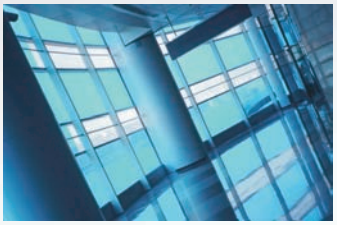
CC Series 50/60Hz

Horizontal Blower Units

Air Volume: 800 to 4000 cfm (1359 to 6797 m^3/hr)



DUNHAM-BUSH®

Products that perform...By people who care

INTRODUCTION

Dunham-Bush, known throughout the industry for reliability and performance offers its line of 'CC' ducted belt driven comfort air conditioners. It features compact, attractive, easy accessible design and other advantages which assure you of a model to best suit your demand. It can be designed for both concealed and exposed ceiling hung installation. Six models (2 to 12 TR [7 to 42 kW] of cooling) are designed to deliver 800 to 4000 cfm [1359 to 6797 m³/hr] to satisfy various cooling requirement with a total static pressure capability of up to 2"wg [0.5kPa]. Multiple units may be used for larger requirements. Every aspect of construction is under close supervision by experience quality control personnel to ensure high performance and reliable finished products.

NOMENCLATURE

6 CC 800 3R

Blank – 50Hz
6 – 60Hz

CC - Fan Coil

Coil Arrangements Water Coils
3 - 3 Row
4 - 4 Row
6 - 6 Row

Unit Size Model
800 - 800 cfm
1200- 1200 cfm
1600- 1600 cfm
2000- 2000 cfm
3000- 3000 cfm
4000- 4000 cfm

FEATURES

CASING

All steel parts are coated with epoxy powder paint which gives excellent finishing, weatherability and salt-spray test of minimum 840 hours. Before coating, the part undergoes a complete pretreatment process which involves degreasing, phosphating and rinsing with deionized water. It increases the paint adhesion effect and rust preventing effect to obtain high quality paint film. All panels are insulated with 1/2” [13mm] thick 1.5 lbs per cubic feet [24 kg per cubic meter] mat faced linacoustic fiberglass.

COILS

Available for chilled water and DX applications. Chilled water and DX coil consist of staggered rows of 1/2" [13mm] and 3/8” [9.5mm] O.D. seamless copper tubes each. Coils are mechanically expanded into die-formed aluminium fins spaced 12 fins per inches [25mm]. Fins are of corrugated design to improve heat transfer. Standard chilled water coils are of 3, 4 and 6 rows design. Standard DX coils are of 4 rows design. All coils are tested under water with 350 psig [24 bar] air pressure. Coils are furnished with a vent and drain connection. Every coil is computer optimised selected to ensure best selection to reduce operating cost and ensure low first cost.

FEATURES

BLOWER ASSEMBLY

Blower wheels are of forward curved double inlet design and are constructed of zinc coated steel. As the blower wheels are statically and dynamically balanced in accordance with AMCA standard prior to and after assembly. They will assure quiet, smooth performance well below the first critical speed at all design conditions. The wheel shafts are made from solid steel and are ground and polished to close tolerances. Bearings are of self aligning, regreaseable ball type and selected for minimum 100,000 operating hours. The adjusted motor pulley on the belt drive system allows air flow and static pressure to be balanced to best suit actual site conditions.

