



## Cabinet Unit Heaters Steam / Hot Water



MODEL FC



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The Modine Breeze® AccuSpec is the fastest way to generate performance data based on actual job conditions. The Breeze® AccuSpec program is a web-based sizing and selection program. The program provides a series of step-by-step questions that allow for the easy configuration of Modine products. After a model has been configured, the program can generate Submittal Schedules, Submittal Data (including performance and dimensional drawings), and Specifications.

**Figure 1 - Model Nomenclature**

| 1,2,3 | 4,5,6 | 7   | 8   | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|-------|-------|-----|-----|----|----|----|----|----|----|----|----|----|----|
| MT    | CFM   | ADO | ADT | DS | IS | OS | AS | CR | HM | PF | MT | LB | OA |

**1,2 - Model Type (MT)**

FC - Pedestal Style  
WCC - Exposed, Recessed, or Ceiling Unit

**4,5,6 - Nominal Air Flow (CFM)**

002 - 250 CFM  
003 - 330 CFM  
004 - 450 CFM  
006 - 620 CFM  
008 - 840 CFM  
010 - 1050 CFM  
012 - 1240 CFM  
014 - 1430 CFM

**7 - Arrangement Digit One (ADO)**

0 - Wall or Floor  
5 - Ceiling  
9 - Inverted

**8 - Arrangement Digit Two (ADT)**

0 - Bottom In, Top Out  
6 - Front In, Top Out  
7 - Bottom In, Front Out  
8 - Front In, Front Out

**9 - Development Sequence (DS)**

A - Current

**10 - Inlet Style (IS)**

L - Louvers  
B - Bar Grille  
D - Duct Collar

**11 - Outlet Style (OS)**

L - Louvers  
B - Bar Grille  
D - Duct Collar  
A - Adjustable Louvers

**12 - Access Side (AS)**

L - Left  
R - Right

**13 - Coil Rows (CR)**

1 - 1 Row Coil  
2 - 2 Row Coil  
3 - 3 Row Coil  
4 - 4 Row Coil  
6 - 2 Row Coil with Cooling  
7 - 3 Row Coil with Cooling

**14 - Access Doors (AD)**

1 - None  
2 - Top  
3 - Front Panel  
4 - Top with Key Locks  
5 - Front Panel with Key Locks

**15 - Panel Fasteners (PF)**

0 - None  
1 - Spanner Head  
2 - Key Locks

**16 - Motor Type (MT)**

P - Standard PSC  
H - High Static PSC  
F - Standard PSC with Plug-In Leads  
I - High Static PSC with Plug-In Leads  
E - Standard EC  
K - High Static EC

**17 - Leveling Bolts (LB)**

0 - None  
1 - Leveling Bolts

**18 - Outside Air (OA)**

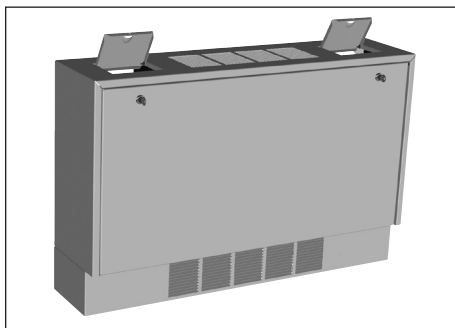
0 - None  
1 - 25% OA Duct Collar  
2 - 100% OA Duct Collar  
5 - 100% OA Motorized Damper  
6 - 25% OA Motorized Damper



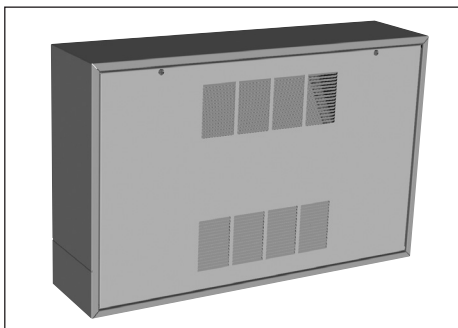
As Modine Manufacturing Company has a continuous product improvement program, it reserves the right to change design and specifications without notice.

# MODEL IDENTIFICATION

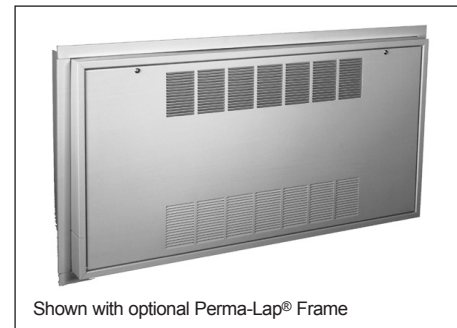
**Figure 2**  
**Model FC - Floor Mounted Unit**



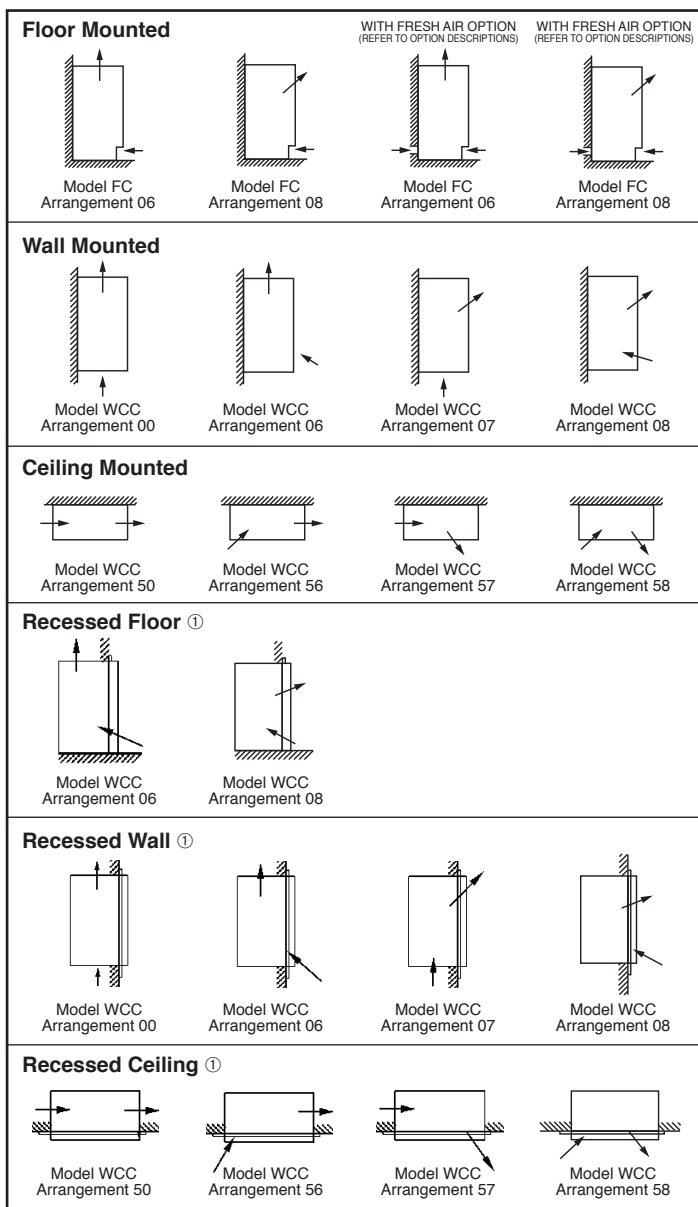
**Figure 3**  
**Model WCC - Wall or Ceiling Mounted Unit**



**Figure 4**  
**Model WCC - Recessed (full or partial) Wall or Ceiling Mounted Unit**

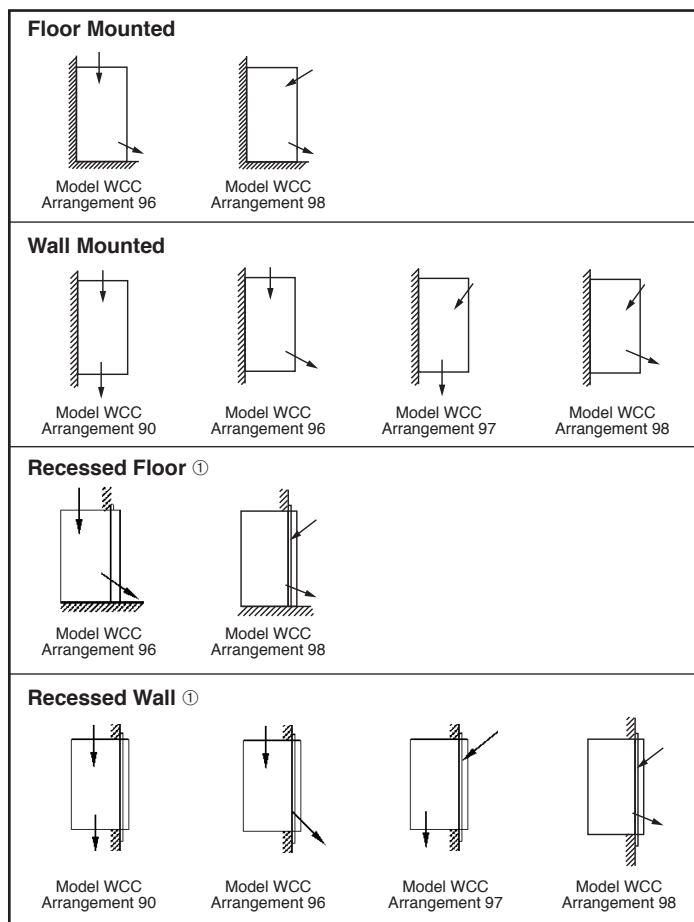


**Figure 5 - Standard Air Flow Options**

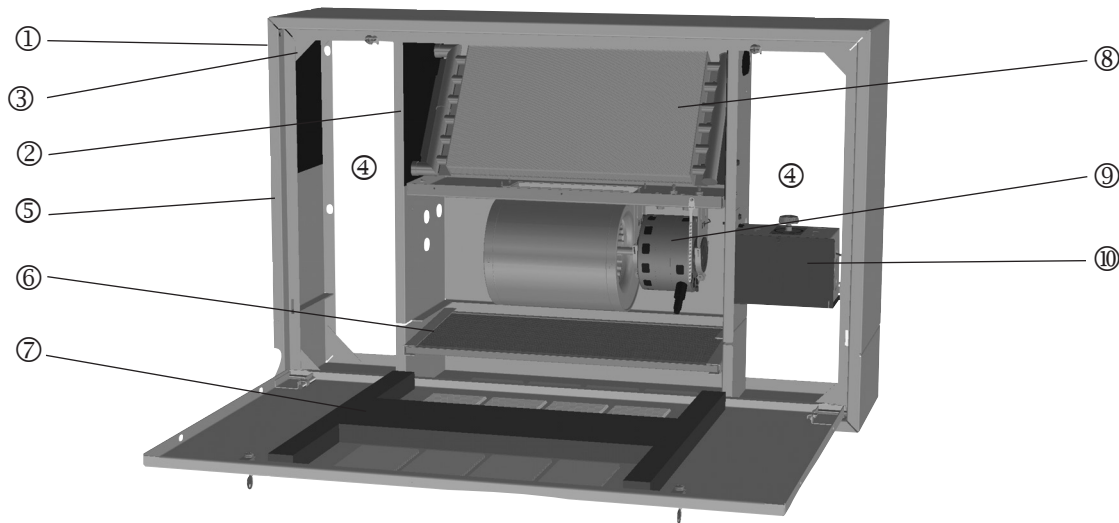


① Perma-Lap® frame available for recessed units.

**Figure 6 - Inverted Air Flow Options**



## FEATURES AND BENEFITS



① **One-Piece Cabinet Top and Sides (STD)**

Cabinet top and sides are formed from a single sheet of 18 gauge steel reducing the number of parting lines common to multi-piece construction. Fronts are 16 gauge. All louvers are stamped as standard.

② **Wrap-Around Partitions and Back Sheet (STD)**

Inner partition panels and back sheet are die-formed from a single sheet of 18 gauge steel. This assures precision fit and alignment of all internal components and maximum cabinet rigidity.

③ **All-Welded Construction (STD)**

Cabinet unit heaters utilize five to eight structural components in the basic cabinet. The components are fixture-aligned and welded.

④ **Cabinet End Pockets (STD)**

The two cabinet end pockets provide ample space for convenient installation of piping and electrical wiring. Easy access reduces costs and installation time.

⑤ **Cabinet Finish (STD)**

After assembly and welding operations are completed, the entire cabinet unit is treated for prevention of rust and corrosion. Entire cabinet is finished with a tan color, durable polyester powder-coat paint.

⑥ **Quick-Change Permanent Filters (STD)**

Filters are removable without tools. After opening the unit's front panel, the filter easily slides out. Cleanable filters are provided as standard.

⑦ **Insulation (STD)**

Sound dampening insulation on all front panels.

⑧ **Coils – Steam/Hot Water and Chilled Water (STD)**

All coils used in cabinet heaters use copper tube, aluminum fin construction with sweat connections. Tubes are mechanically expanded into integral fin collars. Return bends and joints are silver alloy brazed and the coil is pressure-tested to 200 psi pressure. Field reversible coils allow piping to be made for left or right side connection, with left hand piping as factory standard.

⑨ **Power Assembly (STD)**

Blower platform, blower, and blower motor on all sizes are removable as a single unit. A direct drive, multi-speed, PSC motor with built in thermal overload protection powers the forward curved aluminum blower wheels. Right hand electrical as factory standard.

⑩ **Speed Control (STD)**

Solid state infinite speed control with off position.

**Access Doors (not shown) (STD)**

⑪ Tilt type access doors standard on Model FC units.

# FACTORY MOUNTED OPTIONS

## Unit Equipment Options

### Piping Options

- 2, 3 & 4 Row High Capacity Coil, for use with water only. See page 11 for performance data.
- Right Hand Piping, Left Hand Electrical.

### Electrical Options

- Standard EC motor is offered with 3 speed switch to reduce electrical consumption over PSC motor. See page 19 for motor performance data.
- High Static PSC Motor & High Static EC motor. Used to overcome up to 0.4"W.C. external static pressure. See page 19 for data.
- Plug-In Motor. Allows removal of motor(s) or fan board without unwiring unit.
- Disconnect Switch. On-Off DPST toggle switch to disconnect electric power (hot and neutral lines) to unit. Located in electrical end compartment. See Figure 6.3.
- Unit Mounted Return Air Thermostat. Temperature sensing bulb is located in return air stream. Temperature set point range 55° to 90°F. Not for use with inverted air flow arrangements. Normally used with a control valve (see Accessories). See Figure 6.3.

### Access Door Options

- Access Doors for Model WCC. Two doors per unit.
- Front Panel Tamper Proof Fasteners with Tool.
- Key Locks on Access Doors. Two locks per unit. Especially valuable for units located in public place, these key locks make unit controls tamperproof.
- Key Locks on Front Panel. Two locks per unit. Especially valuable for units located in public place, these key locks make unit controls tamperproof.

