

ENGINEERING GUIDE

# FCC Fan-Coil Units High-Performance, Vertical



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NOTES:

- Johnson Controls offers Web-Select®, the industry’s first web-based rating and selection program for complete unit, coil and sound selection. See your representative for more information.
- All data herein is subject to change without notice. Some drawings are not shown in this catalog.
- Drawings not for installation purposes; refer to IOM manual.
- ETL Report Number 524615.
- MEA Number MEA 54-98-E applies to all units with any combination of chilled water or R-22 direct expansion coils and either hot water coils, steam coils, or electric heat.

## FEATURES AND BENEFITS

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### HIGH PERFORMANCE

The Johnson Controls FCC Series B vertical fan coil unit is designed to maximize flexibility of selection and installation.

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

Johnson Controls vertical fan coil units set the new standards for quality, flexibility, and competitive pricing.

### DESIGN FLEXIBILITY

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

Options include: mixing box without linkage, rear or bottom return, bottom return plenum, single wall stainless steel drain pans, foil faced or elastomeric closed cell foam insulation, and electric heat with single power connection. All electric heat units are listed with ETL as an assembly and carry the cETL label.

All units comply with the latest edition of ARI Standard 440 for testing and rating fan coil units, are certified, and display the ARI symbol. Sizes 16 and 20 exceed the maximum airflow rate in ARI 440 and are therefore not certified.

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

Coil options allow for three or four row cooling coils. One or two row hot water coils are placed in the reheat position.

### CONVENIENT INSTALLATION

All FCC Series fan coil units are shipped completely assembled, reducing field installation time and labor. All units are thoroughly inspected and tested prior to shipment, eliminating potential problems at startup. Motor wiring is brought to a junction box on the outside of the unit casing, reducing electrical hook-up time.

All FCC Series fan coil units have a front access electrical enclosure, allowing easy access to all electrical components, terminal blocks and wiring.

Available factory installed control packages can greatly reduce field labor and setup time. Consisting of control transformer and all needed relays, these packages integrate seamlessly with either factory provided thermostats or field installed thermostats and controllers.

### QUALITY PRODUCT

FCC Series fan coil units are built from galvanized steel. This metal surpasses the ASTM 125 hour salt spray test for corrosion and rust.

Standard insulation is 1/2 inch thick, fiberglass insulation which is glued and pin spotted for maximum positive adhesion. Insulation complies with UL 181 and NFPA 90A.

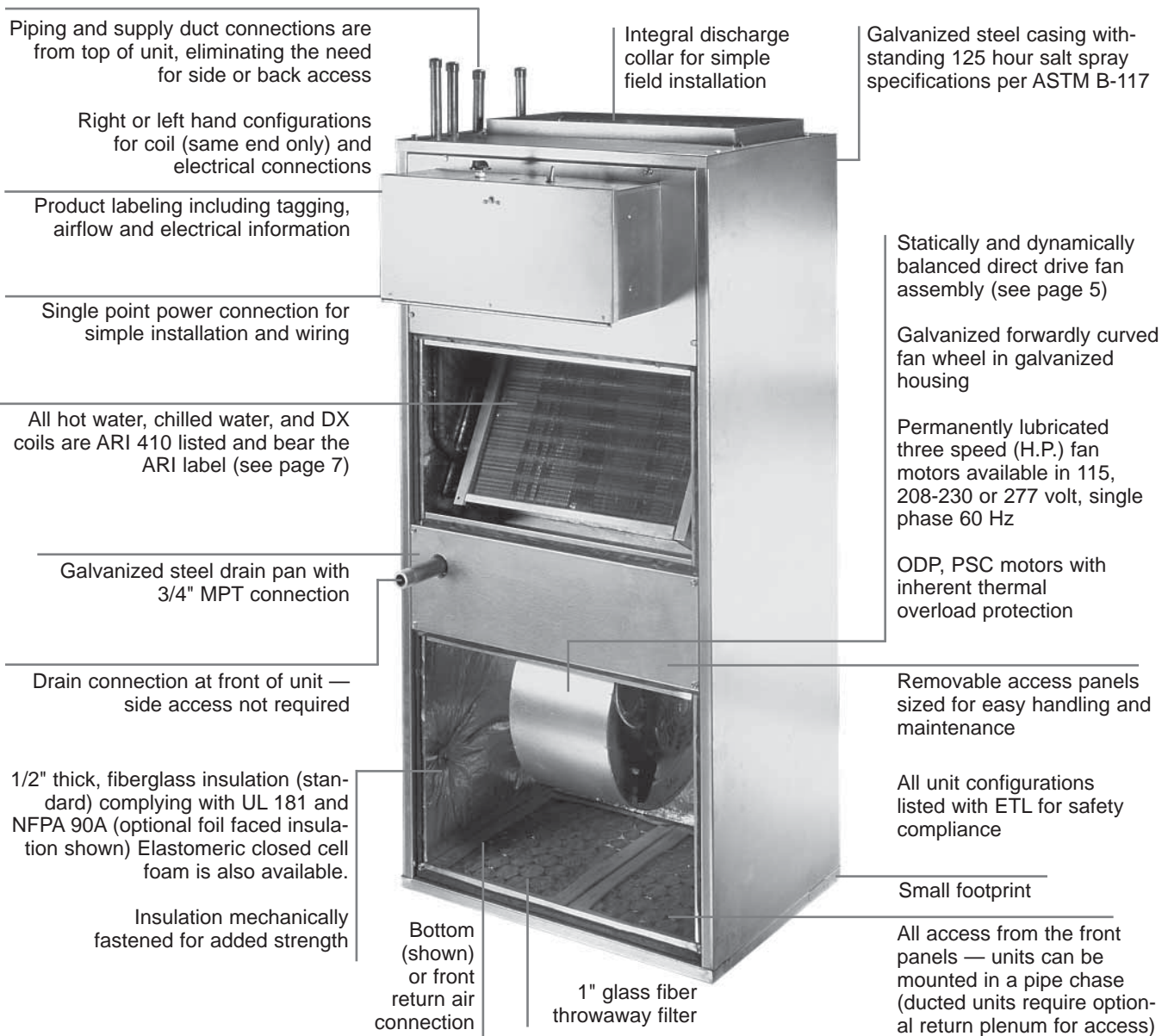
All units, with or without electric heat, are cETL listed and labeled. All wiring is in compliance with NEC, assuring safety and quality for the owner.

FCC Series fan coil units have a removable fan assembly. The entire fan assembly can be removed from the unit and serviced easily on a workbench.

# CONSTRUCTION FEATURES

## MODEL FCC

Many standard features on the FCC fan coil unit are expensive add-ons for other manufacturers.



