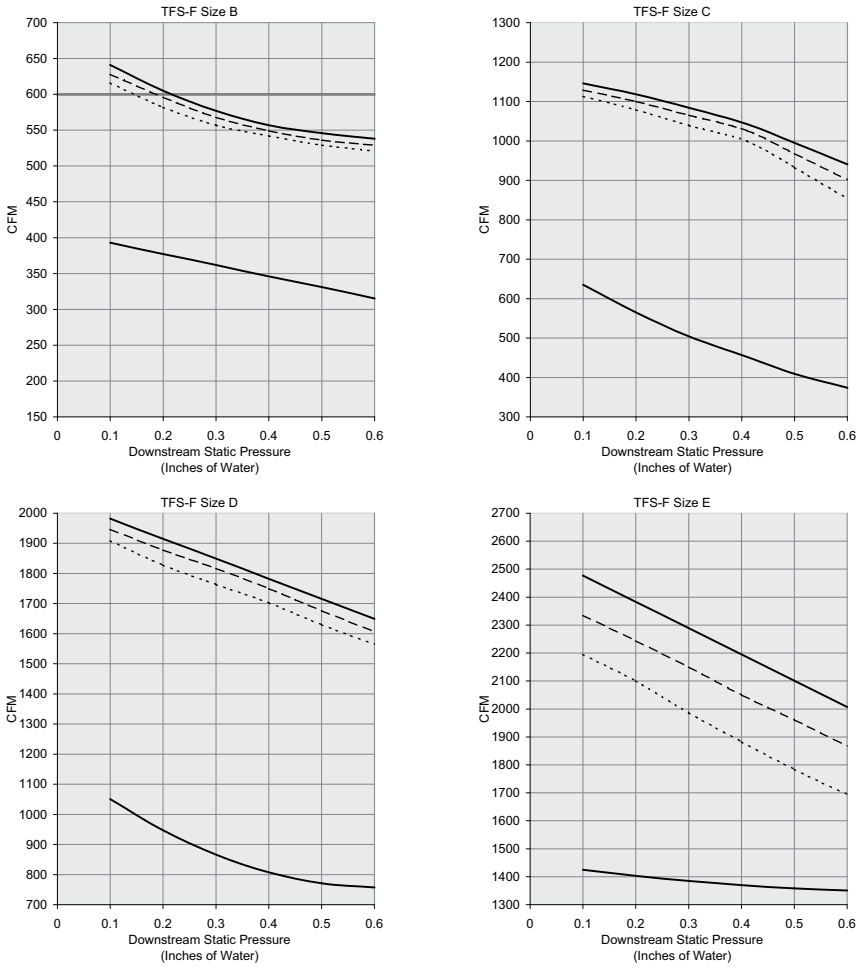
ADDITIONAL ACCESSORIES (OPTIONAL)

- Induced air filter, 1" thick disposable construction type
- Fan disconnect switch (not available on units with optional electric coils)
- 1" Liner
- Fibre-Free Liner
- SteriLoc Liner
- EcoShield liner
- Fan unit fusing
- Hanger brackets
- Camlocks on fan access door

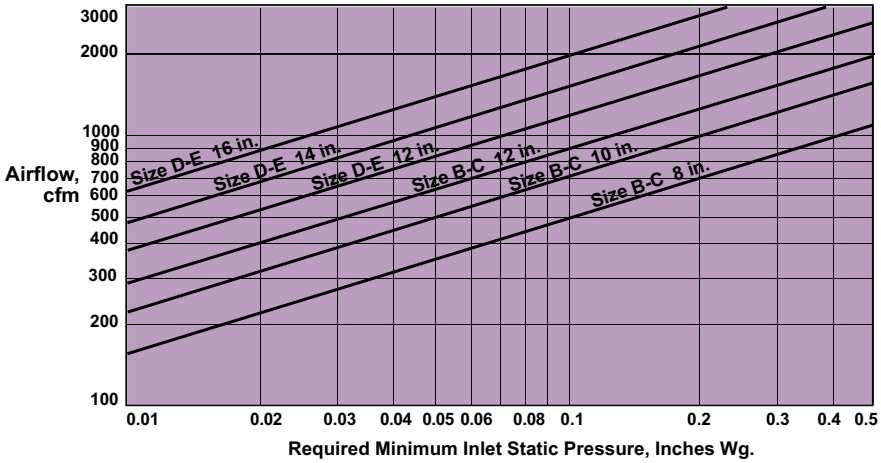
Electrical Data				
Unit Size	Motor HP	120V	208/240V	277V
		FLA	FLA	FLA
B	$^{1}/_{6}$	3.0	1.4	1.0
C	$^{1}/_{4}$	3.9	1.7	1.5
D	$^{1}/_{3}$	7.4	3.0	2.6
E	$^{3}/_{4}$	11.2	5.3	4.5

All motors are single phase, 60(Hz).
FLA = Full Load Amperage, as tested in accordance with UL 60335.
All fan motors are same voltage as electric coil (when supplied), with exception that 277V motors are used with 480V 3 Phase coils (four wire wye).
For ECM electrical data see page N38

PTFS-F, ATFS-F, DTFS-F / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE



PRIMARY AIR INLET PRESSURE / PTFS-F, ATFS-F, DTFS-F



Note: For selection procedure, see the Engineering Guidelines and the topic, 'Sizing Basic Terminals from Capacity Tables'.

PTFS-F, ATFS-F, DTFS-F / WATER COIL HEATING CAPACITY (MBH)

Unit Size	Rows	gpm	Head Loss	Airflow, cfm								
				200	250	300	350	400	450	500	550	600
B	One Row	1.0	0.16	14.3	14.8	15.4	15.9	16.3	16.7	17.1	17.5	17.8
		2.0	0.50	16.4	17.2	18.0	18.6	19.3	19.9	20.5	21.0	21.6
		4.0	1.83	17.7	18.6	19.6	20.4	21.2	21.9	22.6	23.3	23.9
		6.0	3.95	18.2	19.2	20.2	21.0	21.9	22.7	23.5	24.1	24.9
		Airside ΔPs		0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03
	Two Row	1.0	0.14	20.4	21.3	22.1	22.8	23.5	24.1	24.7	25.1	25.6
		2.0	0.33	25.0	26.4	27.9	29.1	30.4	31.5	32.6	33.5	34.5
		4.0	1.19	27.4	29.1	31.0	32.6	34.2	35.6	37.1	38.4	39.7
		6.0	2.56	28.2	30.1	32.1	33.8	35.6	37.2	38.8	40.2	41.7
		Airside ΔPs		0.03	0.03	0.04	0.04	0.05	0.05	0.06	0.07	0.07

Unit Size	Rows	gpm	Head Loss	Airflow, cfm								
				400	490	580	670	760	850	940	1030	1100
C	One Row	1.0	0.16	14.5	15.7	16.7	17.5	18.3	18.9	19.5	20.0	20.4
		2.0	0.50	16.4	18.1	19.5	20.7	21.8	22.8	23.6	24.4	25
		4.0	1.87	17.6	19.5	21.2	22.6	24.0	25.1	26.2	27.2	28
		6.0	4.05	18	20	21.8	23.4	24.8	26.1	27.2	28.2	29.1
		Airside ΔPs		0.02	0.03	0.03	0.04	0.05	0.06	0.07	0.08	0.09
	Two Row	1.0	0.13	21.5	23.4	24.90	26.20	27.30	28.20	29.00	29.6	30.1
		2.0	0.33	26.4	29.5	32.20	34.50	36.60	38.40	40.00	41.4	42.4
		4.0	1.21	28.9	32.8	36.20	39.30	42.00	44.50	46.80	48.8	50.3
		6.0	2.61	29.8	34	37.80	41.10	44.20	46.90	49.50	51.8	53.5
		Airside ΔPs		0.04	0.05	0.07	0.08	0.10	0.12	0.14	0.16	0.18

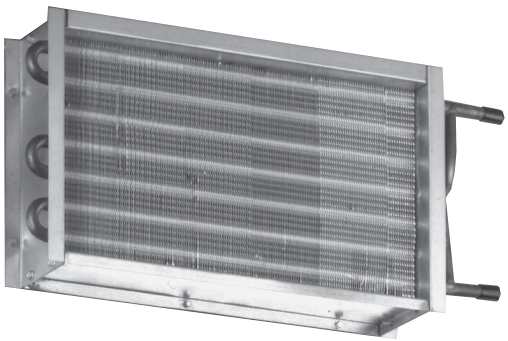
Unit Size	Rows	gpm	Head Loss	Airflow, cfm								
				800	925	1050	1175	1300	1425	1550	1675	1800
D	One Row	1.0	0.26	23.7	24.9	25.9	26.8	27.5	28.2	28.8	29.4	29.9
		2.0	0.78	28.7	30.5	32.1	33.5	34.8	36.0	37.0	38.0	38.9
		4.0	2.86	31.7	33.9	36.0	37.8	39.5	41.0	42.5	43.8	45.0
		6.0	6.19	32.8	35.3	37.5	39.5	41.3	43.0	44.6	46.1	47.5
		Airside ΔPs		0.02	0.03	0.04	0.04	0.05	0.06	0.07	0.08	0.09
	Two Row	1.0	0.53	35.9	37.6	39.1	40.2	41.2	42.1	42.9	43.5	44.1
		2.0	1.49	46.5	49.8	52.7	55.3	57.5	59.6	61.4	63.0	64.5
		4.0	5.46	53.0	57.7	61.8	65.6	69.0	72.2	75.0	77.7	80.2
		6.0	5.48	53.0	57.7	61.8	65.6	69.0	72.2	75.0	77.7	80.2
		Airside ΔPs		0.05	0.06	0.07	0.09	0.10	0.12	0.13	0.15	0.17

Unit Size	Rows	gpm	Head Loss	Airflow, cfm								
				1400	1525	1650	1775	1900	2025	2150	2275	2320
E	One Row	1.0	0.26	28.1	28.7	29.3	29.8	30.2	30.7	31.1	31.4	31.5
		2.0	0.77	35.7	36.8	37.8	38.7	39.6	40.4	41.1	41.8	42.0
		4.0	2.86	40.8	42.2	43.5	44.8	46.0	47.0	48.1	49.1	49.4
		6.0	6.19	42.7	44.3	45.8	47.2	48.5	49.7	50.9	52.0	52.4
		Airside ΔPs		0.06	0.07	0.07	0.08	0.09	0.10	0.11	0.12	0.13
	Two Row	1.0	0.53	41.9	42.7	43.4	44.0	44.5	45.0	45.4	45.8	46.0
		2.0	1.49	59.2	61.0	62.7	64.2	65.6	66.9	68.1	69.1	69.5
		4.0	5.46	71.5	74.5	77.2	79.7	82.0	84.2	86.3	88.2	88.8
		6.0	5.46	71.5	74.5	77.2	79.7	82.0	84.2	86.3	88.2	88.8
		Airside ΔPs		0.11	0.13	0.15	0.17	0.19	0.21	0.23	0.25	0.26

For Performance Notes, see the next page

PTFS-F, ATFS-F, DTFS-F / WATER COIL HEATING CAPACITY (MBH)

- All coil performance in accordance with AHRI 410-2001
- Heating capacities are in MBH
- Data based on 180°F entering water and 65°F entering air
- For temperature differentials other than 115°, multiply MBH by correction factors below
- Head loss is in feet of water
- Always supply water to lowest connection pipe to prevent air entrapment
- Air temperature rise = 927 x MBH/cfm
- Water temperature drop = 2.04 x MBH/gpm
- Connection size is $^{5}/_{8}$" OD male solder
- Coils are not intended for steam applications and are labeled for a maximum water temperature of 200°F
- Coils are tested for leakage at test pressure of 500 psi
- Water volumes less than those shown may result in laminar flow and reduced heating capacity. If possible reduce the number of coil rows to increase water velocity into turbulent range.



Correction factors for other entering conditions:

ΔT	50	60	70	80	90	100	115	125	140	150
Factor	0.44	0.52	0.61	0.70	0.79	0.88	1.00	1.07	1.20	1.30

PTFS-F, ATFS-F, DTFS-F / RADIATED SOUND PERFORMANCE

Size	CFM	Discharge Ps	Min ΔPs	Octave Band Sound Power, Lw																									
				Fan Only							0.5" ΔPs							1.0" ΔPs							1.5" ΔPs						
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
B08	375	0.25	0.03	56	43	42	35	35	32	**17**	54	44	42	40	40	37	**15**	56	46	44	41	42	40	**17**	57	48	44	42	43	42	**18**
	400		0.04	57	44	43	36	35	32	**18**	55	45	43	41	40	37	**16**	57	48	44	42	42	40	**18**	58	49	45	43	43	42	**19**
	450		0.05	59	47	45	38	36	33	**21**	57	47	45	42	41	38	**18**	59	50	46	43	43	41	**20**	59	51	46	44	44	43	**20**
	500		0.06	61	49	47	40	36	33	**23**	59	49	46	43	42	39	**20**	60	51	47	44	44	42	**22**	61	53	48	45	45	44	**23**
	550		0.07	63	51	48	41	37	34	**26**	60	50	47	44	42	40	**22**	62	53	48	45	44	43	**24**	62	55	49	46	45	45	**24**
C10	600	0.25	0.05	62	49	46	39	35	33	**24**	63	52	46	42	37	33	**25**	64	54	47	42	40	39	**27**	64	55	48	43	42	42	**27**
	700		0.07	63	51	48	42	37	34	**26**	63	53	48	43	38	34	**25**	64	55	49	44	41	40	**27**	64	56	49	45	43	43	**27**
	800		0.09	63	53	49	44	38	36	**26**	64	53	49	44	39	35	**27**	64	55	50	45	42	41	**27**	65	56	50	46	44	44	**28**
	900		0.11	64	54	51	46	40	37	**27**	64	54	50	46	40	36	**27**	64	56	51	46	43	41	**27**	65	57	52	47	45	45	**28**
	1050		0.15	65	56	53	49	42	38	**28**	64	55	51	47	41	37	**27**	65	56	52	48	44	42	**28**	65	57	53	49	46	46	**28**
D12	1000	0.25	0.03	62	52	47	42	37	31	**24**	61	52	48	43	39	35	**23**	63	55	49	44	42	40	**25**	65	56	50	44	43	43	**28**
	1150		0.05	64	54	49	44	40	35	**27**	62	53	50	44	41	37	**24**	65	56	51	45	44	42	**28**	66	58	52	46	45	45	**29**
	1300		0.06	66	55	51	46	42	38	**29**	63	55	51	46	43	39	**25**	66	58	52	47	45	43	**29**	68	59	53	48	47	46	**32**
	1450		0.07	68	57	52	48	43	40	**32**	64	56	53	48	44	40	**27**	67	59	54	49	47	45	**31**	69	60	55	49	48	48	**33**
	1600		0.09	69	58	53	49	45	43	**33**	65	57	54	49	45	41	**28**	68	60	55	50	48	46	**32**	70	61	56	51	49	49	**34**
E14	1500	0.25	0.04	70	63	56	51	46	42	**35**	69	61	54	50	45	41	**33**	70	62	55	50	47	45	**34**	70	63	56	51	48	47	**34**
	1650		0.05	71	65	58	52	48	44	**36**	70	62	56	51	46	43	**34**	71	63	57	52	49	46	**36**	71	64	58	53	50	49	**36**
	1800		0.06	73	67	59	54	50	46	**38**	71	63	57	53	48	44	**36**	71	65	59	54	50	48	**36**	72	66	59	54	51	50	**37**
	1950		0.08	74	68	61	55	51	48	**40**	71	64	59	54	49	45	**36**	72	66	60	55	51	49	**37**	73	67	61	55	53	51	**38**
	2100		0.09	75	70	62	57	53	50	**42**	72	65	60	55	50	46	**37**	73	67	61	56	52	50	**38**	74	68	62	57	54	53	**40**

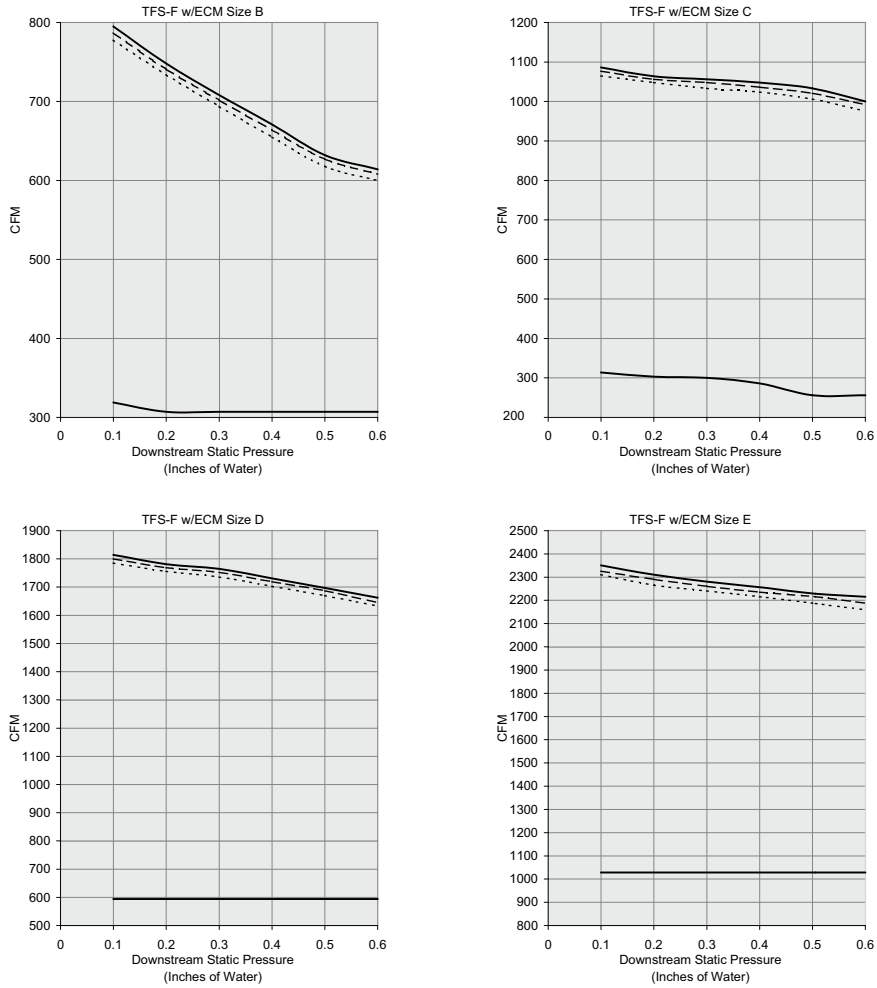
- Radiated sound is the noise transmitted through the unit casing and emitted from the induction port
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N41 for AHRI Certified Performance Listings.

PTFS-F, ATFS-F, DTFS-F / DISCHARGE SOUND PERFORMANCE

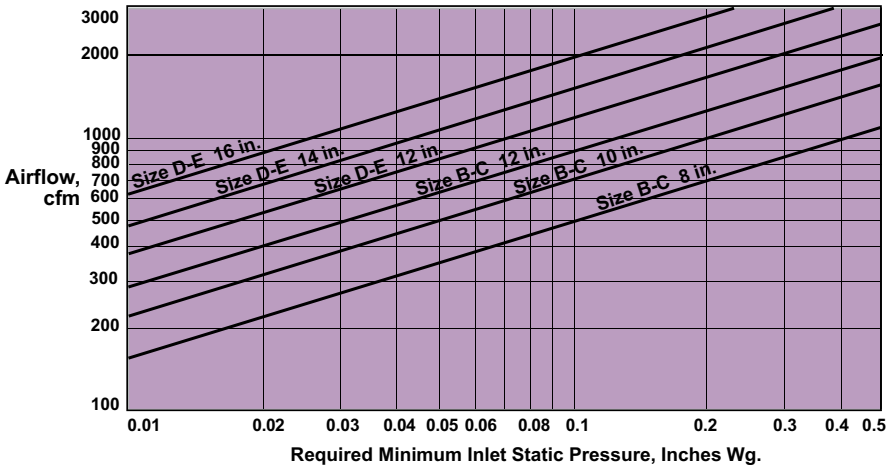
Size	CFM	Discharge Ps	Min ΔPs	Octave Band Sound Power, Lw																									
				Fan Only							0.5" ΔPs							1.0" ΔPs							1.5" ΔPs						
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
B08	375	0.25	0.03	65	51	52	50	50	48	**17**	64	54	52	53	51	49	**16**	65	54	51	52	51	49	**17**	65	54	51	52	51	49	**17**
	400		0.04	66	52	53	51	51	49	**19**	65	56	53	54	52	50	**17**	66	56	52	53	52	50	**19**	66	56	52	53	52	50	**19**
	450		0.05	68	55	54	53	53	51	**21**	68	58	54	55	54	53	**21**	68	58	54	55	54	53	**21**	68	58	54	55	54	53	**21**
	500		0.06	70	58	55	55	55	53	**24**	70	60	56	57	56	55	**24**	70	60	56	57	56	55	**24**	70	60	56	57	56	55	**24**
	550		0.07	71	60	56	57	56	55	**25**	72	62	58	59	58	57	**26**	72	62	57	59	58	57	**26**	72	62	57	59	58	57	**26**
C10	600	0.25	0.05	69	62	55	54	54	52	**22**	67	60	54	53	52	50	**20**	68	61	54	53	52	51	**21**	69	61	54	53	52	51	**22**
	700		0.07	71	64	57	57	57	56	**25**	68	62	56	56	55	54	**21**	69	63	56	56	55	54	**22**	70	63	56	56	55	55	**24**
	800		0.09	73	66	59	59	59	59	**25**	69	63	57	58	57	57	**21**	70	64	57	58	58	57	**21**	70	64	57	58	58	58	**22**
	900		0.11	74	68	60	61	61	61	**26**	70	65	59	60	60	59	**23**	71	65	59	60	60	60	**24**	71	65	58	60	60	60	**24**
	1050		0.15	76	70	62	64	64	65	**29**	71	66	60	62	62	63	**27**	71	67	60	62	63	63	**27**	72	67	60	62	63	64	**28**
D12	1000	0.25	0.03	66	61	57	58	58	56	**20**	67	62	56	57	56	55	**19**	69	62	56	56	56	55	**20**	70	62	56	56	56	55	**21**
	1150		0.05	69	64	59	61	61	60	**24**	68	63	58	60	59	58	**22**	70	64	58	59	59	58	**22**	72	64	58	59	59	58	**24**
	1300		0.06	72	67	61	63	63	63	**27**	70	65	60	62	61	61	**25**	72	65	60	62	61	61	**25**	73	66	60	61	61	61	**25**
	1450		0.07	74	69	63	66	66	65	**29**	71	66	62	65	63	63	**27**	73	67	62	64	63	63	**27**	74	67	62	64	63	63	**27**
	1600		0.09	76	71	65	68	68	68	**31**	72	68	63	67	66	66	**30**	74	68	63	66	65	65	**29**	75	68	63	66	65	65	**29**
E14	1500	0.25	0.04	78	73	65	67	68	66	**32**	77	72	64	65	64	62	**31**	78	73	64	66	65	63	**32**	79	73	64	66	65	63	**33**
	1650		0.05	79	75	66	69	70	68	**34**	79	74	65	67	66	65	**33**	80	75	66	68	67	65	**34**	81	75	66	68	67	66	**35**
	1800		0.06	81	76	68	71	71	70	**36**	80	76	67	69	68	67	**36**	82	76	67	69	69	67	**36**	82	77	67	70	69	68	**37**
	1950		0.08	82	78	69	72	73	72	**38**	82	77	69	70	70	69	**37**	83	78	69	71	71	69	**38**	84	78	69	71	71	70	**39**
	2100		0.09	84	79	70	74	75	74	**39**	83	78	70	72	72	71	**38**	84	79	70	73	72	71	**39**	85	80	70	73	73	72	**40**

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N41 for AHRI Certified Performance Listings.

PTFS-F, ATFS-F, DTFS-F WITH ECM MOTOR / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE



PRIMARY AIR INLET PRESSURE / PTFS-F, ATFS-F, DTFS-F



ECM ELECTRICAL DATA

Unit Size	Motor HP	120V	208V/240V	277V
B	1/3	5.0	2.8	2.6
C	1/3	5.0	2.8	2.6
D	1/2	7.7	4.3	4.1
E	3/4	9.6	6.8	5.5

Note: For selection procedure, See the section Engineering Guidelines and the topic 'ECM Motors - Fan Powered Terminals' for additional information

PTFS-F, ATFS-F, DTFS-F WITH ECM / RADIATED SOUND PERFORMANCE

Size	CFM	Discharge Ps	Min ΔPs	Octave Band Sound Power, Lw																									
				Fan Only							0.5" ΔPs							1.0" ΔPs							1.5" ΔPs						
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
B08	400	0.25	0.04	59	49	46	40	36	31	**21**	57	47	44	40	37	32	**18**	58	50	45	42	40	39	**19**	59	52	46	43	42	43	**20**
	475		0.05	61	51	47	42	40	36	**23**	59	50	46	42	38	33	**20**	61	53	48	44	42	40	**23**	62	55	48	45	44	44	**24**
	550		0.07	63	52	49	44	44	41	**26**	61	52	48	44	40	35	**23**	63	55	49	45	44	42	**25**	64	57	50	46	46	46	**27**
	625		0.09	64	53	50	45	48	44	**27**	63	54	50	45	41	36	**25**	65	57	51	47	45	43	**28**	66	59	52	48	47	47	**29**
	700		0.11	65	54	51	46	51	48	**28**	65	56	51	46	43	37	**28**	67	59	53	48	46	44	**31**	68	61	53	49	48	48	**32**
C10	450	0.25	0.03	50	41	41	33	27	21	**14**	51	44	41	37	33	28	**14**	54	48	43	39	37	36	**16**	55	50	44	40	40	40	**17**
	600		0.05	55	47	46	39	34	28	**20**	54	46	44	40	35	30	**17**	57	50	46	42	40	38	**19**	59	53	47	43	42	42	**20**
	750		0.07	59	51	49	44	38	33	**23**	57	48	47	42	37	32	**20**	60	52	49	44	41	40	**23**	62	55	50	45	44	44	**24**
	900		0.11	62	54	52	48	42	37	**27**	59	50	49	44	39	33	**23**	62	54	51	46	43	41	**25**	64	56	52	47	45	45	**27**
	1050		0.15	65	57	55	51	45	40	**30**	61	51	50	45	40	35	**24**	64	55	52	48	44	42	**27**	66	58	53	49	46	47	**29**
D12	800	0.25	0.02	55	46	42	38	33	28	**16**	56	46	43	41	37	32	**17**	60	50	45	42	40	38	**22**	62	52	46	43	42	41	**24**
	1000		0.03	59	50	45	42	37	33	**21**	59	49	46	43	39	35	**20**	62	53	48	45	42	40	**24**	64	54	49	46	44	43	**27**
	1200		0.05	62	53	48	44	40	37	**24**	61	52	49	45	41	37	**23**	64	55	51	47	44	42	**27**	66	57	52	48	46	46	**29**
	1400		0.07	65	56	51	47	43	40	**28**	62	54	51	47	43	39	**25**	66	57	53	48	46	44	**29**	68	59	54	49	48	47	**32**
	1600		0.09	67	58	53	49	45	43	**31**	64	56	53	48	44	40	**27**	67	59	54	50	47	46	**31**	69	61	55	51	49	49	**33**
E14	1300	0.25	0.03	65	56	52	47	42	37	**28**	62	55	51	46	43	39	**25**	64	57	53	48	45	43	**27**	65	58	54	48	47	46	**28**
	1500		0.04	68	59	55	50	45	41	**32**	65	57	54	49	45	41	**28**	67	59	55	50	47	45	**31**	68	61	56	51	49	48	**32**
	1700		0.06	70	62	57	53	48	44	**35**	67	59	56	51	46	42	**31**	69	61	57	52	49	47	**33**	70	63	58	53	50	49	**34**
	1900		0.07	72	65	60	55	51	47	**37**	69	61	57	52	48	44	**33**	71	63	59	54	50	48	**36**	72	64	60	54	52	51	**37**
	2100		0.09	74	67	62	57	53	50	**40**	71	63	59	54	49	45	**36**	73	65	60	55	52	50	**38**	74	66	61	56	53	52	**40**

- Radiated sound is the noise transmitted through the unit casing and emitted from the induction port
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N41 for AHRI Certified Performance Listings

PTFS-F, ATFS-F, DTFS-F WITH ECM / DISCHARGE SOUND PERFORMANCE

Size	CFM	Discharge Ps	Min ΔPs	Octave Band Sound Power, Lw																									
				Fan Only							0.5" ΔPs							1.0" ΔPs							1.5" ΔPs						
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
B08	400	0.25	0.04	70	60	55	56	56	54	**24**	65	56	53	53	53	51	**17**	66	57	53	54	53	52	**19**	66	57	53	54	53	52	**19**
	475		0.05	73	63	58	59	59	58	**28**	68	60	56	56	56	55	**21**	69	60	56	57	56	55	**22**	70	61	56	57	57	56	**24**
	550		0.07	75	66	60	61	61	60	**30**	71	63	58	59	59	58	**25**	72	63	58	59	59	58	**26**	73	64	58	59	59	59	**28**
	625		0.09	77	68	62	63	64	63	**33**	74	66	60	61	61	61	**29**	75	66	60	61	62	61	**30**	76	66	60	61	62	61	**31**
	700		0.11	79	70	63	65	66	65	**35**	76	68	62	63	64	63	**31**	77	69	62	63	64	63	**33**	78	69	62	63	64	64	**34**
C10	450	0.25	0.03	67	58	52	53	52	49	**20**	63	54	49	48	47	45	**15**	64	55	49	48	47	45	**16**	65	55	49	48	48	46	**17**
	600		0.05	70	62	56	57	56	55	**24**	65	57	53	53	52	51	**17**	67	58	53	53	53	52	**20**	68	59	53	53	53	52	**21**
	750		0.07	73	65	58	60	60	59	**25**	67	60	56	57	56	56	**20**	69	61	56	57	57	56	**20**	70	61	56	57	57	57	**21**
	900		0.11	75	67	60	62	62	62	**28**	69	62	59	60	60	60	**24**	71	63	59	60	60	60	**24**	71	63	59	60	60	61	**25**
	1050		0.15	77	69	62	64	65	65	**30**	70	64	61	63	63	63	**27**	72	65	61	63	63	64	**28**	73	65	61	63	63	64	**28**
D12	800	0.25	0.02	62	51	50	53	52	49	**13**	61	53	53	53	52	50	**14**	63	54	53	53	52	51	**15**	64	55	53	53	53	51	**15**
	1000		0.03	66	57	54	58	57	55	**19**	65	56	56	58	56	55	**19**	66	58	57	58	57	55	**19**	68	58	57	58	57	56	**20**
	1200		0.05	70	62	58	62	61	60	**24**	67	59	59	61	60	59	**23**	69	61	59	61	60	60	**24**	70	61	60	61	61	60	**24**
	1400		0.07	73	66	62	65	64	64	**28**	70	62	62	64	63	63	**27**	71	63	62	64	63	63	**27**	72	64	62	64	64	63	**27**
	1600		0.09	76	69	64	67	67	67	**30**	72	64	64	67	66	66	**30**	73	66	64	67	66	66	**30**	74	66	64	67	66	66	**30**
E14	1300	0.25	0.03	74	68	60	64	64	62	**26**	69	64	58	60	61	58	**22**	70	65	58	61	61	59	**23**	71	66	59	61	62	59	**24**
	1500		0.04	77	71	63	67	67	65	**30**	71	67	61	64	64	62	**26**	73	68	61	64	65	62	**26**	74	69	62	64	65	63	**27**
	1700		0.06	79	74	66	69	70	68	**33**	74	70	63	66	67	65	**29**	75	71	64	67	67	66	**30**	76	72	64	67	68	66	**31**
	1900		0.07	81	77	68	72	73	71	**37**	76	73	66	69	69	68	**32**	77	73	66	69	70	69	**32**	78	74	66	70	70	69	**33**
	2100		0.09	83	79	70	74	75	74	**39**	77	75	68	71	72	71	**34**	79	76	68	71	72	71	**36**	80	76	68	72	73	72	**36**

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011 for Appendix E. See Terminal Unit Engineering Guidelines
- All NC levels determined using AHRI 885-2008
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N41 for AHRI Certified Performance Listings.

AHRI Directory of Certified Performance

Titus is a charter member company and current participant in the AHRI Directory of Certified Performance. This voluntary certification program was developed by participating manufacturers in conjunction with the former Air-Conditioning and Refrigeration Institute (ARI) in the 1990's. It is currently administrated by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI). The purpose of this program is to provide for the independent verification of manufacturers' published performance data. Only participating products are authorized to bear the AHRI VAV Certification Mark. Certified data may be viewed and downloaded at www.ahrinet.org.

In order to participate in this program, member companies pay annual dues based on sales volume, submit published performance data for all applicable model types, and agree to provide a number of randomly selected product samples for annual rounds of independent testing at the manufacturers' expense. All verification testing is conducted in accordance with ASHRAE Standard 130 'Methods of Testing Air Terminal Units'. These tests are conducted to verify that a manufacturer's published certified ratings are within the test tolerances outlined in AHRI Standard 880 'Performance Rating of Air Terminals'. Any failure to demonstrate the certified performance is punished by additional testing requirements, mandatory performance re-rating, monetary penalties and possible expulsion from the Certified Directory.

Product samples provided for certification testing are standard production units with standard ½ in dual density fiberglass lining (unless otherwise specified) and no optional appurtenances such as add-on attenuators or heating/cooling coils. The certified ratings are measured at the standard operating points under the following test conditions:

PTFS, ATFS, DTFS, PTFS-F, ATFS-F, DTFS-F

- Rated airflow (cfm) – Based on lesser of an inlet velocity of 2000 fpm or the maximum fan flow with 0.25 in wg of downstream pressure
- Rated fan power (watts) – Based on fan operating at the rated airflow with 0.25 in wg of downstream pressure
- Rated Min ΔPs (in wg) – Min ΔPs is the difference between atmospheric pressure and the inlet static pressure at rated airflow with the primary damper full open and the unit fan set to match the primary flow
- Rated ΔPs (in wg) – A static pressure of 1.5 in wg applied to the inlet duct
- Rated sound power by octave band (dB, re 10^{-12} watts) – Radiated and discharge sound performance conducted in a reverberation room that meets both the broadband and pure tone qualifications of AHRI Standard 220

						Fan Only						Fan Plus 100% Primary						Fan Only						
Unit	Rated	Fan	Min	Discharge		Radiated Sound Power						Radiated Sound Power						Discharge Sound Power						
Size	CFM	Watts	ΔPs	H	W	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	
A06	350	110	0.01	10	18.5	62	54	49	47	41	35	72	64	56	52	49	46	69	63	62	61	60	57	PTFS, ATFS, DTFS
B08	550	210	0.07	12.5	20.5	66	61	56	53	44	44	65	63	60	56	49	50	77	65	58	60	60	58	
C10	1100	430	0.16	12.5	20.5	66	59	59	58	49	50	73	68	65	62	55	54	79	68	63	66	66	66	
D12	1600	690	0.09	17.5	25	68	62	60	57	52	50	75	69	65	63	58	55	81	71	65	68	70	69	
E14	2100	870	0.09	17.5	25	74	67	64	62	56	53	80	73	69	66	60	57	86	79	70	74	75	74	
G16	2800	2770	0.10	15	34	71	68	64	60	55	53	79	77	72	67	63	60	76	72	70	69	67	66	

						Fan Only						Fan Plus 100% Primary						Fan Only						
Unit	Rated	Fan	Min	Discharge		Radiated Sound Power						Radiated Sound Power						Discharge Sound Power						
Size	CFM	Watts	ΔPs	H	W	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	
A06	350	90	0.01	10	18.5	63	54	50	48	43	38	72	65	56	53	49	47	67	61	62	62	60	57	PTFS, ATFS, DTFS with ECM
B08	700	210	0.11	12.5	20.5	69	65	59	57	49	49	69	67	63	59	52	53	77	68	62	64	64	63	
C10	1100	340	0.16	12.5	20.5	69	64	61	58	51	50	72	67	64	60	54	54	76	68	62	64	65	64	
D12	1600	460	0.09	17.5	25	67	62	60	57	52	51	74	70	66	63	58	55	75	66	60	63	65	64	
E14	2100	690	0.09	17.5	25	72	66	64	61	55	53	80	73	69	66	60	57	83	79	70	74	75	74	
G16	2800	2770	0.10	15	34	71	68	64	60	55	53	79	77	72	67	63	60	76	72	70	69	67	66	

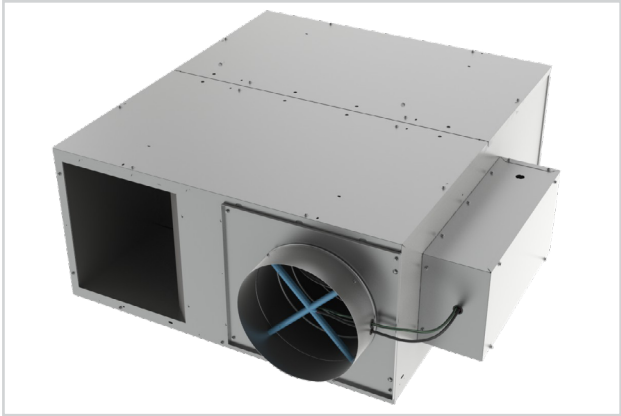
						Fan Only						Fan Plus 100% Primary						Fan Only						
Unit	Rated	Fan	Min	Discharge		Radiated Sound Power						Radiated Sound Power						Discharge Sound Power						
Size	CFM	Watts	ΔPs	H	W	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	
B08	550	210	0.07	12.5	20.5	63	51	48	41	37	34	62	55	49	46	45	45	71	60	56	57	56	55	PTFS-F, ATFS-F, DTFS-F
C10	1050	470	0.15	12.5	20.5	65	56	53	49	42	38	65	57	53	49	46	46	76	70	62	64	64	65	
D12	1600	790	0.09	17.5	25	69	58	53	49	45	43	70	61	56	51	49	49	76	71	65	68	68	68	
E14	2100	870	0.09	17.5	25	75	70	62	57	53	50	74	68	62	57	54	53	84	79	70	74	75	74	

						Fan Only						Fan Plus 100% Primary						Fan Only						
Unit	Rated	Fan	Min	Discharge		Radiated Sound Power						Radiated Sound Power						Discharge Sound Power						
Size	CFM	Watts	ΔPs	H	W	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	
B08	700	210	0.11	12.5	20.5	65	54	51	46	51	48	68	61	53	49	48	48	79	70	63	65	66	65	PTFS, ATFS, DTFS with ECM
C10	1050	280	0.15	12.5	20.5	65	57	55	51	45	40	66	58	53	49	46	47	77	69	62	64	65	65	
D12	1600	390	0.09	17.5	25	67	58	53	49	45	43	69	61	55	51	49	49	76	69	64	67	67	67	
E14	2100	580	0.09	17.5	25	74	67	62	57	53	50	74	66	61	56	53	52	83	79	70	74	75	74	

AHRI CERTIFIED® www.ahridirectory.org
VAV Terminals
AHRI Standard 880

TQS

- Consistent, quiet design
- Two casings for easy design layout
- Built-in sound baffle for low sound levels, both radiated and discharge
- Pressure independent primary airflow control
- AeroCross™ multi-point inlet velocity sensor with center averaging
- Energy-efficient fan motor, permanent split capacitor type, mounted with vibration isolators
- Optional ultra-high efficiency ECM brushless DC motor available
- Adjustable SCR fan speed control with minimum voltage stop
- Single point electrical, pneumatic main, and thermostat connections
- Solid metal liner
- 20-gauge galvanized steel casing
- Rectangular discharge opening is designed for flanged duct connections



TQS

- Bottom access panel can be removed for service
- No external sound attenuators are required

energy solutions

See website for Specifications

MODELS:

PTQS / Pneumatic Control
ATQS / Analog Control
DTQS / Digital Control

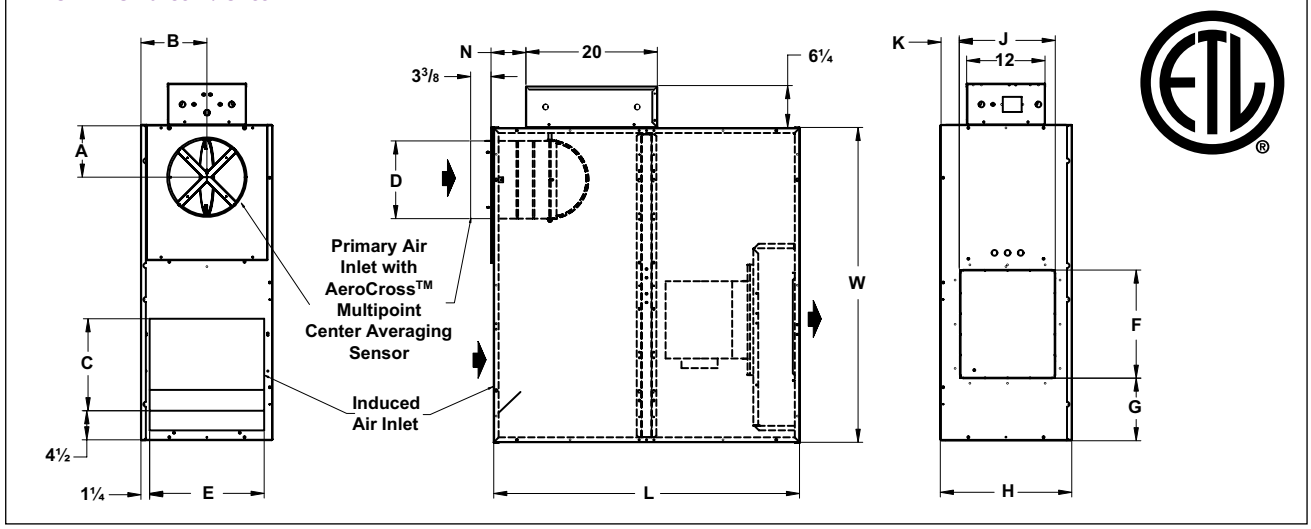
OVERVIEW

Quiet Operation / TQS with UltraLoc Liner™ / TQS with UltraLoc Liner™ and ECM Motor

Designers choose Series flow terminals for their characteristics of constant air delivery and temperature blending. Nevertheless, these terminals maintain the VAV energy savings at the central fan.

TQS UNIT DIMENSIONS

DTQS with UltraLoc™ / Sizes 2-7



TQS Series Unit with UltraLoc™ Liner and ECM Motor															
Size	Inlet Size	A	B	C	D	E	F	G	H	J	K	L	N	W	Filter Size
2, 3	6 8 10 12	6 6 7 8	8 9/16	13¼	5 7/8 7 7/8 9 7/8 11 7/8	14½	14	3½	17 1/8	11	4	40 7/8	2 7/8 2 7/8 4 7/8 4 7/8	36 1/8	19 x 17
4	8 10 12 14	6 7 8 10			7 7/8 9 7/8 11 7/8 13 7/8								2 7/8 4 7/8 4 7/8 6 7/8		
5	10 12 14 16	7 8 10 11	10 1/16	21	9 7/8 11 7/8 13 7/8 15 7/8	17½	16½	9½	20 1/8	14½	2½	46 7/8	4 7/8 4 7/8 6 7/8 6 7/8	48¼	27 x 20
6	12 14 16	8 10 11			11 7/8 13 7/8 15 7/8								4 7/8 6 7/8 6 7/8		
7	14 16	10 11			13 7/8 15 7/8								6 7/8 6 7/8		

All dimensions are in inches

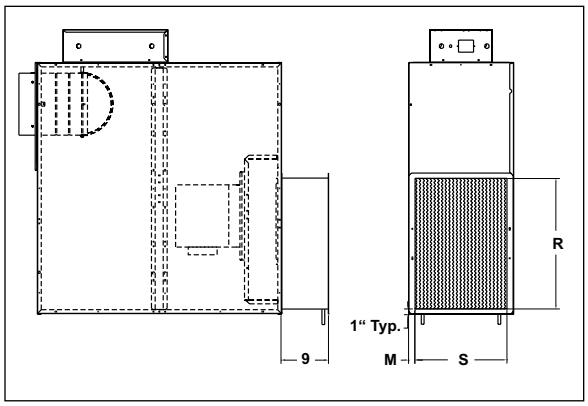
HOT WATER COIL SECTION

STANDARD FEATURES

- ½" copper tubes
- Aluminum ripple fins
- Connections: Male solder
- 5/8" for both 1- and 2-row. Left or right hand connections.
- Galvanized steel casing
- Flanged duct connection
- Coil is installed at discharge of unit

SUPPLY VOLTAGE

- 120V, 1 ph, 60 Hz.
- 208/240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.



Note: R and S are inside dimensions

COIL ROWS

- 1-Row
- 2-Row

Hot Water Coil Section (Discharge Mounted)				
Unit Size	M (1-Row)	M (2-Row)	R	S
2, 3, 4	1	1¼	17	15
5, 6, 7	1	1¼	25	17½

ELECTRIC COIL SECTION

STANDARD FEATURES

- Auto reset thermal cutouts (one per element)
- 80/20 Nickel chrome heating elements
- Magnetic contactors, where required, on pneumatic units
- Airflow safety switch
- Line terminal block (277/1∅, 208/240/3∅, or 480/3∅ 4 wire)
- Flanged connection
- Control transformer for DDC or Analog electronic controls
- Pneumatic electric switch for pneumatic parallel fan terminals only
- Fan relay for DDC fan terminals
- Magnetic contactor per step on terminals with DDC or analog electronic controls

OPTIONS

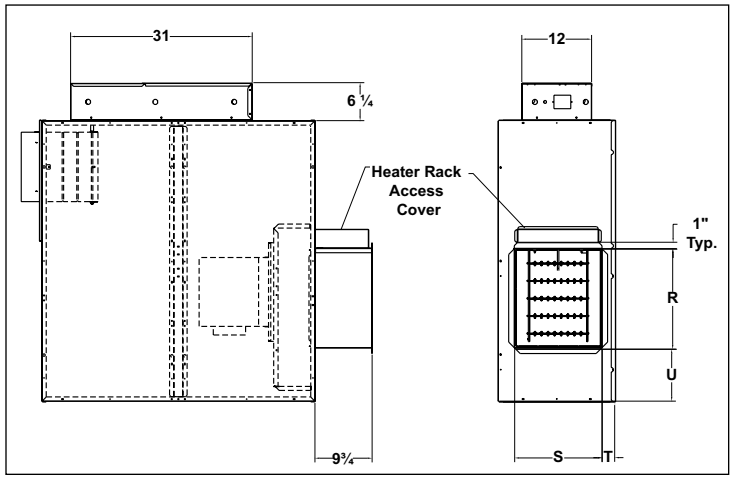
- Interlocking disconnect
- Main power supply fuses
- Mercury contactors
- Manual reset thermal cutout
- Dust-tight construction
- Optional Lynergy Comfort Controlled SSR Electric Heat available

SUPPLY VOLTAGE

- 208V, 1 ph, 60 Hz.
- 240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.
- 208V, 3 ph, 60 Hz.
- 480V, 3 ph, 60 Hz. (4 wire wye only)

Electric Coil Section (Discharge Mounted)				
Unit Size	U	R	S	T
2, 3, 4	3½	14	11	2 7/8
5, 6, 7	9½	16½	14½	3 1/8

Note: R and S are inside dimensions
See Electric Heat Coils in Section O for more information.



