Nailor

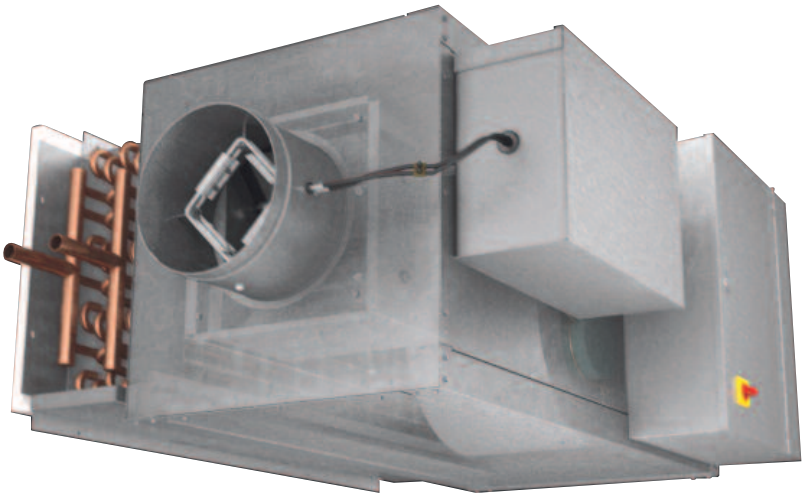
## SERIES FLOW CONSTANT VOLUME

## 33SZ SERIES

- SENSIBLE COOLING (DOAS)

**Models:**

| | |
|---|---|
| **33SZ** | **No Heat** |
| **33SZE** | **Electric Heat** |
| **33SZW** | **Hot Water Heat** |



Model 33SZ



The **33SZ Series** Fan Powered Chilled Water Terminals enhance Nailor's already efficient and flexible Series Fan Terminal Unit product line. A series fan powered terminal unit, the 33SZ incorporates a cooling induction coil to use in conjunction with a DOAS (dedicated outdoor air system). Useful in a variety of commercial and educational applications, like classrooms, office space, laboratories and auditoriums, the 33SZ provides a flexible, industry familiar unit that excels at zone sensible cooling while the dedicated outdoor inlet delivers ASHRAE 62.1 ventilation requirements.

**FEATURES:**

- Standard height and low-profile designs available.
- Sensible cooling coil on the induced air inlet handles zone sensible load. Opposite side to controls location. Coil is constructed of aluminum ripple fins (10 FPI) and 1/2" (13) copper tubes. Hand of coil is determined looking in direction of airflow.
- 16 ga. (1.6) galvanized steel channel frame with 20 ga. (1.0) casing components. Sizes 40 and 50 only.
- 20 ga. (1.0) galvanized steel casing construction. Size 30.
- 16 ga. (1.6) galvanized steel inclined opposed blade damper. 45° rotation. CW to close. Sizes 30, 40 and 50.
- Galvanized steel drip pan integral to sensible coil.
- Controls mounted as standard on RH side as shown. Terminals ordered with LH controls (optional) are inverted and discharge duct hanging elevation will therefore change.
- Single point electrical connection.
- Access panels top and bottom.
- Multi-point averaging diamond flow sensor.
- Low voltage enclosure for factory mounted controls.
- Ultra-high efficiency ECM, fan motor. EPIC fan volume controller.
- 3/4" (19) dual density fiberglass insulation, exposed edges coated to prevent air erosion. Meets requirements of NFPA 90a and UL 181. Sizes 40 and 50.
- 1/2" (13) on Size 30.

**Options:**

CW COIL:
- 2-Row, 4-Row and 6-Row
- Left Hand coil connections.
- Condensate Sensor.

LINER:
- Fiber-free liner.
- Perforated metal liner.
- Solid metal liner.
- Steri-liner.
- Steri-liner w/perforated liner.

FILTER:
- 1" (25) Throwaway.
- 2" (51) Pleated MERV 8.
- 2" (51) Pleated MERV 13.
- Ducted Return Filter Rack.

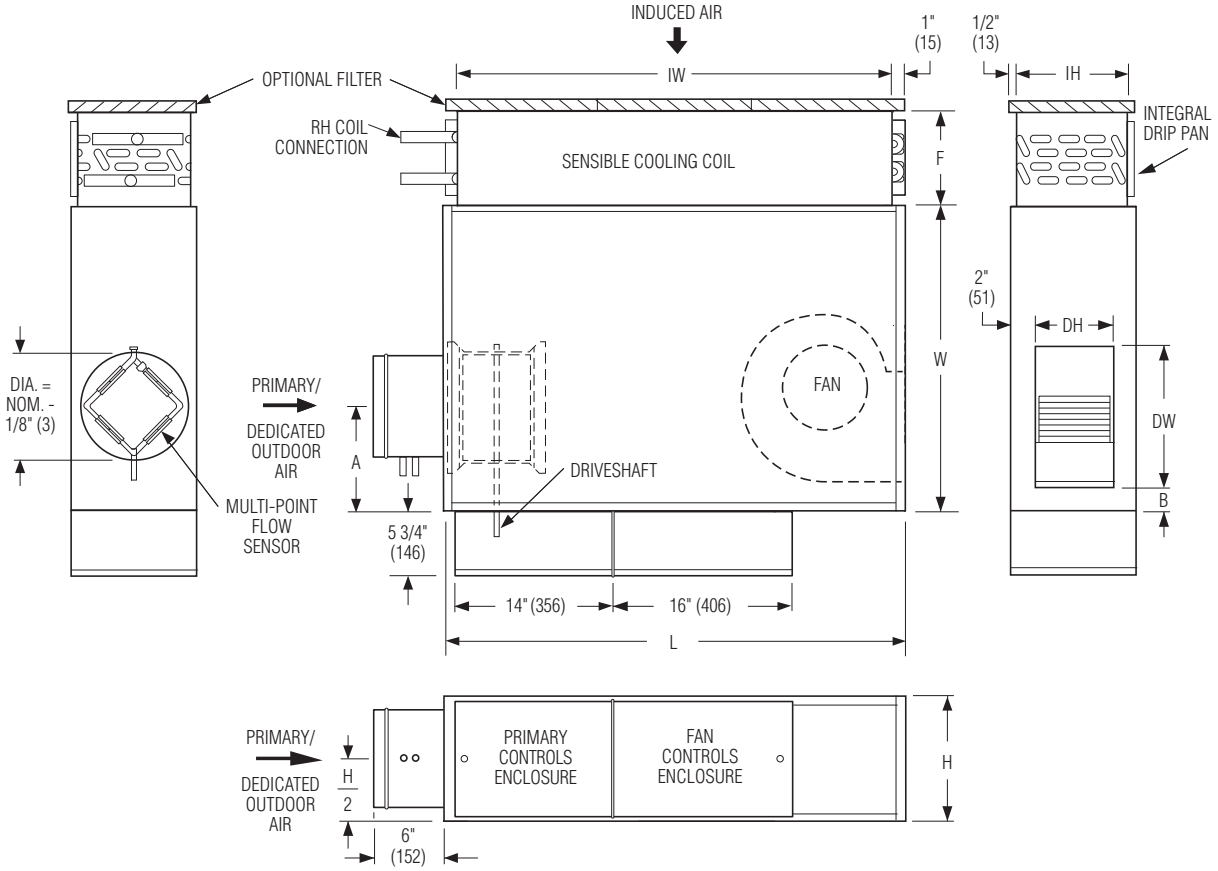
ELECTRICAL:
- LH Controls enclosure
- Toggle disconnect switch.
- FN2 – 90° line voltage enclosure.
- FN3 – Remote line voltage enclosure.
- Motor fusing.

OTHERS:
- Hanger brackets.