**Figure 7 - Tamper Proof Screws, Key Lock**



### Air Inlet Options

- Aluminum Bar Grille. Grille replaces louvers. 12 gauge extruded aluminum.
- Model WCC – 100% Air Inlet Duct Collar. Collar width is 1" and is located at the bottom inlet, except on Arrangement 9 (inverted) where it is located at the top inlet.
- Model FC – 25% Outside Air Inlet Duct Collar. Collar width is 1" and is located at the rear inlet.
- Model FC – 100% Outside Air Inlet Duct Collar. Collar width is 1" and is located at the rear inlet.
- Model FC – 100% Outside/Inside Air Motorized Damper. Allows outside or inside air using 115V electric stall motor and outside/inside changeover switch.
- Model FC – 25% Outside Air/100% Inside Air Motorized Damper. Allows 25% outside air or 100% inside air using 115V electric stall motor and outside/inside changeover switch.

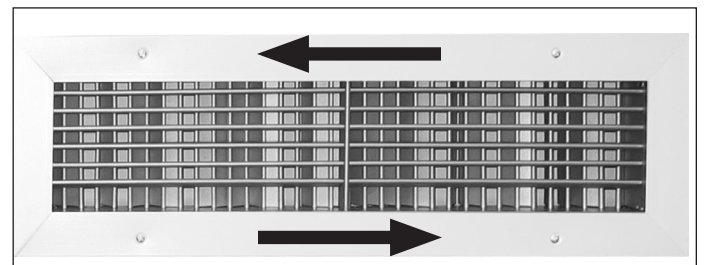
### Air Outlet Options

- Aluminum Bar Grille. Grille replaces louvers.
- Two Way Adjustable Air Deflector Louvers. Cannot be ordered with 2 Row High Capacity Coil.
- 100% Air Outlet Duct Collar. Collar width is 1" and is located at top outlet or bottom outlet on inverted models. Model WCC only.

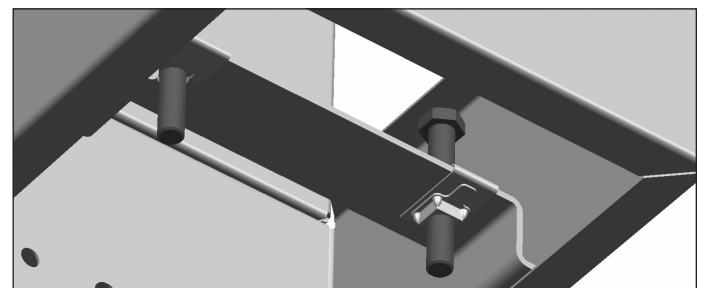
### Miscellaneous Options

- Decorator Color, optional paint color from color chart 75-403, latest revision.
- Leveling Bolts, allows leveling of unit on uneven floors. (Model FC only)
- Drain pan for the option to cool with chilled water; for two and three row coils. (Model FC only)

**Figure 8 - Two-Way Adjustable Louvers**



**Figure 9 - Leveling Bolts**





FIELD INSTALLED ACCESSORIES

Manual Starter

Toggle switch starter with thermal overload and off position. If overload trips, starter must be reset by turning switch to off, then back to on position.

Two and Three Way Electric Valves

Installs to unit supply piping in piping end compartment. Opens and closes in conjunction with starting and stopping of blower motor(s) on thermostat demand, 115 volt, brass body. Model sizes 002 thru 006 use 3/4" NPT, sizes 008 thru 014 use 1" NPT. Can be used with unit mounted return air thermostat or wall thermostat. Select wall thermostat from accessory list. System pressure not to exceed 15 psi. Three-way valve adds bypass of water or steam.

Modulating Non-electric Valve

Installs to unit supply piping in piping end compartment. Modulates hot/chilled water or steam flow in response to return air temperature, integral set point adjustment with remote sensing bulb located in return air stream. Responds to small changes in temperature. Requires constant blower operation. Modulating control reduces energy consumption and eliminates overheating. Temperature control range 48°-83°F. Straight through style valve, brass body. Unit sizes 002 thru 006 use 3/4" NPT, sizes 008 thru 014 use 1" NPT. System pressure not to exceed 15 psi.

Figure 10 - Perma-Lap® Frames

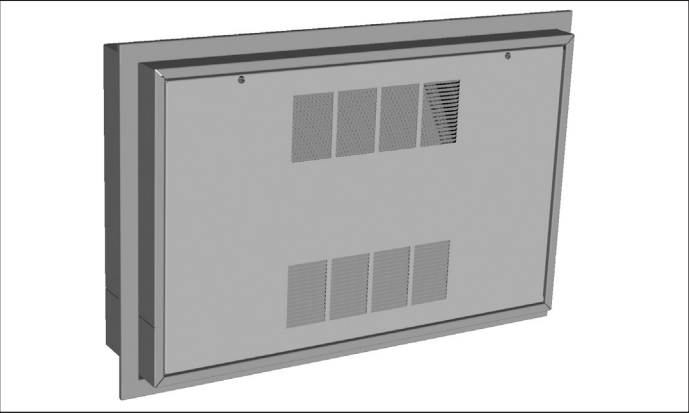


Figure 11 - Two or Three Way Electric Valve



Perma-Lap® Frames

The Perma-Lap® frame is a field installed accessory that can be used to recess Model WCC cabinet unit heaters. Units can be fully or partially recessed. The unit is framed in the recess providing permanent contact with any wall or ceiling whether it is a smooth, rough or irregular surface. This permanent bond does not permit air leakage, which can cause wall streaking.

The front panel of the unit is never in contact with the wall or ceiling, so servicing is never a problem.

The Perma-Lap frame has a 3/8" projection and a 1-1/2" width.

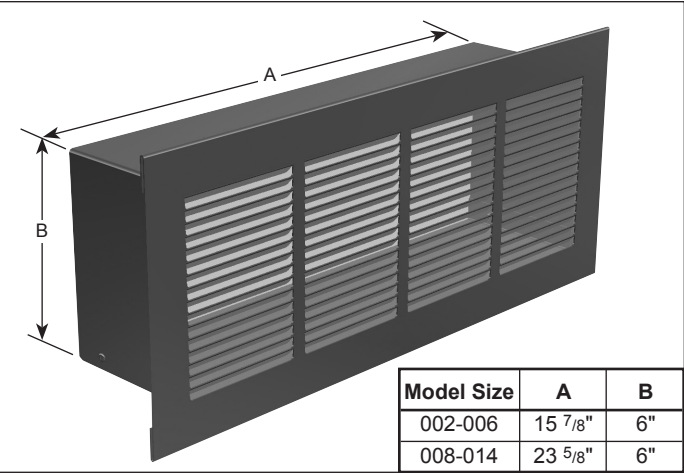
Aquastat

Delays blower motor(s) operation until coil is hot to prevent cold air delivery on start-up. Installs on return pipe in piping end compartment. Temperature set point range 100°-240°F, 10 amps @ 115 volts, 10°F differential, non-adjustable.

Figure 12 - Disconnect Switch and Return Air Thermostat, (Solid State Speed Controller is Standard)



Figure 13 - Outside Air Wall Box



# SAMPLE SIZING CALCULATIONS - HOT WATER

## General Selection Procedure

Selection of a cabinet unit heater requires the following information: 1) room heat loss; 2) heat loss due to ventilation load if outside air is introduced; 3) entering water temperature; 4) entering air temperature; 5) water flow rate and/or final water temperature; 6) required air circulation. Final selection of a cabinet unit heater is based on the following factors:

- Coil selection
- Unit size
- Model type
- Air flow arrangement
- Options and accessories

## Coil Selection

Generally, unit size is determined by the coils capacity to offset the design heat loss. Capacities of the standard and high capacity coils overlap, thereby making it possible to select the most economical coil for application requirements. The descriptions which follow illustrate the differences between the coils.

**Standard Coil (one row)** - This coil will meet the vast majority of heating-application requirements. Maximum operating conditions with water: 240°F (115°C) and 200 PSIG (1379 kPa) working pressure. This coil is also suitable for steam pressures up to 10 PSIG (68.9 kPa).

**High-Capacity Coil (two, three, & four row)** - Designed for use where the design load exceeds the capacity of the standard coil for a given size. This can be especially valuable where installation space is limited, since it will usually permit a smaller unit size to meet design requirements. The high-capacity coil will provide increased capacity over the standard coil in the same unit. The extra capacity of this coil may also allow use of lower water temperatures than the standard coil. Maximum operating conditions with water: 200°F (93°C) and 200 PSIG (1379 kPa) working pressure. Only single row coils are suitable for steam.

## Unit Size

Cabinet unit heaters should be selected to offset room heat loss. Normally selection is made on the basis of high fan speed. This insures use of the smallest, most economical unit. Selections made in this manner will normally satisfy room heating requirements at lower fan speeds, except during periods of extreme weather.

## Hot Water Selection

Hot water heating capacities for cabinet unit heaters are based on standard conditions of 200°F entering water temperature (EWT), 60°F entering air temperature (EAT), and a 20°F water temperature drop (WTD). Conversion factors for other than standard conditions are listed in Table 8.1 on page 8. See formulas, page 9.

An alternate method of unit selection at non-standard conditions requires actual performance to be converted to equivalent standard performance at 200°F EWT and 60°F. The required unit size can easily be determined from standard heating capacity tables on pages 10 and 11. See formulas, page 9.

## Example 1 - Standard Coil

### Requirements:

- Heating load, 27,000 Btu/hr
- Entering air temperature, 60°F
- Entering water temperature, 210°F
- Water flow, 2 GPM

### Solution:

From Table 8.1, page 8, the heating capacity conversion factor is 1.071. From formula 9.2, page 9:

$$\text{Standard Btu/hr} = \frac{27,000 \text{ Btu/hr}}{1.071} = 25,200 \text{ Btu/hr}$$

Table 10.1, page 10 shows selection of a unit size 004 with 25,800 Btu/hr is sufficient for application requirements.

From formula 9.1, page 9:

$$\text{Actual Btu/hr} = 25,800 \text{ Btu/hr} \times 1.071 = 27,600 \text{ Btu/hr}$$

From formula 9.4, page 9:

$$\text{Final Air Temperature} = \frac{27,600 \text{ Btu/hr}}{450 \text{ CFM} \times 1.085} + 60^\circ\text{F} = 116^\circ\text{F}$$

## Example 2 - Standard Coil

### Requirements:

- Heating load, 23,000 Btu/hr
- Entering air temperature, 60°F
- Entering water temperature, 220°F
- Water flow, 3 GPM maximum
- External static pressure, .05" W.C

### Solution:

From Table 8.2, page 8, the conversion factor for 0.05" W.C., ESP, can be determined to be 0.90. From formula 9.2, page 9:

$$\text{Btu/hr required} = \frac{23,000 \text{ Btu/hr}}{0.90} = 25,500 \text{ Btu/hr for .05" ESP.}$$

From Table 8.1, page 8 the heating capacity conversion factor is 1.143. From formula 9.2, page 9:

$$\text{Standard Btu/hr} = \frac{25,500 \text{ Btu/hr}}{1.143} = 22,300 \text{ Btu/hr}$$

Table 10.1, page 10 shows a selection of a unit size 003 unit with 22,800 Btu/hr is sufficient for application requirements.

$$\text{Actual capacity is } 22,800 \text{ Btu/hr} \times 0.90 \times 1.14 = 23,400 \text{ Btu/hr}$$

Use formula 9.3, page 9 to calculate water temperature drop.

Use formula 9.4, page 9 to determine final air temperature.

Find CFM at 0.05" ESP from Table 8.2 on page 8.



# CORRECTION FACTORS - HOT WATER

**Table 1 - Heating Capacity Conversion Factors**

To determine the heating capacity (Btu/hr.) of a cabinet unit heater at any entering water temperature and entering air temperature, multiply the capacity at 200°F EWT and 60°F EAT (data on page 10-11) by the factor from this table. **NOTE:** GPM must be identical to that at 200°F EWT and 60°F EAT.

| Entering Water Temp (°F) | Entering Air Temperature (°F) |       |       |       |       |       |       |       |
|--------------------------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|
|                          | 30                            | 40    | 50    | 60    | 70    | 80    | 90    | 100   |
| 100                      | 0.518                         | 0.439 | 0.361 | 0.286 | 0.212 | 0.140 | 0.069 | 0.000 |
| 110                      | 0.592                         | 0.512 | 0.434 | 0.357 | 0.283 | 0.210 | 0.138 | 0.068 |
| 120                      | 0.666                         | 0.585 | 0.506 | 0.429 | 0.353 | 0.279 | 0.207 | 0.137 |
| 130                      | 0.740                         | 0.658 | 0.578 | 0.500 | 0.424 | 0.349 | 0.276 | 0.205 |
| 140                      | 0.814                         | 0.731 | 0.651 | 0.571 | 0.494 | 0.419 | 0.345 | 0.273 |
| 150                      | 0.888                         | 0.805 | 0.723 | 0.643 | 0.565 | 0.489 | 0.414 | 0.342 |
| 160                      | 0.962                         | 0.878 | 0.795 | 0.714 | 0.636 | 0.559 | 0.483 | 0.410 |
| 170                      | 1.036                         | 0.950 | 0.867 | 0.786 | 0.706 | 0.629 | 0.552 | 0.478 |
| 180                      | 1.110                         | 1.024 | 0.940 | 0.857 | 0.777 | 0.699 | 0.621 | 0.547 |
| 190                      | 1.184                         | 1.097 | 1.012 | 0.929 | 0.848 | 0.768 | 0.690 | 0.615 |
| 200                      | 1.258                         | 1.170 | 1.084 | 1.000 | 0.918 | 0.838 | 0.759 | 0.684 |
| 210                      | 1.332                         | 1.243 | 1.157 | 1.071 | 0.989 | 0.908 | 0.828 | 0.752 |
| 220                      | 1.406                         | 1.312 | 1.229 | 1.143 | 1.060 | 0.978 | 0.897 | 0.820 |
| 230                      | 1.480                         | 1.390 | 1.301 | 1.214 | 1.130 | 1.048 | 0.966 | 0.889 |
| 240                      | 1.554                         | 1.463 | 1.373 | 1.286 | 1.201 | 1.118 | 1.035 | 0.957 |

**Table 2 - Heating Capacity Conversion Factors (3 & 4 row coils)**

To determine the heating capacity (Btu/hr.) of a cabinet unit heater at any entering water temperature and entering air temperature, multiply the capacity at 140°F EWT and 60°F EAT (data on page 12-13) by the factor from this table. Note: GPM must be identical to that at 140°F EWT and 60°F EAT.