ADDITIONAL ACCESSORIES (OPTIONAL)

- Induced air filter, 1" thick disposable construction type
- Fan disconnect switch (not available on units with optional electric coils)
- Metal controller cover
- Fan P/E switch for night setback control. See Section O for additional control options
- 1" Liner
- Fibre-Free Liner
- SteriLoc Liner
- UltraLoc Liner
- EcoShield liner
- Fan unit fusing
- Hanger brackets
- Camlocks on fan access door

Electrical Data				
Unit Size	Motor HP	120V	208/240V	277V
		FLA	FLA	FLA
2	1/6	4.0	1.8	1.3
3	¼	7.0	3.0	2.4
4	⅓	9.8	4.1	2.9
5	⅓	10.0	4.3	3.3
6	¾	13.4	7.2	5.4
7	1	N/A	9.0	6.5

All motors are single phase, 60(Hz).
FLA = Full Load Amperage, as tested in accordance with UL 60335
All fan motors are same voltage as electric coil (when supplied), with exception that 277V motors are used with 480V 3 Phase coils (four wire wye)
For ECM electrical data see page N55

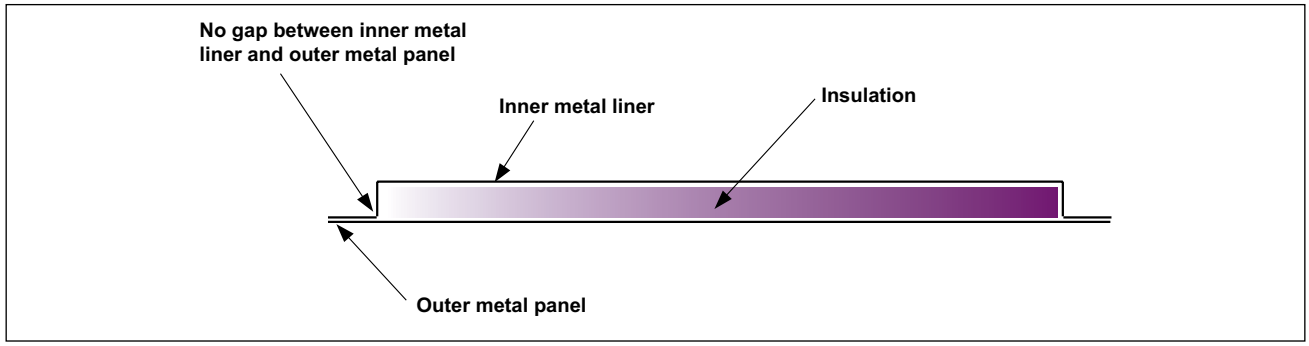
TQS WITH ULTRALOC™ FEATURES

As the concern about indoor air quality grows, the demand for metal lined fan boxes is increasing. We are happy to offer the best selling series fan powered terminal on the market with a premium solid double wall liner. UltraLoc is a solid metal liner over 1" insulation. All edges of the unit are covered to eliminate any exposed fiberglass and meet your IAQ concerns.

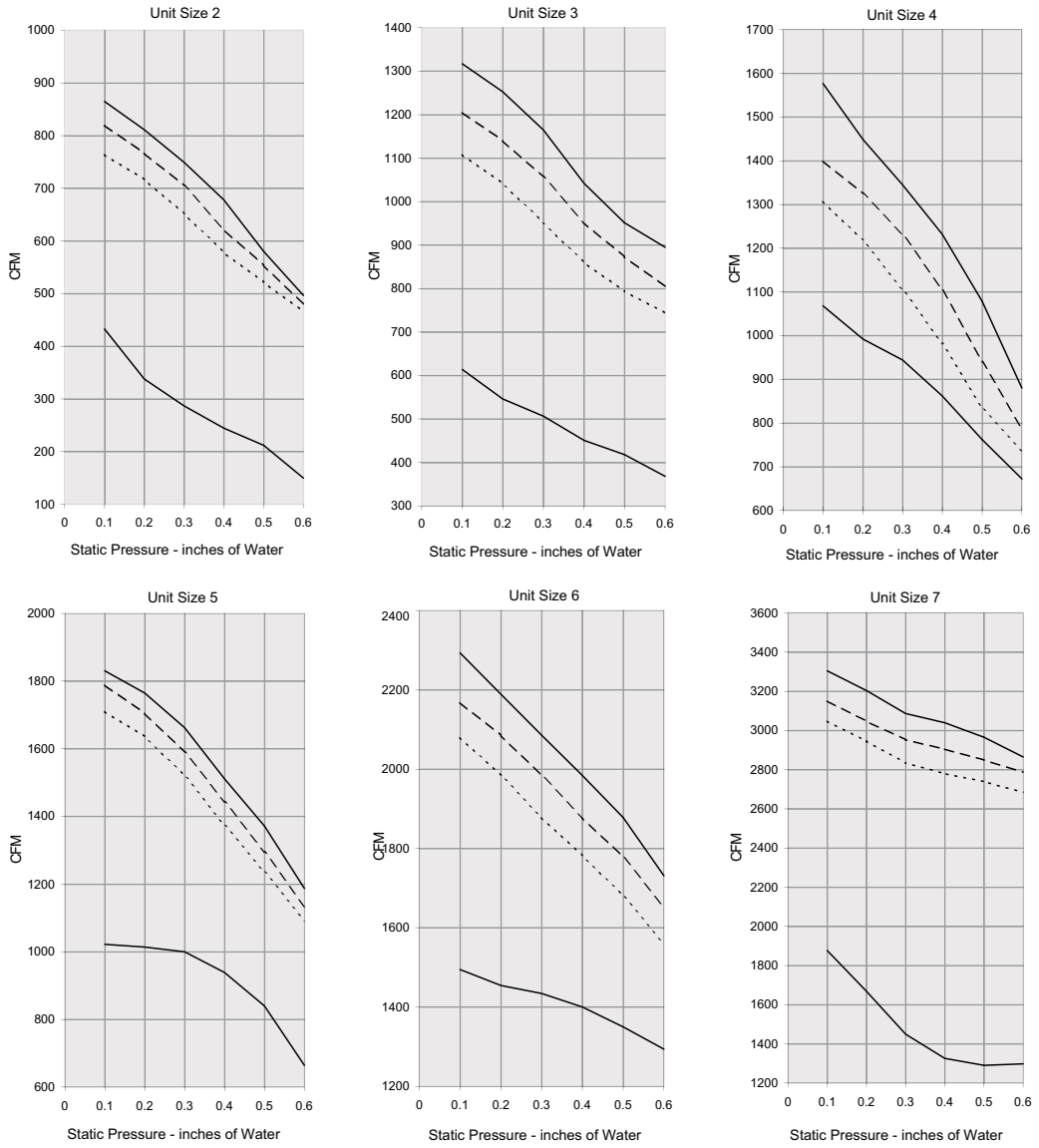
Titus UltraLoc Construction – "Engineered for IAQ"

Double wall lined terminals are typically used in indoor air quality applications requiring that the unit be wiped down regularly. A concern with most double wall terminals is that the liner and casing edges meet, but do not overlap. This provides the potential for water to become trapped between the liner and casing walls, providing a perfect home for mold growth.

The Titus design is engineered using double edge construction. The UltraLoc design captures the insulation edges to insure that there is no exposed fiberglass. The edge construction shown below covers all four edges of the access panel. All internal corners are manufactured in the same manner to completely cover all edges.

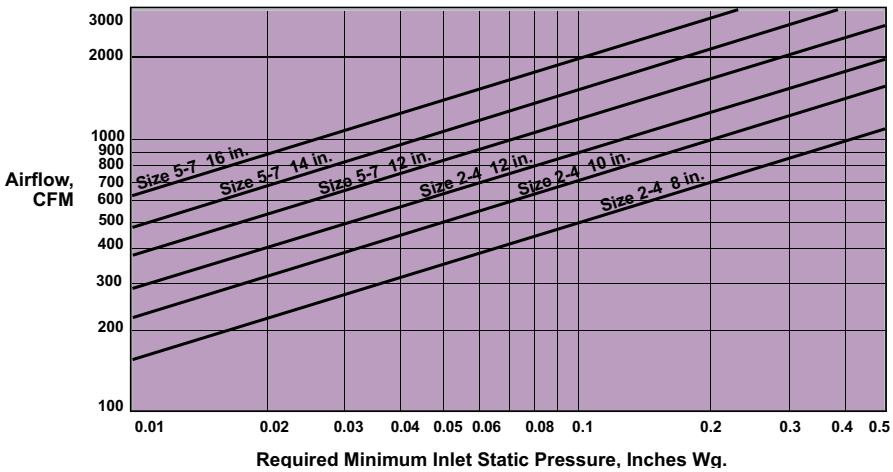


PTQS, ATQS, DTQS WITH ULTRALOC™ LINER / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE



No Coil or with Electric Coil ——————
1 Row Water Coil – – – – –
2 Row Water Coil ----------

PRIMARY AIR INLET PRESSURE / PTQS, ATQS, DTQS WITH ULTRALOC™ LINER



Note: For selection procedure, See the section Engineering Guidelines and the topic 'ECM Motors - Fan Powered Terminals' for additional information.

A NOTE ON RADIATED SOUND LEVELS FOR TQS WITH ULTRALOC™ LINER

The radiated sound paths for a fan-powered unit start at the fan motor/blower assembly and the primary damper. This sound energy must either exit through the induction port or pass through the casing before reaching the plenum, ceiling tile, occupied space, and eventually the listener.

AHRI 885 was developed to provide a standardized way to accurately predict sound levels in a space resulting from noise generated in the ceiling plenum above. It is important to understand that AHRI 885 was formulated to deal with noise from a point source. Terminal units with 'soft' liners behave very much like a point source, in that noise is emitted from all external casing surfaces in a roughly equal manner. This is not true for a dual wall unit, where the radiated sound is much more directional.

With standard fiberglass and other 'soft' liners, sound is emitted from the casing in all directions with slightly more on the side that includes the induction port. Dual wall construction results in a casing with such a high transmission loss that virtually all radiated sounds exit through the induction port. This in effect concentrates and directs the sound energy across the ceiling rather than through it, resulting in lower than expected NC levels in the occupied space. Furthermore, the TQS with UltraLoc was carefully engineered to attenuate the second and third octave band frequencies for overall reduced sound levels.

Radiated sound power tests were run for all TQS with UltraLoc units in accordance with AHRI 880. The resulting sound power figures make it appear that these units are louder than TQS units with 'soft' liners, but mock-up testing has shown lower NC levels. This is due to the fact that all sound generated, regardless of directionality, is measured in a reverberant field. In a mock-up situation, the sound from the induction port is directed into plenum where it is easily attenuated. Although it is difficult to estimate the resulting NC reduction for all unit sizes, it can be as high as 6 NC.

AHRI Standard 885 calculations are based upon a 'point source' of sound energy. This type of idealized sound source would emit sound energy equally in all directions. While this is very true for single and dual duct terminals and somewhat true for fan-powered units (with other liners), it isn't true for dual wall fan-powered units. The TQS with UltraLoc liner will have lower actual sound in application than the AHRI 885 NC data shows.

PTQS, ATQS, DTQS WITH ULTRALOC™ LINER / RADIATED SOUND POWER LEVELS / FAN AND 100% PRIMARY

Unit Size	Inlet Size	cfm	Fan Only						Fan Plus 100% Primary															
			Sound Power Octave Bands						0.5" ΔPs						1.0" ΔPs						2.0" ΔPs					
			2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7
2	8	300	58	48	51	46	44	36	60	50	51	46	46	39	62	54	53	49	49	42	65	60	55	51	52	44
		400	61	51	53	50	49	42	63	54	53	50	51	45	66	58	56	53	53	46	69	64	58	55	56	49
		500	63	53	55	53	52	47	66	56	55	53	52	47	68	61	58	56	56	50	72	67	60	58	58	52
		625	66	56	57	56	56	52	68	59	57	56	56	52	71	64	60	59	59	54	75	70	62	61	61	56
		750	68	58	59	58	59	56	71	62	59	58	59	56	73	67	62	61	61	58	77	73	64	63	64	59
3	10	500	60	50	49	50	49	40	63	53	51	52	52	43	66	58	55	55	55	46	71	65	60	59	60	51
		650	63	53	52	53	53	45	66	56	54	54	55	47	69	61	57	57	58	50	73	67	62	61	62	54
		800	65	55	54	55	55	49	68	58	56	55	55	49	71	63	59	59	60	53	75	69	64	63	64	57
		1000	67	58	57	57	58	53	70	60	57	57	58	53	73	65	61	61	62	57	78	71	66	65	66	60
		1200	69	60	59	60	61	57	72	62	59	60	61	57	75	67	63	63	64	59	79	73	67	66	68	62
4	12	1000	66	59	58	58	58	52	66	61	60	60	60	54	70	63	61	61	61	55	74	66	62	62	62	57
		1100	67	60	60	60	60	54	67	62	62	62	62	56	71	64	63	62	62	57	75	67	63	63	64	58
		1200	69	62	61	61	61	56	69	62	63	63	63	58	72	65	64	64	64	59	76	68	65	64	65	60
		1300	70	63	63	62	63	58	70	63	63	62	63	58	73	66	65	65	65	61	77	69	66	66	66	62
		1400	71	64	64	64	64	60	71	64	64	64	64	60	75	67	66	66	66	62	78	70	67	67	68	63
5	12	1200	67	59	57	56	57	53	67	59	57	56	59	53	70	62	59	58	59	57	73	65	60	59	60	61
		1300	68	60	58	58	58	54	68	60	58	58	58	54	71	63	60	59	60	58	74	65	61	60	61	62
		1400	69	61	59	59	60	56	69	61	59	59	60	56	72	64	61	61	61	59	75	66	62	61	62	62
		1550	71	62	61	60	61	58	71	62	61	60	61	58	74	65	63	60	61	61	77	67	63	62	64	64
		1700	72	63	62	62	63	60	72	63	62	62	63	60	75	66	64	62	63	62	78	68	64	64	65	65
6	14	1500	69	60	57	57	58	53	69	61	59	59	60	55	71	62	59	59	60	57	72	63	59	59	61	59
		1600	70	61	58	58	60	55	70	61	60	60	61	55	72	63	60	60	62	58	73	64	60	60	62	60
		1750	71	62	60	60	61	57	71	62	61	60	61	57	73	64	61	61	63	60	74	65	61	62	63	61
		1900	73	63	61	61	63	59	73	63	61	61	63	59	75	66	63	63	65	61	76	67	63	63	65	63
		2100	74	65	63	63	65	61	74	65	63	63	65	61	76	67	63	64	66	63	77	68	64	64	67	65
7	16	1800	72	62	64	63	61	56	72	64	66	65	64	59	75	66	67	66	65	59	77	68	68	68	67	60
		2100	74	65	66	66	65	60	74	67	66	68	67	62	77	68	69	69	68	63	79	70	70	70	70	64
		2400	76	68	68	68	68	64	76	68	68	68	68	64	79	70	71	71	71	66	81	72	72	72	72	67
		2750	78	71	71	71	71	67	78	71	71	71	71	67	81	73	73	73	73	69	82	74	74	74	75	70
		3100	80	73	73	73	74	70	80	73	73	73	74	70	82	75	75	75	75	70	84	76	76	76	77	72

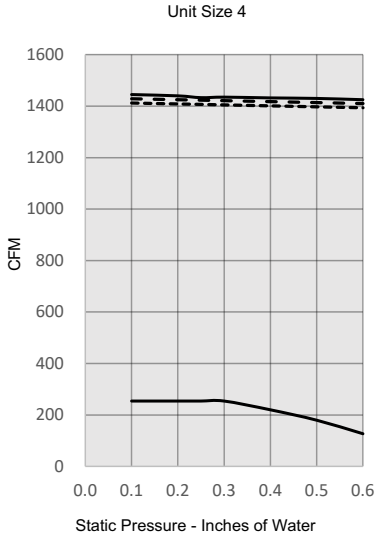
- Radiated sound is the noise transmitted through the unit casing and emitted from the induction port
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N63 for AHRI Certified Performance Listings.

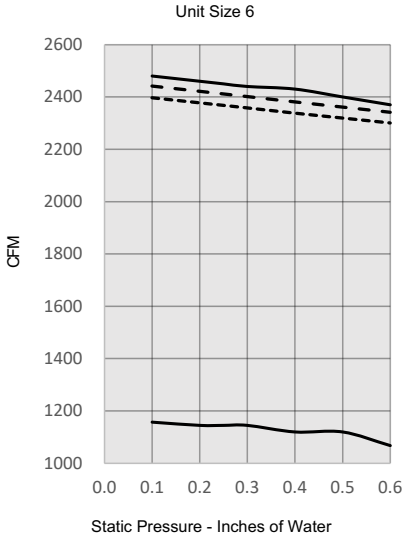
PTQS, ATQS, DTQS WITH ULTRALOC™ LINER / DISCHARGE SOUND POWER LEVELS / FAN AND 100% PRIMARY

Size	CFM	Discharge Ps	Min ΔPs	Octave Band Sound Power, Lw																									
				Fan Only							0.5"ΔPs							1.0" ΔPs							1.5" ΔPs						
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
208	350	0.25	0.05	73	65	62	60	60	59	**28**	73	67	62	60	60	59	**28**	73	67	64	61	60	59	**28**	73	67	64	61	62	60	**28**
	400		0.06	76	67	64	63	64	63	**31**	76	69	65	65	64	63	**31**	78	69	65	65	66	64	**34**	78	69	65	65	66	64	**34**
	500		0.10	78	70	65	66	67	66	**34**	80	71	67	67	68	68	**36**	80	71	67	67	68	68	**36**	80	71	67	67	68	68	**36**
	625		0.16	80	72	67	68	69	69	**36**	82	73	68	70	71	71	**39**	82	73	68	70	71	71	**39**	82	73	68	70	71	71	**39**
	725		0.21	82	73	68	70	72	71	**36**	84	75	70	72	73	73	**39**	84	75	70	72	73	73	**39**	84	75	70	72	73	73	**39**
310	650	0.25	0.08	71	65	61	59	60	57	**25**	71	65	61	59	60	57	**25**	71	65	61	59	60	57	**25**	71	65	61	59	60	57	**25**
	750		0.11	73	67	63	62	63	60	**25**	73	67	63	62	63	60	**25**	73	67	63	62	63	60	**25**	75	69	65	63	64	62	**28**
	900		0.16	76	69	65	63	65	63	**29**	76	69	65	63	65	63	**29**	76	69	65	63	65	63	**29**	78	71	66	65	66	64	**31**
	1150		0.26	78	71	66	65	67	65	**31**	78	71	66	65	67	65	**31**	80	73	68	67	68	67	**34**	80	73	68	67	68	67	**34**
	1400		0.39	80	73	68	67	68	68	**34**	80	73	68	67	68	68	**34**	82	74	70	68	70	69	**36**	82	74	70	68	70	69	**36**
412	850	0.25	0.09	78	72	66	66	66	64	**31**	80	74	68	68	68	66	**34**	80	74	68	68	68	66	**34**	80	74	68	68	68	66	**34**
	1075		0.15	79	73	67	68	67	66	**33**	81	75	69	69	69	67	**35**	81	75	69	69	69	67	**35**	81	75	69	69	69	67	**35**
	1300		0.21	80	74	68	69	68	67	**34**	82	76	70	70	70	69	**36**	82	76	70	70	70	69	**36**	80	76	68	69	68	67	**36**
	1400		0.25	81	75	69	70	69	68	**35**	83	77	71	71	71	70	**38**	83	77	71	71	71	70	**38**	81	75	69	70	69	68	**35**
	1500		0.28	82	76	69	71	70	69	**36**	83	78	71	71	70	69	**38**	82	76	69	71	70	69	**36**	82	76	69	71	70	69	**36**
512	1000	0.25	0.07	85	69	69	67	66	65	**40**	87	69	71	67	68	65	**43**	85	69	71	67	68	65	**40**	85	71	71	67	68	65	**40**
	1200		0.10	86	70	70	69	68	66	**42**	88	70	72	69	68	66	**44**	86	70	72	69	68	66	**42**	86	72	72	69	69	66	**42**
	1500		0.16	86	71	71	70	69	67	**42**	88	71	71	71	69	69	**44**	86	71	71	71	69	69	**42**	86	73	71	71	69	69	**42**
	1650		0.19	87	72	72	71	70	69	**43**	87	72	72	73	70	71	**43**	87	72	72	73	70	71	**43**	87	72	72	73	70	71	**43**
	1800		0.23	88	73	73	72	71	70	**44**	88	73	73	74	71	72	**44**	88	73	73	74	71	72	**44**	88	73	73	74	71	72	**44**
614	1500	0.25	0.10	81	72	69	69	68	66	**35**	83	74	71	70	70	68	**38**	83	74	71	70	70	68	**38**	83	74	71	70	70	68	**38**
	1700		0.13	82	73	70	70	69	67	**36**	84	75	72	72	71	69	**39**	84	75	72	72	71	69	**39**	84	75	72	72	71	69	**39**
	2000		0.17	83	75	71	71	71	69	**38**	85	77	73	73	72	71	**40**	85	77	73	73	72	71	**40**	85	77	73	73	72	71	**40**
	2250		0.22	84	77	73	73	72	71	**39**	86	78	74	75	74	72	**42**	86	78	74	75	74	72	**42**	86	78	74	75	74	72	**42**
	2500		0.27	86	79	74	75	74	73	**42**	86	79	74	75	74	73	**42**	88	80	76	76	76	74	**44**	88	80	76	76	76	74	**44**
716	1800	0.25	0.08	83	73	70	70	70	68	**38**	85	75	72	72	72	70	**40**	85	75	72	72	72	70	**40**	83	73	70	70	70	68	**38**
	2150		0.12	85	75	72	73	72	71	**40**	85	77	74	74	74	73	**40**	85	75	72	73	72	71	**40**	85	75	72	73	72	71	**40**
	2400		0.15	86	77	74	75	75	73	**42**	86	77	74	75	75	73	**42**	86	77	74	75	75	73	**42**	86	77	74	75	75	73	**42**
	2700		0.19	87	79	76	77	77	76	**43**	87	79	76	77	77	76	**43**	87	79	76	77	77	76	**43**	87	79	76	77	77	76	**43**
	3100		0.25	89	81	78	79	79	78	**45**	89	81	78	79	79	78	**45**	89	81	78	79	79	78	**45**	89	81	78	79	79	78	**45**

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts.
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N63 for AHRI Certified Performance Listings.

PTQS, ATQS, DTQS WITH ULTRALOC™ LINER AND ECM MOTOR / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE





No Coil or with Electric Coil
1 Row Water Coil
2 Row Water Coil

ECM ELECTRICAL DATA

Unit Size	Motor HP	115V	208/240V	277V
4	½	7.7	4.3	4.1
6	1	12.8	9.1	6.9

PTQS, ATQS, DTQS WITH ULTRALOC™ LINER AND ECM MOTOR / RADIATED SOUND POWER DATA

Unit Size	Inlet Size	cfm	Fan Only						Fan Plus 100% Primary															
			Sound Power Octave Bands						0.5" ΔPs						1.0" ΔPs						2.0" ΔPs					
			2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7
4	12	300	56	47	45	45	43	35	61	51	48	47	45	37	66	57	52	50	49	40	71	65	57	54	54	44
		575	62	53	53	52	51	45	65	56	55	52	51	45	69	61	58	56	56	49	74	68	62	60	61	52
		850	66	58	57	57	57	51	68	58	57	57	57	51	71	63	61	60	60	54	75	70	65	63	65	57
		1125	68	60	61	60	60	55	68	60	61	60	60	55	72	65	64	63	63	58	77	71	67	66	67	61
		1400	70	63	63	63	63	58	70	63	63	63	63	58	74	67	66	65	66	61	78	72	69	68	70	64
6	14	1200	61	52	51	50	51	48	63	54	53	53	54	51	65	56	54	53	54	53	68	58	54	53	55	56
		1500	65	56	55	54	56	52	67	58	57	56	58	55	69	60	58	57	58	57	71	62	58	57	59	60
		1800	69	60	58	58	60	56	69	60	58	59	60	56	72	63	61	60	62	60	74	65	61	60	62	62
		2100	72	63	61	60	63	60	72	63	61	60	63	60	74	66	63	60	65	62	77	67	64	62	65	65
		2400	74	66	64	63	66	63	74	66	64	63	66	63	77	68	65	63	66	65	79	70	66	63	68	67

- Radiated sound is the noise transmitted through the unit casing and emitted from the induction port
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N63 for AHRI Certified Performance Listings.

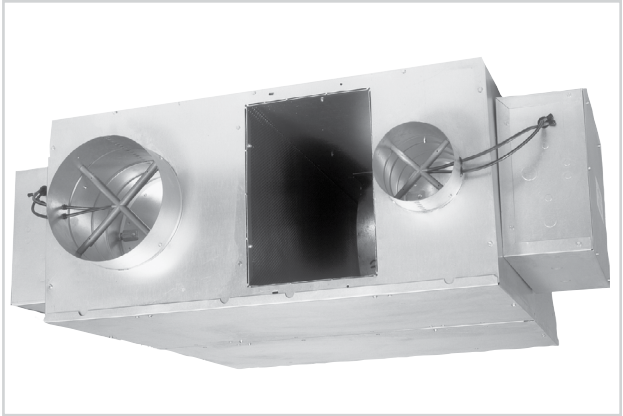
PTQS, ATQS, DTQS WITH ULTRALOC™ LINER AND ECM MOTOR / DISCHARGE SOUND POWER DATA

Size	CFM	Discharge Ps	Min ΔPs	Octave Band Sound Power, Lw																								
				Fan Only							0.5"ΔPs							1.0" ΔPs							1.5" ΔPs						
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
412	300	0.25	0.01	69	62	57	56	56	51	**30**	69	62	57	56	56	51	**30**	69	62	57	56	56	51	**30**	69	62	57	56	56	51	**30**
	575		0.04	73	67	62	61	61	58	**35**	73	67	62	61	61	58	**35**	74	69	64	63	63	58	**37**	74	69	64	63	63	58	**37**
	850		0.25	0.09	70	65	64	65	63	**37**	76	72	67	66	66	64	**38**	77	72	67	66	67	65	**39**	77	72	67	66	67	65	**39**
	1125		0.16	76	72	67	66	67	66	**39**	78	74	69	68	69	68	**41**	79	74	70	68	69	68	**41**	79	74	70	68	69	68	**41**
	1400		0.25	77	74	69	67	69	68	**41**	80	76	71	70	71	71	**44**	80	76	71	70	71	71	**44**	80	76	71	70	71	71	**44**
614	1200	0.25	0.10	75	66	65	64	64	62	**36**	76	68	67	66	65	64	**37**	76	68	67	66	65	64	**37**	76	68	67	66	65	64	**37**
	1500		0.12	78	70	69	68	68	66	**40**	80	72	70	70	69	68	**41**	80	72	70	70	69	68	**41**	80	72	70	70	69	68	**41**
	1800		0.25	0.17	74	71	71	71	70	**43**	83	75	73	73	72	72	**45**	83	75	73	73	72	72	**45**	83	75	73	73	72	72	**45**
	2100		0.24	83	76	74	74	73	73	**46**	85	78	76	75	75	74	**47**	85	78	76	75	75	74	**47**	85	78	76	75	75	74	**47**
	2400		0.31	86	78	76	76	76	75	**48**	87	80	78	78	77	77	**50**	87	80	78	78	77	77	**50**	87	80	78	78	77	77	**50**

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N63 for AHRI Certified Performance Listings.

TQS with IAQ

- Consistent, quiet design
- Two casings for easy design layout
- Built-in sound baffle for low sound levels, both radiated and discharge
- Pressure independent primary airflow control
- AeroCross™ multi-point inlet velocity sensor with center averaging
- Energy-efficient fan motor, permanent split capacitor type, mounted with vibration isolators
- Optional ultra-high efficiency ECM brushless DC motor available
- Adjustable SCR fan speed control with minimum voltage stop
- Single point electrical, pneumatic main, and thermostat connections
- Dual density insulation, coated to prevent air erosion, meets requirements of NFPA 90A and UL 181
- 20 gauge, galvanized steel casing



TQS WITH IAQ

See website for Specifications

MODELS:

PTQS / Pneumatic Control
ATQS / Analog Control
DTQS / Digital Control

OVERVIEW

Quiet Operation / with Indoor Air Quality (IAQ) Inlet

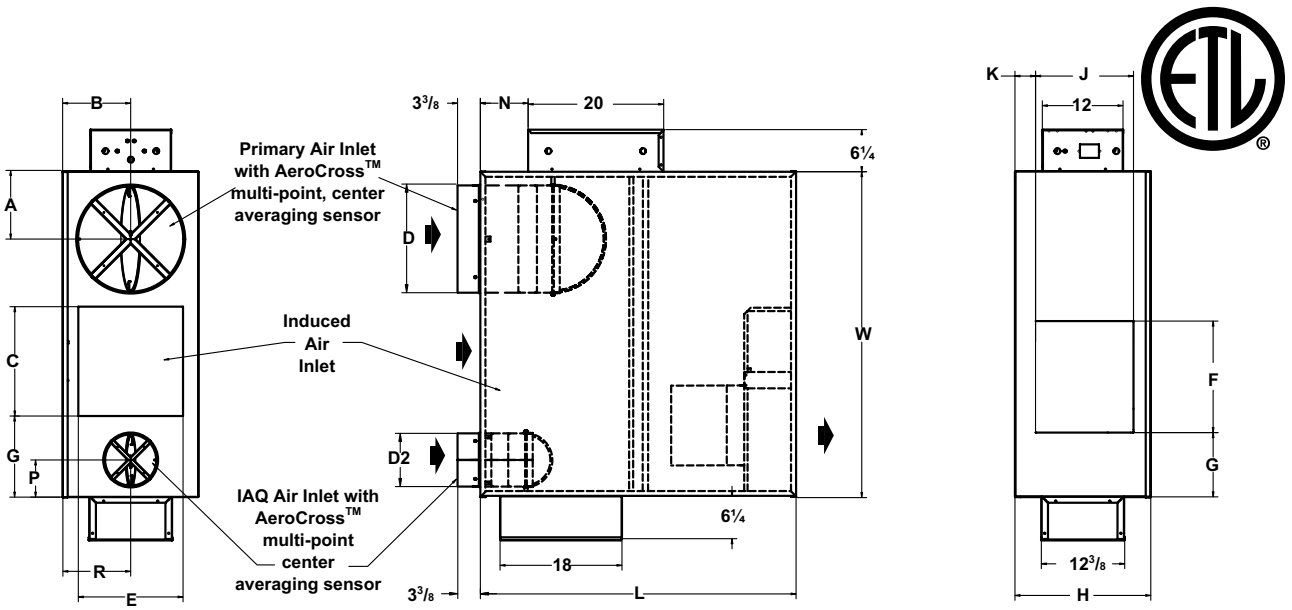
Designers choose Series flow terminals for their characteristics of constant air delivery and temperature blending. Nevertheless, these terminals maintain the VAV energy savings at the central fan.

ADDITIONAL FEATURES

- Rectangular discharge opening is designed for flanged duct connections
- Bottom access panel can be removed for service
- No external sound attenuators are required
- Additional IAQ (ventilation) inlet with damper outside air directly to zone

TQS WITH IAQ UNIT DIMENSIONS

DTQS: Sizes 3-7 (Unit Size 2 is not available with IAQ Inlet)



TQS Series Unit with IAQ Inlet																			
Size	Primary Inlet Size	Inlet	A	B	C	D	D2	E	F	G	H	J	K	L	M	N	P	R	W
3	6	4	6	8½	10⅛	5⅞	3⅞	14½	14	3½	17⅛	11	4	40⅞	8¾	2⅞	5	8½	36⅛
	8		6			7⅞										2⅞			
	10		7			9⅞										4⅞			
	12		8			11⅞										4⅞			
4	8	5	6			7⅞	4⅞									2⅞			
	10		7			9⅞										4⅞			
	12	6	8			11⅞	5⅞									4⅞			
	14		10			13⅞										6⅞			
5	10	7	7	10⅛	18⅛	9⅞	6⅞	17½	16½	9½	20⅛	14½	2½	46⅞	11	4⅞	5½	10	48⅛
	12		8			11⅞										4⅞			
	14		10			13⅞										6⅞			
	16		11			15⅞										6⅞			
6	12	8	8			11⅞	7⅞									4⅞			
	14		10			13⅞										6⅞			
	16		11			15⅞										6⅞			
7	14		10			13⅞										6⅞			
	16		11			15⅞										6⅞			

All dimensions are in inches

HOT WATER COIL SECTION

STANDARD FEATURES

- ½" copper tubes
- Aluminum ripple fins
- Connections: Male solder 5/8" for both 1- and 2-row. Left or right hand connections.
- Galvanized steel casing
- Flanged duct connection
- Coil is installed at discharge of unit

COIL ROWS

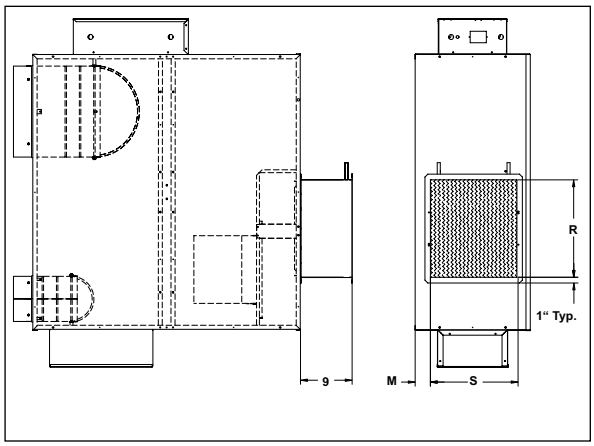
- 1-Row
- 2-Row

Hot Water Coil Section (Discharge Mounted)				
Unit Size	M (1-Row)	M (2-Row)	R	S
3, 4	1	1¼	17	15
5, 6, 7	1	1¼	25	17½

Note: R and S are inside dimensions

SUPPLY VOLTAGE

- 120V, 1 ph, 60 Hz.
- 208/240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.



ELECTRIC COIL SECTION

STANDARD FEATURES

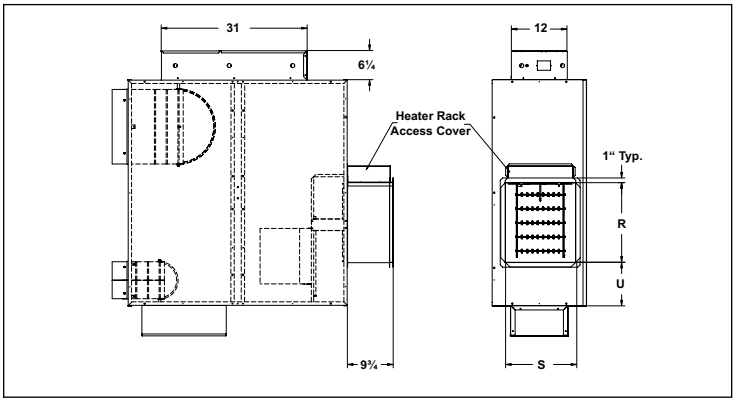
- Auto reset thermal cutouts (one per element).
- 80/20 Nickel chrome heating elements.
- Magnetic contactors, where required, on pneumatic units
- Airflow safety switch
- Line terminal block (277/1∅, 208/240/3∅, or 480/3∅ 4 wire)
- Flanged connection
- Control transformer for DDC or Analog electronic controls
- Pneumatic electric switch for pneumatic parallel fan terminals only
- Fan relay for DDC fan terminals
- Magnetic contactor per step on terminals with DDC or analog electronic controls

OPTIONS

- Interlocking disconnect
- Main power supply fuses
- Mercury contactors
- Manual reset thermal cutout
- Dust-tight construction
- Optional Lynergy Comfort Controlled SSR Electric Heat available

SUPPLY VOLTAGE

- 208V, 1 ph, 60 Hz.
- 240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.
- 208V, 3 ph, 60 Hz.
- 480V, 3 ph, 60 Hz. (4 wire wye only)



Electric Coil Section (Discharge Mounted)				
Unit Size	U	R	S	T
3, 4	3½	14	11	2 7/8
5, 6, 7	9½	16½	14½	3 1/8

Note: R and S are inside dimensions

See Electric Heat Coils in Section O for more information

ADDITIONAL ACCESSORIES (OPTIONAL)

- Induced air filter, 1" thick disposable construction type
- Fan disconnect switch (not available on units with optional electric coils)
- Metal controller cover
- Fan P/E switch for night setback control. See Section O for additional control options
- 1" Liner
- Fibre-Free Liner
- SteriLoc Liner
- UltraLoc Liner
- EcoShield liner
- Fan unit fusing
- Hanger brackets
- Camlocks on fan access door

Electrical Data				
Unit Size	Motor HP	120V	208/240V	277V
		FLA	FLA	FLA
2	1/6	3.0	1.4	1.0
3	¼	3.9	1.7	1.5
4	⅓	7.4	3.0	2.6
5	⅓	7.4	3.0	2.6
6	¾	11.2	5.3	4.5
7	1	-	5.7	4.9

All motors are single phase, 60(Hz).
FLA = Full Load Amperage, as tested in accordance with UL 60335
All fan motors are same voltage as electric coil (when supplied), with exception that 277V motors are used with 480V 3 Phase coils (four wire wye)

For ECM electrical data see page N55

TQS WITH INDOOR AIR QUALITY (IAQ) INLET BACKGROUND

Titus offers the Indoor Air Quality Inlet for the TQS. The demand for fresh air inlets on series fan powered terminals has been growing to address the growing IAQ concerns. Titus introduces the IAQ inlet option on the TQS premiere fan powered terminal.

Building owners are becoming more aware of the health concerns related to poor IAQ. Indoor air is a combination of outside air and indoor air distributed throughout a building. Indoor air pollution is caused by an accumulation of contaminants that primarily come from inside the building.

ASHRAE Standard 62, Ventilation for Acceptable Indoor Air Quality, specifies the minimum ventilation rates and indoor air quality that will be acceptable to human occupants. The standard is intended to minimize the potential for adverse health effects.

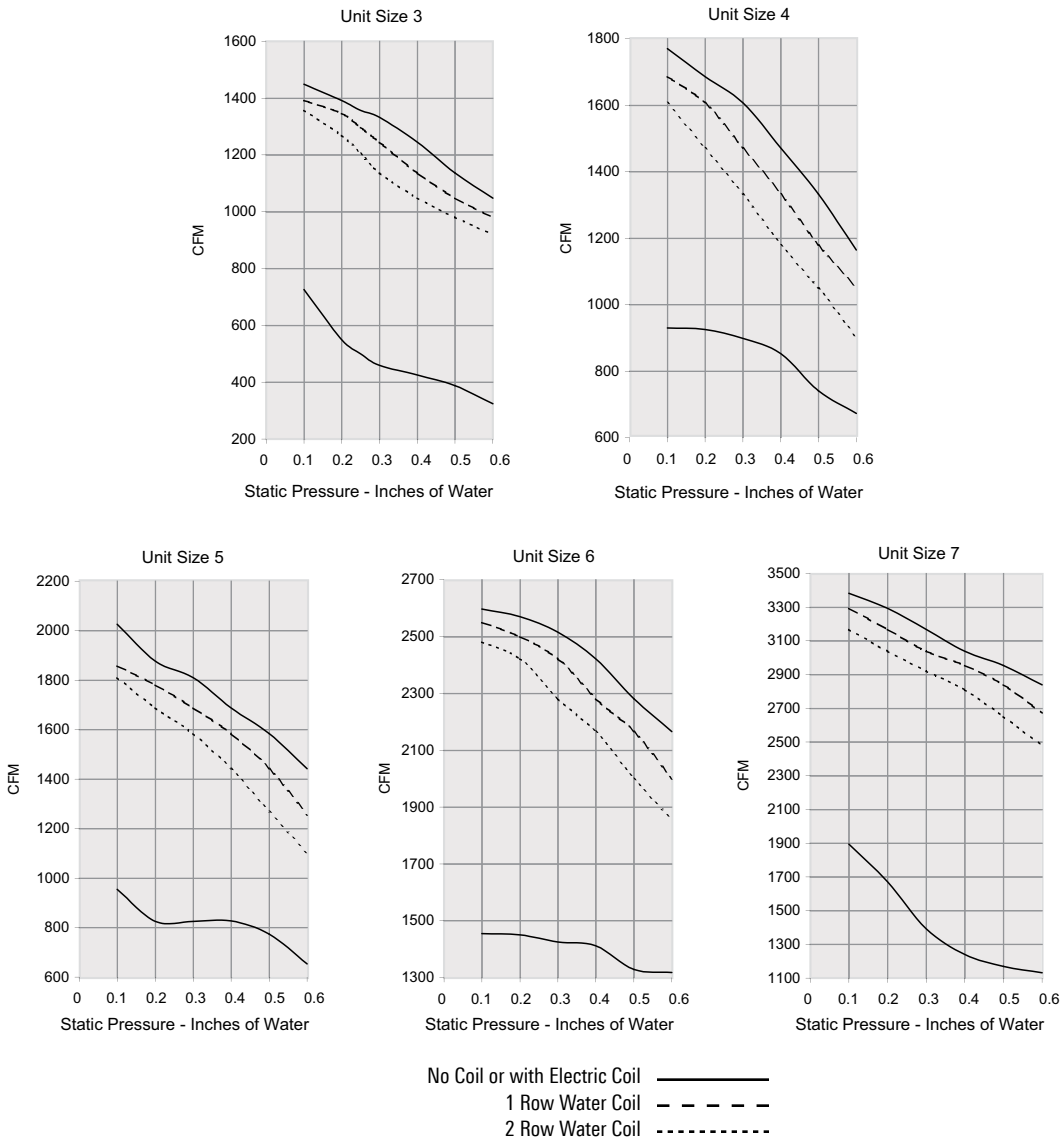
Standard 62 defines the outdoor air quality acceptable for ventilation, outdoor air treatment when necessary, ventilation rates for residential, commercial, institutional, vehicular, and industrial spaces, the criteria for reduction of outdoor air quantities when recirculated air is treated by contaminant-removal equipment, and the criteria for variable ventilation when the air volume in the space can be used as a reservoir to dilute contaminants.

In January 2000, the Environmental Protection Agency (EPA) released a report on the Energy Costs and IAQ Performance of Ventilation Systems and Controls. The study discusses the benefits (thermal and economic) of the various systems in the three climates, most of these issues will not be discussed in this catalog.

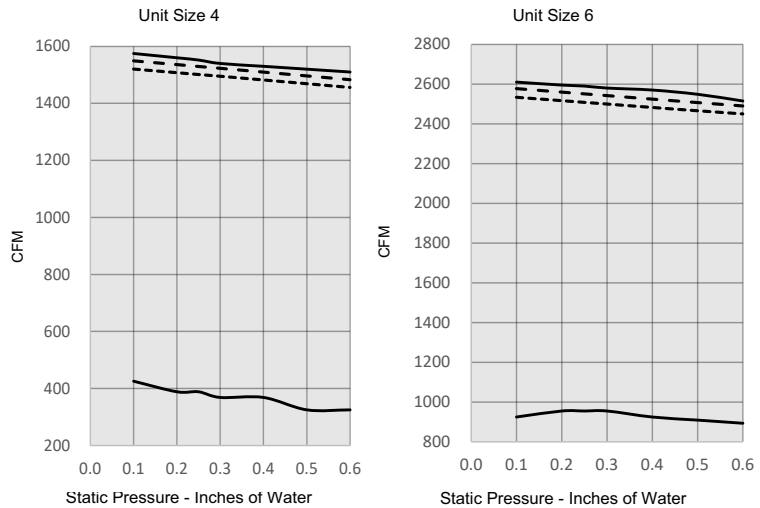
The study found that core zones consistently received less outdoor air than the perimeter zones. The core of a building is typically the zone with the largest occupancy levels and therefore would require more outdoor air than the perimeters.

Outside air control is typically handled by the central air handling unit. Due to varying conditions in individual zones, the outside air supplied by the air handler may not meet the minimum requirement for the zone. By supplying outside air directly to the zone using the TQS with IAQ inlet, the minimum ventilation requirement for the zone can be maintained.

PTQS, ATQS, DTQS WITH IAQ / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE

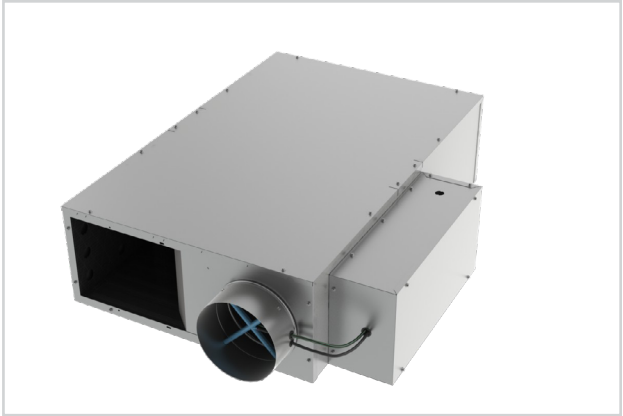


PTQS, ATQS, DTQS WITH IAQ INLET AND ECM MOTOR - AIRFLOW VS. DOWNSTREAM STATIC PRESSURE



FLS

- Only 10½ inches high, in all sizes. Especially useful where building height limits dictate shallow ceiling plenums.
- Pressure independent primary airflow control
- AeroCross™ multi-point inlet velocity sensor with center averaging
- Primary airflow balancing connections
- Adjustment points are easily accessible through ceiling opening
- Energy efficient fan motor, permanent split capacitor type, mounted in vibration isolators
- Adjustable SCR fan speed control, with minimum voltage stop
- Single point electrical, pneumatic main and thermostat connections
- Dual density insulation, coated to prevent air erosion, meets requirements of NFPA 90A and UL 181
- Heavy gauge, galvanized steel casing



FLS

energy solutions

See website for Specifications

MODELS:

PFLS / Pneumatic Control
AFLS / Analog Control
DFLS / Digital Control

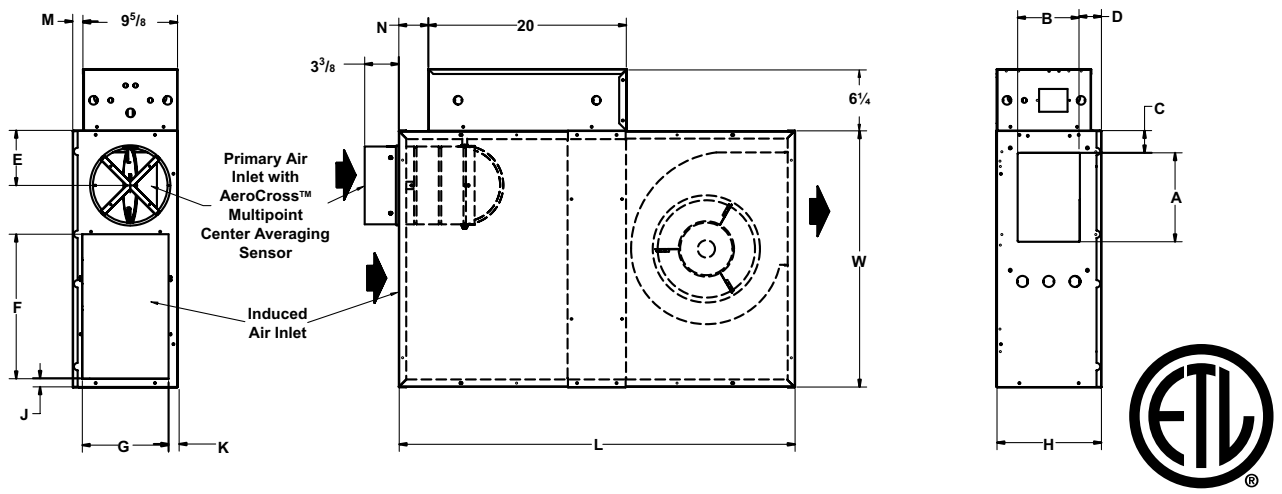
OVERVIEW

Constant Volume / Low Profile

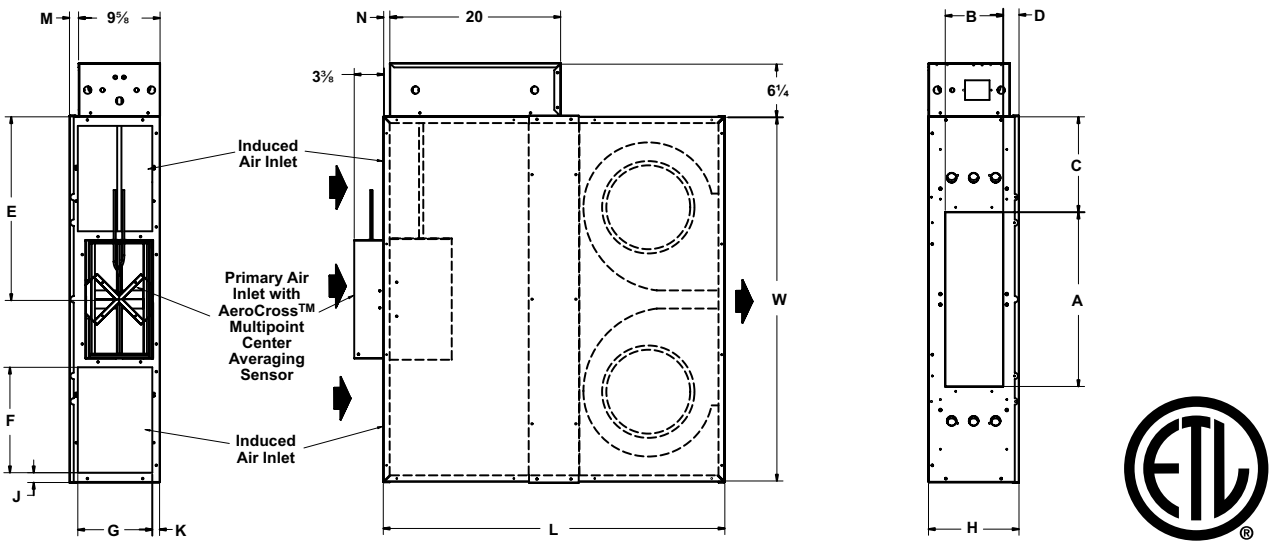
The FLS is a Low Profile Series Fan Powered Terminal designed for small ceiling plenum applications. At a height of 10 ½", they are especially useful where building height limits dictate shallow ceiling plenums.