C ETL LISTED US
Intertek

## Dimensions

### Model Series 33SZ • FPCWT (DOAS) • Series Flow • Unit Size 30 (Low Profile)

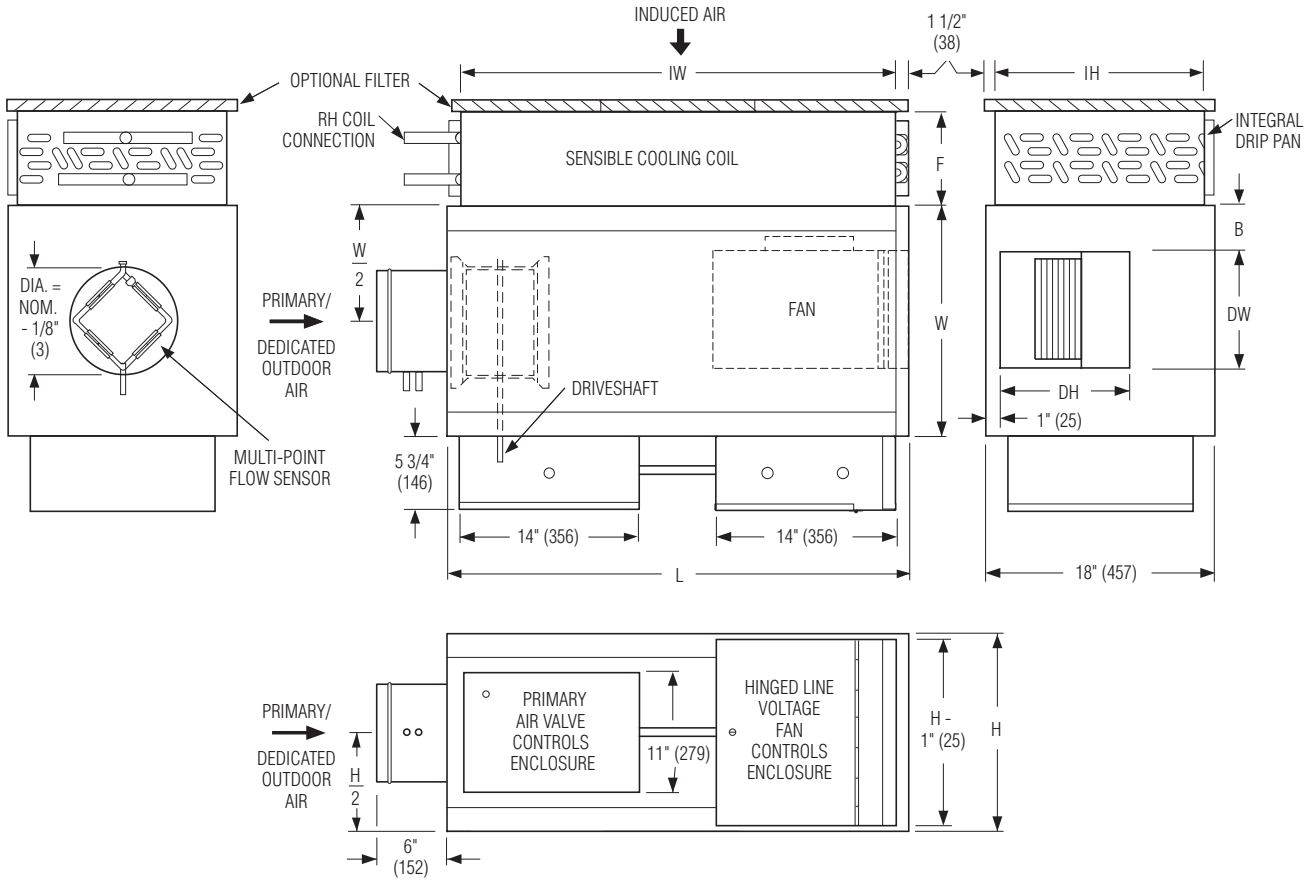



### Dimensional Data

| Unit Size | Inlet Size | W | H | L | A | B | Cooling Coil IW x IH | F | Outlet Discharge DW x DH | Filter Size |
|---|---|---|---|---|---|---|---|---|---|---|
| 30 | 5, 6, 8 (127, 152, 203) | 26½ (673) | 11 (279) | 40¼ (1022) | 7 (178) | 2 (51) | 36 X 8¾ (914 X 222) | 2 Row: 5⅛ (130)<br>4 Row: 7 5⁄16 (186)<br>6 Row: 9½ (241) | 12⅜ X 6⅞ (314 X 175) | 38 X 10 (965 X 254) |

# Dimensions

## Model Series 33SZ • FPCWT (DOAS) • Series Flow • Unit Sizes 40 – 50




## Dimensional Data

| Unit Size | Inlet Size | W | H | L | B | Cooling Coil IW x IH | F | Outlet Discharge DW x DH | Filter Size |
|---|---|---|---|---|---|---|---|---|---|
| 40 | 4, 5, 6, 8, 10 (102, 127, 152, 203, 254) | 18 (457) | 18 (457) | 36 (914) | 3½ (89) | 31 X 15 (787 X 381) | 2 Row: 5⅛ (130)<br>4 Row: 7 5⁄16 (186)<br>6 Row: 9½ (241) | 9⅛ X 10¼ (232 X 260) | 33 X 16 (838 X 406) |
| 50 | 5, 6, 8, 10, 12 (127, 152, 203, 254, 305) | 26 (660) | 18 (457) | 41 (1041) | 5 (127) | 36 x 15 (914 X 381) | | 13⅛ X 11¼ (232 X 286) | 38 X 16 (965 X 406) |

# Dimensions

## Model Series 33SZ • FPCWT (DOAS) • Series Flow

### Hot Water Coil Section

### Model 33SZW

Available in one or two row. Coil section installed on unit discharge. Right hand coil connection looking in direction of airflow standard (shown). Left hand is optional (terminals are inverted). Connections must be selected same hand as controls enclosure location.

**Standard Features:**

- Coil section installed on unit discharge.
- 1/2" (13) copper tubes.
- Aluminum ripple fins @10 FPI.
- Sweat Connections:

Size 30:
One row: 1/2" (13)
Two row: 5/8" (16)
O.D. male solder.

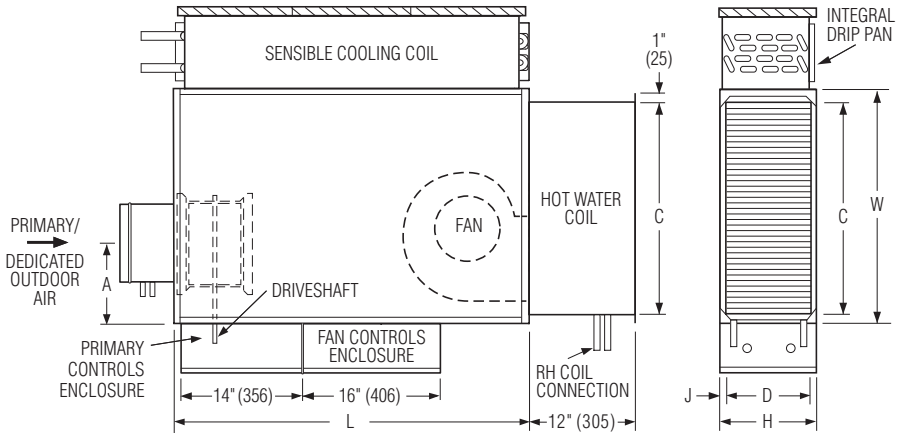
Size 40:
One row: 1/2" (13)
Two row: 7/8" (22)
O.D. male solder.

Size 50:
One row: 7/8" (22)
Two row: 7/8" (22)
O.D. male solder.

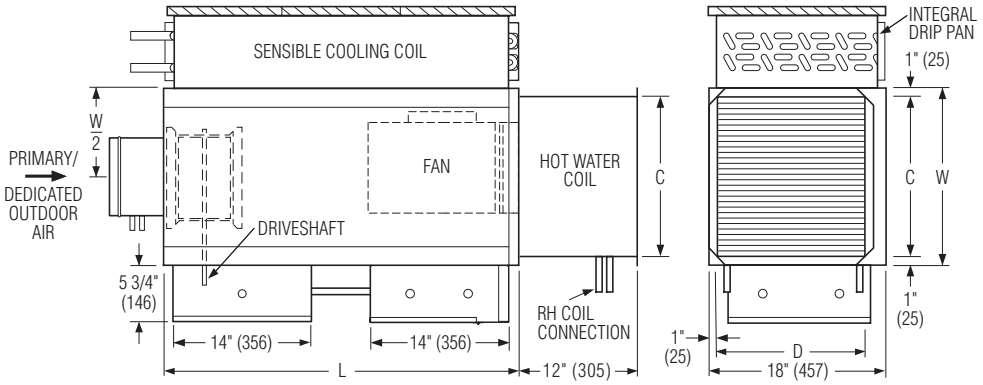
- Flanged outlet duct connection.

**Note:** Hot water coil, chilled water sensible coil and controls enclosure orientation, must be specified individually.