| Entering Water Temp (°F) | Entering Air Temperature (°F) |       |       |       |       |       |       |       |
|--------------------------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|
|                          | 30                            | 40    | 50    | 60    | 70    | 80    | 90    | 100   |
| 100                      | 0.907                         | 0.769 | 0.632 | 0.501 | 0.371 | 0.245 | 0.121 | 0.000 |
| 110                      | 1.037                         | 0.897 | 0.760 | 0.625 | 0.496 | 0.368 | 0.242 | 0.119 |
| 120                      | 1.166                         | 1.025 | 0.886 | 0.751 | 0.618 | 0.489 | 0.363 | 0.240 |
| 130                      | 1.296                         | 1.152 | 1.012 | 0.876 | 0.743 | 0.611 | 0.483 | 0.359 |
| 140                      | 1.426                         | 1.280 | 1.140 | 1.000 | 0.865 | 0.734 | 0.604 | 0.478 |
| 150                      | 1.555                         | 1.410 | 1.266 | 1.126 | 0.989 | 0.856 | 0.725 | 0.599 |
| 160                      | 1.685                         | 1.538 | 1.392 | 1.250 | 1.114 | 0.979 | 0.846 | 0.718 |
| 170                      | 1.814                         | 1.664 | 1.518 | 1.377 | 1.236 | 1.102 | 0.967 | 0.837 |
| 180                      | 1.944                         | 1.793 | 1.646 | 1.501 | 1.361 | 1.224 | 1.088 | 0.958 |
| 190                      | 2.074                         | 1.921 | 1.772 | 1.627 | 1.485 | 1.345 | 1.208 | 1.077 |
| 200                      | 2.203                         | 2.049 | 1.898 | 1.751 | 1.608 | 1.468 | 1.329 | 1.198 |

**Table 3 - External Static Pressure Conversion Factors (standard coil)**

To determine the heating capacity (Btu/hr.) for applications with external static pressure, multiply the capacity at 200°F EWT and 60°F EAT (data on page 10-11) by the factor from this table.

| Model Size | 0.00" ESP |            | 0.05" ESP |            | 0.10" ESP |            | 0.125" ESP |            |
|------------|-----------|------------|-----------|------------|-----------|------------|------------|------------|
|            | CFM       | BTU Factor | CFM       | BTU Factor | CFM       | BTU Factor | CFM        | BTU Factor |
| 002        | 250       | 1.00       | 210       | 0.90       | 170       | 0.80       | 150        | 0.77       |
| 003        | 330       | 1.00       | 280       | 0.90       | 230       | 0.80       | 200        | 0.77       |
| 004        | 450       | 1.00       | 400       | 0.90       | 325       | 0.80       | 285        | 0.77       |
| 006        | 620       | 1.00       | 540       | 0.90       | 430       | 0.80       | 380        | 0.77       |
| 008        | 840       | 1.00       | 720       | 0.90       | 590       | 0.80       | 510        | 0.77       |
| 010        | 1050      | 1.00       | 905       | 0.90       | 735       | 0.80       | 640        | 0.77       |
| 012        | 1240      | 1.00       | 1065      | 0.90       | 870       | 0.80       | 755        | 0.77       |
| 014        | 1430      | 1.00       | 1230      | 0.90       | 1000      | 0.80       | 870        | 0.77       |

## CORRECTION FACTORS - HOT WATER

**Table 4 - CFM vs. Entering Air Temperature Conversion Factors**

To determine CFM at various entering air temperatures, multiply CFM from hot water performance tables by factor from this table.

|        | Entering Air Temperature (°F) |       |       |       |       |       |       |       |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|
|        | 30                            | 40    | 50    | 60    | 70    | 80    | 90    | 100   |
| Factor | 1.050                         | 1.040 | 1.020 | 1.000 | 0.982 | 0.964 | 0.945 | 0.928 |

**Table 5 - Propylene and Ethylene Glycol Correction Factors**

The following correction factors are for various percentages of propylene or ethylene glycol in water. Use the factors to correct the heating capacity of cabinet unit heaters when using an propylene or ethylene glycol solution. Follow the normal procedures in determining the heating capacity of a cabinet unit heater at any water temperature and entering air temperature, then apply the correction factor from the following table to determine the corrected heating capacity based on an propylene or ethylene glycol solution.

| Glycol % | Entering Glycol Solution Temperature |       |       |       |                 |       |       |       |
|----------|--------------------------------------|-------|-------|-------|-----------------|-------|-------|-------|
|          | Propylene Glycol                     |       |       |       | Ethylene Glycol |       |       |       |
|          | 100°F                                | 150°F | 200°F | 240°F | 100°F           | 150°F | 200°F | 240°F |
| 20       | 0.96                                 | 0.96  | 0.96  | 0.95  | 0.99            | 0.99  | 0.99  | 0.98  |
| 30       | 0.93                                 | 0.93  | 0.93  | 0.93  | 0.96            | 0.96  | 0.96  | 0.96  |
| 40       | 0.92                                 | 0.92  | 0.92  | 0.92  | 0.95            | 0.95  | 0.95  | 0.95  |
| 50       | 0.88                                 | 0.89  | 0.89  | 0.89  | 0.93            | 0.94  | 0.94  | 0.94  |
| 60       | 0.85                                 | 0.860 | 0.87  | 0.87  | 0.89            | 0.90  | 0.92  | 0.92  |

### Formulas: Hot Water

9.1)  $BTU_A = BTU_S \times \text{Factor}$  (Table 8.1 or 8.2, page 8)

9.2)  $BTU_S = \frac{BTU_A}{\text{Factor}}$  (Table 8.1 or 8.2, page 8)

9.3)  $D_A = \frac{BTU_A}{500 \times G_A}$

9.4)  $F_A = \frac{BTU_A}{CFM_A \times 1.085} + E_A$

### Identification of Symbols

- BTU** = Btu/hr performance  
**D** = Water temperature drop (°F)  
**E** = Entering air temperature (°F)  
**F** = Final air temperature (°F)  
**G** = Gallons per minute (GPM)

### Subscripts

- S** = Standard operating condition for 1 & 2 row coils  
 (140°F EWT, 60°F EAT)  
**S** = Standard operating condition for 3 & 4 row coils  
 (140°F EWT, 60°F EAT)  
**A** = Actual operating conditions

# PERFORMANCE DATA - HOT WATER

**Table 6 - Standard One Row Coil at Standard Conditions  
(200°F Entering Water/60°F Entering Air)**

| Unit Size | 1 Row, 200F EWT, 60F EAT |               |             |            |                    |               |             |            |                    |               |             |            |            |            |
|-----------|--------------------------|---------------|-------------|------------|--------------------|---------------|-------------|------------|--------------------|---------------|-------------|------------|------------|------------|
|           | High Fan Speed Data      |               |             |            | Med Fan Speed Data |               |             |            | Low Fan Speed Data |               |             |            | Water Data |            |
|           | CFM                      | Btu/hr        | WTD         | FAT        | CFM                | BTU/HR        | WTD         | FAT        | CFM                | Btu/hr        | WTD         | FAT        | GPM        | WPD (ft)   |
| 002       | 250                      | 10,700        | 44.7        | 100        | 200                | 9,522         | 39.7        | 104        | 150                | 8,200         | 34.1        | 110        | 0.5        | 0.1        |
|           |                          | 11,900        | 24.9        | 104        |                    | 10,604        | 22.1        | 109        |                    | 9,100         | 19.0        | 116        | 1          | 0.1        |
|           |                          | <b>12,400</b> | <b>20.0</b> | <b>106</b> |                    | <b>11,041</b> | <b>17.7</b> | <b>111</b> |                    | <b>9,500</b>  | <b>15.2</b> | <b>118</b> | <b>1.3</b> | <b>0.2</b> |
|           |                          | 12,700        | 17.6        | 107        |                    | 11,244        | 15.6        | 112        |                    | 9,700         | 13.4        | 119        | 1.5        | 0.2        |
|           |                          | 12,900        | 13.4        | 107        |                    | 11,441        | 11.9        | 113        |                    | 9,800         | 10.2        | 120        | 2          | 0.3        |
| 003       | 330                      | 18,000        | 37.5        | 110        | 265                | 15,263        | 31.8        | 113        | 195                | 12,100        | 25.3        | 117        | 1          | 0.1        |
|           |                          | 20,100        | 27.9        | 116        |                    | 17,079        | 23.7        | 119        |                    | 13,600        | 18.9        | 124        | 1.5        | 0.2        |
|           |                          | <b>22,400</b> | <b>20.0</b> | <b>123</b> |                    | <b>18,956</b> | <b>17.2</b> | <b>126</b> |                    | <b>15,100</b> | <b>13.5</b> | <b>131</b> | <b>2.3</b> | <b>0.3</b> |
|           |                          | 22,700        | 18.9        | 123        |                    | 19,227        | 16.0        | 127        |                    | 15,300        | 12.7        | 132        | 2.5        | 0.4        |
|           |                          | 23,000        | 16.0        | 124        |                    | 19,559        | 13.6        | 128        |                    | 15,600        | 10.8        | 134        | 3          | 0.5        |
| 004       | 450                      | 20,400        | 42.5        | 102        | 360                | 17,870        | 37.2        | 106        | 270                | 15,100        | 31.4        | 111        | 1          | 0.1        |
|           |                          | 25,200        | 26.3        | 112        |                    | 22,096        | 23.0        | 117        |                    | 18,700        | 19.4        | 124        | 2          | 0.3        |
|           |                          | <b>28,400</b> | <b>20.0</b> | <b>118</b> |                    | <b>25,019</b> | <b>17.4</b> | <b>124</b> |                    | <b>21,000</b> | <b>14.8</b> | <b>132</b> | <b>3</b>   | <b>0.5</b> |
|           |                          | 30,400        | 15.8        | 122        |                    | 26,640        | 13.9        | 128        |                    | 22,500        | 11.7        | 137        | 4          | 0.7        |
|           |                          | 30,700        | 12.8        | 123        |                    | 26,957        | 11.2        | 129        |                    | 22,800        | 9.5         | 138        | 5          | 0.9        |
| 006       | 620                      | 37,000        | 38.6        | 115        | 495                | 32,328        | 33.7        | 120        | 370                | 27,100        | 28.2        | 128        | 2          | 0.3        |
|           |                          | 40,700        | 28.3        | 121        |                    | 35,544        | 24.7        | 126        |                    | 29,800        | 20.7        | 134        | 3          | 0.6        |
|           |                          | <b>44,800</b> | <b>20.0</b> | <b>127</b> |                    | <b>39,145</b> | <b>17.4</b> | <b>133</b> |                    | <b>32,800</b> | <b>14.6</b> | <b>142</b> | <b>4.7</b> | <b>1.0</b> |
|           |                          | 45,300        | 18.9        | 127        |                    | 39,537        | 16.5        | 134        |                    | 33,200        | 13.8        | 143        | 5          | 1.1        |
|           |                          | 46,200        | 16.0        | 129        |                    | 40,314        | 14.0        | 135        |                    | 33,800        | 11.7        | 144        | 6          | 1.4        |
| 008       | 840                      | 41,900        | 43.6        | 106        | 695                | 36,816        | 38.4        | 109        | 545                | 31,200        | 32.5        | 113        | 2          | 0.1        |
|           |                          | 47,000        | 24.5        | 112        |                    | 41,370        | 21.5        | 115        |                    | 35,100        | 18.3        | 119        | 4          | 0.2        |
|           |                          | <b>49,000</b> | <b>20.0</b> | <b>114</b> |                    | <b>43,095</b> | <b>17.6</b> | <b>117</b> |                    | <b>36,600</b> | <b>14.9</b> | <b>122</b> | <b>5.1</b> | <b>0.4</b> |
|           |                          | 50,100        | 17.4        | 115        |                    | 44,097        | 15.3        | 118        |                    | 37,400        | 13.0        | 123        | 6          | 0.5        |
|           |                          | 50,100        | 17.4        | 115        |                    | 44,997        | 11.7        | 120        |                    | 37,400        | 13.0        | 123        | 8          | 0.5        |
| 010       | 1,050                    | 50,800        | 35.3        | 105        | 870                | 45,555        | 31.6        | 108        | 685                | 39,600        | 27.5        | 113        | 3          | 0.1        |
|           |                          | 54,700        | 22.8        | 108        |                    | 49,051        | 20.4        | 112        |                    | 42,700        | 17.8        | 117        | 5          | 0.4        |
|           |                          | <b>55,900</b> | <b>20.0</b> | <b>109</b> |                    | <b>50,084</b> | <b>18.0</b> | <b>113</b> |                    | <b>43,600</b> | <b>15.6</b> | <b>119</b> | <b>5.8</b> | <b>0.5</b> |
|           |                          | 57,200        | 17.0        | 110        |                    | 51,239        | 15.2        | 114        |                    | 44,600        | 13.3        | 120        | 7          | 0.7        |
|           |                          | 58,200        | 13.5        | 111        |                    | 52,119        | 12.1        | 115        |                    | 45,300        | 10.5        | 121        | 9          | 1.1        |
| 012       | 1,240                    | 68,200        | 35.5        | 111        | 1,025              | 60,153        | 31.3        | 114        | 805                | 51,300        | 26.7        | 119        | 4          | 0.2        |
|           |                          | 70,800        | 24.6        | 113        |                    | 62,498        | 21.7        | 116        |                    | 53,300        | 18.5        | 121        | 6          | 0.6        |
|           |                          | <b>72,400</b> | <b>20.0</b> | <b>114</b> |                    | <b>63,872</b> | <b>17.7</b> | <b>117</b> |                    | <b>54,500</b> | <b>15.1</b> | <b>122</b> | <b>7.5</b> | <b>0.9</b> |
|           |                          | 74,200        | 15.4        | 115        |                    | 65,427        | 13.6        | 119        |                    | 55,800        | 11.6        | 124        | 10         | 1.4        |
|           |                          | 74,800        | 13.0        | 116        |                    | 66,012        | 11.5        | 119        |                    | 56,300        | 9.8         | 124        | 12         | 1.8        |
| 014       | 1,430                    | 73,800        | 38.4        | 108        | 1,180              | 65,709        | 34.2        | 111        | 930                | 56,900        | 29.6        | 116        | 4          | 0.2        |
|           |                          | 76,900        | 26.7        | 110        |                    | 68,484        | 23.8        | 113        |                    | 59,300        | 20.6        | 119        | 6          | 0.6        |
|           |                          | <b>79,500</b> | <b>20.0</b> | <b>111</b> |                    | <b>70,745</b> | <b>17.8</b> | <b>115</b> |                    | <b>61,200</b> | <b>15.4</b> | <b>121</b> | <b>8.3</b> | <b>1.0</b> |
|           |                          | 80,600        | 16.8        | 112        |                    | 71,776        | 15.0        | 116        |                    | 62,100        | 12.9        | 122        | 10         | 1.4        |
|           |                          | 81,200        | 14.1        | 112        |                    | 72,294        | 12.6        | 116        |                    | 62,600        | 10.9        | 122        | 12         | 1.8        |