## OPTIONAL CONSTRUCTION FEATURES

- Scrim reinforced foil faced insulation to meet ASTM C665 and C1136 is available for mold, mildew, and humidity resistance — all edges are sealed to prevent erosion
- Elastomeric closed cell foam insulation to meet ASTM G-21 for fungi resistance and UL 181 for mold growth/humidity and air erosion.
- Integral discharge air plenum with adjustable double deflection supply grille
- Stainless steel coil casings
- Auto air vents on hydronic coils
- Quick open access panels
- Stainless steel drain pan with 3/4" MPT connection
- Drain pan float switch
- Electric resistance heat section meets NEC code requirements (see page 9). All units ETL listed with integral electric heat as an assembly.
- 2" filter rack
- Integral induction air mixing box section for precise ventilation air blending
- Three position motor speed switch
- Low voltage controls
- Toggle type single phase disconnect switch for service
- Unit start/stop relay for flexibility of control
- SCR electronic fan speed controller for finite airflow adjustment

# CONSTRUCTION FEATURES

## QUIET, ENERGY EFFICIENT FAN ASSEMBLY

A key to comfort is the Johnson Controls extra quiet fan assembly. Each assembly is specifically designed and built for quiet, energy efficient air delivery.

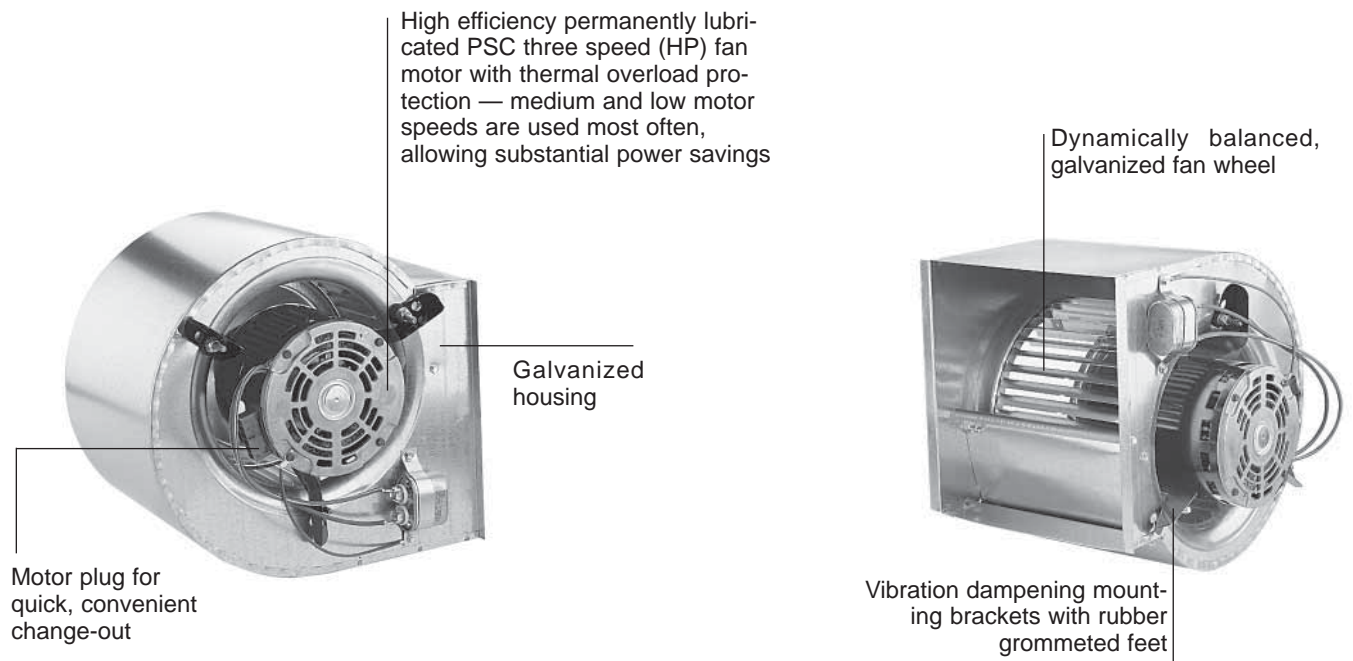
What makes Johnson Controls fan assemblies efficient is the use of three speed, three winding, permanent split capacitor fan motors. The three speed motors are capable of delivering three separate horsepower outputs. For example, a nominal 1/2 HP motor at medium and low speeds will deliver 1/3 HP and 1/4 HP respectively. This is the most efficient means of handling reduced fan capacities.

A quick select terminal strip is provided for switching between motor speeds. An optional three position rotary switch is also available for simplified motor speed selection. Additional air balance of the fan can be achieved through field adjustment of an electronic (SCR) fan speed controller. The electronic (SCR) fan

speed controller is manufactured by Johnson Controls and has been specifically designed for compatibility with the fan motors. Each SCR also includes a minimum voltage limiter for stall protection.

The combination of a three speed fan motor, and electronic SCR provides the most flexible and energy efficient means of balancing fan capacities with varying field conditions. This combination is preferred over single speed motor and SCR combinations which cause excessive power consumption and high motor winding temperatures.

Each fan housing is specifically designed for compatibility with the fan motors and internal pressure losses of the FCC cabinets. This design provides proper motor loading and maximizes fan performance.



## STANDARD AND OPTIONAL FEATURES

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### STANDARD FEATURES

#### Construction

- ARI 440 certified and labeled
- Heavy gauge galvanized steel construction
- 1/2" thick fiberglass insulation
- 1" duct discharge collar
- Removable access panels sized for easy handling

#### Coils

- ARI 410 certified and labeled
- Cooling - 3 or 4 row chilled water or DX, heat pump compatible
- Heating - 1 or 2 row hot water – reheat position
- 6 total rows of cooling and heating coils maximum
- 1/2" O.D. seamless copper tubes
- 0.016" tube wall thickness
- Left or right hand connections
- 300 PSIG working pressure at 200°F
- Removable for service
- Manual air vents

#### Filter Rack and Filters

- 1" flat filter rack
- 1" nominal throwaway filters

#### Drain Pans

- Single wall, galvanized steel, externally insulated – fire retardant and antimicrobial
- Positively sloped to drain connection
- 3/4" MPT galvanized drain connection

#### Fan Assemblies

- Forward curved, DWDI centrifugal type
- 115 volt, single phase, three tap PSC motors
- Quick disconnect motor connections
- Removable fan(s)/motor(s) for service

#### Electrical

- cETL listed for safety compliance
- Electrical junction box for field wiring terminations
- Terminal block for field connections