### Unit Size 30




### Unit Sizes 40 and 50




### Dimensional Data

| Unit Size | W | H | L | J | Outlet Duct Size C x D |
|---|---|---|---|---|---|
| 30 | 26½ (673) | 11 (279) | 40¼ (1022) | 1 (25) | 24 X 8¾ (610 X 222) |
| 40 | 18 (457) | - | 36 (914) | - | 16 X 15 (406 X 381) |
| 50 | 26 (660) | - | 41 (1041) | - | 24 X 15 (610 X 381) |

# Dimensions

## Model Series 33SZ • FPCWT (DOAS) • Series Flow

### Electric Coil Section

### Model 33SZE

**Standard Features:**

- Unique hinged heater design permits easy access, removal and replacement of heater element without disturbing ductwork.
- Coil installed on unit discharge.
- Insulated coil element wrapper.
- Automatic reset high limit cut-outs (one per element).
- Single point electrical connection for entire terminal unit.
- Electronic Fan Interlock Relay.
- Flanged outlet duct connection.
- Controls mounted as standard on RH side as shown. Terminals ordered with L.H. controls (optional) are inverted.

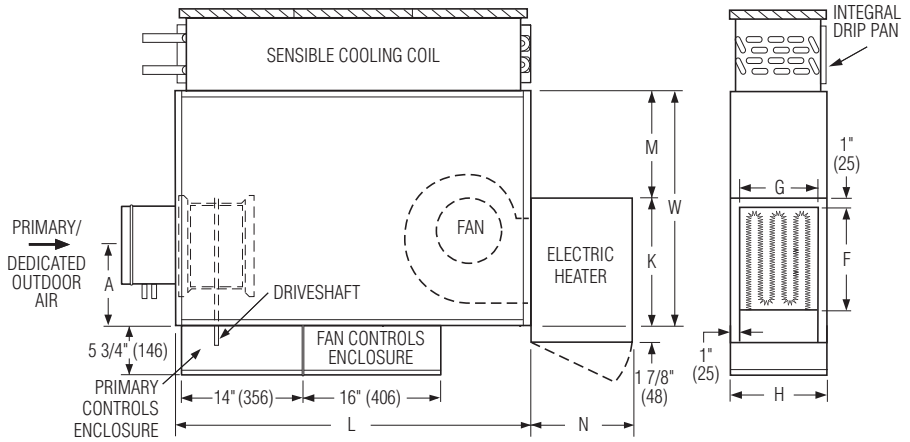
**Standard Supply Voltage (60 Hz):**

- 120, 208, 240 and 277V, single phase.
- 208, 480 (4 wire wye) and 600V (dual point connection) three phase.

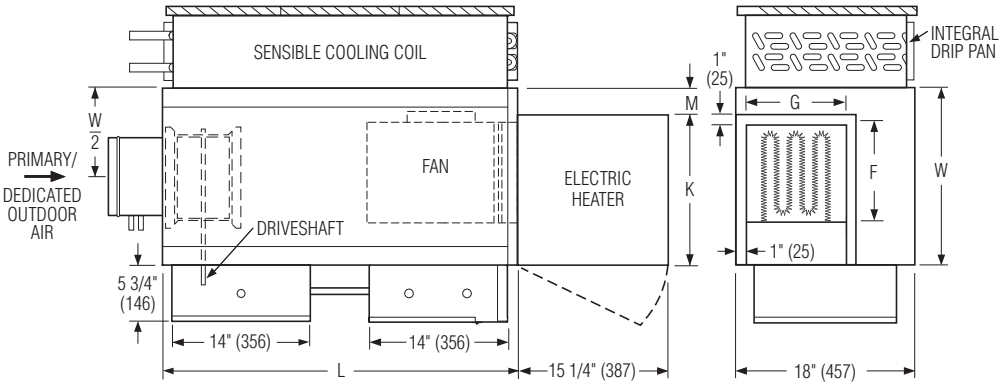
**Options:**

- SCR control (0–10 VDC).
  - 4–20ma
  - with discharge temperature control.
- Toggle disconnect switch (includes fan).
- Door interlock disconnect switch.
- Quiet contactors.
- Main line fusing.
- Class 'A' 80/20 Ni./Ch. wire.
- Dust tight construction.
- Manual Reset secondary thermal cut out.
- Positive Pressure airflow switch.

### Unit Size 30




### Unit Sizes 40 and 50



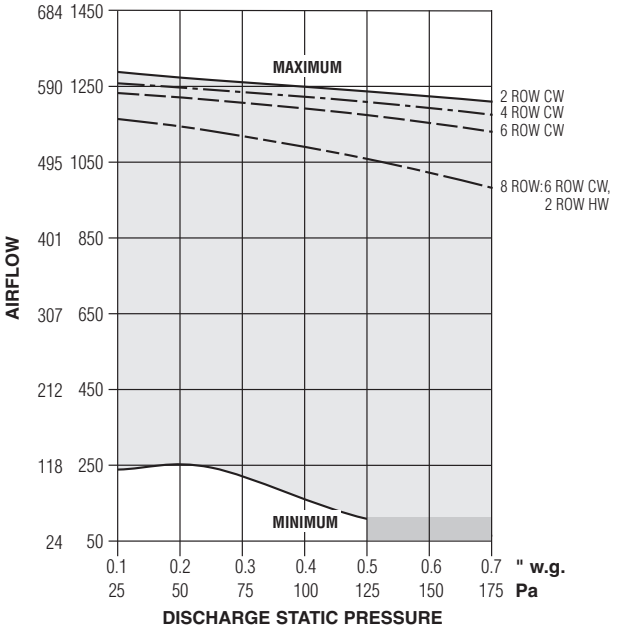

### Dimensional Data

| Unit Size | W | H | L | K | M | N | Outlet Duct Size F x G |
|---|---|---|---|---|---|---|---|
| 30 | 26½ (673) | 11 (280) | 40¼ (1022) | 16⅜ (416) | 10⅛ (257 | 11½ (292) | 13⅜ x 8 (340 x 203) |
| 40 | 18 (457) | - | 36 (914) | 15½ (394) | 2½ (64) | - | 10¼ x 10½ (260 x 267) |
| 50 | 26 (660) | - | 41 (1041) | 22 (559) | 4 (102) | - | 14¼ x 11¾ (362 x 298) |

