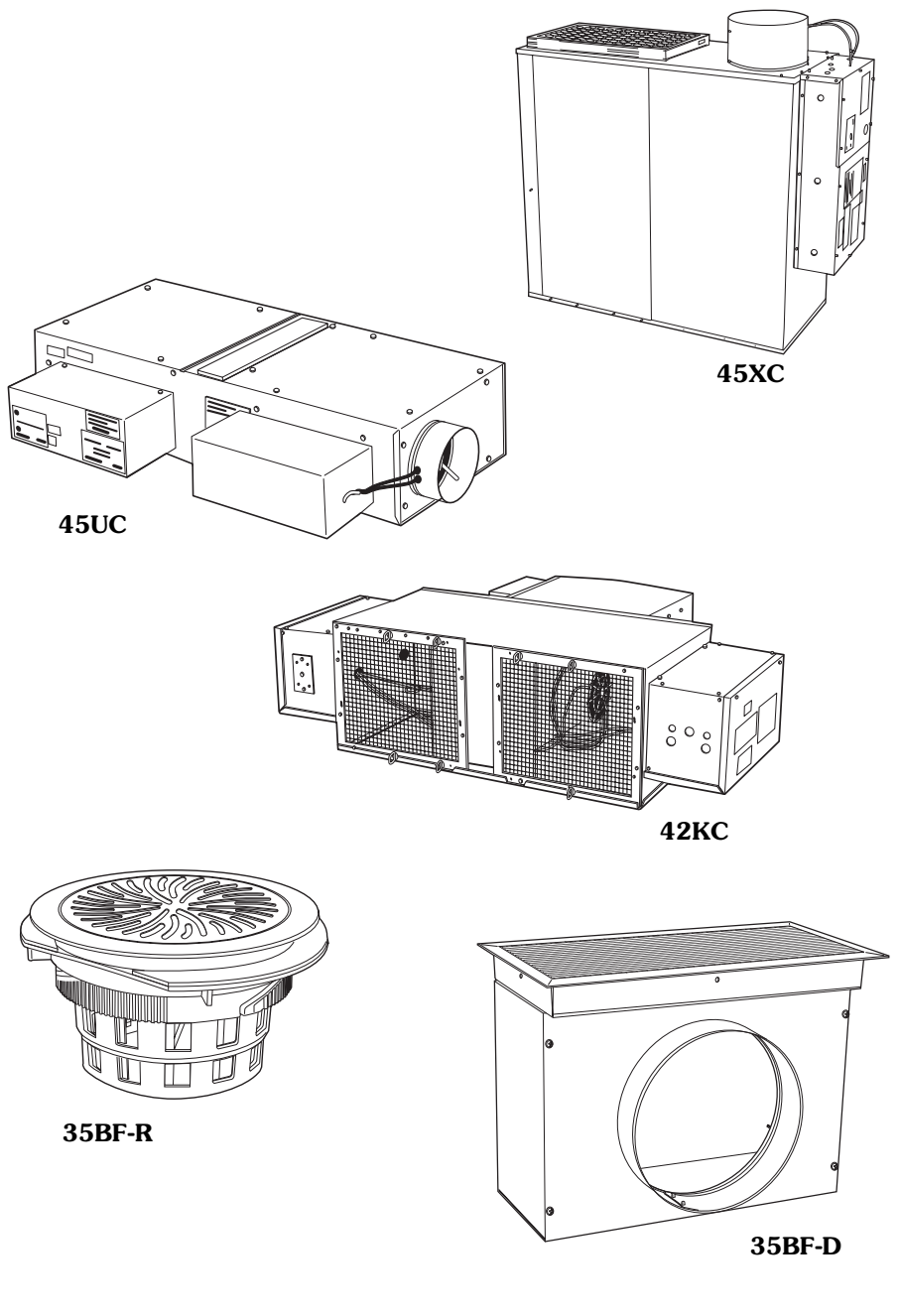




Product Data

AXIS™ 45X, 45U, 42K, 35BF Access Floor Terminal Units for Variable Air Volume Systems



Features/Benefits

Access Floor Systems can provide flexibility and economic advantage when applied in commercial office building applications. Carrier's Axis Underfloor HVAC Systems provide a wide array of products to meet these building application needs. Underfloor systems allow building designers the option to integrate the HVAC (heating, ventilation and air conditioning) air distribution system with the power and communication wiring run within a raised floor plenum. The advantages of Access Floor Systems include:

- Flexibility to accommodate workplace changes — diffusers can easily be changed by moving a floor tile. Limited space is required for control component changes, and electrical power/telecommunications cabling can be easily accessed and moved.
- Reduced installation costs — reduced airflow requirements and lower pressures mean smaller supply and exhaust fans. Raised floor plenums eliminate costly ductwork; simplification of HVAC, power and data allows faster build out of tenant spaces to shorten time to occupancy.
- Lower operating costs — better heat removal with floor to ceiling airflow pattern. Less ductwork leads to lower static pressures, which reduces fan power consumption. Terminal controls can provide demand control ventilation (DCV) to meet required ventilation without wasting energy.
- Improved air quality — occupants can have greater control over temperature in individual work spaces. A continual supply of fresh air is introduced directly into the zone where people breathe, and stale contaminated air rises up out of the occupied breathing zone.

Access Underfloor Systems can also help qualify for U.S. Green Building Leadership in Energy and Environmental Design (LEED™) credits in several categories.



Access Floor Systems can be applied in a building application in a number of ways. The following Carrier products have been grouped in this publication to provide a single source for obtaining information for your application.

45X — Fan Powered Zone Mixing Unit

A specific DDC (direct digital controls) controller for this parallel fan powered box will control both the pressure and temperature of the delivered air to the underfloor plenum. A standard air-handling source can provide 55-degree air, the 45X unit will blend the supply and return air to provide a typical 63-degree air underfloor. This allows for mixing to be done at a floor zone level and it also allows colder 55-degree air to be available for areas that may need additional cooling.

45U — Underfloor Series Flow Fan Powered Unit

This unit is designed to be installed in the underfloor plenum and will fit between the pedestals of a standard access floor grid system. The 45U unit can be used to assist with high interior loads (example: conference rooms) or with a ducted primary and available hot water or electric heat for perimeter applications.

42K — Perimeter Fan Coil Unit

This unit is designed to be installed in the underfloor plenum and will fit between the pedestals of a standard access floor grid. The 42K unit is used to provide either hot water or electric heat to the perimeter zone. Plenum air is drawn into the 42K unit, heated and then ducted to perimeter floor grilles.

35BF-R — High Induction Swirl Diffuser

These grilles are used in pressurized access floor distribution systems. They are

easily relocated to accommodate occupant relocations and they provide a means for individual space temperature adjustments. The 35BF-R-FR Fire Rated Swirl Diffuser meets NFPA (National Fire Protection association) 90A requirements.

35BF-D — Linear Floor Diffuser Plenum

Plenums are designed for use in floor applications for return or constant volume perimeter applications.

35BF-V — Linear Floor Diffuser Plenum with Damper

Plenums are designed for use in floor applications where frequent load variations occur. Ideal for conference rooms cooling loads or in perimeter heat applications.

35BF-CT480/481

Rectangular Floor Grille is used in conjunction with either of the 35BF plenum units.

Selection procedure

The performance data tables, fan curves, electrical data tables and heat data tables in this document will provide a quick reference guide for unit selection.

Refer to the Carrier Electronic Selection Program for more detailed unit selection information.

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Features



45X

45X — Fan Powered Zone Mixing Unit

A standard air-handling source can provide 55-degree air; the 45X unit will blend the supply and return air to provide a typical 63-degree air underfloor. This allows mixing to be done at a floor zone level and also allows colder 55-degree air to be available for areas that may need additional cooling.

The 45X unit is available in 2 fan and cabinet sizes with a number of inlet size combinations, providing an air delivery range from 50 to 6200 cfm.

The 45X unit features factory-mounted controls that regulate the pressure and volume of air delivery from the unit to respond to cooling and heating load requirements of the conditioned space. Stand-alone controls will fulfill the thermal requirements of a given control space. Carrier ComfortID™ controls are communicating controls that can

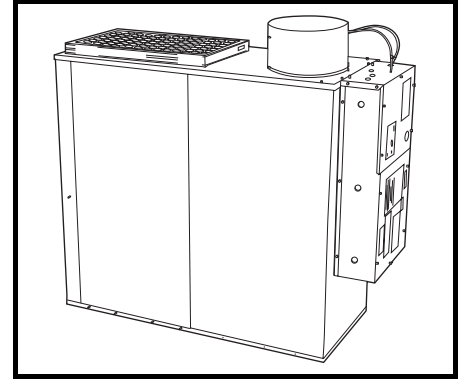
integrate with the total building HVAC system.

The controls for the 45X unit are identified as the 45XC — Direct Digital Controls.

Standard features include:

- 20-gage galvanized steel construction
- Control enclosure for electronic components
- 1/2-in. thick dual density fiberglass insulation meets NFPA (National Fire Protection Association) 90A and UL (Underwriters' Laboratories) 181 safety requirements
- ECM (electronically commutated motor) with auto fan control
- Integral induced air attenuator
- Motor/blower isolation
- Removable panel allows easy access to motor/blower assembly
- Linear averaging flow sensor
- Factory-supplied 24-volt control transformer for electronic controls

- ETL listed — adherence to UL 1995 and CSA (Canadian Standards Association) C22.2 No. 236.95
- Sound ratings in accordance with ARI Standard 880-98
- Rectangular discharge opening is designed for flanged duct connections



Options and accessories

Factory-installed options

- Liner options
 - 1-in. dual density fiberglass insulation
 - Foil encapsulated fiberglass insulation
 - Cellular insulation
 - Steriliner (rigid board insulation)
 - No liner
- Recirculated air filter
- Motor disconnect
- Motor fusing
- Dust-tight control enclosure
- Mounting brackets

Carrier Comfort Network (CCN) Controls

— The 45XC pressure independent control package is designed to be an integral part of the Carrier DDC

control system. The control arrangement includes a standard linear inlet flow sensor, control enclosure, auto fan speed controller, 24-volt transformer, and fan relay. Several types of room sensors may be ordered, with and without set point adjustment, and with integral CO₂ sensors.

The CCN control packages must be used in combination with a thermostat. Thermostats are not included in the CCN package.

45XC CCN Control Arrangement:
4840 — Access Floor Mixing Unit

Field-installed accessories

Thermostat: 33ZCT56SPT: RT (room temperature) sensor, with set point adjust and override.

Thermostat: 33ZCT55SPT: RT (room temperature) sensor, with override only.

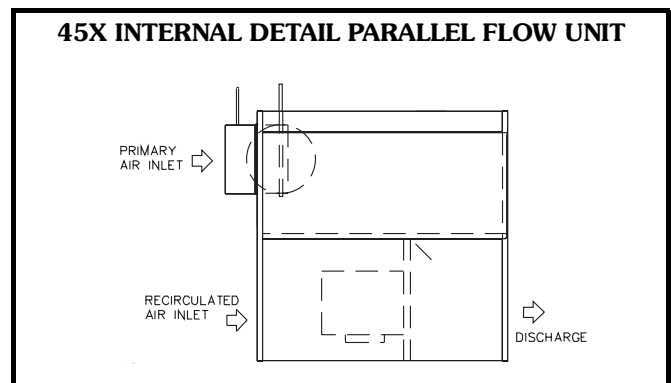
Thermostat: 33ZCT56CO2: RT (room temperature) and CO₂ sensor, with set point adjust and override.

Thermostat: 33ZCT55CO2: RT (room temperature) and CO₂ sensor, with override only.

Thermostat: 33ZCT58SPT: Communicating room temperature sensor with LCD, set point adjust, fan control and occupancy override.

Physical data and dimensions

45X SIZE	UNIT WEIGHT (lb)	FILTER SIZE (in.)	FILTER P/N	FILTER KIT P/N
4	209	17 x 17 x 1	102649-1717	3503341717
7	269	22 x 19 x 1	102649-2219	3503342219

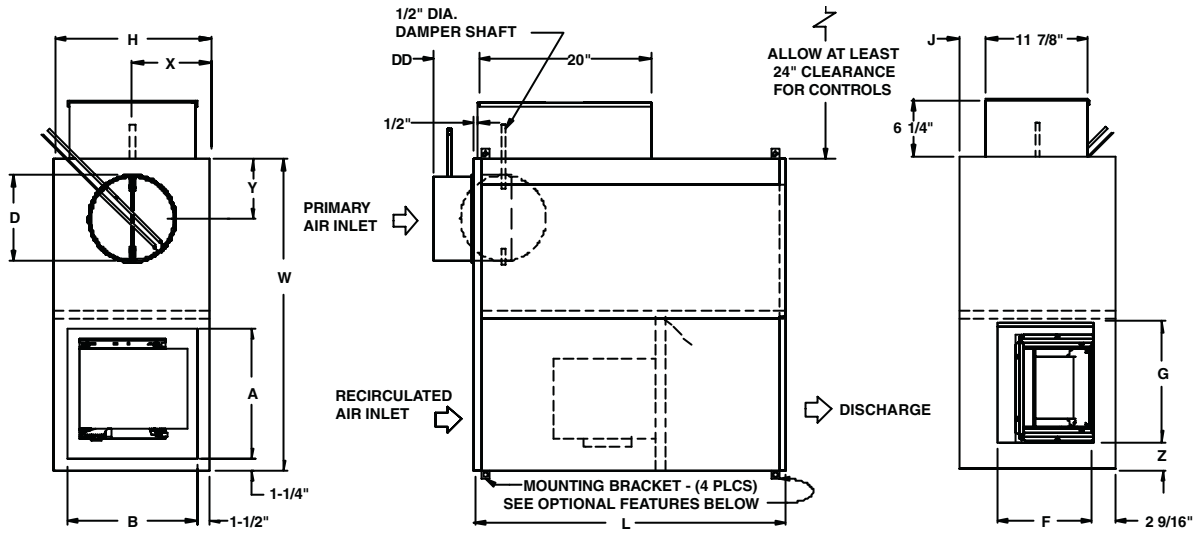


Physical data and dimensions (cont)



45X

45X FAN POWERED ZONE MIXING UNIT



INLET VIEW

PLAN VIEW – LEFT HAND UNIT
RIGHT HAND UNITS AVAILABLE - CONTROLS NOT SHOWN

DISCHARGE VIEW

Inlet Size: 6-10, DD = 3⁷/₈ in.

Inlet Size: 12-16, DD = 5⁷/₈ in.

UNIT SIZE	INLET SIZE (in.)	PRI. CFM	FAN CFM*	MAX FLOW	HP	DIMENSIONS (in.)											
						L	W	H	Recirc. Air		D	Discharge		X	Y	Z	J
									A	B		F	G				
4	6	500	1200	1700	1/2	36 ¹ / ₈	36 ¹ / ₈	18 ¹ / ₁₆	15 ¹ / ₈	15	5 ⁷ / ₈	11	14	9	6	3 ¹ / ₈	3 ¹ / ₈
	8	900	1200	2100	1/2	36 ¹ / ₈	36 ¹ / ₈	18 ¹ / ₁₆	15 ¹ / ₈	15	7 ⁷ / ₈	11	14	9	6	3 ¹ / ₈	3 ¹ / ₈
	10	1400	1200	2600	1/2	36 ¹ / ₈	36 ¹ / ₈	18 ¹ / ₁₆	15 ¹ / ₈	15	9 ⁷ / ₈	11	14	9	7	3 ¹ / ₈	3 ¹ / ₈
	12	2100	1200	3300	1/2	36 ¹ / ₈	36 ¹ / ₈	18 ¹ / ₁₆	15 ¹ / ₈	15	11 ⁷ / ₈	11	14	9	8	3 ¹ / ₈	3 ¹ / ₈
7	10	1400	2500	3900	1	42 ¹ / ₈	46 ¹ / ₈	20 ¹ / ₁₆	20 ¹ / ₈	17	9 ⁷ / ₈	15	17	10	7	5 ¹ / ₂	4 ¹ / ₈
	12	2100	2500	4600	1	42 ¹ / ₈	46 ¹ / ₈	20 ¹ / ₁₆	20 ¹ / ₈	17	11 ⁷ / ₈	15	17	10	8	5 ¹ / ₂	4 ¹ / ₈
	14	2800	2500	5300	1	42 ¹ / ₈	46 ¹ / ₈	20 ¹ / ₁₆	20 ¹ / ₈	17	13 ⁷ / ₈	15	17	10	10	5 ¹ / ₂	4 ¹ / ₈
	16	3700	2500	6200	1	42 ¹ / ₈	46 ¹ / ₈	20 ¹ / ₁₆	20 ¹ / ₈	17	15 ⁷ / ₈	15	17	10	10 ¹ / ₄	5 ¹ / ₂	4 ¹ / ₈

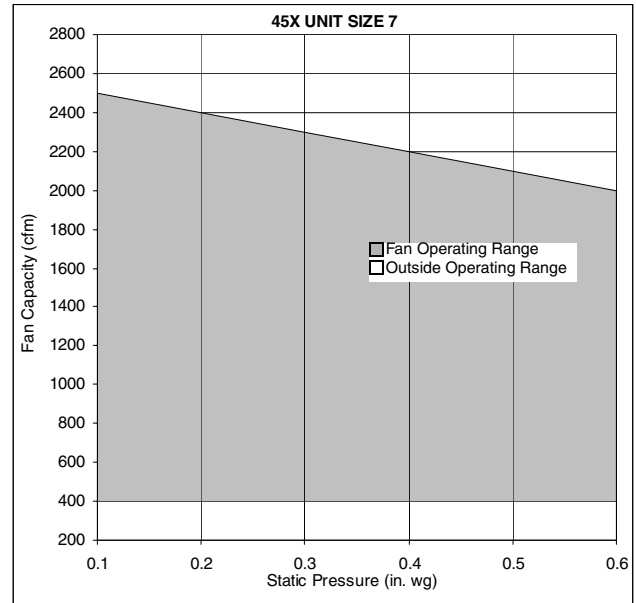
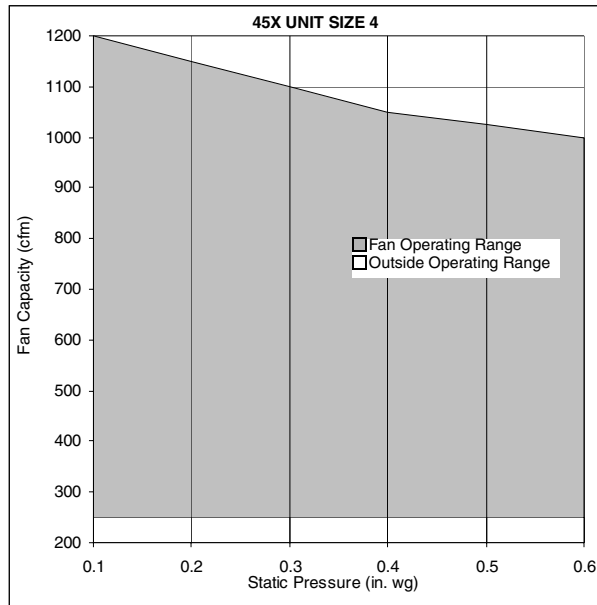
*Estimated for rpm/torque controlled motor, at 0.1 in. wg static pressure under floor.