#### Electric Heat

- cETL listed as an assembly for safety compliance
- Integral electric heat assembly with removable elements for easy service
- Automatic reset primary and back-up secondary thermal limits
- Single point power connection
- Hinged electrical enclosure

### OPTIONAL FEATURES

#### Construction

- Scrim reinforced foil faced fiberglass insulation
- Elastomeric closed cell foam insulation
- Double deflection discharge grille
- Quarter turn quick open access panel fasteners
- Return and supply plenums

#### Coils

- Automatic air vents
- Stainless steel coil casings
- 0.025" tube wall thickness

#### Filter Rack and Filters

- 2" flat filter rack
- Spare throwaway filters

#### Inlet Damper Section

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

#### Drain Pans

- Single wall, stainless steel with external insulation

#### Fan Assemblies

- 208-230 & 277 volt, single phase, three tap PSC motors

#### Electrical

- Front access electrical enclosure
- SCR fan speed controller
- Fan relay packages
- Toggle disconnect switch
- Condensate overflow switch (drain pan)
- Main fusing
- Unit and remote mounted three speed fan switches

#### Electric Heat

- Door interlocking disconnect switches
- Main fusing
- Manual reset secondary thermal limits

#### Thermostats

- Remote mounted analog, digital display or programmable
- 2 and 4 pipe control sequences
- Automatic and manual changeover
- Integral three speed fan switches

# COILS, PHYSICAL DATA

## COILS

Johnson Controls manufactures hot water, chilled water, and direct expansion (DX) coils for specific application with all FCC direct drive fan coils. ARI 410 certified and labeled, and strict on-site inspection before, during, and after installation guarantees the highest quality and performance available.

### STANDARD FEATURES

- Designed, manufactured and tested by Johnson Controls
- ARI 410 certified and labeled
- 1/2" O.D. seamless copper tubes
- High efficiency aluminum fin surface for optimizing heat transfer, pressure drop and carryover.
- Mechanically expanded copper tubes leak tested to a minimum 450 PSIG air pressure under water
- Manual air vent plug on all water coils
- Copper ODM sweat connections
- 300 PSIG working pressure at 200°F
- Evaporator coils are factory sealed and charged with minimum of 5 PSIG nitrogen or refrigerated dry air
- Refrigerant coils are provided with a fixed orifice metering device (distributor-eliminator)
- 0.016" tube wall thickness

### OPTIONAL FEATURES

- Automatic air vents on water coils
- Stainless steel coil casings
- 0.025" tube wall thickness
- DX coils are heat pump compatible



## COIL FACE AREA AND FILTER DATA

UNIT SIZE	AUXILIARY HEATING COIL	COOLING COIL	NOMINAL FILTER SIZES	
	FACE AREA	FACE AREA	WITH FRONT RETURN	WITH BOTTOM RETURN
04	0.9 [0.08]	1.3 [0.12]	16 x 22 x 1 [406 x 559 x 25]	(2) 14 x 10.5 x 1 [356 x 267 x 25]
06	0.9 [0.08]	1.6 [0.15]	16 x 22 x 1 [406 x 559 x 25]	(2) 14 x 10.5 x 1 [356 x 267 x 25]
08	1.2 [0.11]	1.8 [0.17]	16 x 22 x 1 [406 x 559 x 25]	(2) 14 x 10.5 x 1 [356 x 267 x 25]
10	2.0 [0.19]	2.6 [0.24]	16 x 29 x 1 [406 x 737 x 25]	(2) 14 x 17 x 1 [356 x 432 x 25]
12	2.0 [0.19]	2.9 [0.27]	16 x 29 x 1 [406 x 737 x 25]	(2) 14 x 17 x 1 [356 x 432 x 25]
16	3.3 [0.31]	4.0 [0.37]	(2) 16 x 23 x 1 [406 x 584 x 25]	(2) 17 x 22.5 x 1 [432 x 572 x 25]
20	3.3 [0.31]	5.1 [0.47]	(2) 16 x 23 x 1 [406 x 584 x 25]	(2) 17 x 22.5 x 1 [432 x 572 x 25]

**NOTES:**

1. Standard filters are 1" throwaway; optional filters are 2" throwaway.
2. Coil face areas are measured in square feet [square meters].
3. Filter sizes are measured in inches [millimeters].

## PHYSICAL DATA

### ARI STANDARD RATINGS

UNIT SIZE	ARI 440 CERTIFIED	COIL		AIRFLOW CFM (Dry Flow)	COOLING CAPACITY		WATER		POWER INPUT (WATTS)
		Rows	FPI		QT (BTUH)	QS (BTUH)	Flow Rate GPM	WPD ft-wg	
04	•	4	10	400	13.6	9.4	2.7	3.2	250
06	•	4	10	600	18.0	12.9	3.6	3.6	275
08	•	4	10	800	24.3	17.2	4.9	4.8	425
10	•	4	10	1000	33.6	23.0	6.7	5.8	450
12	•	4	10	1200	40.4	27.5	8.1	8.2	850
16		4	10	1600	57.6	38.4	11.5	9.8	850
20		4	10	2000	66.4	45.7	13.3	4.3	900

#### NOTES:

1. Based on 80°F DB and 67°F WB EAT, 45°F EWT, 10°F temperature rise, high fan speed. Motor type is PSC and motor voltage is 115/1/60. Airflow under dry coil conditions. All models tested at 0.05" external static pressure.
2. Airflow rate CFM on sizes 16 and 20 exceed maximum ratings in ARI 440 and are therefore not certified.
3. For other selections, refer to Web-Select®.

### HEATING CAPACITY

UNIT SIZE	NOMINAL CFM	1 ROW			2 ROW		
		QS (MBH)	GPM	WPD	QS (MBH)	GPM	WPD
04	400	12.5	1.3	1.5	21.2	2.2	1.5
06	600	14.9	1.5	2.1	26.4	2.7	2.2
08	800	20.5	2.1	4.9	36.3	3.7	4.9
10	1000	30.7	3.2	2.9	52.9	5.4	4.3
12	1200	33.5	3.4	3.4	58.5	6.0	5.2
16	1600	50.4	5.2	4.4	89.0	9.1	12.3
20	2000	56.0	5.7	5.4	100.9	10.3	15.7