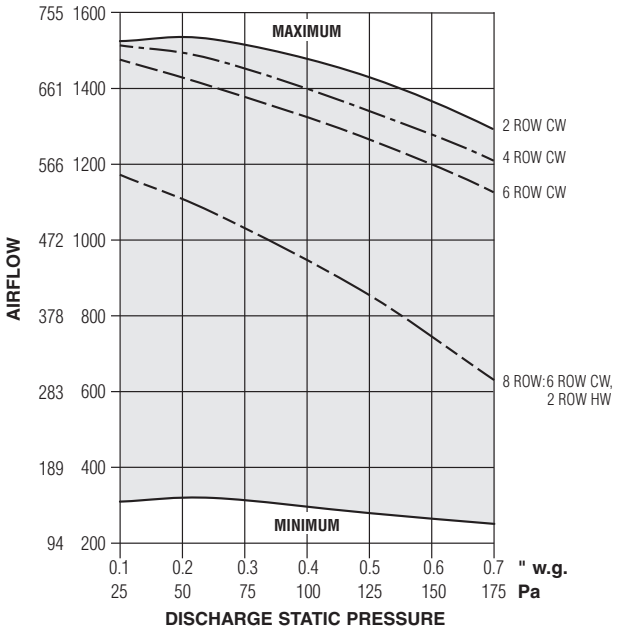
# Performance Data

## ECM Fan Curves – Airflow vs. Downstream Static Pressure
## 33SZ Series • FPCWT (DOAS) • EPIC Fan Technology®

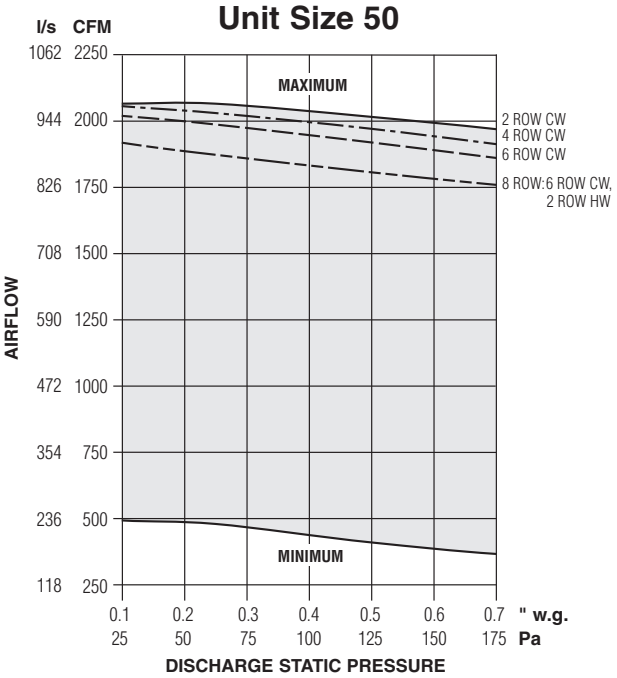
### Unit Size 30




### Unit Size 40




### Unit Size 50




### Electrical Data

| Unit Size | Motor H. P. | ECM FLA† | | | |
|---|---|---|---|---|---|
| | | 120/1/60 | 208/1/60 | 240/1/60 | 277/1/60 |
| 30 | * | 7.5 | 5.0 | 5.0 | 4.9 |
| 40 | * | 6.5 | 4.2 | 4.2 | 4.2 |
| 50 | * | 9.5 | 6.4 | 6.2 | 6.0 |

* The ECM is a variable horsepower motor. Refer to Selectworks Schedule.
FLA = Full load amperage
† EON motor series

**NOTES:**

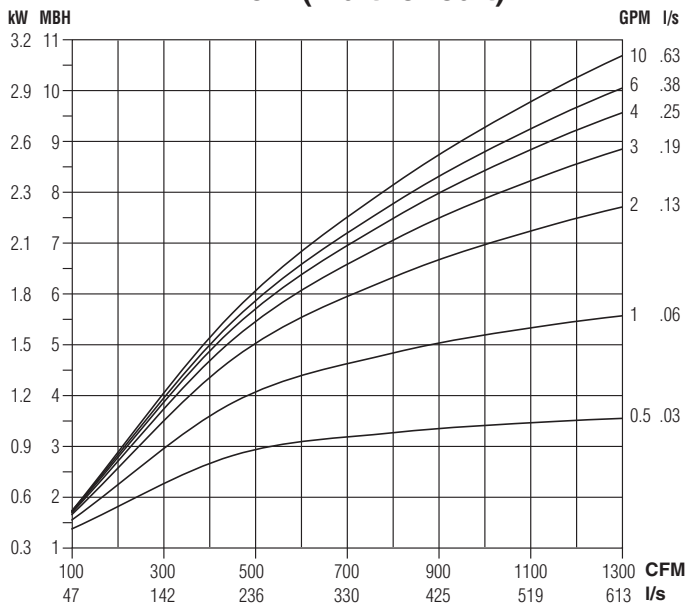
- The fan curves for the ECM are unlike those for traditional PSC motors. The ECM is pressure independent and constant volume in operation at factory or field set point within the shaded area. When the setpoint is on, or below, the respective maximum curve, airflow does not vary with changing static pressure conditions. The motor compensates for any changes in external static pressure or induced air conditions such as filter loading.
- The maximum indicated discharge static pressure is representative of typical design conditions. Refer to Selectworks for enhanced performance capabilities and selection.
- Fan curves shown are applicable to 120, 208, 240 and 277 volt, single phase ECM's. ECM's, although DC in operation, include a built-in inverter.
- Minimum operation within the dark shaded area is not predictable.

# Performance Data • Sensible Chilled Water Coil

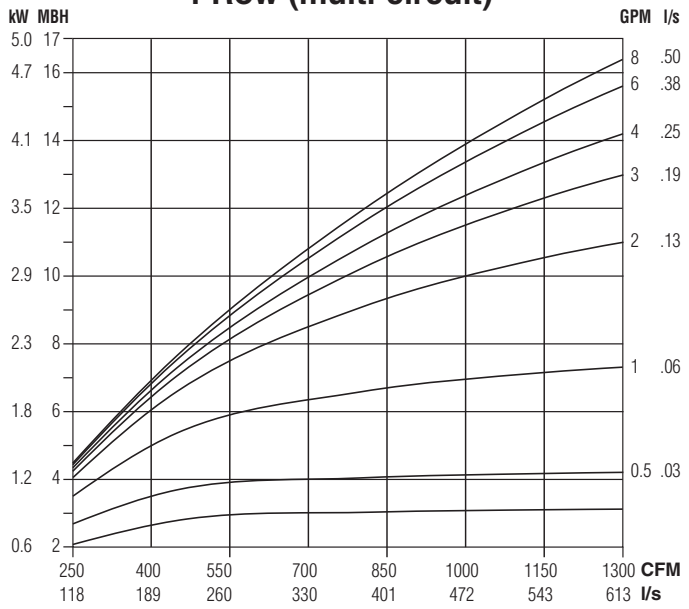
## Models: 33SZ, 33SZE, 33SZW • FPCWT (DOAS) • Series Flow

### Unit Size 30

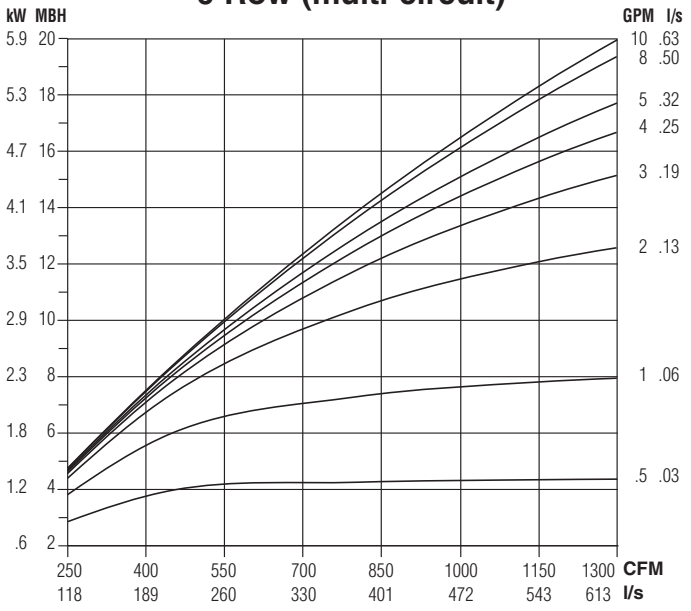
#### 2 Row (multi-circuit)



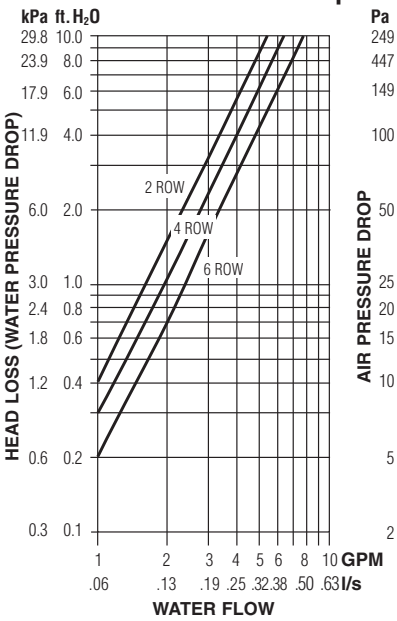

#### 4 Row (multi-circuit)



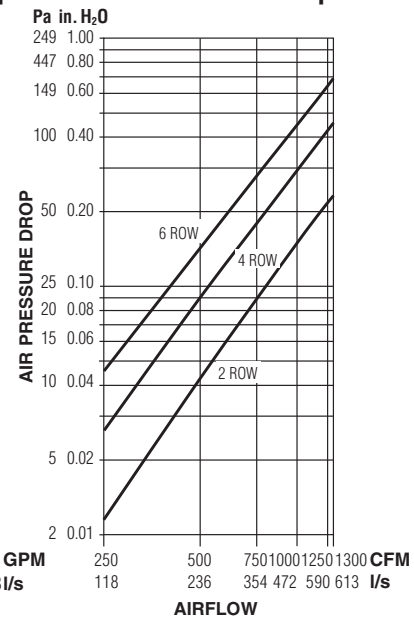

#### 6 Row (multi-circuit)




#### Water Pressure Drop




#### Air Pressure Drop




## NOTES:

1. Capacities are in MBH (kW), *thousands of Btu per hour (kilo Watts).*
2. MBH (kW) values are based on: 57°F (32°C) Entering Water Temperature (EWT). 75°F (42°C) Entering Air Temperature (EAT). Entering water temperature must be above return air dew point to prevent condensation.
3. Air Temperature Rise.
   $ATR\ (°F) = 927 \times \frac{MBH}{cfm}$, $ATR\ (°C) = 829 \times \frac{kW}{l/s}$
4. Water Temp. Drop.
   $WTD\ (°F) = 2.04 \times \frac{MBH}{GPM}$, $WTD\ (°C) = .224 \times \frac{kW}{l/s}$
5. Connections: 2, 4 & 6 Row: 7/8" (22) O.D. male solder.