DRAIN PAN

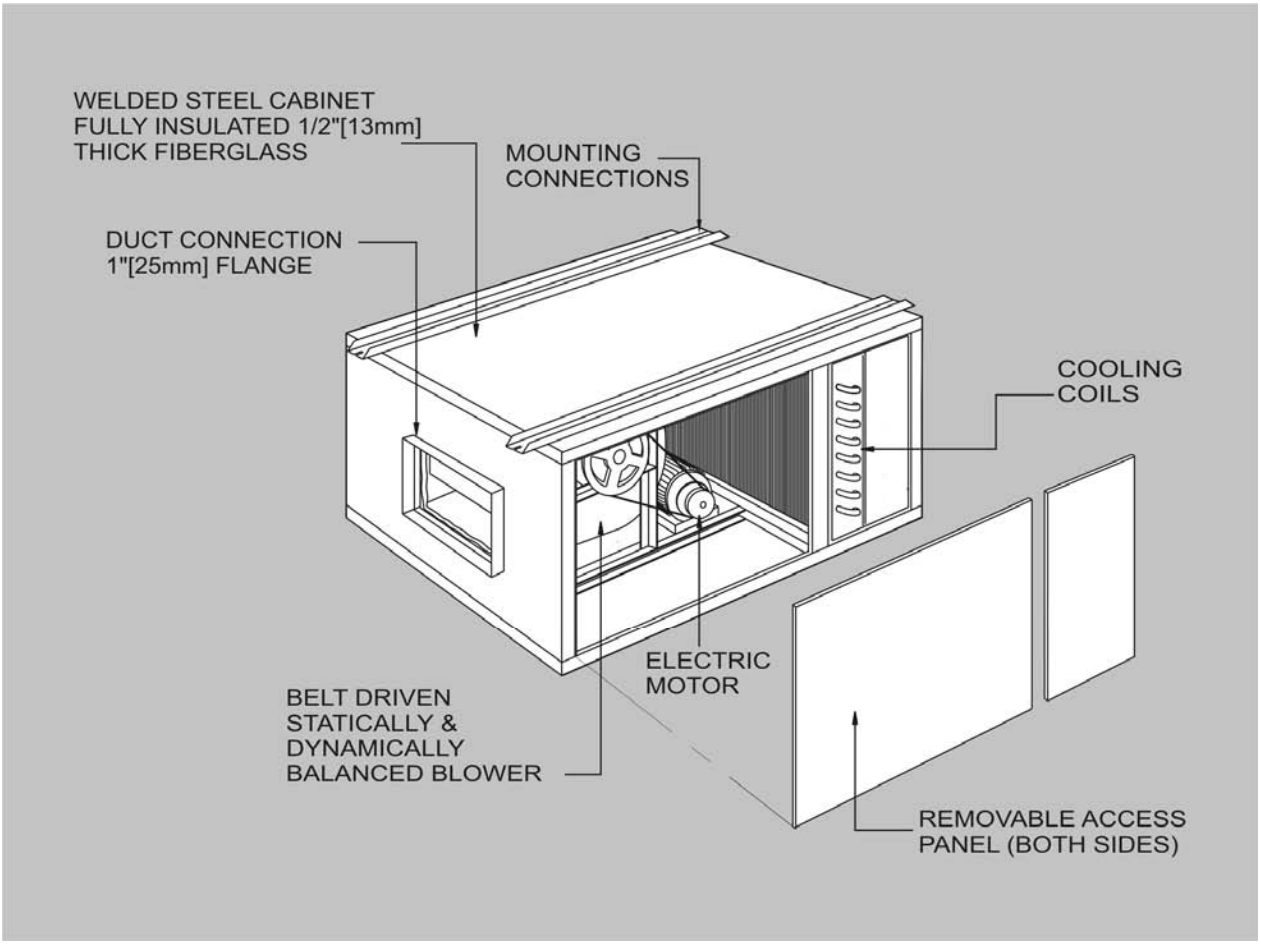
The drain pan is constructed of heavy gauge metal and is internally painted with mastic and externally insulated with minimum 6 mm thick fire-retardant PE foam. As the condensate is prevented to be in contact with the metal the possibility of corrosion is minimised. The unit is designed, when mounted level, to assist condensate draining by having a positive pitch. This in conjunction with an adequately sized drain connection assures rapid condensate runoff.

MOTOR AND DRIVE PACKAGE

3 phase TEFC motors are standard. The motor mounting bracket can be adjusted to ensure proper belt tension and alignment. V-belt and pulleys can be selected to suit various static pressure and cfm required.

FILTERS

Standard flat filters are 1" [25mm] washable type. The filter media is constructed of 70% arrestance efficiency synthetic fiber.