#### NOTES:

1. Based on 70°F EAT, 180°F EWT, 20°F temperature drop, high fan speed.
2. For other selections, refer to Web-Select®.

### UNIT WEIGHT DATA

COMPONENT	UNIT SIZE							
	04	06	08	10	12	16	20	
BASE UNIT	81 [37]	81 [37]	103 [47]	103 [47]	106 [48]	128 [58]	134 [61]	
MIXING BOX	24 [11]	24 [11]	24 [11]	37 [17]	37 [17]	54 [24]	54 [24]	
DISCHARGE PLENUM	21 [10]	21 [10]	21 [10]	33 [15]	33 [15]	48 [22]	48 [22]	
RETURN PLENUM	17 [8]	17 [8]	17 [8]	25 [11]	25 [11]	33 [15]	33 [15]	
COIL ROWS	1 ROW - DRY	7 [3]	7 [3]	8 [4]	11 [5]	11 [5]	16 [7]	16 [7]
	1 ROW - WET	8 [4]	8 [4]	9 [4]	14 [6]	14 [6]	19 [9]	19 [9]
	2 ROW - DRY	10 [5]	10 [5]	12 [5]	17 [8]	17 [8]	25 [11]	25 [11]
	2 ROW - WET	12 [5]	12 [5]	14 [6]	21 [10]	21 [10]	31 [14]	31 [14]
	3 ROW - DRY	16 [7]	19 [9]	21 [10]	27 [12]	29 [13]	38 [17]	46 [21]
	3 ROW - WET	20 [9]	23 [10]	26 [12]	35 [16]	38 [17]	49 [22]	60 [27]
	4 ROW - DRY	20 [9]	23 [10]	26 [12]	34 [15]	37 [17]	49 [22]	59 [27]
	4 ROW - WET	25 [11]	29 [13]	34 [15]	44 [20]	48 [22]	64 [29]	77 [35]

**NOTE:** Unit weight data is shipping weight in pounds [kilograms].



# ELECTRIC HEAT

## STANDARD FEATURES

- ETL listed as an assembly for safety compliance
- Single point power connection
- Mounted in reheat position
- Automatic reset primary and back-up secondary thermal limits
- Internal wiring rated at 105°C
- Integral electric heat assembly with removable element for easy service



## USEFUL FORMULAS

$$kW^* = \frac{CFM \times \Delta T \times 1.085^{**}}{3413}$$

$$1\emptyset \text{ AMPs} = \frac{kW \times 1000}{Volts}$$

\* 1kW = 3413 BTU/H

\*\* Capacity at sea level

### Altitude Considerations:

Reduce by 0.034 for each 1000 ft. of altitude above sea level.

Example: 5000 ft./1000 ft. = 5

$$5 \times 0.034 = 0.17$$

$$1.085 - 0.17 = 0.915$$

## OPTIONAL FEATURES

- Silent solid state relays
- Door interlocking disconnect switch
- Main fusing
- Manual reset secondary limits

## ELECTRICAL CALCULATIONS INFORMATION

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

ELECTRIC HEAT SELECTION CHART (AMPS)

UNIT SIZE	MBH	6.83	8.53	10.24	11.95	13.65	17.07	20.48	23.89	27.30	30.72	34.13	37.54	40.96	44.37
	KW	2.0	2.5	3.0	3.5	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0
	VOLTS	AMPS													
04	115	17.4	21.8	26.1	30.5	34.8	43.5								
	208	9.6	12.0	14.4	16.8	19.2	24.1								
	230	8.7	10.9	13.1	15.2	17.4	21.8								
	277	7.2	9.0	10.8	12.6	14.4	18.1								
06	115	17.4	21.8	26.1	30.5	34.8	43.5								
	208	9.6	12.0	14.4	16.8	19.2	24.1	28.9	33.7	38.5					
	230	8.7	10.9	13.1	15.2	17.4	21.8	26.1	30.5	34.8					
	277	7.2	9.0	10.8	12.6	14.4	18.1	21.7	25.3	28.9					
08	115	17.4	21.8	26.1	30.5	34.8	43.5								
	208	9.6	12.0	14.4	16.8	19.2	24.1	28.9	33.7	38.5	43.3				
	230	8.7	10.9	13.1	15.2	17.4	21.8	26.1	30.5	34.8	39.2	43.5			
	277	7.2	9.0	10.8	12.6	14.4	18.1	21.7	25.3	28.9	32.5	36.1	39.7		
10	115	17.4	21.8	26.1	30.5	34.8	43.5								
	208	9.6	12.0	14.4	16.8	19.2	24.1	28.9	33.7	38.5	43.3				
	230	8.7	10.9	13.1	15.2	17.4	21.8	26.1	30.5	34.8	39.2	43.5			
	277	7.2	9.0	10.8	12.6	14.4	18.1	21.7	25.3	28.9	32.5	36.1	39.7	43.3	46.9
12	115					34.8	43.5								
	208					19.2	24.1	28.9	33.7	38.5	43.3				
	230					17.4	21.8	26.1	30.5	34.8	39.2	43.5			
	277					14.4	18.1	21.7	25.3	28.9	32.5	36.1	39.7	43.3	46.9
16	115					34.8	43.5								
	208					19.2	24.1	28.9	33.7	38.5	43.3				
	230					17.4	21.8	26.1	30.5	34.8	39.2	43.5			
	277					14.4	18.1	21.7	25.3	28.9	32.5	36.1	39.7	43.3	46.9
20	115					34.8	43.5								
	208					19.2	24.1	28.9	33.7	38.5	43.3				
	230					17.4	21.8	26.1	30.5	34.8	39.2	43.5			
	277					14.4	18.1	21.7	25.3	28.9	32.5	36.1	39.7	43.3	46.9

### NOTES:

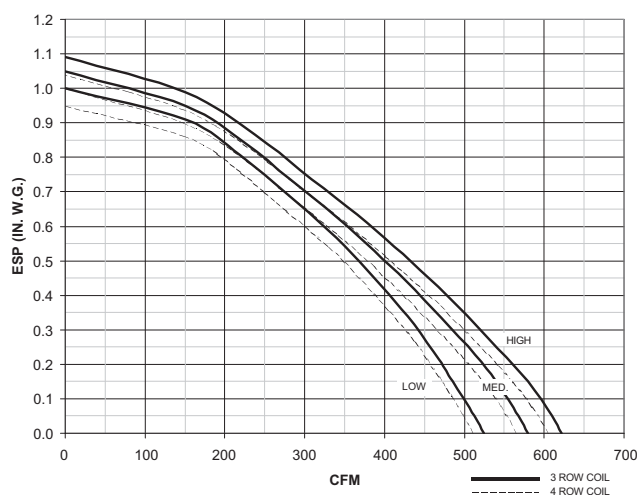
1. Shaded areas indicate kW and voltage options not available.
2. Available voltages are single phase, 60 hertz.

