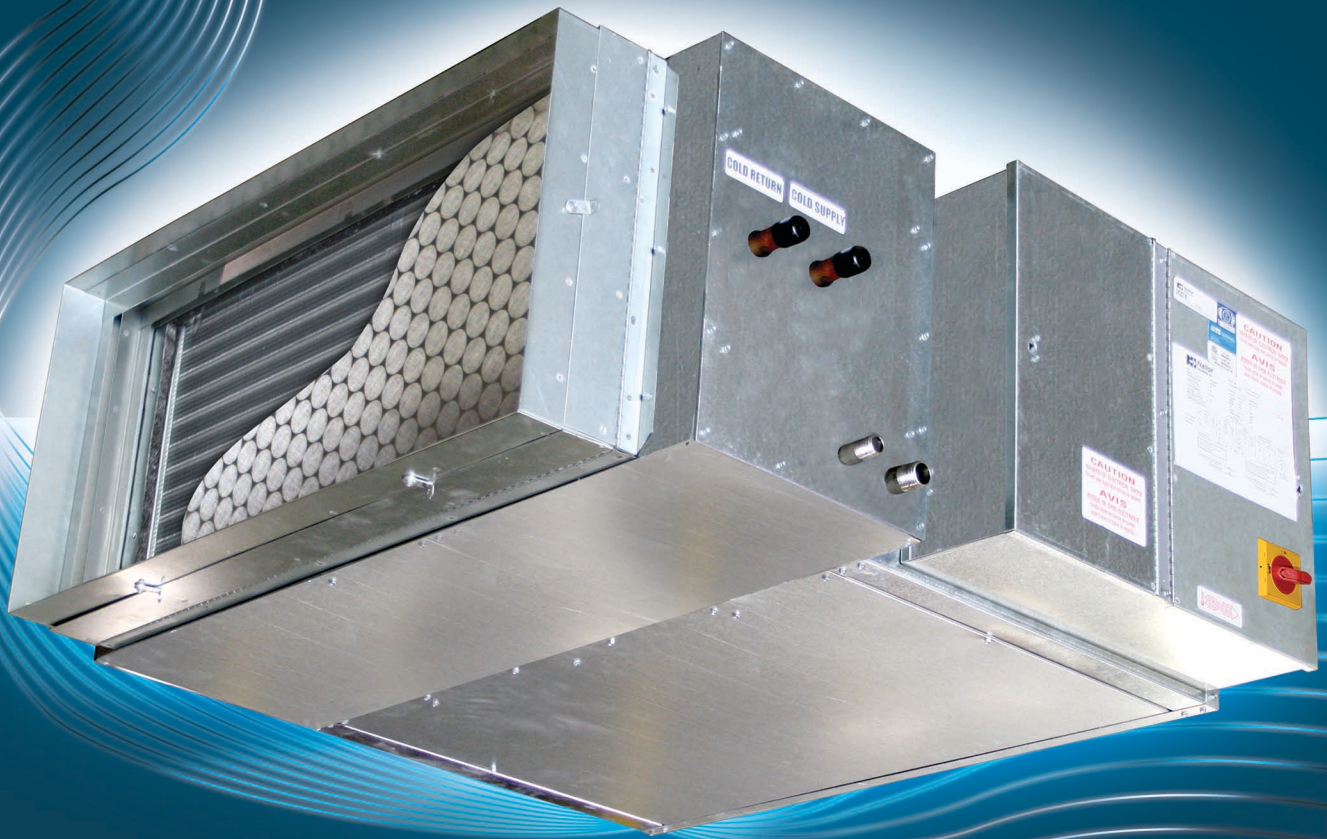


FAN COIL UNIT 35FH SERIES

UNIT SIZE 4 - 24
200 - 2500 CFM



DESIGNED FOR EXCELLENT
PERFORMANCE
AND FLEXIBILITY

Engineered
Comfort
by Nailor Industries Inc.

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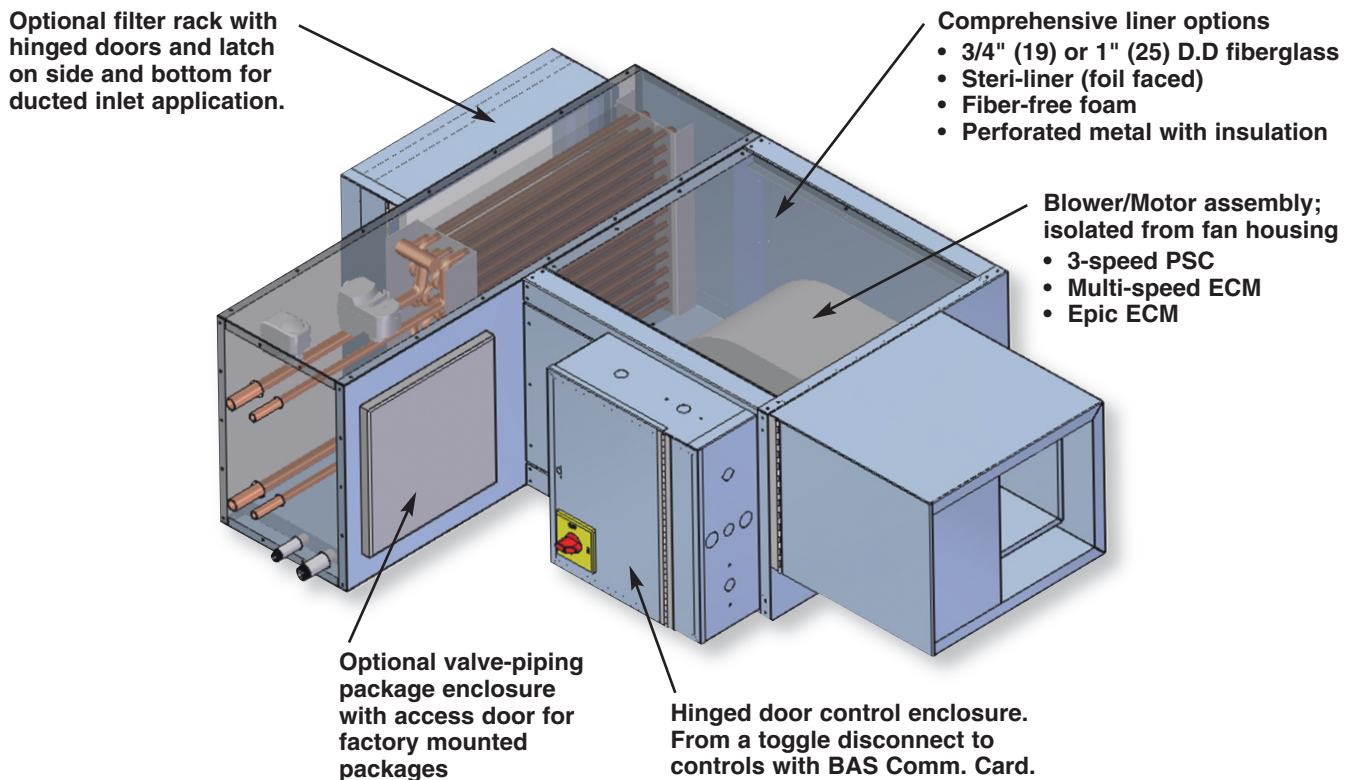
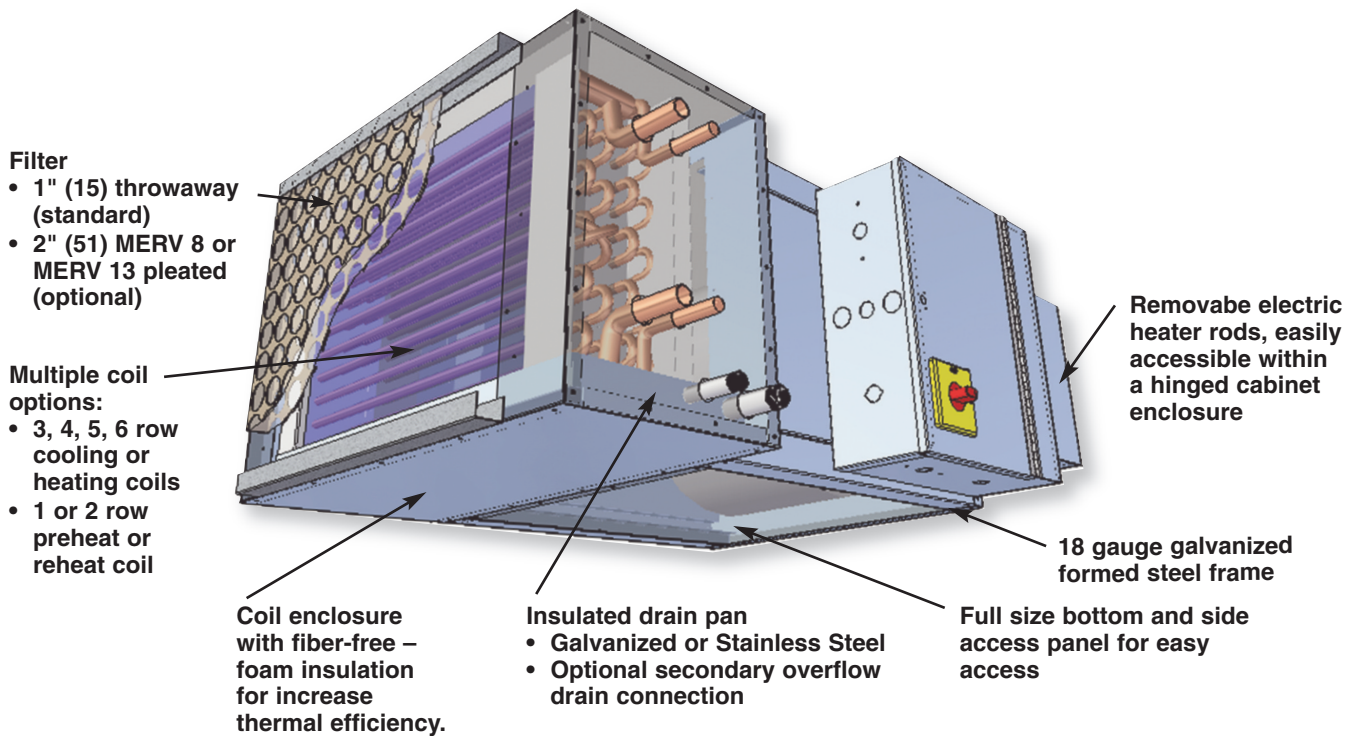
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PSC Motor Performance Data • Sound Power Levels • NC Level Application Guide

FH32Epic ECM Motor Performance Data • Sound Power Levels • NC Level Application Guide **FH33**

Direct Drive, Draw-thru Design



High Performance Direct Drive Draw-thru Horizontal Fan Coil Units

Models: 35FHW, 35FHZ, 35FHZW and 35FHZE

Nailor's 35FH Series fan coil accommodate a variety of applications, designed typically for installation above a ceiling where a high capacity is required. Ten nominal sizes are offered, ranging from 200 to 2550 CFM (94 to 1200 l/s) or 1 to 6 tons with external static pressure up to 0.8" (200 Pa).

Completely assembled and shipped from the factory with the desirable controls and options to minimize field installation time and cost.

Nailor's Direct Drive Draw-thru design provides the following benefits:

- The Direct Drive blower motor assembly eliminates the belt drive maintenance and drive loss typically associated with a belt driven unit.
- A Draw-thru design pulls air through the entire face of the coil providing a more even air velocity and consequently better heat transfer and less air pressure drop.
- Less air turbulence is created due to the design's ability to draw the air into the coil rather than forcing it, making the Draw-thru sound levels lower due to the even velocities, this is compared to the Blow-thru where face velocities are concentrated around the blower discharge area of the coil, increasing air turbulence.
- Reduced air pressure drop and greater coil heat transfer in the Draw-thru design allows for lower energy consumption.
- Direct Drive blower/motor assembly reduces the amount of sound transmission to the occupant.

For optimal acoustical performance consider using Nailor's VAV EPIC Fan Technology® 35FH sound power, Lw, data for ducted discharge, casing radiated components for all unit sizes are available in Nailor Selection Program "SelectWorks".

Sound power levels tested and published in accordance with ASHRAE 130/AHRI 880.

AHRI certified units available as:

2-pipe hydronic systems:

- 1, 2 or 3 row coil for heating only.
- 3, 4, 5 or 6 row coil for cooling only.
- 3, 4, 5 or 6 row coil for cooling or heating.

2-pipe hydronic systems with 1, 2 stage or SCR control electric heater

- 3, 4, 5 or 6 row coil and up to 16 kW.

4-pipe hydronic systems:

- 3, 4, 5 or 6 row cooling coil and 1 or 2 row heating coil.
- Either as reheat or preheat.

Contact Nailor's representative for steam heating or direct expansion application.

STANDARD FEATURES

Construction

- ETL Listed. Constructed in compliance with ANSI/ UL Standard.
- 18 ga. (1.3) galvanized steel channels frame with 20 ga. casing components.
- Coil casing insulated with 3/4" (19) fiber-free closed cell insulation. Other panels insulated with dual density fiberglass insulation.
- 1" (25) Throwaway filter.
- Easily removable bottom and side access panels.
- Discharge opening designed for flanged duct connection.
- Electrical enclosure with hinged access door.

Fan/Motor Assemblies

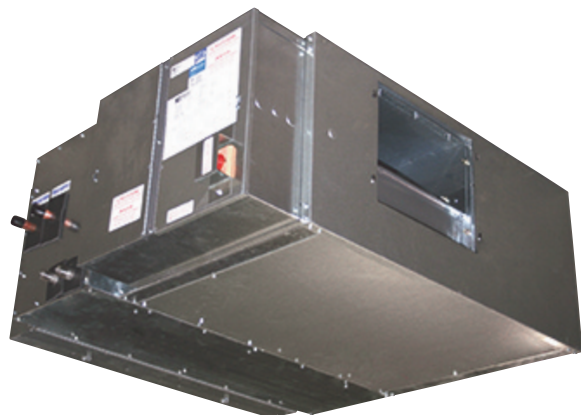
- Forward Curved, DWDI, direct driven blowers.
- Blower/motor assembly isolated from fan housing with vibration isolators.
- Motor power leads with quick disconnect brought into an external hinged door starter-control enclosure.
- PSC, Multi-Speed ECM or fully variable EPIC ECM.
- 120, 208, 240 and 277 volts single phase motor.

Coils

- Water coils with copper tubes and aluminum ripple fins. Performance rated and certified in accordance with the current edition of AHRI Standard 410.
- Coils installed in an insulated casing with 3/4" (19) fiber-free(closed cell) insulation for increased thermal efficiency.

Drain Pans

- Positively sloped galvanized steel drain pan with 3/4" (19) male NPT connection, which meets the requirements of ASHRAE 62-2001.
- Externally insulated with fiber-free foam.

High Performance Direct Drive Draw-thru Horizontal Fan Coil Units (cont.)**Models: 35FHW, 35FHZ, 35FHZW and 35FHZE****35FHZ****OPTIONS AND ACCESSORIES****Construction****Insulation**

- Fiber-free – closed cell foam.
- Steri-liner – foil faced high density fiberglass.
- Perforated metal with DD fiber glass.
- Perforated metal with steri-liner.
- 1" (25) DD fiberglass.

1" (25) or 2" (51) Filter Rack with hinged doors and latch on the side and bottom for ease of maintenance.

- 1" (25) Throwaway.
- 1" (25) Throwaway filter with spare.
- 2" (51) MERV 8 or MERV 13.
- 2" (51) MERV 8 or MERV 13 with spare.

Coils

- Manual or Automatic air vents with valve package.
- Coil Casing 20 ga. (1.0) stainless steel drain pan externally insulated with fiber-free foam.
- Stainless steel coil casing.
- 0.025" (0.635) tube wall thickness.
- 0.0075" (0.191) aluminum fins.

Drain Pans

- Stainless Steel drain pan externally insulated with fiber-free foam.
- 5/8" (15.9) Secondary (overflow) drain connection with or without overflow safety switch.

Control Packages

- Toggle Disconnect Switch.
- Door Interlocking disconnect switch.

- Main Unit Fusing.
- Quiet Contactors.
- Airflow switches.
- Manual reset hi-limit.
- 24V transformer and fan relay packages.
- Digital or Analog variable Engineered Comfort air volume control for Epic ECM motor.
- On-Off or Modulating controls.
- Dust Tight Control Enclosure.
- Factory installed controls – provided by others.

Valve-Piping Packages

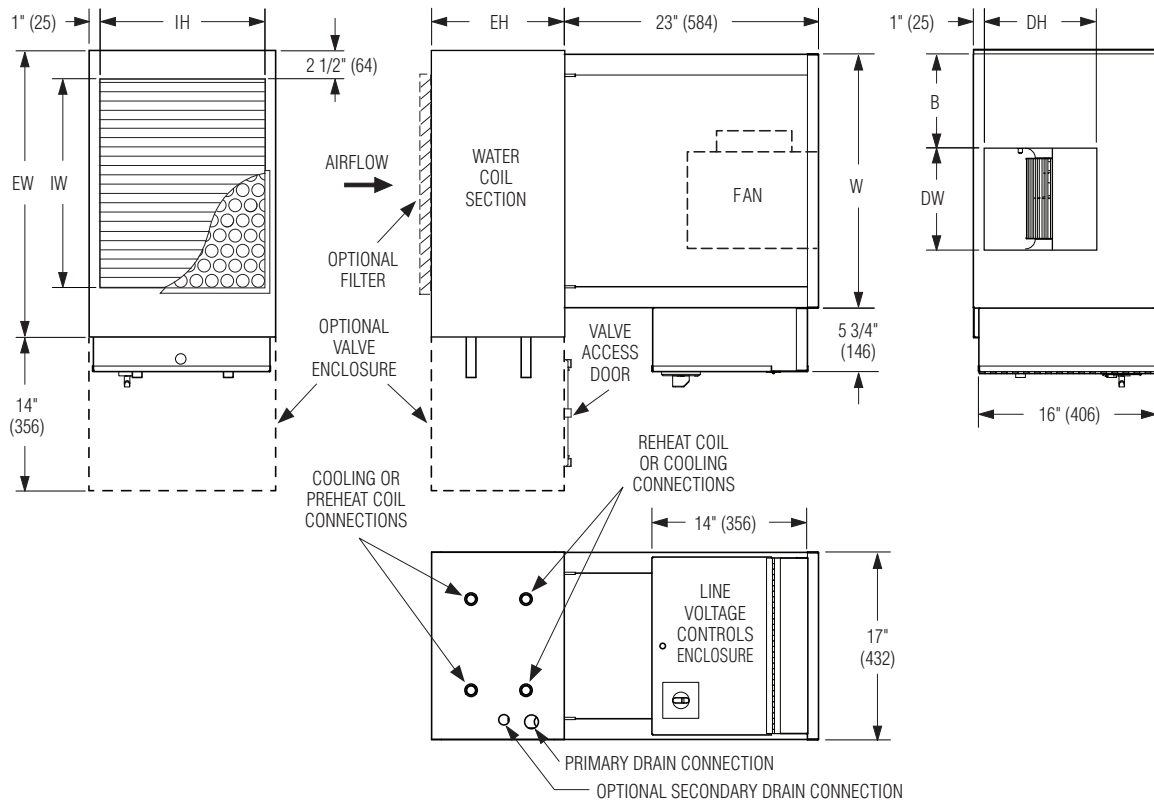
- Factory assembled and Installed in enclosure or field installed.
- 1/2", 3/4" or 1" (13, 19 or 25) 2 or 3 way valves.
- On/Off, 24V or 115V, modulating 3 wire or 0–10 vdc.
- Unions, P/T ports and Shut-off valves.
- Circuit setters (manual or auto-fixed flow control).
- Strainers.

Other Options

- Hanger Mounting Brackets.
- LH or RH Control/Coil Connection.
- Manual or Auto Air Vents.
- Mixing Box.
- Outside Air Dampers .
 - Manual
 - Motorized
- Ultraviolet Light.
- Isolators.