SAMPLE UNIT SELECTION

FORMULAE AND DEFINITIONS

1. LDB = LWB + [(EDB-EWB) x DR]
2. Sensible Heat = 1.08 x SCFM x Δ T
3. Total Heat = 4.5 x SCFM x Δ H

Where:

EDB	=	Entering dry bulb °F
EWB	=	Entering wet bulb °F
DR	=	Depression ratio
LDB	=	Leaving dry bulb °F
LWB	=	Leaving wet bulb °F
SCFM	=	Cubic feet per minute of standard air
Δ T	=	EDB minus LDB
Δ H	=	Entering air enthalpy minus leaving air enthalpy

EXAMPLE: CHILLED WATER COIL

Required: 1080 SCFM
84 °F dry bulb
71 °F wet bulb
42 °F entering water temp.
8.0 USgpm
58,000 Btuh total capacity
26,000 Btuh sensible capacity

A.) Select a unit with a cfm which is close to the required cfm. A model CC1200 has a nominal cfm of 1200.

B.) To determine the actual unit total capacity, from table 1 select a six (6) row cooling coil as its total capacity is closest to the required total capacity. Through interpolation determine the total capacity for 8 USgpm.

Total capacity = 47,000 btuh @ 8 USgpm and nominal cfm.

Find the SCFM percentage of nominal cfm

SCFM/Nom.cfm = 1080/1200 = 90%

Enter table 2 under total factor for a 6 row chilled water coil at 90%, read a correction factor of 0.96. Enter table 3 at entering air wet bulb temperature of 71°F and entering water temperature of 42 °F.

Read a correction factor of 1.35.

Actual total capacity = 47,000 Btuh x 0.96 x 1.35

Actual total capacity = 60,900 Btuh

C.) Determine the leaving wet bulb temperature by using formula 3 and the psychometric chart.

Total Heat = 4.5 x SCFM x Δ H
60,900 = 4.5 x 1080 x Δ H
Δ H = 12.53

The psychometric chart at 84 °F EDB and 71 °F EWB indicates an entering enthalpy of 35.00. This enthalpy minus the change in enthalpy will provide the leaving enthalpy. 35.00 - 12.53 = 22.47

The psychometric chart for this enthalpy indicates a leaving wet bulb temperature of 53.8 °F.

D.) To determine the leaving dry bulb temperature enter table 2 at the depression ratio for a six row water coil at 90% of nominal cfm. Correction factor is 0.04.

Use formula 1:

LDB = [(EDB-EWB) x DR] + LWB
LDB = [(84° - 71°) x 0.04] + 53.8
= 54.32°F

E.) To determine actual sensible heat, use formula 2.

Sensible Heat = 1.08 x SCFM x (EDB - LDB)
Sensible Heat = 1.08 x 1080 x (84 - 54.32) = 34.62 MBH

F.) To determine the water coil pressure drop, interpolate from table 1 will give 8.1 ft. of water gauge.

TABLE 1: COOLING COIL CAPACITY

Model CC	Water Flowrate (m³/h)	Chilled Water Coil									DX Coil	
		3 Row Coil			4 Row Coil			6 Row Coil			4 Row Coil	
		Water Pressure Drop (kPa)	Total Cooling (kW)	Sensible Cooling (kW)	Water Pressure Drop (kPa)	Total Cooling (kW)	Sensible Cooling (kW)	Water Pressure Drop (kPa)	Total Cooling (kW)	Sensible Cooling (kW)	Total Cooling (kW)	Sensible Cooling (kW)
800	1.37	13.1	7.0	5.2	8.4	7.9	5.8	4.5	9.0	6.5	9.2	5.9
	1.80	21.5	7.6	5.5	13.4	8.6	6.1	7.2	9.9	6.9		
1200	1.37	15.8	9.8	7.6	3.9	10.2	8.1	1.8	11.6	8.9	13.8	8.9
	2.05	32.0	11.2	8.1	7.8	11.8	8.7	3.6	13.6	9.7		
1600	2.27	9.3	13.1	10.1	6.0	14.7	11.2	2.7	16.9	12.5	18.8	12.2
	2.74	12.5	14.0	10.4	8.4	15.7	11.6	3.6	18.1	13.0		
2000	2.95	16.1	17.3	13.0	10.8	19.5	14.5	4.8	22.4	16.1	24.2	15.4
	3.64	23.0	18.5	13.5	15.2	20.8	15.0	6.6	24.0	16.8		
3000	4.10	12.3	24.8	19.0	14.6	29.3	21.7	3.3	32.0	23.5	32.6	21.7
	5.22	18.8	26.9	19.9	22.4	31.7	22.7	5.1	34.9	24.7		
4000	4.75	18.2	33.1	25.4	3.9	34.5	27.2	5.1	42.6	31.4	46.7	30.1
	6.12	28.1	36.1	26.6	6.0	37.9	28.4	7.8	46.7	33.0		