High, Medium & Low Speed data is for Standard PSC Motor & Standard EC Motor

Standard PSC Motor offers variable speed controller

Standard EC Motor offers 3-speed switch

**\*Condition of Acceptability** - Entering water/steam temperature must be less than 240°F.

# PERFORMANCE DATA - HOT WATER

**Table 7 - Optional High Capacity Two Row Coil at Standard Conditions  
(200°F Entering Water/60°F Entering Air)**

| Unit Size | 2 Row, 200F EWT, 60F EAT |                |             |            |                    |                |             |            |                    |               |             |            |             |            |
|-----------|--------------------------|----------------|-------------|------------|--------------------|----------------|-------------|------------|--------------------|---------------|-------------|------------|-------------|------------|
|           | High Fan Speed Data      |                |             |            | Med Fan Speed Data |                |             |            | Low Fan Speed Data |               |             |            | Water Data  |            |
|           | CFM                      | Btu/hr         | WTD         | FAT        | CFM                | BTU/HR         | WTD         | FAT        | CFM                | Btu/hr        | WTD         | FAT        | GPM         | WPD (ft)   |
| 002       | 250                      | 20,200         | 42.0        | 134        | 200                | 17,030         | 35.5        | 138        | 140                | 13,000        | 27.1        | 146        | 1           | 0.7        |
|           |                          | 21,600         | 30.1        | 140        |                    | 18,267         | 25.4        | 144        |                    | 13,900        | 19.4        | 152        | 1.5         | 1.1        |
|           |                          | <b>22,700</b>  | <b>23.7</b> | <b>144</b> |                    | <b>19,182</b>  | <b>20.0</b> | <b>148</b> |                    | <b>14,600</b> | <b>15.2</b> | <b>156</b> | <b>2</b>    | <b>1.8</b> |
|           |                          | 23,400         | 20.0        | 146        |                    | 19,682         | 17.1        | 151        |                    | 15,000        | 12.9        | 159        | 2.4         | 2.7        |
|           |                          | 23,700         | 16.5        | 148        |                    | 20,047         | 13.9        | 152        |                    | 15,300        | 10.6        | 161        | 3           | 4.3        |
| 003       | 330                      | 31,100         | 32.4        | 148        | 265                | 26,584         | 27.7        | 152        | 195                | 21,000        | 21.9        | 159        | 2           | 1.4        |
|           |                          | 31,900         | 26.6        | 151        |                    | 27,317         | 22.8        | 155        |                    | 21,600        | 18.0        | 162        | 2.5         | 2.1        |
|           |                          | <b>32,600</b>  | <b>22.6</b> | <b>152</b> |                    | <b>27,883</b>  | <b>19.4</b> | <b>157</b> |                    | <b>22,000</b> | <b>15.3</b> | <b>164</b> | <b>3</b>    | <b>2.8</b> |
|           |                          | 33,000         | 20.0        | 154        |                    | 28,215         | 17.3        | 158        |                    | 22,300        | 13.5        | 166        | 3.4         | 3.5        |
|           |                          | 33,300         | 17.4        | 155        |                    | 28,513         | 14.9        | 159        |                    | 22,500        | 11.7        | 167        | 4           | 4.5        |
| 004       | 450                      | 41,200         | 43.0        | 146        | 360                | 35,314         | 36.8        | 150        | 270                | 28,300        | 29.4        | 156        | 2           | 1.5        |
|           |                          | 42,600         | 35.3        | 149        |                    | 36,276         | 30.2        | 153        |                    | 29,000        | 24.2        | 159        | 2.5         | 2.4        |
|           |                          | <b>43,300</b>  | <b>30.1</b> | <b>151</b> |                    | <b>37,067</b>  | <b>25.7</b> | <b>155</b> |                    | <b>29,700</b> | <b>20.6</b> | <b>161</b> | <b>3</b>    | <b>2.9</b> |
|           |                          | 44,500         | 23.2        | 153        |                    | 38,140         | 19.9        | 158        |                    | 30,500        | 15.9        | 164        | 4           | 5.0        |
|           |                          | 44,900         | 20.0        | 154        |                    | 38,487         | 17.1        | 159        |                    | 30,800        | 13.7        | 165        | 4.7         | 8.7        |
| 006       | 620                      | 49,700         | 51.7        | 134        | 495                | 42,543         | 44.3        | 139        | 370                | 34,600        | 36.0        | 146        | 2           | 1.4        |
|           |                          | 53,600         | 37.2        | 140        |                    | 45,937         | 31.9        | 146        |                    | 37,300        | 25.9        | 153        | 3           | 2.8        |
|           |                          | <b>56,500</b>  | <b>29.5</b> | <b>145</b> |                    | <b>48,430</b>  | <b>25.2</b> | <b>150</b> |                    | <b>39,300</b> | <b>20.5</b> | <b>158</b> | <b>4</b>    | <b>4.8</b> |
|           |                          | 58,400         | 24.3        | 148        |                    | 50,024         | 20.8        | 153        |                    | 40,600        | 16.9        | 161        | 5           | 7.2        |
|           |                          | 59,300         | 20.0        | 149        |                    | 50,748         | 17.1        | 154        |                    | 41,200        | 13.9        | 163        | 6.2         | 10.7       |
| 008       | 840                      | 66,800         | 27.9        | 134        | 695                | 59,414         | 24.8        | 139        | 540                | 50,500        | 21.1        | 146        | 5           | 1.0        |
|           |                          | 70,900         | 21.1        | 138        |                    | 63,023         | 18.8        | 144        |                    | 53,600        | 15.9        | 151        | 7           | 1.7        |
|           |                          | <b>71,700</b>  | <b>20.0</b> | <b>139</b> |                    | <b>63,767</b>  | <b>17.7</b> | <b>145</b> |                    | <b>54,200</b> | <b>15.1</b> | <b>152</b> | <b>7.5</b>  | <b>1.9</b> |
|           |                          | 74,900         | 15.6        | 143        |                    | 66,545         | 13.9        | 148        |                    | 56,600        | 11.8        | 157        | 10          | 3.2        |
|           |                          | 76,100         | 13.2        | 144        |                    | 67,709         | 11.5        | 150        |                    | 57,500        | 10.0        | 158        | 12.3        | 4.5        |
| 010       | 1,050                    | 79,400         | 28.0        | 130        | 870                | 71,387         | 24.8        | 136        | 680                | 61,600        | 21.4        | 144        | 6           | 1.4        |
|           |                          | 83,000         | 21.6        | 134        |                    | 74,662         | 19.4        | 139        |                    | 64,500        | 16.8        | 147        | 8           | 2.2        |
|           |                          | <b>84,200</b>  | <b>20.0</b> | <b>135</b> |                    | <b>75,744</b>  | <b>17.9</b> | <b>140</b> |                    | <b>65,400</b> | <b>15.5</b> | <b>149</b> | <b>8.8</b>  | <b>2.5</b> |
|           |                          | 87,600         | 15.2        | 138        |                    | 78,772         | 13.7        | 143        |                    | 68,000        | 11.8        | 152        | 12          | 4.3        |
|           |                          | 88,500         | 13.2        | 138        |                    | 79,608         | 11.8        | 144        |                    | 68,700        | 10.2        | 153        | 14          | 5.8        |
| 012       | 1,240                    | 99,000         | 29.4        | 135        | 1,025              | 89,185         | 26.5        | 140        | 790                | 76,400        | 22.7        | 149        | 7           | 1.7        |
|           |                          | 102,300        | 23.7        | 137        |                    | 92,161         | 21.3        | 143        |                    | 78,900        | 18.3        | 152        | 9           | 2.6        |
|           |                          | <b>104,800</b> | <b>20.0</b> | <b>139</b> |                    | <b>94,402</b>  | <b>18.0</b> | <b>145</b> |                    | <b>80,800</b> | <b>15.4</b> | <b>154</b> | <b>10.9</b> | <b>3.7</b> |
|           |                          | 106,800        | 17.1        | 141        |                    | 96,214         | 15.4        | 147        |                    | 82,400        | 13.2        | 156        | 13          | 5.0        |
|           |                          | 107,900        | 15.0        | 142        |                    | 97,291         | 13.5        | 147        |                    | 83,300        | 11.6        | 157        | 15          | 6.5        |
| 014       | 1,430                    | 113,400        | 26.2        | 134        | 1,180              | 101,656        | 23.5        | 139        | 915                | 87,000        | 20.1        | 148        | 9           | 2.6        |
|           |                          | 115,900        | 22.0        | 136        |                    | 103,965        | 19.7        | 141        |                    | 89,000        | 16.9        | 150        | 11          | 3.7        |
|           |                          | <b>117,200</b> | <b>20.0</b> | <b>137</b> |                    | <b>105,130</b> | <b>18.0</b> | <b>142</b> |                    | <b>90,000</b> | <b>15.4</b> | <b>151</b> | <b>12.2</b> | <b>4.5</b> |
|           |                          | 119,500        | 16.6        | 138        |                    | 107,207        | 14.9        | 144        |                    | 91,800        | 12.7        | 152        | 15          | 6.5        |
|           |                          | 120,600        | 14.8        | 139        |                    | 108,139        | 13.3        | 144        |                    | 92,600        | 11.3        | 153        | 17          | 8.2        |

High, Medium & Low Speed data is for Standard PSC Motor & Standard EC Motor  
Standard PSC Motor offers variable speed controller  
Standard EC Motor offers 3-speed switch

**\*Condition of Acceptability** - EWT must be less than 200°F.

**Table 8 - Optional High Capacity Three Row Coil at Standard Conditions  
(140°F Entering Water/60°F Entering Air)**

| Unit Size | 3 Row, 200F EWT, 60F EAT |               |             |            |                    |              |             |            |                    |              |             |            |              |            |
|-----------|--------------------------|---------------|-------------|------------|--------------------|--------------|-------------|------------|--------------------|--------------|-------------|------------|--------------|------------|
|           | High Fan Speed Data      |               |             |            | Med Fan Speed Data |              |             |            | Low Fan Speed Data |              |             |            | Water Data   |            |
|           | CFM                      | BTU/HR        | WTD         | FAT        | CFM                | BTU/HR       | WTD         | FAT        | CFM                | BTU/HR       | WTD         | FAT        | GPM          | WPD        |
| 002       | 260                      | 16827         | 33.7        | 120        | 200                | 14044        | 28.1        | 125        | 160                | 11840        | 24.7        | 128        | 1.00         | 0.3        |
|           |                          | 17112         | 30.0        | 121        |                    | 14217        | 24.9        | 126        |                    | 12017        | 21.9        | 129        | 1.14         | 0.4        |
|           |                          | 17508         | 24.5        | 122        |                    | 14461        | 20.3        | 127        |                    | 12306        | 18.0        | 131        | 1.43         | 0.6        |
|           |                          | <b>17824</b>  | <b>20.0</b> | <b>123</b> |                    | <b>14651</b> | <b>16.4</b> | <b>128</b> |                    | <b>12544</b> | <b>14.7</b> | <b>132</b> | <b>1.78</b>  | <b>0.8</b> |
|           |                          | 17966         | 18.0        | 124        |                    | 14729        | 14.7        | 128        |                    | 12623        | 13.2        | 133        | 2.00         | 1.0        |
| 003       | 340                      | 22669         | 31.8        | 122        | 260                | 18715        | 26.2        | 127        | 200                | 15270        | 22.3        | 130        | 1.43         | 0.7        |
|           |                          | 23092         | 27.0        | 123        |                    | 18963        | 22.1        | 128        |                    | 15531        | 18.9        | 132        | 1.71         | 1.0        |
|           |                          | 23392         | 23.4        | 124        |                    | 19135        | 19.2        | 128        |                    | 15744        | 16.4        | 133        | 2.00         | 1.3        |
|           |                          | <b>23669</b>  | <b>20.0</b> | <b>124</b> |                    | <b>19302</b> | <b>16.3</b> | <b>129</b> |                    | <b>15950</b> | <b>14.0</b> | <b>134</b> | <b>2.37</b>  | <b>1.8</b> |
|           |                          | 23925         | 16.8        | 125        |                    | 19457        | 13.6        | 129        |                    | 16101        | 11.7        | 134        | 2.85         | 2.5        |
| 004       | 470                      | 30547         | 30.6        | 120        | 360                | 25361        | 25.4        | 125        | 280                | 20974        | 21.9        | 129        | 2.00         | 0.5        |
|           |                          | 30994         | 27.1        | 121        |                    | 25627        | 22.4        | 126        |                    | 21260        | 19.4        | 130        | 2.28         | 0.6        |
|           |                          | 31619         | 22.2        | 122        |                    | 26009        | 18.2        | 127        |                    | 21708        | 15.8        | 131        | 2.86         | 0.9        |
|           |                          | <b>31889</b>  | <b>20.0</b> | <b>123</b> |                    | <b>26165</b> | <b>16.4</b> | <b>127</b> |                    | <b>21894</b> | <b>14.3</b> | <b>132</b> | <b>3.19</b>  | <b>1.1</b> |
|           |                          | 32050         | 18.7        | 123        |                    | 26260        | 15.3        | 128        |                    | 21992        | 13.4        | 132        | 3.43         | 1.3        |
| 006       | 650                      | 43910         | 30.8        | 123        | 500                | 36301        | 25.4        | 127        | 390                | 29894        | 21.8        | 131        | 2.86         | 1.3        |
|           |                          | 44658         | 26.1        | 124        |                    | 36744        | 21.4        | 128        |                    | 30361        | 18.5        | 132        | 3.43         | 1.8        |
|           |                          | 45186         | 22.6        | 124        |                    | 37052        | 18.5        | 129        |                    | 30741        | 16.0        | 133        | 4.00         | 2.4        |
|           |                          | <b>45570</b>  | <b>20.0</b> | <b>125</b> |                    | <b>37276</b> | <b>16.4</b> | <b>129</b> |                    | <b>31031</b> | <b>14.2</b> | <b>133</b> | <b>4.56</b>  | <b>3.1</b> |
|           |                          | 46108         | 16.2        | 126        |                    | 37600        | 13.2        | 130        |                    | 31368        | 11.4        | 134        | 5.71         | 4.6        |
| 008       | 880                      | 62592         | 31.3        | 126        | 730                | 54399        | 27.2        | 129        | 610                | 47103        | 24.6        | 131        | 4.00         | 1.2        |
|           |                          | 63313         | 27.7        | 127        |                    | 54885        | 24.0        | 130        |                    | 47591        | 21.7        | 132        | 4.57         | 1.5        |
|           |                          | 64295         | 22.5        | 128        |                    | 55558        | 19.5        | 130        |                    | 48364        | 17.6        | 133        | 5.71         | 2.3        |
|           |                          | <b>64755</b>  | <b>20.0</b> | <b>128</b> |                    | <b>55851</b> | <b>17.3</b> | <b>131</b> |                    | <b>48730</b> | <b>15.7</b> | <b>134</b> | <b>6.48</b>  | <b>2.9</b> |
|           |                          | 65174         | 17.6        | 129        |                    | 56155        | 15.1        | 131        |                    | 49014        | 13.8        | 134        | 7.42         | 3.7        |
| 010       | 1100                     | 74254         | 32.5        | 123        | 920                | 65414        | 28.6        | 126        | 770                | 57007        | 26.0        | 128        | 4.57         | 1.6        |
|           |                          | 75772         | 26.5        | 124        |                    | 66493        | 23.3        | 127        |                    | 58099        | 21.2        | 130        | 5.71         | 2.3        |
|           |                          | 76810         | 22.4        | 125        |                    | 67218        | 19.6        | 128        |                    | 58943        | 17.9        | 131        | 6.85         | 3.2        |
|           |                          | <b>77381</b>  | <b>20.0</b> | <b>125</b> |                    | <b>67593</b> | <b>17.5</b> | <b>128</b> |                    | <b>59428</b> | <b>16.0</b> | <b>131</b> | <b>7.74</b>  | <b>4.0</b> |
|           |                          | 78067         | 17.1        | 126        |                    | 68063        | 14.9        | 129        |                    | 59891        | 13.7        | 132        | 9.14         | 5.4        |
| 012       | 1300                     | 90104         | 31.6        | 124        | 1080               | 78684        | 27.6        | 127        | 900                | 68200        | 24.9        | 130        | 5.71         | 2.9        |
|           |                          | 91474         | 26.7        | 125        |                    | 79620        | 23.2        | 128        |                    | 69185        | 21.0        | 131        | 6.85         | 4.0        |
|           |                          | 92451         | 23.1        | 126        |                    | 80300        | 20.1        | 129        |                    | 69965        | 18.2        | 132        | 7.99         | 5.3        |
|           |                          | <b>93278</b>  | <b>20.0</b> | <b>126</b> |                    | <b>80825</b> | <b>17.3</b> | <b>129</b> |                    | <b>70617</b> | <b>15.8</b> | <b>132</b> | <b>9.33</b>  | <b>7.0</b> |
|           |                          | 93736         | 18.2        | 127        |                    | 81145        | 15.8        | 130        |                    | 70913        | 14.4        | 133        | 10.28        | 8.3        |
| 014       | 1500                     | 100464        | 32.0        | 122        | 1250               | 88311        | 28.1        | 125        | 1050               | 77352        | 25.7        | 128        | 6.28         | 3.4        |
|           |                          | 101993        | 27.5        | 123        |                    | 89373        | 24.1        | 126        |                    | 78454        | 22.0        | 129        | 7.42         | 4.6        |
|           |                          | 103080        | 24.1        | 124        |                    | 90147        | 21.1        | 127        |                    | 79346        | 19.3        | 130        | 8.57         | 6.0        |
|           |                          | <b>104342</b> | <b>20.0</b> | <b>124</b> |                    | <b>91038</b> | <b>17.4</b> | <b>127</b> |                    | <b>80354</b> | <b>16.0</b> | <b>131</b> | <b>10.43</b> | <b>8.6</b> |
|           |                          | 104831        | 18.4        | 125        |                    | 91356        | 16.0        | 128        |                    | 80660        | 14.7        | 131        | 11.42        | 10.1       |

High & Medium Speed data is for High Static PSC Motor. Medium Speed is lowest speed for this motor option.