**Altitude Correction Factors:**

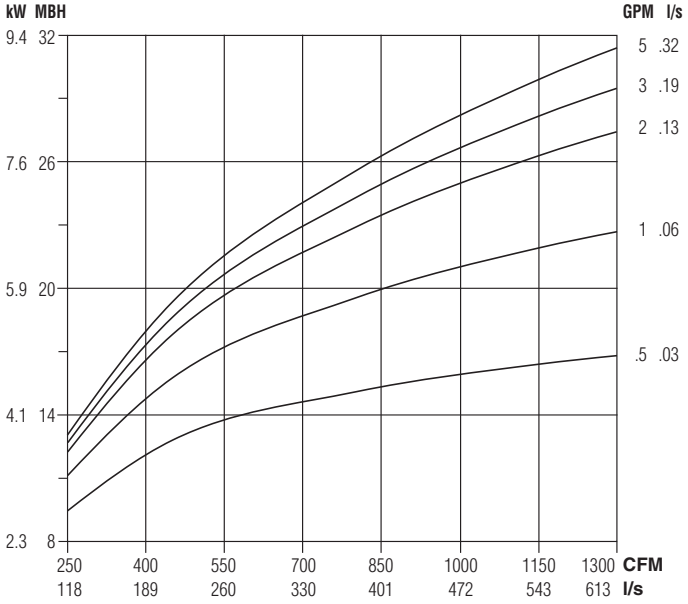
| Attitude (ft.) | 0 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 |
|---|---|---|---|---|---|---|---|---|
| Air Density (lb./cu.ft.) | 0.075 | 0.072 | 0.070 | 0.067 | 0.065 | 0.063 | 0.060 | 0.058 |
| Sensible Capacity | 1000 | 0.960 | 0.930 | 0.900 | 0.860 | 0.830 | 0.800 | 0.700 |

# Performance Data • Hot Water Coil

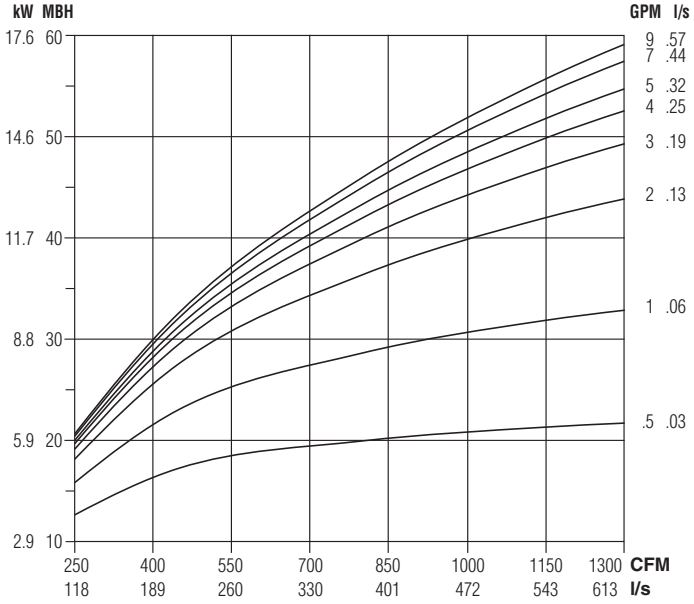
## Model: 33SZW • FPCWT (DOAS) • Series Flow

### Unit Size 30

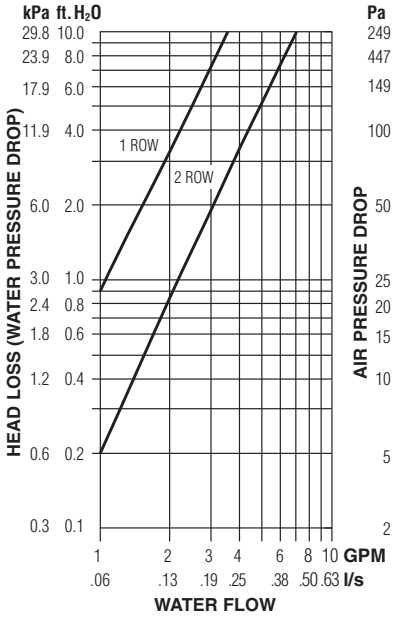
#### 1 Row (single-circuit)



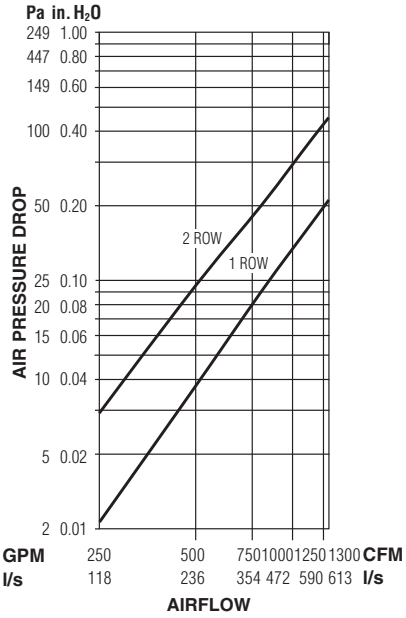

#### 2 Row (multi-circuit)




#### Water Pressure Drop




#### Air Pressure Drop




## NOTES:

1. Capacities are in MBH (kW), *thousands of Btu per hour (kilo Watts)*.
2. MBH (kW) values are based on a Δt (temperature difference) of 120°F (67°C) between entering air and entering water. For other Δt's; multiply the MBH (kW) values by the factors below.
3. Air Temperature Rise.
   ATR (°F) = 927 x $\frac{MBH}{cfm}$, ATR (°C) = 829 x $\frac{kW}{l/s}$
4. Water Temp. Drop.
   WTD (°F) = 2.04 x $\frac{MBH}{GPM}$, WTD (°C) = .224 x $\frac{kW}{l/s}$
5. Connections: 1 Row 1/2" (13) and 2 Row 5/8" (16); O.D. male solder.

**Altitude Correction Factors:**

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

**Correction factors at other entering conditions:**

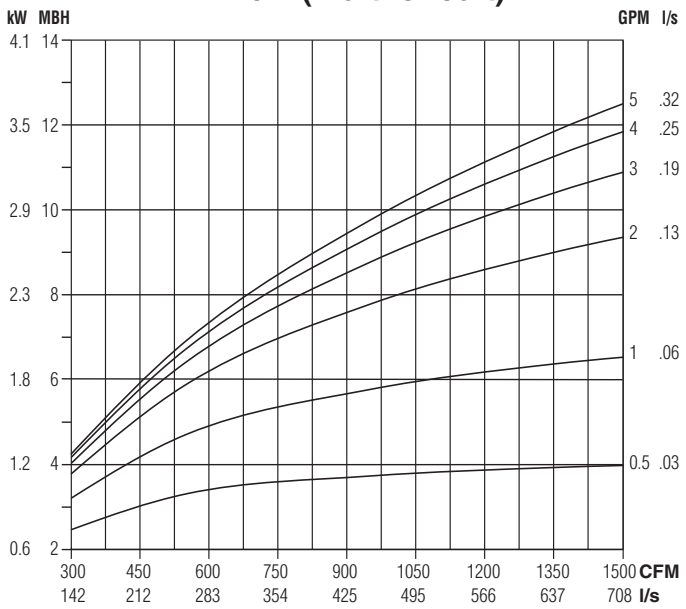
| Δt °F (°C) | 50 (28) | 60 (33) | 70 (39) | 80 (44) | 90 (50) | 100 (56) | 110 (61) | 120 (67) | 130 (72) | 140 (78) | 150 (83) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Factor | .417 (.418) | .500 (.493) | .583 (.582) | .667 (.657) | .750 (.746) | .833 (.836) | .917 (.910) | 1.00 (1.00) | 1.08 (1.08) | 1.17 (1.16) | 1.25 (1.24) |