FLS UNIT DIMENSIONS

DFLS: Sizes 2-3



DFLS: Sizes 4



Size	Inlet Size	A	B	C	D	E	F	G	H	J	K	L	M	N	W	Filter Size
2, 3	8 Dia.	9	6¼	2½	2¼	5 5/8	14 5/8	8¾	10½	7/8	1 1/8	40¼	1	3	26	10 x 15
4	8 x 16	20½	6¾	11¼	1 7/8	21½	12 3/8	8¾	10½	1 1/8	7/8	40¼	1 1/8	¾	43	10 x 15

All dimensions are in inches

HOT WATER COIL SECTION

STANDARD FEATURES

- ½" copper tubes
- Aluminum ripple fins
- Connections: Male solder 5/8" for both 1- and 2-row. Left or right hand connections.
- Galvanized steel casing
- Flanged duct connection
- Coil is installed at discharge of unit

COIL ROWS

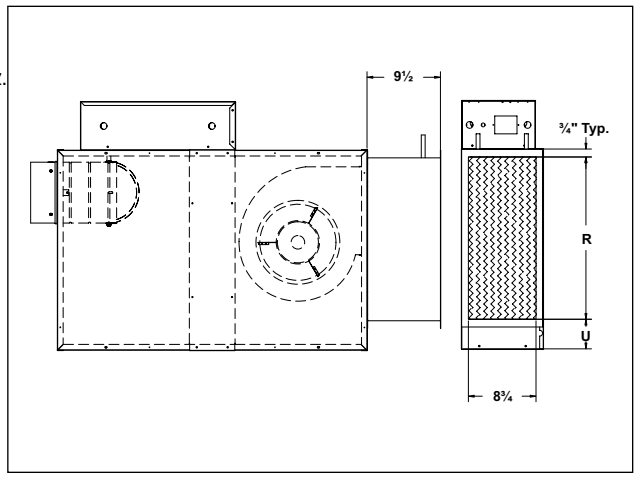
- 1-Row
- 2-Row

SUPPLY VOLTAGE

- 120V, 1 ph, 60 Hz.
- 208/240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz..

Unit Size	R	S
2, 3	21	3 7/8
4	28	7½

Note: R is an inside dimension



ELECTRIC COIL SECTION

STANDARD FEATURES

- Auto reset thermal cutouts (one per element)
- 80/20 Nickel chrome heating elements
- Magnetic contactors, where required, on pneumatic units
- Airflow safety switch
- Line terminal block (277/1∅, 208/240/3∅, or 480/3∅ 4 wire)
- Flanged connection
- Control transformer for DDC or Analog electronic controls
- Pneumatic electric switch for pneumatic parallel fan terminals only
- Fan relay for DDC fan terminals
- Magnetic contactor per step on terminals with DDC or analog electronic controls

Unit Size	R	U
2, 3	10½	10½
4	20 3/8	20 3/8

Note: R is an inside dimension

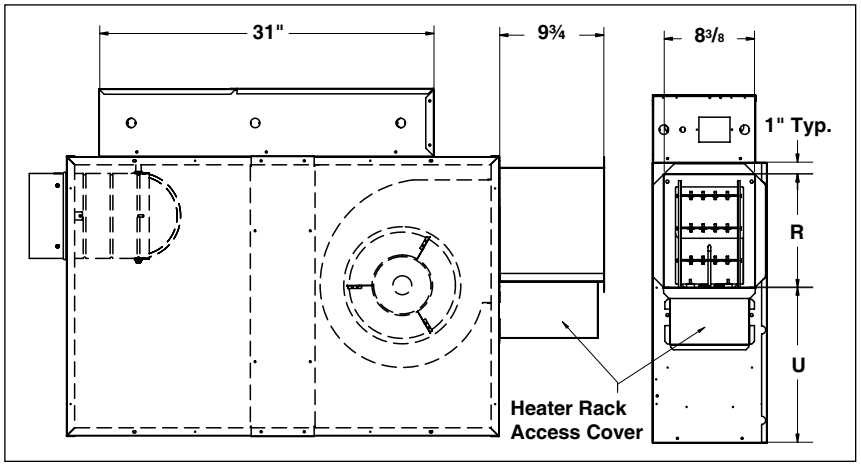
See Electric Heat Coils in Section O for more information

OPTIONS

- Interlocking disconnect
- Main power supply fuses
- Mercury contactors
- Manual reset thermal cutout
- Dust-tight construction
- Optional Lynergy Comfort Controlled SSR Electric Heat available

SUPPLY VOLTAGE

- 208V, 1 ph, 60 Hz.
- 240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.
- 208V, 3 ph, 60 Hz.
- 480V, 3 ph, 60 Hz. (4 wire wye only)



ADDITIONAL ACCESSORIES (OPTIONAL)

- Induced air filter, 1" thick disposable construction type
- Fan toggle disconnect switch (Not available on units with optional electric coils)
- Fan PE switch for night shutdown (PFLS). See Section O for additional control options.
- Hanger brackets
- Fan motor fusing
- Fibre Free Liner
- Foil Face Liner
- 1- or 2-row hot water coil
- Fan relay/pressure switch for night setback (AFLS)

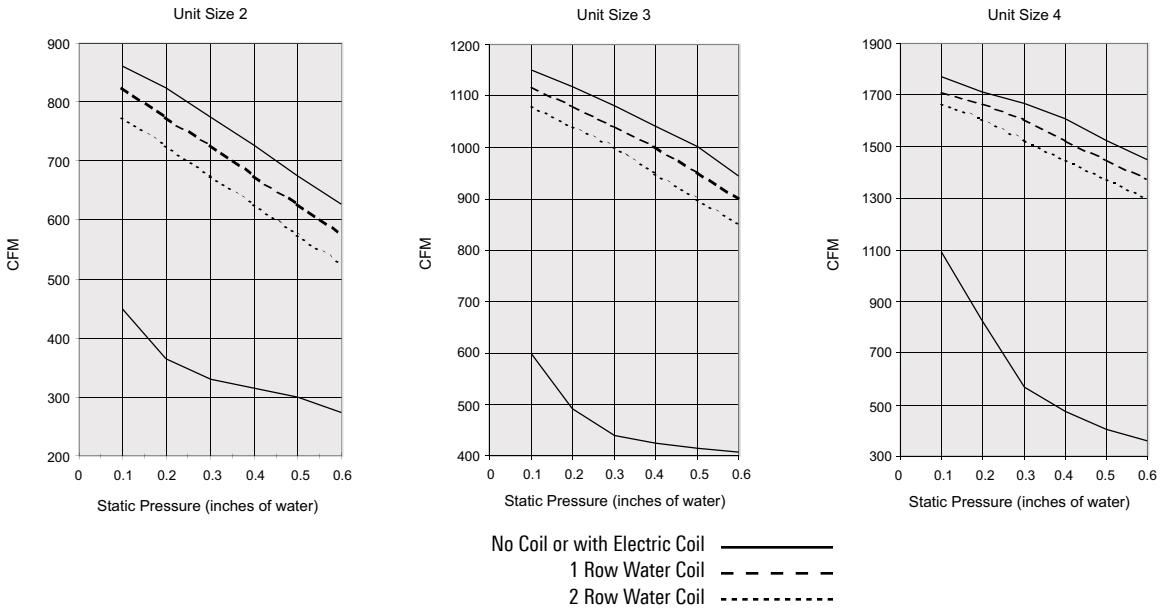
Electrical Data				
Unit Size	Motor HP	Motor Full Load Amps		
		120V	208/240V	277V
2	1/6	3.0	1.4	1.0
3	¼	4.3	1.7	1.4
4	(2) 1/6	6.0	2.8	2.0

ECM ELECTRICAL DATA

Unit Size	Motor HP	120V	208V/240V	277V
3	⅓	5.0	2.8	2.6
4	(2) ⅓	10.0	5.6	5.2

Note: All motors are single phase, same voltage as electrical coils (when supplied), with exception that 277 volt motors are used with 480 volt, three phase coils (four wire wye)

PFLS, AFLS, DFLS / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE



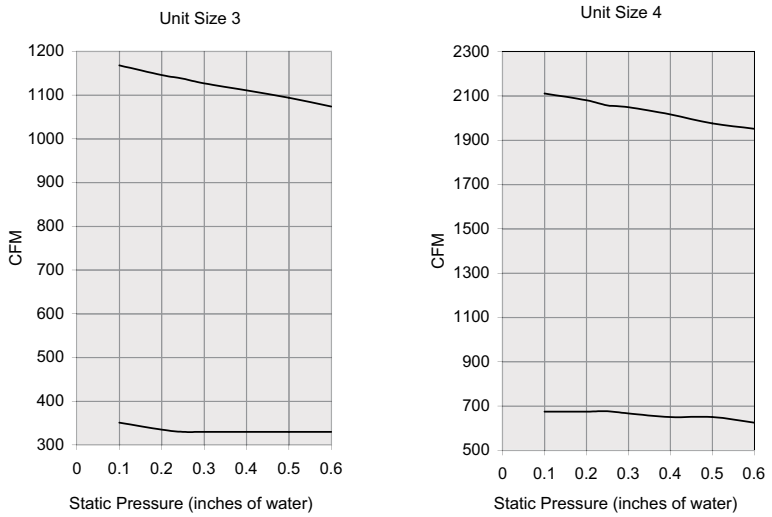
PRIMARY AIR CFM RANGES

Inlet Size	Total cfm Range	PFLS TITUS II Pneumatic Controller		PFLS TITUS I Pneumatic Controller		AFLS TITUS TA1 Analog Electronic Controller		DFLS Typical Digital Controller	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
8	0-900	*145-590	265-900	*190-590	265-900	*145-900	145-900	*145-900	145-900
8 x 16	0-1860	325-1320	590-1860	420-1320	590-1860	325-1860	*325-1860	*325-1860	325-1860

Note 1: An asterisk (*) indicates Factory cfm settings (except zero) will not be made below this range because control accuracy is reduced

Note 2: For selection procedure, see the section, Engineering Guidelines and the topic 'ECM Motors - Fan Powered Terminals' for additional information

PFLS, AFLS, DFLS WITH ECM MOTOR / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE

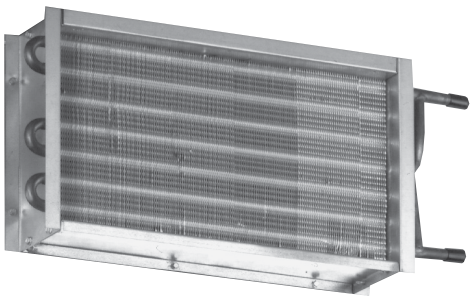


PFLS, AFLS, DFLS / WATER COIL HEATING CAPACITY (MBH)

Unit Size	Rows	gpm	Head Loss	Airflow, cfm							
				300	350	400	450	500	550	600	650
2-3	One Row	1.0	0.10	10.3	11.0	11.6	12.1	12.6	13.0	13.4	13.7
		2.0	0.33	11.5	12.4	13.2	13.9	14.5	15.0	15.6	16.0
		4.0	1.24	12.3	13.3	14.1	14.9	15.7	16.3	17.0	17.5
		6.0	2.70	12.5	13.6	14.5	15.3	16.1	16.8	17.5	18.1
		Airside ΔPs		0.02	0.03	0.04	0.05	0.05	0.06	0.07	0.08
	Two Row	1.0	0.20	17.2	18.5	19.6	20.6	21.5	22.3	23.0	23.6
		2.0	0.61	19.7	21.5	23.1	24.6	25.9	27.1	28.2	29.2
		4.0	2.26	21.1	23.2	25.2	26.9	28.6	30.1	31.5	32.8
		6.0	4.90	21.6	23.9	25.9	27.8	29.6	31.2	32.7	34.1
		Airside ΔPs		0.05	0.06	0.08	0.09	0.11	0.13	0.15	0.17

Unit Size	Rows	gpm	Head Loss	Airflow, cfm							
				450	500	550	600	650	700	750	800
4	One Row	1.0	0.15	16.00	16.6	17.2	17.8	18.3	18.8	19.2	19.6
		2.0	0.48	18.3	19.2	20.1	20.9	21.6	22.3	23.0	23.6
		4.0	1.79	19.7	20.8	21.8	22.7	23.6	24.5	25.3	26.0
		6.0	3.90	20.2	21.3	22.4	23.4	24.4	25.3	26.1	26.9
		Airside ΔPs		0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.05
	Two Row	1.0	0.29	25.3	26.5	27.6	28.6	29.4	30.2	31.0	31.6
		2.0	0.91	30.00	31.9	33.6	35.2	36.6	38.0	39.3	40.5
		4.0	3.36	32.7	35	37.2	39.2	41.0	42.8	44.5	46.1
		6.0	7.29	33.7	36.2	38.5	40.6	42.7	44.6	46.5	48.2
		Airside ΔPs		0.04	0.04	0.05	0.06	0.06	0.07	0.08	0.09

- All coil performance in accordance with AHRI 410-2001
- Heating capacities are in MBH
- Data based on 180°F entering water and 65°F entering air
- For temperature differentials other than 115°, multiply MBH by correction factors below
- Head loss is in feet of water
- Always supply water to lowest connection pipe to prevent air entrapment
- Air temperature rise = 927 x MBH/cfm
- Water temperature drop = 2.04 x MBH/gpm
- Connection size is ½" OD male solder
- Coils are not intended for steam applications and are labeled for a maximum water temperature of 200°F
- Coils are tested for leakage at test pressure of 500 psi
- Water volumes less than those shown may result in laminar flow and reduced heating capacity. If possible reduce the number of coil rows to increase water velocity into turbulent range.



Correction factors for other entering conditions:

ΔT	50	60	70	80	90	100	115	125	140	150
Factor	0.44	0.52	0.61	0.7	0.79	0.88	1	1.07	1.2	1.3

PFLS, AFLS, DFLS / RADIATED SOUND PERFORMANCE

Size	CFM	Discharge Ps	Min ΔPs	Octave Band Sound Power, Lw																									
				Fan Only							0.5"ΔPs							1.0" ΔPs							2.0" ΔPs						
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
208	350	0.25	0.05	62	50	50	47	38	29	24	64	54	52	49	41	32	27	65	58	55	51	44	36	29	66	61	56	52	47	39	30
	400		0.07	63	52	52	48	40	30	27	65	56	54	50	43	33	28	66	60	56	52	45	37	30	67	62	58	53	49	40	32
	500		0.11	66	55	54	51	43	34	29	68	59	56	53	45	36	32	69	63	59	55	48	39	34	70	65	60	56	51	43	35
	600		0.16	68	58	56	53	45	36	32	70	62	58	55	47	38	34	71	65	61	57	50	41	36	72	68	62	58	53	45	38
	700		0.22	70	60	57	55	47	38	35	70	64	60	57	47	38	35	73	68	62	59	52	43	38	73	70	64	60	54	46	41
308	500	0.25	0.11	60	54	57	45	36	23	32	65	60	57	52	43	33	31	68	64	61	55	48	39	36	70	66	62	57	51	43	37
	600		0.16	63	57	58	48	40	28	33	67	63	58	53	45	34	33	69	67	62	57	50	40	37	71	69	63	59	53	44	40
	700		0.22	66	59	59	50	43	32	34	69	65	61	55	47	36	36	71	69	63	59	52	42	40	73	71	65	60	54	45	42
	850		0.32	69	62	61	54	47	37	36	71	67	63	58	50	39	38	73	72	66	61	53	43	43	74	73	67	63	57	47	44
	1000		NA	71	64	62	57	51	41	38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
426 (8 x 16)	800	0.25	0.02	56	52	53	49	40	26	28	59	56	56	53	46	37	30	60	59	58	56	50	46	32	61	61	60	59	54	51	35
	1000		0.03	59	55	56	53	43	31	31	62	59	59	56	48	40	34	63	61	61	58	53	48	36	64	64	63	61	56	53	38
	1200		0.05	61	58	58	55	47	36	33	65	62	61	58	51	41	36	66	64	63	60	55	49	38	66	66	65	63	57	54	40
	1400		0.07	63	60	60	58	49	39	35	67	64	62	60	53	44	37	68	65	65	63	56	50	40	68	68	66	64	59	56	41
	1600		0.09	64	62	62	60	51	42	38	68	65	64	62	54	46	39	69	67	66	64	57	52	41	70	69	67	66	60	57	42

- Radiated sound is the noise transmitted through the unit casing and emitted from the induction port
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N63 for AHRI Certified Performance Listings.

PFLS, AFLS, DFLS / DISCHARGE SOUND PERFORMANCE

Size	CFM	Discharge Ps	Min ΔPs	Octave Band Sound Power, Lw																									
				Fan Only							0.5"ΔPs							1.0" ΔPs							2.0" ΔPs						
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
208	350	0.25	0.05	39	39	53	56	64	61	25	57	52	56	56	64	61	25	58	56	57	56	64	61	25	59	58	58	56	64	61	25
	400		0.07	45	44	56	59	66	63	27	59	54	59	59	66	63	27	61	59	60	59	66	63	27	62	61	60	59	66	63	27
	500		0.11	54	53	61	63	70	68	31	64	60	63	63	70	68	31	65	63	64	63	70	68	31	66	66	65	63	70	68	31
	600		0.16	61	60	65	66	73	72	35	68	65	67	66	73	72	35	70	68	68	66	73	72	35	71	70	68	66	73	72	35
	700		0.22	67	66	68	69	76	75	38	72	69	70	69	76	75	38	72	71	71	69	76	75	38	74	74	71	69	76	75	38
308	500	0.25	0.11	74	67	64	62	61	58	29	74	69	64	64	64	60	29	74	69	64	64	63	60	29	74	69	64	64	63	60	29
	600		0.16	76	70	66	64	64	61	31	76	72	66	66	66	63	32	76	72	66	66	66	63	32	76	72	66	64	64	63	32
	700		0.22	78	72	68	66	66	64	34	80	74	68	68	68	66	36	80	74	68	66	68	66	36	80	74	68	66	66	66	36
	850		0.32	80	75	70	68	69	67	34	82	77	70	70	69	67	37	82	77	72	68	69	67	37	82	77	72	68	69	67	37
	1000		NA	81	77	72	70	71	70	37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
426 (8 x 16)	800	0.25	0.02	59	60	59	60	55	49	17	62	60	61	64	66	60	24	63	62	62	64	65	60	24	63	63	63	64	64	60	24
	1000		0.03	62	62	62	63	60	54	19	65	62	64	66	70	64	28	66	65	65	67	68	64	28	67	66	66	67	66	64	28
	1200		0.05	64	64	65	66	64	59	23	67	66	67	69	72	66	30	68	67	68	69	70	66	30	69	68	68	70	69	66	30
	1400		0.07	65	65	67	68	67	62	26	69	67	67	70	73	68	31	70	68	70	71	72	68	31	71	69	70	71	71	68	31
	1600		0.09	67	67	69	70	70	66	30	71	69	69	72	75	71	34	72	70	72	73	74	71	34	73	71	72	73	73	71	34

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N63 for AHRI Certified Performance Listings.

AHRI Directory of Certified Performance

Titus is a charter member company and current participant in the AHRI Directory of Certified Performance. This voluntary certification program was developed by participating manufacturers in conjunction with the former Air-Conditioning and Refrigeration Institute (ARI) in the 1990's. It is currently administrated by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI). The purpose of this program is to provide for the independent verification of manufacturers' published performance data. Only participating products are authorized to bear the AHRI VAV Certification Mark. Certified data may be viewed and downloaded at www.ahrinet.org.

In order to participate in this program, member companies pay annual dues, submit published performance data for all applicable model types, and agree to provide a number of randomly selected product samples for annual rounds of independent testing at the manufacturers' expense. All verification testing is conducted in accordance with ASHRAE Standard 130 'Methods of Testing Air Terminal Units'. These tests are conducted to verify that a manufacturer's published certified ratings are within the test tolerances outlined in AHRI Standard 880 'Performance Rating of Air Terminals'. Any failure to demonstrate the certified performance is punished by additional testing requirements, mandatory performance re-rating, monetary penalties and possible expulsion from the Certified Directory.

Product samples provided for certification testing are standard production units with standard ½ in dual density fiberglass lining (unless otherwise specified) and no optional appurtenances such as add-on attenuators or heating/cooling coils. The certified ratings are measured at the standard operating points under the following test conditions:

PTQS, ATQS, DTQS, PFLS, AFLS, DFLS

- Rated airflow (cfm) – Based on lesser of an inlet velocity of 2000 fpm or the maximum fan flow with 0.25 in wg of downstream pressure
- Rated fan power (watts) – Based on fan operating at the rated airflow with 0.25 in wg of downstream pressure
- Rated Min ΔPs (in wg) – Min ΔPs is the difference between atmospheric pressure and the inlet static pressure at rated airflow with the primary damper full open and the unit fan set to match the primary flow
- Rated ΔPs (in wg) – A static pressure of 1.5 in wg applied to the inlet duct
- Rated sound power by octave band (dB, re 10^{-12} watts) – Radiated and discharge sound performance conducted in a reverberation room that meets both the broadband and pure tone qualifications of AHRI Standard 220

PTQS, ATQS, DTQS

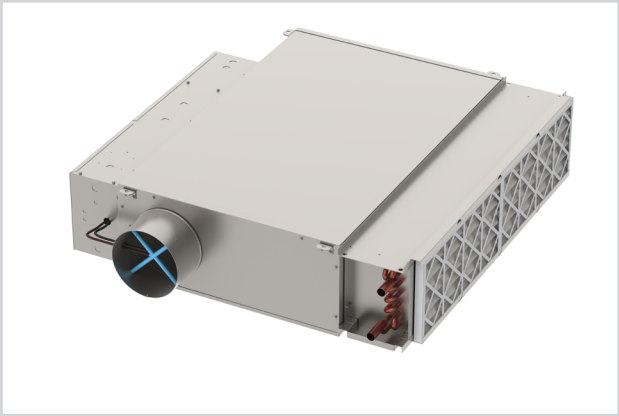
						Fan Only						Fan Plus 100% Primary						Fan Only					
Unit	Rated	Fan	Min	Discharge		Radiated Sound Power						Radiated Sound Power						Discharge Sound Power					
Size	CFM	Watts	ΔPs	H	W	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7
208	500	340	0.10	15	17	63	59	54	47	41	37	67	62	57	51	46	43	77	68	62	60	60	59
310	900	570	0.16	15	17	62	58	55	49	41	36	70	62	58	52	46	41	73	65	61	57	57	55
412	1300	700	0.21	15	17	69	64	60	55	48	42	74	67	63	57	51	46	77	72	65	62	62	61
512	1500	860	0.16	17.5	25	69	63	59	57	51	45	74	67	62	60	53	48	77	68	67	64	63	63
614	2000	1400	0.17	17.5	25	70	67	61	58	52	47	76	70	64	60	55	50	77	68	67	65	64	64
716	2400	1800	0.15	17.5	25	76	67	67	62	58	54	80	71	69	64	61	57	81	68	68	66	65	65

PFLS, AFLS, DFLS

						Fan Only						Fan Plus 100% Primary						Fan Only					
Unit	Rated	Fan	Min	Discharge		Radiated Sound Power						Radiated Sound Power						Discharge Sound Power					
Size	CFM	Watts	ΔPs	H	W	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7
208	700	250	0.22	8.75	21	70	60	57	55	47	38	73	70	64	60	54	46	67	66	68	69	76	75
308	700	350	0.22	8.75	21	66	59	59	50	43	32	73	71	65	60	54	45	78	72	68	66	66	64
426	1600	800	0.09	8.75	28	64	62	62	60	51	42	70	69	67	66	60	57	67	67	69	70	70	66

AHRI CERTIFIED®
www.ahridirectory.org
VAV Terminals
AHRI Standard 880

DLSC



- Sensible cooling coil allows for reduction of primary air to minimum required for ventilation and latent cooling
- Low profile sizes for applications with shallow ceiling plenums
- Pressure independent primary airflow control
- Casing manufactured of 20 gauge G40 galvanized steel
- Standard internal liner, ½ EcoShield faced for resistance to air erosion. Contains no harmful irritants or chemicals with EPA registered antimicrobial inhibitor and meets requirements of NFPA 90A and UL 181.
- Ultra high efficiency ECM brushless DC motor with microprocessor based controller
- Fan airflow controlled by a manual or remote PWM speed controller
- Titus AeroCross™ multipoint center averaging inlet velocity sensor with +/- 5% accuracy across the complete airflow range
- Fully gasketed round damper with metal shaft rotating in Delrin self-lubricating bearings
- Primary airflow balancing connections for CFM measurement

energy solutions

See website for Specifications

MODEL:

DLSC / Basic Unit

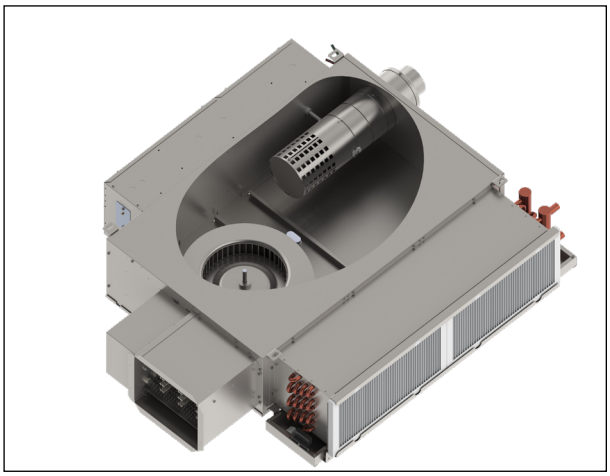
OVERVIEW

Fan Powered Induction

The DLSC is a fan powered terminal unit that features a sensible cooling coil. It has been designed to work as part of a dedicated outdoor air system (DOAS) and as a companion product within chilled beam installations. These systems provide an alternate solution to addressing ASHRAE 62.1 ventilation requirements. The DLSC provides the designer the ability to tightly control the environment of the occupied space, maximize occupant comfort while minimizing energy costs.

ADDITIONAL FEATURES

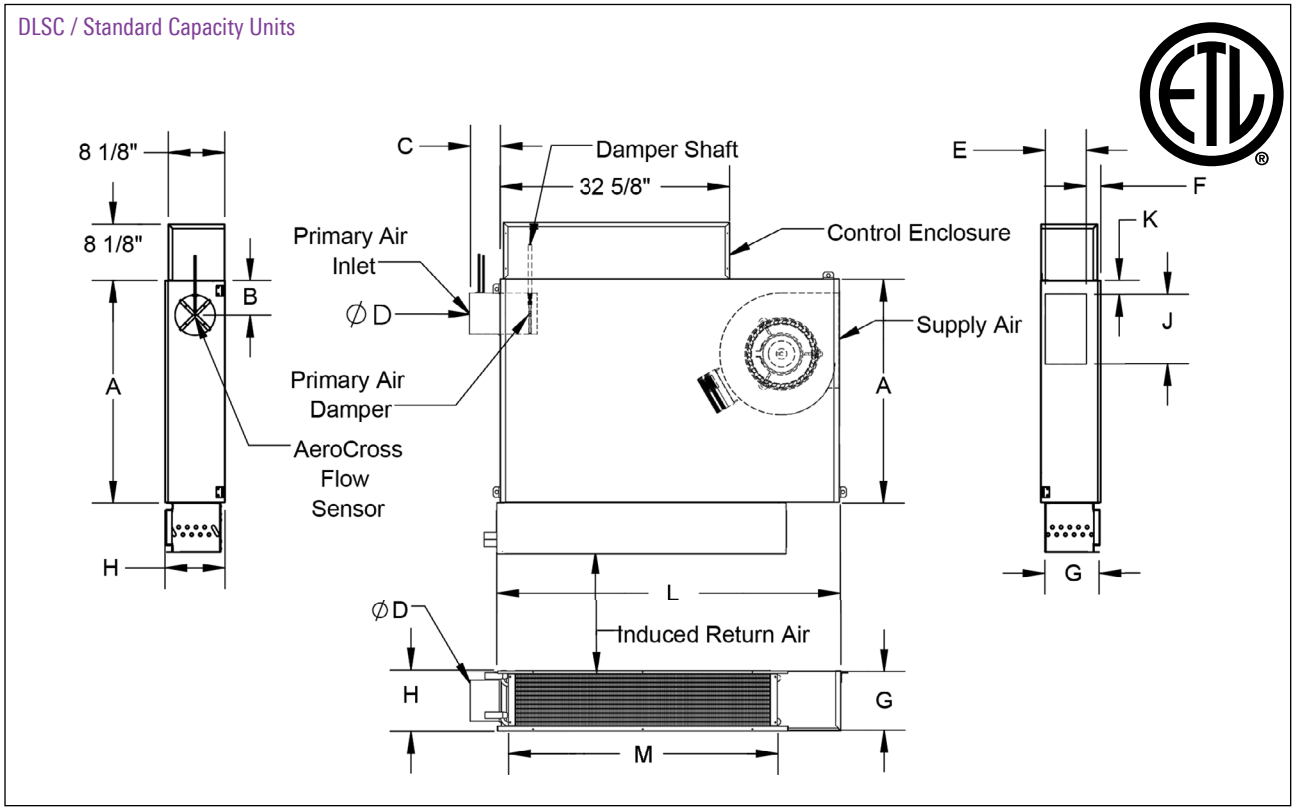
- Single point electrical connections
- Rectangular discharge opening is designed for flanged duct connections
- Sensible coil condensate tray, for emergency condensate collection
- High efficiency sensible cooling and booster heating coils factory installed on return air inlet
- Removable bottom access panel for easy service/maintenance
- UL Class 2 control transformer 24V secondary voltage
- ETL Certified
- Discharge Mounted Hot water supplemental heat
- Discharge Mounted Electric Supplemental heat



Cutaway view of the LSC terminal unit to reveal components

DLSC DIMENSIONS

DLSC / Standard Capacity Units



Unit Size	A	E	F	G	H	J	K	L	M
1	32	5 7/8	2 1/8	7 3/4	8 5/8	10	2	48 1/8	38 3/4
2			3	8 1/2	9 1/2				
3	26	6 7/8	2 1/8	9 3/4	11	9	2 1/4	40 1/8	
5	35	10 7/8	3 1/4	13 1/2	17	10	6 1/4	46 1/8	44 3/4

Inlet Size	B	C	D
4	5	6 7/8	3 7/8
5			4 7/8
6		4 3/4	5 7/8
8	6		7 7/8
10	7		9 7/8
12	8	6 3/4	11 7/8
14	10		13 7/8

ECM ELECTRICAL DATA

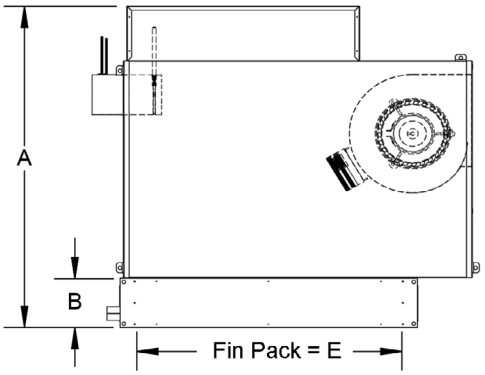
		Motor Full Load Amps		
Unit Size	Motor HP	120V	208V/240V	277V
1	1/3	5.0	2.8	2.6
2	1/3	5.0	2.8	2.6
3	1/2	7.7	4.3	4.1
5	3/4	9.6	6.8	5.5

All dimensions are in inches

DLSC DIMENSIONS

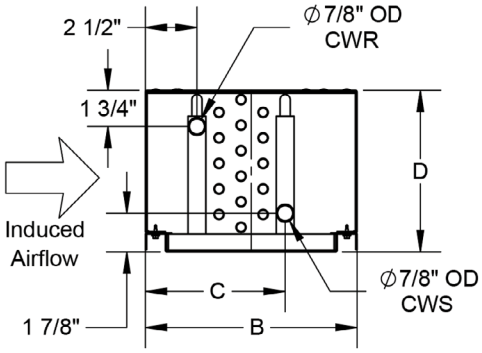
DLSC / Standard Capacity Sensible Coil

Sensible Cooling Coil Dimensions



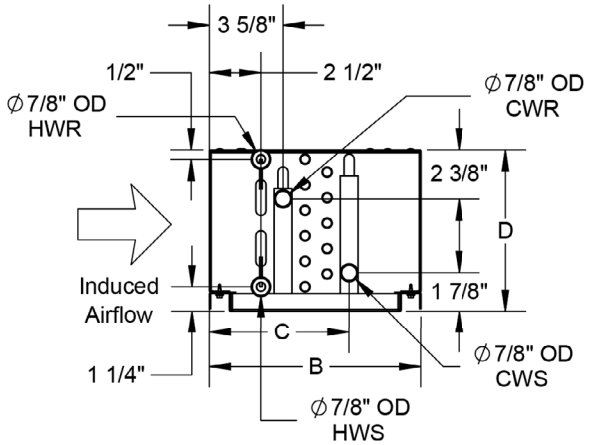
Unit Size	Coil Rows	A	B	C	D	E
1	2	47¼	7 1/8	3¼	7¾	36
	3	48¼	8¼	4¾		
	4	49½	9¼	12½		
	5	50½	10 3/8	6 7/8		
	6	51 5/8	11½	7 7/8		
	7	52½	12½	9 1/8		
	8	53 6/8	13 5/8	9 7/8		
2	2	47¼	7 1/8	3¼	8½	36
	3	48 3/8	8¼	4¾		
	4	49 3/8	9¼	5½		
	5	50½	10 3/8	6 7/8		
	6	51 5/8	11½	7 7/8		
	7	52 5/8	12½	9 1/8		
	8	53¾	13 5/8	9 7/8		
3	2	41¼	7 1/8	3¼	9¾	36
	3	42 3/8	8¼	4¾		
	4	43 3/8	9¼	5½		
	5	44½	10 3/8	6 7/8		
	6	45 5/8	11½	7 7/8		
	7	46 5/8	12½	9 1/8		
	8	47¾	13 5/8	9 7/8		
5	2	51 1/8	7 1/8	3¼	13½	36
	3	52¼	8¼	4¾		
	4	53¼	9¼	5½		
	5	54 3/8	10 3/8	6 7/8		
	6	55½	11½	7 7/8		
	7	56½	12½	9 1/8		
	8	57 5/8	13 5/8	9 7/8		

2-Pipe Coil Details



Size 1, 5 Row Cooling Shown

4-Pipe Coil Details

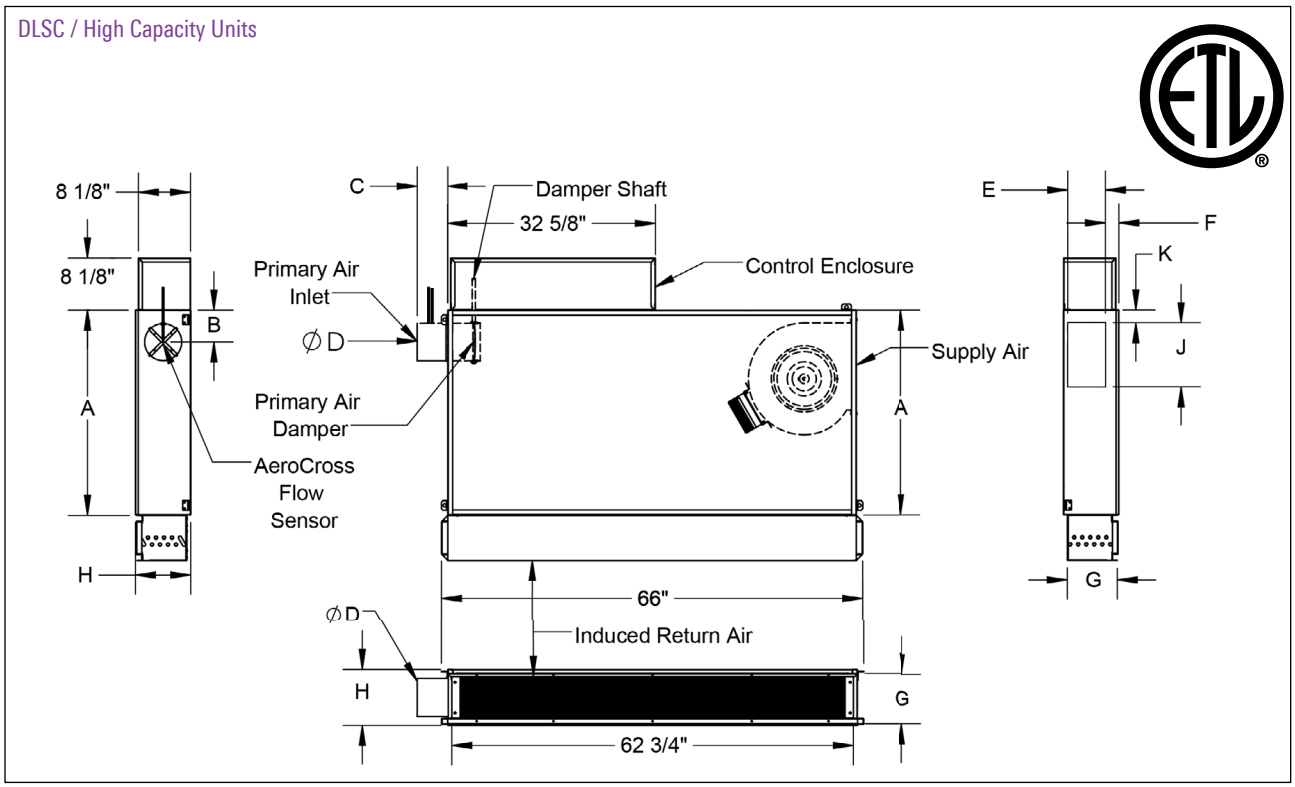


Size 1, 4 Row Cooling, 1 Row Heating Shown

All dimensions are in inches

DLSC DIMENSIONS

DLSC / High Capacity Units



Unit Size	A	E	F	G	H	J	K
A	32	5 7/8	2 1/8	7 3/4	8 5/8	10	2
B			3	8 1/2	9 1/2		
C	26	6 7/8	2 1/8	9 3/4	11	9	2 1/4
E	35	10 7/8	3 1/4	13 1/2	17	10	6 1/4

Inlet Size	B	C	D
4	5	6 7/8	3 7/8
5			4 7/8
6		4 3/4	5 7/8
8	6		7 7/8
10	7		9 7/8
12	8	6 3/4	11 7/8
14	10		13 7/8

ECM ELECTRICAL DATA

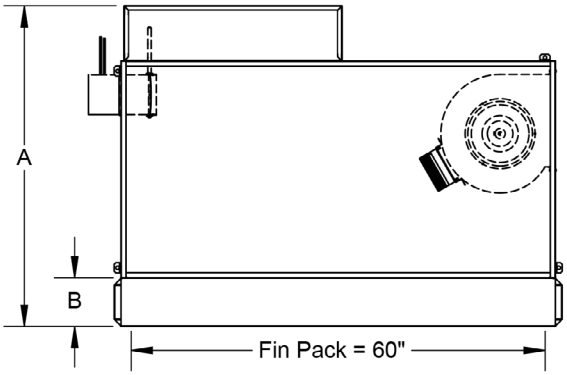
Unit Size	Motor HP	120V	208V/240V	277V
A	1/3	5.0	2.8	2.6
B	1/3	5.0	2.8	2.6
C	1/2	7.7	4.3	4.1
E	3/4	9.6	6.8	5.5

All dimensions are in inches

DLSC DIMENSIONS

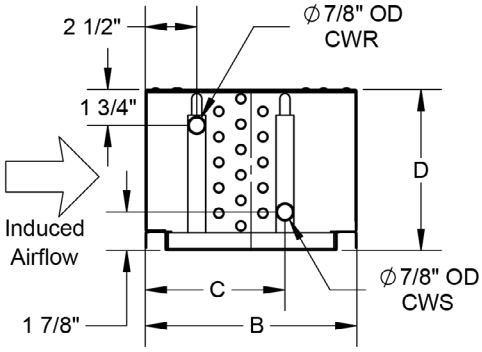
DLSC / High Capacity Sensible Coil

Sensible Cooling Coil Dimensions



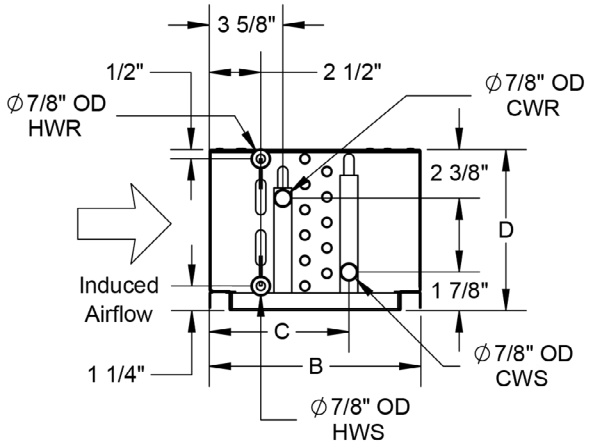
Unit Size	Coil Rows	A	B	C	D
A	2	47¼	7 1/8	3¼	7¾
	3	48¼	8¼	4¾	
	4	49½	9¼	12½	
	5	50½	10 3/8	6 7/8	
	6	51 5/8	11½	7 7/8	
	7	52½	12½	9 1/8	
	8	53 6/8	13 5/8	9 7/8	
B	2	47¼	7 1/8	3¼	8½
	3	48 3/8	8¼	4¾	
	4	49 3/8	9¼	5½	
	5	50½	10 3/8	6 7/8	
	6	51 5/8	11½	7 7/8	
	7	52 5/8	12½	9 1/8	
	8	53¾	13 5/8	9 7/8	
C	2	41¼	7 1/8	3¼	9¾
	3	42 3/8	8¼	4¾	
	4	43 3/8	9¼	5½	
	5	44½	10 3/8	6 7/8	
	6	45 5/8	11½	7 7/8	
	7	46 5/8	12½	9 1/8	
	8	47¾	13 5/8	9 7/8	
E	2	51 1/8	7 1/8	3¼	13½
	3	52¼	8¼	4¾	
	4	53¼	9¼	5½	
	5	54 3/8	10 3/8	6 7/8	
	6	55½	11½	7 7/8	
	7	56½	12½	9 1/8	
	8	57 5/8	13 5/8	9 7/8	

2-Pipe Coil Details



Size A, 5 Row Cooling Shown

4-Pipe Coil Details

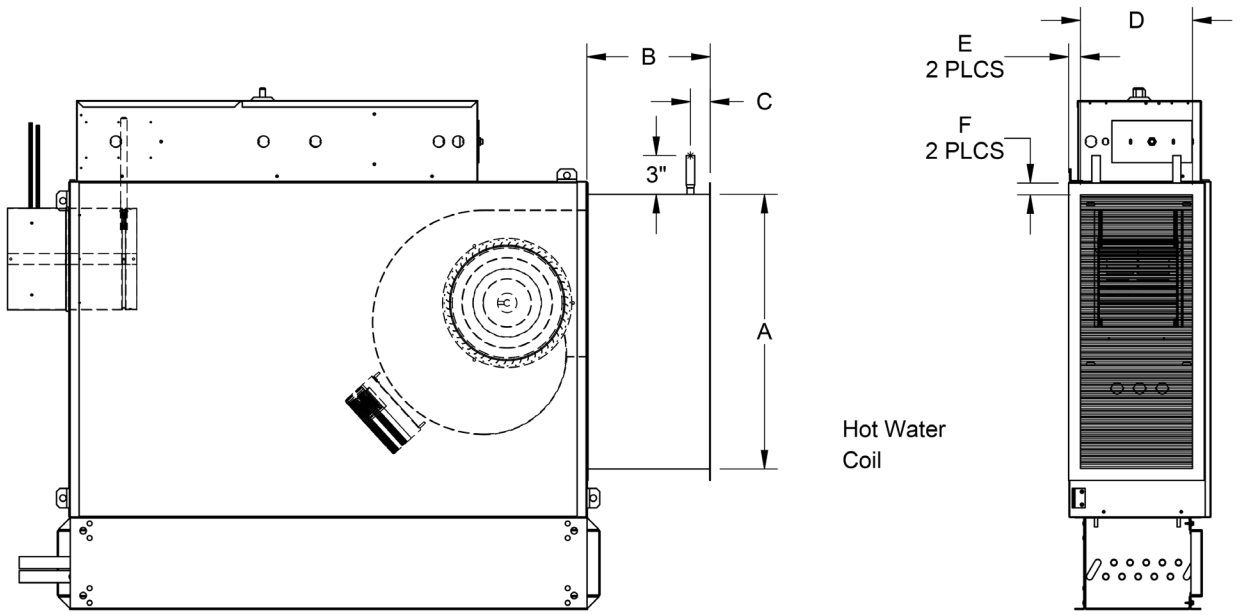


Size A, 4 Row Cooling, 1 Row Heating Shown

All dimensions are in inches

DLSC DIMENSIONS

DLSC / Discharge Hot Water Coil Option



DISCHARGE HOT WATER COIL SECTION

STANDARD FEATURES

- 1/2" Copper tubes
- Aluminum ripple fins, 10 per inch
- Connections: Male solder, 5/8"
- Galvanized steel casing
- Flanged duct connection
- Flanged connection???

OPTIONS

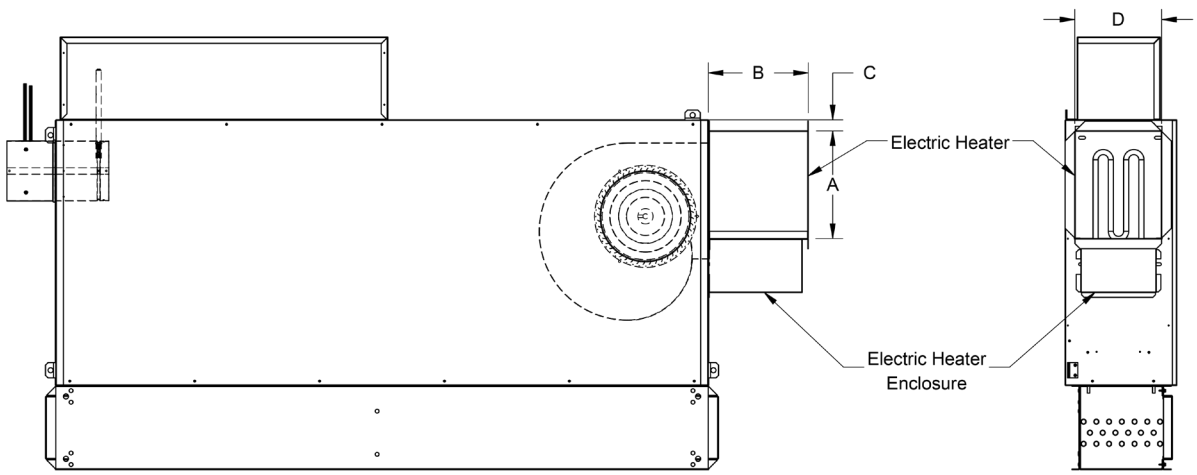
- Left hand or right hand connections
- 1-Row or 2-Row coils available

Unit Size	Coil Rows	A	B	C	D	E	F
1 & A	1 Row	20½	9½	2 5/8	6 5/8	½	¾
	2 Row						
2 & B	1 Row	20½	9½	2 5/8	6 5/8	½	¾
	2 Row						
3 & C	1 Row	21 1/8	9½	1½	8 5/8	7/8	1
	2 Row						
5 & E	1 Row	22	8	1 9/16	15	½	1
	2 Row		9 3/16	2 1/8			

Notes:
Image depicts top and bottom coil flanges formed outward. For sizes 1, 2, A & B coil top and bottom flanges are formed inward.