# FAN PERFORMANCE

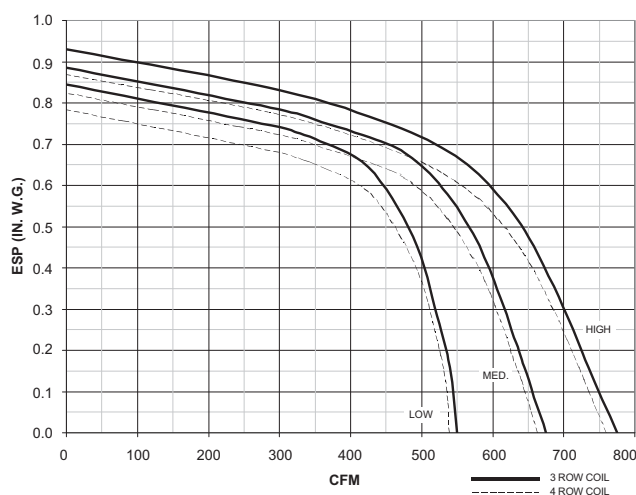
## GENERAL FAN NOTES

1. Fan curves depict actual performance of each motor tap without any additional fan balance adjustment. Actual capacities which fall below each curve can be obtained by adding an adjustment device. Units should not be run prior to installation of downstream ductwork; otherwise, damage to the motor may result. The minimum external static pressure required is 0.1 inches w.g.
2. Johnson Controls fan coil units are equipped with permanent split-capacitor (PSC) motors with three separate speeds (High, Medium and Low) which provides variable horsepower outputs. Most often, size selections are conservative and actual CFM requirements and/or external static pressure requirements are lower than those specified. In this case, the unit fan motor can be run at low or medium tap, substantially reducing the operating cost of the unit.
3. All fan curves are for 115/1/60 motors and include losses for cabinet, electric heater, 3 or 4 row coil, and clean 1" throwaway filter. For other configurations, adjust performance curves based on pressure losses for individual components found on page 7.
4. See page 12 for fan motor electrical data.

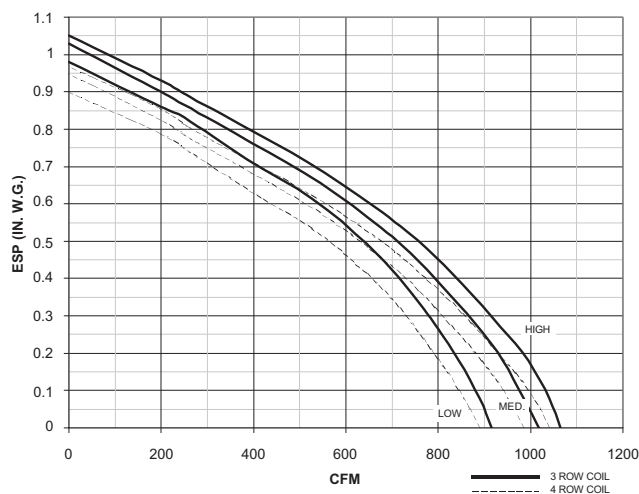
FCC 04 • 3 and 4 Row Coils



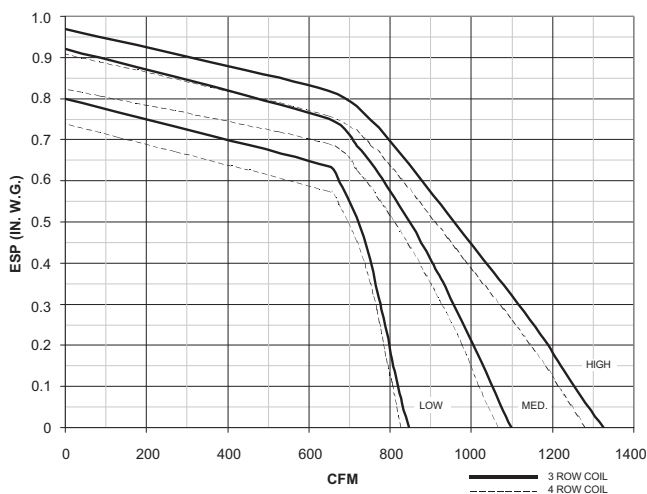
FCC 06 • 3 and 4 Row Coils



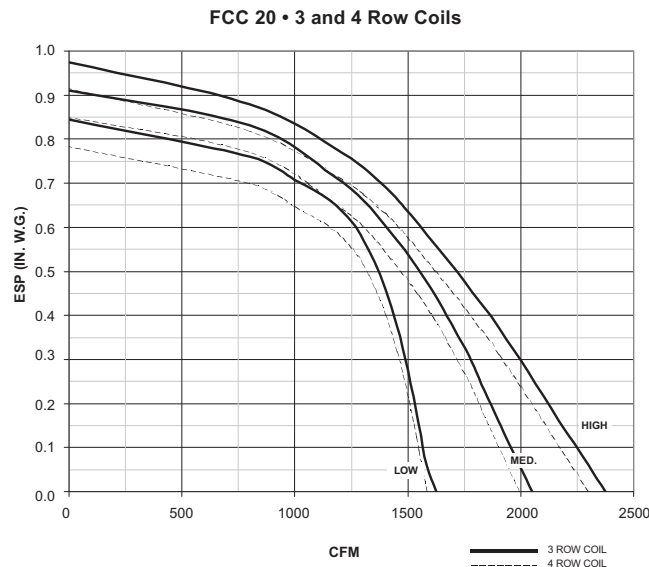
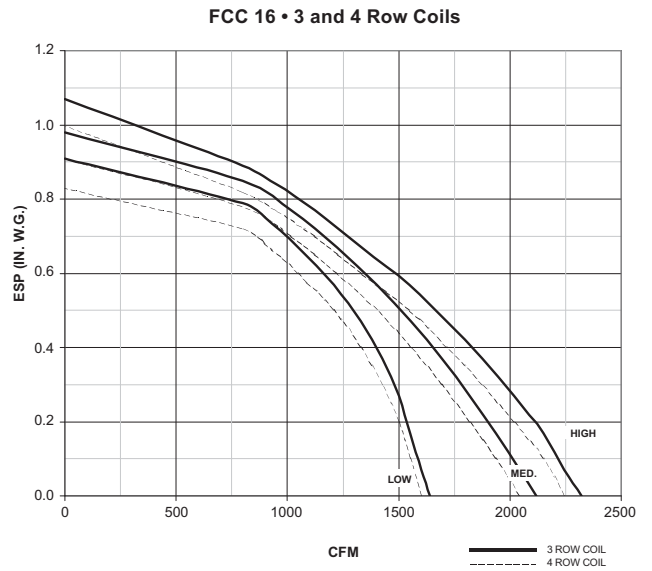
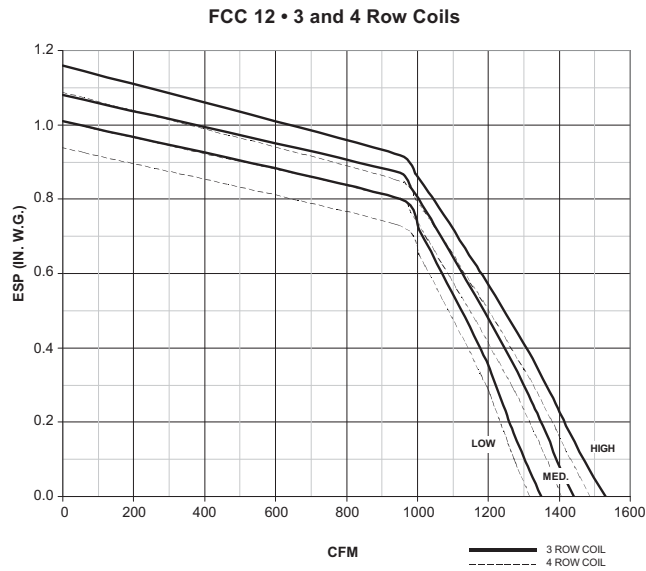
FCC 08 • 3 and 4 Row Coils