High, Medium & Low Speed data is for High Static EC Motor

High Static PSC Motor offers variable speed controller

High Static EC Motor offers 3-speed switch.

**\*Condition of Acceptability** - EWT must be less than 200°F.

**Table 9 - Optional High Capacity Four Row Coil at Standard Conditions  
(140°F Entering Water/60°F Entering Air)**

| Unit Size | 4 Row, 140F EWT, 60F EAT |               |             |            |                    |              |             |            |                    |              |             |            |              |            |
|-----------|--------------------------|---------------|-------------|------------|--------------------|--------------|-------------|------------|--------------------|--------------|-------------|------------|--------------|------------|
|           | High Fan Speed Data      |               |             |            | Med Fan Speed Data |              |             |            | Low Fan Speed Data |              |             |            | Water Data   |            |
|           | CFM                      | BTU/HR        | WTD         | FAT        | CFM                | BTU/HR       | WTD         | FAT        | CFM                | BTU/HR       | WTD         | FAT        | GPM          | WPD        |
| 002       | 260                      | 19607         | 34.3        | 130        | 200                | 15913        | 27.9        | 134        | 160                | 13122        | 23.9        | 136        | 1.14         | 1.2        |
|           |                          | 19942         | 27.9        | 131        |                    | 16088        | 22.5        | 134        |                    | 13329        | 19.5        | 137        | 1.43         | 1.8        |
|           |                          | 20154         | 23.5        | 132        |                    | 16197        | 18.9        | 135        |                    | 13485        | 16.4        | 138        | 1.71         | 2.5        |
|           |                          | <b>20318</b>  | <b>20.0</b> | <b>132</b> |                    | <b>16285</b> | <b>16.0</b> | <b>135</b> |                    | <b>13600</b> | <b>13.9</b> | <b>138</b> | <b>2.03</b>  | <b>3.5</b> |
|           |                          | 20408         | 17.9        | 133        |                    | 16331        | 14.3        | 136        |                    | 13647        | 12.4        | 139        | 2.28         | 4.3        |
| 003       | 340                      | 26013         | 30.4        | 131        | 260                | 20916        | 24.4        | 134        | 200                | 16682        | 20.3        | 137        | 1.71         | 1.4        |
|           |                          | 26290         | 26.3        | 132        |                    | 21054        | 21.1        | 135        |                    | 16840        | 17.6        | 138        | 2.00         | 1.8        |
|           |                          | 26483         | 23.2        | 132        |                    | 21150        | 18.5        | 135        |                    | 16973        | 15.5        | 138        | 2.28         | 2.3        |
|           |                          | <b>26682</b>  | <b>20.0</b> | <b>133</b> |                    | <b>21252</b> | <b>15.9</b> | <b>136</b> |                    | <b>17113</b> | <b>13.4</b> | <b>139</b> | <b>2.67</b>  | <b>3.1</b> |
|           |                          | 26928         | 15.7        | 133        |                    | 21361        | 12.5        | 136        |                    | 17259        | 10.5        | 140        | 3.43         | 4.9        |
| 004       | 470                      | 35288         | 30.9        | 130        | 360                | 28550        | 25.0        | 133        | 280                | 23030        | 21.0        | 136        | 2.28         | 0.9        |
|           |                          | 35859         | 25.1        | 131        |                    | 28850        | 20.2        | 134        |                    | 23375        | 17.1        | 137        | 2.86         | 1.3        |
|           |                          | 36230         | 21.2        | 131        |                    | 29035        | 16.9        | 135        |                    | 23639        | 14.4        | 138        | 3.43         | 1.8        |
|           |                          | <b>36334</b>  | <b>20.0</b> | <b>132</b> |                    | <b>29085</b> | <b>16.0</b> | <b>135</b> |                    | <b>23716</b> | <b>13.6</b> | <b>138</b> | <b>3.63</b>  | <b>2.0</b> |
|           |                          | 36681         | 16.1        | 132        |                    | 29258        | 12.8        | 135        |                    | 23927        | 10.9        | 139        | 4.57         | 3.1        |
| 006       | 650                      | 49363         | 34.6        | 130        | 500                | 39999        | 28.0        | 134        | 390                | 32247        | 23.5        | 136        | 2.86         | 1.2        |
|           |                          | 50071         | 29.2        | 131        |                    | 40358        | 23.6        | 135        |                    | 32647        | 19.9        | 137        | 3.43         | 1.7        |
|           |                          | 50561         | 25.3        | 132        |                    | 40609        | 20.3        | 135        |                    | 32981        | 17.2        | 138        | 4.00         | 2.2        |
|           |                          | <b>51171</b>  | <b>20.0</b> | <b>133</b> |                    | <b>40911</b> | <b>16.0</b> | <b>136</b> |                    | <b>33440</b> | <b>13.6</b> | <b>139</b> | <b>5.12</b>  | <b>3.4</b> |
|           |                          | 51567         | 16.4        | 133        |                    | 41109        | 13.1        | 136        |                    | 33643        | 11.2        | 140        | 6.28         | 5.0        |
| 008       | 880                      | 69023         | 30.2        | 133        | 730                | 59111        | 25.9        | 135        | 610                | 50530        | 23.0        | 136        | 4.57         | 1.5        |
|           |                          | 69531         | 27.1        | 133        |                    | 59407        | 23.1        | 135        |                    | 50869        | 20.6        | 137        | 5.14         | 1.9        |
|           |                          | 69919         | 24.5        | 134        |                    | 59641        | 20.9        | 136        |                    | 51160        | 18.7        | 137        | 5.71         | 2.3        |
|           |                          | <b>70553</b>  | <b>20.0</b> | <b>134</b> |                    | <b>60040</b> | <b>17.0</b> | <b>136</b> |                    | <b>51659</b> | <b>15.3</b> | <b>138</b> | <b>7.06</b>  | <b>3.4</b> |
|           |                          | 70867         | 17.7        | 135        |                    | 60195        | 15.1        | 136        |                    | 51853        | 13.5        | 138        | 7.99         | 4.2        |
| 010       | 1100                     | 82970         | 32.3        | 130        | 920                | 72075        | 28.1        | 133        | 770                | 62011        | 25.1        | 134        | 5.14         | 1.9        |
|           |                          | 84196         | 26.8        | 131        |                    | 72859        | 23.2        | 133        |                    | 62882        | 20.9        | 135        | 6.28         | 2.7        |
|           |                          | 84994         | 22.9        | 132        |                    | 73377        | 19.8        | 134        |                    | 63530        | 17.8        | 136        | 7.42         | 3.7        |
|           |                          | <b>85567</b>  | <b>20.0</b> | <b>132</b> |                    | <b>73759</b> | <b>17.2</b> | <b>134</b> |                    | <b>63955</b> | <b>15.6</b> | <b>137</b> | <b>8.56</b>  | <b>4.8</b> |
|           |                          | 85787         | 18.8        | 132        |                    | 73910        | 16.2        | 134        |                    | 64088        | 14.6        | 137        | 9.14         | 5.4        |
| 012       | 1300                     | 100552        | 29.4        | 132        | 1080               | 86403        | 25.2        | 134        | 900                | 73873        | 22.5        | 136        | 6.85         | 2.4        |
|           |                          | 101444        | 25.4        | 132        |                    | 86935        | 21.8        | 135        |                    | 74496        | 19.4        | 136        | 7.99         | 3.1        |
|           |                          | 102095        | 22.4        | 133        |                    | 87340        | 19.1        | 135        |                    | 74993        | 17.1        | 137        | 9.14         | 4.0        |
|           |                          | <b>102557</b> | <b>20.0</b> | <b>133</b> |                    | <b>87635</b> | <b>17.1</b> | <b>135</b> |                    | <b>75359</b> | <b>15.3</b> | <b>137</b> | <b>10.26</b> | <b>4.9</b> |
|           |                          | 102947        | 18.0        | 133        |                    | 87873        | 15.4        | 135        |                    | 75610        | 13.8        | 137        | 11.42        | 6.0        |
| 014       | 1500                     | 113635        | 28.4        | 130        | 1250               | 98247        | 24.6        | 133        | 1050               | 84934        | 22.1        | 135        | 7.99         | 3.1        |
|           |                          | 114519        | 25.1        | 131        |                    | 98806        | 21.6        | 133        |                    | 85580        | 19.5        | 135        | 9.14         | 4.0        |
|           |                          | 115217        | 22.4        | 131        |                    | 99286        | 19.3        | 134        |                    | 86113        | 17.5        | 136        | 10.28        | 4.9        |
|           |                          | <b>115838</b> | <b>20.0</b> | <b>132</b> |                    | <b>99620</b> | <b>17.2</b> | <b>134</b> |                    | <b>86584</b> | <b>15.6</b> | <b>136</b> | <b>11.58</b> | <b>6.1</b> |
|           |                          | 116200        | 18.5        | 132        |                    | 99869        | 15.9        | 134        |                    | 86841        | 14.4        | 136        | 12.56        | 7.1        |

High & Medium Speed data is for High Static PSC Motor. Medium Speed is lowest speed for this motor option.

High, Medium & Low Speed data is for High Static EC Motor

High Static PSC Motor offers variable speed controller

High Static EC Motor offers 3-speed switch.

**\*Condition of Acceptability** - EWT must be less than 200°F.



## PERFORMANCE DATA - CHILLED WATER

**Table 10 - Optional High Capacity Two and Three Row Coil with Cooling Option at Standard Conditions (45°F Entering Water and 80°F Entering Air DB) at High Fan Speed\***

| Unit Size | Coil Type          | Entering DB Air Temp (°F) | Entering WB Air Temp (°F) | CFM   | Entering Water Temp (°F) | Water Flow (GPM) | Water Temp Rise (°F) | Total Capacity (MBH) | Sensible Capacity (MBH) | Leaving DB Air Temp (°F) | Leaving WB Air Temp (°F) |
|-----------|--------------------|---------------------------|---------------------------|-------|--------------------------|------------------|----------------------|----------------------|-------------------------|--------------------------|--------------------------|
| 002       | 2-Row with Cooling | 80                        | 67                        | 250   | 45                       | 0.95             | 10                   | 4.8                  | 4.0                     | 65.7                     | 61.4                     |
|           | 3-Row with Cooling | 80                        | 67                        | 260   | 45                       | 1.23             | 10                   | 6.1                  | 4.9                     | 62.9                     | 59.7                     |
| 003       | 2-Row with Cooling | 80                        | 67                        | 325   | 45                       | 1.29             | 10                   | 6.5                  | 5.4                     | 65.1                     | 60.9                     |
|           | 3-Row with Cooling | 80                        | 67                        | 340   | 45                       | 1.75             | 10                   | 8.7                  | 6.9                     | 61.6                     | 59.0                     |
| 004       | 2-Row with Cooling | 80                        | 67                        | 440   | 45                       | 1.65             | 10                   | 8.2                  | 6.7                     | 66.3                     | 61.3                     |
|           | 3-Row with Cooling | 80                        | 67                        | 470   | 45                       | 2.15             | 10                   | 10.8                 | 8.4                     | 63.9                     | 60.0                     |
| 006       | 2-Row with Cooling | 80                        | 67                        | 615   | 45                       | 2.40             | 10                   | 12.0                 | 9.7                     | 65.8                     | 61.1                     |
|           | 3-Row with Cooling | 80                        | 67                        | 650   | 45                       | 3.50             | 10                   | 17.4                 | 13.3                    | 61.6                     | 58.7                     |
| 008       | 2-Row with Cooling | 80                        | 67                        | 835   | 45                       | 3.00             | 10                   | 15.1                 | 12.6                    | 66.4                     | 61.5                     |
|           | 3-Row with Cooling | 80                        | 67                        | 880   | 45                       | 4.85             | 10                   | 24.1                 | 18.3                    | 61.3                     | 58.4                     |
| 010       | 2-Row with Cooling | 80                        | 67                        | 1,040 | 45                       | 3.25             | 10                   | 16.2                 | 13.2                    | 68.6                     | 62.3                     |
|           | 3-Row with Cooling | 80                        | 67                        | 1,100 | 45                       | 5.65             | 10                   | 28.1                 | 20.6                    | 63.2                     | 59.1                     |
| 012       | 2-Row with Cooling | 80                        | 67                        | 1,220 | 45                       | 4.50             | 10                   | 22.5                 | 18.0                    | 66.7                     | 61.4                     |
|           | 3-Row with Cooling | 80                        | 67                        | 1,300 | 45                       | 7.60             | 10                   | 38.0                 | 28.7                    | 60.1                     | 57.8                     |
| 014       | 2-Row with Cooling | 80                        | 67                        | 1,410 | 45                       | 4.75             | 10                   | 23.8                 | 18.9                    | 67.9                     | 61.9                     |
|           | 3-Row with Cooling | 80                        | 67                        | 1,500 | 45                       | 9.00             | 10                   | 45.2                 | 32.5                    | 60.5                     | 57.5                     |

\*Motors are controlled with variable speed controllers or 3-speed switch; above data is for high fan speed only.