Notes: 1. Water cooling coil rated at 27°C/19°C entering air, 7°C entering water at nominal cfm.
2. DX cooling coils rated at 27°C/19°C entering air, 4°C S.S.T. at nominal cfm, R22.
3. For other conditions contact Dunham-Bush for computer selection.

TABLE 2: AIR VOLUME CAPACITY CORRECTION FACTORS

	Coil Type	Percent (%) Nominal cfm					
		70	80	90	100	110	120
Total Factor	Chilled Water 3 Row	0.90	0.94	0.97	1.00	1.03	1.05
	Chilled Water 4 Row	0.89	0.93	0.97	1.00	1.03	1.06
	Chilled Water 6 Row	0.88	0.92	0.96	1.00	1.04	1.07
	DX 4 Row	0.90	0.94	0.97	1.00	1.03	1.05
Depression Ratio	Chilled Water 3 Row	0.16	0.18	0.20	0.22	0.24	0.25
	Chilled Water 4 Row	0.09	0.10	0.12	0.13	0.14	0.15
	Chilled Water 6 Row	0.03	0.04	0.04	0.05	0.05	0.06
	DX 4 Row	0.13	0.15	0.16	0.18	0.20	0.21

TABLE 3: TOTAL CAPACITY CORRECTION FACTORS

ENT'G W.B.(°F)	DX Coil						Chilled Water Coil						
	Saturated Suction Temperature °C						Entering Water Temperature °C						
	2	3	4	6	7	8	4	6	6.6	7.2	8	9	10
17	0.94	0.87	0.80	0.74	0.67	0.60	0.95	0.89	0.82	0.78	0.75	0.67	0.61
18	1.04	0.97	0.90	0.84	0.77	0.70	1.06	0.99	0.92	0.89	0.85	0.78	0.70
19	1.14	1.07	1.00	0.94	0.87	0.80	1.18	1.11	1.04	1.00	0.96	0.88	0.79
21	1.24	1.17	1.10	1.04	0.97	0.90	1.30	1.22	1.15	1.12	1.08	1.00	0.91
22	1.34	1.27	1.20	1.14	1.07	1.00	1.42	1.35	1.28	1.24	1.20	1.11	1.00

TABLE 4: APPROXIMATE SHIPPING WEIGHTS – lbs[kg]*

Rows Of Coil	Model					
	CC 800	CC 1200	CC 1600	CC 2000	CC 3000	CC 4000
3	220 [100]	260 [118]	310 [141]	353 [160]	412 [187]	535 [243]
4	230 [104]	270 [122]	320 [145]	360 [163]	424 [192]	545 [247]
6	250 [113]	290 [132]	350 [159]	373 [169]	467 [212]	565 [256]