FCC 10 • 3 and 4 Row Coils



# FAN PERFORMANCE CURVES



## WEB-SELECT

Johnson Controls offers the industry's first web-based fan coil rating and selection program for complete unit, coil and sound selection. See your representative for more information.

# MOTOR, FAN AND SOUND DATA

## MOTOR AND FAN DATA

UNIT SIZE	MOTOR TAP	MOTOR (QTY.) HP	NUMBER OF FANS	AMPS			
				115V	208V	230V	277V
04	HI	(1) 1/6	1	2.7	1.4	1.4	1.0
	MED	(1) 1/8		2.4	0.9	0.9	0.9
	LOW	(1) 1/10		2.2	0.6	0.6	0.8
06	HI	(1) 1/6	1	2.7	1.4	1.4	1.0
	MED	(1) 1/8		2.4	0.9	0.9	0.9
	LOW	(1) 1/10		2.2	0.6	0.6	0.8
08	HI	(1) 1/4	1	4.9	2.2	2.2	2.0
	MED	(1) 1/5		4.1	1.5	1.5	1.7
	LOW	(1) 1/8		3.2	1.1	1.1	1.4
10	HI	(1) 1/4	1	4.9	2.2	2.2	2.0
	MED	(1) 1/5		4.1	1.5	1.5	1.7
	LOW	(1) 1/8		3.2	1.1	1.1	1.4
12	HI	(1) 1/2	1	9.6	4.0	4.0	3.6
	MED	(1) 1/3		9.3	2.7	2.7	2.9
	LOW	(1) 1/4		8.8	2.0	2.0	2.8
16	HI	(2) 1/4	2	9.8	4.4	4.4	4.0
	MED	(2) 1/5		8.2	3.0	3.0	3.4
	LOW	(2) 1/8		6.4	2.2	2.2	2.8
20	HI	(2) 1/4	2	9.8	4.4	4.4	4.0
	MED	(2) 1/5		8.2	3.0	3.0	3.4
	LOW	(2) 1/8		6.4	2.2	2.2	2.8

**NOTES:**

1. Motor electrical data is nameplate data. Actual data will vary with application.
2. 230 volt motor is nameplated for 208-230/1/60. Use 230 volt motor data for 208 volt applications.

## SOUND DATA

UNIT SIZE	FAN SPEED	CFM	RPM	TOTAL SOUND POWER LEVEL						
				OCTAVE BAND / CENTER FREQUENCY (HZ)						
				2/125	3/250	4/500	5/1000	6/2000	7/4000	8/8000
04	HI	610	1107	70	62	57	53	51	49	42
	MED	570	1040	69	61	55	51	49	49	42
	LOW	515	949	69	63	58	53	50	49	42
06	HI	750	1050	78	71	63	59	57	56	49
	MED	650	895	73	66	59	55	53	51	47
	LOW	540	735	68	61	54	50	48	45	41
08	HI	1050	1114	75	70	64	59	57	56	49
	MED	1000	1023	72	68	62	57	55	54	46
	LOW	895	877	69	64	58	53	51	48	40
10	HI	1275	1051	74	70	64	64	62	61	53
	MED	1050	849	70	64	60	59	56	55	47
	LOW	825	671	65	58	54	53	50	48	40
12	HI	1490	1089	77	72	67	68	68	67	62
	MED	1420	1035	76	71	66	67	66	65	60
	LOW	1320	964	74	69	64	65	64	63	58
16	HI	2300	1099	77	71	67	65	64	63	57
	MED	2030	988	75	69	65	63	61	60	54
	LOW	1600	785	71	63	59	57	55	54	46
20	HI	2290	1088	77	73	68	66	64	64	58
	MED	1970	941	76	69	65	63	61	60	54
	LOW	1590	769	71	64	60	57	56	53	46

**NOTES:**

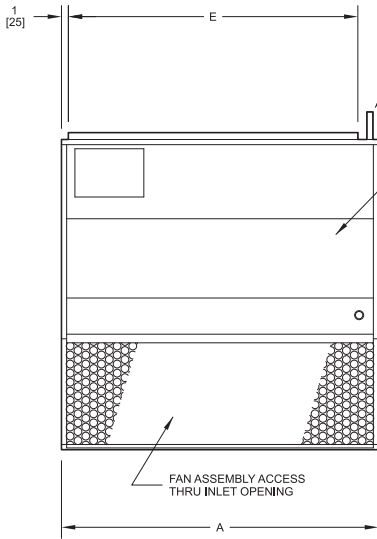
1. Sound data tested in accordance with ARI 350-86.
2. Sound levels are expressed in decibels, dB RE: 1 x 10<sup>-12</sup> watts.
3. Total sound power level data based on fan CFM at corresponding motor tap with 115/1/60 volt motor, 0.0" external static pressure and standard rated internal pressure losses.