Dimensional Data • Unit Sizes 4 – 16

Models: 35FHZ Chilled Water • 35FHW Hot Water • 35FHZW Chilled & Hot Water



Dimensional Data

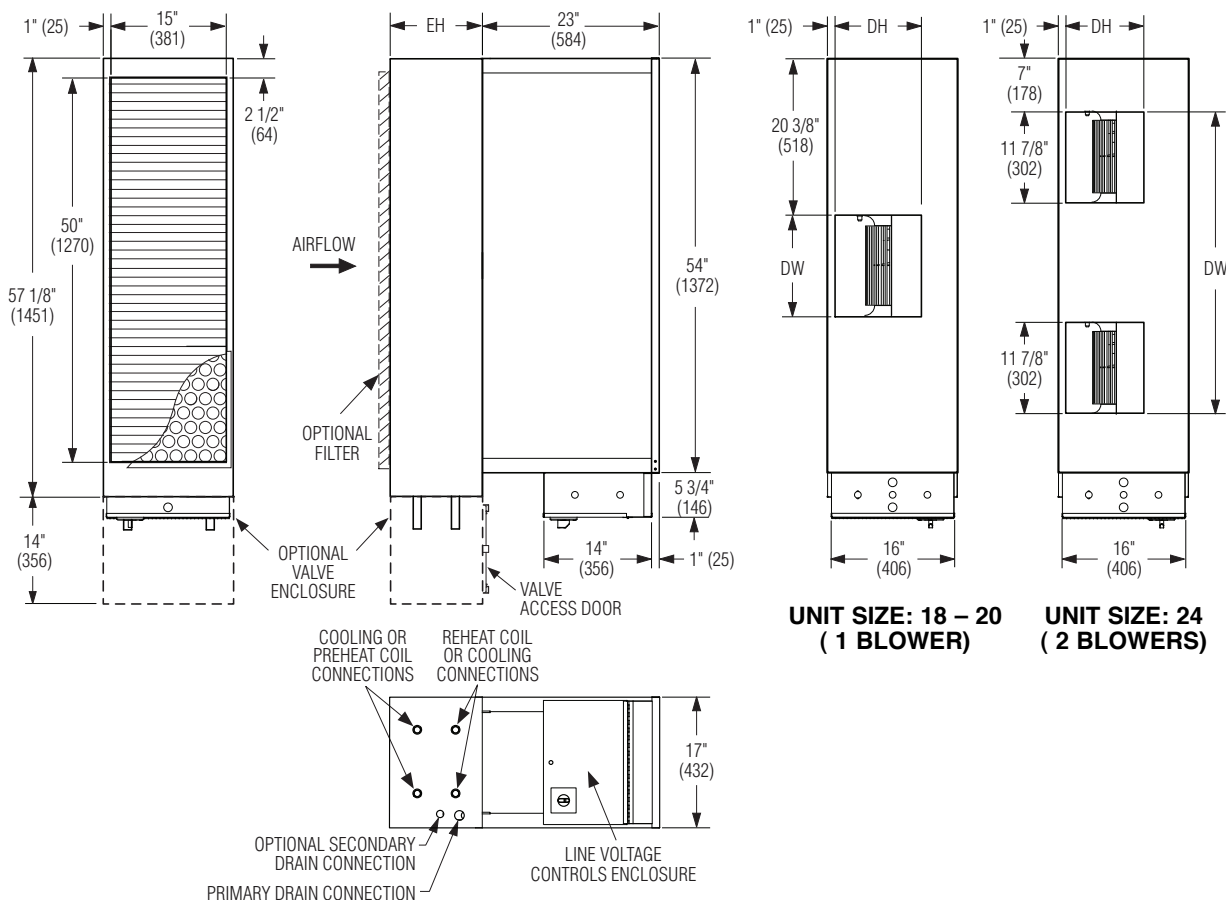
Unit Size	Airflow Range* CFM (l/s)	Inlet IW x IH (483 x 381)	Coil Enclosure		B (216)	W (584)	Outlet Discharge DW x DH (175 x 257)	Filter Size (406 x 508)
			EW (660)	EH (305)				
4	200 - 400 (94 - 189)	19 x 15 (483 x 381)	26 (660)	3, 4, 5 & 6 ROW COIL: 12 (305)	8 1/2 (216)	23 (584)	6 1/8 x 10 1/8 (175 x 257)	16 x 20 (406 x 508)
6	400 - 700 (189 - 330)						9 1/4 x 10 1/8 (235 x 257)	
8	350 - 975 (165 - 460)						9 1/4 x 10 1/8 (235 x 257)	
10	700 - 1100 (330 - 519)	33 x 15 (838 x 381)	40 (1016)	7 & 8 ROW COIL: 14 (356)	16 (406)	37 (940)	9 1/4 x 10 1/8 (235 x 257)	16 x 35 (406 x 889)
12	750 - 1300 (354 - 613)						11 1/8 x 10 1/8 (302 x 257)	
14	900 - 1400 (425 - 661)						11 1/8 x 10 1/8 (302 x 257)	
16	500 - 1650 (236 - 779)						13 1/4 x 11 1/4 (337 x 286)	

Coil O.D. Sweat Connections

Unit Size	Number of Rows				
	1 & 2	3	4	5	6
4 - 8	5/8 (15.9)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)
10 - 16	5/8 (15.9)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)	1 1/8 (28.6)

Dimensional Data • Unit Sizes 18 – 24

Models: 35FHZ Chilled Water • 35FHW Hot Water • 35FHZW Chilled & Hot Water



Dimensional Data

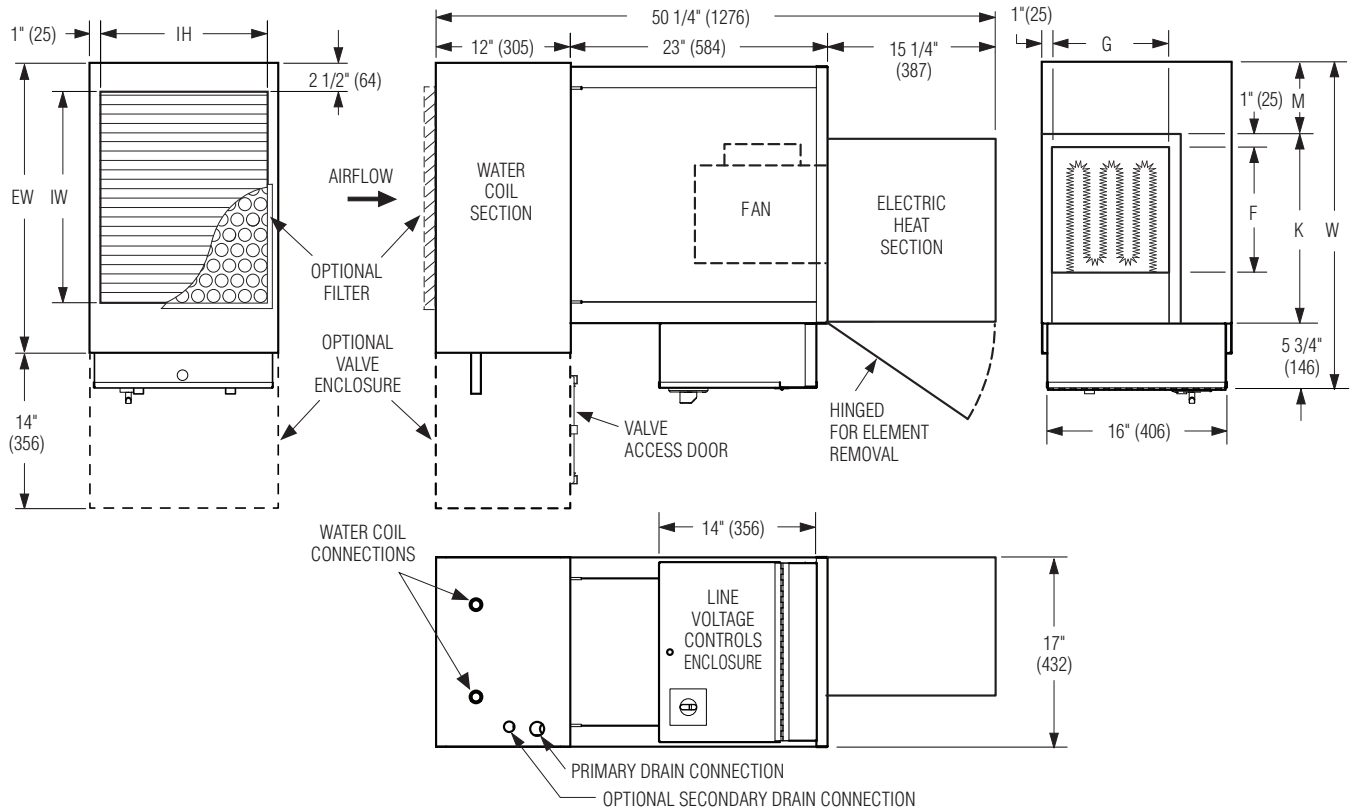
Unit Size	Airflow Range CFM (l/s)	Coil Enclosure		Outlet Discharge DW x DH	Filter Size
		EW	EH		
18	1100 - 1800 (519 - 849)	57 1/8" (1451)	3, 4, 5 & 6 ROW COIL: 12 (305), 7 & 8 ROW COIL: 14 (356)	13 1/4 x 11 1/4 (337 x 286)	16 x 52 (406 x 1321)
20	800 - 2000 (378 - 944)			13 1/4 x 11 1/4 (337 x 286)	
24	1000 - 2450 (472 - 1156)			39 1/4 x 10 1/8 (997 x 257)	

Coil O.D. Sweat Connections

Unit Size	Number of Rows				
	1 & 2	3	4	5	6
18 - 24	5/8 (15.9)	1 1/8 (28.6)	1 1/8 (28.6)	1 1/8 (28.6)	1 1/8 (28.6)

Dimensional Data • Units with Electric Heat • Sizes 4 – 16

Model: 35FHZE Chilled Water with Electric Heat



Dimensional Data

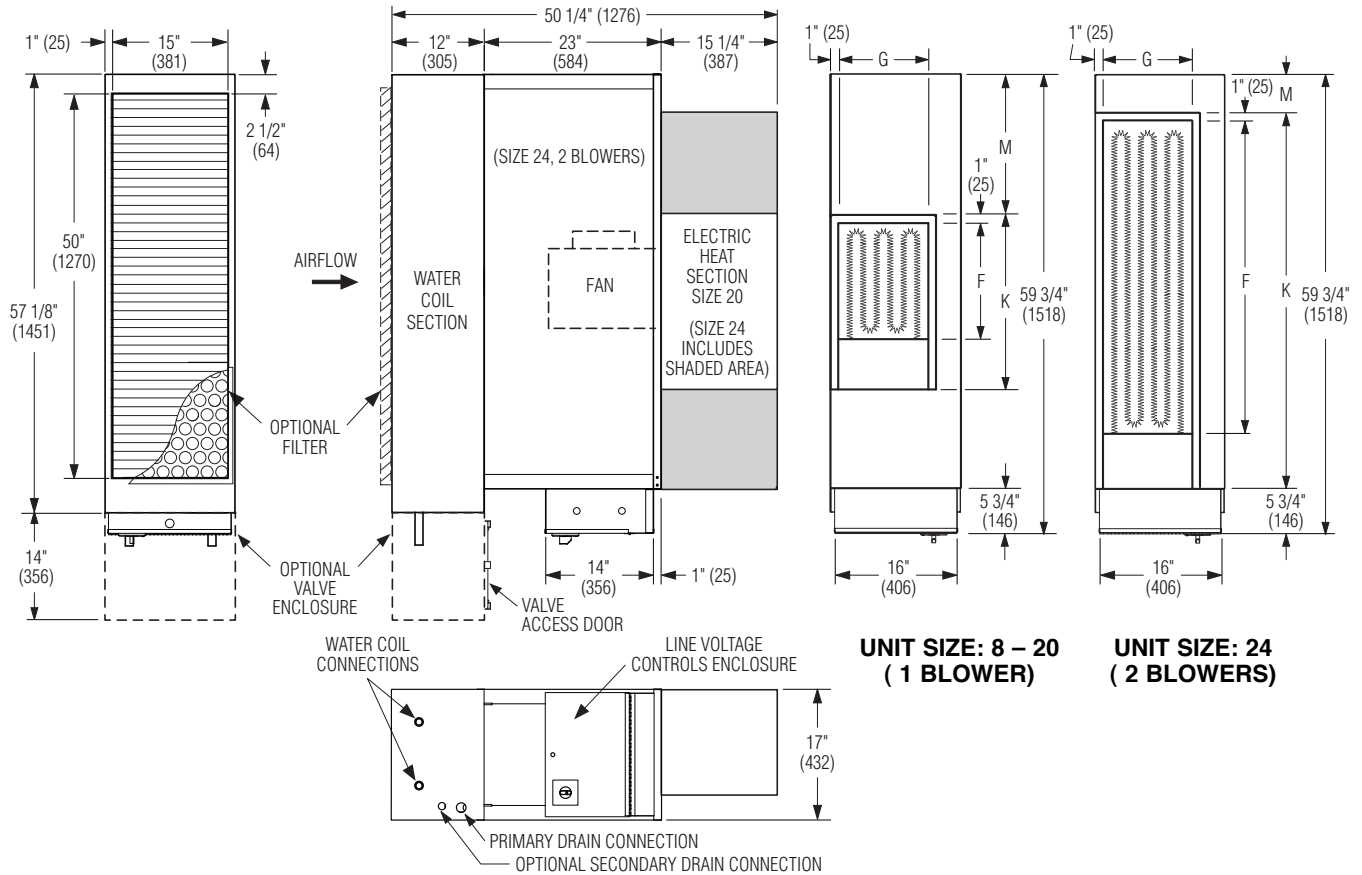
Unit Size	Airflow Range CFM (l/s)	Inlet IW x IH	Coil Enclosure EW	Outlet Duct Size F x G	M	K	W	Filter Size
4	200 - 400 (94 - 189)	19 x 15 (483 x 381)	26 (660)	8 7/8 x 10 1/2 (225 x 267)	6 1/2 (165)	16 1/2 (419)	28 3/4 (730)	16 x 20 (406 x 508)
6	400 - 700 (189 - 330)			11 1/4 x 10 1/2 (286 x 267)				
8	350 - 975 (165 - 460)			11 1/4 x 10 1/2 (286 x 267)				
10	700 - 1100 (330 - 519)	33 x 15 (838 x 381)	40 (1016)	12 1/2 x 11 3/4 (318 x 298)	14 (356)	23 (584)	42 3/4 (1086)	16 x 35 (406 x 889)
12	750 - 1300 (354 - 613)			13 7/8 x 11 3/4 (352 x 298)				
14	900 - 1400 (425 - 661)			13 7/8 x 11 3/4 (352 x 298)				
16	500 - 1650 (236 - 779)			15 1/8 x 11 3/4 (384 x 298)				

Coil O.D. Sweat Connections

Unit Size	Number of Rows			
	3	4	5	6
4 - 8	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)
10 - 16	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)	1 1/8 (28.6)

Dimensional Data • Unit with Electric Heat • Sizes 18 – 24

Model: 35FHZE Chilled Water with Electric Heat



Dimensional Data

Unit Size	Airflow Range CFM (l/s)	Outlet Duct Size F x G	M	K	Filter Size
18	1100 - 1800 (519 - 849)	15 1/4 x 11 3/4 (387 x 298)	18 3/4 (467)	23 (584)	16 x 52 (406 x 1321)
20	800 - 2000 (378 - 944)	15 1/4 x 11 3/4 (387 x 298)			
24	1000 - 2450 (472 - 1156)	41 1/4 x 11 3/4 (1048 x 298)	5 (127)	49 (1245)	

Coil O.D. Sweat Connections

Unit Size	Number of Rows			
	3	4	5	6
18 – 24	1 1/8 (28.6)	1 1/8 (28.6)	1 1/8 (28.6)	1 1/8 (28.6)

Dimensional Data

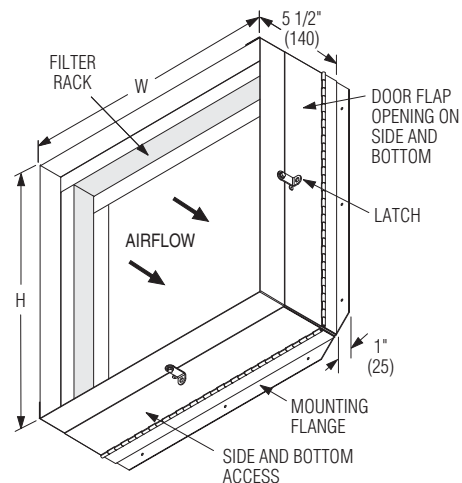
Options and Accessories

Filter Rack Option

- The FFR Ducted Filter Connection is an optional accessory used for ducted inlet applications where easy accessibility to the filter is required.
- The hinged door flap with latch on the side and bottom of the unit accessory allows for easy removal and replacement of the filter.
- The filter rack accommodates a 1" (25) or 2" (51) optional filter. Factory mounted on the induced air inlet of the draw through water coil section and comes with a duct collar.

Dimensional Data

Unit Size	Inlet Size H x W	Filter Size (Nominal)
4, 6, 8	16 ½ x 20 ¼ (419 x 514)	16 x 20 (406 x 508)
10, 12, 14, 16	16 ½ x 35 ¼ (419 x 895)	16 x 35 (406 x 889)
18, 20, 24	16 ½ x 52 ¼ (419 x 1327)	16 x 52 (406 x 1321)



Performance Data

2-pipe Systems • Cooling and Heating

AHRI Standard Rating

Unit Size	Airflow		Main Coil Rows	GPM (l/s)		WPD		Cooling Capacity ⁽¹⁾				Cooling Capacity ⁽²⁾		PSC Motor (Watts)
	CFM	l/s				FtH ₂ O	Kpa	TMBH	kW	SMBH	kW	MBH	kW*	
4	400	189	3	2.8	0.17	1.7	5.1	13.1	3.8	9.0	2.6	23.3	6.8	175
	390	184	4	3.0	0.19	1.2	3.6	14.8	4.3	9.8	2.9	25.2	7.4	170
	375	177	5	3.2	0.20	0.9	2.7	15.7	4.6	10.0	2.9	25.8	7.6	165
	375	177	6	3.4	0.22	0.8	2.4	16.6	4.9	10.5	3.1	26.7	7.8	165
6	680	321	3	3.8	0.24	3.2	9.6	18.1	5.3	13.3	3.9	34.3	10.1	280
	660	311	4	4.4	0.28	2.5	7.5	21.1	6.2	14.8	4.3	38.4	11.2	275
	650	307	5	4.8	0.31	2.1	6.3	23.4	6.9	15.8	4.6	41.2	12.1	270
	630	297	6	5.1	0.32	1.7	5.1	24.8	7.3	16.3	4.8	42.3	12.4	265
8	870	411	3	4.4	0.28	4.2	12.6	21.0	6.2	16.0	4.7	40.5	11.9	310
	830	392	4	5.1	0.32	3.3	9.9	24.5	7.2	17.7	5.2	45.6	13.4	305
	800	378	5	5.6	0.35	2.7	8.1	27.1	7.9	18.8	5.5	48.6	14.2	300
	770	363	6	5.9	0.37	2.2	6.6	28.7	8.4	19.3	5.7	50.0	14.7	295
10	1170	552	3	6.4	0.40	2.0	6.0	30.2	8.9	22.7	6.7	58.3	17.1	450
	1140	538	4	7.9	0.50	3.8	11.4	38.0	11.2	26.3	7.7	67.2	19.7	440
	1110	524	5	9.0	0.57	5.9	17.6	43.5	12.7	28.5	8.4	72.2	21.2	430
	1080	510	6	9.3	0.59	3.4	10.2	45.2	13.2	29.1	8.5	73.7	21.6	420
12	1280	604	3	6.7	0.43	2.2	6.6	31.9	9.3	24.2	7.1	62.1	18.2	500
	1250	590	4	8.4	0.53	4.3	12.9	40.3	11.8	28.1	8.2	72.1	21.1	490
	1220	576	5	9.6	0.61	6.7	20.0	46.5	13.6	30.8	9.0	77.9	22.8	475
	1190	562	6	10.0	0.63	3.9	11.7	48.4	14.2	31.5	9.2	80.0	23.5	460
14	1400	661	3	7.0	0.44	2.4	7.2	33.4	9.8	25.7	7.5	65.9	19.3	575
	1350	637	4	8.8	0.56	4.7	14.0	42.2	12.4	29.7	8.7	76.4	22.4	560
	1300	614	5	10.1	0.64	7.4	22.1	48.5	14.2	32.3	9.5	82.1	24.1	540
	1260	595	6	10.5	0.66	4.3	12.9	50.5	14.8	33.0	9.7	84.1	24.6	530
16	1600	755	3	7.6	0.48	2.8	8.4	35.3	10.3	27.7	8.1	71.9	21.1	785
	1540	727	4	9.6	0.61	5.5	16.4	45.2	13.2	32.3	9.5	84.1	24.7	755
	1490	703	5	11.0	0.70	8.8	26.3	52.6	15.4	35.4	10.4	91.4	26.8	740
	1490	703	6	11.7	0.74	5.4	16.1	56.2	16.5	37.3	10.9	96.6	28.3	730
18	1750	826	3	10.5	0.67	6.6	19.7	50.1	14.7	35.5	10.4	91.1	26.7	830
	1720	812	4	12.3	0.77	5.5	16.4	58.6	17.2	39.8	11.7	102.4	30.0	820
	1700	802	5	14.0	0.88	8.5	25.4	67.3	19.7	43.7	12.8	110.9	32.5	805
	1680	793	6	15.3	0.96	11.7	35.0	73.7	21.6	46.5	13.6	115.9	34.0	795
20	1930	911	3	11.2	0.71	7.4	22.1	52.9	15.5	38.0	11.1	97.6	28.6	935
	1880	887	4	13.0	0.82	6.2	18.5	61.9	18.1	42.5	12.5	109.7	32.1	915
	1840	868	5	14.8	0.93	9.5	28.4	71.2	20.9	46.5	13.6	118.4	34.7	895
	1800	850	6	16.1	1.01	13	38.9	77.6	22.7	49.2	14.4	123.0	36.1	860
24	2400	1133	3	12.7	0.80	9.4	28.1	60.1	17.6	44.7	13.1	113.2	33.2	1000
	2330	1100	4	14.9	0.94	8.0	23.9	71.1	20.8	50.3	14.7	128.6	37.7	980
	2230	1052	5	16.9	1.07	12.3	36.8	81.5	23.9	54.5	16.0	138.1	40.5	950
	2050	967	6	17.8	1.12	15.8	47.2	85.7	25.1	54.9	16.1	137.5	40.3	940

All performance based on actual airflow using PSC motors. Cooling performance is based on 80°F DB and 67°F WB (26.7/19.4°C), 45°F (7.2°C) EWT and a 10°F (5.6°C) temperature rise.