Performance data



45X

45X FAN POWERED ZONE MIXING UNIT (ECM) FAN CURVES



45X FAN POWERED ZONE MIXING UNIT (ECM)

UNIT SIZE	INLET SIZE	MOTOR HP	ECM MOTOR AMPS			PRIMARY AIRFLOW		ECM FAN AIRFLOW**		MAX FLOW
			120 V FLA*	240 V FLA*	277 V FLA	Max	Min†	Max	Min	
4	6	1/2	9.5	4.7	4.1	521	52	1200	250	1721
	8					927	93			2127
	10					1448	145			2648
	12					2085	208			3285
7	10	1	18.0	9.0	8.1	1448	145	2500	400	3948
	12					2085	208			4585
	14					2838	284			5338
	16					3706	371			6206

LEGEND

ECM — Electronically Commutated Motor
FLA — Full Load Amps

*Special order.

†This value is based on a signal of 0.03 in. wg differential pressure of the linear averaging flow probe. Minimum Primary flow may be zero.

**Rpm/torque controlled motor, at 0.1 in. wg static pressure underfloor.

NOTE: Data is based on tests conducted in accordance with ARI (Air Conditioning and Refrigeration Institute) Standard 880-98.

Performance data (cont)



45X FAN POWERED ZONE MIXING UNIT — ECM FAN SOUND POWER LEVELS — FAN ONLY

45X

UNIT SIZE	FLOW RATE		RADIATED SOUND POWER							DISCHARGE SOUND POWER						
			Octave Band Sound Power, L _w							L _p	Octave Band Sound Power, L _w					
	Cfm	(L/s)	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
4	400	(189)	59	59	52	44	39	38	—	58	61	58	50	47	42	23
	600	(283)	63	62	57	51	45	45	—	62	63	61	54	53	49	27
	800	(378)	66	64	60	56	50	49	21	65	64	64	58	57	54	22
	1000	(472)	68	65	63	59	53	53	24	68	66	66	61	60	57	24
	1200	(566)	70	66	65	62	56	56	26	70	67	67	63	62	60	27
7	800	(378)	63	60	59	52	48	43	—	61	60	60	55	52	49	25
	1300	(614)	68	66	64	59	56	52	25	67	65	65	61	59	58	24
	1600	(755)	71	68	66	62	59	56	27	70	68	67	64	62	61	27
	2000	(944)	73	71	68	66	62	60	30	73	71	70	67	66	65	28
	2500	(1180)	76	73	70	69	66	64	33	76	73	72	70	69	69	32

LEGEND

- ARI — Air Conditioning and Refrigeration Institute
- CFM — Air Volume (cubic feet per minute)
- L_p — Room Sound Pressure
- L_w — Sound Power
- NC — ARI 885-98 Test Conditions (see Application Assumptions below)
- Ps — Static Pressure
- — Indicates an NC Level Less Than 20

NOTES:

1. ΔPs is the difference in static pressure from inlet to discharge.
2. Sound power levels are in decibels, re: 10⁻¹² watts.
3. All sound data are based upon tests conducted in accordance with ARI Standard 880-98.
4. NC Application data from ARI 885-98.

APPLICATION ASSUMPTIONS

ARI 885-98	RADIATED ATTENUATION VALUES						
	Octave Bands						
	2	3	4	5	6	7	
Environ. Effect	2	1	0	0	0	0	
Plenum/Room Effect	29	33	33	35	35	36	
Total Attenuation	31	34	33	35	35	36	

NOTE: NC basepan factors found in ARI Standard 885-98.
Ceiling type — Double Gypsum board.

ARI 885-98	DISCHARGE 300-700 CFM						
	OCTAVE BANDS						
	2	3	4	5	6	7	
Env Effect	2	1	0	0	0	0	
Underfloor Plenum*	15	15	15	15	15	15	
10 in. End Reflection	9	5	1	0	0	0	
Power Division (6 outlets)	8	8	8	8	8	8	
5 ft, 8 in. Flex Duct	—	—	—	—	—	—	
Space Effect	10	11	12	13	14	15	
Total Attenuation*	43	40	36	36	37	38	

ARI 885-98	DISCHARGE <300 CFM						
	OCTAVE BANDS						
	2	3	4	5	6	7	
Env Effect	2	1	0	0	0	0	
Underfloor Plenum*	15	15	15	15	15	15	
End Reflection	9	5	2	0	0	0	
Power Division (0 outlets)	0	0	0	0	0	0	
5 ft, 8 in. Flex Duct	—	—	—	—	—	—	
Space Effect	10	11	12	13	14	15	
Total Attenuation*	36	32	29	28	29	30	

ARI 885-98	DISCHARGE >700 CFM						
	OCTAVE BANDS						
	2	3	4	5	6	7	
Env Effect	2	1	0	0	0	0	
Underfloor Plenum*	15	15	15	15	15	15	
End Reflection	9	5	2	0	0	0	
Power Division (10 outlets)	10	10	10	10	10	10	
5 ft, 8 in. Flex Duct	—	—	—	—	—	—	
Space Effect	10	11	12	13	14	15	
Total Attenuation*	46	42	39	38	39	40	

*Estimated attenuation, underfloor plenum.



45X FAN POWERED ZONE MIXING UNIT — ECM (cont)
FAN PLUS PRIMARY MAXIMUM DISCHARGE SOUND POWER LEVELS

45X

UNIT SIZE	INLET SIZE	PRIMARY AIRFLOW		MIN. ΔPs		FAN AIRFLOW AT 0.1 ps		FAN ONLY							FAN PLUS PRIMARY AIR — SOUND POWER OCTAVE BANDS																
								0.10 in. wg Discharge Ps							NC	1.0 in. wg Differential Pressure							NC	2.0 in. wg Differential Pressure							NC
								2	3	4	5	6	7	2		3	4	5	6	7	2	3		4	5	6	7				
Cfm	(L/s)	in. wg	(pa)	Cfm	(L/s)	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7								
4	6	100	(47)	0.013	(3.1)	400	(189)	58	61	58	50	47	42	23	58	61	58	50	47	43	23	58	61	58	50	47	43	23			
		200	(94)	0.050	(12.4)	400	(189)	58	61	58	50	47	42	23	58	61	58	50	47	43	23	58	61	58	50	48	44	23			
		300	(142)	0.113	(28.0)	400	(189)	58	61	58	50	47	42	23	59	61	58	50	48	43	23	60	61	58	50	48	44	23			
		400	(189)	0.200	(49.8)	400	(189)	58	61	58	50	47	42	15	61	62	59	51	48	43	16	63	62	59	51	49	45	16			
		500	(236)	0.313	(77.8)	400	(189)	58	61	58	50	47	42	15	64	64	59	52	48	44	17	66	64	60	52	49	45	17			
	8	180	(85)	0.013	(3.3)	700	(330)	64	64	63	56	55	52	28	64	64	63	56	55	52	28	64	64	63	56	55	52	28			
		360	(170)	0.053	(13.2)	700	(330)	64	64	63	56	55	52	20	64	64	63	56	55	52	20	64	64	63	57	55	52	21			
		540	(255)	0.119	(29.6)	700	(330)	64	64	63	56	55	52	20	65	64	63	57	55	52	21	66	65	63	57	55	52	21			
		720	(340)	0.212	(52.7)	700	(330)	64	64	63	56	55	52	17	67	65	63	57	55	52	18	69	66	63	57	55	52	18			
		900	(425)	0.331	(82.3)	700	(330)	64	64	63	56	55	52	17	69	66	63	57	55	52	18	72	68	64	58	56	52	18			
	10	290	(137)	0.014	(3.5)	1200	(566)	70	67	67	63	62	60	27	70	67	67	63	62	60	27	70	67	67	63	62	60	27			
		580	(274)	0.056	(13.8)	1200	(566)	70	67	67	63	62	60	27	70	67	67	63	62	60	27	70	67	68	63	62	60	27			
		870	(411)	0.125	(31.1)	1200	(566)	70	67	67	63	62	60	24	71	67	68	63	62	60	24	71	68	68	63	63	60	25			
		1160	(547)	0.222	(55.3)	1200	(566)	70	67	67	63	62	60	24	72	68	68	63	63	60	25	74	69	68	64	63	61	25			
		1450	(684)	0.348	(86.5)	1200	(566)	70	67	67	63	62	60	24	75	70	68	64	63	61	25	76	71	68	65	64	61	26			
7	12	420	(198)	0.014	(3.4)	1100	(519)	65	63	63	59	57	55	21	65	64	64	59	57	55	21	65	64	64	59	57	55	21			
		840	(396)	0.055	(13.7)	1100	(519)	65	63	63	59	57	55	19	65	64	64	59	57	55	19	66	64	64	59	57	55	19			
		1260	(595)	0.124	(30.9)	1100	(519)	65	63	63	59	57	55	19	66	64	64	59	57	55	20	67	65	64	60	57	55	20			
		1680	(793)	0.221	(54.9)	1100	(519)	65	63	63	59	57	55	19	67	64	64	60	57	55	20	70	65	65	61	58	56	21			
		2100	(991)	0.345	(85.7)	1100	(519)	65	63	63	59	57	55	19	69	65	64	60	58	55	21	72	66	65	62	59	56	22			
	14	570	(269)	0.015	(3.7)	1600	(755)	70	68	67	64	62	61	27	70	68	67	64	62	61	27	70	68	67	64	62	61	27			
		1140	(538)	0.059	(14.7)	1600	(755)	70	68	67	64	62	61	24	70	68	67	64	62	61	24	71	68	68	64	62	62	24			
		1710	(807)	0.133	(33.0)	1600	(755)	70	68	67	64	62	61	24	71	68	68	64	63	62	25	72	69	68	64	63	62	25			
		2280	(1076)	0.236	(58.7)	1600	(755)	70	68	67	64	62	61	24	72	69	68	64	63	62	25	74	70	69	65	63	62	26			
		2850	(1345)	0.368	(91.7)	1600	(755)	70	68	67	64	62	61	24	73	69	68	65	63	62	25	76	71	70	66	64	62	26			
	16	740	(349)	0.014	(3.5)	2500	(1180)	76	73	72	70	69	69	32	76	73	72	70	69	69	32	76	73	72	70	69	69	32			
		1480	(698)	0.056	(13.9)	2500	(1180)	76	73	72	70	69	69	32	76	73	72	70	69	69	32	76	73	72	70	69	69	32			
		2220	(1048)	0.126	(31.3)	2500	(1180)	76	73	72	70	69	69	32	76	73	72	70	69	69	32	78	74	73	70	69	69	32			
		2960	(1397)	0.224	(55.6)	2500	(1180)	76	73	72	70	69	69	32	77	74	72	70	69	69	32	79	75	73	71	70	69	32			
		3700	(1746)	0.349	(86.9)	2500	(1180)	76	73	72	70	69	69	32	79	74	73	71	70	69	32	82	75	74	71	70	70	32			

LEGEND

- ARI** — Air Conditioning and Refrigeration Institute
- CFM** — Air Volume (cubic feet per minute)
- Lp** — Room Sound Pressure
- Min ΔPs** — Minimum Static Pressure Required to Achieve Rated Airflow
- NC** — ARI 885-98 Test Conditions (see Application Assumptions on page 6)
- Ps** — Static Pressure

NOTES:

1. Sound power levels are in decibels, re: 10⁻¹² watts.
2. Radiated sound power is the noise emitted from the unit casing and induction port.
3. All sound data are based upon tests conducted in accordance with ARI Standard 880-98.
4. See Application Assumptions on page 6 for NC calculation assumptions.

Guide specifications



45X

HVAC Guide Specifications Fan Powered Zone Mixing Terminal Unit

Size Range: **50 to 6200 Nominal Cfm**

Carrier Model Number:

45XC — Direct Digital Controls, Carrier CCN

Part 1 — General

1.01 SYSTEM DESCRIPTION:

Variable speed, parallel fan-powered terminal for access floor application to provide pressure and temperature control to an underfloor air distribution plenum. Manufacturer shall supply unit(s) of the design, number, size and performance as shown on equipment drawings and schedules.

1.02 QUALITY ASSURANCE:

- A. Insulation shall meet NFPA-90A requirements for flame spread and smoke generation and UL-181 requirements for anti-erosion, corrosion and fungus properties.
- B. Sound power levels shall be in accordance with the requirements of ARI 880-98.

1.03 DELIVERY AND STORAGE:

Units shall be stored and handled per manufacturer's recommendations.

Part 2 — Products

2.01 Equipment

A. General:

Factory-assembled, externally powered, variable air volume control terminal. Unit shall be complete with an ECM (electronically commutated) motor, damper assembly, flow sensor, externally mounted volume controller, collars for duct connection and all required features. Control box shall be clearly marked with an identification label that lists such information as nominal cfm, maximum and minimum factory-set airflow limits, coil type and coil hand, where applicable.

B. Unit Cabinet:

1. Constructed of 20-gage galvanized steel with round inlet collar and rectangular discharge with flanged duct connection. All primary air inlet collars shall accommodate standard flex duct sizes.
2. Insulated with 1/2-in. thick, 1 1/2-lb equivalent density mat-faced insulation that meets the requirements of UL-181 and NFPA-90A.

3. 1-IN. THICK INSULATION (ALTERNATIVE TO ITEM 2): Unit casing shall be lined with dual density, 1-in. thick, 3-lb density fiberglass insulation that meets UL-181 and NFPA-90A.

4. FOIL ENCAPSULATED INSULATION (ALTERNATIVE TO ITEM 2): Unit casing shall be lined with nylon reinforced foil-wrapped exposed edges, either 1-in. or 1/2-in. thick, 1 1/2-lb density fiberglass insulation that meets UL-181 and NFPA-90A.

5. STERILINER INSULATION (ALTERNATIVE TO ITEM 2): Unit casing shall be lined with 3/16-in. thick, 4-lb density, rigid board insulation with nylon reinforced foil covering insulation fibers that meets UL-181 and NFPA-90A. Liner shall be attached to unit casing by insulation adhesive and full-seam-length Z-strips to enclose and seal the insulation cut edges.

6. NO LINER (ALTERNATIVE TO ITEM 2): Unit casing shall be equipped with no internal insulation liner.

7. CELLULAR INSULATION (ALTERNATIVE TO ITEM 2): Unit casing shall be lined with 3/8-in. thick, smooth surface, closed-cell elastomeric thermal insulation for fiber free application.

C. Unit Electrical Motors:

Unit electrical motors shall be 277-volt, single-phase ECM (electronically commutated motor) fan motors with an EVO AutoFan control. Units shall be available with fused fan motors.

D. Damper Assembly:

The control air damper assembly shall be constructed of heavy gage galvanized steel with solid shaft rotating in Delrin® bearings. Damper shaft shall be marked on the end to indicate damper position. Damper blade shall incorporate a flexible gasket for tight airflow shutoff and operate over a full 90 degrees.

E. Controls:

Units shall have pressure-independent communicating controls, as specified, capable of maintaining required airflow set points $\pm 5\%$ of the unit's capacity at any inlet pressure up to 6 in. wg. The controllers shall be capable of resetting between factory or field-set maximum and minimum (>350 fpm inlet duct velocity) set points to satisfy the room thermostat demand.

Features



45U — Underfloor Series Flow Fan Powered Unit

This unit is designed to be installed in the underfloor plenum and will fit between the pedestals of a standard access floor grid system. The 45U unit can be used to assist with high interior loads (example: conference rooms) or with a ducted primary and available hot water or electric heat for perimeter applications.

The 45U unit is available in 2 sizes, providing an air delivery range of 280 to 1200 cfm.

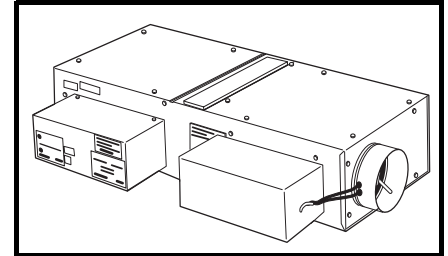
The standard PSC (permanent split capacitor) fan motor is available in 120, 208/240 or 277 volts (single-phase, 60 Hz). An optional high-efficiency, 277-volt, single-phase, 60 Hz ECM (electronically commutated motor) is also available.

The controls for the 45U unit are identified as the 45UC — Direct Digital Controls. The 45U unit is also available without controls (45UN).

Standard features include:

- 20-gage steel casing
- Dual density insulation, coated to prevent air erosion, meets NFPA 90A and UL 181 safety requirements
- Adjustable SCR fan speed control with minimum voltage stop
- Multipoint, center averaging velocity sensor
- Top access panels can be removed for service of damper, blower, or filter sections
- Energy efficient fan motor, permanent split capacitor (PSC) type, mounted in vibration isolators

- Primary airflow balancing connections
- Pressure-independent primary flow controls
- Single point electrical connections
- Rectangular discharge opening is designed for flanged duct connections



45U

Options and accessories

Factory-installed options

- Induced air filter, 1-in. thick, disposable construction type
- Toggle disconnect switch
- Fiber-free liner
- Foil-faced liner
- Fan unit fusing
- ECM motor
- Electric heat coil
- Hot water coil

Carrier Comfort Network (CCN)

Controls — The 45UC pressure independent control package is designed to be an integral part of the Carrier DDC control system. The control arrangement includes a standard linear inlet flow sensor, control enclosure, auto fan speed controller, 24-volt transformer, and fan relay.

Several types of room sensors may be ordered, with and without set point adjustment, and with integral CO₂ sensors.