DLSC DIMENSIONS

DLSC / Electric Heater Option



ELECTRIC COIL SECTION

STANDARD FEATURES

- Safety auto reset thermal cutouts (one per heater element)
- 80/20 Nickel chrome heating elements
- Magnetic contactors for stepped heating
- Airflow safety switch
- Terminal block
- Flanged connection

SUPPLY VOLTAGE

- 208V, 1 ph, 60 Hz.
- 240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.
- 208V, 3 ph, 60 Hz.
- 480V, 3ph, 60 Hz. (4 wire WYE only)

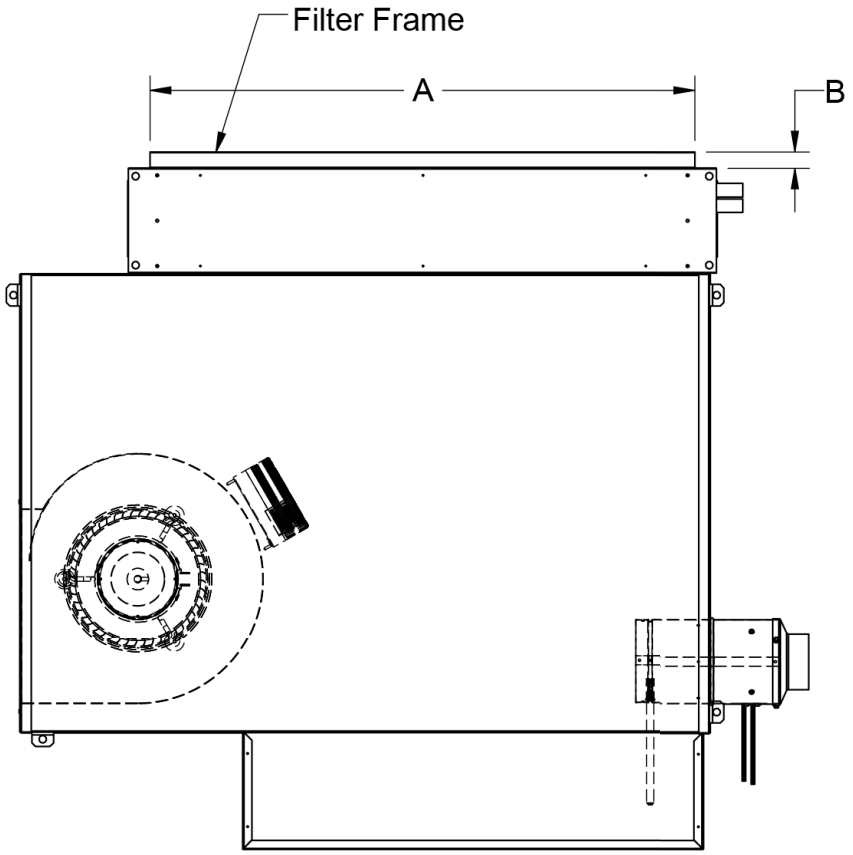
Unit Size	A	B	C	D
1 & A	10½	10½	1 1/8	7¾
2 & B	10½	10 3/8	2 1/8	7¾
3 & C	10½	9 5/8	1 1/8	8½
5 & E	14½	9¾	6¼	13

Notes:
Duct connection for sizes 1, 2, A & B are slip and drive. Duct connection for sizes 3, 5, C & E are 1" flanged connections.

OPTIONS

- Fuse Block
- Door Interlock Disconnect Switch
- Secondary Manual reset thermal cutout
- Dust-tight construction
- Lynergy Comfort Controlled solid state relay electric heat:
  - Accepts the following control signals
    - PWM heat
    - 2 Stage heat
    - 0-10V / 0-20mA
    - 2-10V / 4-20mA
    - Incremental T-stat
    - Binary
    - 3 point floating
  - Discharge temperature limit sensor/control

DLSC / Filter Rack and Filter Options



Unit Size	A
1, 2, 3	38
5	44
A, B, C, E	62

Filter Type	B
MERV 8	1 1/8
MERV 13	2 1/8

FILTER RACK AND FILTER OPTION

STANDARD FEATURES

- 1" MERV8 or 2" MERV13 Filter

OPTIONS

- Return air filter flange for ducted applications

ADDITIONAL ACCESSORIES (OPTIONAL)

- Motor fuses
- Unit hanger brackets
- Discharge air slip & drive connection kit
- Unit disconnect switch

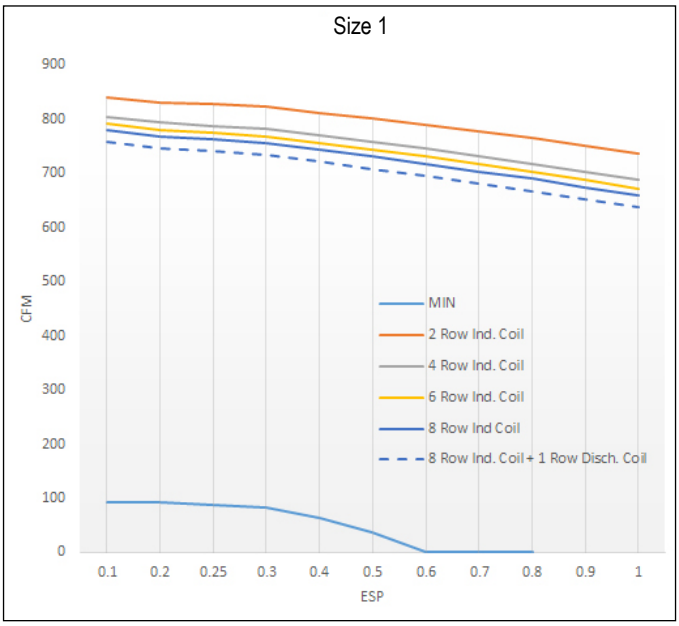
PRIMARY AIR CFM RANGES

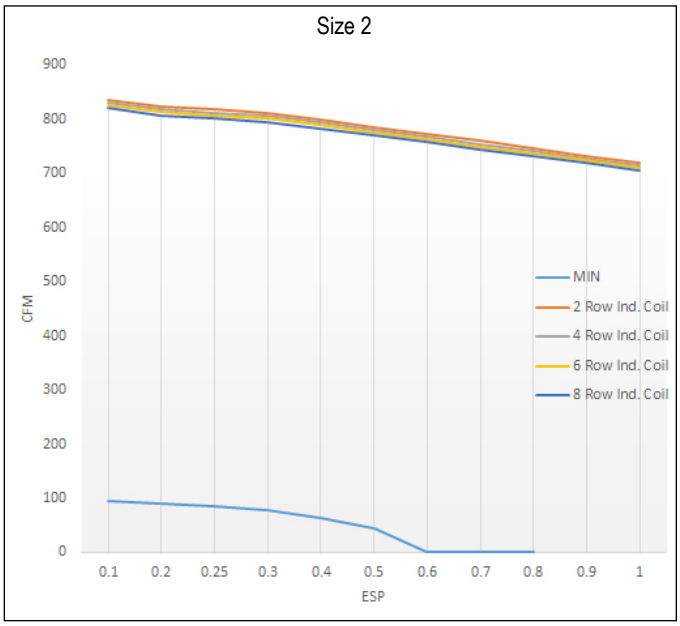
Inlet Size	Total Range (cfm)	Minimum and Maximum Range Settings (cfm)	
		Minimum	Maximum
4	0-225	30*-225	30-225
6	0-500	45*-500	45-500
8	0-900	90*-900	90-900
10	0-1400	145*-1400	145-1400
12	0-2000	190*-2000	190-2000
14	0-3000	300*-3000	300-3000
16	0-4000	385*-4000	385-4000

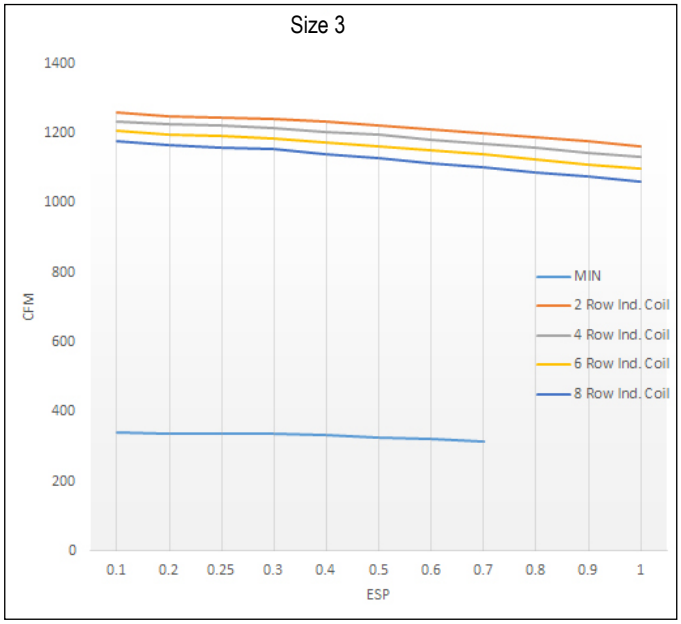
Notes:
1. An asterisk (*) indicates factory cfm settings (except zero) will not be made below this range because control accuracy is reduced

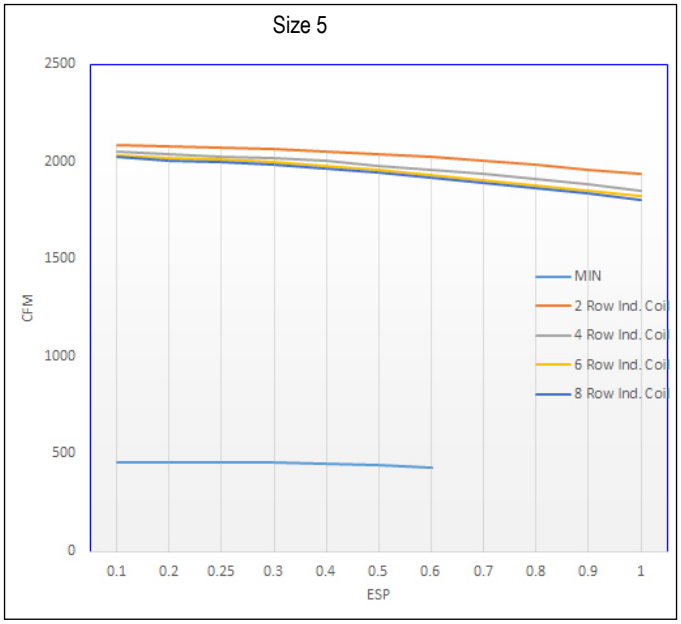
2. For selection procedure, see the section "Engineering Guidelines" and the topic "ECM Motors - Fan Powered Terminals" for additional information

DLSC / FAN CURVES

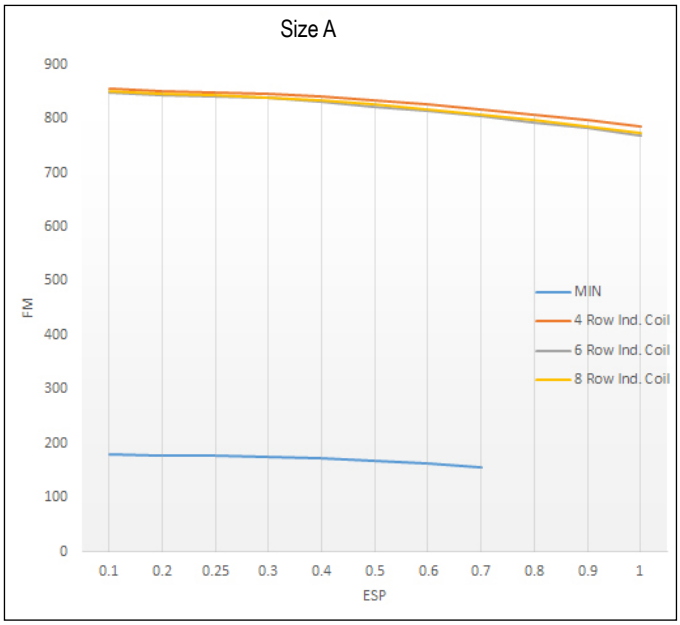


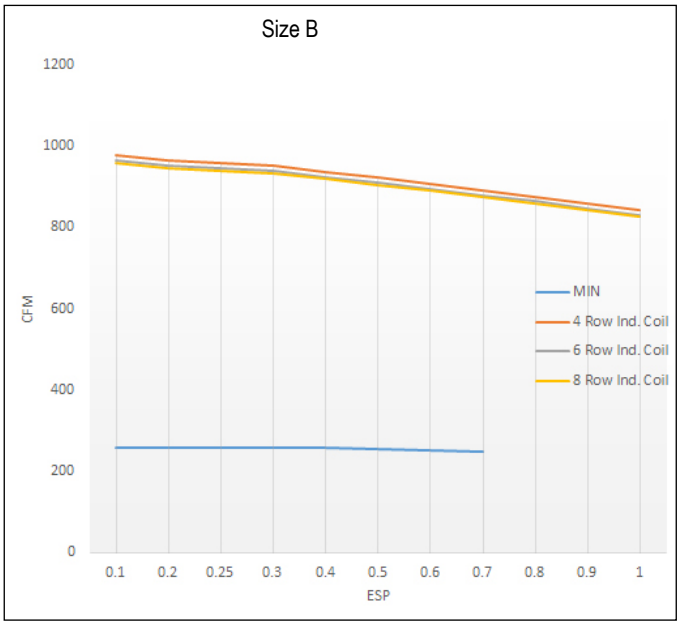


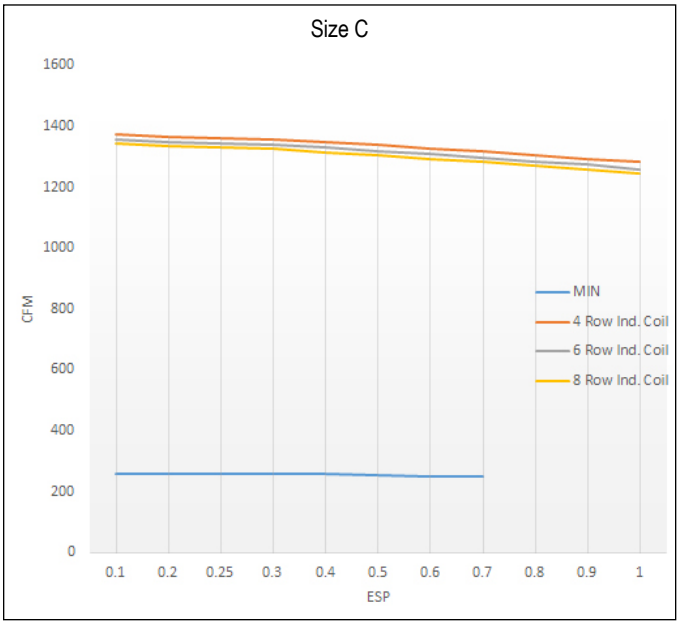


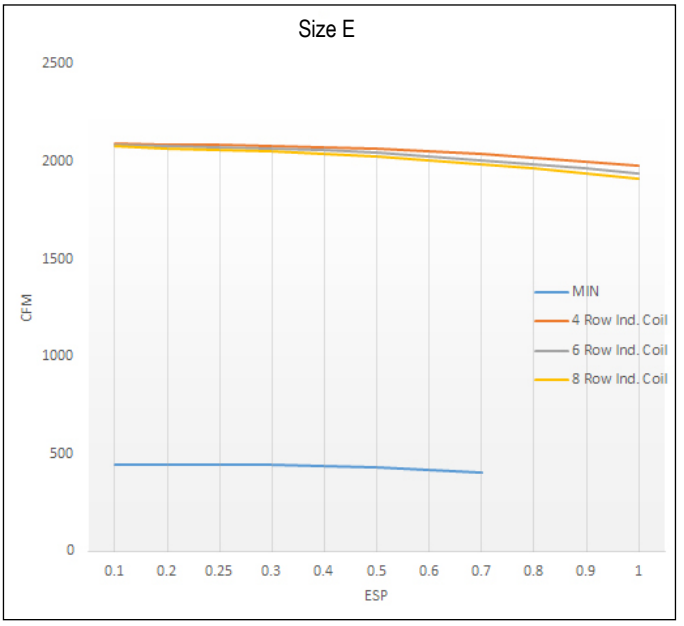


DLSC / FAN CURVES

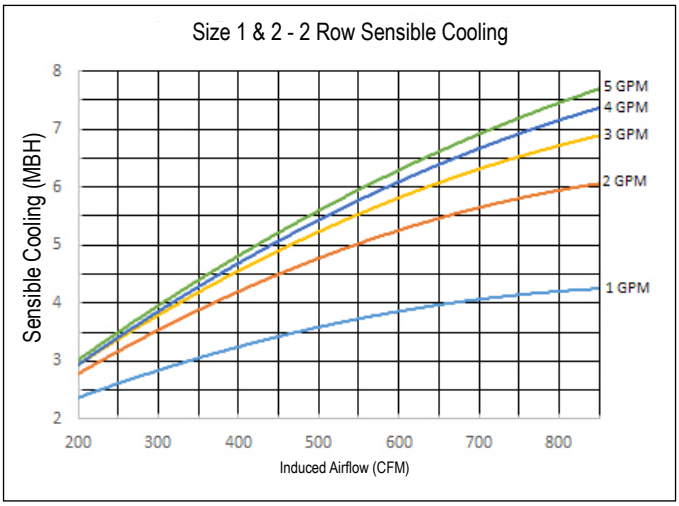


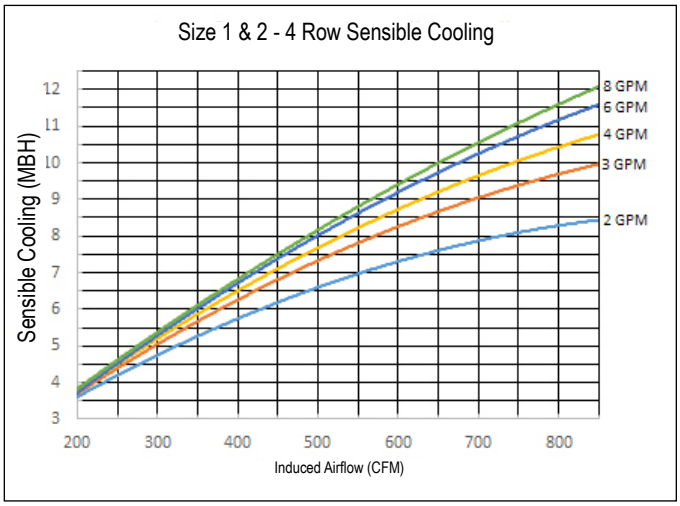


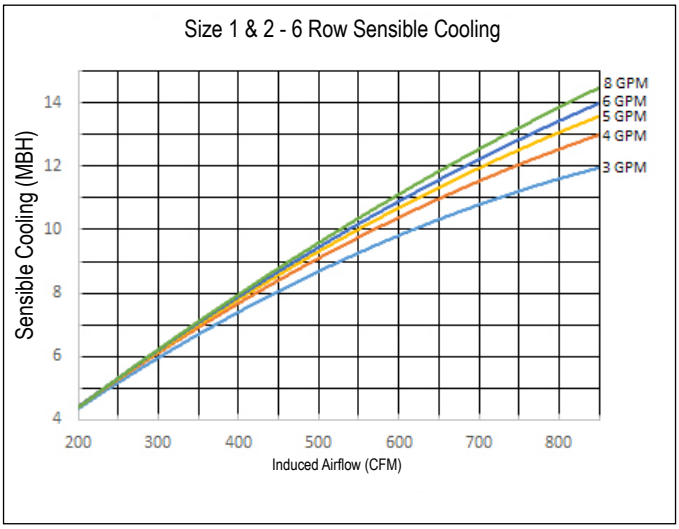


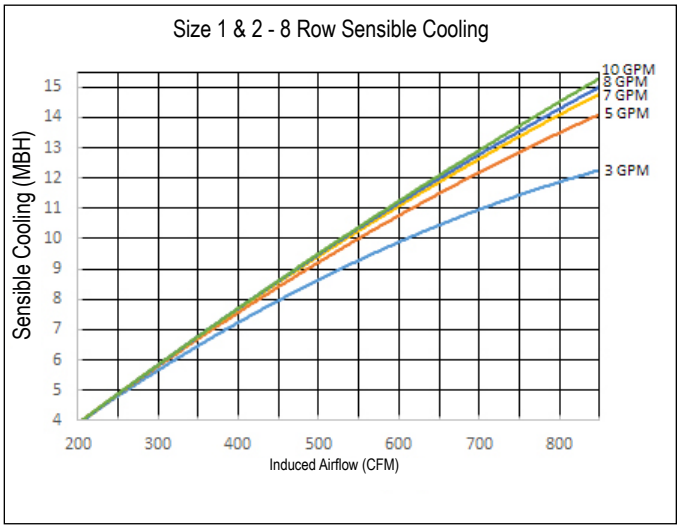


DLSC / SENSIBLE WATER COIL

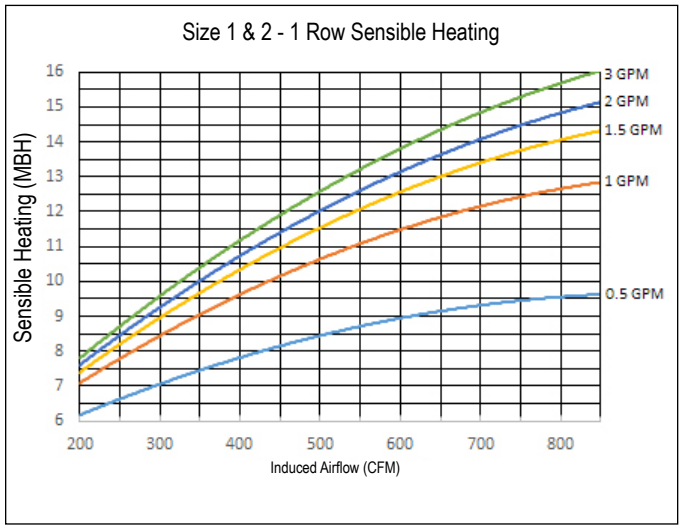


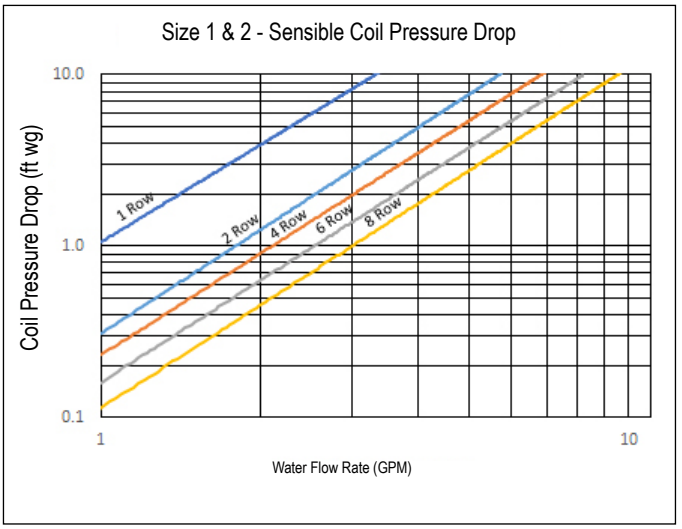






DLSC / SENSIBLE WATER COIL





Notes:
Capacity shown is for the sensible coil only. It does not include any contribution or offset from the primary air.
Cooling capacity is based on 75°F room air temperature and 57°F supply water termperature
Heating capacity is based on 70°F room air temperature and 140°F supply water termperature

CORRECTION FACTORS FOR OTHER COOLING ENTERING CONDITIONS:

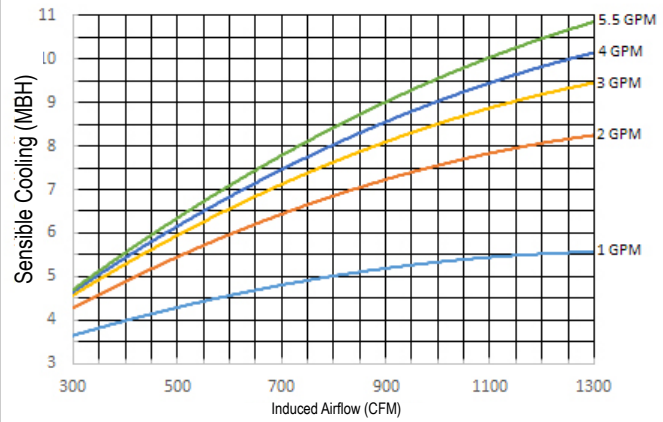
Actual ΔT	10	12	14	16	18	20	22	24
Cooling Factor	0.56	0.67	0.78	0.89	1.00	1.11	1.22	1.33

CORRECTION FACTORS FOR OTHER HEATING ENTERING CONDITIONS:

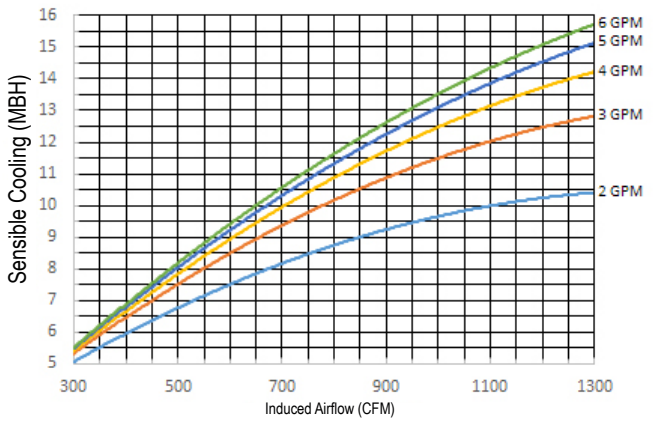
ΔT(°F)	60	65	70	75	80	85	90
Heating Factor:	1.14	1.07	1.00	0.93	0.86	0.79	0.71

DLSC / SENSIBLE WATER COIL

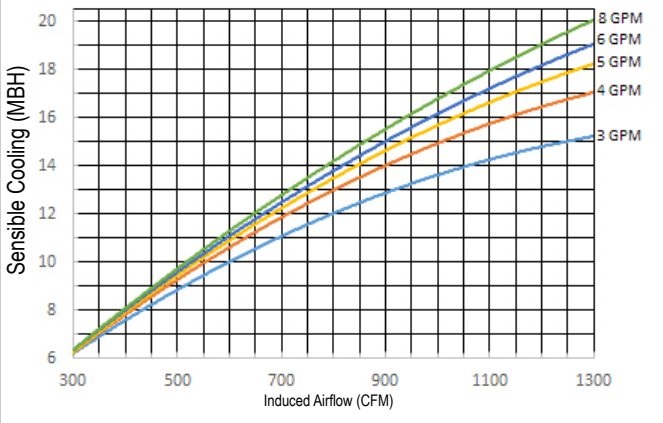
Size 3 - 2 Row Sensible Cooling



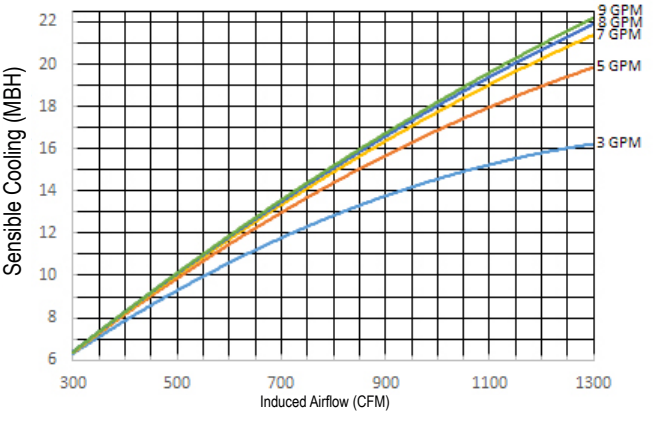
Size 3 - 4 Row Sensible Cooling



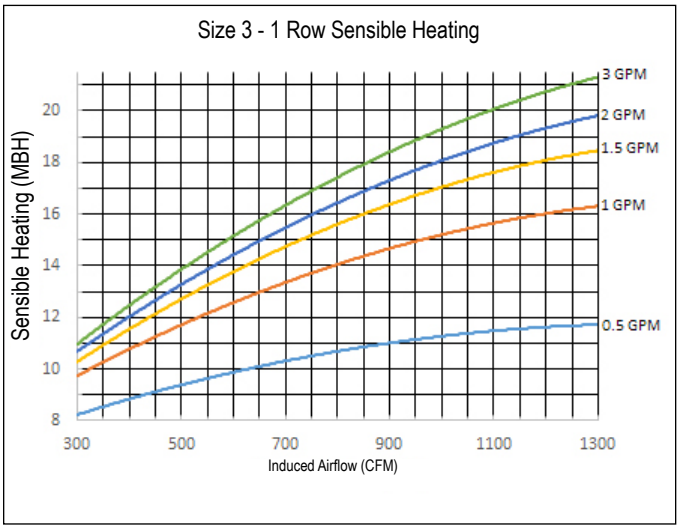
Size 3 - 6 Row Sensible Cooling

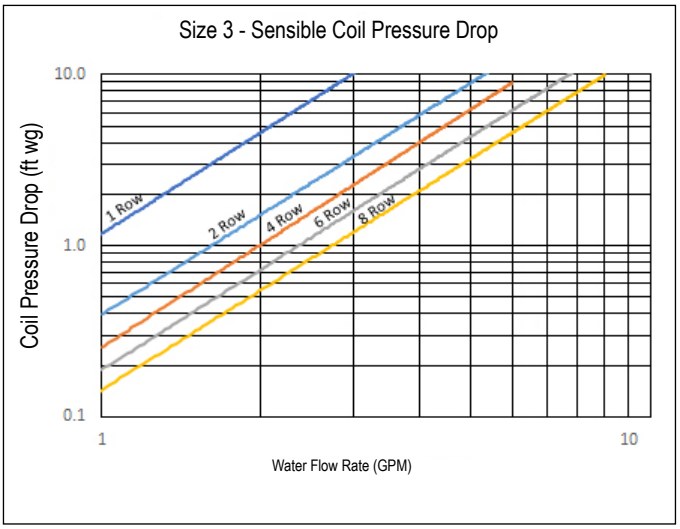


Size 3 - 8 Row Sensible Cooling



DLSC / SENSIBLE WATER COIL





Notes:
Capacity shown is for the sensible coil only. It does not include any contribution or offset from the primary air.
Cooling capacity is based on 75°F room air temperature and 57°F supply water termperature
Heating capacity is based on 70°F room air temperature and 140°F supply water termperature

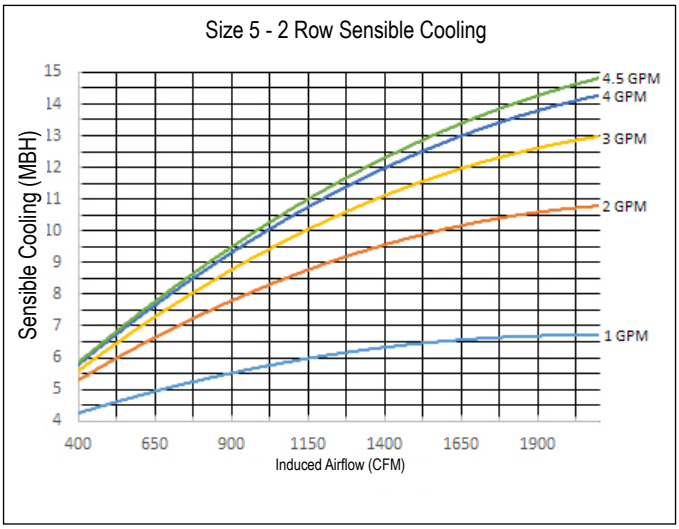
CORRECTION FACTORS FOR OTHER COOLING ENTERING CONDITIONS:

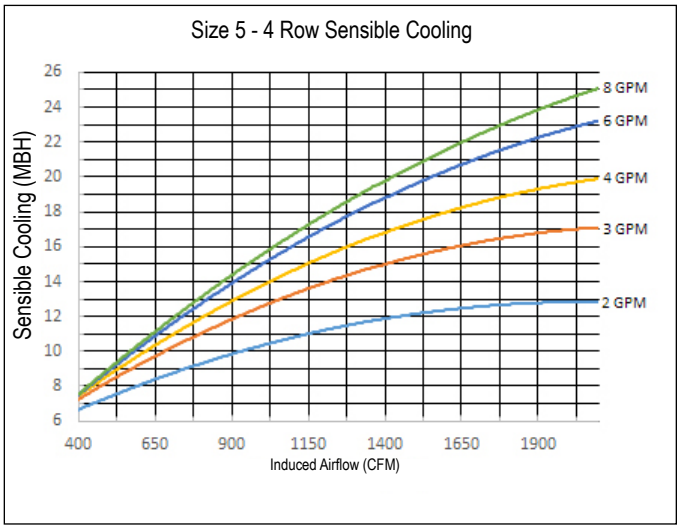
Actual ΔT	10	12	14	16	18	20	22	24
Cooling Factor	0.56	0.67	0.78	0.89	1.00	1.11	1.22	1.33

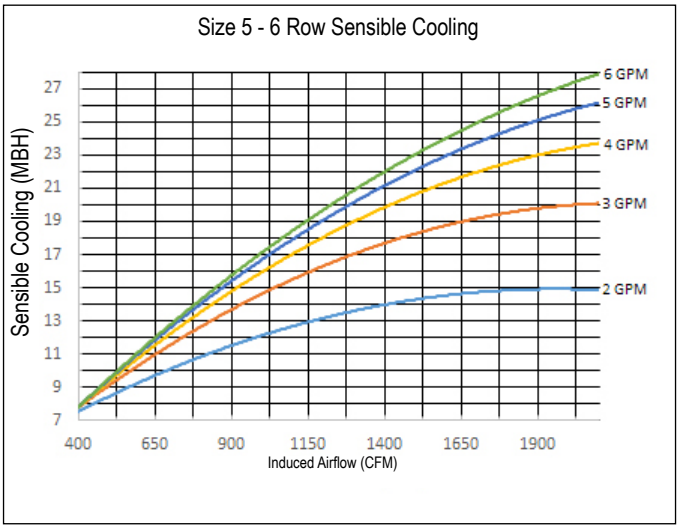
CORRECTION FACTORS FOR OTHER HEATING ENTERING CONDITIONS:

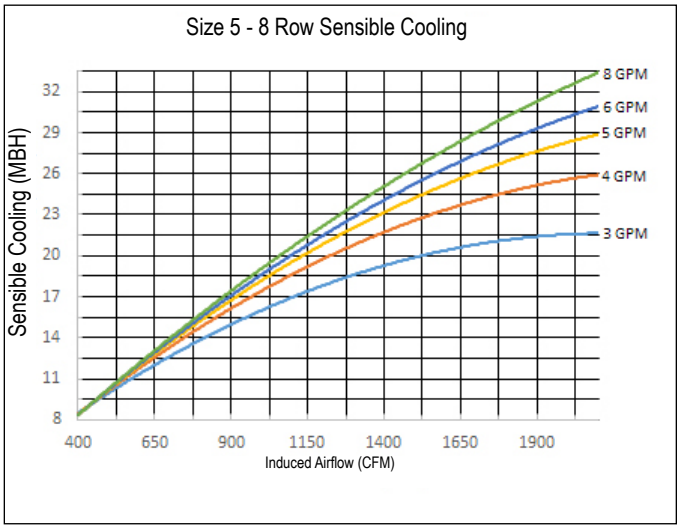
ΔT(°F)	60	65	70	75	80	85	90
Heating Factor:	1.14	1.07	1.00	0.93	0.86	0.79	0.71

DLSC / SENSIBLE WATER COIL

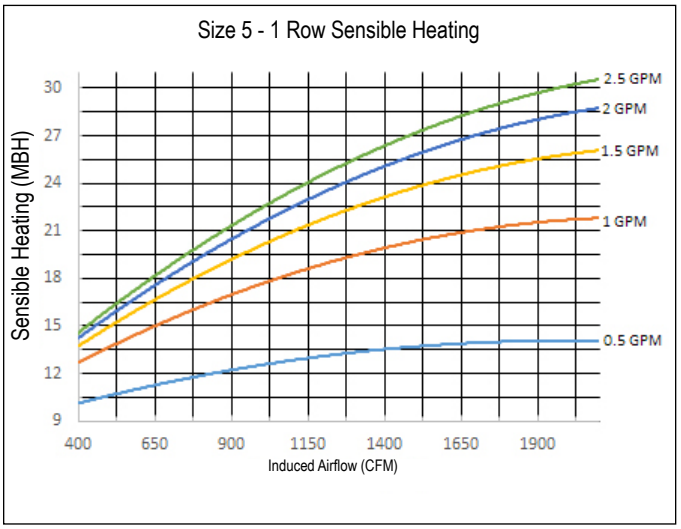


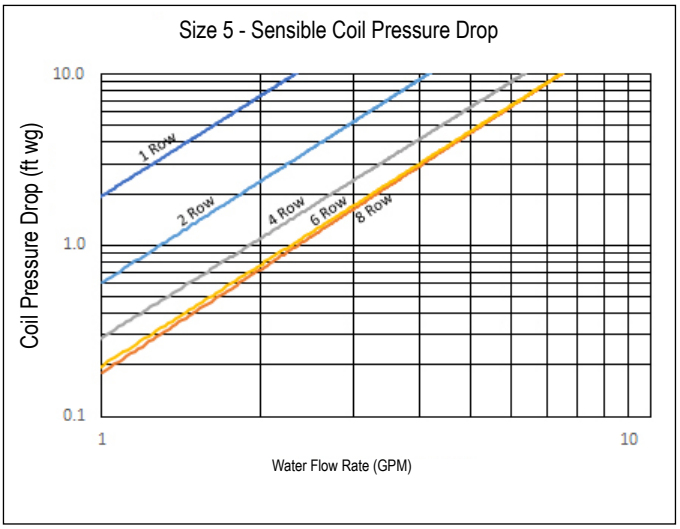






DLSC / SENSIBLE WATER COIL





Notes:
Capacity shown is for the sensible coil only. It does not include any contribution or offset from the primary air.
Cooling capacity is based on 75°F room air temperature and 57°F supply water termperature
Heating capacity is based on 70°F room air temperature and 140°F supply water termperature

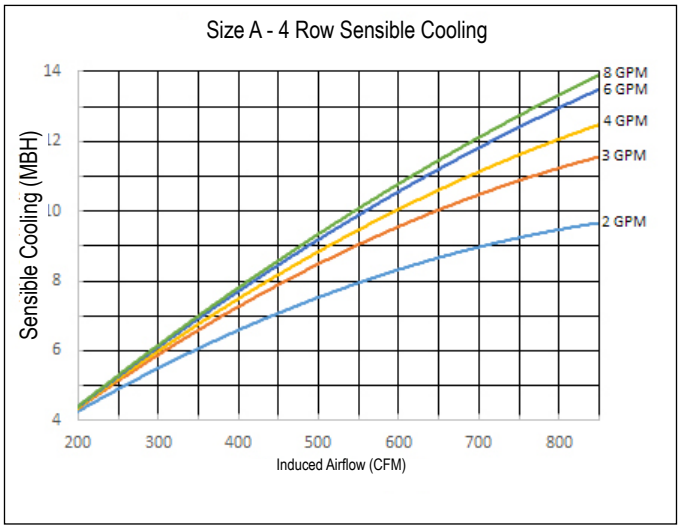
CORRECTION FACTORS FOR OTHER COOLING ENTERING CONDITIONS:

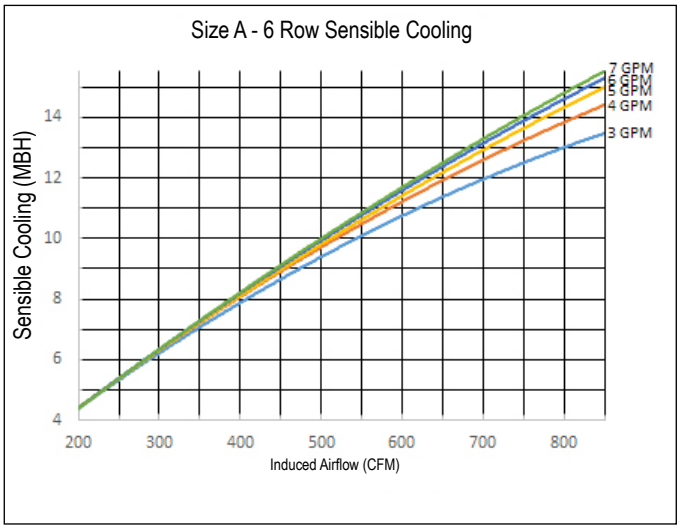
Actual ΔT	10	12	14	16	18	20	22	24
Cooling Factor	0.56	0.67	0.78	0.89	1.00	1.11	1.22	1.33

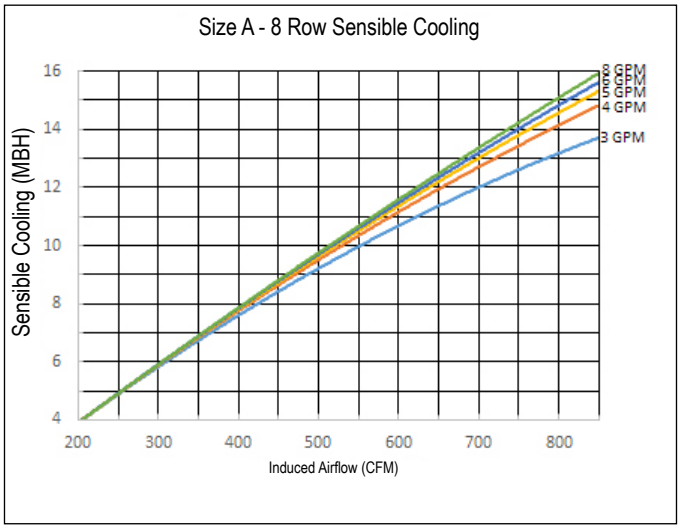
CORRECTION FACTORS FOR OTHER HEATING ENTERING CONDITIONS:

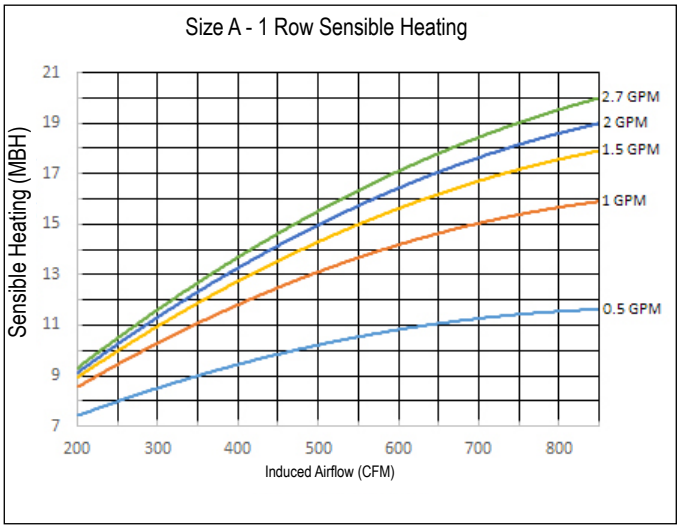
ΔT(°F)	60	65	70	75	80	85	90
Heating Factor:	1.14	1.07	1.00	0.93	0.86	0.79	0.71

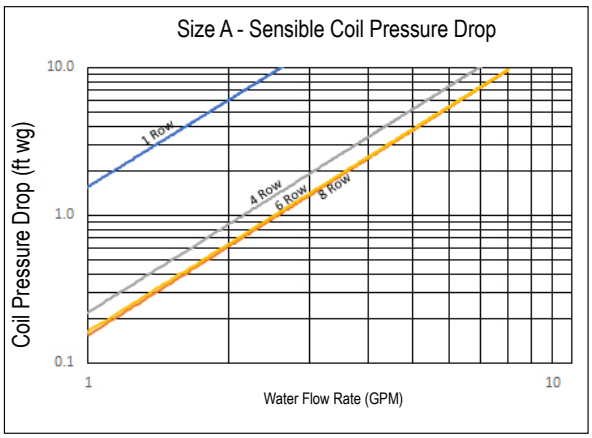
DLSC / SENSIBLE WATER COIL











Notes:
Capacity shown is for the sensible coil only. It does not include any contribution or offset from the primary air.
Cooling capacity is based on 75°F room air temperature and 57°F supply water termperature
Heating capacity is based on 70°F room air temperature and 140°F supply water termperature

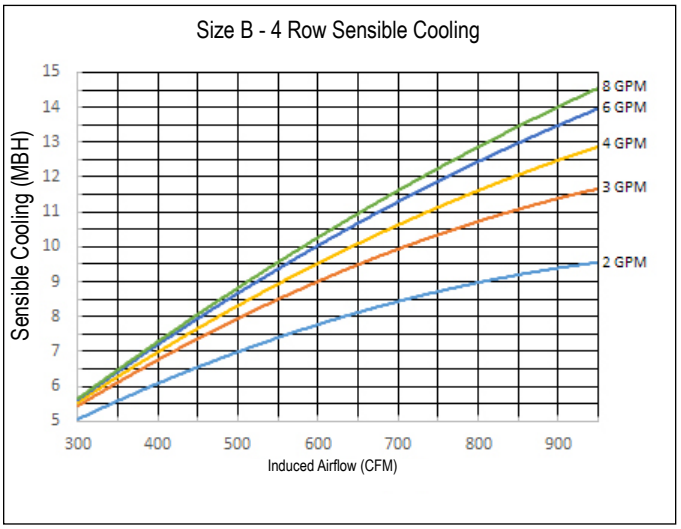
CORRECTION FACTORS FOR OTHER COOLING ENTERING CONDITIONS:

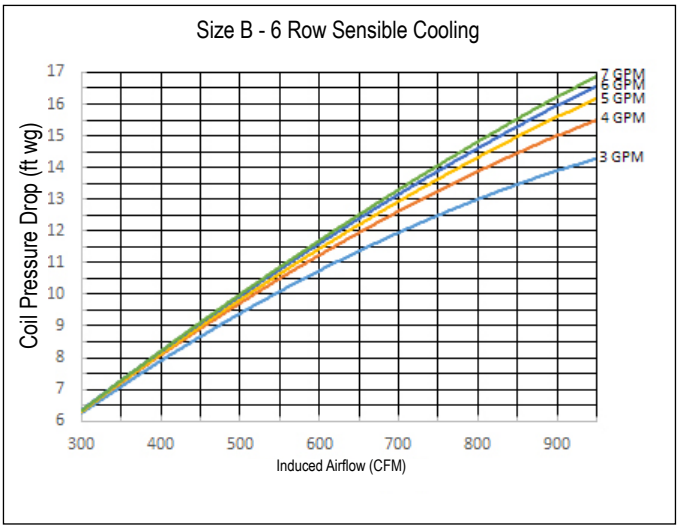
Actual ΔT	10	12	14	16	18	20	22	24
Cooling Factor	0.56	0.67	0.78	0.89	1.00	1.11	1.22	1.33

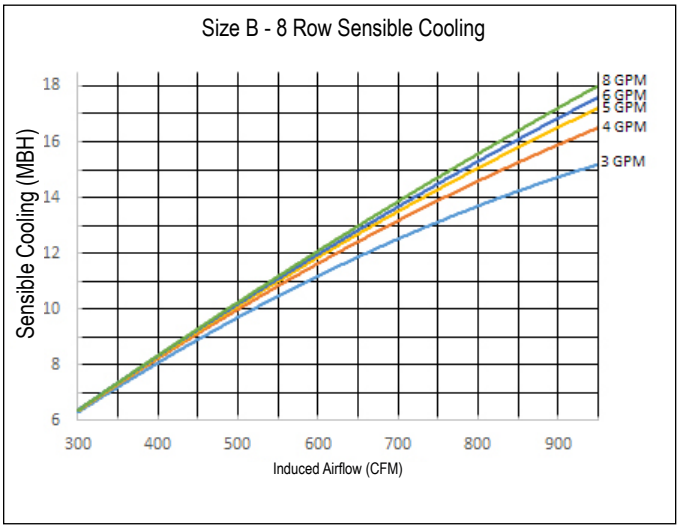
CORRECTION FACTORS FOR OTHER HEATING ENTERING CONDITIONS:

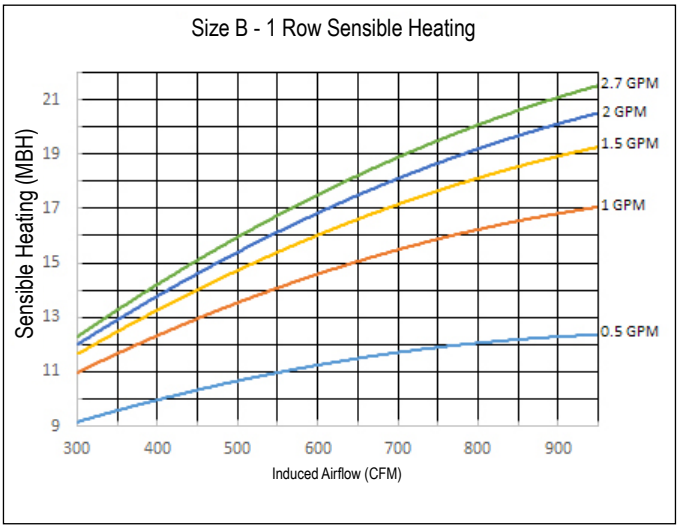
ΔT(°F)	60	65	70	75	80	85	90
Heating Factor:	1.14	1.07	1.00	0.93	0.86	0.79	0.71

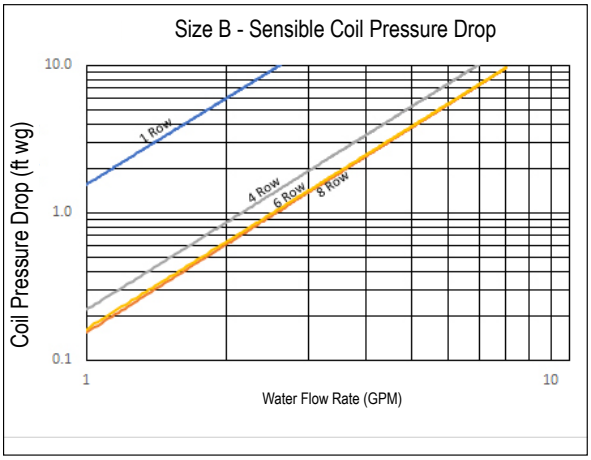
DLSC / SENSIBLE WATER COIL











Notes:

Capacity shown is for the sensible coil only. It does not include any contribution or offset from the primary air.