Heating performance is based on 70°F (21.1°C) entering air temperature, 140°F (60°C) entering hot water temperature performance unit.

(1) Dissipated PSC motor heat taken into account within cooling capacity. Dissipated capacity for an ECM is less, providing you a higher cooling capacity.

For specific performance outside of AHRI condition request Engineering SelectWorks through your nearest sales representative or for a quick glance, go to coil performance curves on pages FH14 through FH21. PSC motor watts at full load.

(2) For Electric heater kW selection see table shown on page FH11.

Performance Data

Heating Capacity for Secondary Heating Coil on 4-pipe Systems

Unit Size	Airflow		Heating Coil Rows	WPD		Heating Capacity			
	CFM	l/s		GPM	l/s	FtH ₂ O	Kpa	MBH	kW
4	400	189	1	0.9	0.06	13.2	3.9	17.1	5.0
	375	177	2	1.3	0.08	16.7	4.9	25.6	7.5
6	680	321	1	1.2	0.08	18.2	5.3	22.8	6.7
	630	297	2	1.9	0.12	24.9	7.3	37	10.8
8	870	411	1	1.3	0.08	21.1	6.2	25.9	7.6
	770	363	2	2.2	0.14	28.9	8.5	43.3	12.7
10	1170	552	1	2	0.13	30.5	8.9	38.8	11.4
	1080	510	2	2.6	0.16	45.4	13.3	51.4	15.1
12	1280	604	1	2.1	0.13	32.2	9.4	40.7	11.9
	1190	562	2	3.2	0.20	48.7	14.3	62.9	18.4
14	1400	661	1	2.2	0.14	33.6	9.9	42.5	12.5
	1260	595	2	3.4	0.21	50.7	14.9	66.7	19.5
16	1600	755	1	2.3	0.15	35.7	10.5	45.4	13.4
	1490	703	2	3.6	0.23	56.6	16.6	70.6	20.7
18	1750	826	1	3	0.19	50.4	14.8	58.6	17.1
	1680	793	2	4.8	0.30	73.9	21.7	94.5	27.7
20	1930	911	1	3.1	0.20	53.2	15.6	61.5	18.0
	1800	850	2	5.1	0.32	77.9	22.8	101	29.5
24	2400	1133	1	3.5	0.22	60.5	17.7	68.6	20.1
	2050	967	2	5.9	0.37	86.2	25.3	116	33.9

Performance based at the nominal airflow for the specific unit. Heating performance is based on 70°F (21.1°C) entering air temperature, 180°F (82.2°C) entering hot water temperature with a 40°F (22.2°C) water temperature drop.

Hot water coils available in pre-heat or re-heat position.

Performance Data Electric Heat

ELECTRIC HEATER

Electric heat coils are available as a factory mounted on the unit discharge. Nailor Electric Coils are tested with the fan terminal in accordance with CSA 236/UL 1995 and meet all the requirements of the NEC. Units and heaters are listed and labeled by the ETL testing Laboratory as an integrated package. A NEMA 1 enclosure with hinges is placed at the side of the fan coil to provide easy access. All motor and heater wiring terminates in the enclosure for single point electrical connection.

STANDARD FEATURES

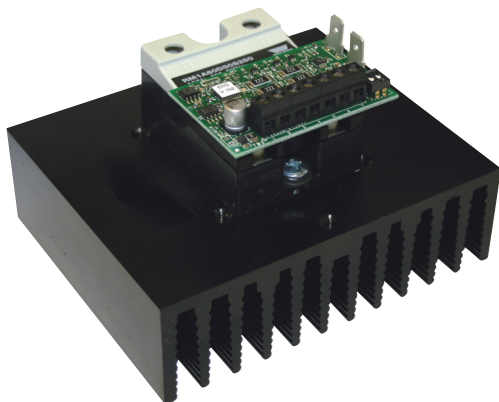
- Automatic reset high limit thermal cut-outs
- Magnetic contactors per stage with DDC or Analog electronic controls
- Control voltage transformer (Class 2) for DDC and Analog controls.

OPTIONS

- Toggle Disconnect
- Door Interlocking disconnect switch
- Quiet contactors*
- Power circuit fusing
- Dust tight control enclosure
- High grade Class A 80/20 nickel/chrome.
- Manual reset secondary high limit
- Airflow Safety Switch
- Positive pressure air flow switch
- 1 or 2 Stage Electric Heat
- SCR Control for quieter and variable wattage

SCR Control Option

The SCR (Silicon Controlled Rectifier) option provides infinite heater control using a proportional control. In addition to superior comfort and energy savings, contactor noise is eliminated and life of the electric heater element is extended. This option is normally specified with all analog electronic, or DDC controls. SSR with 4 – 20 ma 0 – 10 Vdc control.



SCR (Silicon Controlled Rectifier)



Electric Heat Selection Tables:

Conventional Staged Heat: 1 or 2 Stage available

Unit Size	1 phase Voltage (Min. – Max.) kW				3 phase Voltage	
	115V	208V	230V	277V	208V	480V
4		1.0 – 2.5			1.0 – 2.5	
6		1.0 – 4.5			1.0 – 4.5	
8		1.0 – 5.0			1.0 – 5.0	
10	2.0 – 4.5		2.0 – 8.5		2.0 – 8.5	
12	2.0 – 4.5		2.0 – 9.0		2.0 – 9.0	
14	2.0 – 4.5	2.0 – 8.5	2.0 – 10.0		2.0 – 10.0	
16	2.0 – 4.5	2.0 – 8.5	2.0 – 9.5	2.0 – 11.0	2.0 – 11.0	
18	2.0 – 4.5	2.0 – 8.5	2.0 – 9.5	2.0 – 11.5	2.0 – 12.0	
20	2.0 – 4.5	2.0 – 8.5	2.0 – 9.5	2.0 – 11.5	2.0 – 14.0	
24	2.0 – 4.5	2.0 – 8.5	4.0 – 9.5	4.0 – 11.5	4.0 – 13.5	4.0 – 16.0

SCR Control

Unit Size	1 phase Voltage Maximum kW				3 phase Voltage Maximum kW	
	115V	208V	230V	277V	208V	480V
4	2.5	2.5	2.5	2.5	2.5	2.5
6	3.0	4.5	4.5	4.5	4.5	4.5
8	3.0	5.0	5.0	5.0	5.0	5.0
10	3.0	5.0	5.5	6.5	8.5	8.5
12	3.0	5.0	5.5	6.5	9	9
14	3.0	5.0	5.5	6.5	10	10
16	3.0	5.0	5.5	6.5	9	11
18	3.0	5.0	5.5	6.5	9	12
20	3.0	5.0	5.5	6.5	9	14
24	3.0	5.0	5.5	6.5	9	16

Notes:

Minimum kW per Stage = 1kW. For Unit size 4, 6, 8 the total minimum kW per 2 stage E/H is 2kW.

PSC and 3-speed ECM max. kW's are determined by a combination of testing (at low speed airflow) and 48 amp limits (EH amps plus motor FLA).

The SCR kW's are limited to 25 amps. For higher kW the total amps may be exceeded. Contact your local Nailor representative for supplemental fusing and special sizing.

Performance Data • Electrical Motor Characteristic

Unit Size	Voltage	No. of fans/ motors	PSC Motor		3-speed ECM		Epic ECM	
			FLA	Full Load Watts	FLA	Full Load Watts	FLA	Full Load Watts
4	120	1/1	1.5	175	1.5	120		
	208	1/1	0.7		1.4			
	230	1/1	0.7		1.4			
	277	1/1	0.6		0.9			
6	120	1/1	2.5	280	2.9	220		
	208	1/1	1.1		1.9			
	230	1/1	1.2		1.9			
	277	1/1	1.1		1.5			
8	120	1/1	2.7	310	3.3	330	4.4	330
	208	1/1	1.3		2.2		3.0	
	230	1/1	1.3		2.2		3.0	
	277	1/1	1.2		1.9		2.6	
10	120	1/1	3.8	450	3.6	370		
	208	1/1	1.9		2.4			
	230	1/1	1.9		2.4			
	277	1/1	1.5		2.4			
12	120	1/1	4.1	500	4.3	430		
	208	1/1	2		2.8			
	230	1/1	2		2.7			
	277	1/1	1.6		2.9			
14	120	1/1	4.6	575	5.1	470		
	208	1/1	2.3		3.4			
	230	1/1	2.3		3.4			
	277	1/1	2		3.2			
16	120	1/1	7.1	785	6	690	8.0	690
	208	1/1	3		4		5.3	
	230	1/1	3		4		5.3	
	277	1/1	2.7		3.7		5.3	
18	120	1/1	7.7	830	6.4	700		
	208	1/1	3.3		4.5			
	230	1/1	3.4		4.5			
	277	1/1	3.2		4.3			
20	120	1/1	8.2	935	7.7	860	9.7	860
	208	1/1	4.3		5.6		6.4	
	230	1/1	4.4		5.6		6.3	
	277	1/1	3.6		5.3		6.2	
24	120	2/2	8.3	1000	9.4	880	9.0	880
	208	2/2	4		6		5.9	
	230	2/2	4		6		5.9	
	277	2/2	3.6		6.1		5.6	

Motor consumptions shown is at max setting for selected motor sizing. Actual operating condition for an ECM provides a substantial less power

Performance Data

Epic ECM vs. PSC Power Consumption Comparison

Unit Size	8		16		20		24	
CFM Range	400 – 975 (189 – 460)		900 – 1700 (425 – 802)		1000 – 2200 (472 – 1038)		1100 – 2575 (519 – 1215)	
Selected Airflow	Low	High	Low	High	Low	High	Low	High
	450	870	1300	1600	1250	2000	1750	2400
PSC	175	310	590	785	485	935	600	1000
ECM	50	240	230	485	150	710	240	765
% Less	71%	23%	61%	38%	69%	24%	60%	24%

Table provides an overview of the power consumption reduction for Epic ECM units at both, low and high fan airflows in comparison to PSC.

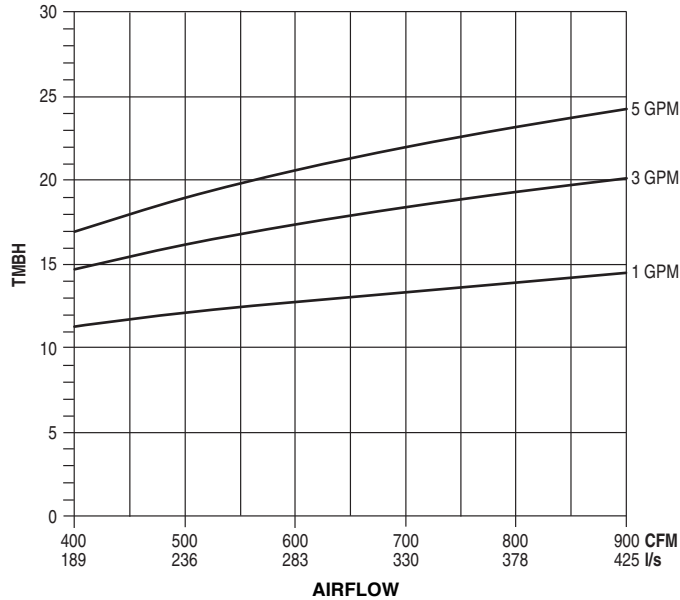
Even at maximum flow settings the ECM power consumption is slightly lower than the PSC motor. At reduced speeds the ECM provides much better energy saving, with a potential up to 70% energy saving % is possible with Nailor Epic ECM units.

Since most fan coils are selected to operate at medium speed the energy savings can become substantial. These values are even higher when it is utilized with the Engineered Comfort controller designed specifically for fan coil units. For more information refer to Engineered Comfort control and piping packages section.

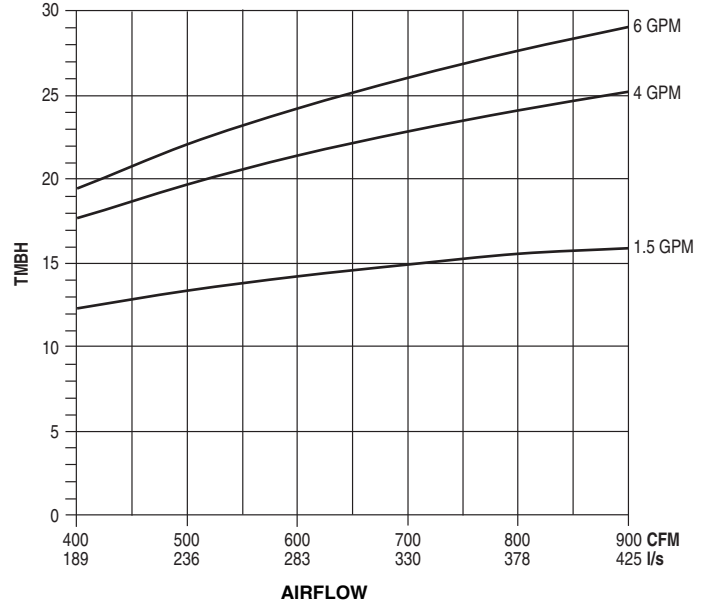
Chilled Water Coil Performance Data • Model Series 35FH • Unit Sizes 4 – 8

Data Based on 80°F DB, 67°F WB Entering Air & 45°F Entering Water

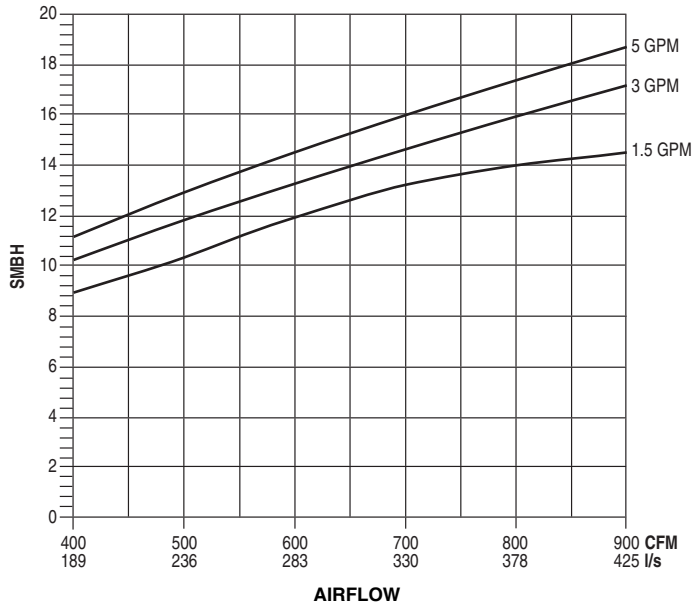
3 Row (Total MBH)



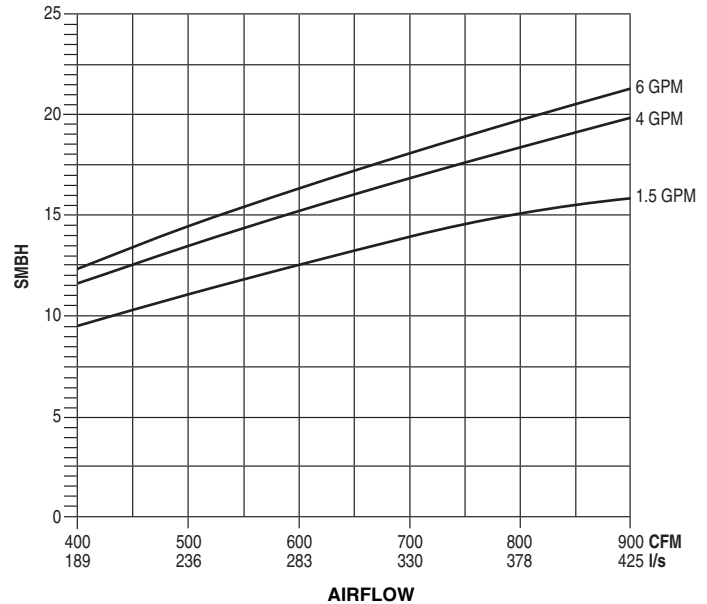
4 Row (Total MBH)



3 Row (Sensible MBH)



4 Row (Sensible MBH)



Altitude Correction Factors

Altitude (ft.)	0	1000	2000	3000	4000	5000	6000	7000
Air Density (lb./cu.ft.)	0.075	0.072	0.070	0.067	0.065	0.063	0.060	0.058
Total Capacity	1000	0.988	0.986	0.983	0.981	0.979	0.977	0.975
Sensible Capacity	1000	0.960	0.930	0.900	0.860	0.830	0.800	0.770
Static Pressure	1000	0.960	0.930	0.900	0.860	0.830	0.800	0.770

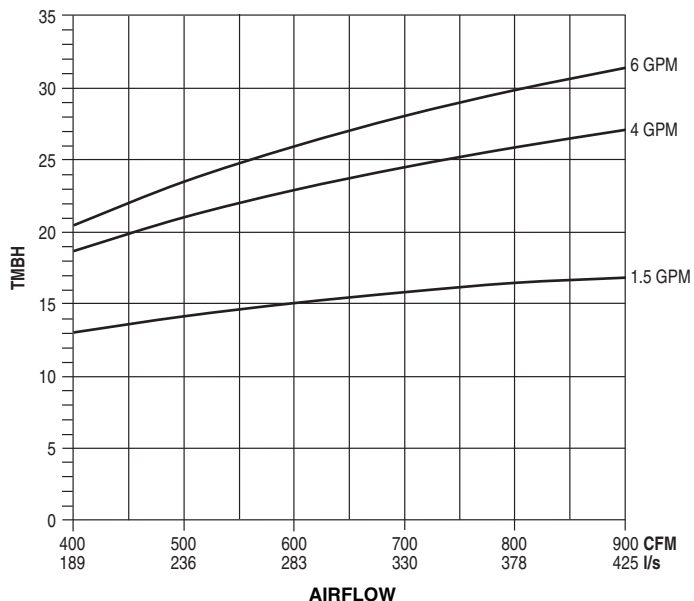
Notes:

1. Capacity and static pressure will be affected for applications above sea level. To apply correction factors, multiply the coil capacity or fan curve data by the tabulated correction factor.
2. Connections: 3 and 4 Row 7/8" (22.2) O.D. male solder.