*Includes motor

TABLE 5: BLOWER PERFORMANCE

Available External Static Pressure (in.wg) For 4-Row Coil

RPM	cfm										Fan Model
	ESP	BHP	ESP	BHP	ESP	BHP	ESP	BHP	ESP	BHP	
CC 800											
	700		**750**		**800**		**850**		**900**		
800	0.08	0.12	0.02	0.14	-	-	-	-	-	-	
900	0.22	0.15	0.18	0.16	0.14	0.18	0.10	0.19	0.04	0.21	9/7
1000	0.34	0.19	0.32	0.20	0.30	0.22	0.28	0.23	0.23	0.24	
1100	0.48	0.23	0.46	0.24	0.45	0.26	0.45	0.28	0.42	0.30	
CC 1200											
	1000		**1100**		**1200**		**1300**		**1400**		
1000	0.47	0.28	0.38	0.32	0.31	0.36	0.21	0.40	0.09	0.46	
1100	0.68	0.34	0.60	0.38	0.53	0.43	0.44	0.47	0.34	0.52	9/7
1200	0.89	0.39	0.83	0.44	0.77	0.50	0.69	0.55	0.59	0.59	
1300	1.08	0.46	1.06	0.51	1.03	0.56	0.94	0.63	0.86	0.68	
CC 1600											
	1400		**1500**		**1600**		**1700**		**1800**		
900	0.42	0.39	0.38	0.43	0.33	0.47	0.28	0.50	0.21	0.54	
1000	0.60	0.48	0.58	0.51	0.55	0.55	0.52	0.59	0.46	0.64	10/10
1100	0.79	0.58	0.77	0.62	0.76	0.66	0.75	0.70	0.71	0.75	
1200	0.99	0.68	0.97	0.74	0.97	0.79	0.97	0.83	0.95	0.87	
CC 2000											
	1600		**1800**		**2000**		**2100**		**2200**		
1000	0.70	0.55	0.64	0.64	0.54	0.73	0.49	0.79	0.43	0.86	
1100	0.91	0.66	0.89	0.75	0.82	0.87	0.77	0.93	0.70	0.97	10/10
1200	1.12	0.79	1.13	0.87	1.10	1.01	1.07	1.09	1.01	1.14	
1300	1.34	0.91	1.37	1.05	1.37	1.14	1.35	1.21	1.32	1.30	
CC 3000											
	2600		**2800**		**3000**		**3200**		**3400**		
900	0.75	1.01	0.70	1.11	0.64	1.21	0.57	1.31	0.51	1.45	
1000	0.99	1.21	0.98	1.32	0.96	1.45	0.91	1.58	0.83	1.70	12/12
1100	1.21	1.42	1.23	1.56	1.25	1.70	1.24	1.85	1.19	2.00	
1200	1.45	1.68	1.48	1.84	1.51	1.97	1.54	2.15	1.54	2.32	
CC 4000											
	3200		**3600**		**4000**		**4400**		**4600**		
1000	1.11	1.58	1.00	1.85	0.91	2.16	0.78	2.51	0.70	2.68	
1100	1.44	1.85	1.36	2.16	1.23	2.87	1.14	2.87	1.08	3.07	12/12
1200	1.74	2.15	1.75	2.51	1.66	2.87	1.53	3.27	1.48	3.49	
1300	2.01	2.47	2.09	2.85	2.09	3.30	1.96	3.73	1.90	3.95	