# SAMPLE SIZING CALCULATIONS - STEAM

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## General Selection Procedure

Selection of a cabinet unit heater requires the following information: 1) room heat loss; 2) heat loss due to ventilation load if outside air is introduced; 3) steam pressure available; 4) entering air temperature; 5) required air circulation. Final selection of a cabinet unit heater is based on the following factors:

- Coil selection - One Row Coil only
- Unit size
- Model type
- Air flow arrangement
- Options and accessories

## Coil Selection

Generally, unit size is determined by the coils capacity to offset the design heat loss. Capacities of the standard coils overlap, thereby making it possible to select the most economical coil for application requirements.

**Standard Coil (one row)** - This coil will meet the vast majority of heating-application requirements. Maximum operating pressure: 10 psig steam. This coil is suitable for steam or hot water.

## Steam Selection

Steam capacities for cabinet unit heaters are based on standard conditions of 2 psig steam and a 60°F entering air temperature (EAT). Conversion factors for other than standard conditions are listed in Table 15.1, page 15.

## Example 1 - Standard Coil

### Requirements:

- Heating load, 29,000 Btu/hr
- Entering air temperature, 60°F
- Entering steam pressure, 5 psig

### Solution:

From Table 15.1 on page 15, conversion factor is 1.05.

From formula 15.2, page 15:

$$\text{Standard Btu/hr} = \frac{29,000 \text{ Btu/hr}}{1.05} = 27,600 \text{ Btu/hr}$$

Table 16.1, page 16 shows selection of a unit size 003 with 28,300 Btu/hr is sufficient for application requirements.

From formula 15.1, page 15:

$$\text{Actual Btu/hr} = 28,300 \text{ Btu/hr} \times 1.05 = 29,400 \text{ Btu/hr}$$

From formula 15.3, page 15:

$$\text{Actual Condensate rate} = \frac{\text{Actual Btu/hr}}{\text{Latent Heat of Steam}}$$

$$= \frac{29,400 \text{ Btu/hr}}{961} = 31 \text{ lbs/hr}$$

From formula 15.4, page 15:

$$\text{Final Air Temperature} = \frac{29,400 \text{ Btu/hr}}{330 \times 1.085} + 60^\circ\text{F} = 143^\circ\text{F}$$

# CORRECTION FACTORS - STEAM

**Table 11 - Heating Capacity Conversion Factors**

To determine the heating capacity (Btu/hr.) of a cabinet unit heater at any steam pressure and entering air temperature, multiply the capacity (2 lbs. steam, 60°F EAT) on page 14 by the factor from this table.

| Steam Press. (psig) | Steam Temp. (°F) | Latent Heat of Steam | Temperature of Entering Air (°F) |      |      |      |      |      |      |      |
|---------------------|------------------|----------------------|----------------------------------|------|------|------|------|------|------|------|
|                     |                  |                      | 30°                              | 40°  | 50°  | 60°  | 70°  | 80°  | 90°  | 100° |
| 0                   | 212              | 970                  | 1.19                             | 1.11 | 1.03 | 0.96 | 0.88 | 0.81 | 0.74 | 0.67 |
| 2                   | 219              | 966                  | 1.24                             | 1.16 | 1.08 | 1.00 | 0.93 | 0.85 | 0.78 | 0.71 |
| 5                   | 227              | 961                  | 1.29                             | 1.21 | 1.13 | 1.05 | 0.97 | 0.90 | 0.83 | 0.76 |
| 10                  | 239              | 953                  | 1.38                             | 1.29 | 1.21 | 1.13 | 1.06 | 0.98 | 0.91 | 0.84 |

**Table 12 - External Static Pressure Conversion Factors (standard coil)**

To determine the heating capacity (Btu/hr.) for applications with external static pressure, multiply the capacity (2 lbs. steam and 60°F EAT) on page 14 by the factor from this table.

The following conversion factors may be used with standard steam data Table 16.1, page 16.

| Model Size | 0.00" ESP |            | 0.05" ESP |            | 0.10" ESP |            | 0.125" ESP |            |
|------------|-----------|------------|-----------|------------|-----------|------------|------------|------------|
|            | CFM       | BTU Factor | CFM       | BTU Factor | CFM       | BTU Factor | CFM        | BTU Factor |
| 002        | 250       | 1.00       | 210       | 0.90       | 170       | 0.80       | 150        | 0.77       |
| 003        | 330       | 1.00       | 280       | 0.90       | 230       | 0.80       | 200        | 0.77       |
| 004        | 450       | 1.00       | 400       | 0.90       | 325       | 0.80       | 285        | 0.77       |
| 006        | 620       | 1.00       | 540       | 0.90       | 430       | 0.80       | 380        | 0.77       |
| 008        | 840       | 1.00       | 720       | 0.90       | 590       | 0.80       | 510        | 0.77       |
| 010        | 1050      | 1.00       | 905       | 0.90       | 735       | 0.80       | 640        | 0.77       |
| 012        | 1240      | 1.00       | 1065      | 0.90       | 870       | 0.80       | 755        | 0.77       |
| 014        | 1430      | 1.00       | 1230      | 0.90       | 1000      | 0.80       | 870        | 0.77       |

**Table 13 - CFM Versus Entering Air Temperature Conversion Factors**

To determine CFM at various entering air temperature multiply the CFM from steam performance tables by factor from this table.

|        | Entering Air Temperature (°F) |       |       |       |       |       |       |       |
|--------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|
|        | 30                            | 40    | 50    | 60    | 70    | 80    | 90    | 100   |
| Factor | 1.050                         | 1.040 | 1.020 | 1.000 | 0.982 | 0.964 | 0.945 | 0.928 |

## Formulas: Steam

15.1)  $BTU_A = BTU_S \times \text{Factor}$  (Table 15.1 or 15.2)

15.2)  $BTU_S = \frac{BTU_A}{\text{Factor}}$  (Table 15.1 or 15.2)

15.3)  $C_A = \frac{BTU_A}{\text{Latent Heat of Steam}}$

15.4)  $F_A = \frac{BTU_A}{CFM_A \times 1.085} + E_A$

## Identification of Symbols

**BTU** = Btu/hr performance

**C** = Condensate (LBS/hr.)

**E** = Entering air temperature (°F)

**F** = Final air temperature (°F)

## Subscripts

**S** = Standard operating condition (2 lbs. steam, 60°F EAT)

**A** = Actual operating conditions

## PERFORMANCE DATA - STEAM

Table 14 - Standard One Row Coil at Standard Conditions (2 lbs. Steam/60°F Entering Air)

| Coil Type           | Unit Size | High Fan Speed Data |         |                     |                     | Low Fan Speed Data |        |                     |                     |
|---------------------|-----------|---------------------|---------|---------------------|---------------------|--------------------|--------|---------------------|---------------------|
|                     |           | CFM                 | Btu/hr  | Condensate (lbs/hr) | Final Air Temp (°F) | CFM                | Btu/hr | Condensate (lbs/hr) | Final Air Temp (°F) |
| Standard 1-Row Coil | 002       | 250                 | 19,800  | 21                  | 133                 | 150                | 14,600 | 15                  | 156                 |
|                     | 003       | 330                 | 28,300  | 29                  | 139                 | 195                | 18,000 | 19                  | 145                 |
|                     | 004       | 450                 | 42,500  | 44                  | 147                 | 270                | 29,300 | 30                  | 160                 |
|                     | 006       | 620                 | 52,100  | 54                  | 137                 | 370                | 42,700 | 44                  | 166                 |
|                     | 008       | 840                 | 67,700  | 70                  | 134                 | 545                | 52,900 | 55                  | 149                 |
|                     | 010       | 1,050               | 76,000  | 79                  | 126                 | 685                | 60,600 | 63                  | 141                 |
|                     | 012       | 1,240               | 95,400  | 99                  | 130                 | 805                | 75,100 | 78                  | 146                 |
|                     | 014       | 1,430               | 102,600 | 106                 | 126                 | 930                | 81,700 | 85                  | 141                 |

# CORRECTION FACTORS

## Mounting Height

Height at which cabinet unit heaters are installed is critical. Maximum mounting heights for all units are listed in the tables below. The data in tables are based on operating conditions of 2 lbs. steam or 220°F entering water with 60°F entering air. When operating conditions are other than those above, refer to chart for mounting height correction factor. To obtain the maximum mounting height at actual operating conditions, multiply the appropriate factor from chart by the mounting height in Tables. The mounting heights must be followed closely to assure maximum comfort.

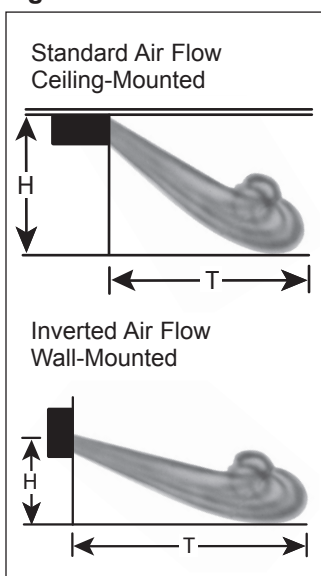
Strong opposing drafts, large obstructions in the air stream of the unit, and higher than normal discharge air temperatures (resulting from high steam pressures) can prevent the heated air discharged by the cabinet unit from reaching the floor.

Under unfavorable conditions such as these, allowances must be made to assure maintenance of desired comfort.

**Table / Figure 15**  
**Maximum Mounting Height ①**

| Size | H<br>(Ft.) | T<br>(Ft.) |
|------|------------|------------|
| 002  | 8          | 15         |
| 003  | 8          | 18         |
| 004  | 9          | 22         |
| 006  | 9          | 23         |
| 008  | 10         | 26         |
| 010  | 10         | 27         |
| 012  | 11         | 26         |
| 014  | 11         | 27         |

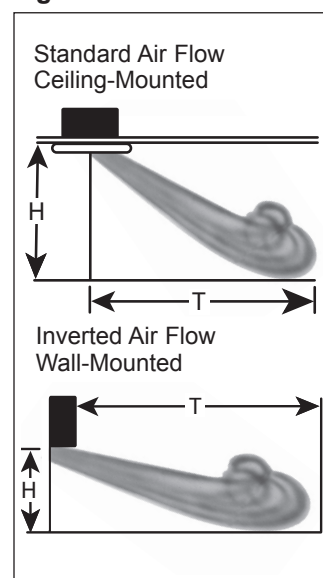
① Maximum mounting height and corresponding heat throw of heaters operating at standard conditions (2 lbs. steam or 220°F entering water, 60° entering air).



**Table / Figure 16**  
**Maximum Mounting Height ①**

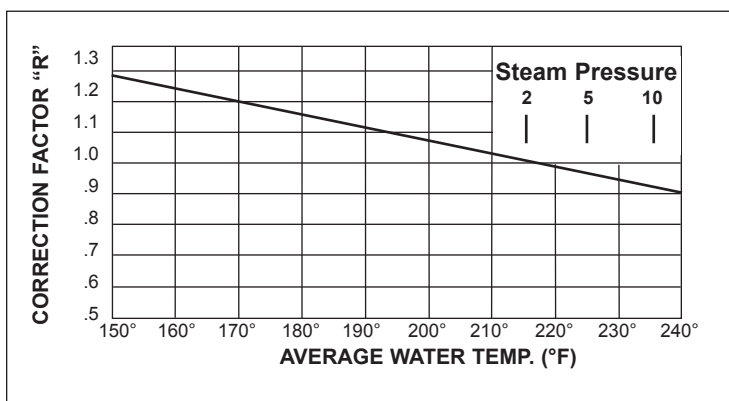
| Size | H<br>(Ft.) | T<br>(Ft.) |
|------|------------|------------|
| 002  | 7          | 8          |
| 003  | 8          | 10         |
| 004  | 8          | 11         |
| 006  | 8          | 12         |
| 008  | 10         | 16         |
| 010  | 10         | 18         |
| 012  | 11         | 20         |
| 014  | 11         | 21         |

① Maximum mounting height and corresponding heat throw of heaters operating at standard conditions (2 lbs. steam or 220°F entering water, 60° entering air).



**Table 17**  
**Maximum Mounting Heights Correction Factors**

These correction factors are to be used as multipliers to correct the maximum recommended mounting heights "H" or heat throw "T" of cabinet unit heaters when operated with steam pressures other than 2 pounds or with water at other than entering temperature of 220°F.



# CORRECTION FACTORS - ALTITUDE

## Altitude

Heat transfer may be reduced at elevations above sea level due to decreased air density. Refer to Table 18 for correction factors to heating and cooling capacity.

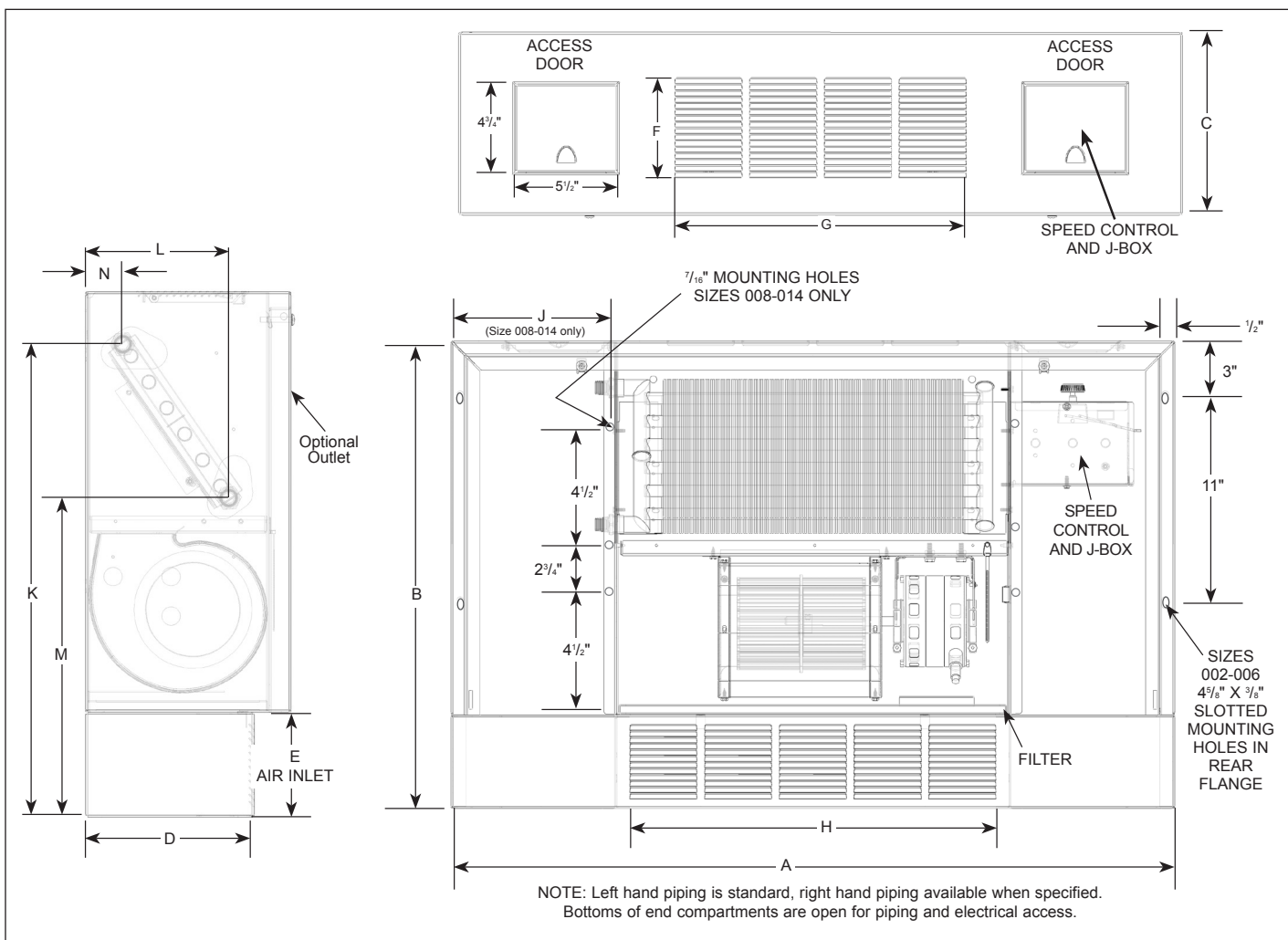
**Table 18 - Altitude Correction Factors**

| Altitude (Ft) | Abs. Press. (inHg) | Air Density (Lb/Ft <sup>3</sup> ) | Correction Factor |
|---------------|--------------------|-----------------------------------|-------------------|
| 0 (sea level) | 29.92              | 0.0763                            | 1.00              |
| 1,000         | 28.86              | 0.0736                            | 0.96              |
| 2,000         | 27.82              | 0.0709                            | 0.93              |
| 3,000         | 26.82              | 0.0684                            | 0.90              |
| 4,000         | 25.84              | 0.0659                            | 0.86              |
| 5,000         | 24.90              | 0.0635                            | 0.83              |
| 6,000         | 23.98              | 0.0611                            | 0.80              |
| 7,000         | 23.09              | 0.0589                            | 0.77              |
| 8,000         | 22.23              | 0.0567                            | 0.74              |
| 9,000         | 21.39              | 0.0545                            | 0.71              |
| 10,000        | 20.58              | 0.0525                            | 0.69              |