Cooling capacity is based on 75°F room air temperature and 57°F supply water termperature

Heating capacity is based on 70°F room air temperature and 140°F supply water termperature

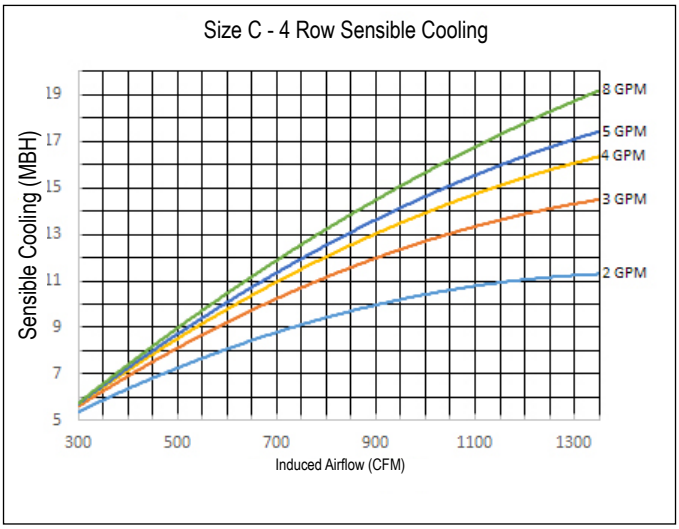
CORRECTION FACTORS FOR OTHER COOLING ENTERING CONDITIONS:

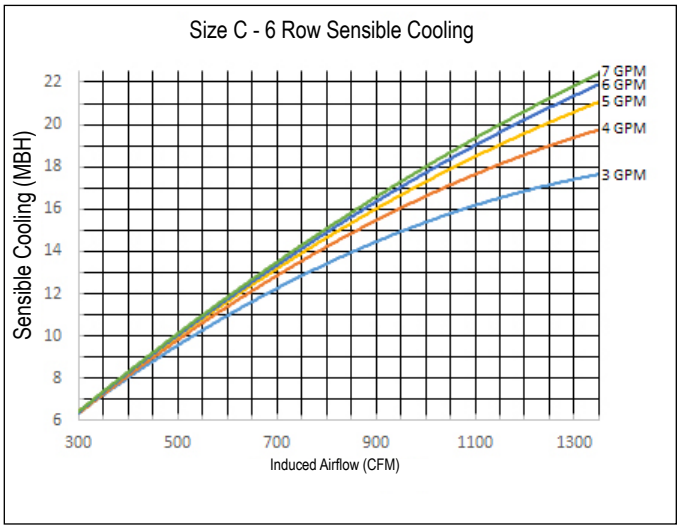
Actual ΔT	10	12	14	16	18	20	22	24
Cooling Factor	0.56	0.67	0.78	0.89	1.00	1.11	1.22	1.33

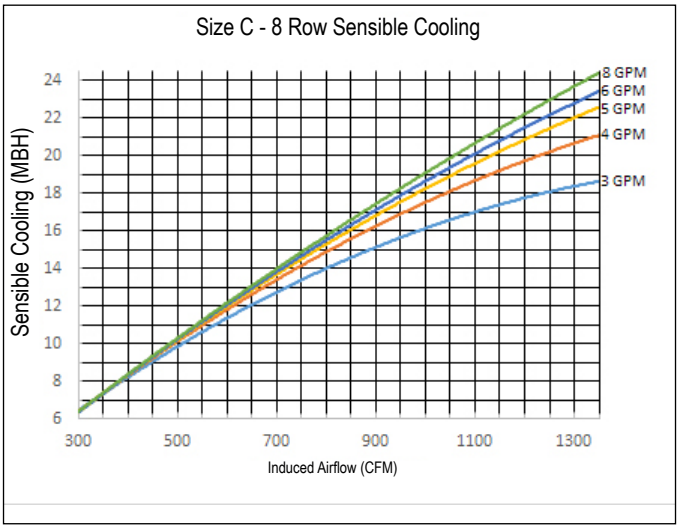
CORRECTION FACTORS FOR OTHER HEATING ENTERING CONDITIONS:

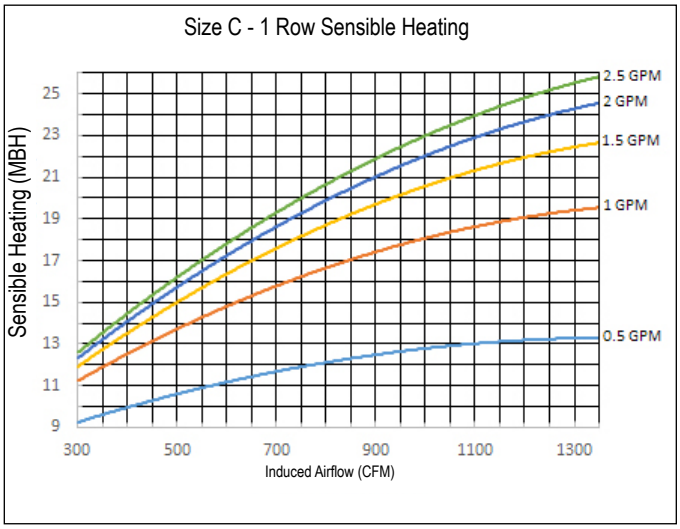
ΔT(°F)	60	65	70	75	80	85	90
Heating Factor:	1.14	1.07	1.00	0.93	0.86	0.79	0.71

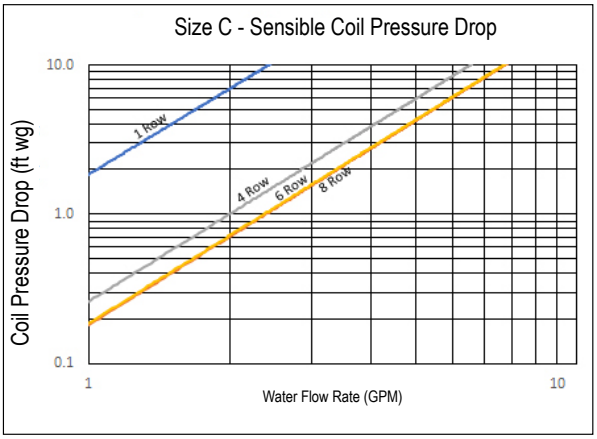
DLSC / SENSIBLE WATER COIL











Notes:

Capacity shown is for the sensible coil only. It does not include any contribution or offset from the primary air.

Cooling capacity is based on 75°F room air temperature and 57°F supply water termperature

Heating capacity is based on 70°F room air temperature and 140°F supply water termperature

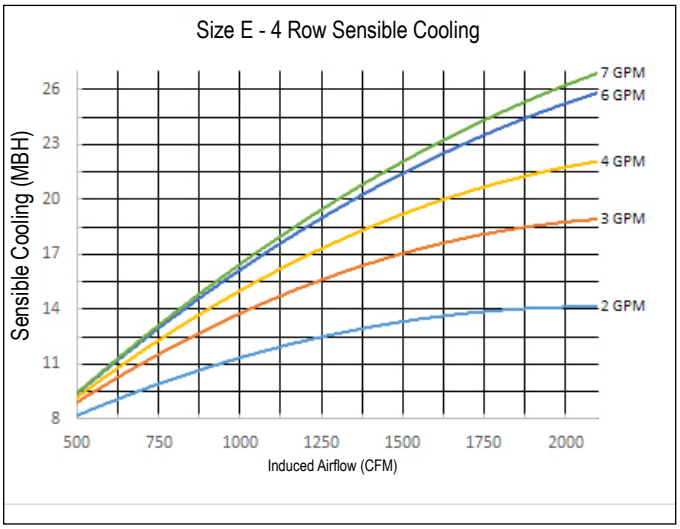
CORRECTION FACTORS FOR OTHER COOLING ENTERING CONDITIONS:

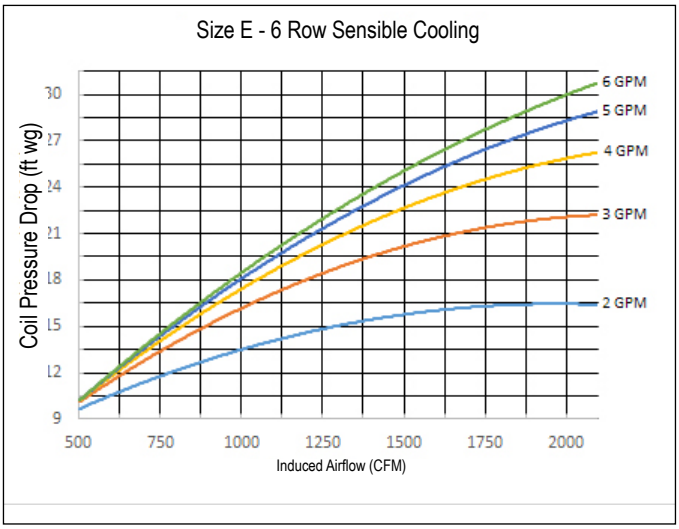
Actual ΔT	10	12	14	16	18	20	22	24
Cooling Factor	0.56	0.67	0.78	0.89	1.00	1.11	1.22	1.33

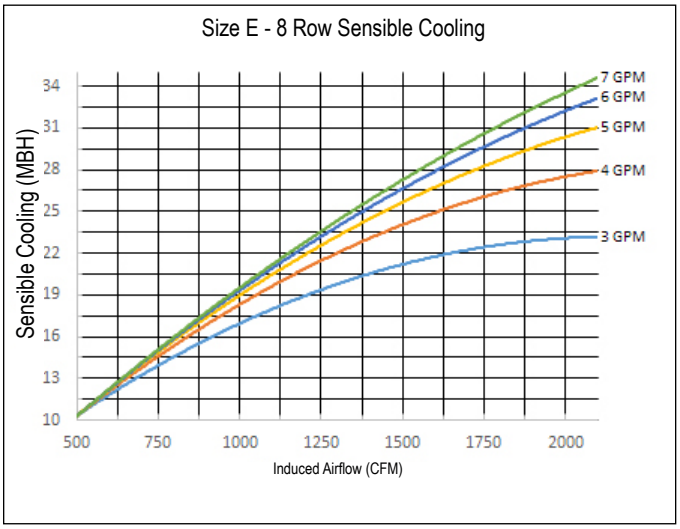
CORRECTION FACTORS FOR OTHER HEATING ENTERING CONDITIONS:

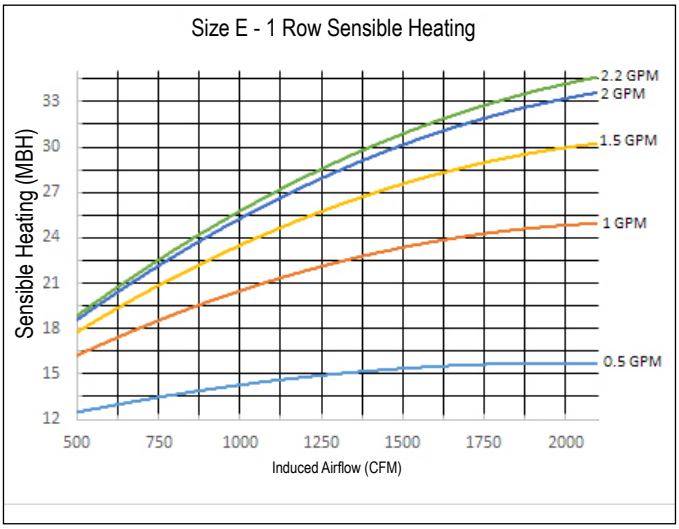
ΔT(°F)	60	65	70	75	80	85	90
Heating Factor:	1.14	1.07	1.00	0.93	0.86	0.79	0.71

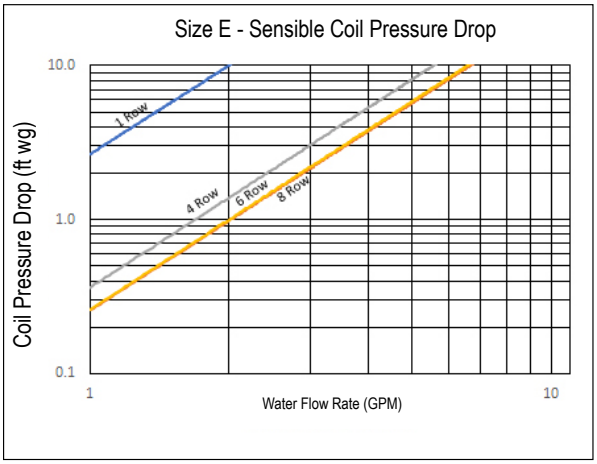
DLSC / SENSIBLE WATER COIL











Notes:
Capacity shown is for the sensible coil only. It does not include any contribution or offset from the primary air.
Cooling capacity is based on 75°F room air temperature and 57°F supply water termperature
Heating capacity is based on 70°F room air temperature and 140°F supply water termperature

CORRECTION FACTORS FOR OTHER COOLING ENTERING CONDITIONS:

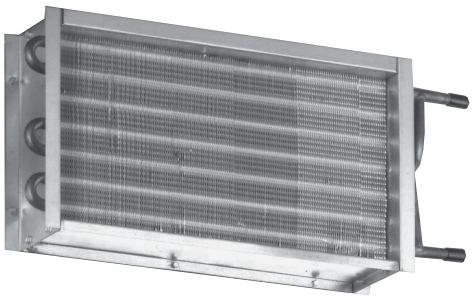
Actual ΔT	10	12	14	16	18	20	22	24
Cooling Factor	0.56	0.67	0.78	0.89	1.00	1.11	1.22	1.33

CORRECTION FACTORS FOR OTHER HEATING ENTERING CONDITIONS:

ΔT(°F)	60	65	70	75	80	85	90
Heating Factor:	1.14	1.07	1.00	0.93	0.86	0.79	0.71

DLSC DISCHARGE HOT WATER COIL

- All coil performance in accordance with AHRI 410-2001
- Heating and cooling capacities are in MBH (1,000 Btu/h)
- Data based on 180°F entering water and 65°F entering air, for temperature differentials other than 115°, multiply MBH by correction factors below
- Refer to submittal documentation for pipe sizes and connection locations
- Air temperature rise = 927 x corrected MBH /gpm
- Water temperature drop = 2.04 x corrected MBH /gpm
- Coils are rated to 200°F (No steam applications)
- Coils are tested for leakage at test pressure of 500 psi
- Water flows less than those shown may result in water laminar flow and reduced heating/cooling capacities. Whenever possible, reduce the number of coil rows to increase water velocity into turbulent range.



Size	Rows	(gpm)	Head Loss	Airflow, cfm								
				150	225	300	375	450	525	600	675	750
1 + A	1	1.0	0.09	7.8	9.4	10.6	11.5	12.3	12.9	13.5	13.9	14.4
		2.0	0.32	8.5	10.5	12.1	13.3	14.4	15.3	16.0	16.7	17.4
		3.0	0.69	8.8	11.0	12.7	14.1	15.2	16.2	17.1	17.9	18.6
		4.0	1.18	9.0	11.2	13.0	14.5	15.7	16.8	17.7	18.6	19.3
	Airside ΔPs			0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09
	2	1.0	0.18	11.8	14.9	17.2	18.9	20.3	21.5	22.5	23.3	24.1
		2.0	0.59	12.8	16.8	19.9	22.5	24.7	26.6	28.2	29.7	30.9
		3.0	1.26	13.2	17.5	20.9	23.9	26.4	28.6	30.5	32.3	33.8
		4.0	2.15	13.4	17.8	21.5	24.6	27.3	29.7	31.8	33.7	35.2
	Airside ΔPs			0.01	0.03	0.05	0.07	0.09	0.12	0.15	0.18	0.21

Size	Rows	(gpm)	Head Loss	Airflow, cfm								
				125	210	295	380	470	555	640	730	825
2 + B	1	1.0	0.09	7.1	9.1	10.5	11.6	12.5	13.1	13.7	14.2	14.7
		2.0	0.32	7.7	10.2	12.0	13.4	14.6	15.6	16.4	17.2	17.9
		3.0	0.69	7.9	10.6	12.6	14.1	15.5	16.6	17.6	18.4	19.3
		4.0	1.18	8.0	10.8	12.9	14.5	16.0	17.2	18.2	19.1	20.0
	Airside ΔPs			0.00	0.01	0.02	0.03	0.04	0.05	0.07	0.09	0.11
	2	1.0	0.18	10.5	14.4	17.0	19.0	20.7	21.9	23.0	23.9	24.7
		2.0	0.59	11.2	16.1	19.7	22.7	25.2	27.3	29.0	30.6	32.1
		3.0	1.25	11.5	16.7	20.7	24.1	27.0	29.4	31.5	33.4	35.2
		4.0	2.14	11.7	17.0	21.3	24.8	28.0	30.6	32.8	35.0	37.0
	Airside ΔPs			0.01	0.03	0.05	0.07	0.10	0.13	0.16	0.20	0.25

Size	Rows	(gpm)	Head Loss	Airflow, cfm								
				175	280	385	495	600	705	815	920	1025
3 + C	1	1.0	0.12	9.0	11.2	12.7	13.9	14.8	15.6	16.2	16.8	17.2
		2.0	0.39	10.0	12.7	14.7	16.4	17.7	18.8	19.8	20.6	21.3
		3.0	0.82	10.3	13.3	15.5	17.4	18.9	20.1	21.3	22.2	23.1
		4.0	1.41	10.5	13.6	16.0	18.0	19.5	20.9	22.1	23.1	24.1
	Airside ΔPs			0.01	0.01	0.02	0.03	0.05	0.06	0.08	0.09	0.11
	2	1.0	0.22	13.6	17.6	20.5	22.6	24.2	25.5	26.6	27.5	28.3
		2.0	0.68	14.9	20.3	24.4	27.8	30.4	32.6	34.6	36.3	37.7
		3.0	1.46	15.4	21.2	25.8	29.8	32.9	35.6	38.0	40.1	41.9
		4.0	2.52	15.6	21.7	26.6	30.8	34.2	37.2	39.9	42.2	44.4
	Airside ΔPs			0.01	0.03	0.05	0.08	0.11	0.14	0.18	0.22	0.27

Size	Rows	(gpm)	Head Loss	Airflow, cfm								
				300	450	600	750	900	1050	1200	1350	1500
5 + E	1	1.0	0.20	14.8	17.5	19.5	21.0	22.1	23.1	23.9	24.6	25.2
		2.0	0.62	16.8	20.6	23.6	25.8	27.7	29.3	30.7	31.9	33.0
		3.0	1.31	17.6	21.9	25.1	27.8	30.0	31.9	33.6	35.1	36.4
		4.0	2.24	18.0	22.5	26.0	28.9	31.3	33.4	35.2	36.9	38.4
	Airside ΔPs			0.01	0.01	0.02	0.02	0.03	0.04	0.05	0.07	0.08
	2	1.0	0.44	21.7	26.6	29.9	32.2	34.0	35.5	36.6	37.6	38.4
		2.0	1.19	24.9	32.0	37.5	41.9	45.4	48.4	50.9	53.1	55.0
		3.0	2.52	26.0	34.1	40.5	45.8	50.3	54.1	57.4	60.3	62.9
		4.0	4.30	26.6	35.2	42.2	48.0	53.0	57.3	61.1	64.5	67.6
	Airside ΔPs			0.01	0.03	0.04	0.06	0.08	0.10	0.13	0.16	0.19

Correction factors for other entering conditions:

ΔT	50	60	70	80	90	100	115	125	140	150
Factor	0.44	0.52	0.61	0.7	0.79	0.88	1	1.07	1.2	1.3

DLSC / DISCHARGE SOUND POWER LEVELS WITH NC

Unit Size	Inlet Size	Fan Airflow (cfm)	Primary Airflow (cfm)	Min. Inlet Ps (in. wc)	Octave Band Sound Power Levels, Lw (dB)																								
					Fan Only							0.5" Inlet Ps							1.0" Inlet Ps							1.5" Inlet Ps						
					2	3	4	5	6	7	**NC**	2	3	4	5	6	7	**NC**	2	3	4	5	6	7	**NC**	2	3	4	5	6	7	**NC**
1	4	790	220	0.35	80	77	73	73	71	69	**37**	81	76	72	72	69	68	**36**	81	76	72	72	70	68	**36**	82	76	72	72	70	69	**36**
		790	170	0.21	80	77	73	73	71	69	**37**	81	76	72	72	70	68	**36**	81	76	72	72	70	69	**36**	81	76	72	72	70	69	**36**
		600	130	0.12	75	71	67	67	64	62	**31**	76	71	68	67	64	62	**31**	76	71	68	67	65	62	**31**	76	71	68	67	65	63	**31**
		350	100	0.07	64	58	57	55	51	47	-	66	61	59	57	54	49	-	67	61	60	58	54	50	-	67	61	60	58	54	50	-
		150	80	0.05	47	38	41	37	31	25	-	51	45	46	42	37	29	-	52	45	46	42	37	30	-	52	45	46	42	37	30	-
	6	790	490	0.24	80	77	73	73	71	69	**37**	81	76	71	71	68	67	**36**	82	76	71	71	69	67	**36**	82	76	71	71	69	68	**36**
		790	390	0.15	80	77	73	73	71	69	**37**	81	76	72	71	69	67	**36**	82	76	72	71	69	68	**36**	82	76	72	71	69	68	**36**
		600	290	0.08	75	71	67	67	64	62	**31**	76	71	67	66	63	61	**31**	77	71	67	66	64	61	**33**	77	71	68	67	64	62	**33**
		350	180	0.03	64	58	57	55	51	47	-	67	61	59	57	53	49	-	67	61	59	57	53	49	-	67	61	59	57	54	49	-
		150	120	0.01	47	38	41	37	31	25	-	51	44	45	40	36	29	-	51	44	45	41	36	29	-	52	44	45	41	36	29	-
2	4	810	220	0.35	81	76	71	71	69	67	**36**	78	71	66	63	60	56	**31**	78	71	67	64	61	57	**31**	79	72	67	64	62	58	**33**
		810	170	0.21	81	76	71	71	69	67	**36**	76	69	65	61	59	53	**29**	77	70	66	62	59	54	**30**	77	70	66	62	60	55	**30**
		600	130	0.12	75	69	66	65	62	59	**30**	72	64	61	57	54	47	**26**	72	65	62	57	54	49	**26**	73	65	62	58	55	49	**28**
		350	100	0.07	64	57	56	54	51	46	-	64	57	55	51	47	39	-	64	57	56	51	47	40	-	65	58	56	51	48	41	-
		150	80	0.05	47	38	41	37	33	25	-	52	46	46	42	37	27	-	52	46	46	42	37	28	-	53	47	47	42	38	29	-
	6	810	490	0.24	81	76	71	71	69	67	**36**	81	74	69	68	66	64	**35**	81	75	70	69	66	65	**35**	82	75	70	69	67	66	**36**
		810	390	0.15	81	76	71	71	69	67	**36**	80	73	69	67	64	62	**34**	81	74	69	67	65	63	**35**	81	74	70	68	66	64	**35**
		600	290	0.08	75	69	66	65	62	59	**30**	75	68	65	62	59	56	**30**	75	69	65	63	60	57	**30**	76	69	65	63	61	57	**31**
		350	180	0.03	64	57	56	54	51	46	-	66	60	57	54	51	45	-	66	60	58	55	51	46	-	67	61	58	55	52	47	-
		150	120	0.01	47	38	41	37	33	25	-	52	46	46	43	38	30	-	53	47	47	44	39	31	-	53	47	47	44	39	32	-
	8	810	750	0.17	81	76	71	71	69	67	**36**	80	73	68	68	65	64	**34**	80	74	69	68	66	66	**34**	81	74	69	69	66	66	**35**
		810	700	0.15	81	76	71	71	69	67	**36**	81	74	69	68	66	65	**35**	81	75	70	69	67	66	**35**	82	75	70	69	67	67	**36**
		600	520	0.08	75	69	66	65	62	59	**30**	75	69	65	64	61	59	**30**	76	70	66	64	62	60	**31**	76	70	66	65	62	61	**31**
		350	310	0.03	64	57	56	54	51	46	-	66	60	57	55	52	47	-	67	60	58	56	53	49	-	67	61	58	56	53	49	-
		150	140	0.01	47	38	41	37	33	25	-	51	45	45	42	37	29	-	52	45	45	42	37	30	-	52	46	46	43	38	31	-

DLSC / DISCHARGE SOUND POWER LEVELS WITH NC

Unit Size	Inlet Size	Fan Airflow (cfm)	Primary Airflow (cfm)	Min. Inlet Ps (in. wc)	Octave Band Sound Power Levels, Lw (dB)																								
					Fan Only							0.5" Inlet Ps							1.0" Inlet Ps							1.5" Inlet Ps						
					2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
3	4	1220	220	0.35	87	81	75	73	73	72	**43**	82	77	72	72	71	70	**37**	83	78	73	72	72	70	**38**	83	78	74	73	72	71	**38**
		1220	170	0.21	87	81	75	73	73	72	**43**	81	76	72	71	70	69	**36**	82	77	73	72	71	70	**37**	83	77	73	72	72	70	**38**
		750	150	0.16	74	68	65	63	61	59	**26**	74	66	64	63	61	58	**26**	74	67	65	64	62	59	**26**	75	68	65	64	62	59	**28**
		500	120	0.10	63	57	56	54	52	48	-	67	58	57	56	53	49	-	68	59	58	57	53	49	**21**	68	59	58	57	54	50	**21**
		340	90	0.06	53	46	48	46	43	37	-	60	50	50	49	44	40	-	61	51	51	50	45	40	-	62	51	52	50	46	41	-
	6	1220	490	0.24	87	81	75	73	73	72	**43**	84	79	74	73	73	71	**39**	85	80	75	74	73	72	**40**	85	81	75	74	74	72	**42**
		1220	390	0.15	87	81	75	73	73	72	**43**	83	79	74	73	72	71	**39**	84	80	74	73	73	71	**40**	85	80	75	74	73	72	**40**
		750	330	0.11	74	68	65	63	61	59	**26**	75	69	66	64	62	59	**28**	76	70	66	65	63	60	**29**	77	71	67	65	64	60	**30**
		500	270	0.07	63	57	56	54	52	48	-	69	61	59	57	54	50	**22**	70	62	59	58	55	51	**24**	70	62	60	58	55	51	**24**
		340	120	0.01	53	46	48	46	43	37	-	61	51	51	49	45	40	-	62	52	52	50	46	41	-	63	52	52	51	46	41	-
	8	1220	870	0.22	87	81	75	73	73	72	**43**	85	82	75	74	74	71	**43**	86	83	76	74	74	72	**44**	87	83	76	75	75	73	**44**
		1220	700	0.15	87	81	75	73	73	72	**43**	85	81	75	73	73	71	**42**	86	82	75	74	74	72	**43**	86	82	76	75	75	72	**43**
		750	590	0.10	74	68	65	63	61	59	**26**	77	72	67	65	63	60	**31**	78	73	68	65	64	60	**32**	79	73	68	66	64	61	**33**
		500	490	0.07	63	57	56	54	52	48	-	71	65	61	57	54	49	**25**	72	66	62	57	54	49	**26**	73	66	62	58	55	50	**28**
		340	210	0.01	53	46	48	46	43	37	-	62	53	52	50	46	41	-	63	54	53	51	47	41	-	64	54	53	51	47	42	-
	10	1220	1090	0.15	87	81	75	73	73	72	**43**	86	83	76	74	73	71	**44**	87	84	77	74	74	72	**45**	88	85	77	75	75	72	**46**
		1220	950	0.12	87	81	75	73	73	72	**43**	86	82	76	74	74	71	**43**	87	83	76	74	74	72	**44**	87	84	77	75	75	73	**45**
		750	820	0.09	74	68	65	63	61	59	**26**	78	73	68	65	63	60	**32**	79	74	69	66	64	60	**33**	80	75	69	66	65	61	**34**
		500	550	0.04	63	57	56	54	52	48	-	71	64	61	58	55	50	**25**	72	65	61	58	56	51	**26**	72	66	62	59	56	51	**26**
		340	270	0.01	53	46	48	46	43	37	-	63	54	53	50	46	41	-	64	55	54	51	47	41	-	65	56	54	51	47	42	-
5	6	2025	490	0.24	84	80	75	75	74	73	**40**	78	75	72	71	71	69	**34**	78	76	72	71	71	70	**36**	79	77	72	72	71	70	**37**
		2025	390	0.15	84	80	75	75	74	73	**40**	78	76	72	71	71	69	**36**	79	77	72	72	72	70	**37**	79	77	73	72	72	70	**37**
		1500	330	0.11	77	74	70	68	67	64	**33**	74	71	68	67	66	62	**30**	75	72	68	67	66	63	**31**	75	73	68	67	66	63	**32**
		1000	270	0.07	68	65	62	60	58	53	**23**	69	65	62	60	58	53	**23**	70	66	62	61	58	53	**24**	70	67	62	61	59	54	**25**
		500	200	0.04	53	50	50	46	43	35	-	60	55	52	49	45	36	-	60	56	52	50	45	37	-	61	57	52	50	45	37	-
	8	2025	870	0.22	84	80	75	75	74	73	**40**	76	74	71	71	70	68	**33**	77	75	72	71	70	69	**34**	77	76	72	71	71	69	**36**
		2025	700	0.15	84	80	75	75	74	73	**40**	77	74	72	71	70	69	**33**	77	75	72	71	71	69	**34**	78	76	72	71	71	70	**36**
		1500	590	0.10	77	74	70	68	67	64	**33**	73	70	67	66	65	62	**28**	74	71	68	66	65	62	**30**	74	72	68	67	65	63	**31**
		1000	490	0.07	68	65	62	60	58	53	**23**	68	64	61	60	57	52	**21**	68	65	62	60	57	53	**23**	69	66	62	60	58	53	**24**
		500	350	0.04	53	50	50	46	43	35	-	59	54	51	49	44	36	-	59	55	52	49	44	36	-	60	56	52	50	45	37	-
	10	2025	1090	0.15	84	80	75	75	74	73	**40**	76	74	71	70	70	68	**33**	77	75	72	71	70	69	**34**	77	75	72	71	70	69	**34**
		2025	950	0.12	84	80	75	75	74	73	**40**	76	74	71	70	70	68	**33**	77	75	72	71	70	69	**34**	77	75	72	71	70	69	**34**
		1500	820	0.09	77	74	70	68	67	64	**33**	72	70	67	66	64	61	**28**	73	71	67	66	65	62	**30**	73	71	68	66	65	62	**30**
		1000	650	0.06	68	65	62	60	58	53	**23**	67	64	61	59	57	52	**21**	68	65	62	60	57	52	**23**	68	65	62	60	57	53	**23**
		500	380	0.02	53	50	50	46	43	35	-	59	54	51	49	44	35	-	59	55	52	49	44	36	-	60	56	52	50	44	36	-
	12	2025	1570	0.15	84	80	75	75	74	73	**40**	75	73	71	70	69	67	**32**	76	74	72	71	69	68	**33**	77	75	72	71	70	68	**34**
		2025	1370	0.12	84	80	75	75	74	73	**40**	75	73	71	70	69	68	**32**	76	74	72	71	70	68	**33**	77	75	72	71	70	69	**34**
		1500	1180	0.09	77	74	70	68	67	64	**33**	72	69	67	66	64	60	**27**	72	70	67	66	64	61	**28**	73	71	68	66	64	61	**30**
		1000	790	0.04	68	65	62	60	58	53	**23**	67	64	61	59	56	51	**21**	68	65	62	60	57	52	**23**	68	65	62	60	57	52	**23**
		500	390	0.01	53	50	50	46	43	35	-	59	54	51	49	44	35	-	59	55	52	49	44	36	-	60	56	52	50	44	36	-

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.

DLSC / DISCHARGE SOUND POWER LEVELS WITH NC

Unit Size	Inlet Size	Fan Airflow (cfm)	Primary Airflow (cfm)	Min. Inlet Ps (in. wc)	Octave Band Sound Power Levels, Lw (dB)																								
					Fan Only							0.5" Inlet Ps							1.0" Inlet Ps							1.5" Inlet Ps						
					2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
A	4	850	220	0.35	80	75	71	71	69	68	**34**	79	74	71	70	68	67	**33**	79	74	71	70	68	67	**33**	79	74	71	70	68	67	**33**
		850	170	0.21	80	75	71	71	69	68	**34**	79	74	71	70	68	67	**33**	79	74	71	70	68	67	**33**	79	74	71	70	68	67	**33**
		600	130	0.12	72	67	65	64	62	59	**26**	71	67	64	63	61	58	**26**	71	67	65	63	61	58	**26**	71	67	65	63	61	58	**26**
		400	100	0.07	63	58	58	56	53	49	-	62	58	57	55	52	47	-	63	58	57	55	52	47	-	63	58	57	55	52	47	-
		180	80	0.05	46	41	44	41	36	28	-	46	41	44	40	35	26	-	46	41	44	40	35	26	-	46	41	44	40	35	26	-
	6	850	470	0.22	80	75	71	71	69	68	**34**	80	75	71	70	68	67	**34**	80	75	71	71	68	67	**34**	80	75	71	71	68	67	**34**
		850	390	0.15	80	75	71	71	69	68	**34**	80	74	71	70	68	67	**34**	80	75	71	70	68	67	**34**	80	75	71	70	68	67	**34**
		600	290	0.08	72	67	65	64	62	59	**26**	72	67	65	63	61	58	**26**	72	67	65	64	61	58	**26**	72	67	65	64	61	58	**26**
		400	180	0.03	63	58	58	56	53	49	-	63	58	57	55	52	47	-	63	58	58	56	52	47	-	63	59	58	56	52	47	-
		180	120	0.01	46	41	44	41	36	28	-	47	42	44	40	36	27	-	47	42	44	40	36	27	-	47	42	44	40	36	27	-
B	4	955	220	0.35	79	76	71	72	70	68	**36**	78	75	71	71	69	68	**34**	79	76	71	71	69	68	**36**	79	76	71	71	69	68	**36**
		955	170	0.21	79	76	71	72	70	68	**36**	78	75	71	71	69	68	**34**	78	76	71	71	69	68	**36**	78	76	71	71	69	68	**36**
		700	130	0.12	73	69	66	66	64	61	**28**	72	69	66	65	63	60	**28**	72	69	66	65	63	60	**28**	72	69	66	65	63	60	**28**
		400	100	0.07	61	58	57	56	52	47	-	61	58	56	55	51	45	-	61	58	56	55	51	46	-	61	58	56	55	51	46	-
		260	80	0.05	53	49	50	48	44	36	-	52	49	49	47	42	34	-	52	49	49	47	42	35	-	53	49	49	47	42	35	-
	6	955	490	0.24	79	76	71	72	70	68	**36**	79	76	71	71	69	68	**36**	79	76	71	71	69	68	**36**	79	76	71	71	69	68	**36**
		955	390	0.15	79	76	71	72	70	68	**36**	79	76	71	71	69	68	**36**	79	76	71	71	69	68	**36**	79	76	71	71	69	68	**36**
		700	290	0.08	73	69	66	66	64	61	**28**	72	69	66	65	63	60	**28**	73	69	66	65	63	60	**28**	73	69	66	65	63	60	**28**
		400	180	0.03	61	58	57	56	52	47	-	61	58	56	55	51	45	-	61	58	56	55	51	46	-	62	58	56	55	51	46	-
		260	120	0.01	53	49	50	48	44	36	-	52	49	49	47	42	34	-	53	49	49	47	42	35	-	53	49	49	47	42	35	-
	8	955	770	0.18	79	76	71	72	70	68	**36**	77	76	71	72	69	68	**36**	77	76	71	72	70	68	**36**	78	76	71	72	70	68	**36**
		955	700	0.15	79	76	71	72	70	68	**36**	78	76	71	71	69	68	**36**	78	76	71	71	69	68	**36**	78	76	71	71	69	68	**36**
		700	520	0.08	73	69	66	66	64	61	**28**	71	69	66	66	63	60	**28**	72	70	66	66	63	60	**30**	72	70	66	66	63	60	**30**
		400	310	0.03	61	58	57	56	52	47	-	60	58	56	55	51	46	-	60	58	57	55	52	46	-	60	58	57	55	52	46	-
		260	140	0.01	53	49	50	48	44	36	-	52	49	49	47	42	35	-	53	49	49	47	42	35	-	53	49	49	47	42	35	-

DLSC / DISCHARGE SOUND POWER LEVELS WITH NC

Unit Size	Inlet Size	Fan Airflow (cfm)	Primary Airflow (cfm)	Min. Inlet Ps (in. wc)	Octave Band Sound Power Levels, Lw (dB)																										
					Fan Only							0.5" Inlet Ps							1.0" Inlet Ps							1.5" Inlet Ps						
					2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
C	4	1360	220	0.35	82	78	73	71	71	70	**38**	81	78	73	71	70	69	**38**	81	78	73	71	70	69	**38**	81	78	73	71	70	69	**38**
		1360	170	0.21	82	78	73	71	71	70	**38**	80	78	73	71	70	69	**38**	80	78	73	71	70	69	**38**	80	78	73	71	70	69	**38**
		750	150	0.16	70	65	63	61	58	55	**23**	70	66	63	60	58	54	**24**	70	66	63	61	58	55	**24**	70	66	63	61	58	55	**24**
		500	120	0.10	61	57	56	53	50	45	-	63	58	56	53	50	44	-	63	58	56	54	50	45	-	63	58	56	54	50	45	-
		340	90	0.06	53	48	49	47	42	35	-	56	50	49	47	42	35	-	56	50	49	47	42	35	-	56	50	49	47	42	36	-
	6	1360	490	0.24	82	78	73	71	71	70	**38**	82	79	73	71	70	69	**39**	82	79	73	71	70	70	**39**	82	79	74	71	71	70	**39**
		1360	390	0.15	82	78	73	71	71	70	**38**	82	78	73	71	70	69	**38**	82	79	73	71	70	70	**39**	82	79	74	71	71	70	**39**
		750	330	0.11	70	65	63	61	58	55	**23**	71	66	63	61	58	55	**24**	71	67	63	61	58	55	**25**	71	67	63	61	59	55	**25**
		500	270	0.07	61	57	56	53	50	45	-	63	58	56	53	50	45	-	64	58	56	54	50	45	-	64	58	56	54	50	45	-
		340	120	0.01	53	48	49	47	42	35	-	56	50	49	47	42	35	-	56	50	49	47	42	35	-	57	50	49	47	43	36	-
	8	1360	870	0.22	82	78	73	71	71	70	**38**	82	79	73	71	70	69	**39**	82	79	73	71	70	70	**39**	82	79	73	71	70	70	**39**
		1360	700	0.15	82	78	73	71	71	70	**38**	82	79	73	71	70	69	**39**	82	79	73	71	70	70	**39**	82	79	74	71	71	70	**39**
		750	590	0.10	70	65	63	61	58	55	**23**	70	66	62	60	58	54	**24**	70	66	63	60	58	54	**24**	70	67	63	61	58	55	**25**
		500	490	0.07	61	57	56	53	50	45	-	56	56	53	52	47	42	-	56	57	54	52	47	42	-	56	57	54	52	48	42	-
		340	210	0.01	53	48	49	47	42	35	-	56	50	49	47	42	35	-	56	50	49	47	42	35	-	56	50	49	47	42	36	-
	10	1360	1090	0.15	82	78	73	71	71	70	**38**	81	79	73	71	70	69	**39**	81	79	73	71	70	69	**39**	81	79	73	71	70	69	**39**
		1360	950	0.12	82	78	73	71	71	70	**38**	81	79	73	71	70	69	**39**	82	79	73	71	70	69	**39**	82	79	73	71	70	70	**39**
		750	680	0.06	70	65	63	61	58	55	**23**	68	66	62	60	57	53	**24**	68	66	62	60	57	54	**24**	68	66	62	60	57	54	**24**
		500	410	0.02	61	57	56	53	50	45	-	62	58	55	53	49	44	-	62	58	56	53	49	44	-	62	58	56	53	50	44	-
		340	270	0.01	53	48	49	47	42	35	-	55	50	49	46	42	35	-	55	50	49	46	42	35	-	55	50	49	47	42	35	-
E	6	2090	490	0.24	80	79	75	74	73	72	**39**	79	78	74	73	72	71	**38**	79	78	74	73	72	71	**38**	79	78	74	73	72	71	**38**
		2090	390	0.15	80	79	75	74	73	72	**39**	79	78	74	73	73	71	**38**	79	78	74	73	73	71	**38**	79	78	74	73	73	71	**38**
		1500	330	0.11	74	72	69	67	66	63	**31**	74	71	68	67	65	62	**30**	74	71	68	67	65	62	**30**	74	71	68	67	65	62	**30**
		1000	270	0.07	67	63	61	60	57	52	**20**	68	63	61	59	56	51	**20**	68	63	61	59	56	51	**20**	68	63	61	59	56	51	**20**
		500	200	0.04	54	49	49	46	41	33	-	57	48	48	46	40	32	-	57	48	48	45	40	32	-	57	48	48	45	40	32	-
	8	2090	870	0.22	80	79	75	74	73	72	**39**	78	77	74	73	72	70	**37**	78	78	74	73	72	70	**38**	79	78	74	73	72	70	**38**
		2090	700	0.15	80	79	75	74	73	72	**39**	78	78	74	73	72	70	**38**	79	78	74	73	72	70	**38**	79	78	74	73	72	71	**38**
		1500	590	0.10	74	72	69	67	66	63	**31**	73	71	68	67	64	61	**30**	73	71	68	66	64	61	**30**	74	71	68	66	64	62	**30**
		1000	490	0.07	67	63	61	60	57	52	**20**	67	62	60	59	55	50	-	67	62	60	59	55	50	-	67	62	60	58	55	51	-
		500	350	0.04	54	49	49	46	41	33	-	57	47	48	45	39	31	-	57	48	48	45	39	31	-	57	48	48	45	39	31	-
	10	2090	1090	0.15	80	79	75	74	73	72	**39**	78	77	74	73	72	70	**37**	78	77	74	73	72	70	**37**	78	77	74	72	72	70	**37**
		2090	950	0.12	80	79	75	74	73	72	**39**	78	77	74	73	72	70	**37**	78	78	74	73	72	70	**38**	78	78	74	73	72	70	**38**
		1500	820	0.09	74	72	69	67	66	63	**31**	73	70	68	66	64	61	**28**	73	70	68	66	64	61	**28**	74	71	68	66	64	61	**30**
		1000	650	0.06	67	63	61	60	57	52	**20**	67	62	60	58	55	50	-	68	62	60	58	55	50	-	68	62	60	58	55	50	-
		500	380	0.02	54	49	49	46	41	33	-	58	47	48	45	39	31	-	58	47	48	45	39	31	-	58	48	48	45	39	31	-
	12	2090	1570	0.15	80	79	75	74	73	72	**39**	79	77	74	72	71	69	**37**	79	77	74	72	71	69	**37**	79	77	74	72	71	69	**37**
		2090	1370	0.12	80	79	75	74	73	72	**39**	79	77	74	72	71	69	**37**	79	77	74	72	71	69	**37**	79	77	74	72	71	70	**37**
		1500	1180	0.09	74	72	69	67	66	63	**31**	74	70	68	66	63	60	**28**	74	70	68	66	63	60	**28**	74	70	67	66	63	60	**28**
		1000	790	0.04	67	63	61	60	57	52	**20**	68	62	60	58	54	49	-	68	62	60	58	54	49	-	68	62	60	58	54	49	-
		500	390	0.01	54	49	49	46	41	33	-	58	47	48	45	39	31	-	58	47	48	45	39	31	-	58	47	48	45	39	31	-

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.