CCN control packages must be used in combination with a thermostat. Thermostats are not included in the CCN package.

45UC CCN CONTROL ARRANGEMENTS

4440	Cooling only
4442	1-3 Stage electric heat
4443	On-off hot water
4444	Proportional (floating) hot water

Field-installed accessories

Thermostat: 33ZCT56SPT: RT (room temperature) sensor, with set point adjust and override.

Thermostat: 33ZCT55SPT: RT (room temperature) sensor, with override only.

Thermostat: 33ZCT56CO2: RT (room temperature) and CO₂ sensor, with set point adjust and override.

Thermostat: 33ZCT55CO2: RT (room temperature) and CO₂ sensor, with override only.

Thermostat: 33ZCT58SPT: Communicating room temperature sensor with LCD, set point adjust, fan control and occupancy override.

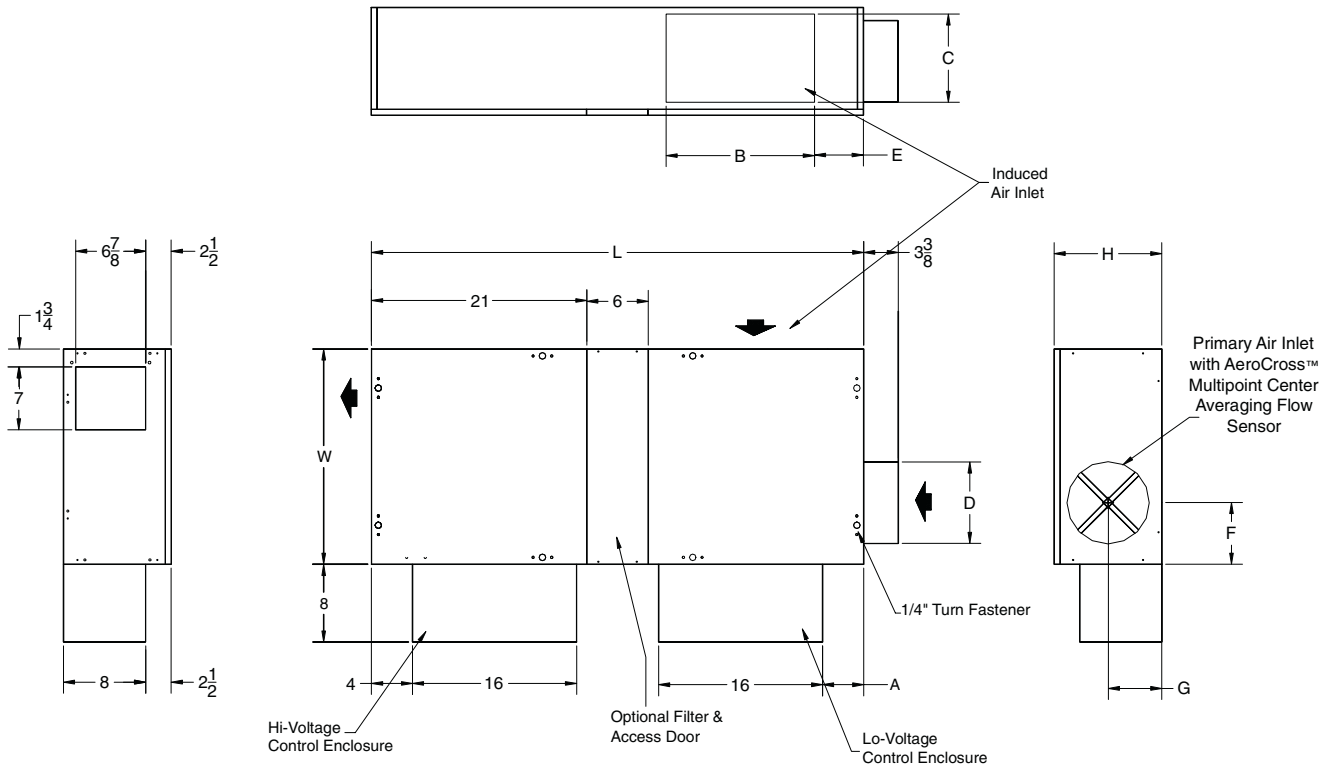
Physical data and dimensions

45U SIZE	INLET SIZE (in.)	WEIGHT (lb)			
		Base Unit	With Hot Water Coil		With Electric Heat
			1-Row	2-Row	
3	9	120	132	136	150
	10	128	140	146	158
4	9	128	140	146	158
	10	128	140	146	158

Physical data and dimensions (cont)



45U UNDERFLOOR SERIES FLOW FAN POWERED UNIT



UNIT SIZE	INLET SIZE	DIMENSIONS (in.)									
		A	B	C	D	E	F	G	H	L	W
3	9-in. Diameter	5	14	8	8 7/8	3 1/2	5 5/8	7	10 1/2	48	21
4	9-in. Diameter	5	14	12	8 7/8	3	5 5/8	7	14 1/8	48	21
	10-in. Diameter				9 7/8		6 5/8				

NOTE: All dimensions are in inches.

45U

45U UNDERFLOOR SERIES FLOW FAN POWERED UNIT — ELECTRIC COIL SECTION

Standard Features

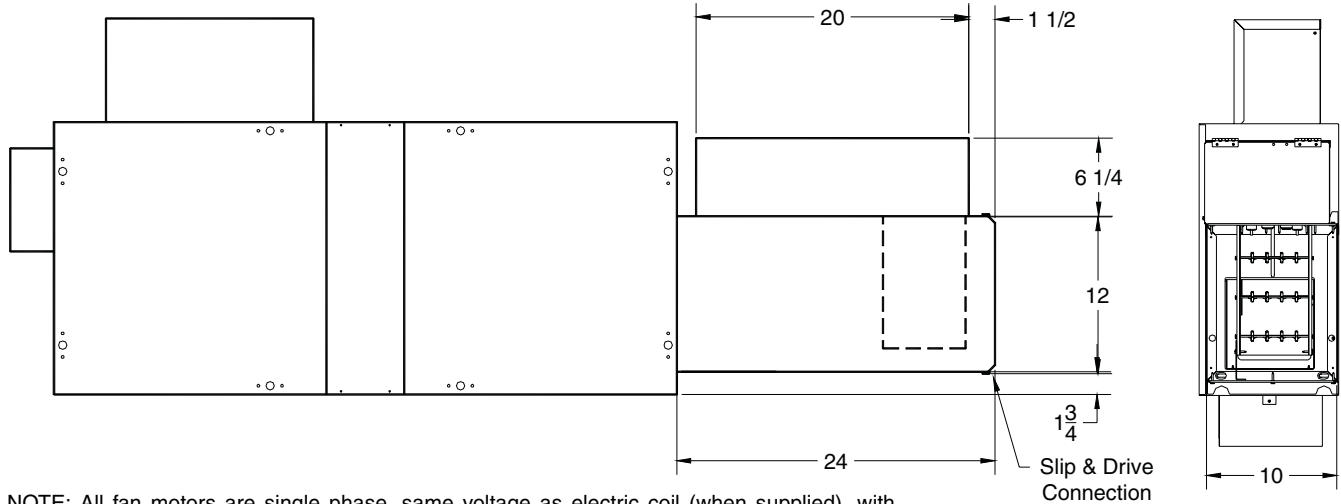
- Automatic reset thermal cutouts, one per element
- Single point electrical connection for entire unit
- Positive pressure flow switch
- Transformer

Options

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

Supply Voltage

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



NOTE: All fan motors are single phase, same voltage as electric coil (when supplied), with exception that 277 v motors are used with 480 v, 3-phase coils (4-wire wye).
All dimensions are in inches.

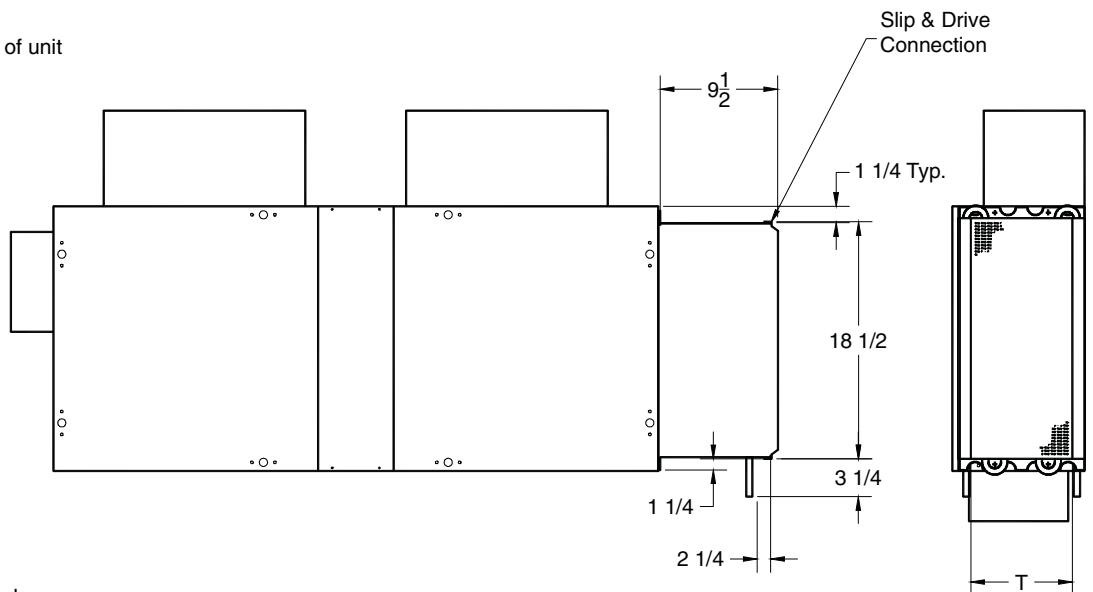
45U

45U UNDERFLOOR SERIES FLOW FAN POWERED UNIT — HOT WATER COIL SECTION

- 1/2-in. copper tubes
- Aluminum ripple fins, 10 per inch
- Connections: Male solder, 5/8-in. 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

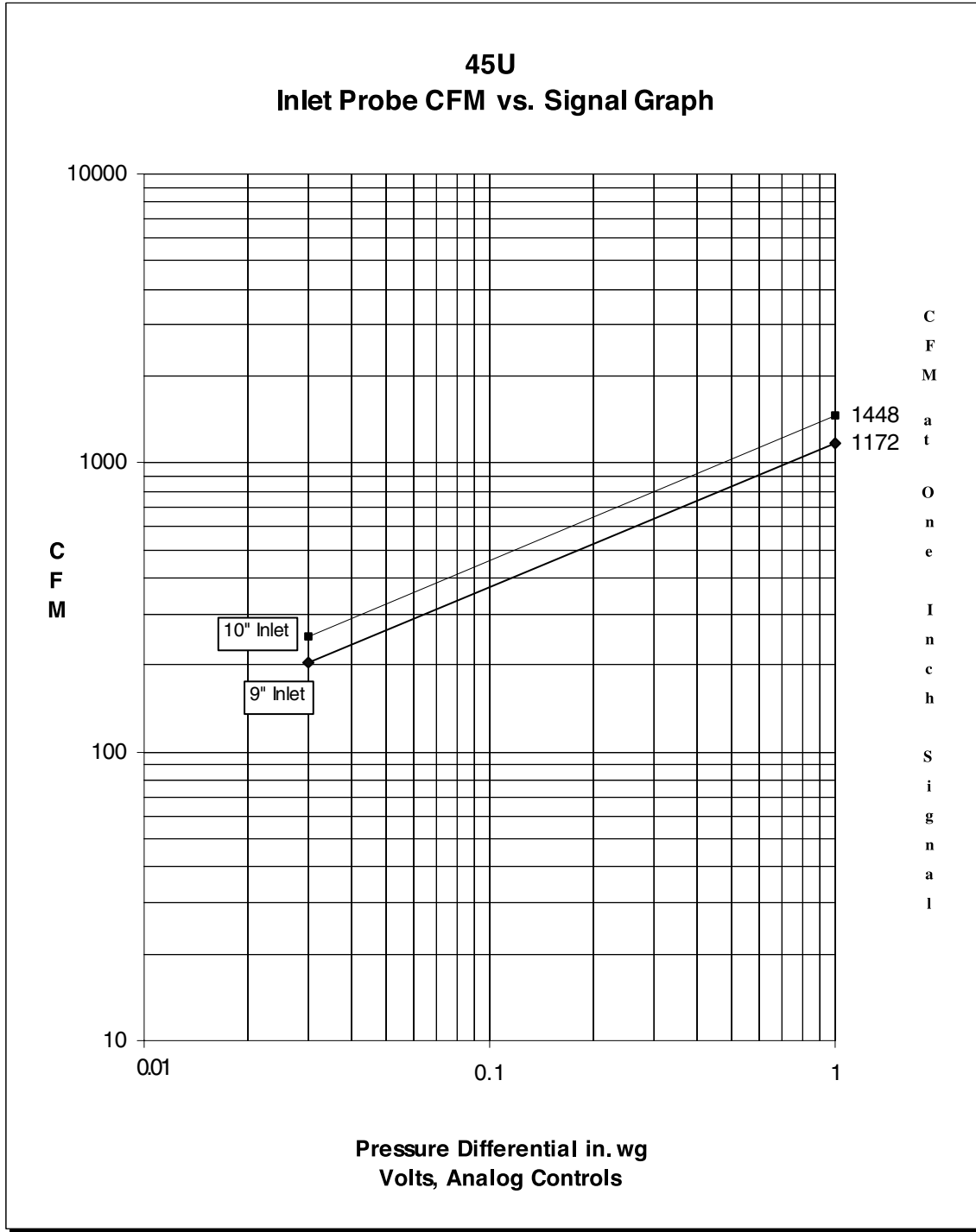
- 1-Row
- 2-Row

UNIT SIZE	T
3	10
4	13 1/2



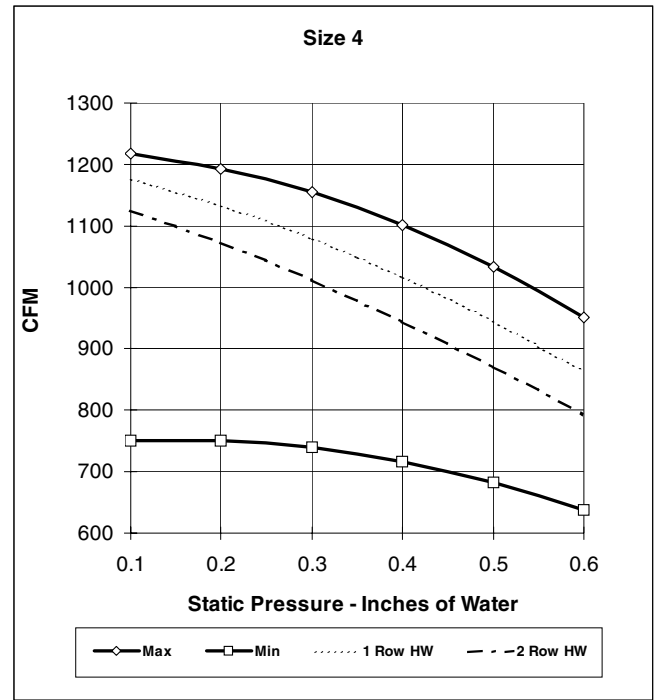
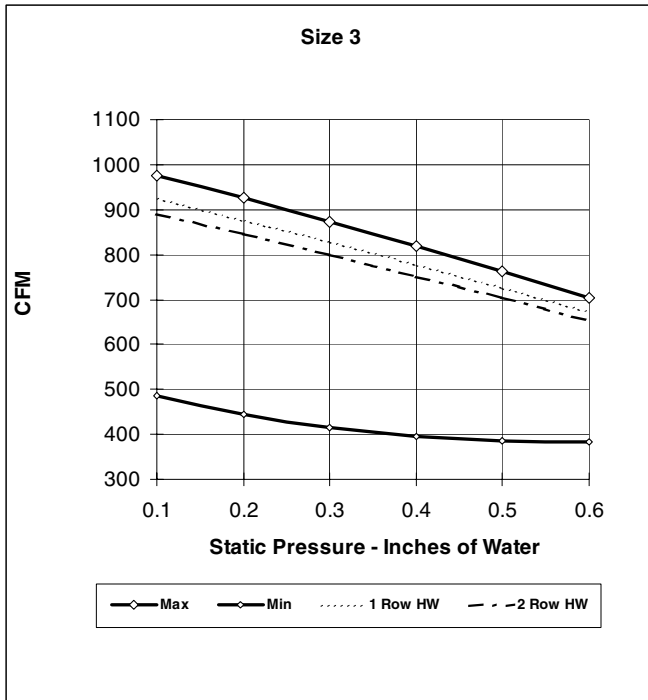
NOTE: All dimensions are in inches.