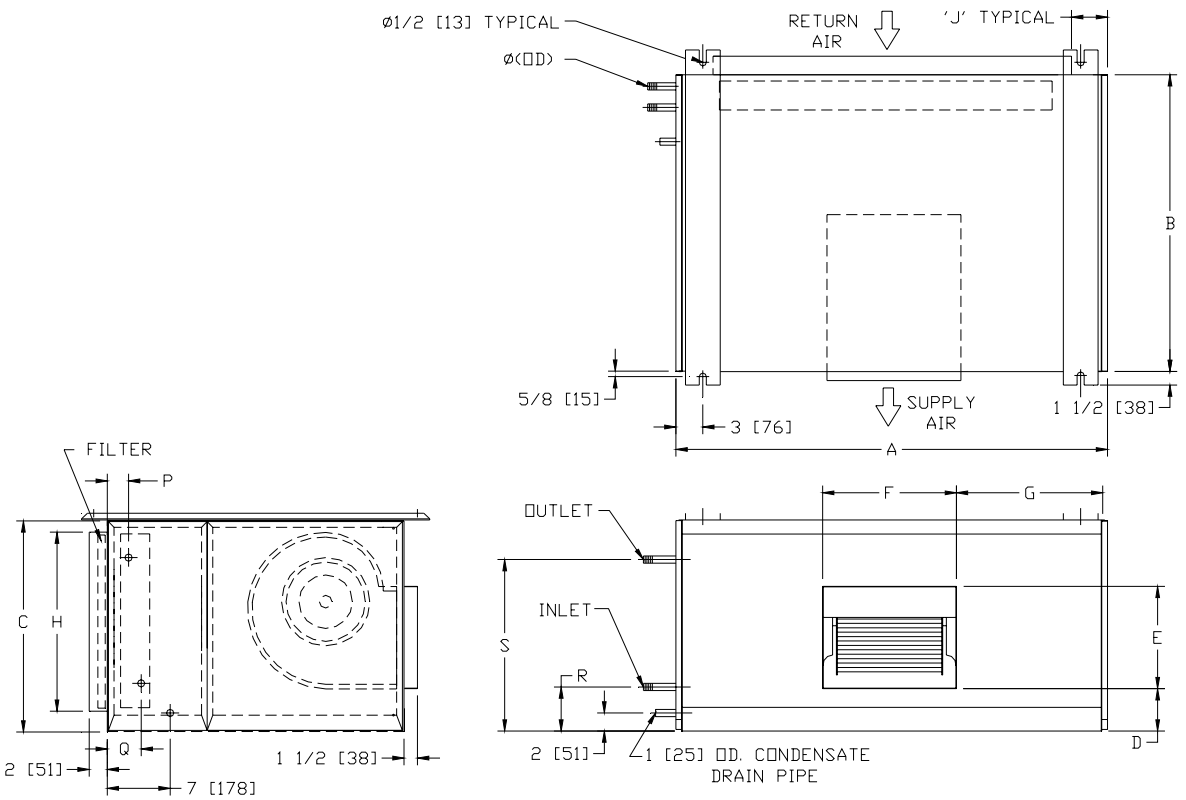
Notes: 1.) Values based on four row wet coil and standard washable filter.
2.) For each additional row of wet coil, add 0.05 SP.

TABLE 6: COMPONENT PRESSURE DROP (in.wg) AT VARYING cfm

Model	Face Area	Component	Component Resistance Inches Water				
CC 800	**1.67 ft²**	**cfm**	600	700	800*	900	950
		Unit and Filter	0.07	0.09	0.11	0.13	0.14
		Supply Plenum	0.01	0.01	0.02	0.03	0.03
		Return Grille	0.02	0.03	0.04	0.05	0.06
CC 1200	**2.50 ft²**	**cfm**	1000	1100	1200*	1300	1400
		Unit and Filter	0.14	0.17	0.19	0.22	0.24
		Supply Plenum	0.03	0.04	0.05	0.06	0.07
		Return Grille	0.03	0.04	0.05	0.06	0.07
CC 1600	**3.33 ft²**	**cfm**	1400	1500	1600*	1700	1800
		Unit and Filter	0.08	0.11	0.15	0.21	0.26
		Supply Plenum	0.03	0.04	0.04	0.04	0.05
		Return Grille	0.03	0.04	0.04	0.04	0.05
CC 2000	**4.17 ft²**	**cfm**	1600	1800	2000*	2100	2200
		Unit and Filter	0.15	0.19	0.24	0.3	0.36
		Supply Plenum	0.04	0.05	0.06	0.07	0.09
		Return Grille	0.03	0.04	0.05	0.06	0.07
CC 3000	**6.25 ft²**	**cfm**	2600	2800	3000*	3200	3400
		Unit and Filter	0.12	0.14	0.16	0.18	0.2
		Supply Plenum	0.04	0.05	0.06	0.07	0.08
		Return Grille	0.04	0.04	0.05	0.06	0.06
CC 4000	**8.33 ft²**	**cfm**	3200	3600	4000*	4400	4600
		Unit and Filter	0.08	0.11	0.15	0.21	0.26
		Supply Plenum	0.01	0.02	0.02	0.02	0.03
		Return Grille	0.03	0.04	0.05	0.06	0.07

* NOMINAL cfm

TABLE 7: DIMENSIONS – inches [mm]