DLSC / RADIATED SOUND POWER LEVELS WITH NC

Unit Size	Inlet Size	Fan Airflow (cfm)	Primary Airflow (cfm)	Min. Inlet Ps (in. wc)	Octave Band Sound Power Levels, Lw (dB)																								
					Fan Only							0.5" Inlet Ps							1.0" Inlet Ps							1.5" Inlet Ps						
					2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
1	4	790	220	0.35	71	67	59	57	52	47	**38**	70	64	56	52	44	37	**35**	71	66	58	54	48	42	**37**	71	66	59	55	50	44	**37**
		790	170	0.21	71	67	59	57	52	47	**38**	70	64	56	52	44	38	**35**	70	65	58	54	48	42	**36**	71	65	59	55	50	44	**36**
		600	130	0.12	66	60	54	52	46	40	**30**	65	59	52	49	42	36	**29**	65	60	54	51	45	40	**30**	66	61	55	52	47	42	**31**
		350	100	0.07	55	48	45	41	34	27	-	56	51	47	42	37	31	**21**	56	52	48	44	41	36	**22**	57	53	50	45	43	38	**24**
		150	80	0.05	38	28	30	25	16	5	-	42	38	38	32	29	25	-	43	39	39	34	33	29	-	43	40	41	36	35	31	-
	6	790	490	0.24	71	67	59	57	52	47	**38**	72	66	58	52	43	37	**38**	73	67	59	54	47	41	**39**	73	68	61	55	49	43	**39**
		790	390	0.15	71	67	59	57	52	47	**38**	71	66	57	52	43	37	**37**	72	67	59	54	47	41	**38**	72	67	60	55	49	43	**38**
		600	290	0.08	66	60	54	52	46	40	**30**	66	61	54	49	41	35	**31**	67	62	56	51	45	39	**32**	67	63	57	52	47	41	**33**
		350	180	0.03	55	48	45	41	34	27	-	57	52	48	43	37	31	**22**	58	53	49	44	40	35	**23**	58	54	51	46	42	37	**25**
		150	120	0.01	38	28	30	25	16	5	-	45	38	38	33	29	24	-	45	39	40	35	33	28	-	46	40	41	36	35	31	-
2	4	810	220	0.35	71	66	62	60	58	53	**37**	69	61	54	51	42	35	**34**	70	62	56	53	46	39	**35**	70	63	58	54	48	42	**35**
		810	170	0.21	71	66	62	60	58	53	**37**	68	60	54	51	42	34	**33**	69	61	56	53	45	39	**34**	69	62	57	54	47	42	**34**
		600	130	0.12	65	59	56	54	49	43	**31**	63	55	50	47	39	32	**26**	64	57	52	49	42	37	**28**	64	57	53	50	44	39	**28**
		350	100	0.07	53	46	46	42	34	26	-	54	48	45	41	34	28	-	55	50	47	43	37	33	**21**	56	51	48	44	39	35	**22**
		150	80	0.05	35	27	29	24	10	-2	-	42	38	37	30	25	21	-	43	40	39	32	29	26	-	43	40	40	34	31	29	-
	6	810	490	0.24	71	66	62	60	58	53	**37**	72	65	57	52	42	35	**38**	72	66	59	54	46	39	**38**	73	67	60	55	48	42	**39**
		810	390	0.15	71	66	62	60	58	53	**37**	71	64	56	51	42	35	**36**	72	65	58	53	46	40	**38**	72	66	60	55	48	42	**38**
		600	290	0.08	65	59	56	54	49	43	**31**	66	59	53	48	39	33	**30**	66	61	55	50	43	37	**31**	67	62	56	51	45	40	**32**
		350	180	0.03	53	46	46	42	34	26	-	56	51	47	41	34	28	**21**	57	53	49	43	37	33	**23**	58	54	50	44	39	35	**24**
		150	120	0.01	35	27	29	24	10	-2	-	44	39	38	31	25	20	-	45	41	40	33	28	24	-	45	42	42	34	30	27	-
	8	810	770	0.18	71	66	62	60	58	53	**37**	75	65	58	52	41	30	**42**	76	67	60	54	45	35	**43**	76	68	62	55	46	37	**43**
		810	700	0.15	71	66	62	60	58	53	**37**	74	66	58	52	42	33	**40**	75	67	60	54	45	37	**42**	75	68	61	55	47	40	**42**
		600	520	0.08	65	59	56	54	49	43	**31**	69	61	55	48	39	30	**34**	69	63	57	50	42	35	**34**	70	64	58	51	44	37	**35**
		350	310	0.03	53	46	46	42	34	26	-	59	53	48	41	33	25	**22**	60	54	50	43	37	30	**24**	61	55	52	45	39	33	**26**
		150	140	0.01	35	27	29	24	10	-2	-	45	39	39	31	24	17	-	46	41	41	33	28	22	-	47	42	42	34	30	25	-

DLSC / RADIATED SOUND POWER LEVELS WITH NC

Unit Size	Inlet Size	Fan Airflow (cfm)	Primary Airflow (cfm)	Min. Inlet Ps (in. wc)	Octave Band Sound Power Levels, Lw (dB)																										
					Fan Only							0.5" Inlet Ps							1.0" Inlet Ps							1.5" Inlet Ps						
					2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
3	4	1220	220	0.35	75	71	70	68	63	62	**46**	70	68	66	65	56	45	**41**	72	70	67	66	58	49	**43**	72	71	68	67	59	52	**44**
		1220	170	0.21	75	71	70	68	63	62	**46**	70	67	65	65	55	45	**40**	71	70	67	66	57	49	**43**	72	71	67	66	59	52	**43**
		750	150	0.16	65	61	62	59	50	47	**37**	64	61	60	58	49	40	**35**	66	64	61	59	51	44	**36**	67	65	62	60	52	47	**37**
		500	120	0.10	56	52	55	52	40	35	**30**	60	56	55	53	43	35	**30**	61	58	56	54	45	40	**31**	62	60	57	55	46	42	**32**
		340	90	0.06	48	44	48	45	30	23	**22**	55	51	50	47	38	31	**24**	57	54	52	49	40	36	**26**	58	55	52	49	41	38	**26**
	6	1220	490	0.24	75	71	70	68	63	62	**46**	72	69	68	66	57	45	**44**	73	71	69	67	59	49	**45**	74	72	70	68	60	51	**46**
		1220	390	0.15	75	71	70	68	63	62	**46**	71	69	67	66	56	45	**43**	73	71	68	67	58	49	**44**	74	72	69	68	60	51	**45**
		750	330	0.11	65	61	62	59	50	47	**37**	66	63	61	59	50	39	**36**	68	65	63	61	52	44	**38**	68	66	64	61	53	46	**39**
		500	270	0.07	56	52	55	52	40	35	**30**	62	58	57	54	44	35	**32**	63	60	58	55	46	39	**33**	64	61	59	56	47	42	**34**
		340	120	0.01	48	44	48	45	30	23	**22**	56	52	51	48	38	31	**25**	57	54	52	49	40	35	**26**	58	55	53	50	41	38	**27**
	8	1220	870	0.22	75	71	70	68	63	62	**46**	74	70	69	67	57	44	**45**	75	73	71	68	59	49	**47**	76	74	71	69	61	51	**47**
		1220	700	0.15	75	71	70	68	63	62	**46**	73	70	68	67	57	44	**44**	74	72	70	68	59	49	**46**	75	73	71	69	60	51	**47**
		750	590	0.10	65	61	62	59	50	47	**37**	68	64	63	61	50	39	**38**	69	66	65	62	52	44	**40**	70	68	65	62	54	46	**40**
		500	490	0.07	56	52	55	52	40	35	**30**	66	61	59	56	45	36	**34**	67	63	61	57	47	40	**36**	68	65	62	57	48	43	**37**
		340	210	0.01	48	44	48	45	30	23	**22**	57	53	52	49	39	31	**26**	59	55	54	50	41	35	**28**	60	56	54	50	42	38	**28**
	10	1220	1090	0.15	75	71	70	68	63	62	**46**	75	71	70	68	58	45	**46**	76	74	71	69	60	49	**47**	77	75	72	69	61	51	**48**
		1220	950	0.12	75	71	70	68	63	62	**46**	74	71	69	67	57	44	**45**	75	73	71	68	59	49	**47**	76	74	72	69	61	51	**48**
		750	820	0.09	65	61	62	59	50	47	**37**	69	65	64	61	51	39	**39**	71	68	66	62	53	44	**41**	72	69	66	63	54	46	**41**
		500	550	0.04	56	52	55	52	40	35	**30**	64	60	59	55	45	35	**34**	66	62	60	56	47	40	**35**	67	63	61	57	48	42	**36**
		340	270	0.01	48	44	48	45	30	23	**22**	58	54	53	49	39	31	**27**	60	56	54	50	41	35	**28**	61	57	55	51	42	38	**30**
5	6	2025	490	0.24	72	72	69	65	60	56	**45**	68	65	65	61	52	46	**40**	69	67	67	62	56	51	**43**	70	68	68	63	58	55	**44**
		2025	390	0.15	72	72	69	65	60	56	**45**	68	64	65	61	52	45	**40**	69	66	66	63	56	51	**41**	69	68	67	63	58	54	**43**
		1500	330	0.11	68	68	65	60	55	49	**40**	64	61	61	58	50	43	**36**	65	63	63	59	53	49	**38**	66	65	64	60	55	52	**39**
		1000	270	0.07	62	62	59	55	47	39	**34**	59	56	57	53	47	39	**32**	60	59	58	54	50	45	**33**	61	60	59	55	52	49	**34**
		500	200	0.04	52	52	50	45	34	22	**24**	51	49	49	44	41	34	**23**	52	52	50	46	44	40	**24**	52	53	51	47	46	43	**25**
	8	2025	870	0.22	72	72	69	65	60	56	**45**	69	66	65	61	53	46	**40**	70	68	67	62	56	52	**43**	70	70	68	63	58	55	**44**
		2025	700	0.15	72	72	69	65	60	56	**45**	68	65	65	61	52	46	**40**	69	68	67	62	56	52	**43**	70	69	68	63	58	55	**44**
		1500	590	0.10	68	68	65	60	55	49	**40**	65	62	62	57	50	44	**37**	66	65	63	59	53	49	**38**	66	66	64	60	55	53	**39**
		1000	490	0.07	62	62	59	55	47	39	**34**	60	58	57	52	47	40	**32**	61	60	59	54	50	46	**34**	61	62	60	55	52	50	**35**
		500	350	0.04	52	52	50	45	34	22	**24**	52	50	49	44	42	36	**23**	53	53	51	46	45	41	**25**	53	54	52	47	47	45	**26**
	10	2025	1090	0.15	72	72	69	65	60	56	**45**	69	66	65	61	53	47	**40**	70	69	67	62	56	53	**43**	70	70	68	63	58	56	**44**
		2025	950	0.12	72	72	69	65	60	56	**45**	69	66	65	61	53	47	**40**	70	69	67	62	56	52	**43**	70	70	68	63	58	56	**44**
		1500	820	0.09	68	68	65	60	55	49	**40**	65	63	62	57	50	44	**37**	66	65	64	59	54	50	**39**	67	67	65	59	56	53	**40**
		1000	650	0.06	62	62	59	55	47	39	**34**	60	58	57	52	47	41	**32**	61	61	59	54	51	47	**34**	62	62	60	55	52	51	**35**
		500	380	0.02	52	52	50	45	34	22	**24**	52	50	49	44	42	36	**23**	53	53	51	46	45	42	**25**	53	54	52	47	47	45	**26**
	12	2025	1570	0.15	72	72	69	65	60	56	**45**	70	67	66	61	53	49	**41**	71	69	68	62	57	54	**44**	71	71	69	63	59	58	**45**
		2025	1370	0.12	72	72	69	65	60	56	**45**	69	67	66	61	53	48	**41**	70	69	67	62	56	54	**43**	71	71	68	63	58	57	**44**
		1500	1180	0.09	68	68	65	60	55	49	**40**	66	63	62	57	51	46	**37**	67	66	64	59	54	52	**39**	67	67	65	60	56	55	**40**
		1000	790	0.04	62	62	59	55	47	39	**34**	61	59	58	53	48	43	**33**	62	61	59	54	51	48	**34**	62	62	60	55	53	52	**35**
		500	390	0.01	52	52	50	45	34	22	**24**	52	50	49	45	42	36	**23**	53	53	51	46	45	42	**25**	53	54	52	47	47	46	**26**

DLSC / RADIATED SOUND POWER LEVELS WITH NC

Unit Size	Inlet Size	Fan Airflow (cfm)	Primary Airflow (cfm)	Min. Inlet Ps (in. wc)	Octave Band Sound Power Levels, Lw (dB)																										
					Fan Only							0.5" Inlet Ps							1.0" Inlet Ps							1.5" Inlet Ps						
					2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
A	4	850	220	0.35	72	66	60	57	50	44	**38**	73	67	59	53	43	35	**39**	73	67	60	55	47	40	**39**	73	68	61	56	50	43	**39**
		850	170	0.21	72	66	60	57	50	44	**38**	72	66	58	53	44	36	**38**	73	67	60	55	48	40	**39**	73	67	61	56	50	43	**39**
		600	130	0.12	64	59	54	50	43	37	**29**	65	59	54	49	41	32	**29**	65	60	56	51	45	37	**30**	65	60	57	52	47	40	**31**
		400	100	0.07	55	50	47	42	35	28	**21**	56	52	49	44	38	28	**23**	56	53	51	46	42	33	**25**	57	53	52	47	44	36	**26**
		180	80	0.05	37	33	34	27	18	11	-	40	38	40	34	31	20	-	40	39	42	36	35	25	-	40	39	43	37	37	27	-
	6	850	470	0.22	72	66	60	57	50	44	**36**	75	69	60	52	42	35	**42**	75	70	62	54	46	39	**42**	76	70	63	55	49	42	**42**
		850	390	0.15	72	66	60	57	50	44	**36**	74	68	60	52	42	35	**41**	75	69	61	54	46	39	**41**	75	69	62	56	49	42	**42**
		600	290	0.08	64	59	54	50	43	37	**28**	67	62	55	48	40	31	**32**	67	62	57	50	44	36	**32**	67	63	58	51	46	39	**33**
		400	180	0.03	55	50	47	42	35	28	-	58	54	50	43	37	28	**24**	58	54	52	45	41	32	**26**	58	55	53	47	43	35	**27**
		180	120	0.01	37	33	34	27	18	11	-	42	40	42	34	30	20	-	42	40	43	36	34	24	-	42	41	44	37	37	27	-
B	4	955	220	0.35	71	65	59	55	49	42	**36**	72	66	59	53	46	37	**38**	73	67	60	55	48	41	**39**	73	67	61	55	50	44	**39**
		955	170	0.21	71	65	59	55	49	42	**36**	72	65	58	53	45	37	**38**	72	66	59	54	48	41	**38**	72	66	60	55	50	43	**38**
		700	130	0.12	65	59	54	49	43	36	**29**	66	60	54	49	42	33	**30**	66	60	55	50	44	37	**30**	66	61	56	51	46	40	**31**
		400	100	0.07	54	48	45	40	32	23	-	55	50	46	41	35	27	-	55	51	47	42	38	31	**21**	55	51	48	43	39	34	**22**
		260	80	0.05	45	40	38	32	23	14	-	47	42	40	35	30	22	-	47	43	41	36	33	26	-	47	43	42	37	34	29	-
	6	955	490	0.24	71	65	59	55	49	42	**36**	74	68	61	54	46	38	**40**	74	69	62	55	49	42	**40**	75	69	62	56	50	44	**42**
		955	390	0.15	71	65	59	55	49	42	**36**	73	68	60	54	46	38	**39**	74	68	61	55	49	42	**40**	74	69	62	56	50	44	**40**
		700	290	0.08	65	59	54	49	43	36	**29**	67	62	55	49	42	34	**32**	68	62	57	50	45	38	**33**	68	63	57	51	46	41	**33**
		400	180	0.03	54	48	45	40	32	23	-	56	51	47	41	36	28	**21**	56	52	49	42	38	32	**23**	57	53	49	43	40	34	**23**
		260	120	0.01	45	40	38	32	23	14	-	48	43	41	35	30	22	-	48	44	42	36	33	27	-	48	45	43	37	35	29	-
	8	955	770	0.18	71	65	59	55	49	42	**36**	76	69	62	53	46	38	**43**	76	70	64	54	49	42	**43**	76	70	64	55	50	44	**43**
		955	700	0.15	71	65	59	55	49	42	**36**	75	69	62	54	46	38	**42**	76	70	63	55	49	42	**43**	76	70	64	55	50	44	**43**
		700	520	0.08	65	59	54	49	43	36	**29**	69	63	57	49	42	34	**34**	70	64	59	50	45	38	**35**	70	64	59	51	47	41	**35**
		400	310	0.03	54	48	45	40	32	23	-	58	53	49	41	36	27	**23**	58	54	51	42	38	31	**25**	59	54	51	43	40	34	**25**
		260	140	0.01	45	40	38	32	23	14	-	48	44	42	35	30	23	-	48	45	43	36	33	27	-	48	45	43	37	35	29	-

DLSC / RADIATED SOUND POWER LEVELS WITH NC

Unit Size	Inlet Size	Fan Airflow (cfm)	Primary Airflow (cfm)	Min. Inlet Ps (in. wc)	Octave Band Sound Power Levels, Lw (dB)																								
					Fan Only							0.5" Inlet Ps							1.0" Inlet Ps							1.5" Inlet Ps						
					2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
C	4	1360	220	0.35	76	70	65	59	48	55	**43**	71	66	62	58	48	46	**37**	72	68	64	60	51	50	**39**	73	70	66	61	52	53	**42**
		1360	170	0.21	76	70	65	59	48	55	**43**	70	65	61	57	46	45	**36**	71	67	63	59	49	50	**38**	72	68	64	60	51	53	**39**
		750	150	0.16	68	59	56	48	34	41	**33**	63	59	55	50	41	40	**30**	65	61	57	52	44	44	**32**	65	62	59	53	46	47	**34**
		500	120	0.10	62	51	49	41	24	32	**25**	58	54	51	46	36	36	**25**	60	56	53	47	39	40	**27**	60	57	54	48	41	43	**28**
		340	90	0.06	56	44	43	34	14	23	-	54	49	46	40	32	32	-	55	51	48	42	35	37	**22**	56	52	49	43	37	39	**23**
	6	1360	490	0.24	76	70	65	59	48	55	**43**	73	70	66	62	52	47	**42**	74	72	68	64	55	52	**44**	75	73	69	65	56	55	**45**
		1360	390	0.15	76	70	65	59	48	55	**43**	72	69	65	61	50	47	**40**	73	71	67	63	53	52	**43**	74	72	68	64	55	54	**44**
		750	330	0.11	68	59	56	48	34	41	**33**	65	62	59	55	45	42	**34**	67	64	61	57	48	46	**36**	67	65	62	58	50	49	**37**
		500	270	0.07	62	51	49	41	24	32	**25**	61	57	54	50	41	38	**28**	62	59	57	52	44	43	**32**	63	60	58	53	46	46	**33**
		340	120	0.01	56	44	43	34	14	23	-	54	50	47	42	33	32	**21**	56	52	49	44	36	37	**23**	56	53	51	45	38	40	**25**
	8	1360	870	0.22	76	70	65	59	48	55	**43**	75	71	69	66	56	49	**45**	76	73	71	68	59	54	**47**	77	75	72	69	60	57	**48**
		1360	700	0.15	76	70	65	59	48	55	**43**	74	71	68	64	54	48	**44**	75	73	70	66	57	53	**46**	76	74	71	67	59	56	**47**
		750	590	0.10	68	59	56	48	34	41	**33**	68	62	62	60	50	45	**37**	69	65	64	62	53	49	**39**	70	66	65	63	55	52	**40**
		500	490	0.07	62	51	49	41	24	32	**25**	66	51	60	63	52	46	**36**	68	53	62	65	56	51	**38**	68	54	63	66	57	53	**39**
		340	210	0.01	56	44	43	34	14	23	-	56	51	50	46	37	34	**24**	57	54	52	48	40	39	**26**	58	55	53	49	42	42	**27**
	10	1360	1090	0.15	76	70	65	59	48	55	**43**	76	71	70	69	58	51	**46**	77	73	72	71	61	56	**48**	78	74	74	72	63	59	**50**
		1360	950	0.12	76	70	65	59	48	55	**43**	75	71	69	67	56	50	**45**	76	73	71	69	59	55	**47**	77	75	73	70	61	58	**49**
		750	680	0.06	68	59	56	48	34	41	**33**	69	61	64	64	53	47	**39**	71	63	66	65	56	51	**41**	71	64	67	66	58	54	**43**
		500	410	0.02	62	51	49	41	24	32	**25**	63	56	57	55	45	41	**32**	64	59	59	57	48	45	**34**	65	60	60	58	50	48	**35**
		340	270	0.01	56	44	43	34	14	23	-	58	51	52	49	40	36	**26**	59	53	54	51	43	41	**28**	60	55	55	52	45	44	**30**
E	6	2090	490	0.24	72	70	65	62	56	50	**42**	71	68	62	60	53	46	**39**	72	70	64	61	55	51	**42**	72	71	65	62	57	54	**43**
		2090	390	0.15	72	70	65	62	56	50	**42**	71	67	62	59	52	44	**38**	72	69	63	61	54	49	**40**	72	70	64	61	56	52	**42**
		1500	330	0.11	68	65	60	56	48	41	**36**	67	63	58	55	49	41	**33**	67	65	59	56	52	46	**36**	68	66	60	57	53	49	**37**
		1000	270	0.07	62	59	54	49	39	30	**28**	62	58	53	49	45	38	**27**	62	60	55	51	48	43	**30**	63	61	56	51	50	46	**31**
		500	200	0.04	53	48	43	37	24	11	-	53	50	45	40	40	32	-	54	51	46	41	42	38	-	54	53	47	42	44	41	**21**
	8	2090	870	0.22	72	70	65	62	56	50	**42**	72	70	64	60	55	50	**42**	73	72	65	62	58	55	**44**	73	73	66	62	59	58	**45**
		2090	700	0.15	72	70	65	62	56	50	**42**	72	70	63	60	54	48	**42**	72	71	65	61	57	54	**43**	73	72	66	62	58	57	**44**
		1500	590	0.10	68	65	60	56	48	41	**36**	68	65	59	56	51	46	**36**	68	67	61	57	54	51	**38**	69	68	62	58	56	54	**39**
		1000	490	0.07	62	59	54	49	39	30	**28**	63	60	54	50	48	42	**30**	64	62	56	51	51	48	**32**	64	63	57	52	52	51	**33**
		500	350	0.04	53	48	43	37	24	11	-	56	51	47	41	42	37	**21**	56	53	48	42	45	43	**22**	57	54	49	43	46	46	**23**
	10	2090	1090	0.15	72	70	65	62	56	50	**42**	73	71	64	61	56	52	**43**	73	73	66	62	59	57	**45**	74	74	67	63	60	60	**46**
		2090	950	0.12	72	70	65	62	56	50	**42**	72	71	64	61	55	51	**43**	73	72	65	62	58	56	**44**	73	74	66	63	60	59	**46**
		1500	820	0.09	68	65	60	56	48	41	**36**	69	67	60	56	53	48	**38**	69	68	62	57	55	54	**39**	70	69	63	58	57	57	**40**
		1000	650	0.06	62	59	54	49	39	30	**28**	64	61	55	51	49	45	**31**	65	63	57	52	52	50	**33**	65	64	58	53	53	53	**34**
		500	380	0.02	53	48	43	37	24	11	-	57	52	47	41	42	38	**21**	57	53	49	42	45	44	**23**	57	54	49	43	47	47	**23**
	12	2090	1570	0.15	72	70	65	62	56	50	**42**	75	72	66	61	58	56	**44**	76	74	67	63	60	61	**46**	76	75	68	63	62	64	**47**
		2090	1370	0.12	72	70	65	62	56	50	**42**	74	72	65	61	57	54	**44**	74	74	67	62	60	59	**46**	75	75	68	63	61	62	**47**
		1500	1180	0.09	68	65	60	56	48	41	**36**	71	67	61	57	54	52	**38**	72	69	63	58	57	58	**40**	72	70	64	59	59	61	**42**
		1000	790	0.04	62	59	54	49	39	30	**28**	66	62	56	51	50	47	**32**	67	63	58	52	53	53	**33**	67	64	59	53	54	56	**34**
		500	390	0.01	53	48	43	37	24	11	-	57	52	47	41	43	39	**21**	57	53	49	42	45	44	**23**	58	54	50	43	47	47	**24**

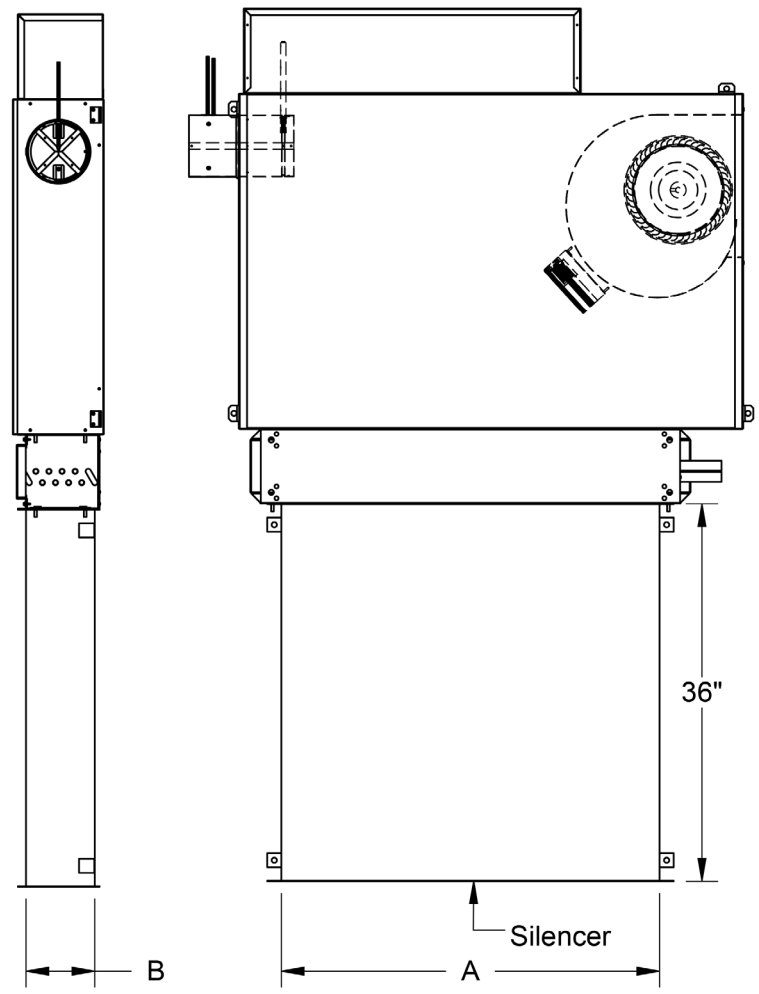
- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the difference between atmospheric pressure and the inlet static pressure with the primary damper full open and the unit fan set to match the primary flow
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.

DLSC / SILENCER TEST

3 ft Silencer Attentuation Deduction Values (dB)														
FAN ONLY								FAN + PRIMARY						
Octave Band							NC	Octave Band						NC
Size	2	3	4	5	6	7		2	3	4	5	6	7	
1	-2	-2	-2	-2	-1	-1	**-3**	-2	-3	-4	-3	-1	0	**-4**
2	-4	-4	-5	-5	-6	-6	**-6**	-3	-4	-5	-4	-2	0	**-6**
3	-4	-4	-5	-5	-6	-6	**-6**	-3	-4	-5	-4	-2	0	**-5**
5	-3	-4	-7	-6	-3	0	**-7**	-3	-5	-9	-9	-9	-10	**-9**
A	-4	-4	-4	-2	-1	0	**-4**	-3	-4	-6	-4	-3	-1	**-6**
B	-4	-4	-4	-5	-3	-2	**-5**	-4	-5	-5	-5	-3	-1	**-6**
C	-5	-6	-7	-7	-2	-4	**-7**	-4	-5	-5	-4	-2	-3	**-6**
E	-4	-4	-5	-6	-3	-2	**-6**	-4	-6	-7	-8	-9	-10	**-7**

Note:
The above silencer attenuation correction values can be applied to the "Radiated Sound Power Levels" only on pages N89 - N91

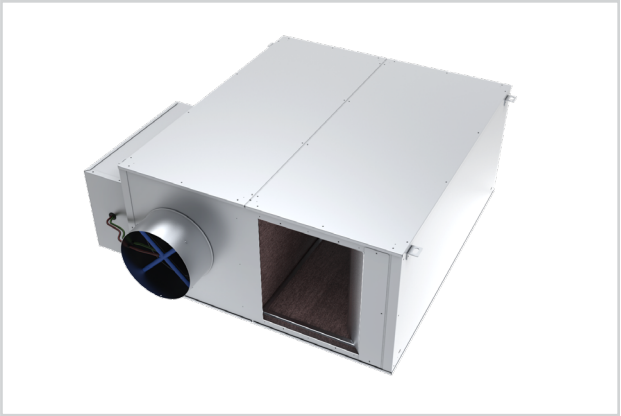
DLSC / Silencer Option



Unit Size	A	B
1	36	6 9/16
2	36	7
3	36	8 1/4
5	42	12
A	60 1/8	6 9/16
B	60 1/8	7
C	60 1/8	8 1/4
E	60 1/8	12

PFB

- Two casing sizes ease in design layout
- Pressure independent primary airflow control
- AeroCross™ multi-point, center averaging inlet velocity sensor
- Primary airflow balancing connections
- Adjustments are easily accessible through ceiling opening
- Ultra high efficiency, brushless DC ECM motor with a unique microprocessor based motor controller.
- Manual PWM controller allows simple screwdriver adjustment of fan speed.
- Remote PWM controller allows for a 0-10 V signal from the DDC controller to adjust the fan speed.
- Single point electrical, pneumatic main, and thermostat connections
- Dual density insulation, coated to prevent air erosion, meets requirements of NFPA 90A and UL 181
- 20 gauge, galvanized steel casing with leak resistant construction



PFB

- Rectangular discharge opening is designed for flanged duct connections
- Bottom access panel can be removed for service

energy solutions

CONTROLS:

Pneumatic Control
Analog Control
Digital Control

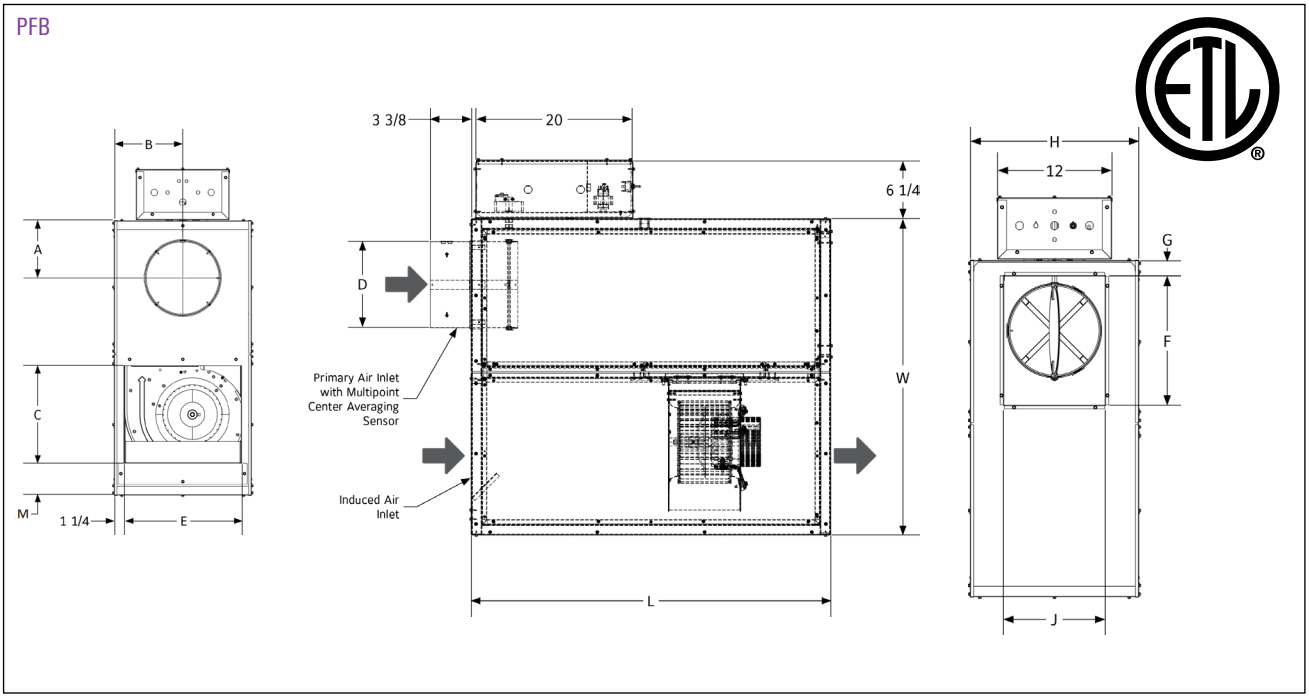
OVERVIEW

Parallel Flow

In a Parallel Flow terminal, the fan is outside the primary airstream and runs intermittently, when the primary air is off. Parallel flow or variable volume Fan Powered terminals operate in two distinct modes: variable volume, constant temperature when handling high cooling loads; and constant volume, variable temperature when heating or handling light cooling loads.

PFB UNIT DIMENSIONS

PFB



PFB Parallel Unit															
Unit Size	Inlet Size	A	B	C	D	E	F	G	H	J	K	L	W	M	Filter Size
B	6 8 10	5½ 6½ 7½	9	15	5 7/8 7 7/8 9 7/8	15½	13¾	1½	18	10¾		41	36 1/8	2½	17 x 17
C	6 8 10 12	5½ 6½ 7½ 8½			5 7/8 7 7/8 9 7/8 11 7/8										
D	10 12 14 16	7½ 8½ 9½ 9½	10½	15	9 7/8 11 7/8 13 7/8 15 7/8	18	16½	9½	21	14½		41	38 1/8	4	19 x 20
E	10 12 14 16	7½ 8½ 9½ 9½			9 7/8 11 7/8 13 7/8 15 7/8										

All dimensions are in inches

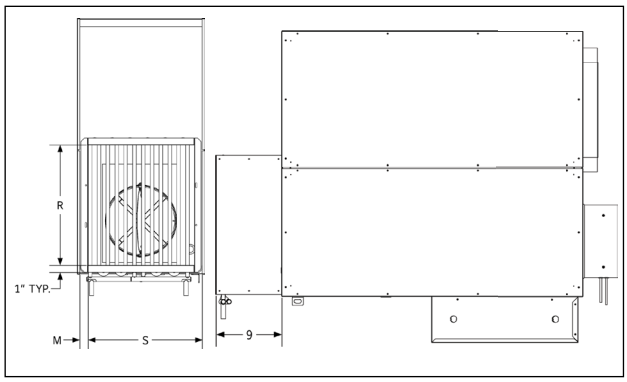
HOT WATER COIL SECTION

STANDARD FEATURES

- ½" copper tubes
- Aluminum ripple fins, 10 per inch
- Connections: Male solder 5/8" for both 1- and 2-row. Right hand only.
- Galvanized steel casing
- Flanged duct connection
- Coil is installed at induced air inlet

SUPPLY VOLTAGE

- 120V, 1 ph, 60 Hz.
- 208/240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.



COIL ROWS

- 1-Row
- 2-Row

Hot Water Coil Section (Inlet Mounted)				
Unit Size	M (1-Row)	M (2-Row)	R	S
B, C	1	1¼	17	15
D, E	1⅛	1⅛	17¼	17½

Note: R and S are inside dimensions

ELECTRIC COIL SECTION

STANDARD FEATURES

- Auto reset thermal cutouts (one per element)
- 80/20 Nickel chrome heating elements.
- Magnetic contactors, where required, on pneumatic units
- Airflow safety switch
- Line terminal block (277/1∅, 208/240/3∅, or 480/3∅ 4 wire)
- Flanged connection
- Control transformer for DDC or Analog electronic controls
- Pneumatic electric switch for pneumatic parallel fan terminals only
- Fan relay for DDC fan terminals
- Magnetic contactor per step on terminals with DDC or analog electronic controls
- Manual reset thermal cutout
- Dust-tight construction
- Optional Lynergy Comfort Controlled SSR Electric Heat available

OPTIONS

- Interlocking disconnect
- Main power supply fuses
- Mercury contactors

SUPPLY VOLTAGE

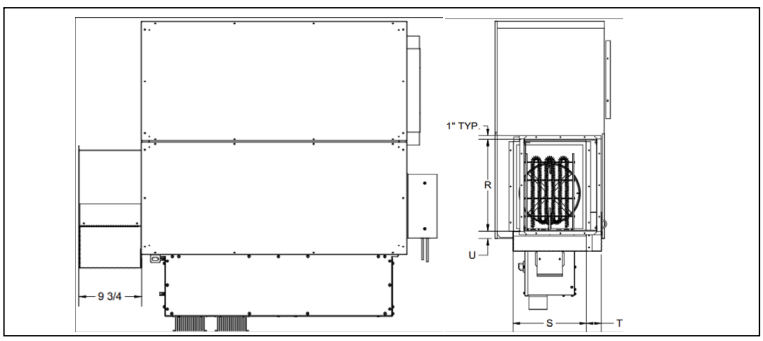
- 208V, 1 ph, 60 Hz.
- 240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.
- 208V, 3 ph, 60 Hz.
- 480V, 3 ph, 60 Hz. (4 wire wye only)

Electric Coil Section (Discharge Mounted)				
Unit Size	U	R	S	T
B, C	1⅛	15	12	3
D, E	1⅛	17½	15½	2¾

Note: Coil control box replaces standard terminal unit control box

Note: R and S are inside dimensions

See Electric Heat Coils in Section O for more information



ADDITIONAL ACCESSORIES (OPTIONAL)

- 1" and 2" Construction, MERV 8 and MERV 13 induced Air Filters
- Fan unit fusing
- Induced Air Sensor
- Toggle type disconnect switch (not available on units with optional electric coils)
- Bottom Access, 90°, and Remote Enclosures
- Slip and Drive Adaptor
- 1" liner
- Fibre-Free liner
- SteriLoc liner
- EcoShield liner
- Hanger brackets
- Camlocks on fan access door

ECM ELECTRICAL DATA

Unit Size	Motor HP	115V	208/230V	277V
B	⅓	5.0	2.8	2.6
C	½	7.7	4.3	4.1
D	¾	9.6	6.8	5.5
E	1	12.8	9.1	6.9

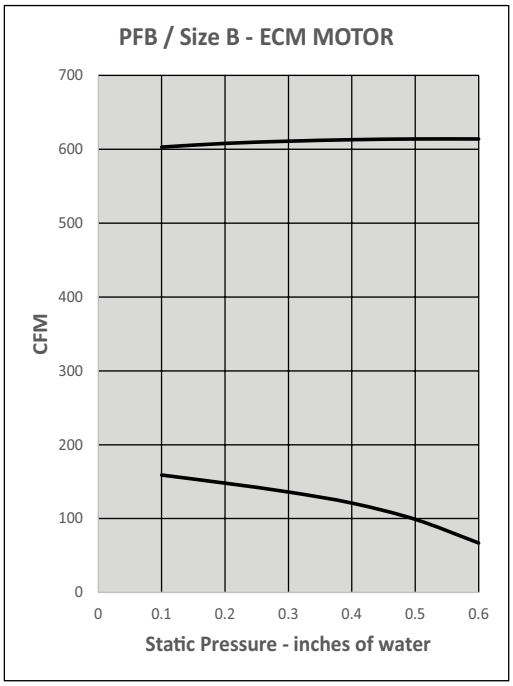
FLA = Full Load Amperage, as tested in accordance with UL 60335
All fan motors are single phase, same voltage as electric coil (when supplied), with exception that 277 voltage motors are used with 480 volt / 3 phase coil (4 wire wye)

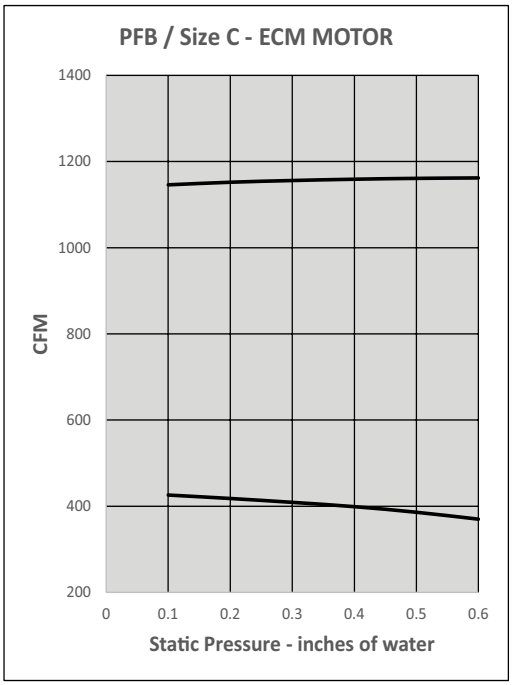
PRIMARY AIR CFM RANGES

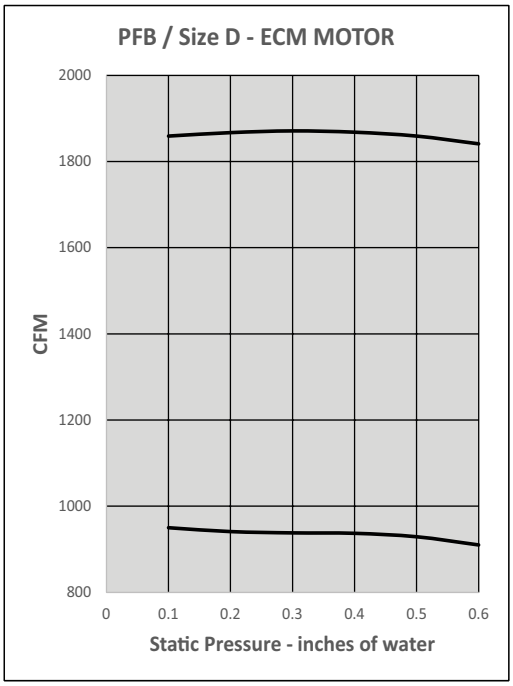
Inlet Size	Total cfm Range	TITUS II, IIA Pneumatic Controller		TITUS I Pneumatic Controller		TITUS TA1 Analog Electronic Controller		Typical Digital Controller	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
6	0-500	*80-330	150-500	*105-350	150-500	*80-500	80-500	*45-500	45-500
8	0-900	*145-590	265-900	*190-590	265-900	*145-900	145-900	*90-900	90-900
10	0-1400	*230-925	415-1400	*300-925	415-1400	*230-1400	230-1400	*145-1400	145-1400
12	0-2000	*325-1330	600-2000	*425-1330	600-2000	*325-2000	325-2000	*190-2000	190-2000
14	0-3000	*450-1800	840-3000	*575-1800	810-3000	*450-3000	450-3000	*300-3000	300-3000
16	0-4000	*580-2350	1100-4000	*750-2350	1100-4000	*580-4000	580-4000	*385-4000	385-4000

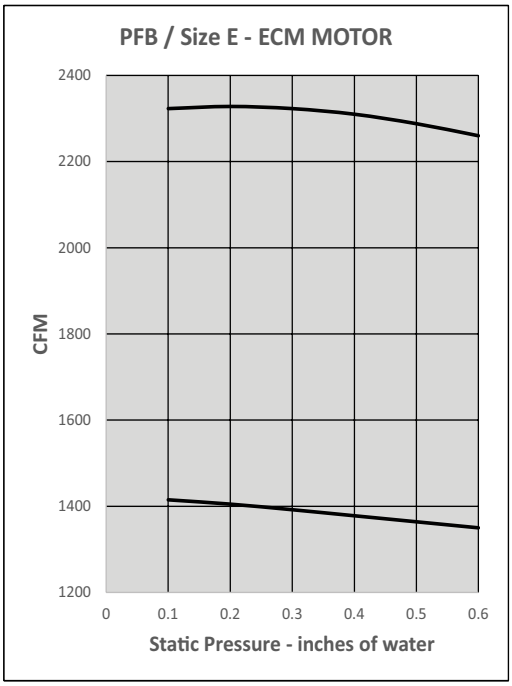
Note: An asterisk (*) indicates factory cfm settings (except zero) will not be made below this range because control accuracy is reduced. On pressure dependent units, minimum cfm is always zero and there is no maximum.

PFB WITH ECM / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE









PFB / WATER COIL HEATING CAPACITY (MBH)

Unit Size	Rows	gpm	Head Loss	Airflow, cfm				
				175	280	385	490	600
B	One Row	1.0	0.17	8.5	10.8	12.5	13.8	14.8
		2.0	0.53	9.1	12	14.1	15.8	17.3
		4.0	1.96	9.5	12.6	15.1	17.1	18.8
		6.0	4.26	9.6	12.9	15.4	17.5	19.4
		Airside ΔPs		0.01	0.01	0.02	0.03	0.04
	Two Row	1.0	0.35	12.6	16.8	19.8	22.2	24.1
		2.0	1.01	13.6	18.9	23.1	26.5	29.5
		4.0	3.71	14.1	20	24.9	29.1	32.8
		6.0	8.02	17.3	20.4	25.6	30	34.1
		Airside ΔPs		0.01	0.02	0.03	0.05	0.07

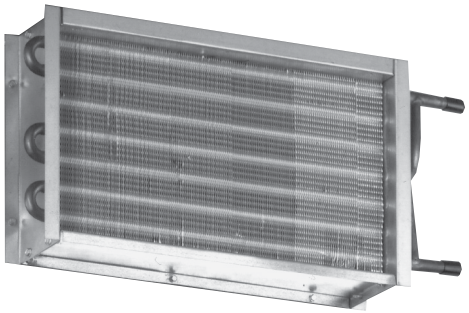
Unit Size	Rows	gpm	Head Loss	Airflow, cfm				
				415	600	785	970	1150
C	One Row	1.0	0.17	12.9	14.8	16.2	17.3	18.1
		2.0	0.53	14.6	17.3	19.3	20.9	22.2
		4.0	1.96	15.7	18.8	21.3	23.3	24.9
		6.0	4.24	16	19.4	22	24.1	25.9
		Airside ΔPs		0.02	0.04	0.05	0.08	0.1
	Two Row	1.0	0.34	20.6	24.1	26.5	28.2	29.6
		2.0	1.01	24.1	29.5	33.6	36.8	39.3
		4.0	3.68	26.2	32.8	38.1	42.4	46
		6.0	8	26.9	34.1	39.8	44.6	48.6
		Airside ΔPs		0.04	0.07	0.11	0.15	0.2

Unit Size	Rows	gpm	Head Loss	Airflow, cfm				
				945	1175	1405	1635	1855
D	One Row	1.0	0.2	18.7	19.9	20.8	21.6	22.2
		2.0	0.61	22.7	24.6	26.1	27.4	28.5
		4.0	2.26	25.2	27.5	29.5	31.2	32.7
		6.0	4.91	26.1	28.7	30.9	32.8	34.3
		Airside ΔPs		0.06	0.08	0.11	0.13	0.16
	Two Row	1.0	0.42	29.8	31.6	33	34	34.9
		2.0	1.17	38.9	42.5	45.4	47.7	49.7
		4.0	4.3	44.9	50	54.2	57.8	60.8
		6.0	9.3	47.2	52.9	57.8	61.9	65.4
		Airside ΔPs		0.11	0.16	0.21	0.27	0.33

Unit Size	Rows	GPM	Head Loss	Airflow, cfm				
				1400	1635	1860	2090	2275
E	One Row	1.0	0.2	20.8	21.6	22.2	22.8	23.2
		2.0	0.61	26.1	27.4	28.5	29.5	30.2
		4.0	2.26	29.5	31.2	32.7	34	35
		6.0	4.91	30.8	32.8	34.4	35.8	36.9
		Airside ΔPs		0.1	0.13	0.16	0.2	0.23
	Two Row	1.0	0.43	32.9	34	34.9	35.6	36.1
		2.0	1.17	45.3	47.7	49.7	51.4	52.6
		4.0	4.29	54.1	57.8	60.9	63.6	65.6
		6.0	9.29	57.7	61.9	65.5	68.7	71.1
		Airside ΔPs		0.21	0.27	0.33	0.43	0.46

For Performance Notes, see the next page

- All coil performance in accordance with AHRI 410-2001
- Heating capacities are in MBH
- Data based on 180°F entering water and 75°F entering air
- For temperature differentials other than 105°, multiply MBH by correction factors below
- Head loss is in feet of water
- Always supply water to lowest connection pipe to prevent air entrapment
- Air temperature rise = 927 x MBH/cfm
- Water temperature drop = 2.04 x MBH/gpm
- Connection size is $^{5}/_{8}$" OD male solder
- Coils are not intended for steam applications and are labeled for a maximum water temperature of 200°F
- Coils are tested for leakage at test pressure of 500 psi
- Water volumes less than those shown may result in laminar flow and reduced heating capacity. If possible reduce the number of coil rows to increase water velocity into turbulent range.