45U

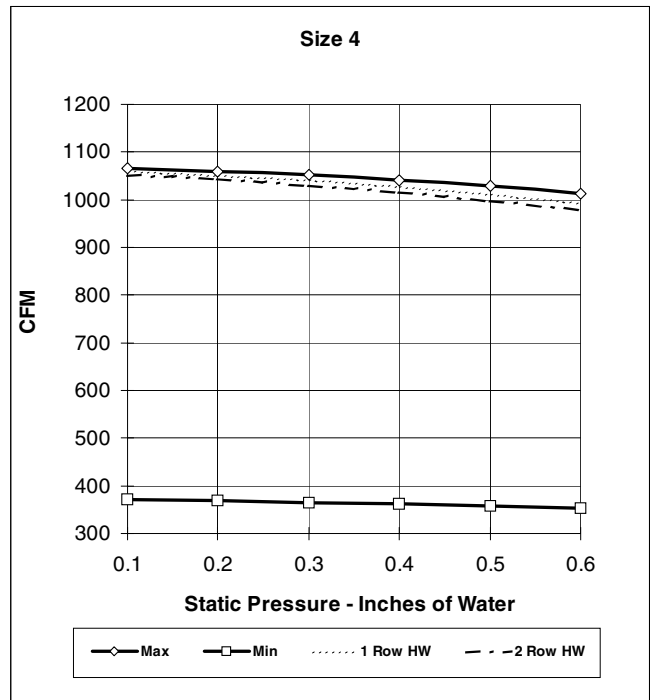
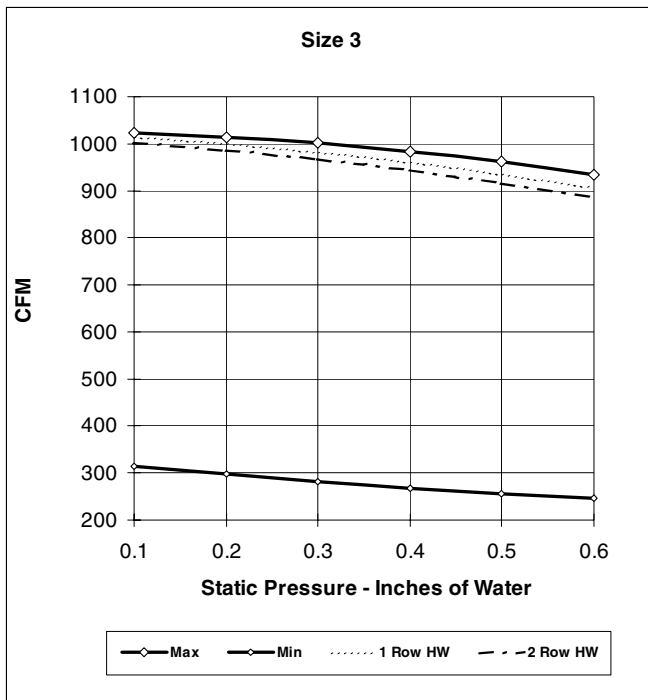


**45U UNDERFLOOR SERIES FLOW FAN POWERED UNIT
AIRFLOW VS. DOWNSTREAM STATIC PRESSURE (PSC)**

45U



AIRFLOW VS. DOWNSTREAM STATIC PRESSURE (ECM)



Performance data (cont)



45U UNDERFLOOR SERIES FLOW FAN BOX — PSC

UNIT SIZE	INLET SIZE	MOTOR HP	MOTOR AMPS			FAN AIRFLOW*		PRIMARY AIRFLOW†			MINIMUM STATIC PRESSURE (in. wg)
			120 V	208/240 V	277 V	Max	Min	Max	CCN Min	Min**	
3	9	1/4	5.8	2.5	1.8	900	380	900	117	203	0.10
4	9	1/3	6.4	3.0	2.5	1200	650	900	117	203	0.10
	10	1/3	6.4	3.0	2.5	1200	650	1200	145	251	0.12

*Max Based on 0.1 in. wg downstream static pressure. Min based on 0.6 in. wg downstream static pressure.

†Maximum Primary airflows are set by the maximum induced airflow, which may vary as a function of downstream pressure.

**Some DDC controls supplied by others may have different limitations.

45U UNDERFLOOR SERIES FLOW FAN BOX — ECM

UNIT SIZE	INLET SIZE	MOTOR HP	MOTOR AMPS			FAN AIRFLOW*		PRIMARY AIRFLOW†		MINIMUM STATIC PRESSURE (in. wg)
			120 V	208/240 V	277 V	Max	Min	Max	Min**	
3	9	1/3	4.1	—	2.4	1000	280	900	203	0.10
4	9	1/3	3.9	—	2.3	1050	360	900	203	0.10
	10	1/3	3.9	—	2.3	1050	360	1050	251	0.09

*Max Based on 0.1 in. wg downstream static pressure. Min based on 0.6 in. wg downstream static pressure.

†Maximum Primary airflows are set by the maximum induced airflow, which may vary as a function of downstream pressure.

**Some DDC controls supplied by others may have different limitations.

45U UNDERFLOOR SERIES FLOW FAN POWERED UNIT

RADIATED SOUND POWER DATA — PSC

UNIT SIZE	INLET SIZE	FLOW RATE		MIN ΔPs		FAN ONLY							FAN + PRIMARY AT 0.5 ΔPs							FAN + PRIMARY AT 1.0 ΔPs						
						Sound Power Octave Bands							Lp	Sound Power Octave Bands							Lp	Sound Power Octave Bands				
		Cfm	(L/s)	in. wg	(pa)	2	3	4	5	6	7	NC		2	3	4	5	6	7	NC		2	3	4	5	6
3	9	500	(236)	0.031	(7.68)	68	52	50	47	38	26	—	68	54	50	47	40	32	—	68	58	53	50	43	38	—
		600	(283)	0.044	(11.06)	69	54	53	49	41	30	—	69	57	53	49	43	34	—	71	61	56	52	45	39	—
		700	(330)	0.060	(15.05)	70	57	55	52	44	33	—	70	60	55	52	44	36	—	73	63	58	54	47	40	22
		800	(378)	0.079	(19.66)	71	59	57	54	46	36	—	71	62	57	54	46	36	—	74	65	60	56	49	41	23
		900	(425)	0.100	(24.88)	71	61	58	55	48	39	20	73	64	58	55	48	39	23	75	67	61	57	51	43	25
4	10	700	(330)	0.040	(10.08)	64	54	55	50	43	35	—	70	62	59	53	47	40	—	73	66	62	56	51	45	23
		900	(425)	0.067	(16.66)	67	59	58	55	48	41	—	72	65	61	57	51	44	22	75	69	64	59	54	48	26
		1000	(472)	0.083	(20.57)	68	61	59	57	51	44	20	74	67	63	57	51	46	24	76	70	65	60	55	49	27
		1100	(519)	0.100	(24.88)	69	62	61	59	53	46	22	75	68	64	59	53	46	25	77	71	66	62	56	50	28
		1200	(566)	0.119	(29.61)	70	64	62	61	54	48	24	75	69	65	61	54	48	26	78	72	67	63	57	51	29

LEGEND

- ARI — Air Conditioning and Refrigeration Institute
- CFM — Air Volume (cubic feet per minute)
- Lp — Room Sound Pressure
- Min ΔPs — Minimum Static Pressure Required to Achieve Rated Airflow
- NC — ARI 885-98 Test Conditions (see Application Assumptions)
- Ps — Static Pressure
- — Indicates an NC Level Less Than 20

NOTES:

1. ΔPs is the difference in static pressure from inlet to discharge.
2. Sound power levels are in decibels, re: 10⁻¹² watts.
3. Radiated sound power is the noise emitted from the unit casing and induction point.
4. All sound data are based upon tests conducted in accordance with ARI Standard 880-98.
5. NC Application data from ARI 885-98, see Application Assumptions tables on page 16.



45U UNDERFLOOR SERIES FLOW FAN POWERED UNIT (cont)
RADIATED SOUND POWER DATA — ECM

UNIT SIZE	INLET SIZE	FLOW RATE		MIN ΔPs		FAN ONLY							FAN + PRIMARY AT 0.5 ΔPs							FAN + PRIMARY AT 1.0 ΔPs						
						Sound Power Octave Bands							Lp	Sound Power Octave Bands							Lp	Sound Power Octave Bands				
		Cfm	(L/s)	in. wg	(pa)	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
3	9	500	(236)	0.031	(7.68)	68	52	50	47	38	26	—	68	54	50	47	40	32	—	68	58	53	50	43	38	—
		600	(283)	0.044	(11.06)	69	54	53	49	41	30	—	69	57	53	49	43	34	—	71	61	56	52	45	39	—
		700	(330)	0.060	(15.05)	70	57	55	52	44	33	—	70	60	55	52	44	36	—	73	63	58	54	47	40	22
		850	(401)	0.089	(22.20)	71	60	57	54	47	37	—	73	63	57	54	47	37	22	74	66	61	56	50	42	24
		1000	(472)	0.123	(30.72)	72	63	60	57	50	41	21	74	65	60	57	50	41	24	76	69	63	59	52	44	26
4	10	700	(330)	0.040	(10.08)	64	54	55	50	43	35	—	70	62	59	53	47	40	—	73	66	62	56	51	45	23
		800	(378)	0.053	(13.16)	65	57	56	53	46	38	—	71	64	60	55	49	42	21	74	67	63	58	52	46	25
		900	(425)	0.067	(16.66)	67	59	58	55	48	41	—	72	65	61	57	51	44	22	75	69	64	59	54	48	26
		1000	(472)	0.083	(20.57)	68	61	59	57	51	44	20	74	67	63	57	51	46	24	76	70	65	60	55	49	27
		1050	(496)	0.091	(22.67)	69	62	60	58	52	45	21	74	67	63	58	52	45	24	77	71	66	61	55	49	27

NOTES:

1. ΔPs is the difference in static pressure from inlet to discharge.
2. Sound power levels are in decibels, re: 10⁻¹² watts.
3. Radiated sound power is the noise emitted from the unit casing and induction point.

4. All sound data are based upon tests conducted in accordance with ARI Standard 880-98.
5. NC Application data from ARI 885-98, see Application Assumptions tables on page 16.

DISCHARGE SOUND POWER DATA — PSC

UNIT SIZE	INLET SIZE	FLOW RATE		MIN ΔPs		FAN ONLY							FAN + PRIMARY AT 0.5 ΔPs							FAN + PRIMARY AT 1.0 ΔPs						
						Sound Power Octave Bands							Lp	Sound Power Octave Bands							Lp	Sound Power Octave Bands				
		Cfm	(L/s)	in. wg	(pa)	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
3	9	500	(236)	0.031	(7.68)	64	56	58	58	56	52	20	64	56	58	58	56	52	20	66	56	58	58	56	52	20
		600	(283)	0.044	(11.06)	66	59	61	61	59	56	23	66	59	61	61	59	56	23	68	59	61	61	59	56	23
		700	(330)	0.060	(15.05)	68	62	63	63	62	60	27	68	62	63	63	62	60	27	70	63	63	63	62	60	27
		800	(378)	0.079	(19.66)	69	64	65	66	65	63	27	71	66	67	68	67	65	29	71	66	67	68	67	65	29
		900	(425)	0.100	(24.88)	71	66	67	68	67	66	29	73	68	68	70	69	68	31	73	68	68	70	69	68	31
4	10	700	(330)	0.040	(10.08)	72	68	69	69	68	66	32	72	68	69	69	68	66	32	72	68	69	69	68	66	32
		900	(425)	0.067	(16.66)	73	72	72	72	71	70	33	73	72	72	72	71	70	33	75	74	73	72	71	70	33
		1000	(472)	0.083	(20.57)	74	73	73	73	73	71	35	74	73	73	73	73	71	35	76	75	75	73	73	71	35
		1100	(519)	0.100	(24.88)	74	74	74	75	74	73	36	74	76	76	75	74	73	36	76	76	76	75	74	73	36
		1200	(566)	0.119	(29.61)	75	75	75	76	75	74	37	75	77	77	76	75	74	37	77	78	77	76	75	74	37

NOTES:

1. ΔPs is the difference in static pressure from inlet to discharge.
2. Sound power levels are in decibels, re: 10⁻¹² watts.
3. End discharge sound power is the noise emitted from the unit discharge into the duct.

4. All sound data are based upon tests conducted in accordance with ARI Standard 880-98.
5. NC Application data from ARI 885-98, see Application Assumptions tables on page 16.

DISCHARGE SOUND POWER DATA — ECM

UNIT SIZE	INLET SIZE	FLOW RATE		MIN ΔPs		FAN ONLY							FAN + PRIMARY AT 0.5 ΔPs							FAN + PRIMARY AT 1.0 ΔPs						
						Sound Power Octave Bands							Lp	Sound Power Octave Bands							Lp	Sound Power Octave Bands				
		Cfm	(L/s)	in. wg	(pa)	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
3	9	500	(236)	0.031	(7.68)	64	56	58	58	56	52	20	64	56	58	58	56	52	20	66	56	58	58	56	52	20
		600	(283)	0.044	(11.06)	66	59	61	61	59	56	23	66	59	61	61	59	56	23	68	59	61	61	59	56	23
		700	(330)	0.060	(15.05)	68	62	63	63	62	60	27	68	62	63	63	62	60	27	70	63	63	63	62	60	27
		850	(401)	0.089	(22.20)	70	65	66	67	66	65	28	72	67	68	69	68	66	30	72	67	68	69	68	66	30
		1000	(472)	0.123	(30.72)	72	68	68	70	69	68	31	74	70	70	71	71	70	33	74	70	70	71	71	70	33
4	10	700	(330)	0.040	(10.08)	72	68	69	69	68	66	32	72	68	69	69	68	66	32	72	68	69	69	68	66	32
		800	(378)	0.053	(13.16)	73	70	70	70	70	68	32	73	70	70	70	70	68	32	75	72	72	70	70	68	32
		900	(425)	0.067	(16.66)	73	72	72	72	71	70	33	73	72	72	72	71	70	33	75	74	73	72	71	70	33
		1000	(472)	0.083	(20.57)	74	73	73	73	73	71	35	74	73	73	73	73	71	35	76	75	75	73	73	71	35
		1050	(496)	0.091	(22.67)	74	74	73	74	74	72	36	74	74	75	74	74	72	36	76	76	75	74	74	72	36

NOTES:

1. ΔPs is the difference in static pressure from inlet to discharge.
2. Sound power levels are in decibels, re: 10⁻¹² watts.
3. End discharge sound power is the noise emitted from the unit discharge into the duct.

4. All sound data are based upon tests conducted in accordance with ARI Standard 880-98.
5. NC Application data from ARI 885-98, see Application Assumptions tables on page 16.

45U

Performance data (cont)



45U UNDERFLOOR SERIES FLOW FAN POWERED UNIT (cont) APPLICATION ASSUMPTIONS

ARI 885-98 DISCHARGE <300 CFM	OCTAVE BANDS					
	2	3	4	5	6	7
Env Effect	2	1	0	0	0	0
Underfloor Plenum*	15	15	15	15	15	15
End Reflection	9	5	2	0	0	0
Power Division (0 outlets)	0	0	0	0	0	0
5 ft, 8 in. Flex Duct	—	—	—	—	—	—
Space Effect	10	11	12	13	14	15
Total Attenuation*	36	32	29	28	29	30

ARI 885-98 DISCHARGE >700 CFM	OCTAVE BANDS					
	2	3	4	5	6	7
Env Effect	2	1	0	0	0	0
Underfloor Plenum*	15	15	15	15	15	15
End Reflection	9	5	2	0	0	0
Power Division (10 outlets)	10	10	10	10	10	10
5 ft, 8 in. Flex Duct	—	—	—	—	—	—
Space Effect	10	11	12	13	14	15
Total Attenuation*	46	42	39	38	39	40

ARI 885-98 DISCHARGE 300-700 CFM	OCTAVE BANDS					
	2	3	4	5	6	7
Env Effect	2	1	0	0	0	0
Underfloor Plenum*	15	15	15	15	15	15
10 in. End Reflection	9	5	1	0	0	0
Power Division (6 outlets)	8	8	8	8	8	8
5 ft, 8 in. Flex Duct	—	—	—	—	—	—
Space Effect	10	11	12	13	14	15
Total Attenuation*	43	40	36	36	37	38

ARI 885-98 RADIATED	OCTAVE BANDS					
	2	3	4	5	6	7
Ceiling Type — Type 10, Double Gypsum Board	29	33	33	35	35	36
Environ. Effect	2	1	0	0	0	0
Total Attenuation	31	34	33	35	35	36

*Estimated attenuation, underfloor plenum.

45U UNDERFLOOR SERIES FLOW FAN POWERED UNIT — WATER COIL PERFORMANCE (MBtuh)

SIZE	ROWS	GPM	PRESSURE DROP (ft wg)	AIRFLOW, CFM						
				380	450	520	660	730	800	870
3	One Row	0.5	0.28	11.4	12.0	12.6	13.6	14.1	14.4	14.8
		1.0	0.94	13.6	14.4	15.4	17.1	17.8	18.4	19.0
		2.0	3.21	15.1	16.1	17.3	19.5	20.4	21.3	22.1
		4.0	10.97	15.9	17.1	18.5	21.0	22.1	23.2	24.2
		Airside Δ PS			0.03	0.04	0.05	0.08	0.09	0.11
3	Two Rows	1.0	0.28	21.5	23.2	24.6	27.0	27.9	28.8	29.5
		2.0	0.94	24.9	27.4	29.6	33.2	34.8	36.2	37.6
		3.0	1.93	26.3	29.1	31.6	35.9	37.8	39.6	41.2
		4.0	10.97	27.1	30.1	32.8	37.5	39.6	41.5	43.3
		Airside Δ PS			0.06	0.07	0.10	0.15	0.18	0.21

SIZE	ROWS	GPM	PRESSURE DROP (ft wg)	AIRFLOW, CFM						
				650	730	800	870	950	1010	1100
4	One Row	0.5	0.28	13.2	13.6	14.0	14.3	14.7	14.9	15.2
		1.0	0.94	16.3	17.0	17.6	18.2	18.8	19.2	19.7
		2.0	3.21	18.5	19.5	20.3	21.0	21.8	22.4	23.1
		4.0	10.97	19.9	21.0	22.0	22.8	23.8	24.4	25.4
		Airside Δ PS			0.08	0.09	0.11	0.13	0.15	0.17
4	Two Rows	1.0	0.28	26.0	27.1	27.9	28.6	29.4	29.9	30.6
		2.0	0.94	31.7	33.4	34.8	36.0	37.3	38.1	39.4
		3.0	1.93	34.2	36.2	37.8	39.3	40.9	42.0	43.5
		4.0	3.21	35.6	37.8	39.6	41.2	42.9	44.2	45.9
		Airside Δ PS			0.15	0.18	0.21	0.24	0.29	0.32

NOTES:

- All data is based on: 65 F entering air and 180 F entering water, at sea level.
- Program calculations assume 0% Glycol.
- See table below for other conditions:

DELTA T (°F)	50	60	70	80	90	100	115	150
Factor	0.44	0.52	0.61	0.70	0.79	0.88	1.00	1.30

Electrical data



45U kW RANGES

UNIT SIZE	MAXIMUM kW				
	208 V	240 V	277 V	208 V	480 V
	Single Phase			3 Phase	
3	8.0	8.0	8.0	8.0	8.0
4	8.0	11.0	11.0	9.5	11.0

STAGES	MINIMUM kW				
	208 V	240 V	277 V	208 V	480 V
	Single Phase			3 Phase	
1	1.0	1.0	1.0	1.5	2.5
2	1.5	1.5	1.5	1.5	2.5
3	2.0	2.0	2.0	1.5	2.5

NOTES:

1. Three-stage heaters are not available with analog or VVT® electronic controls.
2. Heaters require a minimum of 0.03 in. wg downstream static pressure to ensure proper operation.
3. kW/Voltage ratings are sized not to exceed 48 amps so NEC code requirement for circuit fusing is not necessary.

$$\text{Single Phase - Amperes} = \frac{\text{Watts (kW x 1000)}}{\text{Line Voltage}}$$

$$\text{Three Phase - Amperes} = \frac{\text{Watts (kW x 1000)}}{\text{Line Voltage x 1.73}}$$

Electric heat selection — Specify electric duct heaters using voltage, kW and number of steps.