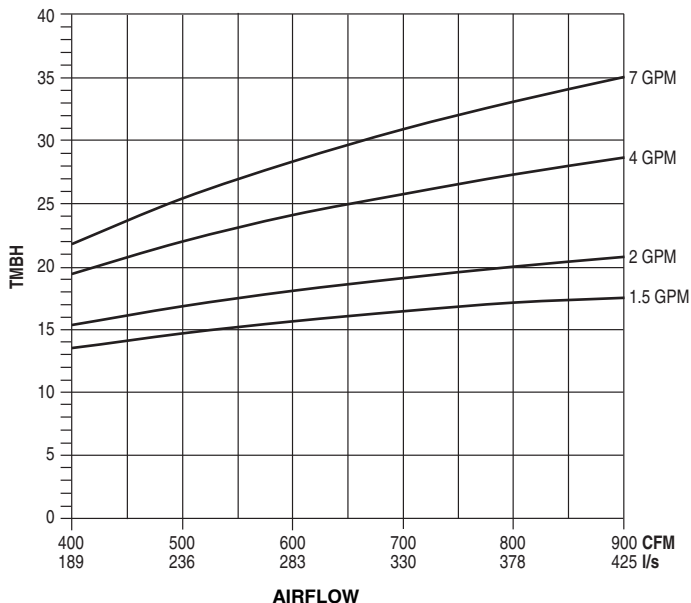
Chilled Water Coil Performance Data • Model Series 35FH • Unit Sizes 4 – 8

Data Based on 80°F DB, 67°F WB Entering Air & 45°F Entering Water

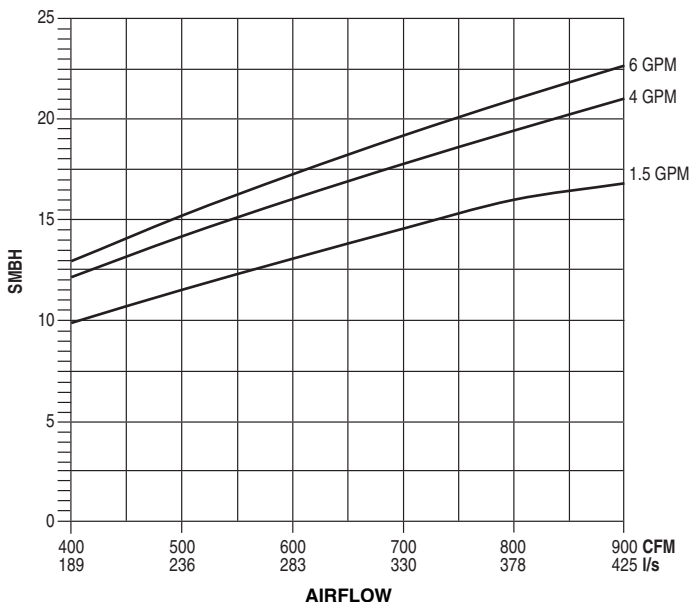
5 Row (Total MBH)



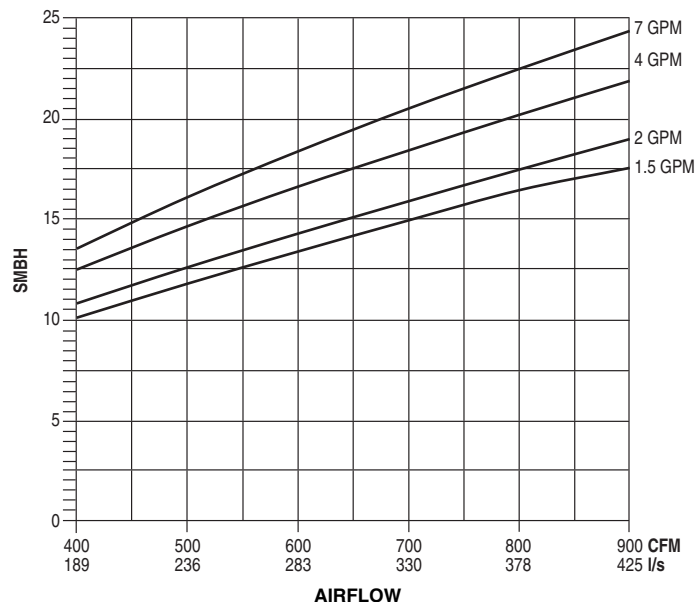
6 Row (Total MBH)



5 Row (Sensible MBH)



6 Row (Sensible MBH)



Altitude Correction Factors

Altitude (ft.)	0	1000	2000	3000	4000	5000	6000	7000
Air Density (lb./cu.ft.)	0.075	0.072	0.070	0.067	0.065	0.063	0.060	0.058
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Sensible Capacity	1000	0.960	0.930	0.900	0.860	0.830	0.800	0.770
Static Pressure	1000	0.960	0.930	0.900	0.860	0.830	0.800	0.770

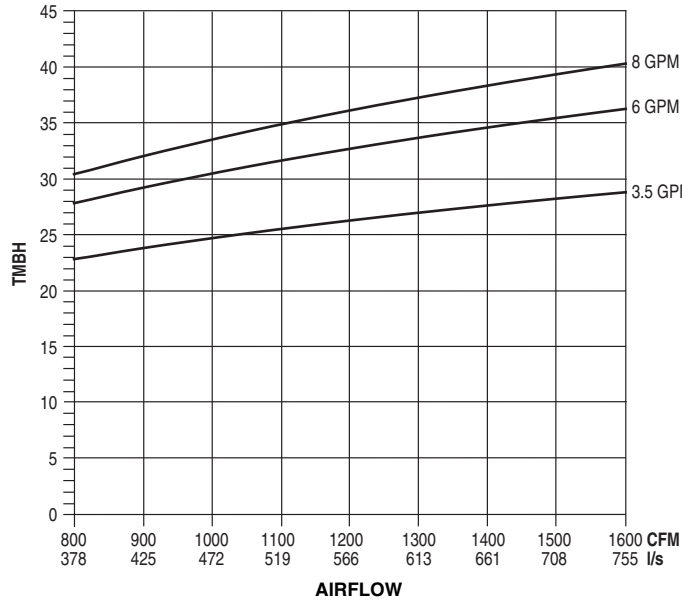
Notes:

- Capacity and static pressure will be affected for applications above sea level. To apply correction factors, multiply the coil capacity or fan curve data by the tabulated correction factor.
- Connections: 5 and 6 Row 7/8" (22.2) O.D. male solder.

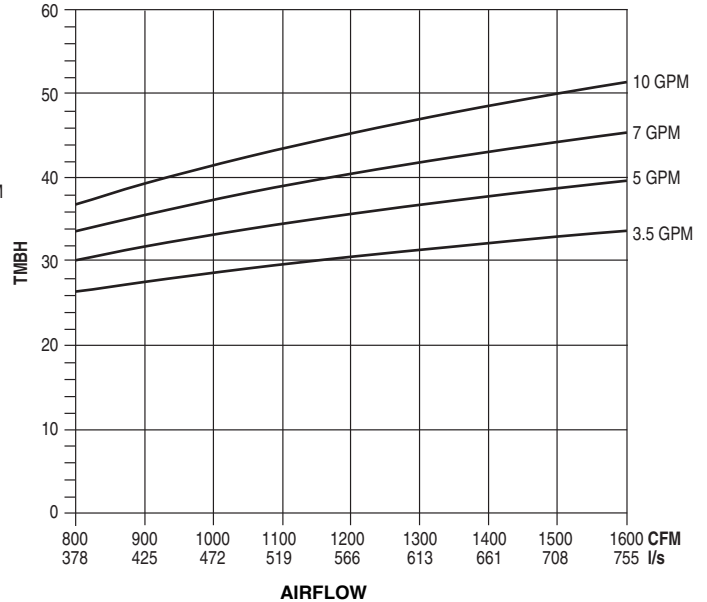
Chilled Water Coil Performance Data • Model Series 35FH • Unit Sizes 10 – 16

Data Based on 80°F DB, 67°F WB Entering Air & 45°F Entering Water

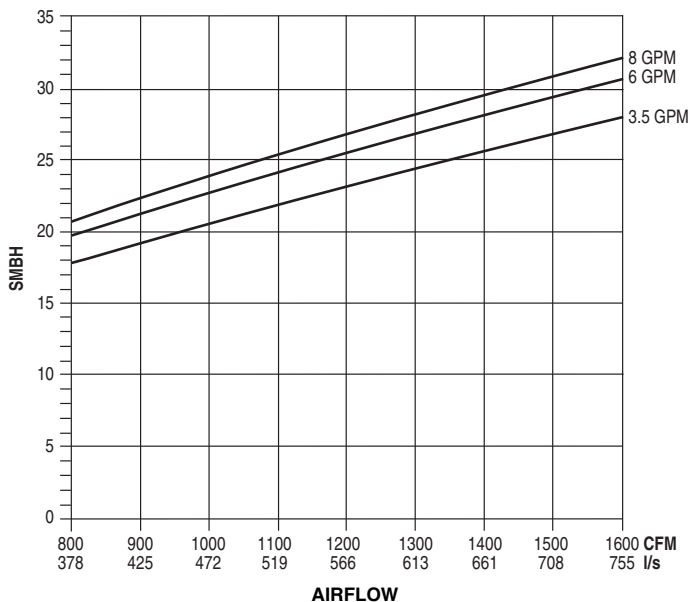
3 Row (Total MBH)



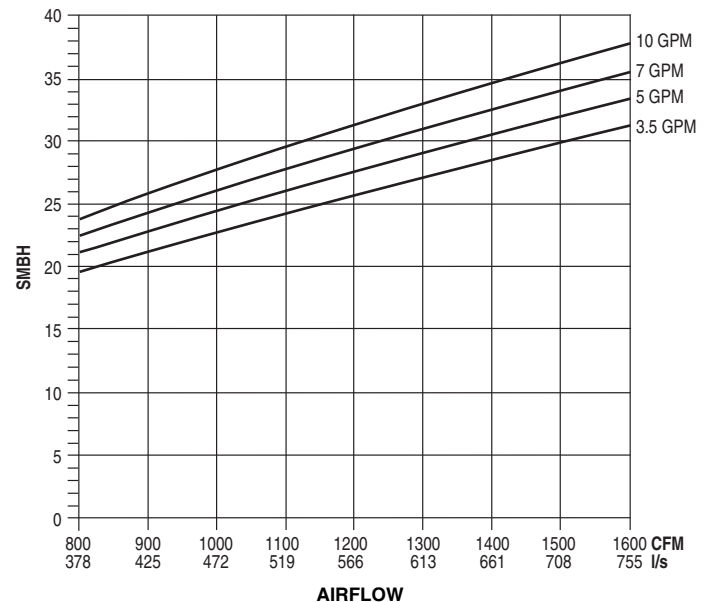
4 Row (Total MBH)



3 Row (Sensible MBH)



4 Row (Sensible MBH)



Altitude Correction Factors

Altitude (ft.)	0	1000	2000	3000	4000	5000	6000	7000
Air Density (lb./cu.ft.)	0.075	0.072	0.070	0.067	0.065	0.063	0.060	0.058
Total Capacity	1000	0.988	0.986	0.983	0.981	0.979	0.977	0.975
Sensible Capacity	1000	0.960	0.930	0.900	0.860	0.830	0.800	0.770
Static Pressure	1000	0.960	0.930	0.900	0.860	0.830	0.800	0.770

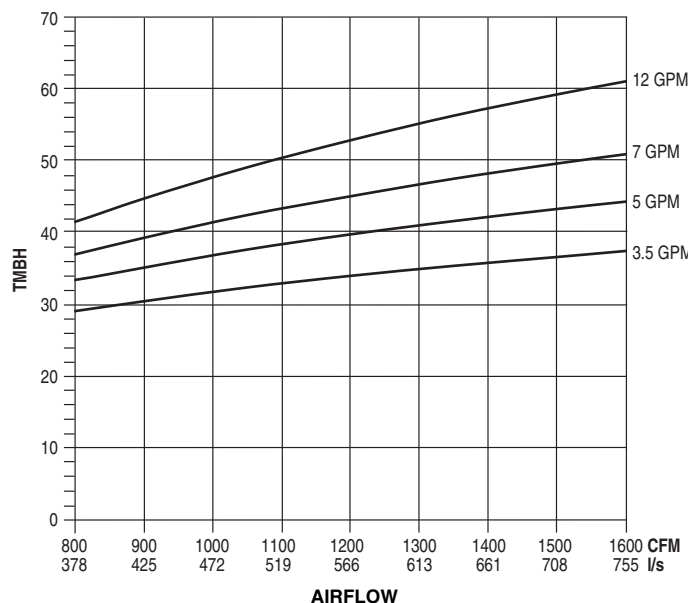
Notes:

- Capacity and static pressure will be affected for applications above sea level. To apply correction factors, multiply the coil capacity or fan curve data by the tabulated correction factor.
- Connections: 3 and 4 Row 7/8" (22.2) O.D. male solder.

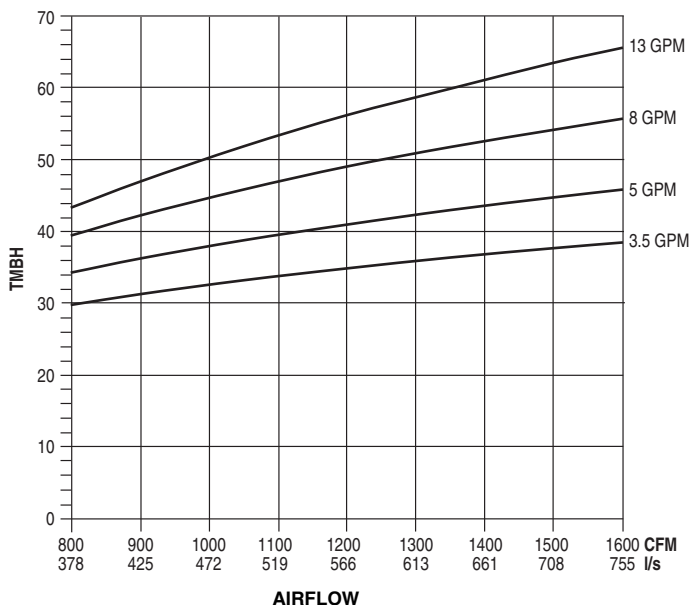
Chilled Water Coil Performance Data • Model Series 35FH • Unit Sizes 10 – 16

Data Based on 80°F DB, 67°F WB Entering Air & 45°F Entering Water

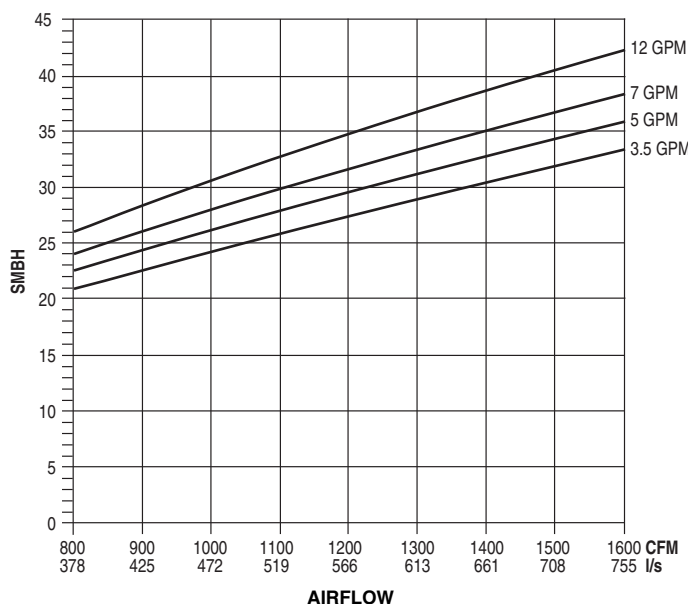
5 Row (Total MBH)



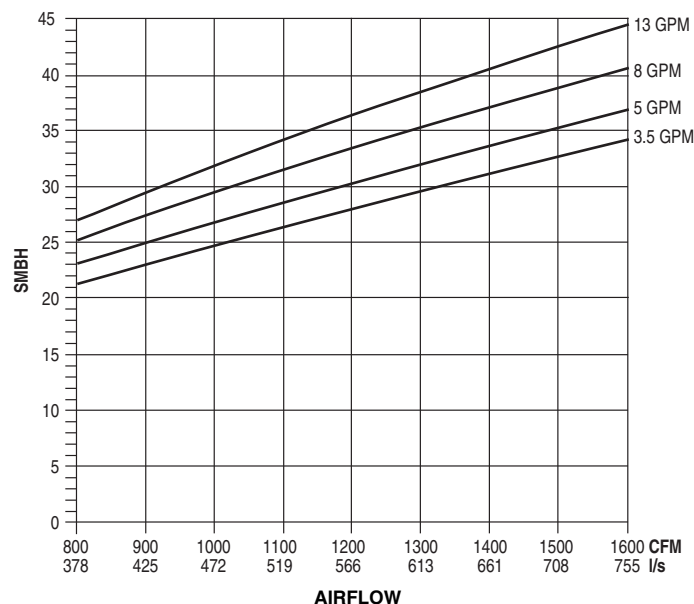
6 Row (Total MBH)



5 Row (Sensible MBH)



6 Row (Sensible MBH)



Altitude Correction Factors

Altitude (ft.)	0	1000	2000	3000	4000	5000	6000	7000
Air Density (lb./cu.ft.)	0.075	0.072	0.070	0.067	0.065	0.063	0.060	0.058
Total Capacity	1000	0.988	0.986	0.983	0.981	0.979	0.977	0.975
Sensible Capacity	1000	0.960	0.930	0.900	0.860	0.830	0.800	0.770
Static Pressure	1000	0.960	0.930	0.900	0.860	0.830	0.800	0.770

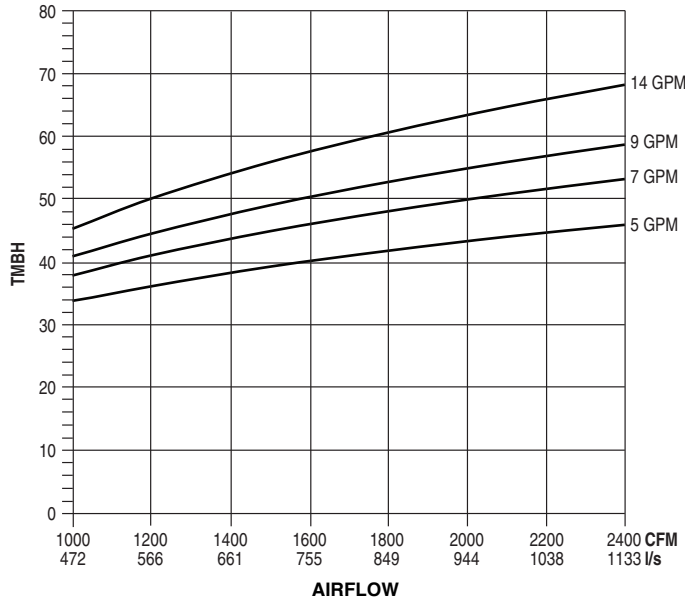
Notes:

- Capacity and static pressure will be affected for applications above sea level. To apply correction factors, multiply the coil capacity or fan curve data by the tabulated correction factor.
- Connections: 5 Row 7/8" (22.2), 6 Row 1 1/8" (28.6) O.D. male solder.