Correction factors for other entering conditions:

ΔT	50	60	70	80	90	100	115	125	140	150
Factor	0.52	0.6	0.69	0.78	0.87	0.96	1.08	1.15	1.28	1.38

PFB / RADIATED SOUND PERFORMANCE / PRIMARY AIR ONLY

Unit Size	Inlet Size	cfm	Min ΔPs	Octave Band Sound Power, Lw																			
				1.0"ΔPs							1.5" ΔPs							2.0" ΔPs						
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
B-C	6	300	0.04	55	53	44	39	38	35	**21**	57	55	46	41	41	38	**24**	58	57	47	42	43	41	**26**
		350	0.05	56	55	46	41	40	36	**24**	58	57	49	43	43	39	**26**	60	59	50	44	45	42	**28**
		400	0.07	58	57	49	43	41	37	**26**	60	59	51	45	44	40	**28**	61	60	52	46	46	43	**30**
		450	0.09	59	58	51	44	42	38	**27**	61	60	53	46	45	41	**30**	62	62	55	48	47	44	**31**
		500	0.11	60	59	53	46	42	39	**29**	62	61	55	48	45	42	**31**	63	63	56	49	48	45	**33**
B-C	8	600	0.05	56	56	45	40	38	35	**25**	58	59	47	42	41	39	**28**	60	61	48	44	43	41	**31**
		650	0.06	57	56	46	41	39	36	**25**	59	59	48	43	42	39	**29**	61	62	50	45	43	42	**32**
		700	0.07	57	57	47	42	40	37	**26**	60	60	49	44	42	40	**29**	61	62	51	46	44	42	**32**
		750	0.08	58	57	48	43	41	37	**26**	60	60	50	45	43	40	**30**	62	62	52	47	45	43	**33**
		800	0.09	58	57	49	44	41	37	**27**	61	61	51	46	44	41	**30**	62	63	52	47	46	43	**33**
B-C	10	900	0.05	63	57	50	47	43	39	**27**	66	60	54	50	46	43	**30**	68	62	57	52	48	45	**32**
		1000	0.06	64	58	51	47	44	40	**28**	66	61	55	51	47	44	**31**	68	64	58	53	49	46	**34**
		1100	0.08	64	60	52	48	45	41	**30**	66	63	56	51	48	45	**33**	68	65	58	54	50	47	**36**
		1200	0.09	64	61	52	49	45	42	**31**	67	65	56	52	48	46	**35**	68	67	59	54	51	48	**38**
		1300	0.11	64	63	53	49	46	43	**33**	67	66	57	53	49	46	**37**	69	68	60	55	51	49	**39**
C	12	1200	0.05	63	59	52	47	46	46	**28**	66	61	55	50	49	50	**31**	68	63	56	52	51	52	**34**
		1400	0.07	64	61	54	49	48	47	**31**	67	64	57	52	51	51	**34**	69	66	59	54	53	53	**36**
		1600	0.09	66	63	56	51	49	49	**33**	68	65	59	54	52	52	**36**	70	67	60	55	54	54	**38**
		1800	0.12	66	64	58	52	50	50	**35**	69	67	60	55	53	53	**38**	71	69	62	57	55	55	**40**
		2000	0.14	67	66	59	54	51	50	**37**	70	69	62	56	54	54	**40**	72	71	63	58	56	56	**42**
D-E	10	900	0.10	61	55	46	42	40	35	**24**	65	59	50	45	43	39	**28**	67	62	53	47	45	41	**32**
		1000	0.13	62	57	47	43	41	36	**26**	65	60	51	46	44	40	**30**	68	63	54	48	46	42	**33**
		1100	0.16	63	58	47	44	42	37	**27**	66	62	51	47	45	41	**32**	68	65	54	49	47	43	**35**
		1200	0.19	63	59	48	45	43	38	**29**	66	63	52	48	46	41	**33**	69	66	55	50	48	44	**36**
		1300	0.22	64	60	49	46	44	39	**30**	67	64	53	49	47	42	**35**	69	67	55	51	49	45	**38**
D-E	12	1200	0.09	63	56	49	44	42	38	**26**	66	60	52	47	44	41	**30**	69	62	54	48	45	43	**33**
		1400	0.12	64	58	50	46	43	39	**28**	67	61	53	48	45	43	**32**	70	64	55	49	46	45	**35**
		1600	0.16	65	59	52	47	44	41	**29**	68	63	54	49	46	44	**33**	70	65	56	51	47	46	**36**
		1800	0.20	66	61	53	48	45	42	**30**	69	64	55	50	47	45	**35**	71	67	58	52	48	47	**38**
		2000	0.24	66	62	54	49	46	42	**32**	69	65	56	51	48	46	**36**	72	68	58	53	49	48	**39**
D-E	14	1500	0.11	65	60	54	49	44	40	**30**	69	64	57	51	47	43	**35**	71	67	59	53	49	46	**38**
		1800	0.16	66	62	55	50	45	42	**32**	70	66	58	53	48	45	**36**	72	68	61	55	50	47	**39**
		2100	0.22	67	63	56	51	46	43	**33**	71	67	59	54	49	46	**37**	73	69	62	56	51	49	**41**
		2400	0.29	68	64	57	52	47	44	**34**	71	68	60	55	50	48	**39**	74	70	63	57	52	50	**42**
		2700	0.37	68	65	58	53	48	45	**35**	72	68	61	56	51	49	**40**	75	71	63	58	53	51	**43**
D-E	16	2000	0.14	66	62	56	52	50	45	**32**	69	65	58	54	52	48	**36**	71	67	60	55	53	51	**38**
		2400	0.21	67	63	58	54	52	47	**34**	70	67	60	56	54	50	**38**	72	69	62	57	55	53	**40**
		2800	0.28	67	65	60	56	54	49	**36**	71	68	62	58	55	52	**39**	73	71	64	59	57	54	**42**
		3200	0.37	68	66	61	58	55	50	**37**	71	70	64	60	57	53	**41**	74	72	65	61	58	55	**44**
		3600	0.46	69	67	63	59	56	51	**38**	72	71	65	61	58	55	**42**	74	73	67	62	59	57	**45**
5-6	16	2000	0.16	68	61	55	49	45	37	**32**	72	65	59	54	49	42	**37**	75	68	62	57	53	46	**41**
		2400	0.23	69	61	57	50	45	37	**33**	73	66	60	55	50	43	**38**	76	69	63	58	53	47	**42**
		2800	0.32	70	62	58	50	46	38	**34**	74	66	61	55	50	43	**40**	77	69	64	58	54	47	**43**
		3200	0.42	71	63	58	51	46	38	**36**	75	67	62	55	51	43	**41**	78	70	65	59	54	47	**45**
		3600	0.53	71	63	59	51	47	38	**36**	76	68	63	56	51	44	**42**	78	71	66	59	55	48	**45**

- Radiated sound is the noise transmitted through the unit casing and emitted from the induction port
- Min ΔPs is the static pressure drop from the unit inlet to the unit outlet with primary damper full open
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2016 and AHRI 880-2017
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N122 for AHRI Certified Performance Listings.

PFB / DISCHARGE SOUND PERFORMANCE / PRIMARY AIR ONLY

Unit Size	Inlet Size	cfm	Min ΔPs	Octave Band Sound Power, Lw																			
				1.0"ΔPs							1.5" ΔPs							2.0" ΔPs						
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
B-C	6	300	0.04	67	61	49	46	45	43	19	68	63	51	48	47	45	21	69	64	53	49	48	47	23
		350	0.05	68	63	51	47	46	44	22	70	65	53	49	47	46	24	71	66	55	50	49	48	25
		400	0.07	70	64	52	48	46	45	23	71	66	55	49	48	47	25	72	68	57	50	49	49	27
		450	0.09	71	66	54	49	47	45	25	73	68	56	50	49	48	27	74	69	58	51	50	50	29
		500	0.11	72	67	55	49	48	46	27	74	69	57	51	49	48	29	75	71	59	52	51	50	30
B-C	8	600	0.05	68	65	53	49	47	45	24	70	68	55	51	49	48	28	71	71	57	53	51	50	31
		650	0.06	68	65	54	50	47	46	24	71	69	56	52	50	49	28	72	71	58	54	51	51	31
		700	0.07	69	66	54	51	48	46	25	71	69	57	53	50	49	29	73	72	59	54	52	51	32
		750	0.08	70	66	55	52	48	47	24	72	70	58	54	51	50	28	74	72	60	55	52	52	31
		800	0.09	70	66	56	52	49	47	24	73	70	59	54	51	50	28	74	73	61	56	53	52	31
B-C	10	900	0.05	72	64	56	52	48	43	23	74	67	59	55	51	47	26	75	69	61	56	52	51	28
		1000	0.06	72	66	58	53	49	44	24	75	69	60	56	52	48	27	76	71	63	57	53	52	29
		1100	0.08	73	68	59	54	50	45	26	75	71	62	57	52	49	29	77	73	64	59	54	53	32
		1200	0.09	74	70	60	55	51	46	28	76	73	63	58	53	50	32	78	75	65	59	55	53	34
		1300	0.11	75	71	61	56	51	47	30	77	74	64	59	54	51	33	78	76	66	60	56	54	36
C	12	1200	0.05	72	64	59	56	53	46	23	74	67	62	59	56	49	27	77	70	64	61	58	52	29
		1400	0.07	73	67	61	58	55	48	25	76	70	64	60	58	51	29	78	72	66	63	60	54	32
		1600	0.09	75	69	63	59	56	50	27	78	72	66	62	59	53	31	80	74	68	64	61	56	34
		1800	0.12	76	71	65	61	58	51	29	79	74	68	64	61	55	33	81	76	70	66	63	57	36
		2000	0.14	77	72	66	62	59	53	31	80	75	69	65	62	56	35	82	78	71	67	64	58	37
D-E	10	900	0.10	72	65	55	51	52	52	23	76	70	59	54	54	56	28	78	73	62	56	56	58	32
		1000	0.13	72	67	56	52	53	54	24	76	71	60	54	55	57	30	79	74	63	56	57	59	33
		1100	0.16	73	68	56	52	53	55	26	77	72	60	55	56	58	31	79	75	63	57	58	60	34
		1200	0.19	73	69	57	53	54	56	27	77	73	61	55	57	59	32	80	76	64	57	58	61	36
		1300	0.22	74	70	57	53	55	57	28	78	74	61	56	57	60	33	80	77	64	58	59	62	37
D-E	12	1200	0.09	72	65	57	53	52	53	24	75	69	61	56	55	56	28	78	72	64	58	57	59	31
		1400	0.12	73	67	58	54	54	54	25	77	71	62	57	56	58	30	79	74	65	59	58	60	33
		1600	0.16	74	68	59	55	55	56	27	78	72	63	57	57	59	31	80	75	66	59	59	62	35
		1800	0.20	75	69	60	55	56	57	28	79	73	64	58	58	60	33	81	76	67	60	60	63	36
		2000	0.24	76	70	61	56	57	58	29	80	75	65	59	59	61	34	82	77	67	61	61	64	37
D-E	14	1500	0.11	74	67	61	58	55	52	26	77	71	65	61	58	56	30	79	74	67	63	60	58	33
		1800	0.16	75	68	63	59	56	54	27	78	72	66	62	60	58	31	80	75	68	64	62	61	35
		2100	0.22	76	69	64	61	58	56	28	79	74	67	64	61	60	33	81	76	69	66	63	62	36
		2400	0.29	77	70	65	62	59	57	30	80	75	68	65	62	61	34	82	77	70	67	65	64	37
		2700	0.37	77	71	65	62	61	59	30	81	75	69	65	64	63	35	83	78	71	68	66	65	38
D-E	16	2000	0.14	72	66	60	55	55	54	24	76	70	63	59	57	59	29	78	73	66	61	60	62	32
		2400	0.21	73	68	61	57	56	55	26	77	72	65	60	59	60	30	80	74	67	62	61	63	34
		2800	0.28	75	69	62	58	57	56	27	78	73	66	61	60	61	32	81	76	69	63	62	64	35
		3200	0.37	76	70	63	59	58	57	28	79	74	67	62	61	62	33	82	77	70	64	63	65	37
		3600	0.46	77	71	64	60	59	58	30	80	75	68	63	62	62	34	83	78	70	65	64	66	38
5-6	16	2000	0.16	76	61	56	50	47	41	29	80	65	60	54	51	45	34	83	68	63	57	54	48	38
		2400	0.23	77	63	58	52	49	43	30	81	67	62	56	53	47	35	84	69	65	59	55	50	39
		2800	0.32	79	64	59	53	50	44	33	83	68	63	57	54	49	38	86	71	66	60	57	52	42
		3200	0.42	80	65	61	54	51	46	34	84	69	65	58	55	50	39	87	72	68	61	58	53	43
		3600	0.53	81	66	62	55	52	47	35	85	70	66	59	57	51	40	88	73	69	62	59	54	44

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the static pressure drop from the unit inlet to the unit outlet with primary damper full open
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2016 and AHRI 880-2017
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N122 for AHRI Certified Performance Listings.

PFB / SOUND PERFORMANCE / FAN ONLY

Size	CFM	Discharge Ps	RADIATED Octave Band Sound Power, Lw Fan Only							DISCHARGE Octave Band Sound Power, Lw Fan Only						
			2	3	4	5	6	7	**NC**	2	3	4	5	6	7	**NC**
B	175	0.25"	54	50	47	40	36	30	**21**	54	49	41	38	34	24	-
	280		57	53	50	44	41	36	**24**	58	53	46	43	40	33	**12**
	385		58	55	52	47	44	41	**26**	60	56	49	46	44	39	**13**
	490		60	57	54	49	46	44	**28**	61	58	52	49	47	43	**15**
	600		61	58	55	51	48	47	**29**	63	60	54	51	49	47	**17**
C	415	0.25"	56	55	51	46	42	37	**25**	62	58	50	47	45	38	**16**
	600		60	59	55	51	47	44	**30**	64	61	54	51	49	44	**19**
	785		63	61	58	54	51	48	**33**	66	64	57	54	52	48	**21**
	970		65	64	60	57	54	52	**35**	68	65	59	57	54	52	**23**
	1150		67	65	62	59	57	55	**38**	69	67	61	59	56	54	**25**
D	945	0.25"	65	64	59	54	53	52	**34**	67	62	60	54	52	51	**19**
	1175		68	66	61	56	56	55	**37**	70	65	62	58	56	55	**23**
	1405		70	68	62	59	58	58	**39**	73	68	64	61	58	58	**26**
	1635		72	70	64	61	60	60	**41**	75	70	66	64	61	60	**29**
	1865		74	71	65	62	62	62	**43**	77	72	68	66	62	63	**31**
E	1400	0.25"	69	65	61	58	58	57	**36**	70	64	62	58	56	55	**22**
	1630		71	68	63	60	60	60	**39**	73	67	65	62	59	59	**25**
	1860		73	71	65	63	63	62	**42**	75	70	67	65	62	61	**28**
	2090		75	73	67	65	65	64	**45**	77	72	69	68	64	64	**31**
	2320		77	75	68	66	66	66	**47**	79	74	70	70	66	66	**33**
6	1400	0.25	72	68	64	59	56	51	**39**	74	68	62	56	56	53	**26**
	1600		74	70	65	60	58	53	**41**	75	69	64	58	58	55	**28**
	1800		75	71	66	62	59	56	**42**	76	70	65	60	59	57	**29**
	2000		76	72	68	63	61	57	**43**	78	71	66	61	61	59	**31**
	2200		77	73	69	65	62	59	**44**	79	72	67	62	62	61	**33**

FAN ONLY RADIATED

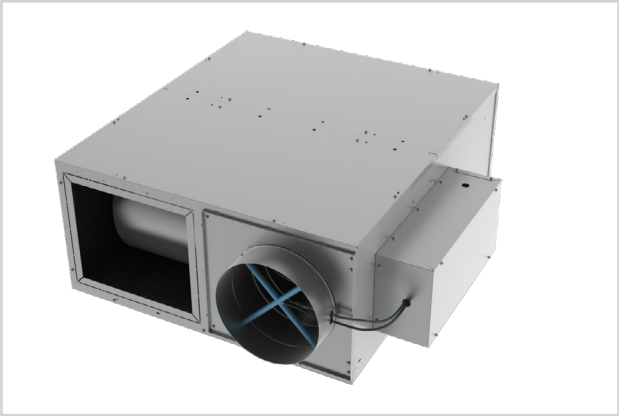
- Radiated sound is the noise transmitted through the unit casing and emitted from the induction port
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2016 and AHRI 880-2017
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N122 for AHRI Certified Performance Listings.
- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork

FAN ONLY DISCHARGE

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2016 and AHRI 880-2017
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N122 for AHRI Certified Performance Listings.

TQP

- Two casing sizes ease in design layout
- Pressure independent primary airflow control
- AeroCross™ multi-point, center averaging inlet velocity sensor
- Primary airflow balancing connections
- Adjustments are easily accessible through ceiling opening
- Energy efficient fan motor, permanent split capacitor type mounted with vibration isolators
- Adjustable SCR fan speed control with minimum voltage stop
- Single point electrical, pneumatic main, and thermostat connections
- Dual density insulation, coated to prevent air erosion, meets requirements of NFPA 90A and UL 181
- 20 gauge, galvanized steel casing with leak resistant construction
- Rectangular discharge opening is designed for flanged duct connections
- Bottom access panel can be removed for service



TQP

energy solutions

See website for Specifications

MODELS:

PTQP / Pneumatic Control
ATQP / Analog Control
DTQP / Digital Control

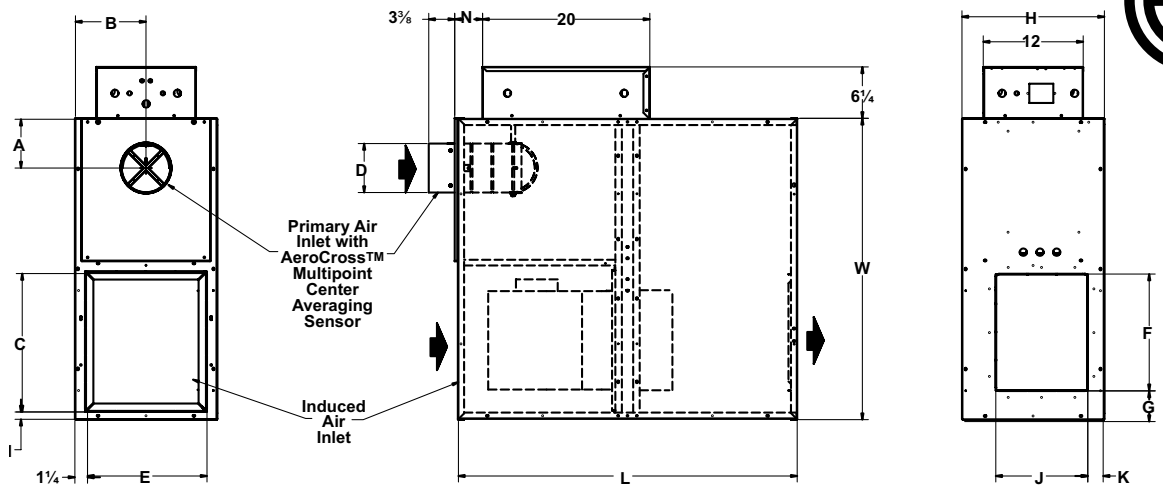
OVERVIEW

Parallel Flow

In a Parallel Flow terminal, the fan is outside the primary airstream and runs intermittently, when the primary air is off. Parallel flow or variable volume Fan Powered terminals operate in two distinct modes: variable volume, constant temperature when handling high cooling loads; and constant volume, variable temperature when heating or handling light cooling loads.

TQP UNIT DIMENSIONS

DTQP / Sizes 2-6



TQP Parallel Unit															
Size	Inlet Size	A	B	C	D	E	F	G	H	J	K	L	N	W	Filter Size
2, 3	6	6	8 9/16	16¾	5 7/8	14½	14	3½	17 1/8	11	2 1/8	40 7/8	2 7/8	36¼	19 x 17
	8	6			7 7/8								2 7/8		
	10	7			9 7/8								4 7/8		
	12	8			11 7/8								4 7/8		
4	8	6			7 7/8								2 7/8		
	10	7			9 7/8								4 7/8		
	12	8			11 7/8								4 7/8		
	14	10			13 7/8								6 7/8		
5	10	7	10 1/16	24½	9 7/8	17½	16½	9½	20 1/8	14½	3 1/8	46 7/8	4 7/8	48¼	27 x 20
	12	8			11 7/8								4 7/8		
	14	10			13 7/8								6 7/8		
	16	11			15 7/8								6 7/8		
6	12	8			11 7/8								4 7/8		
	14	10			13 7/8								6 7/8		
	16	11			15 7/8								6 7/8		

All dimensions are in inches

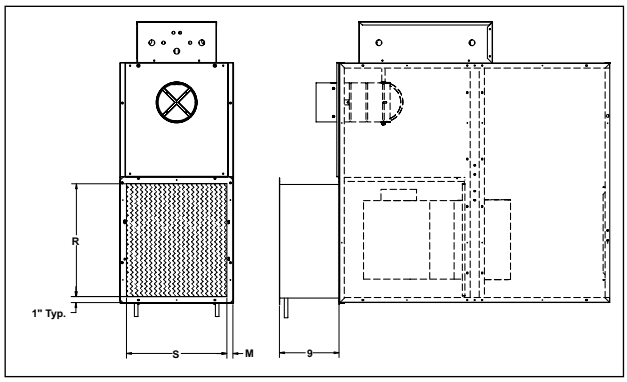
HOT WATER COIL SECTION

STANDARD FEATURES

- ½" copper tubes
- Aluminum ripple fins, 10 per inch
- Connections: Male solder 5/8" for both 1- and 2-row. Right hand only.
- Galvanized steel casing
- Flanged duct connection
- Coil is installed at induced air inlet

SUPPLY VOLTAGE

- 120V, 1 ph, 60 Hz.
- 208/240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.



COIL ROWS

- 1-Row
- 2-Row

Hot Water Coil Section (Inlet Mounted)				
Unit Size	M (1-Row)	M (2-Row)	R	S
2, 3, 4	1	1¼	17	15
5, 6	1	1¼	25	17

Note: R and S are inside dimensions

ELECTRIC COIL SECTION

STANDARD FEATURES

- Auto reset thermal cutouts (one per element)
- 80/20 Nickel chrome heating elements.
- Magnetic contactors, where required, on pneumatic units
- Airflow safety switch
- Line terminal block (277/1∅, 208/240/3∅, or 480/3∅ 4 wire)
- Flanged connection
- Control transformer for DDC or Analog electronic controls
- Pneumatic electric switch for pneumatic parallel fan terminals only
- Fan relay for DDC fan terminals
- Magnetic contactor per step on terminals with DDC or analog electronic controls
- Manual reset thermal cutout
- Dust-tight construction
- Optional Lynergy Comfort Controlled SSR Electric Heat available

OPTIONS

- Interlocking disconnect
- Main power supply fuses
- Mercury contactors

SUPPLY VOLTAGE

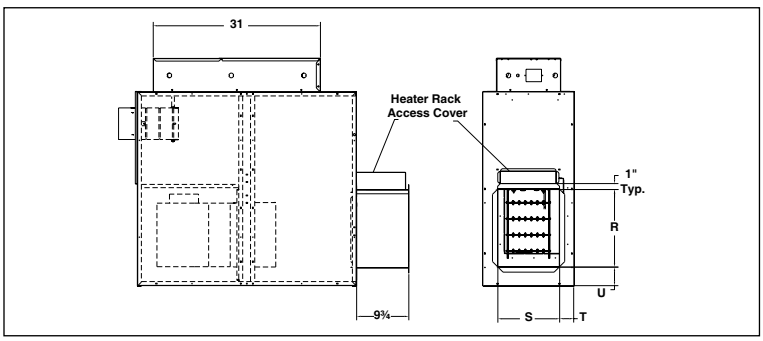
- 208V, 1 ph, 60 Hz.
- 240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.
- 208V, 3 ph, 60 Hz.
- 480V, 3 ph, 60 Hz. (4 wire wye only)

Electric Coil Section (Discharge Mounted)				
Unit Size	U	R	S	T
2, 3, 4	3½	14	11	1 7/8
5, 6	8½	16½	14½	2¼

Note: Coil control box replaces standard terminal unit control box

Note: R and S are inside dimensions

See Electric Heat Coils in Section O for more information



ADDITIONAL ACCESSORIES (OPTIONAL)

- Induced air filter, 1" thick, disposable construction type
- Fan unit fusing
- Toggle type disconnect switch (not available on units with optional electric coils)
- 1" liner
- Fibre-Free liner
- SteriLoc liner
- EcoShield liner
- Hanger brackets
- Camlocks on fan access door

Electrical Data				
Unit Size	Motor HP	Motor Amperage Ratings		
		120V	208/240V	277V
		FLA	FLA	FLA
2	1/6	3.0	1.4	1.0
3	1/4	3.9	1.7	1.5
4	1/3	7.4	3.0	2.6
5	1/3	7.4	3.0	2.6
6	¾	11.2	5.3	5.4

FLA = Full Load Amperage, as tested in accordance with UL 60335
All fan motors are single phase, same voltage as electric coil (when supplied), with exception that 277 voltage motors are used with 480 volt / 3 phase coil (4 wire wye)

ECM ELECTRICAL DATA

Unit Size	Motor HP	120V	208V/240V	277V
3	½	7.7	4.3	4.1
4	½	7.7	4.3	4.1
5	1	12.8	9.1	6.9
6	1	12.8	9.1	6.9

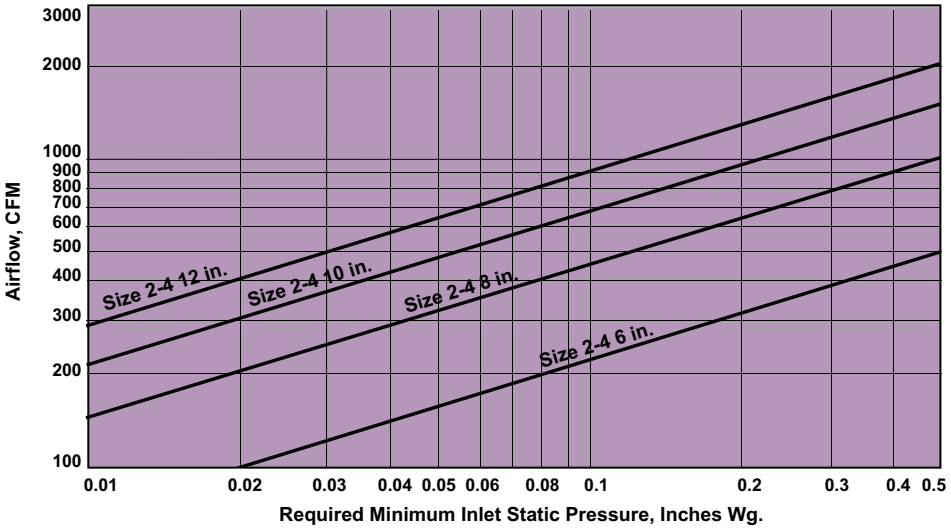
FLA = Full Load Amperage, as tested in accordance with UL 60335
All fan motors are single phase, same voltage as electric coil (when supplied), with exception that 277 voltage motors are used with 480 volt / 3 phase coils (4 wire wye)

PRIMARY AIR CFM RANGES

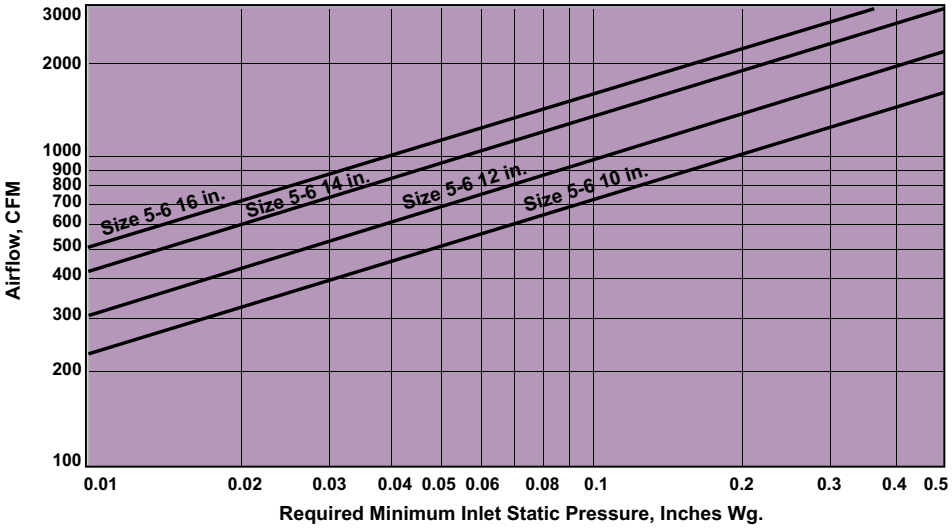
Inlet Size	Total cfm Range	PTQP TITUS II, IIA Pneumatic Controller		PTQP TITUS I Pneumatic Controller		ATQP TITUS TA1 Analog Electronic Controller		DTQP Typical Digital Controller	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
6	0-500	*80-330	150-500	*105-350	150-500	*80-500	80-500	*45-500	45-500
8	0-900	*145-590	265-900	*190-590	265-900	*145-900	145-900	*90-900	90-900
10	0-1400	*230-925	415-1400	*300-925	415-1400	*230-1400	230-1400	*145-1400	145-1400
12	0-2000	*325-1330	600-2000	*425-1330	600-2000	*325-2000	325-2000	*190-2000	190-2000
14	0-3000	*450-1800	840-3000	*575-1800	810-3000	*450-3000	450-3000	*300-3000	300-3000
16	0-4000	*580-2350	1100-4000	*750-2350	1100-4000	*580-4000	580-4000	*385-4000	385-4000

Note: An asterisk (*) indicates factory cfm settings (except zero) will not be made below this range because control accuracy is reduced. On pressure dependent units, minimum cfm is always zero and there is no maximum.

PTQP, ATQP, DTQP / PRIMARY AIR INLET PRESSURES: SIZES 2-4



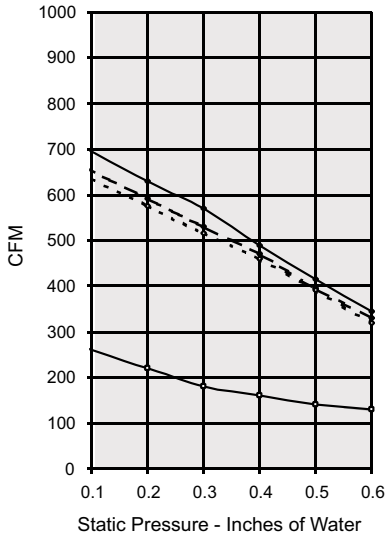
PTQP, ATQP, DTQP / PRIMARY AIR INLET PRESSURES: SIZES 5-6



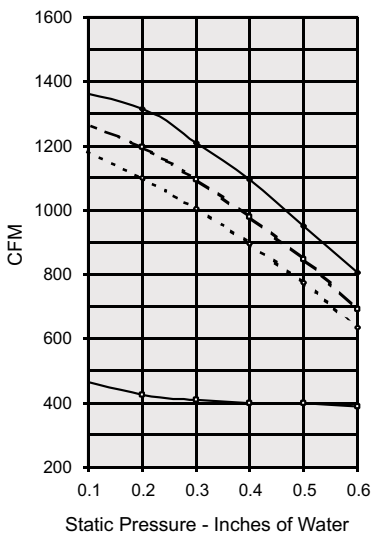
Note: See section Engineering Guidelines and topic 'Sizing Basic Terminals from Capacity Table' to select and size terminal units

PTQP, ATQP, DTQP / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE

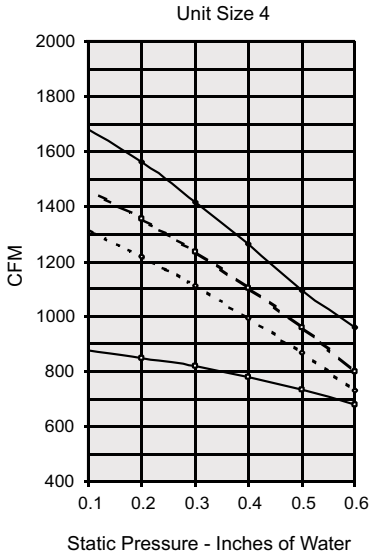
Unit Size 2



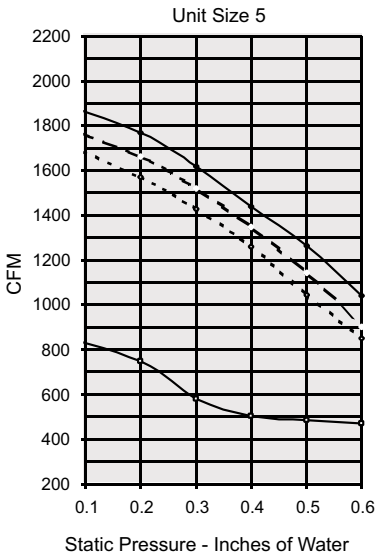
Unit Size 3



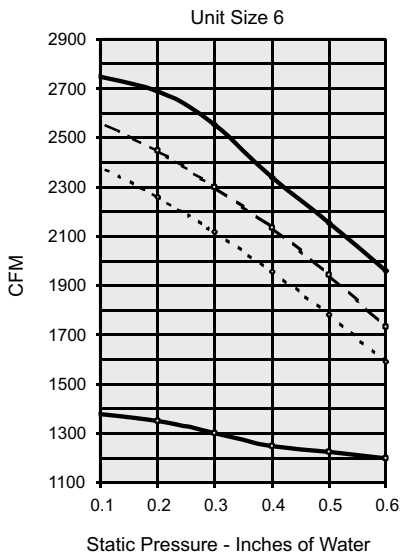
Unit Size 4



Unit Size 5



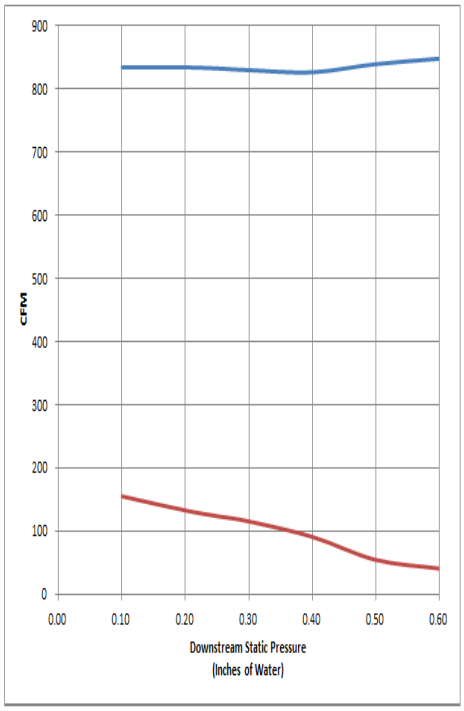
Unit Size 6



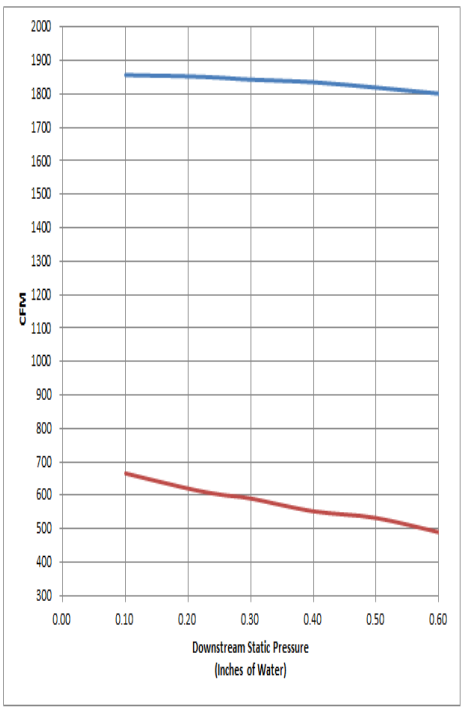
No Coil or with Electric Coil
1 Row Water Coil
2 Row Water Coil

PTQP, ATQP, DTQP WITH ECM / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE

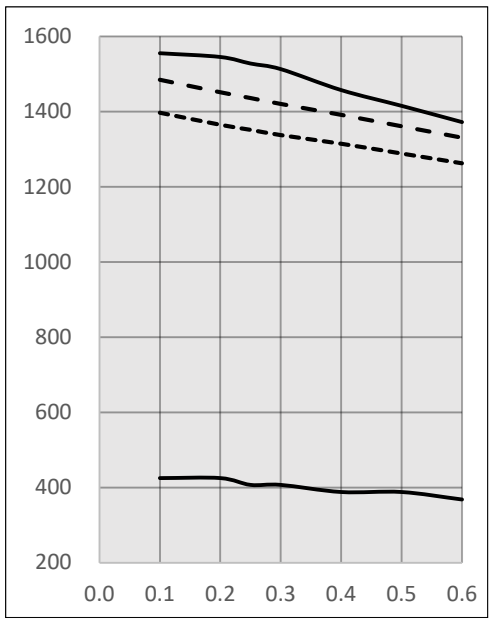
TQP / SIZE 3 - ECM MOTOR



TQP / SIZE 5 - ECM MOTOR

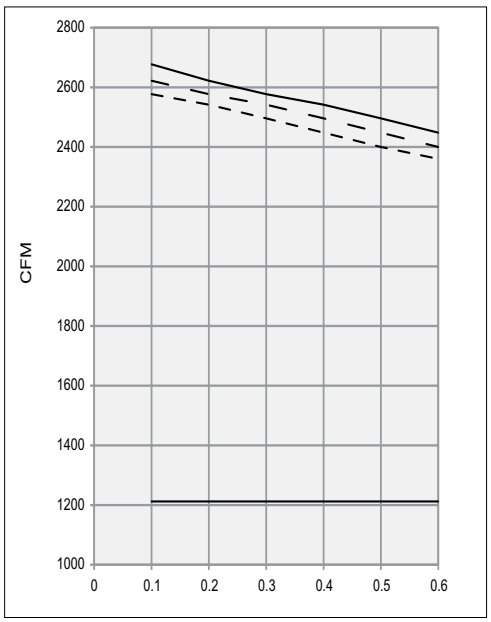


TQP / SIZE 4 - ECM MOTOR



Static Pressure - inches of water

TQP / SIZE 6 - ECM MOTOR



Static Pressure - inches of water

PTQP, ATQP, DTQP / WATER COIL HEATING CAPACITY (MBH)

Unit Size	Rows	gpm	Head Loss	Airflow, cfm								
				180	230	280	330	380	430	480	530	580
2	One Row	1.0	0.17	9.4	10.7	11.8	12.7	13.5	14.2	14.9	15.4	16.0
		2.0	0.53	10.2	11.7	13.1	14.2	15.3	16.2	17.1	17.9	18.6
		4.0	1.97	10.6	12.3	13.8	15.1	16.3	17.4	18.4	19.3	20.2
		6.0	4.27	10.7	12.5	14.0	15.4	16.7	17.8	18.9	19.9	20.8
		Airside ΔPs		0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03
	Two Row	1.0	0.34	14.0	16.3	18.3	20.0	21.5	22.8	24.0	25.0	25.9
		2.0	1.01	15.2	18.1	20.3	23.0	25.0	26.9	28.7	30.2	31.7
		4.0	3.72	15.8	19.0	21.9	24.6	27.0	29.3	31.4	33.3	35.2
		6.0	8.04	16.0	19.3	22.3	25.1	27.7	30.1	32.4	34.5	36.5
		Airside ΔPs		0.01	0.01	0.02	0.03	0.03	0.04	0.05	0.06	0.07

Unit Size	Rows	gpm	Head Loss	Airflow, cfm								
				400	510	620	730	840	950	1060	1170	1280
3	One Row	1.0	0.17	13.8	15.2	16.3	17.3	18.0	18.7	19.3	19.8	20.3
		2.0	0.53	15.7	17.6	19.1	20.5	21.6	22.7	23.6	24.4	25.2
		4.0	1.96	16.8	19.0	20.8	22.5	23.9	25.1	26.3	27.3	28.3
		6.0	4.26	17.2	19.5	21.5	23.2	24.7	26.1	27.3	28.5	29.5
		Airside ΔPs		0.02	0.03	0.04	0.05	0.06	0.07	0.09	0.10	0.12
	Two Row	1.0	0.35	22.1	24.6	26.6	28.2	29.5	30.6	31.6	32.4	-
		2.0	1.01	25.8	29.6	32.8	35.5	37.8	39.8	41.6	43.2	-
		4.0	3.71	27.9	32.6	36.6	40.1	43.1	45.9	48.4	50.6	-
		6.0	8.02	28.7	33.7	38.0	41.8	45.2	48.2	51.0	53.6	-
		Airside ΔPs		0.04	0.05	0.07	0.10	0.12	0.15	0.17	0.20	-

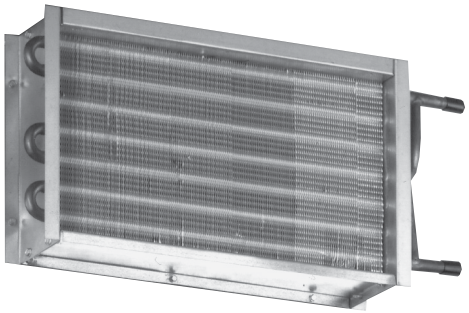
Unit Size	Rows	gpm	Head Loss	Airflow, cfm								
				800	870	940	1010	1080	1150	1220	1290	1360
4	One Row	1.0	0.17	17.8	18.2	18.6	19.0	19.4	19.7	20.0	20.3	20.6
		2.0	0.53	21.2	21.9	22.6	23.2	23.7	24.3	24.8	25.2	25.7
		4.0	1.96	23.4	24.2	25.0	25.8	26.5	27.1	27.8	28.4	28.9
		6.0	4.25	24.2	25.1	26.0	26.8	27.5	28.3	28.9	29.4	30.2
		Airside ΔPs		0.06	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13
	Two Row	1.0	0.36	29.1	29.8	30.4	31.1	31.7	32.2	32.7	33.1	33.5
		2.0	1.01	37.0	38.4	39.7	40.9	41.9	43.0	43.9	44.8	45.6
		4.0	3.70	42.1	43.9	45.7	47.3	48.8	50.2	51.6	52.9	54.1
		6.0	8.00	44.0	46.1	48.0	49.8	51.5	53.1	54.7	56.1	57.5
		Airside ΔPs		0.11	0.13	0.14	0.16	0.18	0.20	0.2	0.2	0.3

Unit Size	Rows	GPM	Head Loss	Airflow, cfm								
				800	910	1020	1130	1240	1350	1460	1570	1680
5	One Row	1.0	0.25	22.7	23.7	24.6	25.3	26.0	26.6	27.2	27.7	28.1
		2.0	0.78	27.4	29.0	30.3	31.6	32.7	33.7	34.7	35.6	36.4
		4.0	2.86	30.2	32.2	34.0	35.6	37.0	38.4	39.7	40.8	41.9
		6.0	6.20	31.4	33.5	35.4	37.1	38.7	40.2	41.6	42.9	44.1
		Airside ΔPs		0.02	0.03	0.04	0.04	0.05	0.05	0.06	0.07	0.08
	Two Row	1.0	0.52	34.4	35.8	37.1	38.1	39.0	39.8	40.5	41.1	41.7
		2.0	1.49	44.4	47.2	49.8	52.0	54.0	55.8	57.4	58.9	60.3
		4.0	5.48	50.7	54.6	58.2	61.4	64.4	67.2	69.8	72.1	74.4
		6.0	5.48	50.7	54.6	58.2	61.4	64.4	67.2	69.8	72.1	74.4
		Airside ΔPs		0.05	0.06	0.07	0.08	0.09	0.11	0.12	0.14	0.15

Unit Size	Rows	gpm	Head Loss	Airflow, cfm								
				1300	1450	1600	1750	1900	2050	2200	2350	2500
6	One Row	1.0	0.25	26.4	27.1	27.8	28.4	28.9	29.4	29.9	30.3	30.6
		2.0	0.77	33.3	34.6	35.8	36.9	37.9	38.8	39.6	40.4	41.1
		4.0	2.85	37.8	39.5	41.1	42.6	44.0	45.2	46.4	47.5	48.5
		6.0	6.19	39.5	41.5	43.3	44.9	46.4	47.8	49.1	50.3	51.5
		Airside ΔPs		0.05	0.06	0.07	0.08	0.09	0.11	0.12	0.13	0.14
	Two Row	1.0	0.53	39.5	40.4	41.3	42.0	42.6	43.1	43.6	44.1	44.4
		2.0	1.49	55	57.3	59.3	61.1	62.7	64.2	65.5	66.7	67.8
		4.0	5.45	66	69.5	72.8	75.7	78.4	80.9	83.2	85.3	87.3
		6.0	5.45	66	69.8	72.8	75.7	78.4	80.9	83.2	85.3	87.3
		Airside ΔPs		0.10	0.12	0.14	0.16	0.19	0.21	0.24	0.26	0.29

For Performance Notes, see the next page

- All coil performance in accordance with AHRI 410-2001
- Heating capacities are in MBH
- Data based on 180°F entering water and 75°F entering air
- For temperature differentials other than 105°, multiply MBH by correction factors below
- Head loss is in feet of water
- Always supply water to lowest connection pipe to prevent air entrapment
- Air temperature rise = 927 x MBH/cfm
- Water temperature drop = 2.04 x MBH/gpm
- Connection size is $^{5}/_{8}$" OD male solder
- Coils are not intended for steam applications and are labeled for a maximum water temperature of 200°F
- Coils are tested for leakage at test pressure of 500 psi
- Water volumes less than those shown may result in laminar flow and reduced heating capacity. If possible reduce the number of coil rows to increase water velocity into turbulent range.



Correction factors for other entering conditions:

ΔT	50	60	70	80	90	100	115	125	140	150
Factor	0.52	0.6	0.69	0.78	0.87	0.96	1.08	1.15	1.28	1.38

PTQP, ATQP, DTQP / RADIATED SOUND PERFORMANCE / PRIMARY AIR ONLY

Unit Size	Inlet Size	cfm	Min ΔPs	Octave Band Sound Power, Lw																			
				1.0"ΔPs							1.5" ΔPs							2.0" ΔPs						
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
2-3	6	300	0.18	57	51	47	39	35	31	**21**	60	54	51	41	38	35	**25**	62	56	53	43	40	38	**28**
		350	0.24	58	53	49	41	37	32	**23**	61	56	52	43	40	36	**27**	63	58	55	45	42	39	**30**
		400	0.32	58	54	51	42	38	33	**25**	61	57	54	45	41	37	**29**	64	59	56	47	43	40	**31**
		450	0.40	59	55	52	44	40	34	**27**	62	58	55	46	43	38	**30**	64	60	58	48	45	41	**33**
		500	0.50	60	56	53	45	41	35	**28**	63	59	57	47	44	39	**32**	65	61	59	49	46	42	**34**
2-4	8	600	0.17	63	56	51	44	37	29	**26**	66	60	55	47	41	34	**30**	68	63	57	50	44	37	**33**
		650	0.20	63	57	52	45	38	30	**27**	66	61	55	48	42	34	**30**	68	64	58	51	44	37	**34**
		700	0.24	64	58	52	46	38	30	**28**	67	62	56	49	42	35	**31**	69	64	59	51	45	38	**34**
		750	0.27	64	59	53	46	39	31	**29**	67	63	56	50	43	35	**33**	69	65	59	52	46	38	**35**
		800	0.31	64	60	53	47	40	31	**30**	67	63	57	50	43	35	**33**	69	66	60	52	46	38	**36**
2-4	10	900	0.18	66	57	54	49	39	30	**29**	70	61	58	53	44	34	**34**	72	64	60	56	47	38	**37**
		1000	0.22	67	58	54	49	40	30	**31**	71	62	58	54	44	35	**36**	73	65	61	57	48	38	**38**
		1100	0.26	68	59	54	50	40	31	**32**	71	63	58	54	45	35	**36**	74	66	61	57	48	39	**40**
		1200	0.31	68	60	55	50	41	31	**32**	72	64	59	54	45	36	**37**	74	66	62	57	49	39	**40**
		1300	0.37	69	60	55	50	41	32	**33**	72	64	59	55	46	36	**37**	75	67	62	58	49	39	**41**
2-4	12	1200	0.17	68	59	56	50	40	31	**32**	72	63	59	54	44	35	**37**	75	66	62	57	47	38	**41**
		1400	0.23	69	60	57	50	41	32	**33**	73	64	60	55	45	36	**38**	76	67	63	58	48	39	**42**
		1600	0.30	71	61	57	51	42	33	**36**	75	65	61	55	46	37	**41**	77	68	63	58	49	40	**43**
		1800	0.38	72	62	58	51	43	34	**37**	76	66	62	55	47	38	**42**	79	68	64	58	50	41	**46**
		2000	0.47	73	62	59	51	44	34	**38**	77	66	62	55	48	39	**43**	80	69	65	59	51	42	**47**
4	14	1500	0.22	69	61	56	49	45	38	**33**	72	66	60	54	50	44	**37**	75	69	63	57	54	48	**41**
		1800	0.32	70	62	57	49	46	38	**35**	74	67	61	54	51	44	**40**	77	70	64	58	54	48	**43**
		2100	0.43	71	63	58	50	46	39	**36**	75	67	62	55	51	45	**41**	78	71	65	58	55	49	**45**
		2400	0.56	72	63	58	50	47	39	**37**	76	68	63	55	52	45	**42**	79	71	66	59	55	49	**46**
		2700	0.71	73	64	59	51	47	40	**38**	77	68	63	55	52	45	**43**	80	72	67	59	56	49	**47**
5	10	900	0.16	66	56	49	45	39	32	**29**	69	60	52	48	43	37	**33**	71	62	55	50	46	41	**36**
		1000	0.19	67	57	50	46	40	33	**31**	70	61	53	49	44	38	**34**	72	63	56	51	47	41	**37**
		1100	0.23	68	58	50	47	40	33	**32**	71	62	54	50	45	38	**36**	73	64	57	52	48	42	**38**
		1200	0.28	69	59	51	47	41	33	**33**	72	63	55	51	45	39	**37**	74	65	58	53	48	42	**40**
		1300	0.32	69	60	52	48	41	34	**33**	73	64	56	51	46	39	**38**	75	66	58	54	49	43	**41**
5-6	12	1200	0.15	66	58	52	46	41	33	**29**	69	61	55	49	45	38	**33**	72	64	57	52	48	42	**37**
		1400	0.21	67	59	53	47	42	34	**31**	71	63	56	50	46	39	**36**	73	65	59	53	49	43	**38**
		1600	0.27	69	60	54	48	42	34	**33**	72	64	57	52	47	40	**37**	75	66	60	54	50	43	**41**
		1800	0.35	70	61	55	49	43	35	**34**	74	65	59	52	48	40	**40**	76	67	61	55	51	44	**42**
		2000	0.43	71	62	56	50	44	36	**36**	75	66	60	53	48	41	**41**	77	68	62	56	51	44	**43**
5-6	14	1500	0.12	69	61	56	49	45	38	**33**	72	66	60	54	50	44	**37**	75	69	63	57	54	48	**41**
		1800	0.18	70	62	57	49	46	38	**34**	74	67	61	54	51	44	**40**	77	70	64	58	54	48	**43**
		2100	0.24	71	63	58	50	46	39	**36**	75	67	62	55	51	45	**41**	78	71	65	58	55	49	**45**
		2400	0.32	72	63	58	50	47	39	**37**	76	68	63	55	52	45	**42**	79	71	66	59	55	49	**46**
		2700	0.40	73	64	59	51	47	40	**38**	77	68	63	55	52	45	**43**	80	72	67	59	56	49	**47**
5-6	16	2000	0.16	68	61	55	49	45	37	**32**	72	65	59	54	49	42	**37**	75	68	62	57	53	46	**41**
		2400	0.23	69	61	57	50	45	37	**33**	73	66	60	55	50	43	**38**	76	69	63	58	53	47	**42**
		2800	0.32	70	62	58	50	46	38	**34**	74	66	61	55	50	43	**40**	77	69	64	58	54	47	**43**
		3200	0.42	71	63	58	51	46	38	**36**	75	67	62	55	51	43	**41**	78	70	65	59	54	47	**45**
		3600	0.53	71	63	59	51	47	38	**36**	76	68	63	56	51	44	**42**	78	71	66	59	55	48	**45**

- Radiated sound is the noise transmitted through the unit casing and emitted from the induction port
- Min ΔPs is the static pressure drop from the unit inlet to the unit outlet with primary damper full open
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N122 for AHRI Certified Performance Listings.