Select heater so that power (kW) matches available electric heat options. Tables show maximum, minimum and available kW's within those ranges. Rounding to the nearest whole number has negligible impact on discharge temperature. If the fan is selected for less than maximum speed, then the maximum operating kW would be lower than the maximum kW shown in the table. Calculate kW based on the available fan cfm. A minimum of 70 cfm is required per kW.

$$\text{Total fan cfm}/70 \text{ cfm} = \text{max allowable kW}$$

The Total kW required for the unit is based on the sum of both (A) room Btuh load and (B) the Btuh required to raise the entering air temperature to the desired room air temperature.

$$\text{Total kW} = \text{room Btuh} + \Delta \text{ Btuh}$$

$$\text{room Btuh kW} = \frac{\text{room Btuh}}{3413}$$

$$\Delta \text{ Btuh kW} = \frac{\text{cfm} \times \Delta t}{3160}$$

where Δt = desired room temp. – air entering electric heater (typically 70 F)

Determine what the desired discharge air temperature will be. Do not select for discharge air temperatures exceeding 120 F. In addition, note that ASHRAE recommends a maximum discharge temperature of 90 F to avoid room air temperature stratification when heating from the ceiling (2001 Fundamentals, Chapter 32).

$$\Delta t = (\text{LAT} - \text{EAT}) = \frac{\text{kW} \times 3160}{\text{cfm}}$$

LAT = Discharge air temperature

EAT = Air temperature to heater

The desired heating airflow for the space can be verified by the following:

$$\text{cfm} = \frac{\text{kW} \times 3160}{\Delta t}$$

ELECTRIC HEAT kW OPTIONS

UNIT	AVAILABLE kW
45U	1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0, 9.5, 10.0, 11.0



45U

Guide specifications



HVAC Guide Specifications Underfloor Series Flow Fan Powered Terminal Unit

Size Range: **280 to 1200 Nominal Cfm**

Carrier Model Number:

45UC (Direct Digital Controls, Carrier CCN)
45UN (No Control)

Part 1 — General

1.01 SYSTEM DESCRIPTION:

Variable air volume control unit for installation in a raised floor plenum that permits access to the unit. Manufacturer shall supply unit(s) of the design, number, size and performance as shown on equipment drawings and schedules. The terminal including all control enclosures shall be designed to fit in the plenum space below a raised floor. The unit shall fit within a 24-in. by 24-in. pedestal grid system without modifications to the grid. Units wider than 21 in. are acceptable when bridge supports are supplied by the floor manufacturer. Cost of the bridge supports to be borne by the terminal manufacturer.

1.02 QUALITY ASSURANCE:

- A. Insulation shall meet NFPA-90A requirements for flame spread and smoke generation and UL-181 requirements for anti-erosion, corrosion and fungus properties.
- B. Hot water coils, when specified, shall be tested for leakage at 400 psig with the coil submerged in water.
- C. Electric heating coils, when specified shall be ETL listed and designed to comply with UL Standard 1096, UL 1995 and CSA C22.2 No. 236.95.
- D. Sound power levels shall be ARI certified in accordance with the requirements of ARI 880-98.

1.03 DELIVERY AND STORAGE:

Units shall be stored and handled per manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT:

A. General:

Factory-assembled, externally powered, variable air volume control terminal. Unit shall be complete with a PSC (permanent split capacitor) motor, damper assembly, flow sensor, externally mounted volume controller, collars for duct connection and all required features. The terminal casing shall have top access panels with cam latches that allow removal of fan and servicing of terminal without disturbing duct connections. Control box shall be clearly marked with an identification label that lists such information as nominal cfm, maximum and minimum factory-set airflow limits, coil type and coil hand, where applicable.

B. Unit Cabinet:

1. Constructed of 20-gage galvanized steel with round inlet collar and rectangular discharge with flanged duct connection. All primary air inlet collars shall accommodate standard flex duct sizes.
2. Insulated with 1/2-in. thick, 1 1/2-lb equivalent density mat-faced insulation that meets the requirements of UL-181 and NFPA-90A.
3. FOIL ENCAPSULATED INSULATION (ALTERNATIVE TO ITEM 2): Unit casing shall be lined with nylon reinforced foil-wrapped exposed edges, either 1-in. or 1/2-in. thick, 1 1/2-lb density fiberglass insulation that meets UL-181 and NFPA-90A.
4. CELLULAR INSULATION (ALTERNATIVE TO ITEM 2): Unit casing shall be lined with 3/8-in. thick, smooth surface, closed-cell elastomeric thermal insulation for fiber free application.

C. Unit Electrical Motors:

Unit electrical motors shall be 120, 208/240, or 277-volt, multi-voltage, single-speed, single-phase, permanently lubricated PSC type designed for use with an SCR fan speed adjustment. The speed control shall incorporate a minimum voltage stop to ensure that the motor cannot operate in a stall mode. Optional 277-volt, single-phase ECM (electronically commutated motor) fan motors shall be available with either a VCU (visually controlled unit) (factory/field set, field adjustable) or ACU (automation controlled unit) (remote set and adjusted) fan speed controller. Units shall be available with fused fan motors.

D. Damper Assembly:

The control air damper assembly shall be constructed of heavy gage galvanized steel with solid shaft rotating in Delrin® bearings. Damper shaft shall be marked on the end to indicate damper position. Damper shall incorporate a mechanical stop to prevent over stroking, and a synthetic seal to limit close-off leakage to the following maximum values for inlet sizes 9 and 10: for 1.5-in. wg change in static pressure, damper leakage shall be limited to 4 cfm; for 3.0-in. wg change in static pressure, damper leakage shall be limited to 5 cfm; for 6.0-in. wg change in static pressure, damper leakage shall be limited to 7 cfm.

E. Controls:

1. Units shall have pressure-independent electronic or communicating controls, as specified, capable of maintaining required airflow set points $\pm 5\%$ of the unit's capacity at any inlet pressure up to 6 in. wg. The controllers shall be capable of resetting between factory or field-set maximum and minimum (>350 fpm inlet duct velocity) set points to satisfy the room thermostat demand.
2. The unit shall be equipped with an amplified linear averaging flow probe located horizontally across the inlet. The sensor will provide a differential pressure signal amplified to equal 3 times the velocity pressure with an accuracy of at least $\pm 10\%$ throughout the range of 350 to 2600 fpm inlet duct velocity, depending on the controller employed.

F. Special Features:

1. Hot Water Heating Coil:

- Hot water coil casing shall be constructed with minimum 20-gage galvanized steel with flanged discharge for attachment to downstream ductwork. Coils shall be factory installed on the terminal unit.
- a. Fins shall be rippled and corrugated heavy gage aluminum, mechanically bonded to tubes.
 - b. Tubes shall be copper with minimum wall thickness of 0.016 in. and with male solder header connections. Coils shall be leak tested to 400 psi.
 - c. Number of coil rows and circuits shall be selected to provide performance as required by the plans. Coil performance data shall be based on tests run in accordance with ARI Standard 410.

2. Electric Heating Coil:

The terminal unit manufacturer shall supply electric coils and they shall be ETL listed. Construct coil casing with minimum of 22-gage zinc-coated steel. Elements shall be nickel chrome and supported by ceramic isolators. The integral control panel shall be housed in a NEMA 1 enclosure, with hinged access door for access to all controls and safety devices. Electric coils shall contain a primary automatic reset thermal cutout and differential pressure airflow switch for proof of airflow. (OPTIONAL) Electric coils shall include manual reset, fused or non-fused door interlocking disconnect switch, mercury contactors, thermal cutout, fuse block, dust-tight enclosure construction, all mounted and/or wired within the control enclosure.

Features



42K — Perimeter Fan Coil Unit

This unit is designed to be installed in the underfloor plenum and will fit between the pedestals of a standard access floor grid. The 42K unit is used to provide either hot water or electric heat to the perimeter zone. Plenum air is drawn into the 42K unit, heated and then ducted to perimeter floor grilles.

The 42K unit is available in 2 sizes, providing air delivery range of 325 to 2800 cfm.

The standard PSC (permanent split capacitor) fan motor is available in 120, 208/240 or 277 volts (single-phase, 60 Hz). An optional

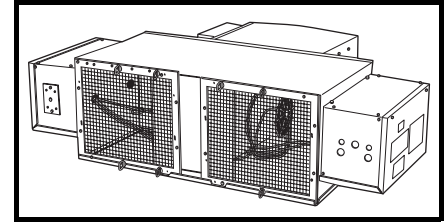
high-efficiency, 277-volt, single-phase, 60 Hz ECM (electronically commutated motor) is also available.

The controls to the 42K unit are identified as 42KC Direct Digital Controls. The 42K unit is also available without controls (42KN).

Standard features include:

- Heavy steel casing with leak resistant construction
- Energy efficient fan motor, permanent split capacitor type, mounted in vibration isolators
- Adjustable SCR fan speed control with minimum voltage stop
- Steel inlet screen covering the inlet side of the unit protects the fan from debris

- Top access to unit, high and low voltage controls, for easy access from room above
- Rectangular discharge opening is designed for flanged duct connections



Options and accessories

Factory-installed options:

- Induced inlet sensor allows monitoring of airflow
- Induced air filter, 1-in. thick, disposable construction type
- ECM motor
- Hot water coil
- Electric heat coil
- Pressure independent controls

Carrier Comfort Network (CCN) Controls

— The 42KC pressure independent control package is designed to be an integral part of the Carrier DDC control system. The control arrangement includes a standard linear inlet flow sensor, control enclosure, auto fan speed controller,

24-volt transformer, and fan relay.

Several types of room sensors may be ordered, with and without set point adjustment, and with integral CO₂ sensors.

The CCN control packages must be used in combination with a thermostat. Thermostats are not included in the CCN package.

42KC CCN CONTROL ARRANGEMENTS

4442	1-3 Stage electric heat
4443	On-off hot water
4444	Proportional (floating) hot water

Field-installed accessories

Thermostat: 33ZCT56SPT: RT (room temperature) sensor, with set point adjust and override.

Thermostat: 33ZCT55SPT: RT (room temperature) sensor, with override only.

Thermostat: 33ZCT56CO2: RT (room temperature) and CO₂ sensor, with set point adjust and override.

Thermostat: 33ZCT55CO2: RT (room temperature) and CO₂ sensor, with override only.

Thermostat: 33ZCT58SPT: Communicating room temperature sensor with LCD, set point adjust, fan control and occupancy override.

42K

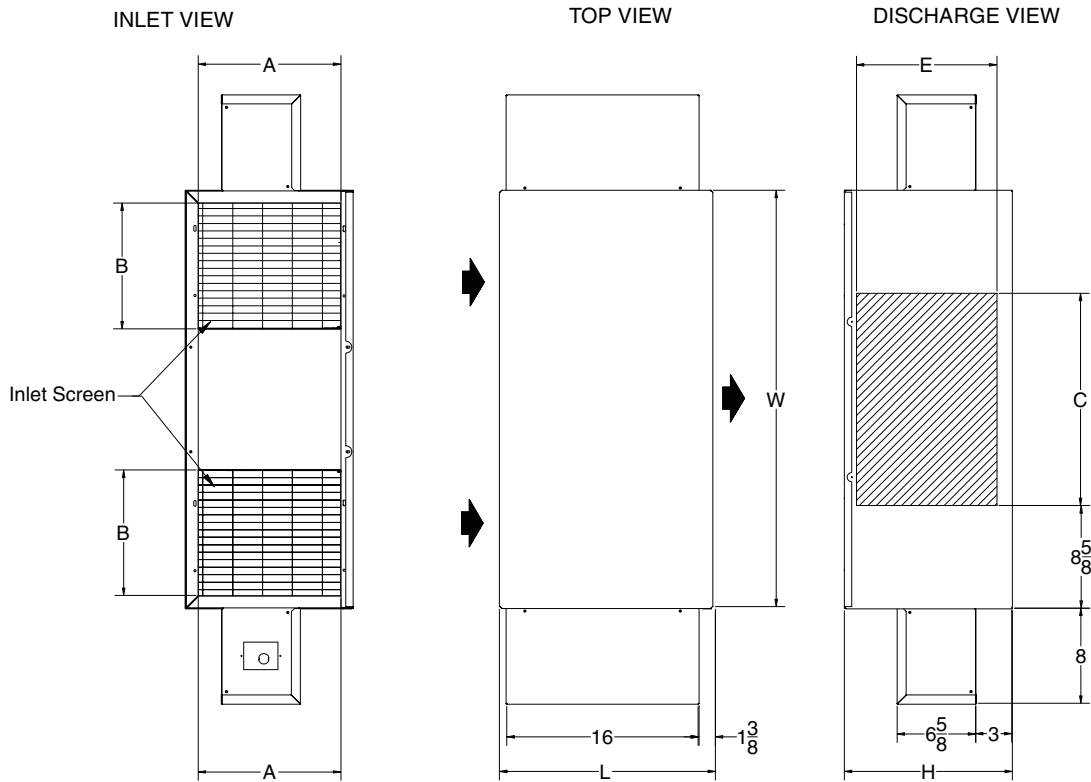
Physical data and dimensions

42K SIZE	INLET SIZE (in.)	WEIGHT (lb)			
		Base Unit	With Hot Water Coil		With Electric Heat
			1-Row	2-Row	
14	12 x 10 ¹ / ₂	120	132	136	150
16	14 x 9 ⁷ / ₈	128	140	146	158

Physical data and dimensions (cont)



42K PERIMETER FAN COIL UNIT



All dimensions are in inches.

UNIT SIZE	DIMENSIONS (in.)						
	A	B	C	E	H	L	W
14	12	10 1/2	17 3/4	11 3/4	14	18	34 7/8
16	14	9 7/8	17 3/4	13 3/4	16	19	34 7/8

42K

42K PERIMETER FAN COIL UNIT — ELECTRIC COIL SECTION

Electric Coil Section

Standard Features

- Automatic reset thermal cutouts, one per element
- Single point electrical connection for entire unit
- Positive pressure flow switch
- Slip and Drive 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

- 208 V, 1 ph, 60 Hz
- 240 V, 1 ph, 60 Hz
- 277 V, 1 ph, 60 Hz
- 208 V, 3 ph, 60 Hz
- 480 V, 3 ph, 60 Hz*

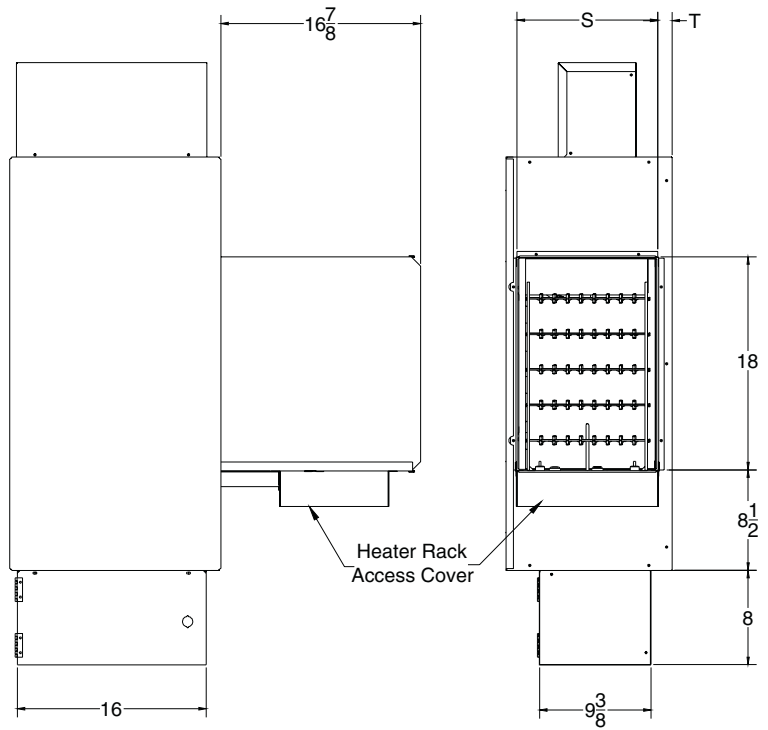
UNIT SIZE	S	T
14	12	1 1/4
16	13 1/2	1 5/8

S is inside dimension.

*4-wire wye only.

NOTE: All fan motors are single phase, same voltage as electric coil (when supplied), with exception that 277 v motors are used with 480 v, 3-phase coils (4 wire wye).

All dimensions are in inches.