# Performance Data • Sensible Chilled Water Coil

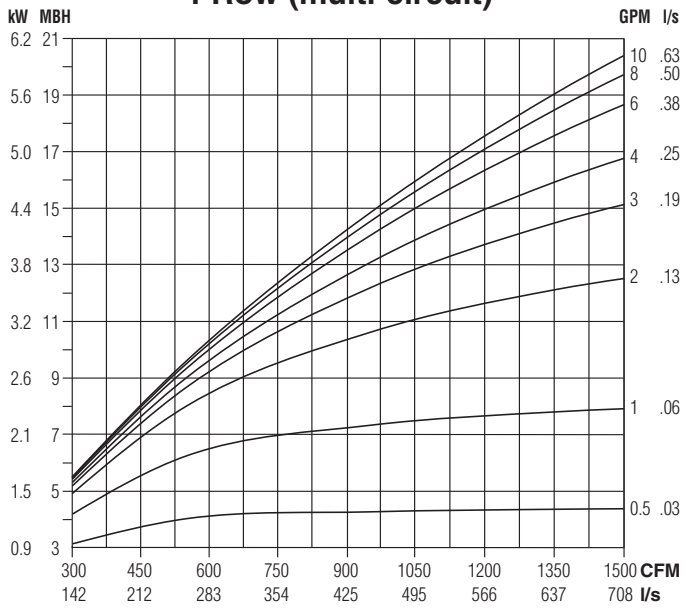
## Models: 33SZ, 33SZE, 33SZW • FPCWT (DOAS) • Series Flow

### Unit Size 40

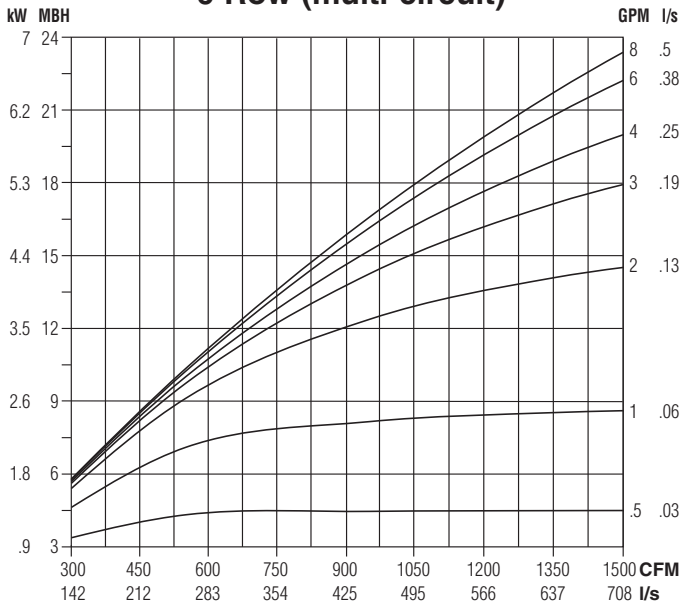
#### 2 Row (multi-circuit)



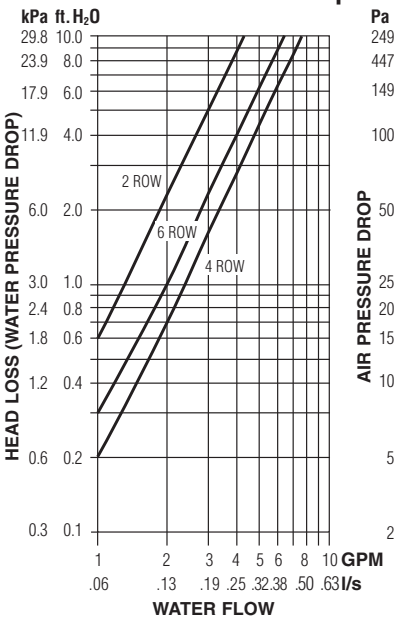

#### 4 Row (multi-circuit)



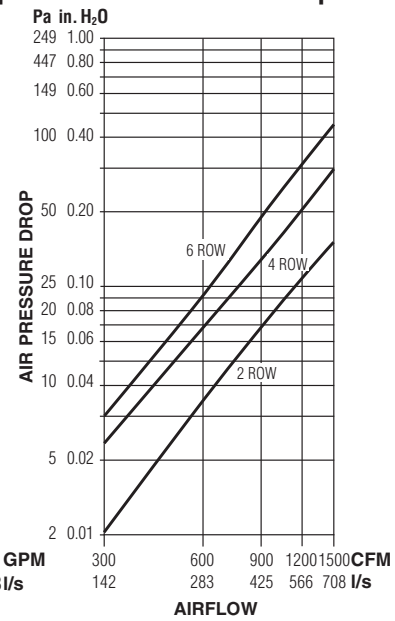

#### 6 Row (multi-circuit)




#### Water Pressure Drop




#### Air Pressure Drop




## NOTES:

1. Capacities are in MBH (kW), *thousands of Btu per hour (kilo Watts).*
2. MBH (kW) values are based on: 57°F (32°C) Entering Water Temperature (EWT). 75°F (42°C) Entering Air Temperature (EAT). Entering water temperature must be above return air dew point to prevent condensation.
3. Air Temperature Rise.
   $ATR\ (°F) = 927 \times \frac{MBH}{cfm}$, $ATR\ (°C) = 829 \times \frac{kW}{l/s}$
4. Water Temp. Drop.
   $WTD\ (°F) = 2.04 \times \frac{MBH}{GPM}$, $WTD\ (°C) = .224 \times \frac{kW}{l/s}$
5. Connections: 2, 4 & 6 Row: 7/8" (22) O.D. male solder.

**Altitude Correction Factors:**

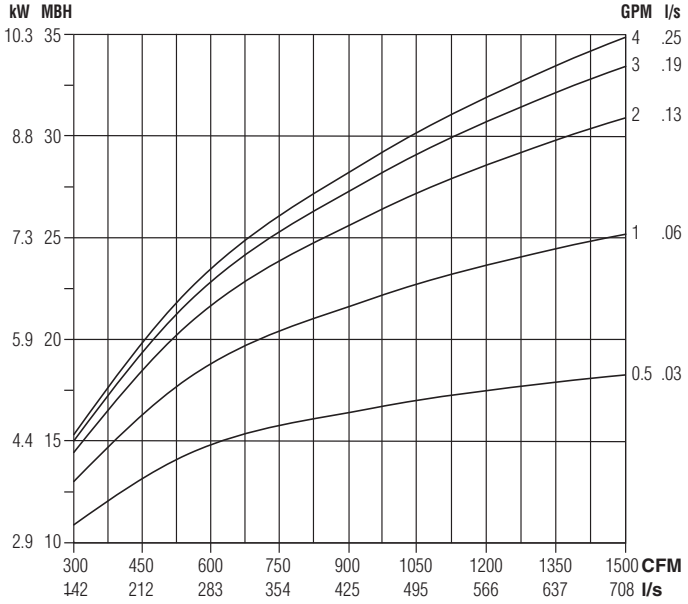
| Attitude (ft.) | 0 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 |
|---|---|---|---|---|---|---|---|---|
| Air Density (lb./cu.ft.) | 0.075 | 0.072 | 0.070 | 0.067 | 0.065 | 0.063 | 0.060 | 0.058 |
| Sensible Capacity | 1000 | 0.960 | 0.930 | 0.900 | 0.860 | 0.830 | 0.800 | 0.700 |