PTQP, ATQP, DTQP / DISCHARGE SOUND PERFORMANCE / PRIMARY AIR ONLY

Unit Size	Inlet Size	cfm	Min ΔPs	Octave Band Sound Power, Lw																			
				1.0" ΔPs							1.5" ΔPs							2.0" ΔPs						
				2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
2-4	6	300	0.18	68	55	45	39	38	36	21	71	58	48	42	41	40	25	72	60	50	44	43	43	26
		350	0.24	69	56	46	41	39	37	22	71	59	50	44	42	41	25	73	61	52	46	45	43	28
		400	0.32	70	57	48	43	40	38	24	72	60	51	45	43	41	26	74	62	54	47	46	44	29
		450	0.40	70	57	49	44	41	38	24	73	60	52	47	44	42	28	74	63	55	49	47	45	29
		500	0.50	71	58	50	45	42	39	25	73	61	54	48	46	43	28	75	63	56	50	47	45	30
2-4	8	600	0.17	73	60	49	46	41	37	28	76	64	53	49	46	42	31	77	67	56	52	49	46	33
		650	0.20	74	61	50	47	42	38	29	76	65	54	50	46	43	31	78	68	57	52	49	46	34
		700	0.24	74	62	50	47	42	38	29	76	66	54	51	47	43	31	78	69	57	53	50	47	34
		750	0.27	74	63	51	48	43	39	26	77	67	55	51	47	44	30	79	70	58	54	50	47	33
		800	0.31	75	64	51	49	43	39	28	77	68	55	52	48	44	30	79	70	58	54	51	48	33
2-4	10	900	0.18	75	60	52	49	44	39	28	78	65	56	53	49	44	31	81	68	59	55	52	48	35
		1000	0.22	76	61	53	50	45	40	29	79	66	57	53	49	45	33	82	69	60	56	53	48	36
		1100	0.26	77	62	54	51	45	40	30	80	66	58	54	50	45	34	83	69	61	57	53	49	38
		1200	0.31	77	63	55	51	46	41	30	81	67	59	55	51	46	35	84	70	61	58	54	50	39
		1300	0.37	78	63	55	52	46	41	31	82	68	59	56	51	47	36	84	71	62	58	54	50	39
2-4	12	1200	0.17	75	62	54	49	45	40	28	79	66	58	53	50	44	33	82	69	61	56	53	47	36
		1400	0.23	77	63	56	50	47	41	30	80	67	59	54	51	46	34	83	70	62	57	54	49	38
		1600	0.30	78	64	57	51	48	42	31	82	68	61	55	52	47	36	84	71	63	58	55	50	39
		1800	0.38	79	64	58	52	49	43	33	83	69	62	56	53	48	38	86	72	64	59	56	51	42
		2000	0.47	80	65	59	53	49	44	34	84	69	63	57	54	49	39	87	72	65	60	57	52	43
2-4	14	1500	0.22	76	59	55	49	46	40	29	80	62	58	53	50	45	34	83	65	61	56	53	48	38
		1800	0.32	78	60	56	50	47	42	31	82	64	60	54	51	46	36	85	66	63	57	54	49	40
		2100	0.43	79	62	58	51	49	43	33	83	65	62	55	53	48	38	86	68	64	58	55	51	42
		2400	0.56	81	63	59	52	50	44	35	85	67	63	56	54	49	40	88	69	65	59	57	52	44
		2700	0.71	82	64	60	53	51	46	36	86	68	64	57	55	50	42	89	70	67	60	58	53	45
5-6	10	900	0.16	76	55	50	46	43	38	29	79	58	54	49	46	42	33	81	61	56	51	49	46	35
		1000	0.19	77	56	51	48	43	39	30	80	60	55	51	47	43	34	82	62	57	53	50	47	36
		1100	0.23	78	57	52	49	44	40	31	81	61	56	52	48	44	35	83	63	58	54	51	47	38
		1200	0.28	78	58	53	50	45	40	31	82	62	57	53	49	45	36	84	65	59	55	52	48	39
		1300	0.32	79	59	54	50	46	41	33	83	63	57	53	50	45	38	85	65	60	55	52	49	40
5-6	12	1200	0.15	73	56	52	47	44	39	25	77	60	56	51	48	44	30	80	62	58	54	51	47	34
		1400	0.21	75	57	54	48	45	40	28	79	61	57	52	49	45	33	82	64	60	55	52	48	36
		1600	0.27	77	59	55	49	46	42	30	81	62	59	53	50	46	35	83	65	61	56	53	49	38
		1800	0.35	78	59	57	50	47	43	31	82	63	60	54	51	47	36	85	66	62	57	54	50	40
		2000	0.43	79	60	58	51	48	44	33	83	64	61	55	52	48	38	86	67	63	58	55	51	42
5-6	14	1500	0.12	75	59	54	49	46	40	28	79	62	57	53	50	45	33	82	65	60	56	53	48	36
		1800	0.18	77	60	55	50	47	42	30	81	64	59	54	51	46	35	84	66	62	57	54	49	39
		2100	0.24	78	62	57	51	49	43	31	82	65	61	55	53	48	36	85	68	63	58	55	51	40
		2400	0.32	80	63	58	52	50	44	34	84	67	62	56	54	49	39	87	69	64	59	57	52	43
		2700	0.40	81	64	59	53	51	46	35	85	68	63	57	55	50	40	88	70	66	60	58	53	44
5-6	16	2000	0.16	76	61	56	50	47	41	29	80	65	60	54	51	45	34	83	68	63	57	54	48	38
		2400	0.23	77	63	58	52	49	43	30	81	67	62	56	53	47	35	84	69	65	59	55	50	39
		2800	0.32	79	64	59	53	50	44	33	83	68	63	57	54	49	38	86	71	66	60	57	52	42
		3200	0.42	80	65	61	54	51	46	34	84	69	65	58	55	50	39	87	72	68	61	58	53	43
		3600	0.53	81	66	62	55	52	47	35	85	70	66	59	57	51	40	88	73	69	62	59	54	44

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the static pressure drop from the unit inlet to the unit outlet with primary damper full open
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N122 for AHRI Certified Performance Listings.

PTQP, ATQP, DTQP / SOUND PERFORMANCE / FAN ONLY

Size	CFM	Discharge Ps	RADIATED Octave Band Sound Power, Lw Fan Only							DISCHARGE Octave Band Sound Power, Lw Fan Only						
			2	3	4	5	6	7	**NC**	2	3	4	5	6	7	**NC**
2	200	0.25	61	54	56	49	44	38	**30**	69	62	59	50	47	45	**26**
	300		66	59	59	53	48	43	**34**	72	66	62	54	50	48	**26**
	400		71	63	61	56	51	47	**36**	74	69	64	56	53	50	**29**
	500		74	65	63	58	53	50	**40**	76	71	65	58	55	52	**31**
	600		76	68	64	60	55	52	**42**	78	73	67	59	57	53	**34**
3	450	0.25	68	60	60	55	48	42	**35**	70	64	60	52	48	44	**24**
	550		69	61	61	56	50	44	**36**	71	65	61	53	49	46	**25**
	680		70	63	63	58	52	46	**38**	72	67	63	54	51	48	**26**
	800		71	64	64	59	53	48	**39**	72	67	63	55	52	50	**21**
	900		72	64	64	59	54	49	**39**	73	68	64	56	53	51	**23**
4	850	0.25	72	63	63	59	53	48	**38**	74	69	65	57	54	52	**27**
	950		73	65	64	60	54	49	**39**	75	69	66	58	55	53	**28**
	1100		74	66	66	62	56	52	**41**	75	70	67	59	57	55	**28**
	1200		74	67	67	63	57	53	**42**	76	71	67	59	58	56	**30**
	1300		75	68	67	64	58	54	**42**	76	72	68	60	59	57	**31**
5	800	0.25	71	63	61	55	51	46	**36**	73	65	59	52	52	48	**25**
	1100		74	67	64	60	56	52	**40**	75	68	62	56	55	53	**28**
	1200		75	67	65	61	57	53	**41**	75	68	63	57	56	54	**28**
	1375		76	69	66	62	59	56	**42**	76	69	64	58	58	56	**29**
	1500		77	70	67	64	61	57	**43**	77	70	65	59	59	57	**30**
6	1400	0.25	72	68	64	59	56	51	**39**	74	68	62	56	56	53	**26**
	1600		74	70	65	60	58	53	**41**	75	69	64	58	58	55	**28**
	1800		75	71	66	62	59	56	**42**	76	70	65	60	59	57	**29**
	2000		76	72	68	63	61	57	**43**	78	71	66	61	61	59	**31**
	2200		77	73	69	65	62	59	**44**	79	72	67	62	62	61	**33**

FAN ONLY RADIATED

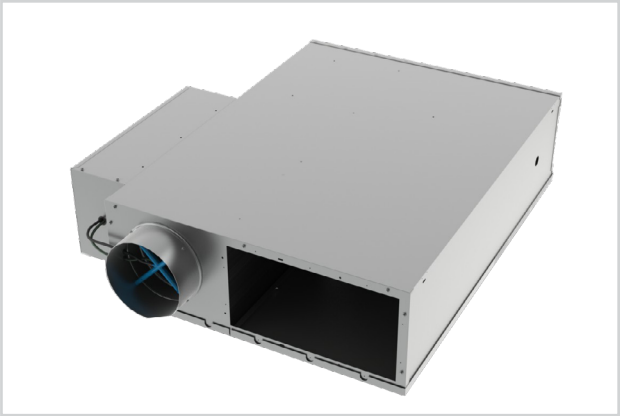
- Radiated sound is the noise transmitted through the unit casing and emitted from the induction port
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N122 for AHRI Certified Performance Listings.
- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork

FAN ONLY DISCHARGE

- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI Certified. See page N122 for AHRI Certified Performance Listings.

FLP

- Only 10½ inches high, in all sizes. Especially useful where building height limits dictate shallow ceiling plenums.
- Pressure independent primary airflow control
- AeroCross™ multi-point inlet velocity sensor with center averaging
- Primary airflow balancing connections
- Opposed blade primary air control damper
- Adjustment points are easily accessible through ceiling opening
- Energy efficient fan motor, permanent split capacitor type, mounted with vibration isolators
- Adjustable SCR fan speed control with minimum voltage stop
- Single point electrical, pneumatic main, and thermostat connections
- Dual density insulation, coated to prevent air erosion, meets requirements of NFPA 90A and UL 181
- Heavy gauge, galvanized steel casing with leak resistant construction



FLP

- Rectangular discharge opening is designed for flanged duct connections
- Bottom access panel can be removed for service

energy solutions

See website for Specifications

MODELS:

PFLP / Pneumatic Control
AFLP / Analog Control
DFLP / Digital Control

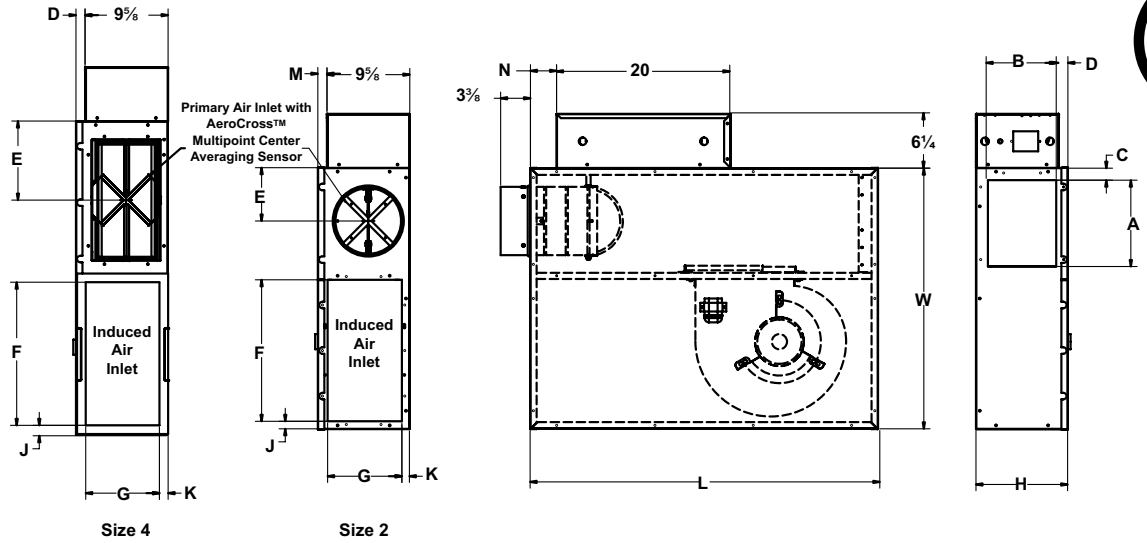
OVERVIEW

Parallel Flow

The FLP is a Low Profile Parallel Fan Powered Terminal designed for small ceiling plenum applications. At a height of 10 ½", they are especially useful where building height limits dictate shallow ceiling plenums.

FLP UNIT DIMENSIONS

DFLP / Sizes 2-4



Model FLP Parallel Unit																
Unit Size	Inlet Size	A	B	C	D	E	F	G	H	J	K	L	M	N	W	Filter Size
2	6, 8	10	8 1/8	1 3/8	1 1/8	6 1/8	16¼	8½	10½	7/8	7/8	40¼	1	2	30	18 X 10
4	14 x 8	15 7/8	7 7/8	1 3/8	1	9 1/8	16½	8¼	10½	1¼	1	40¼	1	¾	36 1/8	18 X 10

All dimensions are in inches

HOT WATER COIL SECTION

STANDARD FEATURES

- ½" copper tubes
- Aluminum ripple fins, 10 per inch
- Connections: Male solder, ½"

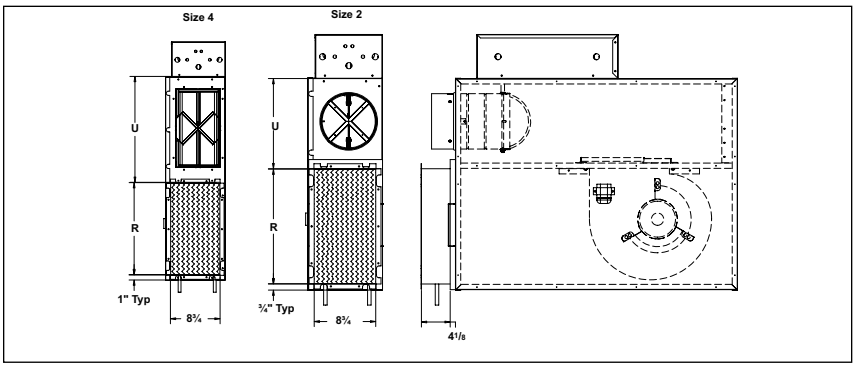
COIL ROWS

- 1-Row
- 2-Row

SUPPLY VOLTAGE

- 120V, 1 ph, 60 Hz.
- 208/240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.

Note: R is an inside dimension



Unit Size	R	S
2	16¼	12⅞
4	16⅜	18⅞

ELECTRIC COIL SECTION

STANDARD FEATURES

- Auto reset thermal cutouts (one per element)
- 80/20 Nickel chrome heating elements
- Magnetic contactors, where required, on pneumatic units
- Airflow safety switch
- Line terminal block (277/1∅, 208/240/3∅, or 480/3∅ 4 wire)
- Flanged connection
- Control transformer for DDC or Analog electronic controls
- Pneumatic electric switch for pneumatic parallel fan terminals only
- Fan relay for DDC fan terminals
- Magnetic contactor per step on terminals with DDC or analog electronic controls
- Manual reset thermal cutout
- Dust-tight construction
- Optional Lynergy Comfort Controlled SSR Electric Heat available

OPTIONS

- Interlocking disconnect
- Main power supply fuses
- Mercury contactors

SUPPLY VOLTAGE

- 208V, 1 ph, 60 Hz.
- 240V, 1 ph, 60 Hz.
- 277V, 1 ph, 60 Hz.
- 208V, 3 ph, 60 Hz.
- 480V, 3 ph, 60 Hz. (4 wire wye only)

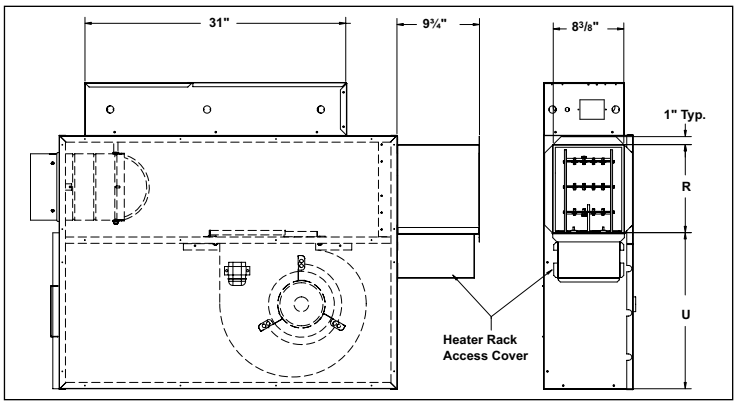
Unit Size	R	U
2	10³/₉	18½
4	16⅝	18⅝

Control box cover is as shown when optional door interlock disconnect switch is used.

Standard control box cover (no disconnect switch) is attached with sheet metal screws, not hinged.

See Electric Heat Coils in Section O for more information

Note: R is an inside dimension



ADDITIONAL ACCESSORIES (OPTIONAL)

- Induced air filter, 1" thick, disposable construction type
- Toggle disconnect switch (not available on units with optional electric coils)
- Fibre-Free Liner
- Foil Face Liner
- EcoShield Liner
- Hanger brackets
- Fan unit fusing

Electrical Data				
Unit Size	Motor HP	Motor Full Load Amps		
		120V	208/240V	277V
2	⅙	3.0	1.4	1.0
4	¼	4.3	1.7	1.4

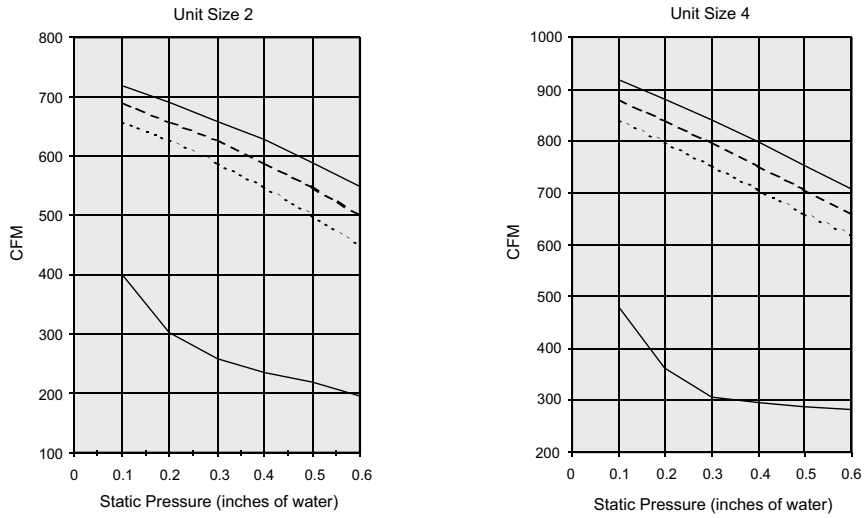
Note: All motors are single phase 60Hz, same voltage as electric coils (when supplied), with exception that 277 volt motors are used with 480 volt, 3 phase coils (four wire wye)

ECM ELECTRICAL DATA

Unit Size	Motor HP	120V	208V/240V	277V
2	⅓	5.0	2.8	2.6
4	⅓	5.0	2.8	2.6

FLA = Full Load Amperage, as tested in accordance with UL 60335
All fan motors are single phase, same voltage as electric coil (when supplied), with exception that 277 voltage motors are used with 480 volt / 3 phase coils (4 wire wye)

PFLP, AFLP, DFLP / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE



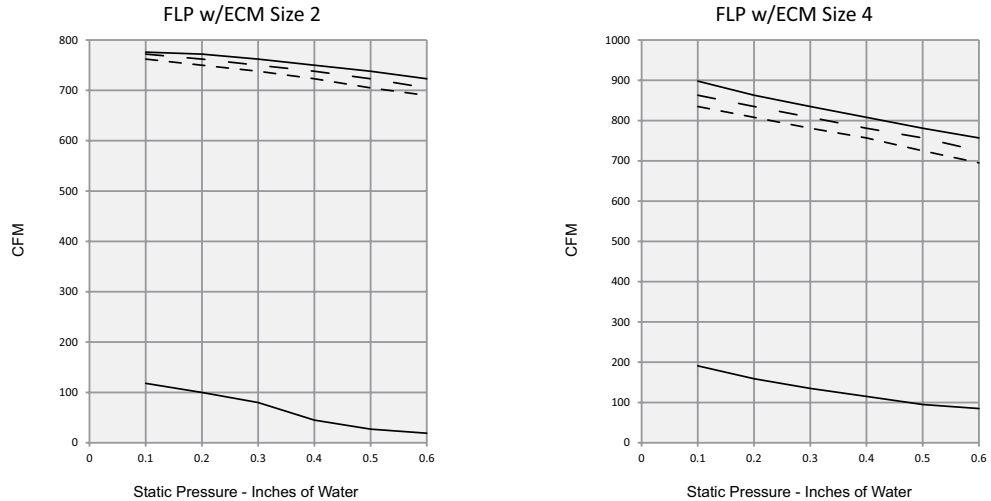
PRIMARY AIR CFM RANGES

Inlet Size	Total cfm Range	PFLP TITUS II Pneumatic Controller		PFLP TITUS I Pneumatic Controller		AFLP TITUS Analog TA1 Electronic Controller		DFLP Typical Digital Controller	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
6	0-500	*80-330	150-500	*105-350	150-500	*80-500	80-500	*80-500	80-500
8	0-900	*145-590	265-900	*190-590	265-900	*145-900	145-900	*145-900	145-900
8 x 14	0-1860	325-1320	590-1860	420-1320	590-1860	325-1860	325-1860	325-1860	325-1860

Note 1: An asterisk (*) indicates Factory cfm settings (except zero) will not be made below this range because control accuracy is reduced

Note 2: For selection procedure, see the section Engineering Guidelines and the topic “ECM Motors - Fan Powered Terminals” for additional information

PFLP, AFLP, DFLP WITH ECM / AIRFLOW VS. DOWNSTREAM STATIC PRESSURE

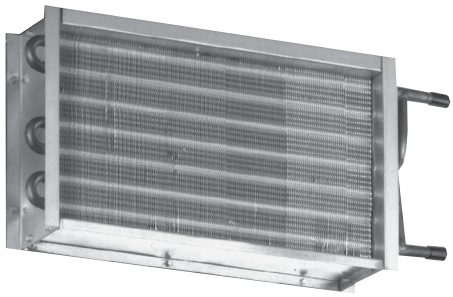


PFLP, AFLP, DFLP / WATER COIL HEATING CAPACITY (MBH)

Unit Size	Rows	gpm	Head Loss	Airflow, cfm							
				300	350	400	450	500	550	600	650
2	One Row	1.0	0.09	9.3	9.9	10.4	10.9	11.3	11.6	12.0	12.3
		2.0	0.31	10.4	11.2	11.8	12.4	13.0	13.5	13.9	14.3
		4.0	1.15	11.1	11.9	12.7	13.4	14.0	14.6	15.2	15.7
		6.0	2.52	11.3	12.3	13.0	13.8	14.4	15.1	15.6	16.2
		Airside ΔPs		0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
	Two Row	1.0	0.18	15.8	16.9	17.9	18.8	19.5	20.2	20.8	21.40
		2.0	0.57	18.0	19.6	21.1	22.4	23.5	24.6	25.6	26.50
		4.0	2.10	19.3	21.2	23.0	24.5	26.0	27.3	28.5	29.70
		6.0	4.54	19.8	21.8	23.7	25.3	26.9	28.3	29.6	30.90
		Airside ΔPs		0.06	0.07	0.09	0.11	0.13	0.15	0.18	0.20

Unit Size	Rows	gpm	Head Loss	Airflow, cfm							
				450	500	550	600	650	700	750	800
4	One Row	1.0	0.09	10.9	11.3	11.7	12.0	12.3	12.6	12.9	13.1
		2.0	0.31	12.5	13.0	13.5	14.0	14.4	14.8	15.2	15.5
		4.0	1.16	13.5	14.1	14.7	15.3	15.8	16.2	16.7	17.1
		6.0	2.53	13.9	14.5	15.2	15.7	16.3	16.8	17.2	17.7
		Airside ΔPs		0.06	0.07	0.08	0.09	0.10	0.11	0.13	0.14
	Two Row	1.0	0.19	18.8	19.6	20.3	20.9	21.5	22.0	22.5	22.9
		2.0	0.57	22.5	23.6	24.7	25.7	26.6	27.4	28.2	28.9
		4.0	2.10	24.6	26.1	27.4	28.7	29.8	30.9	31.9	32.8
		6.0	4.57	25.4	27.0	28.4	29.8	31.0	32.2	33.3	34.4
		Airside ΔPs		0.11	0.13	0.15	0.17	0.20	0.22	0.25	0.28

- All coil performance in accordance with AHRI 410-2001
- Heating capacities are in MBH
- Data based on 180°F entering water and 75°F entering air
- For temperature differentials other than 105°, multiply MBH by correction factors below
- Head loss is in feet of water
- Always supply water to lowest connection pipe to prevent air entrapment
- Air temperature rise = 927 x MBH/cfm
- Water temperature drop = 2.04 x MBH/gpm
- Connection size is ½" OD male solder
- Coils are not intended for steam applications and are labeled for a maximum water temperature of 200°F
- Coils are tested for leakage at test pressure of 500 psi
- Water volumes less than those shown may result in laminar flow and reduced heating capacity. If possible reduce the number of coil rows to increase water velocity into turbulent range.



Correction factors for other entering conditions:

ΔT	50	60	70	80	90	100	115	125	140	150
Factor	0.52	0.62	0.69	0.78	0.87	0.96	1.08	1.15	1.28	1.38

PFLP, AFLP, DFLP - RADIATED SOUND PERFORMANCE - PRIMARY AIR ONLY

Size	CFM	Min ΔPs	Octave Band Sound Power, Lw																			
			1.0"ΔPs							1.5" ΔPs							2.0" ΔPs						
			2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
206	300	0.15	61	56	52	45	40	33	**27**	63	58	53	46	41	34	**28**	65	59	54	47	42	36	**29**
	350	0.21	62	57	53	46	40	34	**28**	64	59	54	47	42	36	**29**	66	60	55	48	42	37	**30**
	400	0.27	63	58	53	47	41	35	**28**	65	60	55	48	42	36	**30**	66	62	56	48	43	38	**32**
	450	0.35	64	60	54	47	41	35	**30**	66	61	55	48	43	37	**31**	67	63	56	49	43	39	**33**
	500	0.43	65	61	55	48	42	36	**31**	67	62	56	49	43	38	**32**	68	64	57	49	44	39	**35**
208	600	0.15	67	60	54	49	44	39	**31**	68	62	56	50	46	41	**32**	69	64	58	51	47	42	**34**
	650	0.17	67	61	55	49	44	39	**31**	69	63	57	51	46	42	**33**	70	64	58	51	47	43	**34**
	700	0.2	68	62	56	50	45	40	**32**	70	64	57	51	47	42	**34**	71	65	59	52	48	44	**36**
	750	0.23	69	63	56	50	46	40	**33**	70	65	58	52	47	43	**35**	71	66	59	53	49	44	**36**
	800	0.26	69	64	57	51	46	41	**34**	71	66	59	52	48	43	**36**	72	67	60	53	49	45	**37**
422 (8x14)	1250	0.58	68	60	58	56	49	45	**33**	70	64	61	60	52	50	**36**	72	66	63	63	55	54	**38**
	1400	0.73	68	61	58	57	49	46	**33**	71	64	62	61	53	51	**37**	73	66	64	64	56	55	**39**
	1550	0.89	69	61	59	58	50	47	**34**	72	65	62	62	54	52	**37**	74	67	65	65	56	56	**40**
	1700	1.07	NA	NA	NA	NA	NA	NA	**NA**	72	65	63	63	54	53	**38**	74	67	65	66	57	57	**40**
	1850	1.27	NA	NA	NA	NA	NA	NA	**NA**	73	65	63	64	55	54	**38**	75	68	66	67	57	58	**41**

PFLP, AFLP, DFLP - RADIATED SOUND PERFORMANCE - FAN ONLY

Size	CFM	Discharge Ps	Octave Band Sound Power, Lw						
			Fan Only						
			2	3	4	5	6	7	NC
2	300	0.25	58	54	54	48	40	28	**28**
	400		61	57	57	52	44	33	**31**
	500		65	60	59	55	48	37	**34**
	600		67	61	61	57	50	40	**36**
	650		68	62	62	58	51	42	**37**
4	400	0.25	62	59	61	51	42	32	**36**
	500		65	62	63	54	46	36	**38**
	600		68	64	65	57	50	40	**40**
	700		70	65	66	60	52	43	**41**
	850		72	67	67	63	56	47	**42**

PFLP, AFLP, DFLP / DISCHARGE SOUND PERFORMANCE / PRIMARY AIR ONLY

Size	CFM	Min ΔPs	Octave Band Sound Power, Lw																			
			1.0"ΔPs							1.5" ΔPs							2.0" ΔPs						
			2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
206	300	0.15	63	57	50	44	39	32	**15**	66	60	53	47	42	35	**19**	68	62	56	49	44	36	**21**
	350	0.21	65	60	52	46	42	34	**18**	68	62	55	49	44	37	**21**	70	65	57	51	47	39	**24**
	400	0.27	67	61	53	47	44	36	**20**	69	64	57	50	46	39	**23**	71	67	59	52	49	41	**26**
	450	0.35	68	63	55	49	45	38	**21**	71	66	58	52	48	41	**25**	72	68	60	54	50	43	**27**
	500	0.43	69	65	56	50	47	40	**24**	72	68	59	53	50	42	**27**	74	70	62	55	52	44	**30**
208	600	0.15	71	68	58	53	50	42	**27**	74	71	61	56	53	45	**31**	76	73	64	58	55	47	**33**
	650	0.17	72	69	59	54	51	44	**28**	75	72	62	57	54	46	**32**	76	74	65	59	56	48	**34**
	700	0.2	73	70	60	55	52	45	**30**	75	73	63	58	55	47	**33**	77	75	65	60	57	49	**36**
	750	0.23	74	71	61	56	53	46	**30**	76	74	64	59	56	48	**33**	78	76	66	61	58	50	**36**
	800	0.26	74	72	61	56	54	47	**31**	77	75	65	59	57	49	**34**	79	77	67	61	59	51	**37**
422 (8x14)	1250	0.58	74	68	63	58	55	49	**26**	78	72	67	64	59	54	**31**	80	75	70	67	61	57	**34**
	1400	0.73	75	68	64	59	56	50	**28**	78	72	68	64	59	55	**31**	81	75	70	68	62	58	**35**
	1550	0.89	75	69	64	60	57	51	**28**	79	73	68	65	60	56	**33**	81	76	71	68	63	59	**36**
	1700	1.07	NA	NA	NA	NA	NA	NA	**NA**	79	73	69	65	61	56	**33**	82	76	71	69	64	59	**36**
	1850	1.27	NA	NA	NA	NA	NA	NA	**NA**	80	73	69	66	62	57	**34**	82	76	72	69	64	60	**36**

PFLP, AFLP, DFLP / DISCHARGE SOUND PERFORMANCE / FAN ONLY

Size	CFM	Discharge Ps	Octave Band Sound Power, Lw						
			Fan Only						
			2	3	4	5	6	7	NC
2	300	0.25	67	63	59	55	50	46	**21**
	400		69	65	61	57	52	49	**24**
	500		71	67	62	59	54	51	**26**
	600		72	68	64	60	56	53	**27**
	650		73	69	64	61	56	54	**28**
4	400	0.25	74	68	65	62	57	57	**29**
	500		76	70	66	65	60	60	**31**
	600		77	71	68	67	62	63	**33**
	700		78	73	69	69	64	66	**34**
	850		80	75	71	71	66	69	**34**

PFLP, AFLP, DFLP / SOUND POWER LEVELS / FAN ONLY / HEATING CYCLE

Size	cfm	Radiated Sound Power						Discharge Sound Power					
		Octave Bands						Octave Bands					
		2	3	4	5	6	7	2	3	4	5	6	7
2	300	58	54	54	48	40	28	59	59	58	55	50	46
	400	62	57	57	52	44	33	61	61	60	57	52	49
	500	65	60	59	55	48	37	63	63	61	59	54	51
	600	67	61	61	57	50	40	64	64	63	60	56	53
	700	69	63	63	59	52	43	66	65	64	61	57	54
4	400	62	59	61	51	42	32	67	65	64	62	57	57
	500	65	62	63	54	46	36	69	67	65	65	60	60
	600	68	64	65	57	50	40	70	68	67	67	62	63
	700	70	65	66	60	52	43	71	70	68	69	64	66
	800	72	67	67	62	55	45	72	71	69	70	66	68

AHRI Directory of Certified Performance

Titus is a charter member company and current participant in the AHRI Directory of Certified Performance. This voluntary certification program was developed by participating manufacturers in conjunction with the former Air-Conditioning and Refrigeration Institute (ARI) in the 1990's. It is currently administrated by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI). The purpose of this program is to provide for the independent verification of manufacturers' published performance data. Only participating products are authorized to bear the AHRI VAV Certification Mark. Certified data may be viewed and downloaded at www.ahrinet.org.

In order to participate in this program, member companies pay annual dues based on sales volume, submit published performance data for all applicable model types, and agree to provide a number of randomly selected product samples for annual rounds of independent testing at the manufacturers' expense. All verification testing is conducted in accordance with ASHRAE Standard 130 'Methods of Testing Air Terminal Units'. These tests are conducted to verify that a manufacturer's published certified ratings are within the test tolerances outlined in AHRI Standard 880 'Performance Rating of Air Terminals'. Any failure to demonstrate the certified performance is punished by additional testing requirements, mandatory performance re-rating, monetary penalties and possible expulsion from the Certified Directory.

Product samples provided for certification testing are standard production units with standard ½ in dual density fiberglass lining (unless otherwise specified) and no optional appurtenances such as add-on attenuators or heating/cooling coils. The certified ratings are measured at the standard operating points under the following test conditions:

PTQP, ATQP, DTQP, PFLP, AFLP, DFLP

- Rated primary airflow (cfm) – Based on an inlet velocity of 2000 fpm
- Rated fan only airflow (cfm) – Per manufacturer with 0.25 in wg of downstream pressure
- Rated fan power (watts) – Based on fan operating at the rated fan only airflow with 0.25 in wg of downstream pressure
- Rated Min ΔPs (in wg) – Minimum static pressure drop from the unit inlet to discharge at rated airflow with damper full open and the unit fan off
- Rated ΔPs (in wg) – A static pressure drop of 1.5 in wg from unit inlet to discharge with the unit fan off
- Rated sound power by octave band (dB, re 10^{-12} watts) – Radiated and discharge sound performance conducted in a reverberation room that meets both the broadband and pure tone qualifications of AHRI Standard 220

PFLP, AFLP, DFLP / FAN ONLY

					Fan Only											
Unit Size	Fan CFM	Fan Watts	Discharge		Radiated Sound Power						Discharge Sound Power					
			H	W	2	3	4	5	6	7	2	3	4	5	6	7
206	650	360	8.125	10	68	62	62	58	51	42	73	69	64	61	56	54
208	650	360	8.125	10	68	62	62	58	51	42	73	69	64	61	56	54
422	850	400	7.875	15.875	72	67	67	63	56	47	80	75	71	71	66	69

PFLP, AFLP, DFLP / PRIMARY ONLY

					Primary Only											
Unit Size	Fan CFM	Fan Watts	Pri CFM	Min ΔPs	Radiated Sound Power						Discharge Sound Power					
					2	3	4	5	6	7	2	3	4	5	6	7
206	400	0.27	400	0.27	65	60	55	48	42	36	69	64	57	50	46	39
208	700	0.2	700	0.20	70	64	57	51	47	42	75	73	63	58	55	47
422	1550	0.89	1550	0.89	72	65	62	62	54	52	79	73	68	65	60	56

For AHRI TQP Performance Data, see the next page

PTQP, ATQP, DTQP / FAN ONLY

Unit Size	Fan CFM	Fan Watts	Discharge		Fan Only											
					Radiated Sound Power						Discharge Sound Power					
			H	W	2	3	4	5	6	7	2	3	4	5	6	7
206	400	340	11	14	71	63	61	56	51	47	74	69	64	56	53	50
208	400	340	11	14	71	63	61	56	51	47	74	69	64	56	53	50
210	400	340	11	14	71	63	61	56	51	47	74	69	64	56	53	50
212	400	340	11	14	71	63	61	56	51	47	74	69	64	56	53	50
306	680	570	11	14	70	63	63	58	52	46	72	67	63	54	51	48
308	680	570	11	14	70	63	63	58	52	46	72	67	63	54	51	48
310	680	570	11	14	70	63	63	58	52	46	72	67	63	54	51	48
312	680	570	11	14	70	63	63	58	52	46	72	67	63	54	51	48
406	950	700	11	14	73	65	64	60	54	49	75	69	66	58	55	53
408	950	700	11	14	73	65	64	60	54	49	75	69	66	58	55	53
410	950	700	11	14	73	65	64	60	54	49	75	69	66	58	55	53
412	950	700	11	14	73	65	64	60	54	49	75	69	66	58	55	53
510	1375	860	14	16.5	76	69	66	62	59	56	76	69	64	58	58	56
512	1375	860	14	16.5	76	69	66	62	59	56	76	69	64	58	58	56
514	1375	860	14	16.5	76	69	66	62	59	56	76	69	64	58	58	56
516	1375	860	14	16.5	76	69	66	62	59	56	76	69	64	58	58	56
610	1600	1400	14	16.5	74	70	65	60	58	53	75	69	64	58	58	55
612	1600	1400	14	16.5	74	70	65	60	58	53	75	69	64	58	58	55
614	1600	1400	14	16.5	74	70	65	60	58	53	75	69	64	58	58	55
616	1600	1400	14	16.5	74	70	65	60	58	53	75	69	64	58	58	55

PTQP, ATQP, DTQP / PRIMARY ONLY

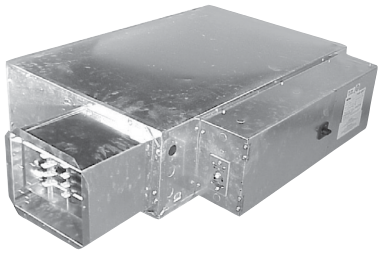
Unit Size	Fan CFM	Fan Watts	Pri CFM	Min ΔPs	Primary Only											
					Radiated Sound Power						Discharge Sound Power					
					2	3	4	5	6	7	2	3	4	5	6	7
206	400	0.32	400	0.32	61	57	54	45	41	37	72	60	51	45	43	41
208	700	0.24	700	0.24	67	62	56	49	42	35	76	66	54	51	47	43
210	1100	0.26	1100	0.26	71	63	58	54	45	35	80	66	58	54	50	45
212	1600	0.30	1600	0.30	75	65	61	55	46	37	82	68	61	55	52	47
306	400	0.32	400	0.32	61	57	54	45	41	37	72	60	51	45	43	41
308	700	0.24	700	0.24	67	62	56	49	42	35	76	66	54	51	47	43
310	1100	0.26	1100	0.26	71	63	58	54	45	35	80	66	58	54	50	45
312	1600	0.30	1600	0.30	75	65	61	55	46	37	82	68	61	55	52	47
406	400	0.32	400	0.32	61	57	54	45	41	37	72	60	51	45	43	41
408	700	0.24	700	0.24	67	62	56	49	42	35	76	66	54	51	47	43
410	1100	0.26	1100	0.26	71	63	58	54	45	35	80	66	58	54	50	45
412	1600	0.30	1600	0.30	75	65	61	55	46	37	82	68	61	55	52	47
510	1100	0.23	1100	0.23	71	62	54	50	45	38	81	61	56	52	48	44
512	1600	0.27	1600	0.27	72	64	57	52	47	40	81	62	59	53	50	46
514	2100	0.24	2100	0.24	75	67	62	55	51	45	82	65	61	55	53	48
516	2800	0.32	2800	0.32	74	66	61	55	50	43	83	68	63	57	54	49
610	1100	0.23	1100	0.23	71	62	54	50	45	38	81	61	56	52	48	44
612	1600	0.27	1600	0.27	72	64	57	52	47	40	81	62	59	53	50	46
614	2100	0.24	2100	0.24	75	67	62	55	51	45	82	65	61	55	53	48
616	2800	0.32	2800	0.32	74	66	61	55	50	43	83	68	63	57	54	49

AHRI CERTIFIED®
www.ahridirectory.org
VAV Terminals
AHRI Standard 880

FEATURES

CONSTRUCTION FEATURES

Integral electric heating coils are available as an option on Titus fan powered terminals. These heating coils have been specifically designed for use with Titus fan powered terminals and are factory mounted at the discharge outlet of the fan terminal unit. For safe operation, the electronic coil controls are interlocked with the recirculating fan to allow the electric coil to energize only after the fan is running. Each complete terminal, with coil installed, has been tested by ETL in accordance with UL standards. The NEMA 1 electrical enclosure includes a single point electrical connection for heater and fan. Each unit is provided with a specific wiring diagram.



STANDARD FEATURES

- Auto reset thermal cutouts (one per element)
- 80/20 Nickel chrome heating elements
- Magnetic contactors, where required, on pneumatic units
- Airflow safety switch
- Line terminal block (277/1∅, 208/240/3∅, or 480/3∅ 4 wire)
- Flanged connection
- Control transformer for DDC or Analog electronic controls
- Pneumatic electric switch for pneumatic parallel fan terminals only
- Fan relay for DDC fan terminals
- Magnetic contactor per step on terminals with DDC or analog electronic controls

OPTIONAL FEATURES

- Interlocking disconnect
- Main power supply fuses
- Mercury contactors
- Manual reset thermal cutout
- Dust-tight construction

RECOMMENDED COIL SELECTION DATA

The table below is a guide for electric heating coil capacities that are available for Titus fan powered terminal units

A coil can be selected for any capacity within the kW range in each column heading

Model	Unit Size	Number of steps available	208/240V 1 Phase kW Range Min	208/240V 1 Phase kW Range Max	277V 1 Phase kW Range Min	277V 1 Phase kW Range Max	208V 3 Phase kW Range Min	208V 3 Phase kW Range Max	480V 3 Phase kW Range Min	480V 3 Phase kW Range Max
ATQS DTQS PTQS	2	1 2 3	1.0 1.5 2.0	6.5 (208V) 6.5 (240V)	1.0 1.5 2.0	6.5	1.5	6.5	2.5	6.5
	3	1 2 3	1.0 1.5 2.0	9.5 (208V) 11 (240V)	1.0 1.5 2.0	12.5	1.5	15.0	2.5	14.5
	4	1 2 3	1.0 1.5 2.0	9 (208V) 10 (240V)	1.0 1.5 2.0	12.5	1.5	15.5	2.5	16.0
	5	1 2 3	1.0 1.5 2.0	9 (208V) 10.5 (240V)	1.0 1.5 2.0	12.5	1.5	15.0	2.5	15.5
	6	1 2 3	1.0 1.5 2.0	8.5 (208V) 10 (240V)	1.0 1.5 2.0	12	1.5	15.0	2.5	29.0
	7	1 2 3	1.0 1.5 2.0	10 (208V) 10 (240V)	1.0 1.5 2.0	11.5	1.5	15.0	2.5	32.0
AFLS DFLS PFLS	2	1 2 3	1.0 1.5 2.0	7.5	1.0 1.5 2.0	7.5	1.5	7.5	2.5	7.5
	3	1 2 3	1.0 1.5 2.0	9 (208V) 9.5 (240V)	1.0 1.5 2.0	11.0	1.5	12.0	2.5	11.0
	4	1 2 3	1.0 1.5 2.0	8.5 (208V) 10 (240V)	1.0 1.5 2.0	12.5	1.5	16.0	2.5	18.0

Note: kW's shown are for standard electric heaters.
Lynergy and SCR type heater kW's may vary.

Model	Unit Size	Number of steps available	208/240V 1 Phase kW Range Min	208/240V 1 Phase kW Range Max	277V 1 Phase kW Range Min	277V 1 Phase kW Range Max	208V 3 Phase kW Range Min	208V 3 Phase kW Range Max	480V 3 Phase kW Range Min	480V 3 Phase kW Range Max
ATQP DTQP PTQP	2	1 2 3	1.0 1.5 2.0	4 (208V) 4 (240V)	1.0 1.5 2.0	4.0	1.5	4.0	2.5	4.0
	3	1 2 3	1.0 1.5 2.0	9 (208V) 10 (240V)	1.0 1.5 2.0	10.5	1.5	10.5	2.5	10.5
	4	1 2 3	1.0 1.5 2.0	9 (208V) 10 (240V)	1.0 1.5 2.0	12.0	1.5	15.5	2.5	17.5
	5	1 2 3	1.0 1.5 2.0	9 (208V) 10 (240V)	1.0 1.5 2.0	10.5	1.5	14.0	2.5	24.0
	6	1 2 3	1.0 1.5 2.0	8.5 (208V) 10 (240V)	1.0 1.5 2.0	12.0	1.5	15.0	2.5	32.0
AFLP DFLP PFLP	2	1 2 3	1.0 1.5 2.0	9.0	1.0 1.5 2.0	9.0	1.5	9.0	2.5	9.0
	4	1 2 3	1.0 1.5 2.0	9 (208V) 10 (240V)	1.0 1.5 2.0	10.0	1.5	10.0	2.5	10.0
ATFS DTFS PTFS	B	1 2 3	1.0 1.5 2.0	7.0	1.0 1.5 2.0	5.5	1.5	5.5	2.5	5.5
	C	1 2 3	1.0 1.5 2.0	9.5 (208V) 11 (240V)	1.0 1.5 2.0	12.5	1.5	13.0	2.5	12.5
	D	1 2 3	1.0 1.5 2.0	9 (208V) 10.5 (240V)	1.0 1.5 2.0	12.0	1.5	15.0	2.5	21.0
	E	1 2 3	1.0 1.5 2.0	8.5 (208V) 10 (240V)	1.0 1.5 2.0	12.0	1.5	15.0	2.5	27.5

Notes

Titus
Redefine your comfort zone.™

Icons

contributes toward energy savings by reducing operating costs of air distribution devices

energy solutions

can be used in open ceiling environments

open ceiling

OSP & IBC seismic certifications available for Titus terminal units

seismic certified