42K

42K PERIMETER FAN COIL UNIT — HOT WATER COIL SECTION

Hot Water Coil Section

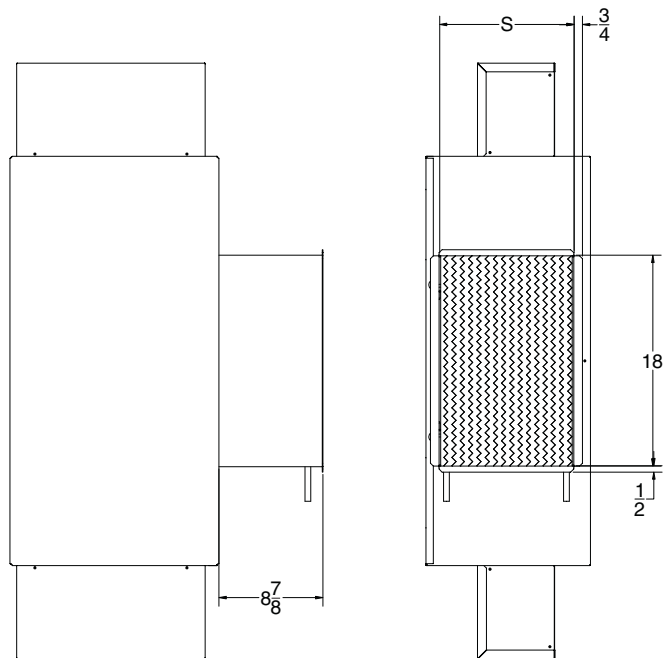
- 1/2-in. copper tubes
- Aluminum ripple fins, 10 per inch
- Connections: Male solder, 5/8-in. for both 1-row and 2-row. Left or right hand connections.
- Galvanized steel casing
- Flanged duct connection
- Coil is installed at discharge of unit

- 1 Row
- 2 Row

UNIT SIZE	T
14	11 1/2
16	13 7/8

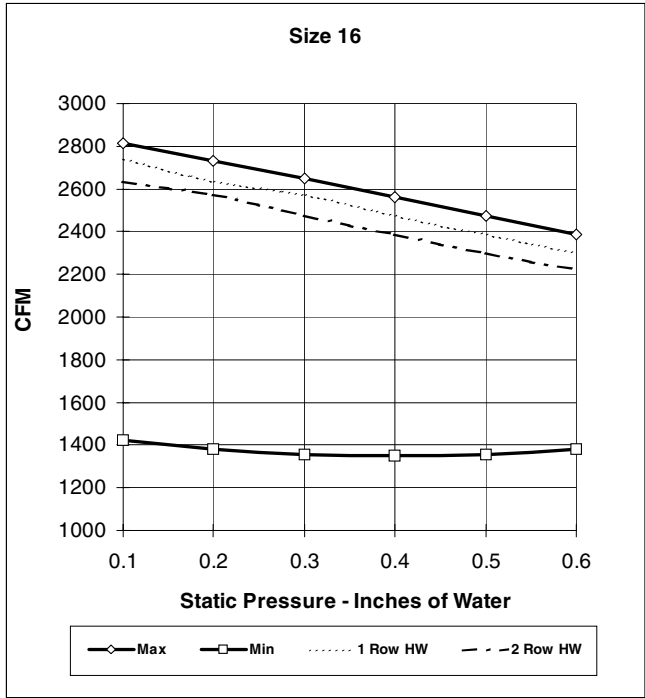
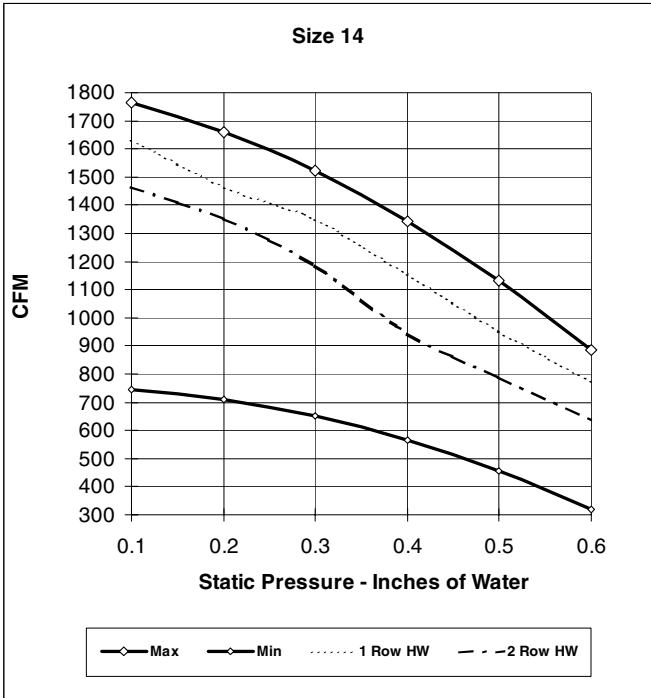
S is inside dimension.

NOTE: All dimensions are in inches.

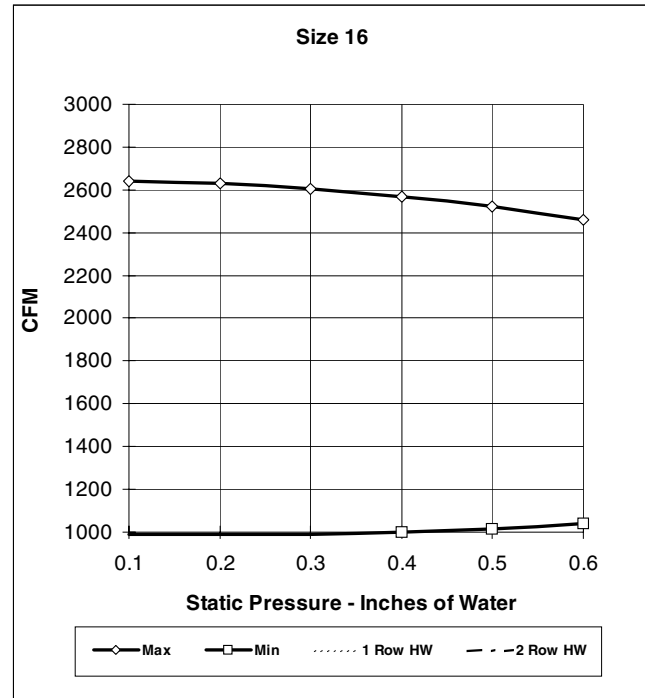
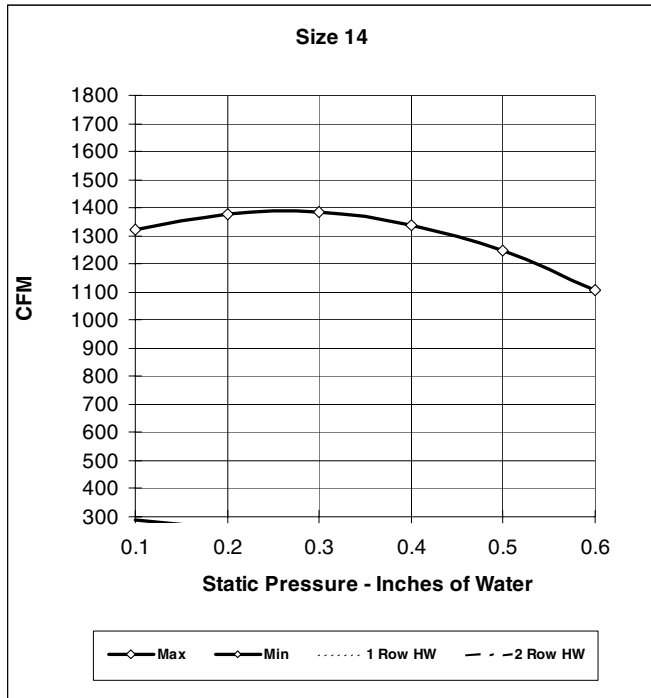


42K PERIMETER FAN COIL UNIT AIRFLOW VS. DOWNSTREAM STATIC PRESSURE (PSC)

42K



AIRFLOW VS. DOWNSTREAM STATIC PRESSURE (ECM)





42K PERIMETER FAN COIL UNIT — PSC

UNIT SIZE	MOTOR HP	MOTOR AMPS			FAN AIRFLOW*	
		120 V	208/240 V	277 V	Max	Min
14	1/3	7.0	3.1	3.2	1750	325
16	3/4	11.4	5.2	5.1	2800	1400

*Max Based on 0.1 in. wg downstream static pressure. Min based on 0.6 in. wg downstream static pressure.

42K PERIMETER FAN COIL UNIT — ECM

UNIT SIZE	MOTOR HP	MOTOR AMPS			FAN AIRFLOW*	
		120 V	208/240 V	277 V	Max	Min
14	1/2	4.9	—	2.3	1350	275
16	1	11.1	—	6.0	2600	1000

*Max Based on 0.1 in. wg downstream static pressure. Min based on 0.6 in. wg downstream static pressure.

42K PERIMETER FAN COIL UNIT — PSC

UNIT SIZE	INLET SIZE	FLOW RATE		DISCHARGE							RADIATED						
				Sound Power Octave Bands							Lp	Sound Power Octave Bands					
		Cfm	(L/s)	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
14	12 x 10 1/2	800	(378)	69	63	64	62	63	60	25	69	63	61	62	62	59	28
		1000	(472)	71	67	67	66	66	64	28	71	66	64	65	65	63	31
		1150	(543)	72	70	69	69	69	67	31	72	69	65	67	67	65	33
		1300	(614)	73	72	71	71	71	69	33	72	71	67	69	69	67	35
16	14 x 9 7/8	1500	(708)	70	67	66	65	65	63	27	71	68	66	66	65	62	31
		1750	(826)	73	71	70	69	69	67	31	73	71	68	69	68	65	34
		2000	(944)	76	75	72	73	72	70	34	76	74	71	72	71	68	37
		2250	(1062)	79	78	75	76	75	73	37	78	76	73	74	74	71	40
		2500	(1180)	81	81	77	78	78	75	40	79	78	74	76	76	74	42

LEGEND

- ARI** — Air Conditioning and Refrigeration Institute
- CFM** — Air Volume (cubic feet per minute)
- Lp** — Room Sound Pressure
- NC** — ARI 885-98 Test Conditions (see Application Assumptions tables on page 24)

NOTES:

1. Sound power levels are in decibels, re: 10⁻¹² watts.
2. End discharge sound power is the noise emitted from the unit discharge into the duct.
3. Radiated sound power is the noise emitted from the unit casing and induction port.
4. All sound data are based upon tests conducted in accordance with ARI Standard 880-98.
5. NC Application data from ARI 885-98, see Application Assumptions tables on page 24.

42K PERIMETER FAN COIL UNIT — ECM

UNIT SIZE	INLET SIZE	FLOW RATE		DISCHARGE							RADIATED						
				Sound Power Octave Bands							Lp	Sound Power Octave Bands					
		Cfm	(L/s)	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
14	12 x 10 1/2	800	(378)	69	63	64	62	63	60	25	69	63	61	62	62	59	28
		950	(448)	70	66	66	65	66	63	28	70	66	63	64	65	62	31
		1100	(519)	72	69	68	68	68	66	30	71	68	65	66	67	64	33
		1200	(566)	72	71	69	70	69	68	31	72	69	66	68	68	66	34
16	14 x 9 7/8	1350	(637)	74	73	71	72	71	70	33	73	71	67	69	70	68	36
		1500	(708)	70	67	66	65	65	63	27	71	68	66	66	65	62	31
		1750	(826)	73	71	70	69	69	67	31	73	71	68	69	68	65	34
		2000	(944)	76	75	72	73	72	70	34	76	74	71	72	71	68	37
		2300	(1085)	79	79	76	76	76	73	38	78	77	73	74	74	72	40
2600	(1227)	82	82	78	79	79	76	41	80	79	75	77	77	75	43		

LEGEND

- ARI** — Air Conditioning and Refrigeration Institute
- CFM** — Air Volume (cubic feet per minute)
- Lp** — Room Sound Pressure
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NOTES:

1. Sound power levels are in decibels, re: 10⁻¹² watts.
2. End discharge sound power is the noise emitted from the unit discharge into the duct.
3. Radiated sound power is the noise emitted from the unit casing and induction port.
4. All sound data are based upon tests conducted in accordance with ARI Standard 880-98.
5. NC Application data from ARI 885-98, see Application Assumptions tables on page 24.

42K

Performance data (cont)



42K PERIMETER FAN COIL UNIT APPLICATION ASSUMPTIONS

ARI 885-98 DISCHARGE <300 CFM	OCTAVE BANDS					
	2	3	4	5	6	7
Env Effect	2	1	0	0	0	0
Underfloor Plenum*	15	15	15	15	15	15
End Reflection	9	5	2	0	0	0
Power Division (0 outlets)	0	0	0	0	0	0
5 ft, 8 in. Flex Duct	—	—	—	—	—	—
Space Effect	10	11	12	13	14	15
Total Attenuation*	36	32	29	28	29	30

ARI 885-98 DISCHARGE >700 CFM	OCTAVE BANDS					
	2	3	4	5	6	7
Env Effect	2	1	0	0	0	0
Underfloor Plenum*	15	15	15	15	15	15
End Reflection	9	5	2	0	0	0
Power Division (10 outlets)	10	10	10	10	10	10
5 ft, 8 in. Flex Duct	—	—	—	—	—	—
Space Effect	10	11	12	13	14	15
Total Attenuation*	46	42	39	38	39	40

ARI 885-98 DISCHARGE 300-700 CFM	OCTAVE BANDS					
	2	3	4	5	6	7
Env Effect	2	1	0	0	0	0
Underfloor Plenum*	15	15	15	15	15	15
10 in. End Reflection	9	5	1	0	0	0
Power Division (6 outlets)	8	8	8	8	8	8
5 ft, 8 in. Flex Duct	—	—	—	—	—	—
Space Effect	10	11	12	13	14	15
Total Attenuation*	43	40	36	36	37	38

ARI 885-98 RADIATED	OCTAVE BANDS					
	2	3	4	5	6	7
Ceiling Type — Type 10, Double Gypsum Board	29	33	33	35	35	36
Environ. Effect	2	1	0	0	0	0
Total Attenuation	31	34	33	35	35	36

*Estimated attenuation, underfloor plenum.

42K

42K PERIMETER FAN COIL UNIT — WATER COIL PERFORMANCE DATA (MBtuh)

SIZE	ROWS	GPM	PRESSURE DROP (ft wg)	AIRFLOW (CFM)								
				320	480	600	750	900	1000	1130	1280	1450
14	One Row	0.5	0.04	10.2	11.3	12.1	12.8	13.4	13.8	14.1	14.5	14.9
		1.0	0.14	12.3	14.0	15.3	16.6	17.6	18.2	18.9	19.7	20.4
		2.0	0.49	13.8	15.9	17.7	19.5	21.0	21.9	23.0	24.0	25.1
		4.0	1.67	14.7	17.2	19.3	21.5	23.4	24.5	25.8	27.2	28.6
		Airsides Δ PS			0.02	0.04	0.06	0.08	0.12	0.14	0.17	0.22
14	Two Rows	0.5	0.09	15.9	18.1	19.1	20.1	20.8	21.2	21.6	22.0	22.3
		1.0	0.31	19.9	24.0	26.2	28.3	30.0	30.9	32.0	33.0	34.0
		2.0	1.06	22.6	28.4	31.7	35.1	37.9	39.6	41.4	43.3	45.2
		4.0	3.60	24.2	31.1	35.3	39.8	43.6	45.8	48.4	51.1	53.8
		Airsides Δ PS			0.04	0.07	0.11	0.16	0.22	0.27	0.33	0.41

SIZE	ROWS	GPM	PRESSURE DROP (ft wg)	AIRFLOW (CFM)								
				1400	1550	1700	1850	2000	2150	2300	2450	2600
16	One Row	0.5	0.05	16.3	16.6	16.9	17.1	17.3	17.5	17.7	17.9	18.0
		1.0	0.18	22.3	23.0	23.6	24.1	24.6	25.0	23.4	25.8	26.1
		2.0	0.61	27.6	28.6	29.5	30.4	31.1	31.9	32.5	33.1	33.7
		4.0	2.10	31.4	32.7	33.9	35.1	36.1	37.1	38.0	38.9	39.7
		Airsides Δ PS			0.18	0.21	0.25	0.29	0.33	0.38	0.43	0.48
16	Two Rows	0.5	0.11	23.6	23.9	24.1	24.3	24.5	24.7	24.8	24.9	25.0
		1.0	0.38	36.5	37.3	38.0	38.7	39.3	39.8	40.2	40.6	41.0
		2.0	1.31	48.8	50.5	52.0	53.4	54.6	55.8	56.8	57.7	58.6
		4.0	4.46	58.2	60.8	63.1	65.2	67.2	69.0	70.7	72.2	73.7
		Airsides Δ PS			0.34	0.41	0.48	0.55	0.64	0.72	0.82	0.91

NOTES:

- All data is based on: 65 F entering air and 180 F entering water, at sea level.
- Program calculations assume 0% Glycol.
- See Correction Factors table below for other conditions:

DELTA T (°F)	50	60	70	80	90	100	115	150
Factor	0.44	0.52	0.61	0.70	0.79	0.88	1.00	1.30

Electrical data



42K kW RANGES

UNIT SIZE	MAXIMUM kW				
	208 V	240 V	277 V	208 V	480 V
	Single Phase			3 Phase	
14	8.0	9.0	11.5	14.0	26.0
16	8.0	9.0	11.5	14.0	26.0

STAGES	MINIMUM kW				
	208 V	240 V	277 V	208 V	480 V
	Single Phase			3 Phase	
1	1.0	1.0	1.0	1.5	2.5
2	1.5	1.5	1.5	1.5	2.5
3	2.0	2.0	2.0	1.5	2.5

NOTES:

1. Three-stage heaters are not available with analog or VVT® electronic controls.
2. Heaters require a minimum of 0.03 in. wg downstream static pressure to ensure proper operation.
3. kW/Voltage ratings are sized not to exceed 48 amps so NEC code requirement for circuit fusing is not necessary.

$$\text{Single Phase - Amperes} = \frac{\text{Watts (kW x 1000)}}{\text{Line Voltage}}$$

$$\text{Three Phase - Amperes} = \frac{\text{Watts (kW x 1000)}}{\text{Line Voltage x 1.73}}$$

Electric heat selection — Specify electric duct heaters using voltage, kW and number of steps.

Select heater so that power (kW) matches available electric heat options. Tables show maximum, minimum and available kW's within those ranges. Rounding to the nearest whole number has negligible impact on discharge temperature. If the fan is selected for less than maximum speed, then the maximum operating kW would be lower than the maximum kW shown in the table. Calculate kW based on the available fan cfm. A minimum of 70 cfm is required per kW.

$$\text{Total fan cfm} / 70 \text{ cfm} = \text{max allowable kW}$$

The Total kW required for the unit is based on the sum of both (A) room Btuh load and (B) the Btuh required to raise the entering air temperature to the desired room air temperature.

$$\text{Total kW} = \text{room Btuh} + \Delta \text{ Btuh}$$

$$\text{room Btuh kW} = \frac{\text{room Btuh}}{3413}$$

$$\Delta \text{ Btuh kW} = \frac{\text{cfm} \times \Delta t}{3160}$$

where Δt = desired room temp. – air entering electric heater (typically 70 F)

Determine what the desired discharge air temperature will be. Do not select for discharge air temperatures exceeding 120 F. In addition, note that ASHRAE recommends a maximum discharge temperature of 90 F to avoid room air temperature stratification when heating from the ceiling (2001 Fundamentals, Chapter 32).

$$\Delta t = (\text{LAT} - \text{EAT}) = \frac{\text{kW} \times 3160}{\text{cfm}}$$

LAT = Discharge air temperature

EAT = Air temperature to heater

The desired heating airflow for the space can be verified by the following:

$$\text{cfm} = \frac{\text{kW} \times 3160}{\Delta t}$$

ELECTRIC HEAT kW OPTIONS

UNIT	AVAILABLE kW
42K	1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0, 9.5, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0, 17.0, 18.0, 19.0, 20.0, 22.0, 23.0, 24.0, 25.0, 26.0



42K

Guide specifications



HVAC Guide Specifications Perimeter Fan Coil Unit

Size Range: **325 to 2800 Nominal Cfm**

Carrier Model Number:

42KC (Direct Digital Controls — Carrier CCN)

42KN (No Control)

Part 1 — General

1.01 SYSTEM DESCRIPTION:

Variable air volume control box for installation in a raised floor plenum that permits access to the unit. Manufacturer shall supply unit(s) of the design, number, size and performance as shown on equipment drawings and schedules. The terminal including all control enclosures shall be designed to fit in the plenum space below a raised floor. The unit shall fit within a 24-in. by 24-in. pedestal grid system without modifications to the grid.