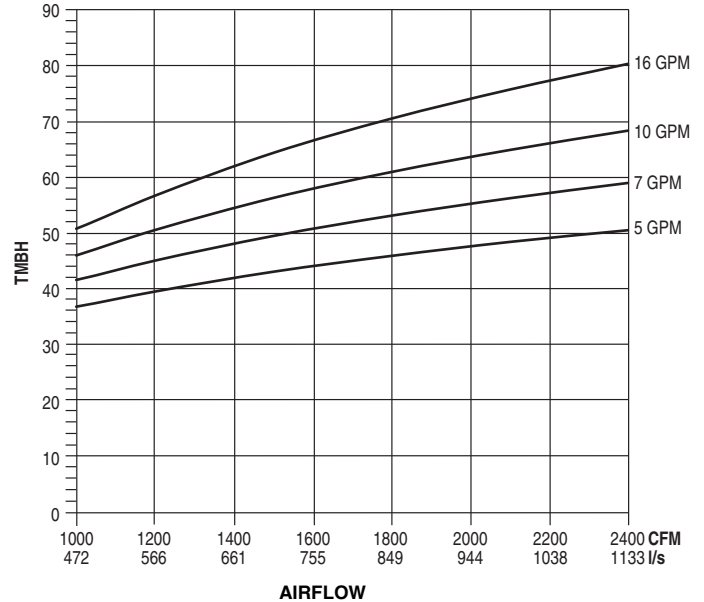
Chilled Water Coil Performance Data • Model Series 35FH • Unit Sizes 18 – 24

Data Based on 80°F DB, 67°F WB Entering Air & 45°F Entering Water

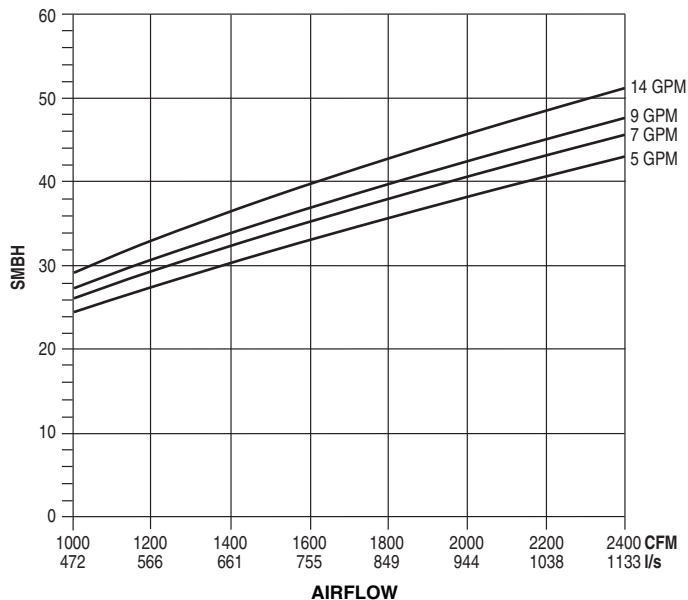
3 Row (Total MBH)



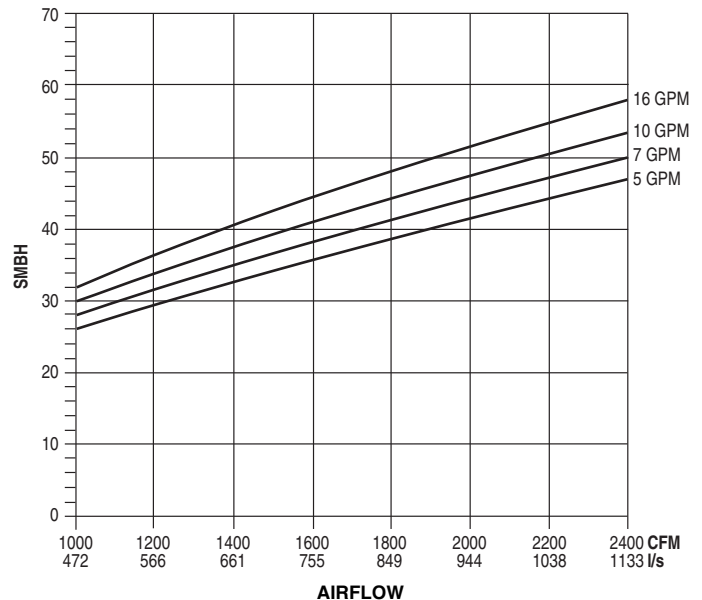
4 Row (Total MBH)



3 Row (Sensible MBH)



4 Row (Sensible MBH)



Altitude Correction Factors

Altitude (ft.)	0	1000	2000	3000	4000	5000	6000	7000
Air Density (lb./cu.ft.)	0.075	0.072	0.070	0.067	0.065	0.063	0.060	0.058
Total Capacity	1000	0.988	0.986	0.983	0.981	0.979	0.977	0.975
Sensible Capacity	1000	0.960	0.930	0.900	0.860	0.830	0.800	0.770
Static Pressure	1000	0.960	0.930	0.900	0.860	0.830	0.800	0.770

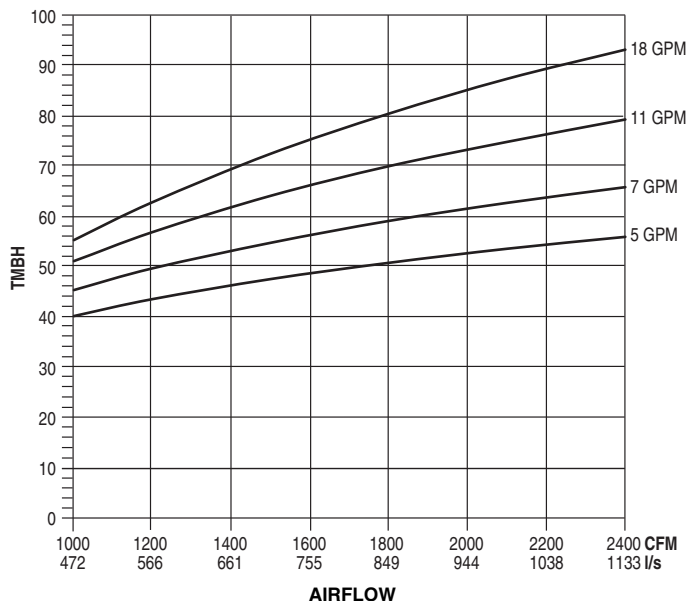
Notes:

- Capacity and static pressure will be affected for applications above sea level. To apply correction factors, multiply the coil capacity or fan curve data by the tabulated correction factor.
- Connections: 3 and 4 Row 1 1/8" (28.6) O.D. male solder.

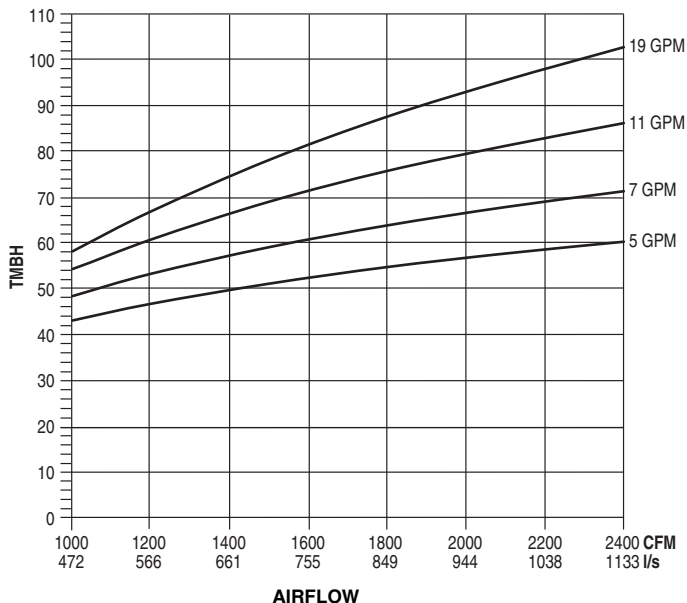
Chilled Water Coil Performance Data • Model Series 35FH • Unit Sizes 18 – 24

Data Based on 80°F DB, 67°F WB Entering Air & 45°F Entering Water

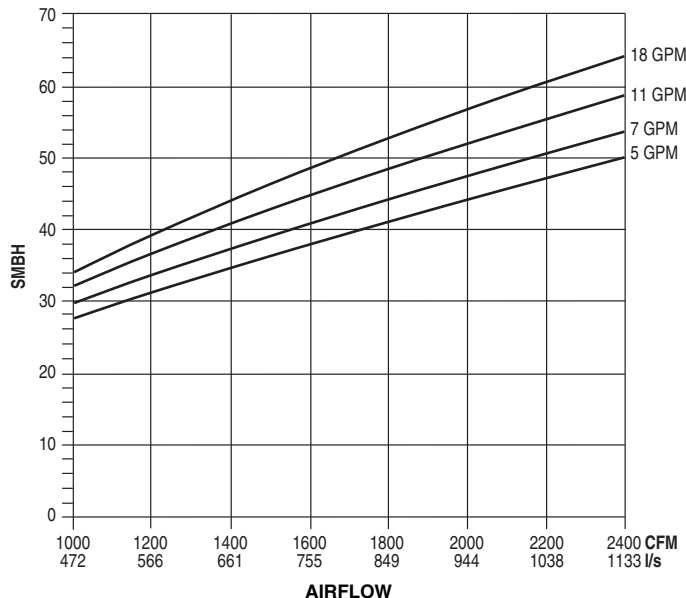
5 Row (Total MBH)



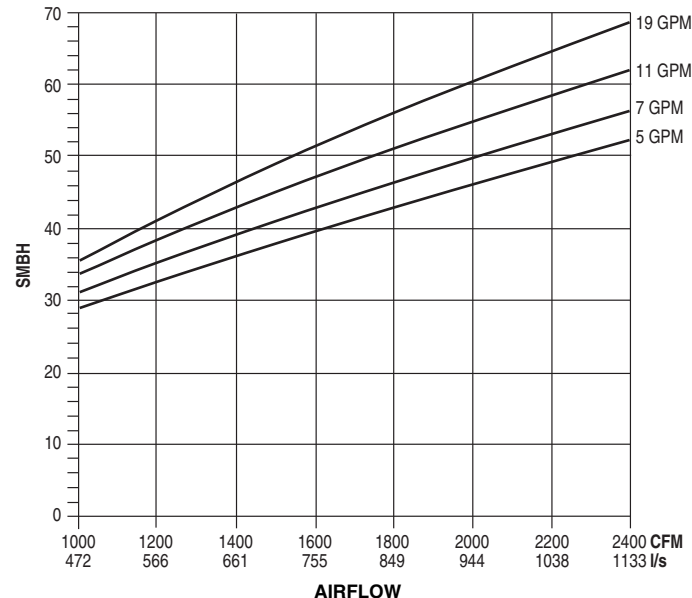
6 Row (Total MBH)



5 Row (Sensible MBH)



6 Row (Sensible MBH)



Altitude Correction Factors

Altitude (ft.)	0	1000	2000	3000	4000	5000	6000	7000
Air Density (lb./cu.ft.)	0.075	0.072	0.070	0.067	0.065	0.063	0.060	0.058
Total Capacity	1000	0.988	0.986	0.983	0.981	0.979	0.977	0.975
Sensible Capacity	1000	0.960	0.930	0.900	0.860	0.830	0.800	0.770
Static Pressure	1000	0.960	0.930	0.900	0.860	0.830	0.800	0.770

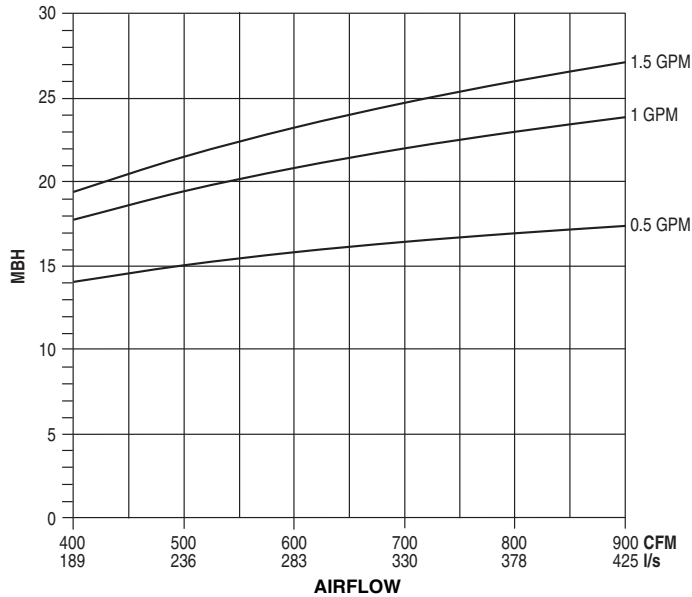
Notes:

- Capacity and static pressure will be affected for applications above sea level. To apply correction factors, multiply the coil capacity or fan curve data by the tabulated correction factor.
- Connections: 5 and 6 Row 1 1/8" (28.6) O.D. male solder.

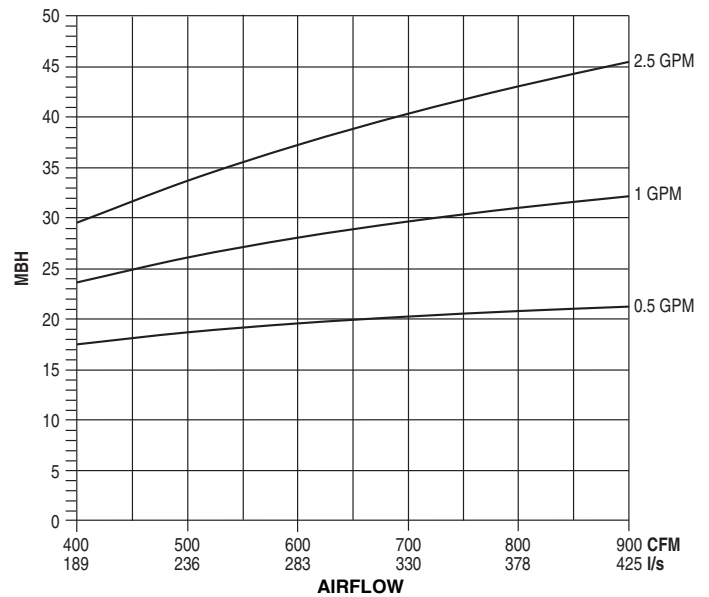
Hot Water Coil Performance Data • Model Series 35FH • Unit Sizes 4 – 8

Data Based on 70°F DB Entering Air & 180°F Entering Water

1 Row (MBH)

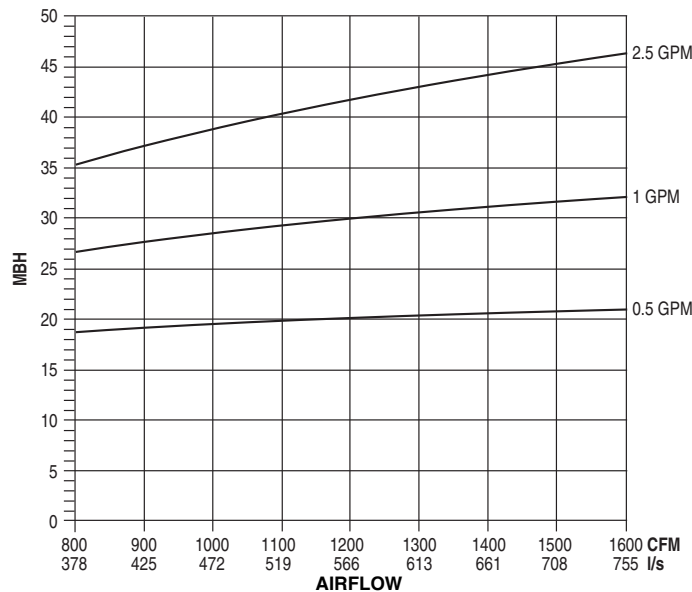


2 Row (MBH)

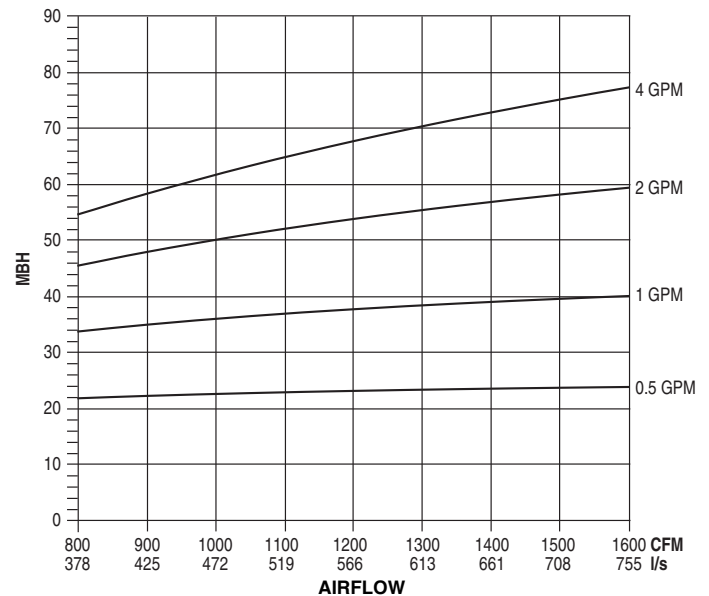


Unit Sizes 10 – 16

1 Row (MBH)



2 Row (MBH)



NOTES:

- Capacities are in MBH.
- MBH (kW) values are based on a Δt (temperature difference) of 110°F (61°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.

- Air Temperature Rise.

$$\text{ATR (°F)} = 927 \times \frac{\text{MBH}}{\text{cfm}}, \quad \text{ATR (°C)} = 829 \times \frac{\text{kW}}{\text{l/s}}$$

- Water Temp. Drop.

$$\text{WTD (°F)} = 2.04 \times \frac{\text{MBH}}{\text{GPM}}, \quad \text{WTD (°C)} = .224 \times \frac{\text{kW}}{\text{l/s}}$$

- Connections: 1 and 2 Row 1/2" (13) O.D. male solder.

Correction factors at other entering conditions:

Δt °F (°C)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	120 (67)	130 (72)	140 (78)	150 (83)
Factor	.455	.545	.636	.727	.818	.909	1.00	1.09	1.18	1.27	1.36

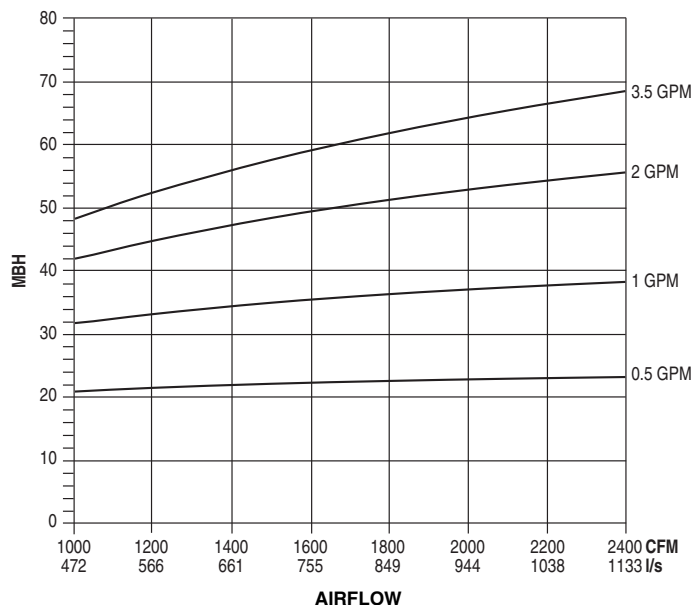
Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

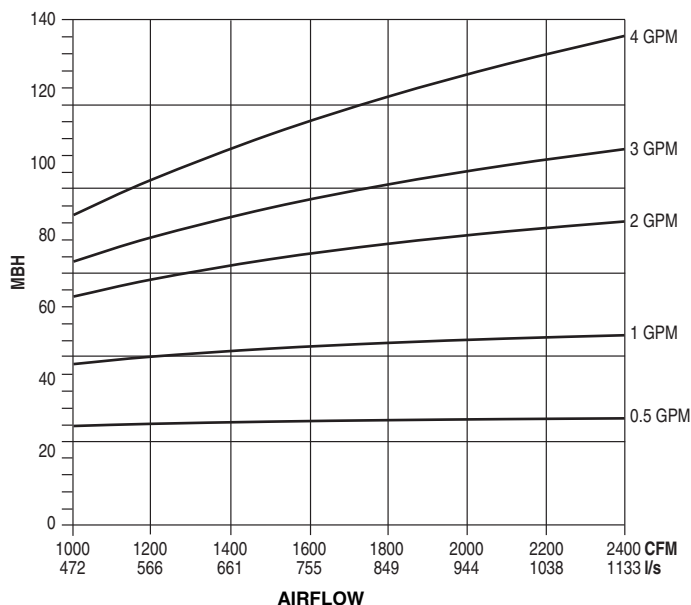
Hot Water Coil Performance Data • Model Series 35FH • Unit Sizes 18 – 24

Data Based on 70°F DB Entering Air & 180°F Entering Water

1 Row (MBH)



2 Row (MBH)



NOTES:

- Capacities are in MBH.
- MBH (kW) values are based on a Δt (temperature difference) of 110°F (61°C) between entering air and entering water. For other Δt 's; multiply the MBH (kW) values by the factors below.
- Air Temperature Rise.

$$ATR (^\circ F) = 927 \times \frac{MBH}{cfm}, \quad ATR (^\circ C) = 829 \times \frac{kW}{l/s}$$
- Water Temp. Drop.

$$WTD (^\circ F) = 2.04 \times \frac{MBH}{GPM}, \quad WTD (^\circ C) = .224 \times \frac{kW}{l/s}$$
- Connections: 1 and 2 Row 1/2" (13) O.D. male solder.