# Performance Data • Hot Water Coil

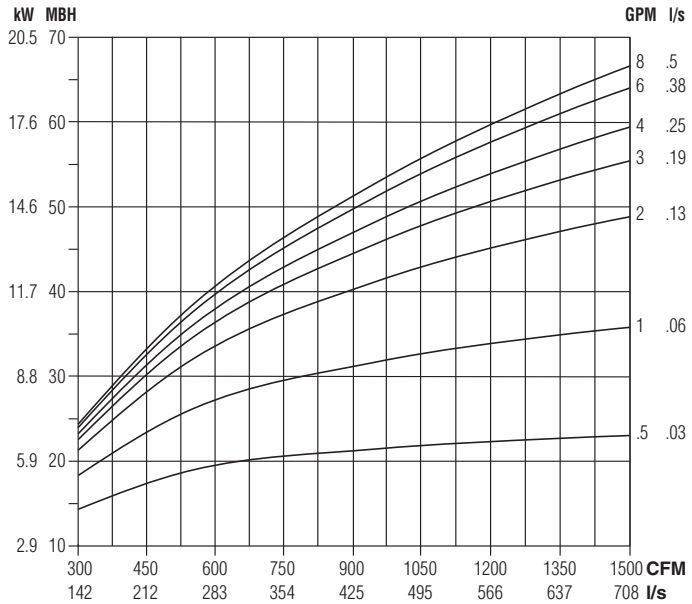
## Model: 33SZW • FPCWT (DOAS) • Series Flow

### Unit Size 40

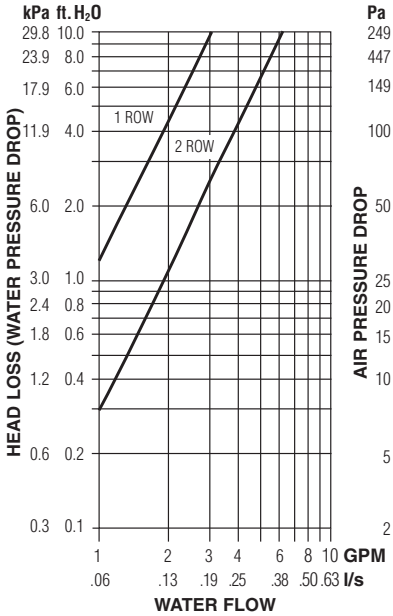
#### 1 Row (single-circuit)



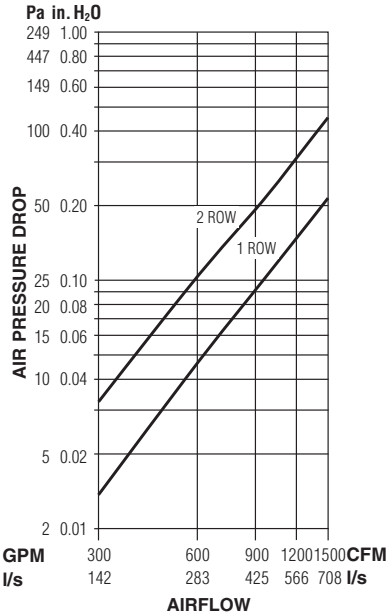

#### 2 Row (multi-circuit)




#### Water Pressure Drop




#### Air Pressure Drop




## NOTES:

1. Capacities are in MBH (kW), *thousands of Btu per hour (kilo Watts)*.
2. MBH (kW) values are based on a Δt (temperature difference) of 120°F (67°C) between entering air and entering water. For other Δt's; multiply the MBH (kW) values by the factors below.
3. Air Temperature Rise.
   ATR (°F) = 927 x $\frac{MBH}{cfm}$, ATR (°C) = 829 x $\frac{kW}{l/s}$
4. Water Temp. Drop.
   WTD (°F) = 2.04 x $\frac{MBH}{GPM}$, WTD (°C) = .224 x $\frac{kW}{l/s}$
5. Connections: 1 Row 1/2" (13) and 2 Row 7/8" (22); O.D. male solder.

**Altitude Correction Factors:**

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

**Correction factors at other entering conditions:**

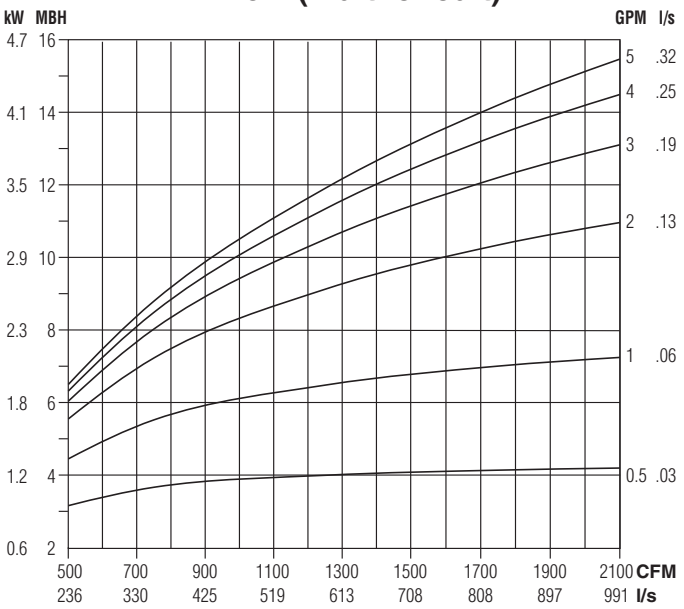
| Δt °F (°C) | 50 (28) | 60 (33) | 70 (39) | 80 (44) | 90 (50) | 100 (56) | 110 (61) | 120 (67) | 130 (72) | 140 (78) | 150 (83) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Factor | .417 (.418) | .500 (.493) | .583 (.582) | .667 (.657) | .750 (.746) | .833 (.836) | .917 (.910) | 1.00 (1.00) | 1.08 (1.08) | 1.17 (1.16) | 1.25 (1.24) |

# Performance Data • Sensible Chilled Water Coil

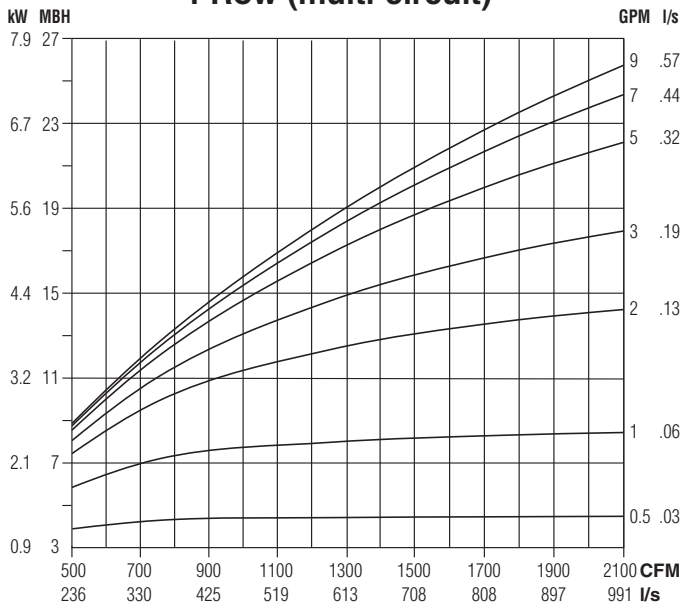
## Models: 33SZ, 33SZE, 33SZW • FPCWT (DOAS) • Series Flow

### Unit Size 50

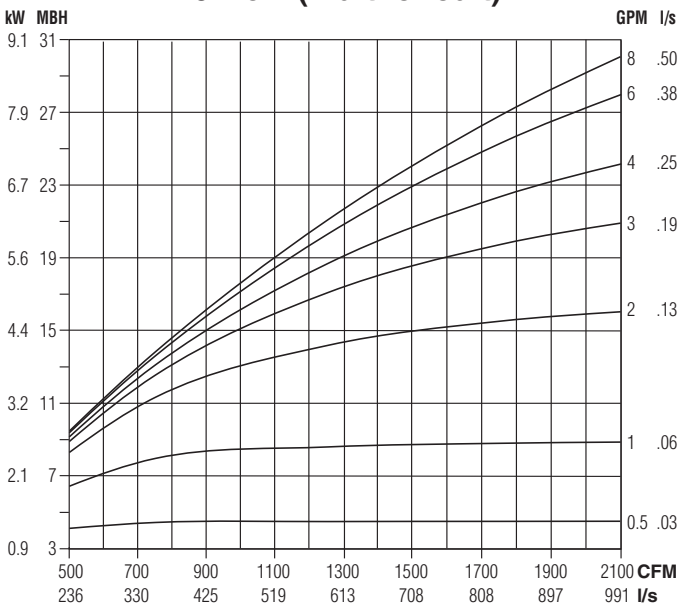
#### 2 Row (multi-circuit)