# DIMENSIONAL DATA

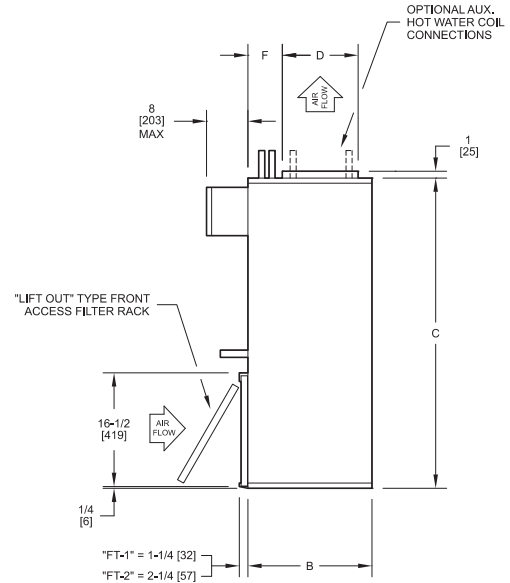
## MODEL FCC VERTICAL UNITS

Drawings are not to scale and not for submittal or installation purposes.

### WITHOUT ELECTRIC HEAT

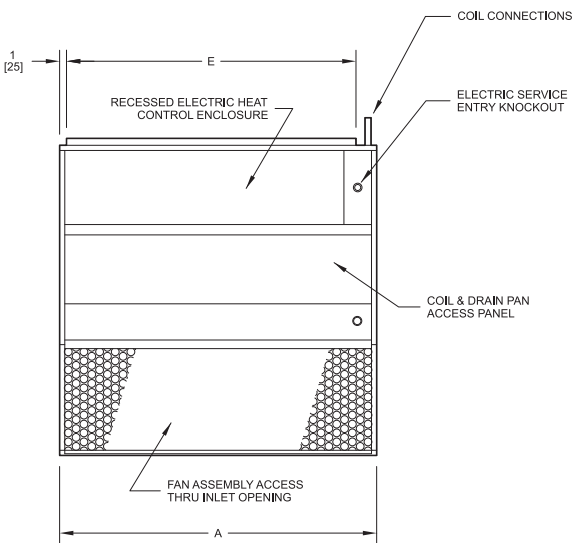


Front View

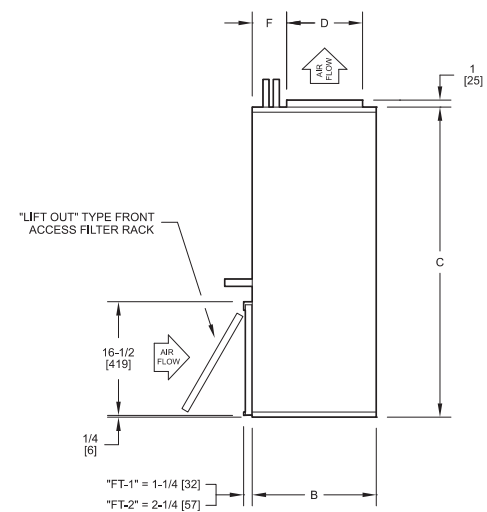


Side View

### WITH ELECTRIC HEAT



Front View



Side View

### DIMENSIONS

UNIT SIZE	A	B	C	D	E	F
04-08	22 [559]	15 [381]	48 [1219]	8 [203]	18 [457]	4 [102]
10-12	29 [737]	18 [457]	48 [1219]	12 [305]	25 [635]	4 [102]
16-20	46 [1168]	18 [457]	48 [1219]	12 [305]	40 [1016]	5 [127]

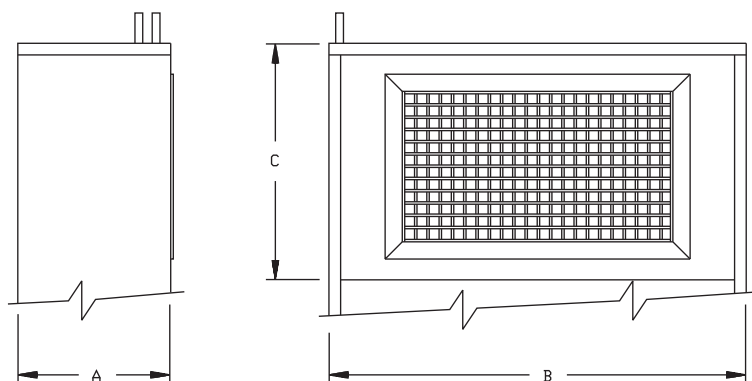
**NOTES:**

1. All dimensions are inches [millimeters] +/- 1/4" [6mm]. Metric values are soft conversion.
2. Front access only is required for installation and service.
3. Right hand unit shown, left hand unit opposite.

# DIMENSIONAL DATA

## SUPPLY PLENUM WITH DOUBLE DEFLECTION GRILLE

Drawings are not to scale and not for submittal or installation purposes.



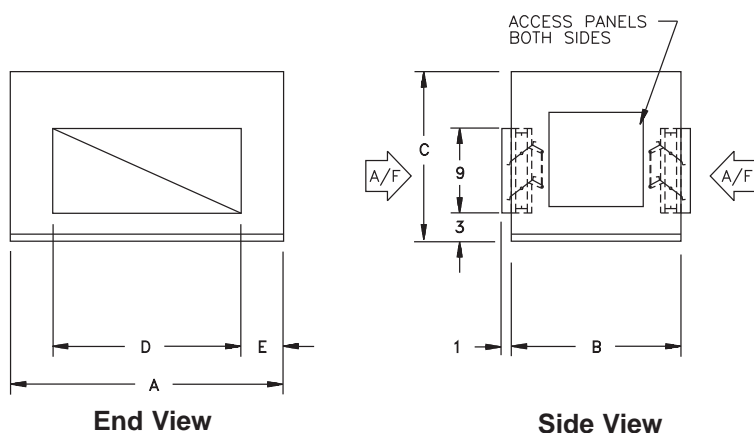
UNIT SIZE	A	B	C	SUPPLY GRILLE W x H
04-08	15" [381]	22" [559]	15" [381]	18" x 8" [457 x 203]
10-12	18" [457]	29" [737]	18" [457]	24" x 12" [610 x 305]
16-20	18" [457]	46" [1168]	18" [457]	40" x 12" [1016 x 305]

**NOTES:**

1. All dimensions are inches [millimeters] +/- 1/4" [6mm]. Metric values are soft conversion.
2. C-dimension adds to basic unit height.

## MIXING BOX SECTION

Drawings are not to scale and not for submittal or installation purposes.



UNIT SIZE	A	B	C	D	E
04-08	22" [559]	15" [381]	15" [381]	15" [381]	3 1/2" [89]
10-12	29" [737]	18" [457]	18" [457]	20" [508]	4 1/2" [114]
16-20	46" [1168]	18" [457]	18" [457]	36" [914]	5" [127]

**NOTES:**

1. All dimensions are inches [millimeters] +/- 1/4" [6mm]. Metric values are soft conversion.
2. Return air plenum (one inlet, no dampers) is available in lieu of mixing box section.
3. C-dimension adds to basic unit height.
4. Linkage and actuator for damper control shall be provided/installed by others.