Altitude Correction Factors:

Altitude ft. (m)	Sensible Heat Factor
0 (0)	1.00
2000 (610)	0.94
3000 (914)	0.90
4000 (1219)	0.87
5000 (1524)	0.84
6000 (1829)	0.81
7000 (2134)	0.78

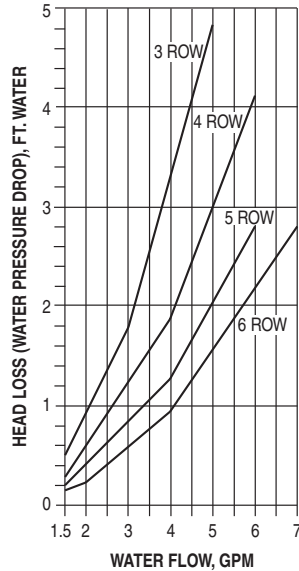
Correction factors at other entering conditions:

Δt °F (°C)	50 (28)	60 (33)	70 (39)	80 (44)	90 (50)	100 (56)	110 (61)	120 (67)	130 (72)	140 (78)	150 (83)
Factor	.455	.545	.636	.727	.818	.909	1.00	1.09	1.18	1.27	1.36

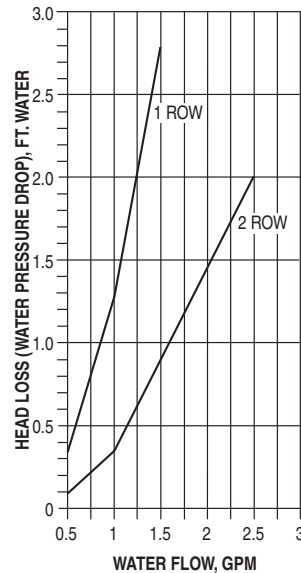
Coil Performance Data • Pressure Drop • Model Series 35FH

Unit Sizes 4 – 8

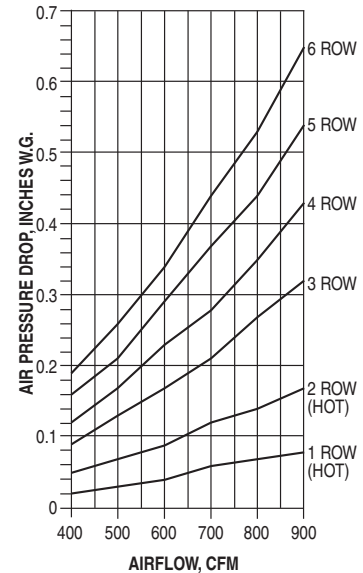
Chilled Water Pressure Drop



Hot Water Pressure Drop

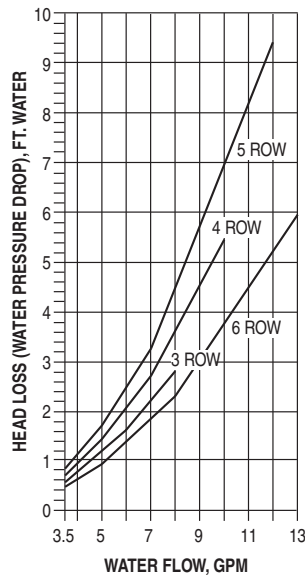


Chilled and Hot Water Air Pressure Drop

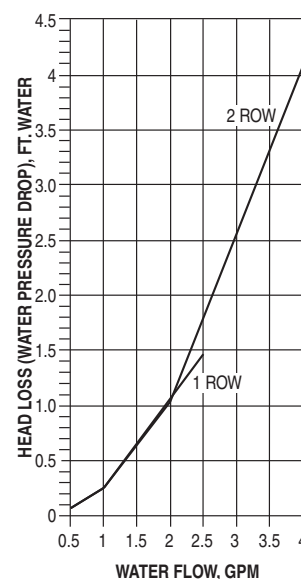


Unit Sizes 10 – 16

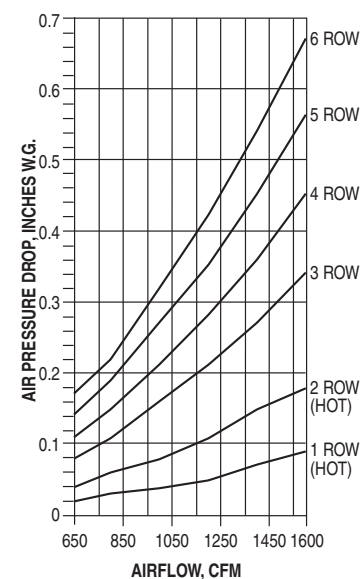
Chilled Water Pressure Drop



Hot Water Pressure Drop



Chilled and Hot Water Air Pressure Drop



Metric Conversion Factors:

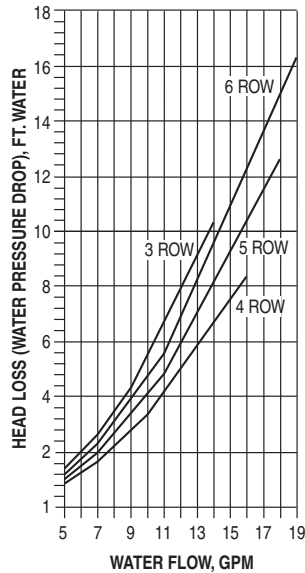
1. Water Flow (liters per second)
 $\text{l/s} = \text{gpm} \times 0.6309$
2. Water Head Loss (kilopascals):
 $\text{kPa} = \text{ft. w.g.} \times 2.9837$
3. Airflow Volume (liters per second)
 $\text{l/s} = \text{CFM} \times 0.472$
4. Air Pressure Drop (Pascals):
 $\text{Pa} = \text{in. w.g.} \times 248.6$

5. Heat (kilowatts):
 $\text{kW} = \text{Mbh} \times 0.293$

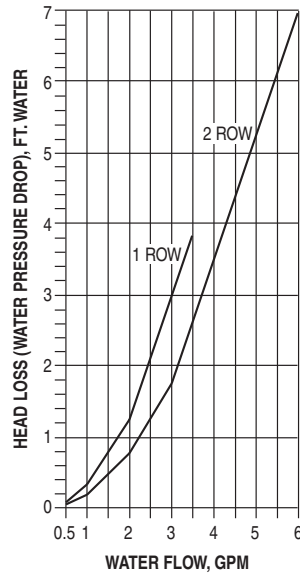
Coil Performance Data • Pressure Drop • Model Series 35FH

Unit Sizes 18 – 24

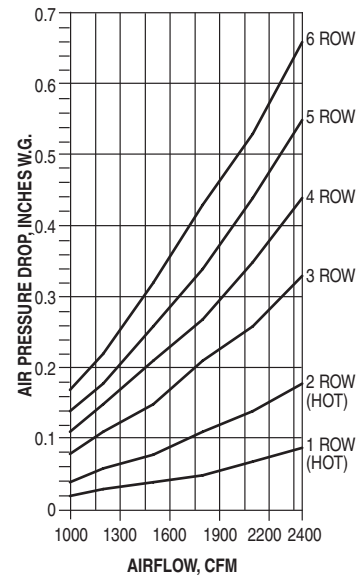
Chilled Water Pressure Drop



Hot Water Pressure Drop



Chilled and Hot Water Air Pressure Drop

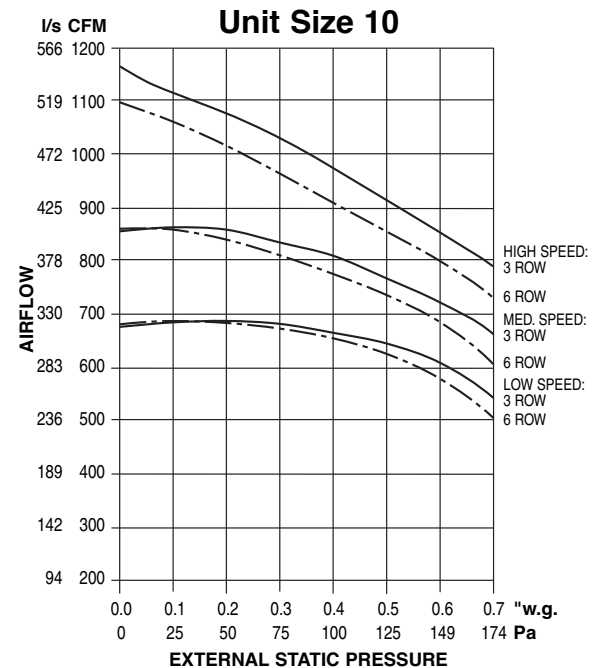
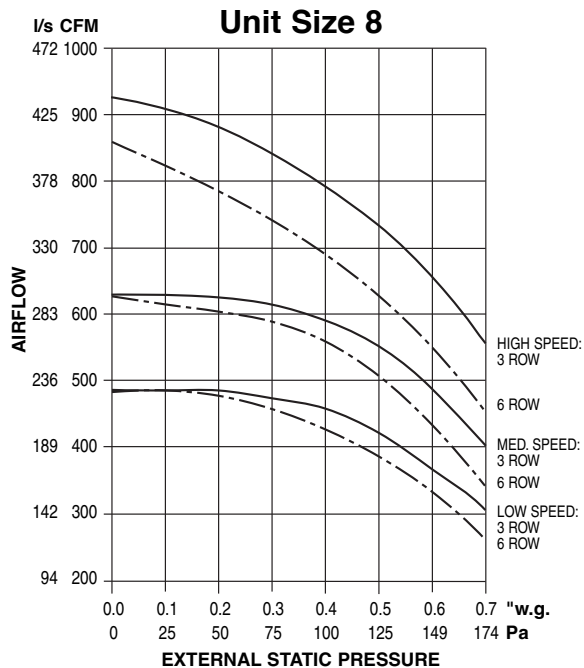
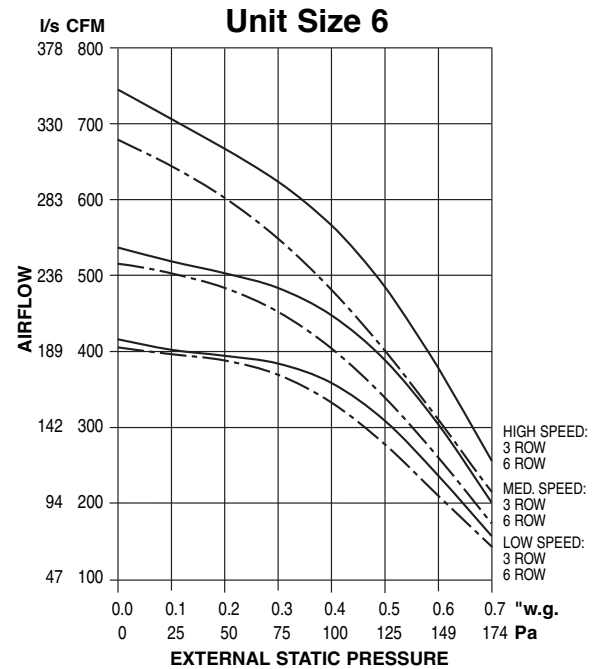
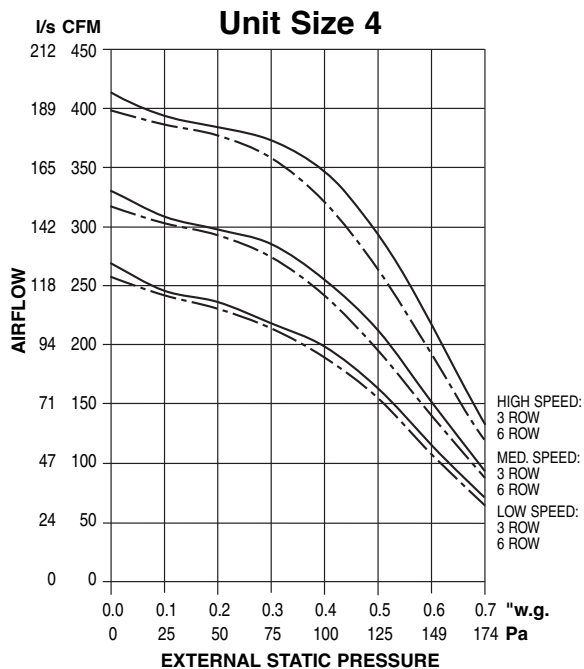


Metric Conversion Factors:

1. Water Flow (liters per second)
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2. Water Head Loss (kilopascals):
 $\text{kPa} = \text{ft. w.g.} \times 2.9837$
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 $\text{l/s} = \text{CFM} \times 0.472$
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5. Heat (kilowatts):
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Model Series 35FH • PSC Motor Fan Performance Curves

Airflow vs. External Static Pressure

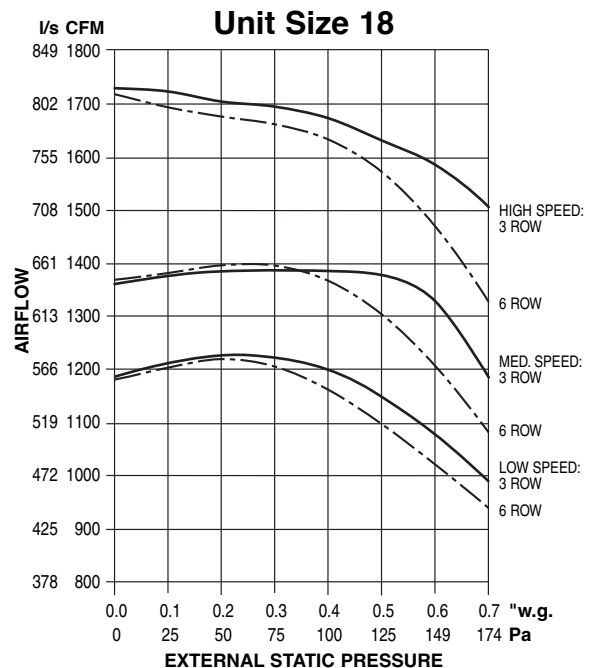
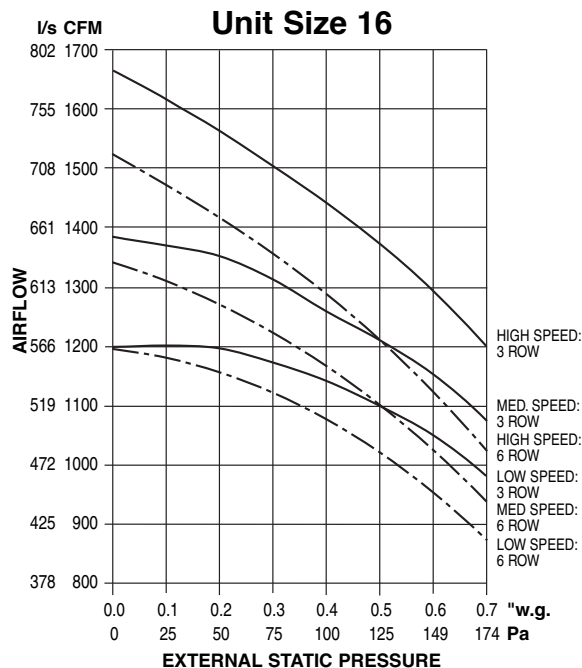
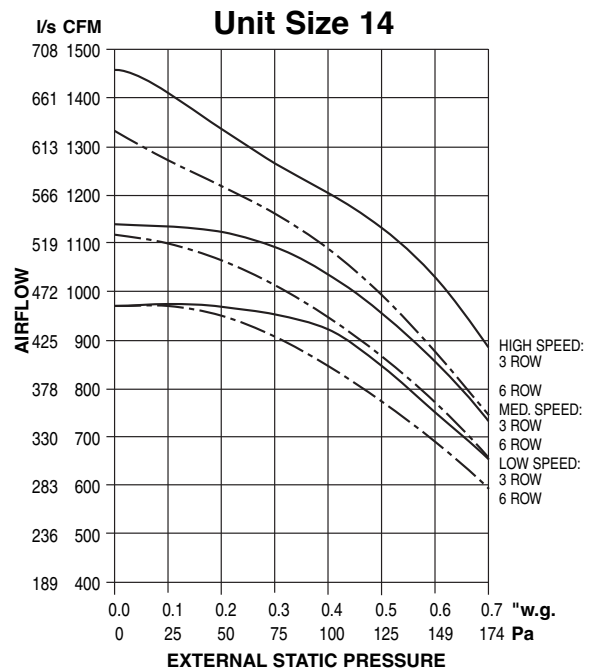
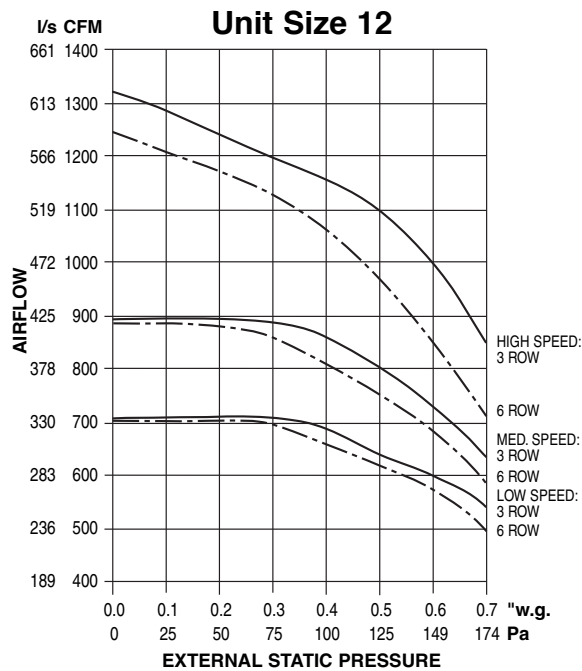


PSC MOTOR FAN NOTES:

1. Permanent split capacitor (PSC) motors are of the three speed type with separate taps (High, Medium and Low) which provide variable horsepower outputs. Commonly, units are selected and sized on a conservative basis and actual airflow and/or external static pressure requirements are lower than specified. When this is the case, the unit fan motor can be run at low or medium speed, reducing power consumption and operating cost.
2. All fan curves shown are for 277 volt single phase PSC motors and include internal losses for cabinet, electric heater and 3 or 6 row water coil.
3. For other coil combinations and type of filters, adjust performance curves based on pressure losses or use Selectworks.
4. Filter pressure drops table shown on page FH31.

Model Series 35FH • PSC Motor Fan Performance Curves

Airflow vs. External Static Pressure

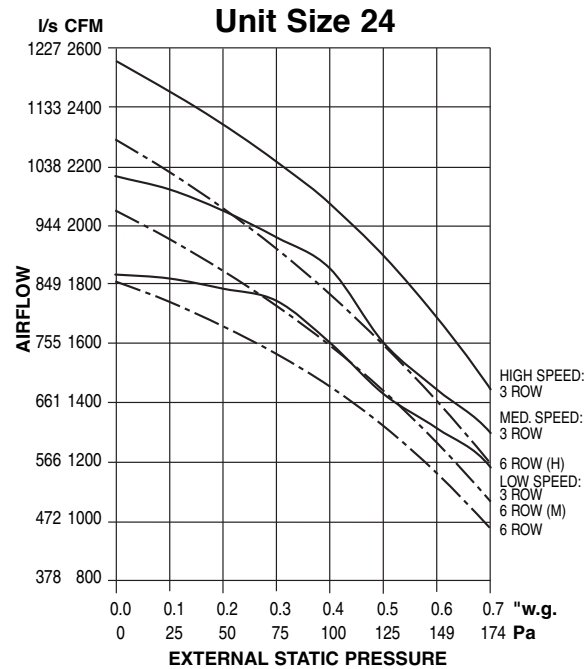
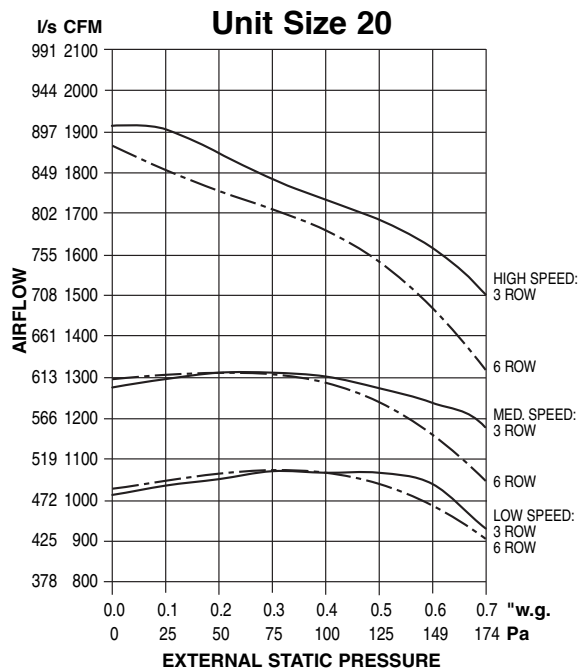


PSC MOTOR FAN NOTES:

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Model Series 35FH • PSC Motor Fan Performance Curves