# MODEL FC DIMENSIONAL DATA

**Figure 14 - Floor Model FC, Sizes 002-014 Steam/Hot Water Cabinet Unit Heaters**



**Table 19 - Cabinet Dimensions (inches)**

| Unit Size | A      | B  | C     | D  | E   | F     | G      | H      | J     | Approx. Unit Weight lbs. "C" | Approx. Unit Weight lbs. "CW" |
|-----------|--------|----|-------|----|-----|-------|--------|--------|-------|------------------------------|-------------------------------|
| 002       | 38-3/4 | 25 | 9-3/4 | 8  | 5 † | 5-1/8 | 15-5/8 | 19-5/8 | —     | 85                           | 90                            |
| 003       | 43-3/4 | 25 | 9-3/4 | 8  | 5 † | 5-1/8 | 19-5/8 | 23-5/8 | —     | 90                           | 100                           |
| 004       | 48-3/4 | 25 | 9-3/4 | 8  | 5 † | 5-1/8 | 27-5/8 | 27-5/8 | —     | 105                          | 115                           |
| 006       | 61-3/4 | 25 | 9-3/4 | 8  | 5 † | 5-1/8 | 39-5/8 | 39-5/8 | —     | 125                          | 135                           |
| 008       | 71-3/4 | 28 | 12    | 10 | 7   | 5-1/8 | 47-5/8 | 30-5/8 | 9-3/4 | 185                          | 205                           |
| 010       | 71-3/4 | 28 | 12    | 10 | 7   | 5-7/8 | 47-5/8 | 39-5/8 | 9-3/4 | 185                          | 205                           |
| 012       | 83-3/4 | 28 | 12    | 10 | 7   | 5-1/8 | 59-5/8 | 51-5/8 | 9-3/4 | 210                          | 240                           |
| 014       | 83-3/4 | 28 | 12    | 10 | 7   | 5-7/8 | 59-5/8 | 51-5/8 | 9-3/4 | 210                          | 240                           |

† Dimension will be increased by 1/2" if Bar Grille is selected for the inlet style.

**Table 21 - Coil Connection Dimensions (inches) \***

| Unit Size    | K        | L     | M        | N     |
|--------------|----------|-------|----------|-------|
| 002 thru 006 | 22-1/2 † | 7-3/8 | 15-1/4 † | 2-3/8 |
| 008 thru 014 | 25-5/8   | 9-1/4 | 18       | 1-5/8 |

\* SEE PAGE 20, COIL CONNECTION DIMENSIONS FOR 3 & 4 ROW UNIT

† Dimension will be increased by 1/2" if Bar Grille is selected for the inlet style.

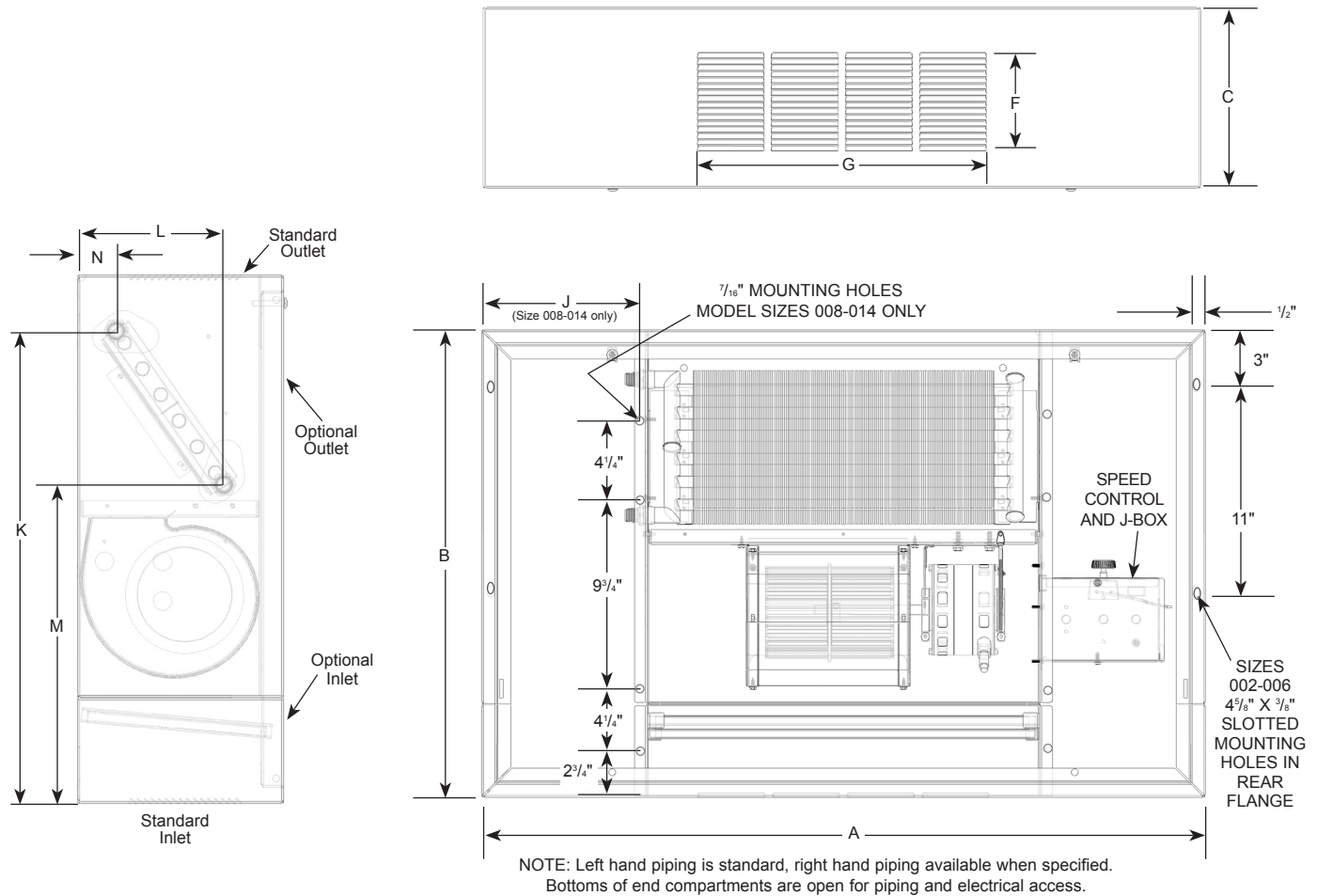
**Table 20 - Filter Dimensions (inches) †**

| Model Size | Filter Size           |
|------------|-----------------------|
| 002        | 8-1/2 x 20-3/4 x 1/2  |
| 003        | 8-1/2 x 25-3/4 x 1/2  |
| 004        | 8-1/2 x 30-3/4 x 1/2  |
| 006        | 8-1/2 x 43-3/4 x 1/2  |
| 008 & 010  | 10-3/4 x 49-3/4 x 1/2 |
| 012 & 014  | 10-3/4 x 61-3/4 x 1/2 |

† Filters are permanent/cleanable.

## MODEL WCC DIMENSIONAL DATA

Figure 15 - Wall or Ceiling Model WCC, Sizes 002-014 Steam/Hot Water Cabinet Unit Heaters ①



① For inverted airflow applications, the unit is flipped 180° upside down from what is shown in Figure 19.1.

Table 22 - Cabinet Dimensions (inches)

| Unit Size | A      | B  | C     | F     | G      | J     | Approx. Shipping Weight lbs. | Approx. Unit Weight lbs. "CW" |
|-----------|--------|----|-------|-------|--------|-------|------------------------------|-------------------------------|
| 002       | 38-3/4 | 25 | 9-3/4 | 5-1/8 | 15-5/8 | —     | 85                           | 90                            |
| 003       | 43-3/4 | 25 | 9-3/4 | 5-1/8 | 19-5/8 | —     | 90                           | 100                           |
| 004       | 48-3/4 | 25 | 9-3/4 | 5-1/8 | 27-5/8 | —     | 105                          | 115                           |
| 006       | 61-3/4 | 25 | 9-3/4 | 5-1/8 | 39-5/8 | —     | 125                          | 135                           |
| 008       | 71-3/4 | 28 | 12    | 5-1/8 | 47-5/8 | 9-3/4 | 185                          | 205                           |
| 010       | 71-3/4 | 28 | 12    | 5-7/8 | 47-5/8 | 9-3/4 | 185                          | 205                           |
| 012       | 83-3/4 | 28 | 12    | 5-1/8 | 59-5/8 | 9-3/4 | 210                          | 240                           |
| 014       | 83-3/4 | 28 | 12    | 5-7/8 | 59-5/8 | 9-3/4 | 210                          | 240                           |

Table 23 - Filter Dimensions (inches) ①

| Model Size | Filter Size           |
|------------|-----------------------|
| 002        | 8-1/2 x 20-3/4 x 1/2  |
| 003        | 8-1/2 x 25-3/4 x 1/2  |
| 004        | 8-1/2 x 30-3/4 x 1/2  |
| 006        | 8-1/2 x 43-3/4 x 1/2  |
| 008 & 010  | 10-3/4 x 49-3/4 x 1/2 |
| 012 & 014  | 10-3/4 x 61-3/4 x 1/2 |

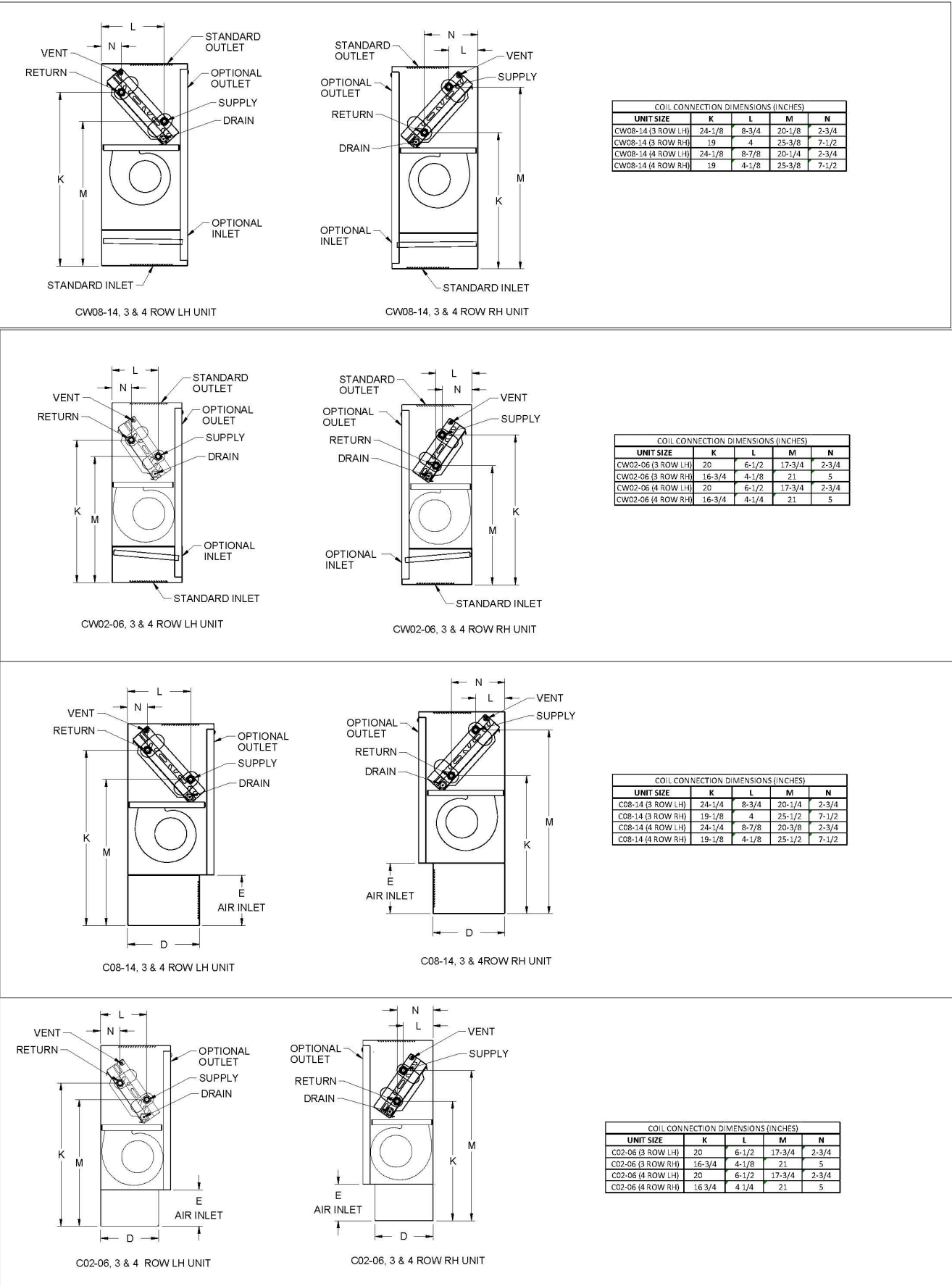
① Filters are permanent/cleanable.