1.02 QUALITY ASSURANCE:

- A. Insulation shall meet NFPA-90A requirements for flame spread and smoke generation and UL-181 requirements for anti-erosion, corrosion and fungus properties.
- B. Hot water coils, when specified, shall be tested for leakage at 400 psig with the coil submerged in water.
- C. Electric heating coils, when specified shall be UL or ETL listed and designed to comply with UL Standard 1096, UL 1995 and CSA C22.2 No. 236.95.
- D. Sound power levels shall be ARI certified in accordance with the requirements of ARI 880-98.

1.03 DELIVERY AND STORAGE:

Units shall be stored and handled per manufacturer's recommendations.

Part 2 — Products

2.01 Equipment

A. General:

The terminal shall be designed, built, and tested as a single unit, including motor and fan assembly, water or electric heating coils, and accessories as shipped. The terminal shall have top access to high and low voltage controls and components and allow removal of and servicing of terminal without disturbing duct connections. Control box shall be clearly marked with an identification label that lists such information as nominal cfm, maximum and minimum factory-set airflow limits, coil type and coil hand, where applicable.

B. Unit Cabinet:

1. Constructed of 20-gage galvanized steel with rectangular discharge with flanged duct connection.
2. Unit casing shall be equipped with no internal insulation liner.

C. Unit Electrical Motors:

Unit electrical motors shall be 120, 208/240, or 277-volt, multi-voltage, single-speed, single-phase, permanently lubricated PSC type designed for use with an SCR fan speed adjustment. The speed control shall incorporate a minimum voltage stop to ensure that the motor cannot operate in a stall mode. Optional 277-volt, single-phase ECM (electronically commutated motor) fan motors shall be available with either a VCU (visually controlled unit) (factory/field set, field adjustable) or ACU (automation controlled unit) (remote set and adjusted) fan speed controller. Units shall be available with fused fan motors.

D. Controls:

Units shall have electronic or communicating controls, as specified, capable of maintaining maximum fan speed from maximum to minimum as a means of setting fan airflow.

E. Special Features:

1. Hot Water Heating Coil:

Hot water coil casing shall be constructed with minimum 20-gage galvanized steel with flanged discharge for attachment to downstream ductwork. Coils shall be factory installed on the terminal unit.

- a. Fins shall be rippled and corrugated heavy gage aluminum, mechanically bonded to tubes.
- b. Tubes shall be copper with minimum wall thickness of 0.016 in. and with male solder header connections. Coils shall be leak tested to 400 psi.
- c. Number of coil rows and circuits shall be selected to provide performance as required by the plans. Coil performance data shall be based on tests run in accordance with ARI Standard 410.

2. Electric Heating Coil:

The terminal unit manufacturer shall supply electric coils and they shall be ETL listed. Construct coil casing with minimum of 22-gage zinc-coated steel. Elements shall be nickel chrome and supported by ceramic isolators. The integral control panel shall be housed in a NEMA 1 enclosure, with hinged access door for access to all controls and safety devices. Electric coils shall contain a primary automatic reset thermal cutout and differential pressure airflow switch for proof of airflow. (OPTIONAL) Electric coils shall include manual reset, fused or non-fused door interlocking disconnect switch, mercury contactors, thermal cutout, fuse block, dust-tight enclosure construction, all mounted and/or wired within the control enclosure.

Features



35BF-R — High Induction Swirl Diffuser

These grilles are used in pressurized access floor distribution systems. They are easily relocated to accommodate occupant relocations and they provide a means for individual space temperature adjustments. The 35BF-R-FR Fire Rated Swirl Diffuser meets NFPA 90A requirements.

Standard features include:

- All components are constructed of a high-impact polycarbonate material, designed to resist damage from traffic.
- Complies with NFPA 90B structural requirement for floor diffusers.

- Diffuser material complies with UL-94-5V standard for flammability.
- 35BF-R-FR (fire rated) complies with NFPA 90A.
- High induction helical air pattern creates ideal circulation without excess inlet pressure requirements.
- Optional flow regulator is manually operated without removing the core.
- External Open/Close indicator coupled with the internal Open/Close stop allow visual determination of damper position.
- Architecturally appealing face design is available in standard light gray or black color. Open/Close indicator is raised from diffuser trim ring and core to be visually

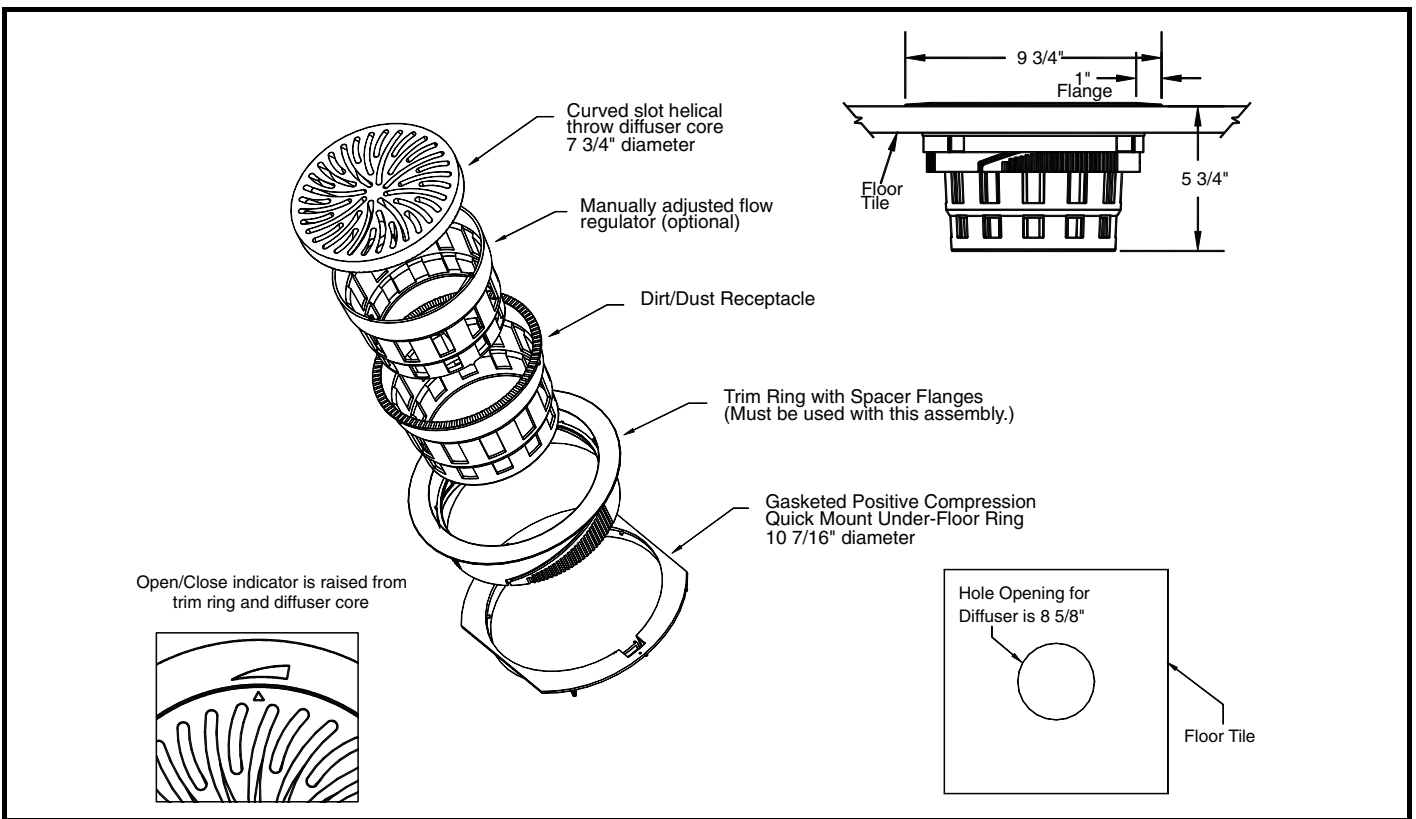
appealing. Optional colors may be specified to match any building interior's scheme.

- The trim ring's extra wide flange is designed to prevent carpet from pulling away from the diffuser.
- The gasketed quick mount under-floor ring is designed for rapid and secure compression fit installation in raised floor panels.
- With the diffuser installed in the floor panel, relocation to another zone is simply done through relocating the floor panel.
- Dirt/dust collection receptacle can be easily removed for cleaning.
- Diffuser can be installed after flooring and carpet installation are complete.

Options

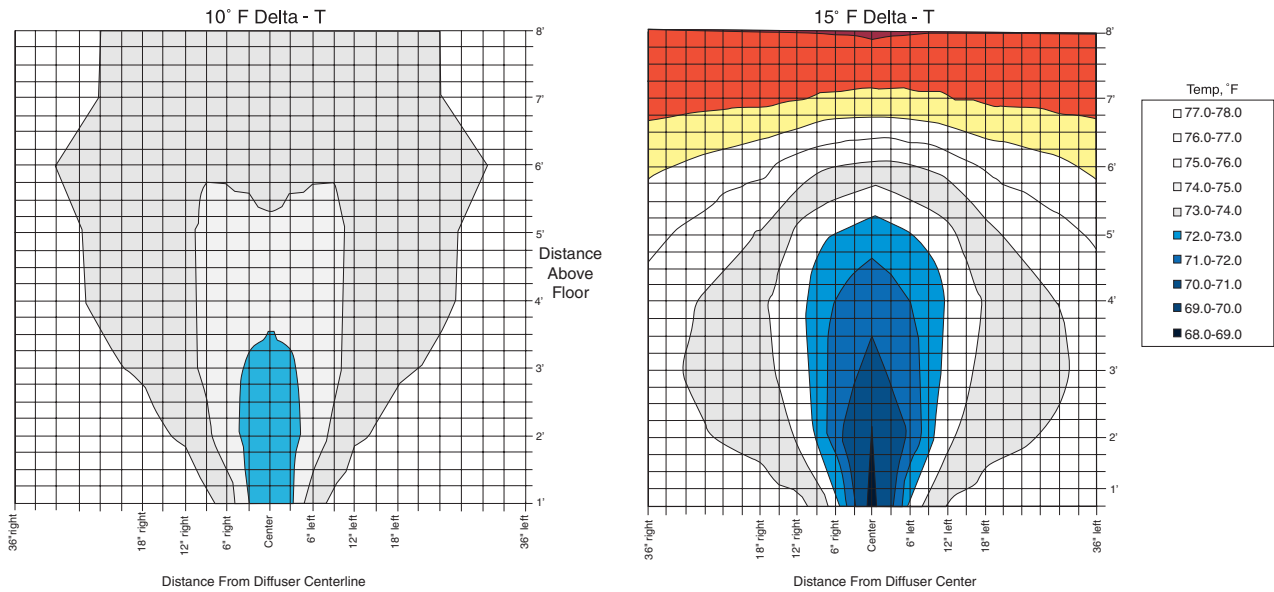
- Manually adjustable air volume regulation
- Dirt/dust receptacle

Dimensions

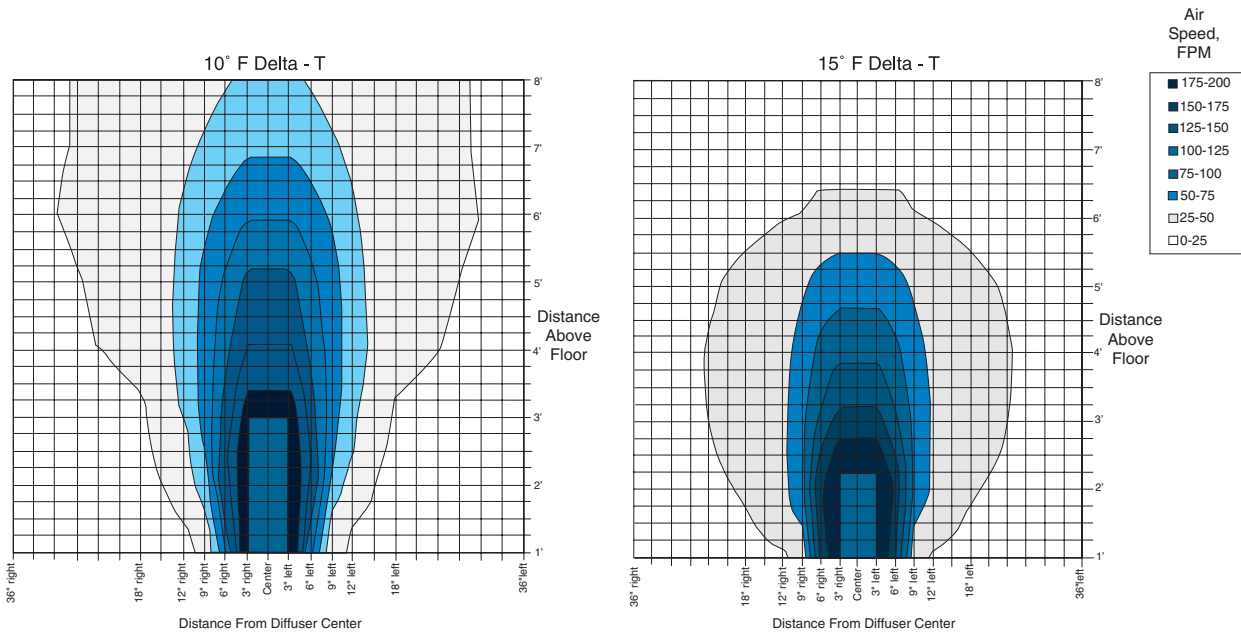


35BF-R

CENTERLINE TEMPERATURE PROFILE



CENTERLINE VELOCITY PROFILE



The 35BF-R diffuser can supply 100 cfm at 0.096 in. wg of plenum pressure and generates a low NC of 15. The charts above show a favorable terminal velocity and temperature gradient in the comfort zone (5 ft 6 in. to 6 ft).

The HVAC system should be designed to operate at reduced capacity to avoid overcooling and excessive temperature swings. Significant "passive" cooling may be experienced with underfloor air distribution systems.

		AIRFLOW, CFM					
		70	80	90	100	110	120
8 in.	Plenum Pressure, in. wg	.035	.046	.057	.071	.086	.103
Dia.	NC (Noise Criteria)	—	11	15	18	21	24
	ΔT Spread, ft, at 50 fpm	1.2	1.8	2.0	2.2	2.2	2.2
10° F	Projection, ft, at 150, 100 and 50 fpm	3 - 4 - 6	3 - 5 - 7	4 - 5 - 7	4 - 5 - 8	4 - 6 - 8	5 - 6 - 8
15° F	Projection, ft, at 150, 100 and 50 fpm	2 - 3 - 5	2 - 4 - 6	3 - 4 - 6	3 - 4 - 6	3 - 5 - 6	4 - 5 - 7

NOTES:

- NC values are based on octave band 2-7 sound power levels minus a room absorption of 10 dB.
- Dash (—) in space denotes an NC value of less than 10.
- Data was obtained from test conducted in accordance with ANSI/ASHRAE Standard 70-1991.

- Spread is the total width of the 50 fpm velocity. Projection is the maximum distance above the floor where the indicated terminal velocity was observed.
- Spread and projection data are determined in a room with a 9-ft ceiling at the indicated ΔT between the supply and average occupied zone temperatures.

Guide specifications



HVAC Guide Specifications

Carrier Model Number:

35BF-R High Induction Swirl Diffuser

35BF-R-FR Fire Rated Swirl Diffuser

Part 1 — General

1.01 SYSTEM DESCRIPTION:

High induction swirl diffuser for use in pressurized access floor distribution system.

1.02 QUALITY ASSURANCE:

- A. Unit shall be tested in accordance with ANSI/ASHRAE Standard 70-1991 at both isothermal and various conditions.
- B. Fire-rated swirl diffuser shall be available and shall meet NFPA-90A.

1.03 DELIVERY AND STORAGE:

Units shall be stored and handled per manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT:

The diffuser shall be constructed of high impact polymeric. The diffuser shall have a removable curved slot helical throw diffuser core. The diffuser core design shall produce a vertical, high induction helical air pattern. A high induction swirl air pattern is acceptable. The trim ring shall have a 1-in. flange for use with carpeting. The dust receptacle shall have an integral flow regulator and shall extend 5³/₄ in. below top of access floor panel. The diffuser shall have an external open/close indicator and internal open/close stop to allow visual determination of damper position. The flow regulator shall be manually operated without removing the diffuser core. The diffuser shall have a positive compression quick mount ring for installation into access floor panel. The access floor diffuser shall be assembled such that the access floor panel is not removed from the floor system for installation of the diffuser.

The diffuser core and trim ring finish shall be gray. The dust receptacle, flow regulator, and quick mount ring finish shall be black.

Features



35BF-D — Linear Floor Diffuser Plenum

Plenums are designed for use in access floor distribution systems for use as a ducted supply or return.

Standard features include:

- Heavy gage diffuser designed for floor applications
- Plenum constructed of heavy gage steel housing
- Installs into access flooring from top of surface — removal of flooring is not required

35BF-V — Variable Volume Diffuser Plenum with Damper

Plenums are designed for use in floor applications where frequent load variations occur. Ideal for conference room cooling loads or in perimeter heat applications.