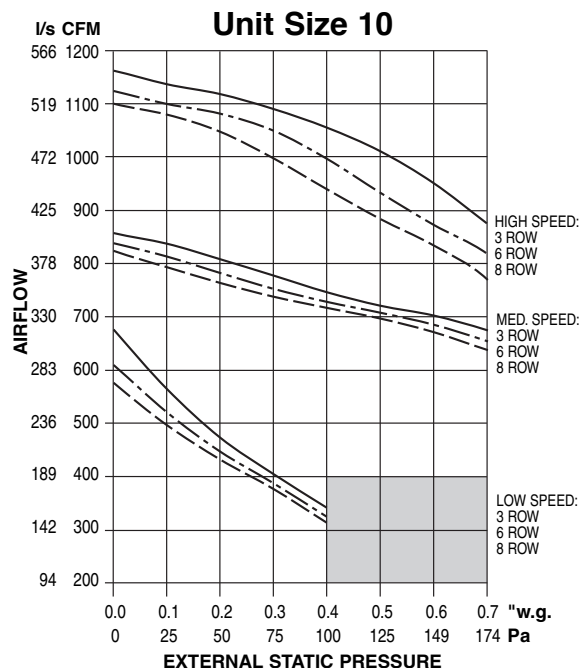
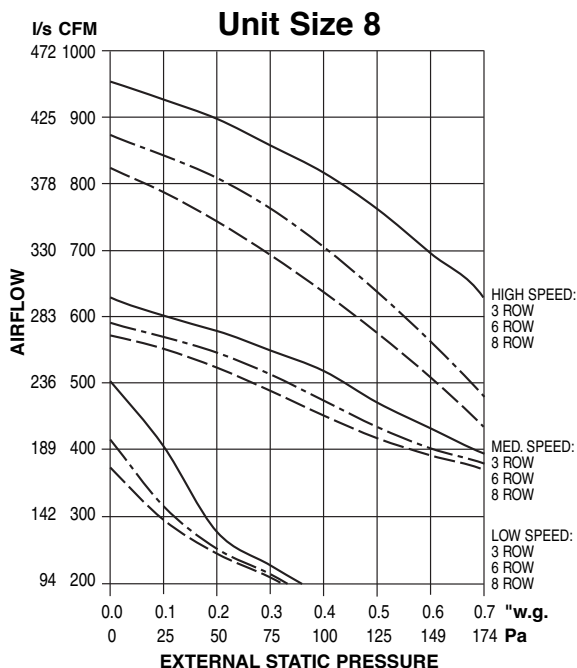
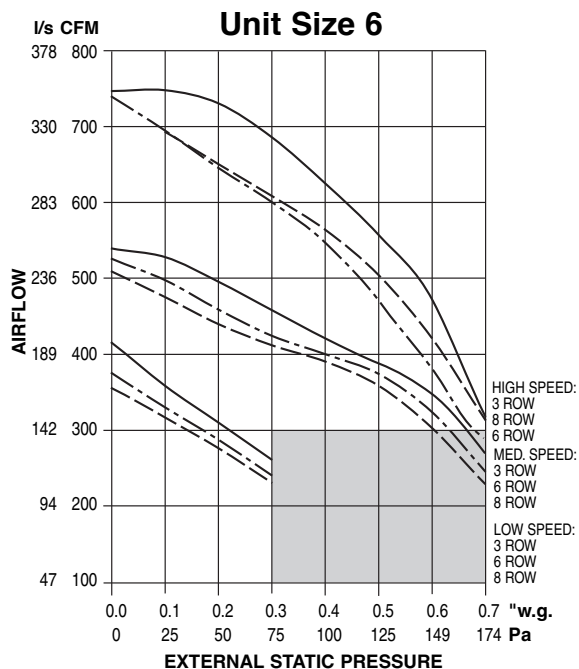
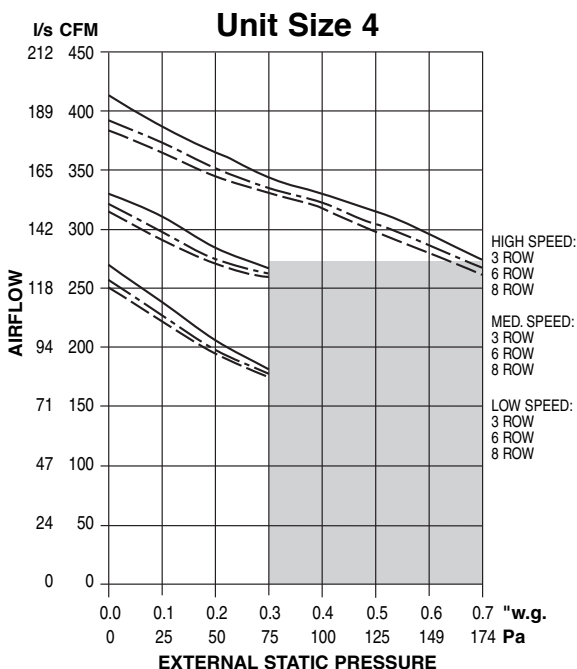
Airflow vs. External Static Pressure



PSC MOTOR FAN NOTES:

1. Permanent split capacitor (PSC) motors are of the three speed type with separate taps (High, Medium and Low) which provide variable horsepower outputs. Commonly, units are selected and sized on a conservative basis and actual airflow and/or external static pressure requirements are lower than specified. When this is the case, the unit fan motor can be run at low or medium speed, reducing power consumption and operating cost.
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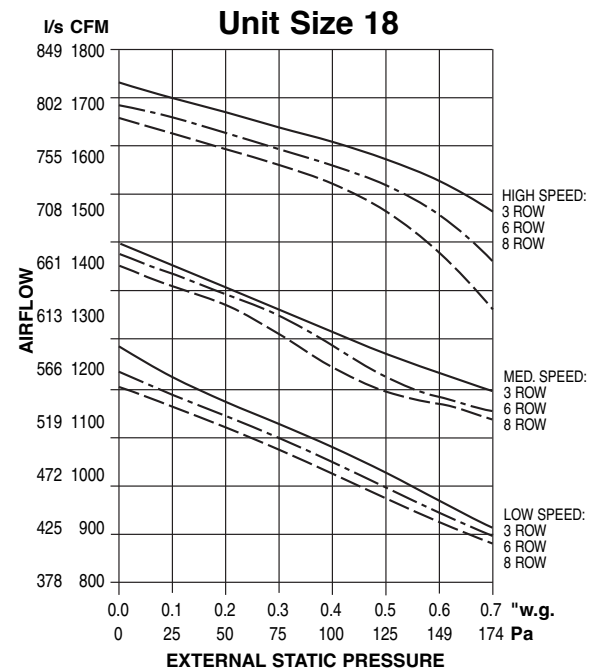
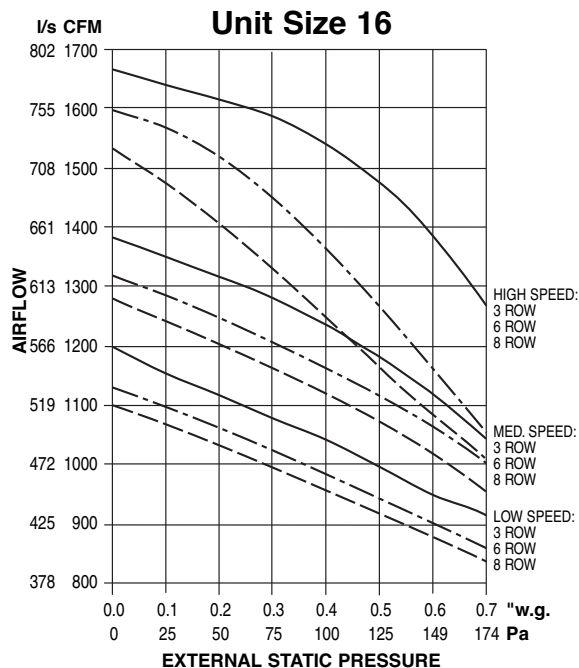
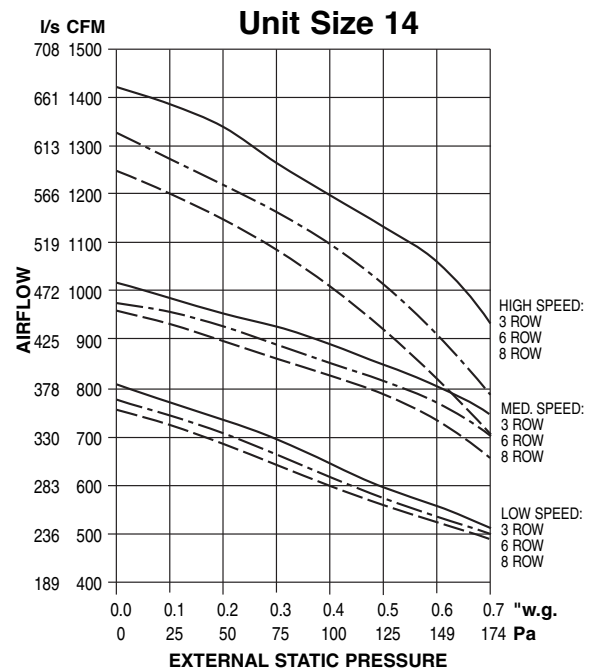
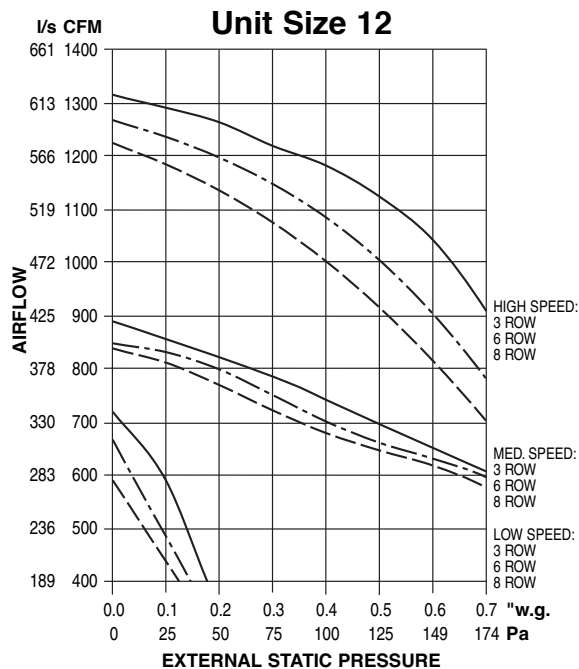
Model Series 35FH • 3-Speed ECM Motor Fan Performance Curves Airflow vs. External Static Pressure



3-SPEED ECM MOTOR FAN NOTES:

1. Fan coil units equipped with 3-speed ECM motors have separate taps (High, Medium and Low) which provide variable horsepower outputs. Commonly, units are selected and sized on a conservative basis and actual airflow and/or external static pressure requirements are lower than specified. When this is the case, the unit fan motor can be run at low or medium speed, reducing power consumption and operating cost.
2. All fan curves shown are for 277 volt single phase 3-speed ECM motors and include internal losses for cabinet, electric heater and 3, 6 or 8 row water coil.
3. For other coil combinations and type of filters, adjust performance curves based on pressure losses or use Selectworks.
4. Filter pressure drops table shown on page FH31.
5. Operation within shaded area not predictable.

Model Series 35FH • 3-Speed ECM Motor Fan Performance Curves Airflow vs. External Static Pressure

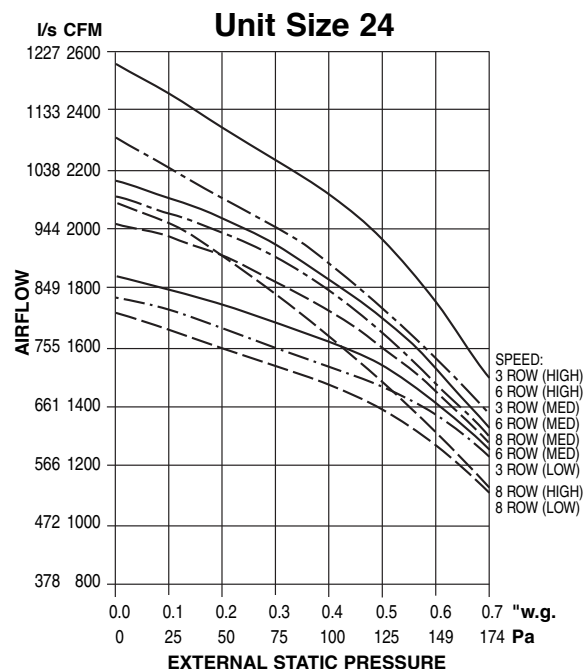
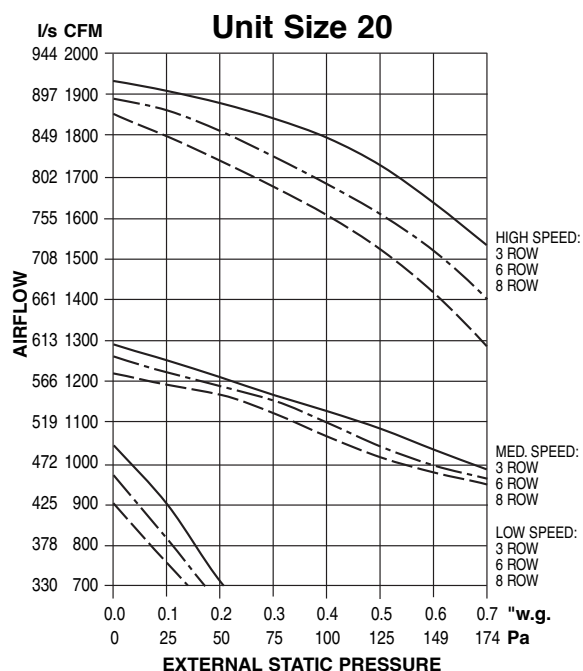


3-SPEED ECM MOTOR FAN NOTES:

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2. All fan curves shown are for 277 volt single phase 3-speed ECM motors and include internal losses for cabinet, electric heater and 3, 6 or 8 row water coil.
3. For other coil combinations and type of filters, adjust performance curves based on pressure losses or use Selectworks.
4. Filter pressure drops table shown on page FH31.

Model Series 35FH • 3-Speed ECM Motor Fan Performance Curves

Airflow vs. External Static Pressure

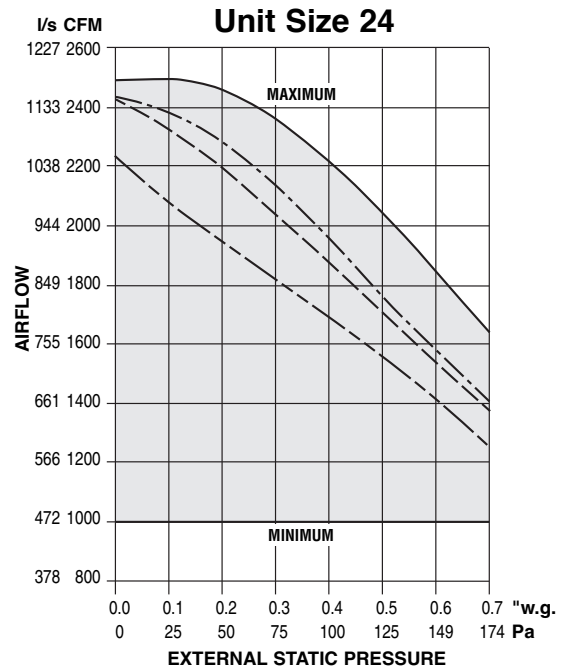
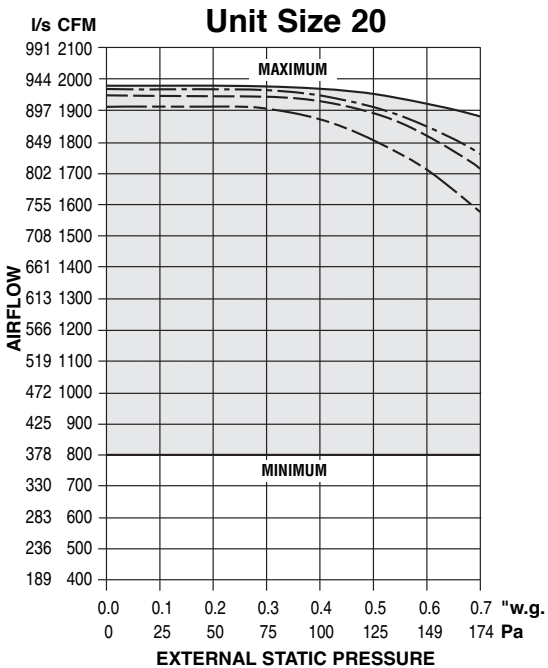
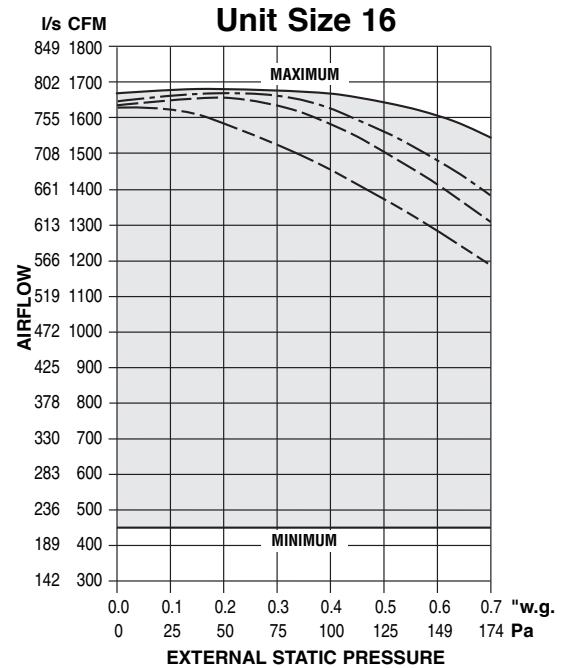
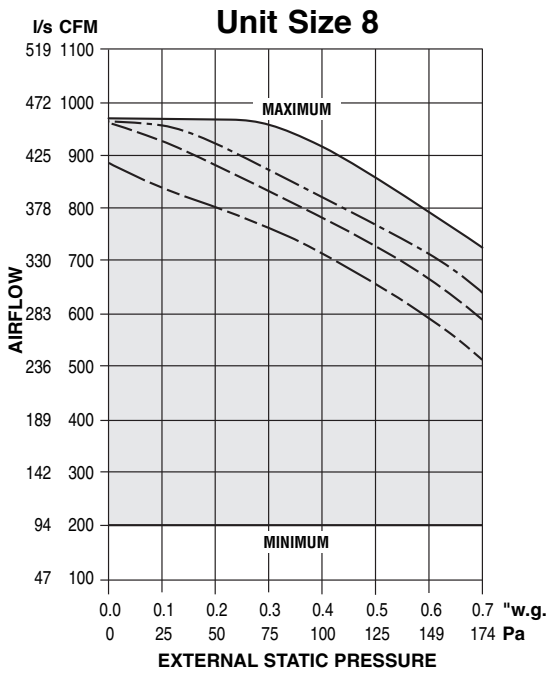


3-SPEED ECM MOTOR FAN NOTES:

1. Fan coil units equipped with 3-speed ECM motors have separate taps (High, Medium and Low) which provide variable horsepower outputs. Commonly, units are selected and sized on a conservative basis and actual airflow and/or external static pressure requirements are lower than specified. When this is the case, the unit fan motor can be run at low or medium speed, reducing power consumption and operating cost.
2. All fan curves shown are for 277 volt single phase 3-speed ECM motors and include internal losses for cabinet, electric heater and 3, 6 or 8 row water coil.
3. For other coil combinations and type of filters, adjust performance curves based on pressure losses or use Selectworks.
4. Filter pressure drops table shown on page FH31.

Model Series: 35FH • EPIC ECM Motor Fan Performance Curves

Airflow vs. External Static Pressure



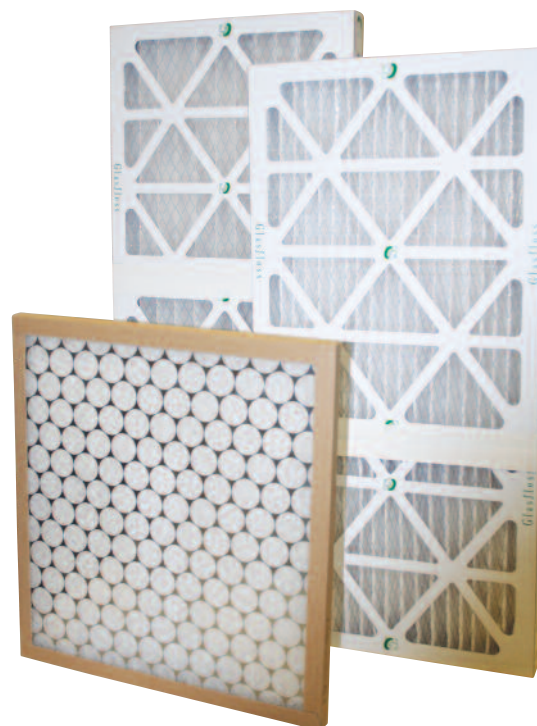
Eplic ECM MOTOR NOTES:

1. The Epic ECM motor is a pressure independent constant volume device at set point and airflow does not vary with changing static pressure condition. The motor compensates for any changes in static pressure such as filter loading. Variations in airflow are generated by the controls which reset the fan airflow based on room demand. (See control sequence).
2. Airflow can be set to operate at any point within shaded area under the selected water coil curve using the Epic volume controller provided.
3. Engineered Comfort Fan Coil units featuring the optional Epic ECM motor have considerably wider turn-down ratios than conventional PSC motors. Hence, a reduced number of unit sizes are required in order to provide the same fan airflow range when compared with fan coils equipped with PSC motors. A reduction in the number of different fan coil sizes required on a typical project simplifies design lay-out and installation and reduces inventory of field service parts.
4. Fan curves shown are applicable to 120/208/240 and 277 volt, single phase Epic ECM motors.

Filter Pressure Drop Adjustments (in w.g.)