Table 24 - Coil Connection Dimensions (inches)

| Unit Size    | K      | L     | M      | N     |
|--------------|--------|-------|--------|-------|
| 002 thru 006 | 22-1/2 | 7-3/8 | 15-1/4 | 2-3/8 |
| 008 thru 014 | 25-5/8 | 9-1/4 | 18     | 1-5/8 |

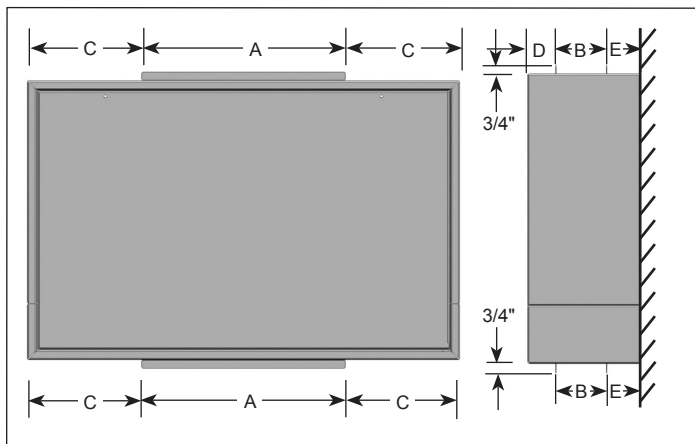
SEE PAGE 20, COIL CONNECTION DIMENSIONS FOR 3 & 4 ROW UNIT

Figure 16 - FC & WCC Coil Connections Dimensions (3 & 4 Row Coil Units):

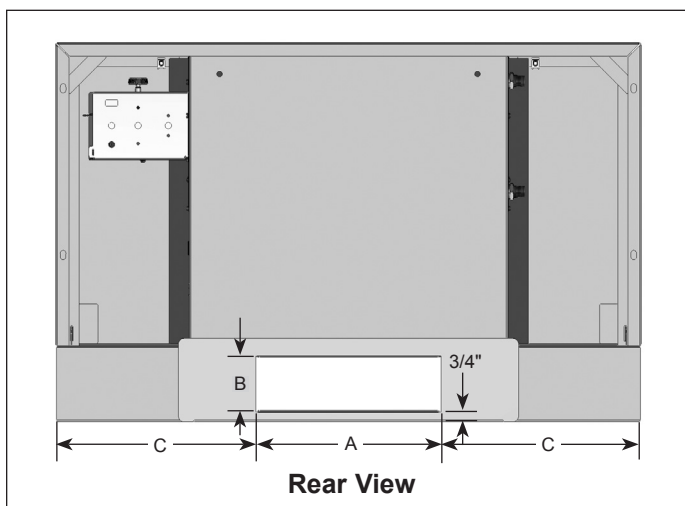


# DUCT COLLAR / PERMA-LAP® FRAME DIMENSIONAL DATA

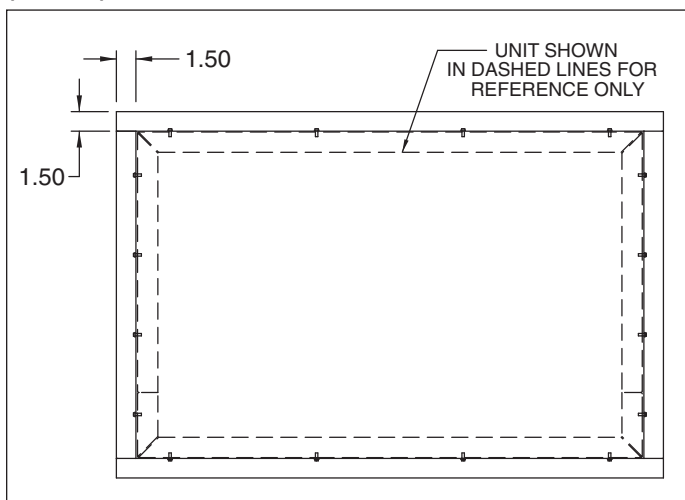
**Figure 17 - Model WCC - Duct Collars**



**Figure 18 - Model FC - Outside Air Duct Collar**



**Figure 19 - Model WCC PermaLap Frame Dimensions (inches)**



**Table 25 - Model WCC - 100% Air Inlet or Outlet Duct Collars ① ②**

| Unit Size | A      | B     | C      | D     | E     |
|-----------|--------|-------|--------|-------|-------|
| 002       | 18-1/4 | 4-1/4 | 10-3/8 | 2-1/2 | 3     |
| 003       | 23-1/4 | 4-1/4 | 10-3/8 | 2-1/2 | 3     |
| 004       | 28-1/4 | 4-1/4 | 10-3/8 | 2-1/2 | 3     |
| 006       | 41-1/4 | 4-1/4 | 10-3/8 | 2-1/2 | 3     |
| 008       | 44-1/4 | 4-1/4 | 10-7/8 | 2-1/2 | 5-1/4 |
| 010       | 44-1/4 | 5-1/4 | 10-7/8 | 2-1/2 | 4-1/4 |
| 012       | 58-1/4 | 4-1/4 | 12-7/8 | 2-1/2 | 5-1/4 |
| 014       | 58-1/4 | 5-1/4 | 12-7/8 | 2-1/2 | 4-1/4 |

**Table 26 - Model FC - 25% and 100% Fresh Air Duct Collar ① ②**

| Nomen<br>Digit 18 | Outside Air Percentage |       |        |           |       |        |
|-------------------|------------------------|-------|--------|-----------|-------|--------|
|                   | 25%                    |       |        | 100%      |       |        |
|                   | 1, 3 or 6              |       |        | 2, 4 or 5 |       |        |
| Unit Size         | A                      | B     | C      | A         | B     | C      |
| 002               | 12 1/4                 | 3 1/2 | 13 1/4 | 18 1/2    | 4 1/4 | 10 1/8 |
| 003               | 12 1/4                 | 3 1/2 | 15 3/4 | 23 1/2    | 4 1/4 | 10 1/8 |
| 004               | 12 1/4                 | 3 1/2 | 18 1/4 | 28 1/2    | 4 1/4 | 10 1/8 |
| 006               | 12 1/4                 | 3 1/2 | 24 3/4 | 41 1/2    | 4 1/4 | 10 1/8 |
| 008               | 24 1/4                 | 3 1/2 | 23 3/4 | 44 1/2    | 4 1/4 | 13 5/8 |
| 010               | 24 1/4                 | 3 1/2 | 23 3/4 | 44 1/2    | 5 1/4 | 13 5/8 |
| 012               | 24 1/4                 | 3 1/2 | 29 3/4 | 58 1/2    | 4 1/4 | 12 5/8 |
| 014               | 24 1/4                 | 3 1/2 | 29 3/4 | 58 1/2    | 5 1/4 | 12 5/8 |

① All dimensions are in inches.

② Includes 3/4" top and bottom duct flanges for duct connection.

# UNIT / MECHANICAL SPECIFICATIONS

**Table 27 - Unit Data Specifications**

|                               | Unit Size     |           |           |           |           |           |
|-------------------------------|---------------|-----------|-----------|-----------|-----------|-----------|
|                               | 002           | 003       | 004       | 006       | 008 & 010 | 012 & 014 |
| Blower Wheel Quantity         | 1             | 1         | 2         | 2         | 3         | 4         |
| Blower Wheel Diameter x Width | 5-1/4 x 7     | 5-3/4 x 7 | 5-1/4 x 7 | 5-3/4 x 7 | 5-3/4 x 7 | 5-3/4 x 7 |
| Standard PSC Motors           |               |           |           |           |           |           |
| Motor #1 HP                   | 0.03          |           | 0.05      |           | 0.03      | 0.05      |
| Motor #2 HP ①                 | n/a ①         |           | n/a ①     |           | 0.05      | 0.05      |
| Total Motor Amps              | 0.7           |           | 1.05      |           | 1.75      | 2.10      |
| High Static PSC Motors        |               |           |           |           |           |           |
| Motor #1 HP                   | 0.4           |           | 0.4       |           | 0.4       | 0.4       |
| Motor #2 HP ①                 | n/a ①         |           | n/a ①     |           | 0.4       | 0.4       |
| Total Motor Amps              | 5.0           |           | 5.0       |           | 10.0      | 10.0      |
| EC Motor                      |               |           |           |           |           |           |
| Motor #1 HP                   | 0.25          |           |           |           | 0.25      |           |
| Motor #2 HP ①                 | n/a           |           | n/a       |           | 0.25      |           |
| Total Motor Amps              | 3.7           |           |           |           | 7.4       |           |
| Supply Voltage                | 115V/1ph/60Hz |           |           |           |           |           |

① Unit has only one motor.

\* Amp values are maximum based on motor name plate.

## Unit Mechanical Specifications

### Cabinet

Floor models shall be provided with stamped louvers and a one inch high dust barrier at the bottom. The cabinet shall be 18-gauge steel with 16 gauge front panels. All painted surfaces shall be treated for corrosion resistance prior to being finished with a hammertone beige, baked on polyester powder coat finish. All unpainted steel shall be galvanized.

(When specified) color as selected by architect shall be provided in one of 8 optional colors as shown on manufacturer's color chart 75-403.

Wall or ceiling models shall have cabinets with stamped louvers. The entire bottom of the unit must be enclosed. Access to the speed control shall be through the easy access 16-gauge front panels.

(Available, when specified, as optional equipment) an access door shall be provided for speed control access.

All models shall have two 9" minimum wide piping end pockets. All wall and ceiling units shall have safety hinged access panels that can be easily removed during installation.

### Coils

The heating coils shall provide specified capacities and not exceed the pressure drop and GPM listed in this catalog. Single row copper coils are warranted for water temperatures up to 240°F (115°C), water pressures up to 200 PSIG (1379 kPa), and steam pressures up to 10 PSIG (68.9 kPa). Multiple row (2,3, or 4) copper coils are warranted for water temperatures up to 200°F (93°C) and water pressures up to 200 PSIG (1379 kPa).

### Motor Speed Control

The unit shall have a unit-mounted solid state motor speed control, with high through low speeds and off positions on all models. For units with the EC motor option, a 3 speed switch with off position for motor control only will be provided.

### Dampers (optional equipment)

When specified, the unit shall be equipped with a 25% galvanized steel fresh air blade damper. Model C, floor units only.

When dampers are specified, indicate one of the following:

1. These dampers shall be controlled from the end pocket with a manual control assembly that indicates the open and closed positions.
2. The damper shall be controlled by an electric, spring-return type motor, which will be energized when the blower motor is turned on thus moving the damper to the 25% or 100% position. It will be de-energized and close the damper when the blower motor is off.

### Motors, Blowers and Drives

Blowers shall be of the centrifugal, forward curved type, to provide even air distribution and low sound level. All units shall have permanent split capacitor (electronically communicated motor) available when specified as optional equipment) direct-drive motors. The motor and blower assembly shall be capable of being easily removed from the unit. Motors are built for continuous duty to NEMA standards.

**Grilles (optional equipment)**

When specified, aluminum linear bar inlet and/or outlet grilles shall be provided.

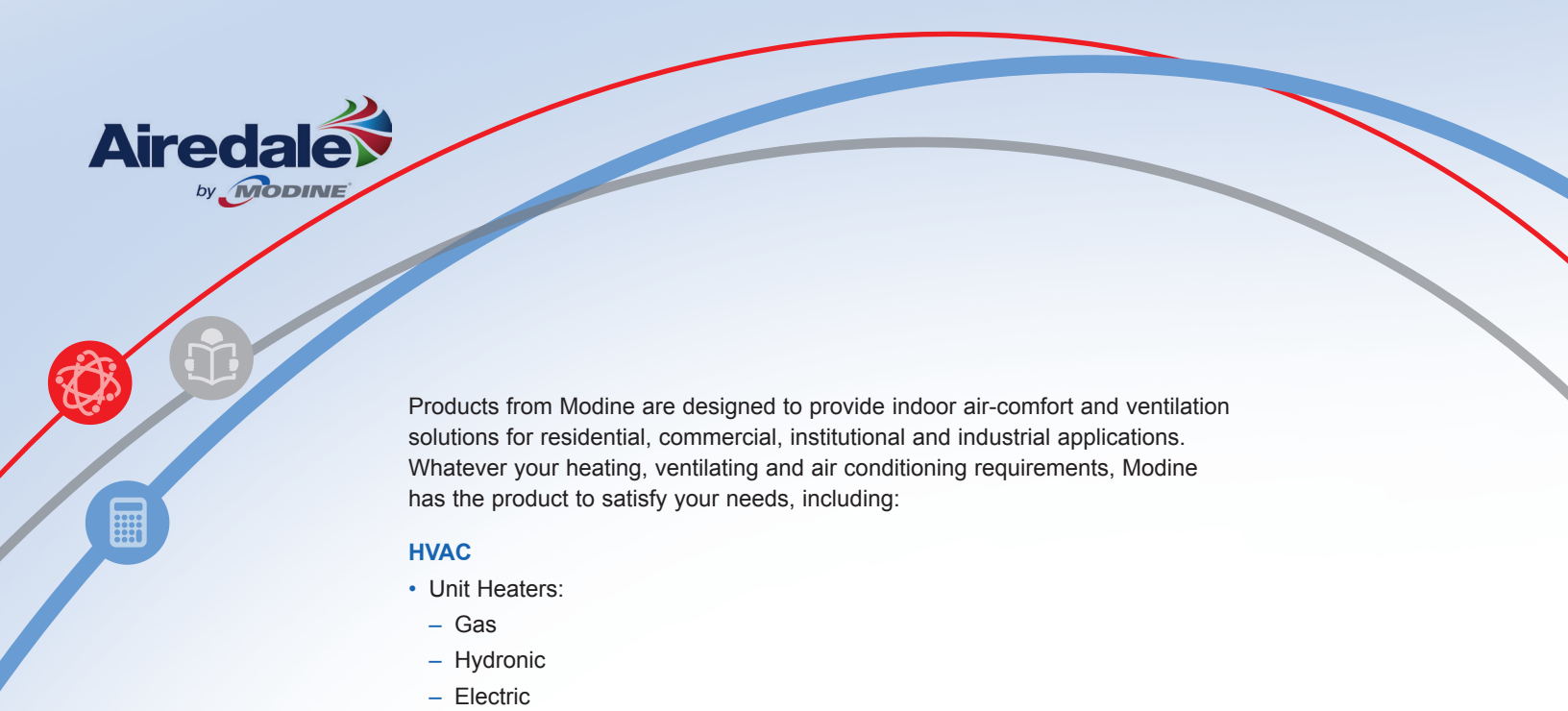
When specified, outlet may have two-way deflection louvers.

**Filters**

All air, both fresh and return, shall be filtered by a cleanable expanded aluminum filter.

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Products from Modine are designed to provide indoor air-comfort and ventilation solutions for residential, commercial, institutional and industrial applications. Whatever your heating, ventilating and air conditioning requirements, Modine has the product to satisfy your needs, including:

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Specific catalogs are available for each product. Catalogs 75-136 and 75-137 provide details on all Modine HVAC equipment.