# GUIDE SPECIFICATIONS

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## GENERAL

Furnish and install Johnson Controls Model FCC Vertical Concealed Direct Drive Fan Coil Unit where indicated on the plans and specifications. Units shall be completely factory assembled, tested and shipped as one piece except where noted.

All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating, and air delivery. All unit dimensions for each model and size shall be considered maximums. Units shall be ETL listed in compliance with UL/ANSI Standard 1995, and be certified as complying with the latest edition of ARI Standard 440.

## CONSTRUCTION

All units shall be fabricated of heavy gauge galvanized steel, able to meet 125 hour salt spray test per ASTM B-117. All exterior panels shall be insulated with 1/2" thick fiberglass insulation rated for a maximum air velocity of 5000 f.p.m. In addition to using adhesive complying with NFPA 90A and 90B, the insulation shall incorporate a secondary mechanical fastener attached to the unit casing wall (weld pin). Adhesive as the only method of fastening the insulation to the casing is not acceptable. Insulation shall conform to UL 181 for erosion, ASTM C-1071 for thermal and sound absorbing material, NFPA 90A and 90B for fire and smoke, and carry a 25/50 Flame Spread and Smoke Developed Rating per ASTM E-84 and UL 723.

All units shall have a minimum 1" duct collar on the discharge. All access panels shall be fully insulated and attached with standard fasteners on at least two opposite sides. No coil, drain piping, or electrical connections shall pass through any access panel.

**Option:** Provide foil faced insulation in lieu of matt faced insulation. Foil insulation shall meet or exceed the requirements stated above, and in addition meet ASTM Standards C-665 and C-1136 for mold, mildew, and humidity resistance. Insulation shall be lined with aluminum foil, fiberglass scrim reinforcement, and #30 kraft paper laminated together with a flame resistant adhesive. All exposed edges shall be sealed to prevent any fibers from reaching the air stream.

**Option:** Provide elastomeric closed cell foam insulation in lieu of standard. Insulation shall meet all requirements of NFPA 90-A flame and smoke spread and melting point, as well as ASTM G-21 for bacterial and fungi resistance. Polyethylene insulation is not acceptable.

Each unit shall be furnished with a one-piece heavy gauge galvanized steel drain pan with welded corner construction.

**Option:** Provide a single wall primary drain pan constructed entirely of heavy gauge stainless steel for superior corrosion resistance. Stainless steel drain pans shall meet or exceed the requirements stated above.

## SOUND

Units shall have published sound power level data tested in accordance with ARI Standard 350-86.

## FAN ASSEMBLY

Unit fan shall be dynamically balanced, forwardly curved, direct drive DWDI wheel with 18 gauge galvanized chromate coated double inlet scroll. Motor shall include torsion flex suspension mount affixed to scroll using permanently attached mounting studs. Motor mount shall be secured with Nylock® lock nuts. Blower scroll shall be mounted to fan bulkhead with 18 gauge mounting rail in a manner to allow no metal-to-metal contact with fan bulkhead.

Blower motor shall be high efficiency, permanently lubricated sleeve bearing, permanent split-capacitor type with thermal overload protection and three separate horsepower taps. Single speed motors are not acceptable. The fan motor shall be unpluggable from the electrical leads at the motor case for simplified removal.

**Option:** Provide an electronic (SCR) fan speed controller for aid in balancing the fan capacity. The speed controller shall have a turn down stop to prevent the possibility of harming the motor bearings, and incorporate electrical noise suppression to minimize noise on the incoming power lines.

## COILS

All unit coils shall be rated in accordance with ARI 410.

All coils shall be 1/2" O.D. seamless copper tubes shall be mechanically expanded to provide an efficient bond between tube and fin. All water coils shall be provided with a manual air vent fitting to allow for coil venting. Valve core type vent fittings shall not be accepted.

All chilled water, hot water, and direct expansion (DX) coils shall have 0.016" tube wall thickness.

# GUIDE SPECIFICATIONS

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All coils shall be hydrostatically tested with air under water at 450 PSIG minimum pressure and rated for a maximum of 300 PSIG working pressure at 200°F.

DX coils shall be tested to 450 PSIG pressure and factory sealed and charged with a minimum of 5 PSIG nitrogen or refrigerated dry air. DX coils shall be provided with a fixed orifice metering device (distributor-eliminator).

## OPTIONS

Coil casing shall be fabricated from Stainless Steel.

Provide automatic air vents, in lieu of manual air vents.

Tube wall thickness shall be 0.025" on chilled water, hot water, and direct expansion coils.

## FILTER

All units shall be furnished with a minimum 1" nominal throwaway filter. Provide optional 2" filter rack with 2" throwaway filter where indicated. Filters shall be tight fitting to prevent air bypass.

## SUPPLY PLENUM SECTION

Provide a fully insulated integral supply plenum section, complete with double deflection supply grille. Supply plenum sections shipped loose for field installation to the units are not acceptable.

## MIXING BOX SECTION

Provide a fully insulated integral mixing box section, complete with return and outside air dampers. Mixing box sections shipped loose for field installation to the units are not acceptable.

## ELECTRICAL

Units shall be furnished with a single point power location and electrical junction box for motor and other electrical terminations.

## ELECTRIC HEAT SECTION

Provide an integral electric resistance heating assembly with the heating capacity, voltage, kilowatts, and stages as shown in the schedule.

The heater assembly shall be designed and rated for installation to the air handling unit without the use of duct extensions or transitions between the unit and the heater assembly. The heater shall be factory assembled and completely wired for single point power connection.

The heater and unit assembly shall be listed for zero clearance and shall meet all NEC requirements, and be ETL listed with the unit as an assembly in compliance with UL/ANSI Standard 1995.

All heating elements shall be open coil design using Ni-Chrome wire mounted in ceramic insulators and housed in an insulated heavy gauge galvanized steel housing. All elements shall terminate in a machine staked stainless steel terminal secured with stainless steel hardware for corrosion resistance. The element support brackets shall be spaced no greater than 3-1/2" on center. All internal wiring shall be rated for 105°C minimum.

All heaters shall include overtemperature protection, and shall be interlocked with the fan. All heater elements shall be single stage unless noted otherwise on the plans.

An incoming line power distribution block shall be provided. The power distribution block shall be designed to accept incoming power wiring capable of carrying 125% of the calculated load current.

**Option:** Provide a manual reset secondary thermal limit.

**Option:** Devices used to energize and de-energize (switch) electric heat must be totally silent. Magnetic, mercury, and/or quiet relays and/or contactors are not acceptable.