Unit Size	Airflow		Filter Type		
	CFM	l/s	1" (25) Throwaway	2" (51) MERV 8	2" (51) MERV 13
4	400	189	0.032	0.066	0.139
	390	184	0.030	0.062	0.134
	375	177	0.026	0.056	0.126
	365	172	0.024	0.052	0.121
6	680	321	0.088	0.179	0.280
	660	311	0.084	0.171	0.270
	650	307	0.082	0.167	0.265
	630	297	0.078	0.159	0.255
8	870	411	0.127	0.256	0.376
	830	392	0.118	0.239	0.356
	800	378	0.112	0.227	0.341
	770	363	0.106	0.215	0.326
10	1170	552	0.087	0.176	0.277
	1140	538	0.083	0.169	0.268
	1110	524	0.080	0.162	0.260
	1080	510	0.076	0.155	0.251
12	1280	604	0.100	0.202	0.309
	1250	590	0.096	0.195	0.300
	1220	576	0.093	0.188	0.292
	1190	562	0.089	0.181	0.283
14	1400	661	0.114	0.230	0.344
	1350	637	0.108	0.218	0.329
	1300	614	0.102	0.207	0.315
	1260	595	0.097	0.197	0.303
16	1600	755	0.137	0.276	0.402
	1540	727	0.130	0.262	0.385
	1490	703	0.124	0.251	0.370
	1490	703	0.124	0.251	0.370
18	1750	826	0.085	0.173	0.273
	1720	812	0.083	0.168	0.267
	1700	802	0.081	0.165	0.263
	1680	793	0.080	0.162	0.259
20	1930	911	0.099	0.200	0.307
	1880	887	0.095	0.193	0.298
	1840	868	0.092	0.187	0.290
	1800	850	0.089	0.180	0.282
24	2400	1133	0.135	0.273	0.398
	2330	1100	0.130	0.262	0.384
	2230	1052	0.122	0.247	0.365
	2050	967	0.111	0.219	0.330

Note: Pressure drop based on clean filters. Using any type of filter will lower unit airflow.



Front: 1" (25) Throwaway
Middle: 2" (51) MERV 13
Back: 2" (51) MERV 8

Model Series 35FH • High Performance • Performance Data

Sound Power Levels for PSC Motor and NC Level Application Guide

Unit Size	Airflow cfm l/s	Discharge Sound Power Levels							Radiated Sound Power Levels						
		Octave Bands						NC	Octave Bands						NC
		2	3	4	5	6	7		2	3	4	5	6	7	
4	380 179	71	70	67	64	61	59	30	79	66	57	51	47	43	46
	310 146	67	66	63	60	57	55	25	75	62	54	47	43	39	41
	220 104	64	62	60	55	51	48	21	72	59	51	43	39	35	38
6	630 297	74	74	70	71	67	66	35	74	68	60	55	49	47	40
	500 236	69	66	64	61	59	57	25	68	61	55	49	42	39	33
	390 184	64	61	59	56	54	51	-	66	58	51	44	37	34	30
8	840 396	68	67	67	66	63	60	25	72	63	58	54	48	44	38
	610 288	64	61	61	58	55	50	-	68	57	54	48	41	35	33
	460 217	60	57	57	54	51	44	-	64	54	51	44	36	29	28
10	1115 526	69	69	69	69	66	65	28	73	64	59	58	52	48	39
	870 411	64	63	64	62	59	56	20	70	61	57	54	48	44	35
	700 330	61	60	61	58	55	51	-	67	58	55	52	44	39	31
12	1220 576	73	71	71	71	66	64	30	75	68	60	58	53	49	41
	900 425	68	64	64	62	59	56	21	71	62	56	52	46	41	36
	720 340	65	61	61	59	55	50	-	68	59	54	49	42	36	33
14	1300 614	73	72	72	72	68	66	31	75	69	61	59	54	50	41
	1070 505	69	68	68	67	63	61	26	74	66	59	56	50	46	40
	890 420	67	65	65	63	60	57	23	73	64	57	54	48	44	39
16	1560 736	72	71	71	71	67	66	30	77	70	62	59	54	51	44
	1370 647	72	69	69	68	65	63	28	76	68	61	56	51	48	43
	1240 585	71	67	67	65	62	60	25	75	66	59	54	49	46	41
18	1720 812	72	73	72	72	68	67	33	74	68	63	60	55	52	40
	1460 689	70	70	71	68	65	64	29	73	66	61	57	52	49	39
	1290 609	67	68	69	65	62	61	26	72	64	59	55	49	46	38
20	1830 864	77	75	73	74	70	70	35	79	71	64	62	57	55	46
	1390 656	73	68	67	65	61	60	26	74	65	60	55	49	46	40
	1120 529	73	63	62	61	56	53	25	71	62	58	52	45	41	36
24	2260 1067	77	74	74	74	71	69	34	78	71	64	61	56	53	45
	1950 920	75	71	71	71	67	64	30	77	69	63	59	54	50	44
	1690 798	72	69	69	68	64	61	28	76	67	61	57	52	48	43

Performance Notes:

1. Fan discharge (external) static pressure is 0.25" w.g. (63 Pa).
2. Sound power levels in decibels, dB re 10⁻¹² watts.
3. All sound data listed by octave bands is raw data without any corrections for room absorption or duct attenuation.
4. Data derived from independent tests conducted following guidelines of are with AHRI Standard 880.

5. NC levels are calculated from the published raw data and based on procedures outlined in Appendix E, AHRI Standard 885.

6. Fan discharge sound attenuation deductions are based on environmental effect, duct lining, branch power division, insulated flexible duct, end reflection and space effect and are as follows:

Discharge attenuation	Octave Band						
	2	3	4	5	6	7	
< 300 cfm	24	28	39	53	59	40	
300 – 700 cfm	27	29	40	51	53	39	
> 700 cfm	29	30	41	51	52	39	

7. Radiated sound attenuation deductions are based on a mineral tile ceiling and environmental effect and are as follows:

Radiated attenuation	Octave Band						
	2	3	4	5	6	7	
Total dB reduction	18	19	20	26	31	36	

10. Dash (–) in space denotes an NC level of less than 20.

Model Series 35FH • High Performance • Performance Data

Sound Power Levels for Epic ECM Motor and NC Level Application Guide

Unit Size	Airflow cfm l/s		Discharge Sound Power Levels							Radiated Sound Power Levels						
			Octave Bands						NC	Octave Bands						NC
2	3	4	5	6	7	2	3	4	5	6	7					
8	900	425	68	68	68	68	64	62	26	73	65	60	56	50	47	39
	800	378	66	66	67	65	62	59	24	72	64	59	54	48	45	38
	700	330	65	64	65	63	59	56	23	69	61	57	52	46	42	34
	600	283	62	62	63	60	57	53	20	68	59	56	50	43	39	33
	500	236	60	59	61	58	54	49	-	67	57	54	48	41	36	31
400	189	57	57	59	55	52	45	-	64	54	53	45	38	32	28	
16	1600	755	74	72	71	71	68	67	31	77	71	64	61	57	52	44
	1400	661	71	69	68	67	64	63	28	75	68	60	59	52	48	41
	1200	566	68	66	65	64	61	59	24	73	65	58	56	49	45	39
	1000	472	65	63	62	61	57	55	20	70	61	56	51	44	40	35
	800	378	62	60	60	58	54	50	-	67	58	54	48	41	36	31
20	2000	944	73	75	74	75	72	71	35	78	71	66	63	59	56	45
	1800	850	72	73	72	72	70	69	33	77	70	64	62	57	54	44
	1600	755	71	71	71	70	67	66	30	75	68	62	59	54	51	41
	1400	661	68	69	69	67	64	63	28	74	66	61	57	51	48	40
	1200	566	66	65	64	63	60	58	23	72	63	58	54	48	44	38
	1000	472	64	62	62	60	57	54	-	70	59	56	51	44	40	35
	800	378	61	59	58	56	53	49	-	66	57	54	48	41	35	30
24	2400	1133	77	74	74	74	70	68	34	81	72	66	63	58	55	49
	2200	1038	76	72	72	72	68	66	31	78	71	65	61	57	53	45
	2000	944	74	71	71	70	66	64	30	78	69	63	59	54	51	45
	1800	850	73	69	69	68	64	61	28	75	68	62	58	53	49	41
	1600	755	71	66	67	65	62	58	24	75	65	61	56	50	46	41
	1400	661	69	64	65	63	59	54	21	72	63	59	54	48	43	38
	1200	566	66	62	63	61	57	51	-	70	61	58	52	46	40	35
	1000	472	65	61	62	59	55	49	-	68	60	57	50	43	38	33

Performance Notes:

1. Fan discharge (external) static pressure is 0.25" w.g. (63 Pa).
2. Sound power levels in decibels, dB re 10⁻¹² watts.
3. All sound data listed by octave bands is raw data without any corrections for room absorption or duct attenuation.
4. Data derived from independent tests conducted following guidelines of are with AHRI Standard 880.

5. NC levels are calculated from the published raw data and based on procedures outlined in Appendix E, AHRI Standard 885.

6. Fan discharge sound attenuation deductions are based on environmental effect, duct lining, branch power division, insulated flexible duct, end reflection and space effect and are as follows:

Discharge attenuation	Octave Band						
	2	3	4	5	6	7	
< 300 cfm	24	28	39	53	58	40	
300 – 700 cfm	27	29	40	51	53	39	
> 700 cfm	29	30	41	51	52	39	

7. Radiated sound attenuation deductions are based on a mineral tile ceiling and environmental effect and are as follows:

Radiated attenuation	Octave Band						
	2	3	4	5	6	7	
Total dB reduction	18	19	20	26	31	36	

10. Dash (–) in space denotes an NC level of less than 20.

Suggested Specifications

Factory-Built Fan Coil Units • Section 15 – – –

1. - Furnish and install Engineered Comfort Model 35FH Series High Performance Horizontal Fan Coil Units where indicated on the plans and in the specifications.

2. - All units shall be Direct Drive – Draw Through configuration and completely factory assembled, tested and shipped as one piece. All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery. All unit dimensions, for each model and size, shall be considered maximums. Units shall be UL or ETL, listed in compliance with UL/ANSI Standard, and be certified as complying with the latest edition of AHRI Standard 440. Must meet the requirements of NFPA 90A and UL 181. 3.- All unit chassis shall be fabricated of heavy gauge galvanized steel panels able to meet 125 hour salt spray test per ASTM B-117. 18 ga. (1.3) galvanized steel channel frame. All panels surrounding the coil shall be insulated with 3/4" (19) thick closed cell fiber-free / foam and rated for air velocity of 6000 f.p.m. Insulation must meet all requirements of ASTM C1071 (including C665), UL 181 for erosion, and carry a 25/50 rating for flame spread/smoke developed per ASTM E-84, UL 723 and NFPA 90A. All other panels, surrounding the units, must also be acoustically and thermally insulated with a minimum of 3/4" (19) of insulation with dual density insulation fiber glass insulation where all exposed edges are coated to prevent air erosion.

Unit cabinet shall have side and bottom full size access panels for ease of maintenance and service and motor blower removal. Access panels shall be attached to casing with screws.

Optional:

- Aluminum foil-faced insulation (steri-liner), meets ASTM Standards C-665 and C-1136 for biological growth in insulation. All exposed edges shall be sealed to prevent any fibers from reaching the air stream.

- Close cell fiber-free liner. Insulation shall conform to UL 181 for erosion and NFPA 90A for fire, smoke and melting, and comply with a 25/50 Flame Spread and Smoke Developed Index per ASTM E-84 or UL 723. Additionally, insulation shall comply with Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21.

- Perforated metal with steri-liner.

4. - Casing leakage shall not exceed 2% of rated airflow @ .5" w.g. (125 Pa). All units shall have a minimum 1 1/4" duct collar at the discharge.

5. - Unit shall be draw through type with fan dynamically balanced, forwardly curved; DWDI centrifugal type constructed of 18 gauge zinc coated galvanized steel for corrosion resistance. The fan assembly shall be easily removable for servicing the motor and blower at, or away from the unit. The entire fan assembly shall be able to come out of the unit by removing four nuts per fan and disconnecting the motor(s) wires

6. - Motor shall be direct drive, isolated from blower and fan housing in at least four (4) locations with rubber isolators to eliminate any motor vibration being transmitted to the fan housing and duct. Motor shall be capable to be serviced through the bottom or side panel. Provide isolation between fan motor assembly and unit casing in at least four (4) locations to eliminate any vibration from the fan to the terminal unit casing. Motors shall be high efficiency, permanently lubricated sleeve bearing. Single speed motors are not acceptable. Motor wires shall be brought into external hinged door starter- control enclosure to facilitate wiring and service. Motors shall of the Permanent Split Capacitor type with UL and CSA listed automatic reset thermal overload protection and three separate horsepower taps.

Optional:

- ECM™, Electronic Commutated Motors, factory-programmed and run-tested in assembled units with 3 speeds. Motor controller is mounted in a control box with a built-in integrated user interface. If

adjustments are needed, motor parameters can be adjusted without factory service personnel at the motor control board. Motors will soft-ramp between speeds to minimize the acoustics due to sudden speed changes. Motors can be operated at either one, two or three speeds or with a factory or field-supplied variable speed controller. All motors have integral thermal overload protection with a maximum ambient operating temperature of 104°F. Motors are capable of starting at 50 percent of rated voltage and operating at 90 percent of rated voltage on all speed settings. Motors can operate up to 10 percent over voltage.

- EPIC ECM™, Electronic Commutated Motors, factory-programmed and run-tested in assembled units with fully variable speed capability. The motor designed for use with single phase power shall have a controller mounted in a control box with a built-in integrated user interface. If adjustments are needed, motor parameters can be adjusted without factory service personnel at the motor control board. Motors shall soft-ramp to programmed specific to minimize the acoustics due to sudden speed changes. Motors can be operated at the established range of airflows with a factory or field-supplied variable speed controller. All motors have integral thermal overload protection with a maximum ambient operating temperature of 104°F. Motors are capable of starting at 50 percent of rated voltage and operating at 90 percent of rated voltage on all speed settings. Motors can operate up to 10 percent over voltage.

7. - Sound

Units shall have discharge and radiated sound power levels published and tested in accordance with AHRI Standard 880.

8. - All water coils shall be AHRI410 certified and tagged with an AHRI 410 label. All coils shall be pressure tested under water at 1.5 times the working pressure classification indicated in the Contract Documents, but the test pressure in no case shall be less than 300 psig. Coils shall have 1/2" O.D. seamless copper tubes, and collared and corrugated aluminum fins. Tube wall thickness of 0.016 to be standard. Coil frames shall be constructed of minimum G-90 galvanized steel. Water velocity in the tubes shall not exceed eight (8) feet per second and the coil face velocity shall not exceed 500 fpm.

For 4 pipe system a separate heating coils shall be furnished in the reheat position as standard.

Coils, header and drain pan shall be provided in a fully insulated integral casing with 3/4" fiber-free/foam insulation to increase thermal efficiency and reduce casing leakage.

Optional:

- For 4 pipe system a separate heating coils shall be furnished in the preheat position as standard.

- Coil tube wall thickness of 0.025".

- All coils (without piping packages shall be provided with a manual air vent fitting to reduce potential air locks within coil.

- All coils shall be provided with a auto air vent fitting to allow for coil venting.

9. - Primary condensate drain pans shall be heavy gauge galvanized steel, and extend under the entire cooling coil. Drain pans shall be of one-piece construction, have at least 1" height side and be positively sloped for condensate removal.

The drain pan shall be externally insulated with minimum 3/8" thick fire retardant, closed cell foam insulation. The insulation shall carry no more than a 25/50 Flame Spread and Smoke Developed Rating per ASTM E-84 and UL 723 and an Antimicrobial Performance Rating of "0", no observed growth, per ASTM G-21.

Optional:

- Provide a primary drain pan constructed entirely of heavy gauge stainless steel for superior corrosion resistance. Stainless steel drain

Suggested Specifications

Factory-Built Fan Coil Units • Section 15 --- (continued)

pans shall be externally insulated and meet or exceed the requirements stated above.

- Provide a secondary drain connection on the primary drain pan for condensate overflow.
- Provide a condensate overflow switch in the primary drain pan for condensate overflow.

10. - Standard units can be ordered without filters.

Optional Filter:

- Unit to be furnished with a minimum 1" nominal glass fiber throwaway filter. Filters shall be tight fitting to prevent air bypass.
- Provide unit with 1" or 2" pleated filters rated at 25-30% efficiency and MERV 6 based on ASHRAE 52.2
- Unit shall be furnished with the FFR Ducted Filter Rack to facilitate the installation of inlet duct. FFR Filter Rack shall have hinged door flap with latch on the side and bottom to facilitate filter replacement.

11. - Electrical

Units shall be furnished with a hinged door starter-control enclosure and wired single point power connection. All power and control wiring shall conform to National Electric Code Standards. Within the control enclosure it shall include all required devices, including but not limited to, service switch, relay, control power transformers and control packages, low voltage remote shutdown relays, etc.

12. - Electric heat

Furnish an electric resistance heating assembly as an integral part of the fan coil unit, with the heating capacity, voltage and kilowatts scheduled. The heater assembly shall be designed and rated for installation on the fan coil unit without the use of duct extensions or transitions, and be located in the unit as to not expose the fan assembly to excessive leaving air temperatures that could affect motor performance.

The heater and unit assembly shall be listed for zero clearance and meet all NEC requirements, and be ETL listed with the unit as an assembly in compliance with UL/ANSI Standard. A NEMA 1 enclosure with hinges shall be placed at the side of the fan coil to provide easy access. All motor wiring and heater terminates in the enclosure for single point electrical connection.

All heating elements shall be open coil type Ni-Chrome wire mounted in ceramic insulators and located in an insulated heavy gauge galvanized steel housing. All elements shall terminate in a machine staked stainless steel terminal secured with stainless steel hardware for corrosion resistance. The element support brackets shall be spaced no greater than 3-1/2" on center. All internal wiring shall be rated for 105°C minimum. All heaters shall include over temperature protection consisting of an automatic reset primary thermal limit and back up secondary thermal limit. All heaters shall be single stage unless noted otherwise on the plans. All units with electric heat shall be provided with an incoming line power distribution block, designated to accept single point power wiring capable of carrying 125% of the calculated load current.

Automatic reset thermal cutouts and an airflow switch shall be furnished for heater protection. A Class 2 transformer shall be provided for low voltage control. The airflow switch shall prove adequate fan airflow before the electric heater can be energized. All devices shall be serviceable through the hinged enclosure and without removing heating element from the unit.

Optional

- Heating coils shall be controlled with the SCR option and proportional control to provide infinite heater control.
- 2 Stage Electric Heat shall be provided.

- Toggle Disconnect.
- Door Interlocking disconnect switch.
- Quieter operation option available.
- Power circuit fusing.
- Dust tight control enclosure.
- High grade Class A 80/20 nickel/chrome element wire.
- Manual reset secondary high limit corrosion resistance.
- Manual reset secondary high limit.
- Positive pressure air flow switch.

13. - Piping – Valve Packages

As optional

- Provide a factory assembled and installed valve piping package in a fully insulated integral casing with ¾" fiber-free/foam insulation to increase thermal efficiency and reduce casing leakage. Valve package shall consist of a 2 or 3 way, on/off, motorized electric control valve and two ball isolation valves. Maximum entering water temperature on the control valve shall be 200°F with a maximum operating pressure of 300 PSIG. Refer to Specification Section titled, "Pipes, Valves, Fittings and Accessories" for optional and accessories specifications.

- Provide 3-wire floating point modulating control valve (fail-in-place) in lieu of standard 2-position control valve with factory assembled valve piping package.

- Provide high pressure close-off actuators for 2-way on/off control valves.

- Provide a fixed-auto flow control device for each piping package with the specific gpm specified for the unit on the schedule.

- Provide an adjustable flow control device for each piping package.

- Provide unions and/or pressure-temperature ports for each piping package.

14. - Ultraviolet Light

As optional each unit shall be supplied with Ultraviolet Lights for disinfection for HVAC mold, bacteria & odor control. Fixture assembly to be installed at the coil discharge (downstream of the coil), between the coil and fan housing. Fixtureless lamps are to be installed in sufficient quantity and in such a manner so as to provide an equal distribution of UVC energy. The minimal UVC energy striking a surface shall be sufficient to continuously destroy a monolayer of mold and bacteria in less than six hours when at 55-135° F. The third party modeling shall include the destruction time for at least four of the most common fan coil surface microbes.

Lamp Clamps may be permanently or magnetically affixed to the irradiated cavity. They shall be constructed of high memory, plated steel for maximum holding power and corrosion resistance. Fixture shall be electrically terminated to within factory

supplied ballast housings to meet NEC and local codes. Lamps shall be mounted to irradiate the intended surface(s) as well as all of the available line of sight airstream by proper placement and incident angle reflection.

To protect maintenance personnel, all access panels and doors to the UVC assembly and/or within view of the UVC assembly must include mechanical interlock switch(es) to insure that the UVC assembly will be de-energized when any of these accesses are opened. For complete safety, the UVGI equipment shall have been tested, Listed and labeled as an integral part of the fan coil unit by the fan coil manufacturer, no exceptions.

15. - Controls

Controller and sensors provided by others but mounted and wired during unit assembly at the fan coil manufacturing facility.