Model		CC 800	CC 1200	CC 1600	CC 2000	CC 3000	CC 4000
A		27 [686]	35 [889]	35 [889]	42 [1067]	48 [1219]	57 [1448]
B		39 [991]	39 [991]	44 [1118]	40 [1016]	41 [1041]	42 [1067]
C		18 1/2 [470]	18 1/2 [470]	22 [559]	22 [559]	26 1/2 [673]	26 1/2 [673]
D		2 1/2 [64]	2 1/2 [64]	3 1/2 [89]	3 1/2 [89]	3 1/2 [89]	3 1/2 [89]
E		10 1/2 [267]	10 1/2 [267]	11 1/2 [292]	11 1/2 [292]	13 1/2 [343]	13 1/2 [343]
F		9 1/4 [235]	9 1/4 [235]	13 1/2 [343]	13 1/2 [343]	15 5/8 [397]	15 5/8 [397]
G		8 7/8 [225]	12 7/8 [327]	10 3/4 [273]	22 1/8 [562]	23 3/4 [603]	28 [711]
H		16 [406]	16 [406]	20 [508]	20 [508]	25 [635]	25 [635]
J		3 7/16 [87]	4 15/16 [125]	4 15/16 [125]	5 3/8 [137]	4 3/8 [111]	3 7/8 [98]
ø		1 [25]	1 [25]	1 [25]	1 [25]	1 1/2 [38]	1 1/2 [38]
Fan (Qty)		9x7 [229x178](1)	9x7 [229x178](1)	10x10 [254x254](1)	10x10 [254x254](1)	12x12 [305x305](1)	12x12 [305x305](1)
Filter (Qty)	1"[25mm] Thick	16x20 [406x508](1)	16x25 [406x635](1)	20x25 [508x635](1)	16x20 [406x508](2)	20x25 [508x635](2)	25x25 [635x635](2)
3 Row Coil	P	3 [76]	3 [76]	3 [76]	3 [76]	3 [76]	3 [76]
	Q	4 1/4 [108]	4 1/4 [108]	4 1/4 [108]	4 1/4 [108]	4 1/4 [108]	4 1/4 [108]
	R	4 1/2 [114]	4 1/2 [114]	5 [127]	5 [127]	5 1/2 [140]	5 1/2 [140]
	S	13 1/2 [343]	13 1/2 [343]	18 [457]	18 [457]	23 [584]	23 [584]
	Operating Weight- lbs[kg]	224 [102]	266 [121]	319 [145]	339 [154]	374 [170]	484 [220]
4 Row Coil	P	3 [76]	3 [76]	3 [76]	3 [76]	3 [76]	3 [76]
	Q	5 1/4 [133]	5 1/4 [133]	5 1/4 [133]	5 1/4 [133]	5 1/4 [133]	5 1/4 [133]
	R	4 1/2 [114]	4 1/2 [114]	5 [127]	5 [127]	5 1/2 [140]	5 1/2 [140]
	S	13 1/2 [343]	13 1/2 [343]	18 [457]	18 [457]	23 [584]	23 [584]
	Operating Weight- lbs[kg]	236 [107]	279 [127]	331 [150]	348 [158]	389 [176]	499 [226]
6 Row Coil	P	3 [76]	3 [76]	3 [76]	3 [76]	3 [76]	3 [76]
	Q	7 1/2 [191]	7 1/2 [191]	7 1/2 [191]	7 1/2 [191]	7 1/2 [191]	7 1/2 [191]
	R	4 1/2 [114]	4 1/2 [114]	5 [127]	5 [127]	5 1/2 [140]	5 1/2 [140]
	S	13 1/2 [343]	13 1/2 [343]	18 [457]	18 [457]	23 [584]	23 [584]
	Operating Weight- lbs[kg]	259 [117]	303 [137]	367 [166]	367 [166]	436 [198]	530 [240]
Optional	Plenum Width	12 [305]	12 [305]	12 [305]	12 [305]	16 [406]	16 [406]

Notes: 1.) For standard unit, motor is located on the left hand side viewing from the return air side.
2.) Standard water inlet and outlet comes with BS males threaded connection.

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