Standard features include:

- Heavy gage diffuser designed for floor applications
- Plenum constructed of heavy gage steel housing

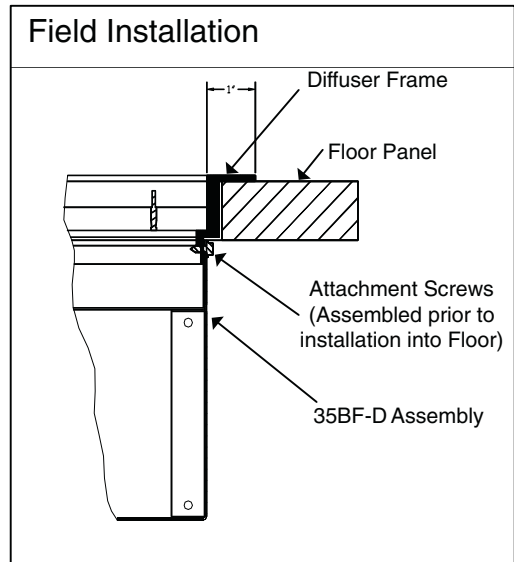
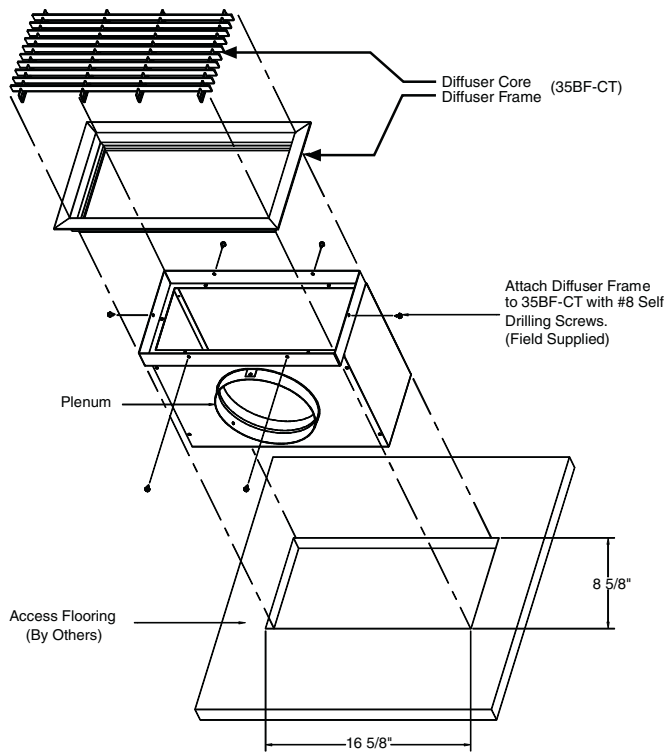
- Installs into access flooring from top of surface — removal of flooring is not required
- Tight close-off damper
- 24-volt electric damper actuator is available with the assembly

35BF-CT480/481 — Rectangular Floor Grille

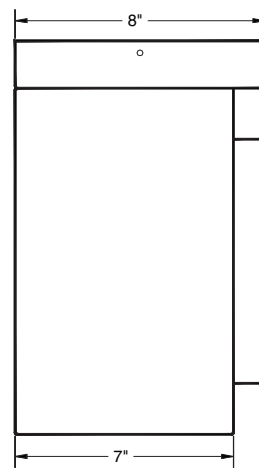
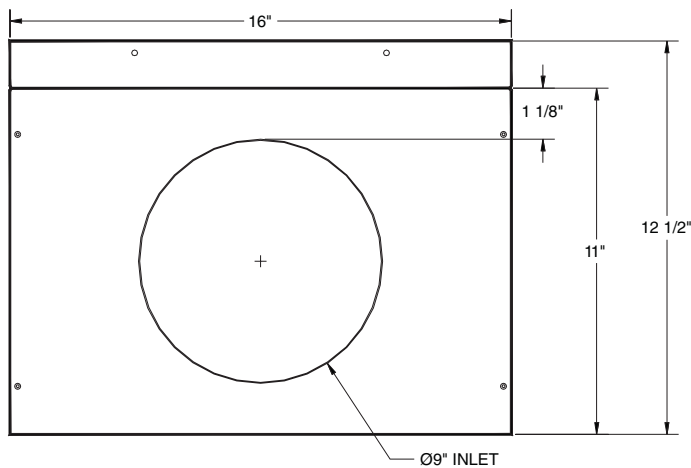
The Rectangular Floor Grille is used in conjunction with either of the 35BF plenum units.

Dimensions

35BF-D DIFFUSER PLENUM WITH INLET



NOTE: 35BF-CT diffuser/frame and 35BF-D plenum are sold as separate units.

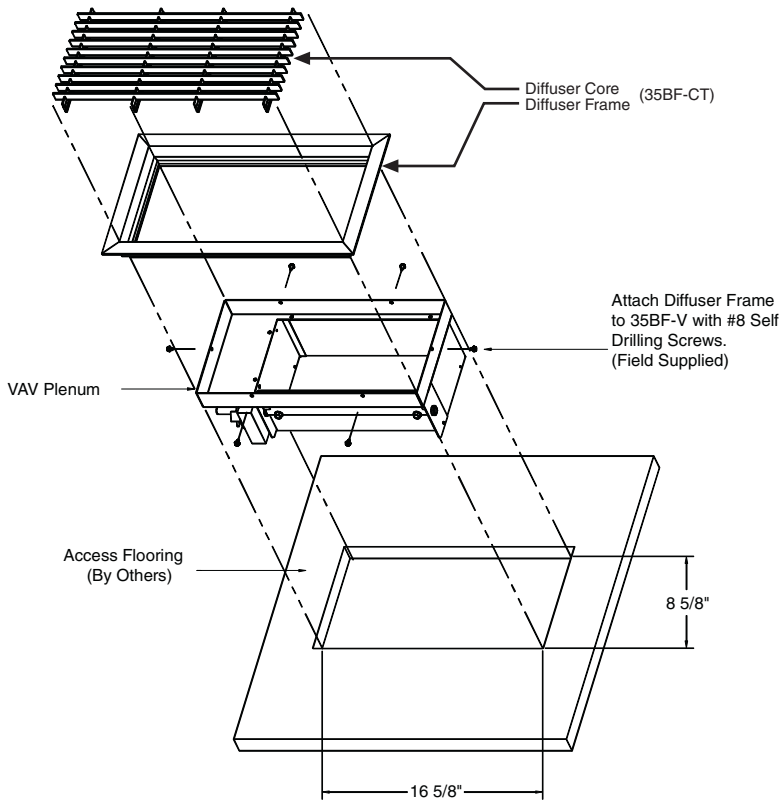


35BF-D,V,CT

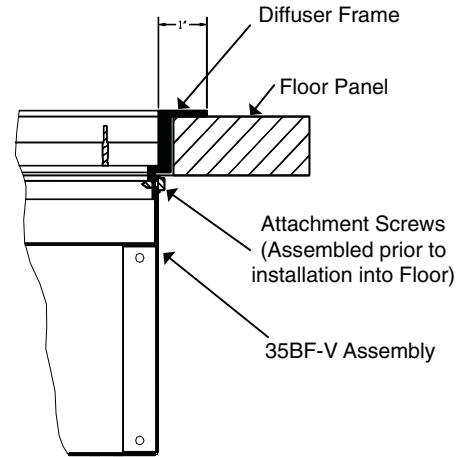
Dimensions (cont)



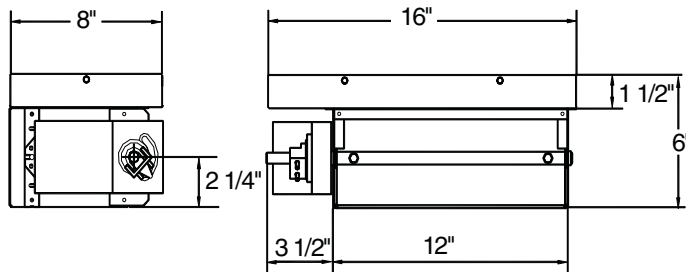
35BF-V VARIABLE VOLUME DIFFUSER PLENUM



FIELD INSTALLATION



NOTE: 35BF-CT diffuser/frame and 35BF-V plenum are sold as separate units.



35BF-D, V, CT

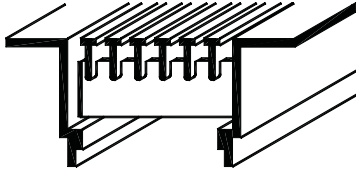
Dimensions (cont)



35BF-CT ALUMINUM — FIXED BARS

CT-480 — 1/4-IN. SPACING, 1/8-IN. BARS, 0° DEFLECTION
 CT-481 — 1/4-IN. SPACING, 1/8-IN. BARS, 15° DEFLECTION

CORE WITH HEAVY DUTY MOUNTING FRAME FOR FLOOR APPLICATIONS

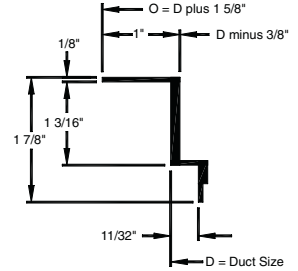


Type 5 heavy duty mounting frame is shown.
 NOTE: Core is furnished with additional reinforcing.

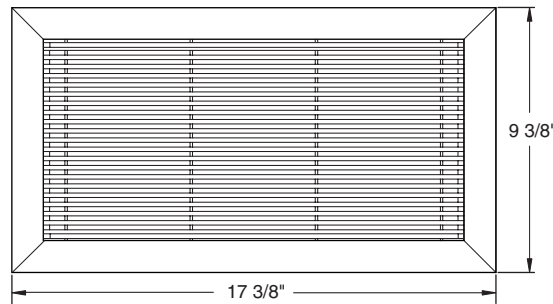
HEAVY DUTY MOUNTING FRAME FOR FLOOR APPLICATIONS

Frame Type 5
 • 1 in. Flange

Removable core is furnished with frame. When spring clip is furnished, add an additional 1/4 in. to duct width.



FACE VIEW OF FRAME

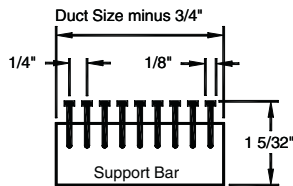


AVAILABLE CORES

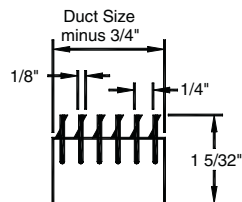
Check Selection

1/4 in. Spacing
 1/8 in. Bars

MODEL CT-480
 0° DEFLECTION

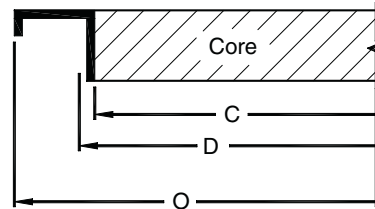


MODEL CT-481
 15° DEFLECTION



OVERALL LENGTH AND WIDTH

Length



	DUCT SIZE	FRAME	CORE
TYPE	D	O	C
5	16	17 ³ / ₈	15 ³ / ₈

Width

1/4 IN. SPACING			
DUCT SIZE	FRAME	CORE	NUMBER OF BLADES
D	O	C	
8	9 ³ / ₈	7 ³ / ₈	29

35BF-D,V,CT

Performance data



35BF-CT-480, 8 in. X 16 in. 0° DEFLECTION, 1/8 in. BARS, 1/4 in. SPACING, ENGLISH/SI

ENGLISH					NC	SI					SOUND POWER OCTAVE BANDS						
Airflow	Floor Pressure	Vertical Throw at 150, 100 and 50 fpm				Airflow	Floor Pressure	Vertical Throw at 0.75, 0.50 and 0.25 m/s			2	3	4	5	6	7	
		+20 °F ΔT	-10 °F ΔT	-20 °F ΔT				+11 °C ΔT	-6 °C ΔT	-12 °C ΔT							
Cfm	in. wg	ft	ft	ft	L/s	Pa	m	m	m								
50	0.002	2 - 4 - 11	2 - 4 - 10	2 - 4 - 9	—	7.8	0.6	0.5 - 1.1 - 3.3	0.5 - 1.1 - 3.0	0.5 - 1.1 - 2.6	—	—	—	—	—		
75	0.005	4 - 8 - 16	4 - 8 - 12	4 - 7 - 10	—	11.6	1.3	1.1 - 2.5 - 5.0	1.1 - 2.5 - 3.7	1.1 - 2.2 - 3.2	16	16	—	—	—		
100	0.009	7 - 11 - 21	7 - 10 - 14	7 - 9 - 12	—	15.5	2.3	2.0 - 3.3 - 6.2	2.0 - 3.0 - 4.3	2.0 - 2.6 - 3.7	21	21	—	—	—		
150	0.021	11 - 16 - 25	10 - 12 - 17	9 - 10 - 15	—	23.3	5.1	3.3 - 5.0 - 7.6	3.0 - 3.7 - 5.3	2.6 - 3.2 - 4.5	28	28	11	—	—		
200	0.037	15 - 21 - 29	12 - 14 - 20	10 - 12 - 17	—	31.0	9.1	4.4 - 6.2 - 8.8	3.5 - 4.3 - 6.1	3.0 - 3.7 - 5.2	33	34	20	—	—		
250	0.057	18 - 23 - 32	13 - 16 - 22	11 - 13 - 19	—	38.8	14.3	5.5 - 7.0 - 9.9	3.9 - 4.8 - 6.8	3.3 - 4.1 - 5.8	36	38	26	11	—		
325	0.097	21 - 26 - 37	15 - 18 - 25	13 - 15 - 22	22	50.5	24.1	6.5 - 7.9 - 11.2	4.5 - 5.5 - 7.8	3.8 - 4.7 - 6.6	41	43	34	22	16		

35BF-CT-481, 8 in. X 16 in. 15° DEFLECTION, 1/8 in. BARS, 1/4 in. SPACING, ENGLISH/SI

ENGLISH					NC	SI					SOUND POWER OCTAVE BANDS						
Airflow	Floor Pressure	Vertical Throw at 150, 100 and 50 fpm				Airflow	Floor Pressure	Vertical Throw at 0.75, 0.50 and 0.25 m/s			2	3	4	5	6	7	
		+20 °F ΔT	-10 °F ΔT	-20 °F ΔT				+11 °C ΔT	-6 °C ΔT	-12 °C ΔT							
Cfm	in. wg	ft	ft	ft	L/s	Pa	m	m	m								
50	0.002	2 - 4 - 11	2 - 4 - 10	2 - 4 - 9	—	7.8	0.6	0.5 - 1.1 - 3.3	0.5 - 1.1 - 3.0	0.5 - 1.1 - 2.6	11	—	—	—	—		
75	0.005	4 - 8 - 16	4 - 8 - 12	4 - 7 - 10	—	11.6	1.3	1.1 - 2.5 - 5.0	1.1 - 2.5 - 3.7	1.1 - 2.2 - 3.2	18	17	—	—	—		
100	0.009	7 - 11 - 21	7 - 10 - 14	7 - 9 - 12	—	15.5	2.3	2.0 - 3.3 - 6.2	2.0 - 3.0 - 4.3	2.0 - 2.6 - 3.7	22	22	—	—	—		
150	0.020	11 - 16 - 25	10 - 12 - 17	9 - 10 - 15	—	23.3	5.1	3.3 - 5.0 - 7.6	3.0 - 3.7 - 5.3	2.6 - 3.2 - 4.5	29	30	13	—	—		
200	0.036	15 - 21 - 29	12 - 14 - 20	10 - 12 - 17	—	31.0	9.1	4.4 - 6.2 - 8.8	3.5 - 4.3 - 6.1	3.0 - 3.7 - 5.2	34	35	21	—	—		
250	0.057	18 - 23 - 32	13 - 16 - 22	11 - 13 - 19	22	38.8	14.2	5.5 - 7.0 - 9.9	3.9 - 4.8 - 6.8	3.3 - 4.1 - 5.8	38	39	28	13	—		
325	0.096	21 - 26 - 37	15 - 18 - 25	13 - 15 - 22	29	50.5	23.9	6.5 - 7.9 - 11.2	4.5 - 5.5 - 7.8	3.8 - 4.7 - 6.6	42	44	35	23	17		

LEGEND

Cfm — Air Volume (Cubic Feet per Minute)
 NC — Noise Criteria

NOTES

1. NC values are based on octave band 2 - 7 sound power levels minus a room absorption 10 dB, re 10⁻¹² watts.
2. Dash (—) in space denotes an NC value of less than 10.
3. Data was obtained from tests conducted in accordance with ANSI/ASHRAE Standard 70-1991.
4. Throw data is for vertical upward projection.

35BF-D,V,CT

Guide specifications



HVAC Guide Specifications

Carrier Model Number:

35BF-D Linear Floor Diffuser Plenum

**35BF-V Variable Volume Diffuser Plenum
with Damper**

35BF-CT Linear Bar Diffusers

Part 1 — General

1.01 SYSTEM DESCRIPTION:

Floor diffuser plenum for use in access floor distribution systems.

1.02 QUALITY ASSURANCE:

Unit shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

1.03 DELIVERY AND STORAGE:

Units shall be stored and handled per manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT:

Linear bar diffusers shall be model Carrier 35BF-CT with 1/8-in. thick fixed bars at 0 or 15 degrees deflection, spaced 1/4-in. on center. Linear bar diffusers shall be mounted to Carrier model 35BF-D diffuser plenum with inlet or 35BF-V VAV diffuser plenum.

The diffuser core shall have extruded aluminum bars locked into a heavy extruded aluminum border. Diffuser shall have heavy duty mounting frames and

removable cores for easy access. The deflection bars must be fixed and parallel to the long dimension. The core must have support bars located no more than 6 in. apart and shall be parallel to the short dimension.

The finish shall be white. The finish shall be an anodic acrylic paint, baked at 315 F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100-hour ASTM D117 Corrosive Environments Salt Spray Test without creepage, blistering, or deterioration of film. The paint must pass a 250-hour ASTM-870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-in. pound force applied.

Heavy gage extruded aluminum end borders and mitered corners shall be available to close off the ends of the diffusers.

The manufacturer shall provide published performance data for the linear bar diffuser. The diffuser shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

The 35BF-D and 35BF-V plenum shall be constructed of minimum 22 gage galvanized steel.

The 35BF-V plenum shall have a damper controlled by a 24-v actuator supplied by the manufacturer. Actuators supplied by others are acceptable.

The diffuser plenum shall be installed without the removal of the access floor panel.



Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.