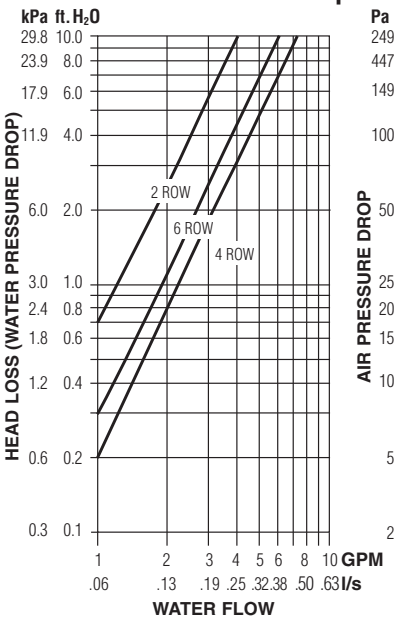

#### 4 Row (multi-circuit)



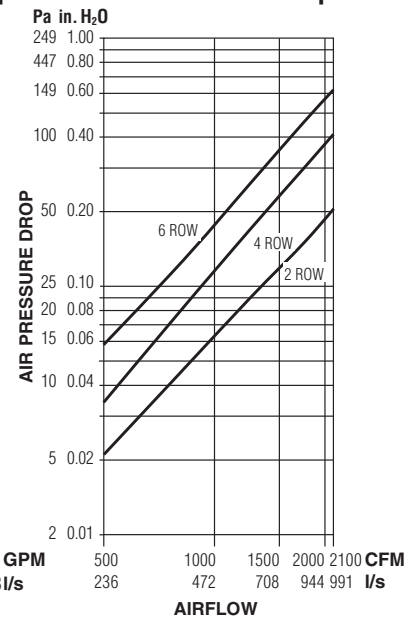

#### 6 Row (multi-circuit)




#### Water Pressure Drop




#### Air Pressure Drop




## NOTES:

1. Capacities are in MBH (kW), *thousands of Btu per hour (kilo Watts).*
2. MBH (kW) values are based on: 57°F (32°C) Entering Water Temperature (EWT). 75°F (42°C) Entering Air Temperature (EAT). Entering water temperature must be above return air dew point to prevent condensation.
3. Air Temperature Rise.
   ATR (°F) = 927 x $\frac{MBH}{cfm}$, ATR (°C) = 829 x $\frac{kW}{l/s}$
4. Water Temp. Drop.
   WTD (°F) = 2.04 x $\frac{MBH}{GPM}$, WTD (°C) = .224 x $\frac{kW}{l/s}$
5. Connections: 2, 4 & 6 Row: 7/8" (22) O.D. male solder.

**Altitude Correction Factors:**

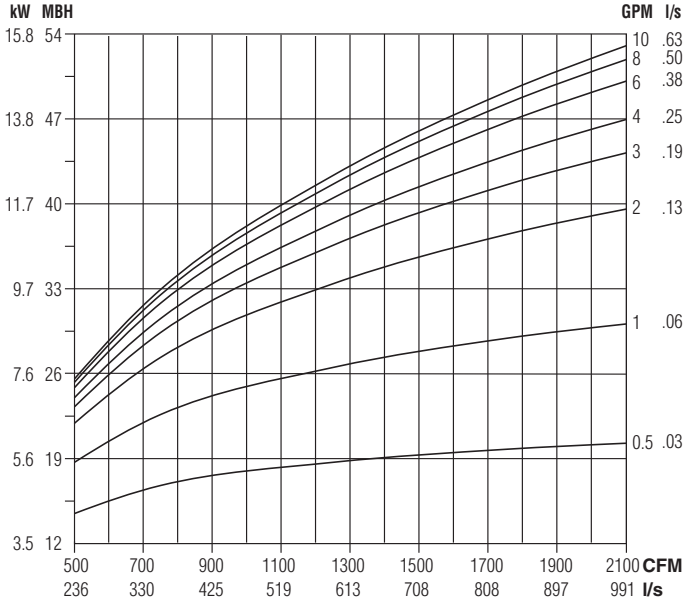
| Attitude (ft.) | 0 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 |
|---|---|---|---|---|---|---|---|---|
| Air Density (lb./cu.ft.) | 0.075 | 0.072 | 0.070 | 0.067 | 0.065 | 0.063 | 0.060 | 0.058 |
| Sensible Capacity | 1000 | 0.960 | 0.930 | 0.900 | 0.860 | 0.830 | 0.800 | 0.700 |

# Performance Data • Hot Water Coil

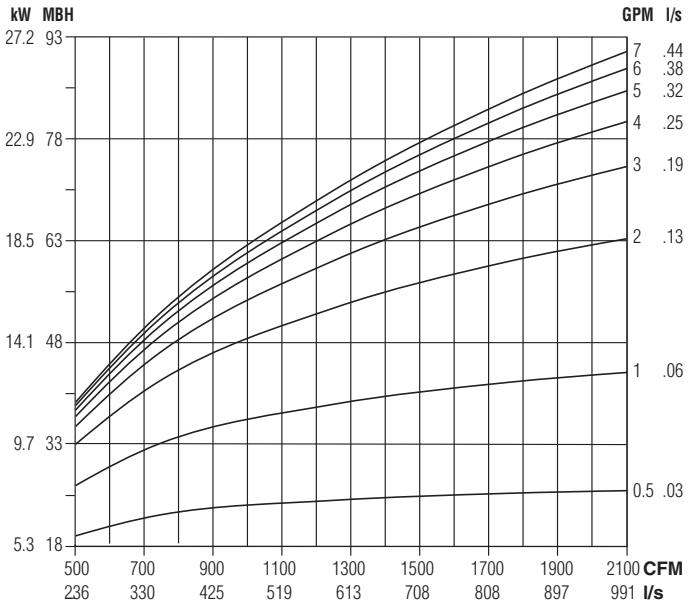
## Model: 33SZW • FPCWT (DOAS) • Series Flow

### Unit Size 50

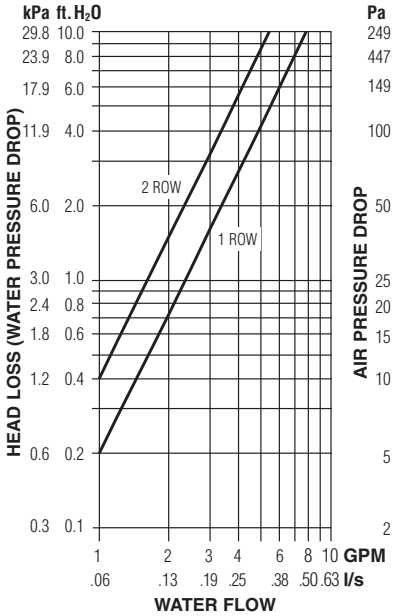
#### 1 Row (multi-circuit)



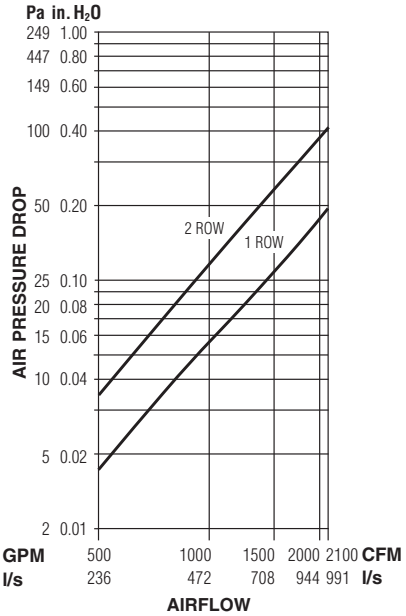

#### 2 Row (multi-circuit)




#### Water Pressure Drop




#### Air Pressure Drop




## NOTES:

1. Capacities are in MBH (kW), *thousands of Btu per hour (kilo Watts)*.
2. MBH (kW) values are based on a Δt (temperature difference) of 120°F (67°C) between entering air and entering water. For other Δt's; multiply the MBH (kW) values by the factors below.
3. Air Temperature Rise.
   ATR (°F) = 927 x $\frac{MBH}{cfm}$, ATR (°C) = 829 x $\frac{kW}{l/s}$
4. Water Temp. Drop.
   WTD (°F) = 2.04 x $\frac{MBH}{GPM}$, WTD (°C) = .224 x $\frac{kW}{l/s}$
5. Connections: 1 and 2 Row: 7/8" (22); O.D. male solder.

**Altitude Correction Factors:**

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

**Correction factors at other entering conditions:**

| Δt °F (°C) | 50 (28) | 60 (33) | 70 (39) | 80 (44) | 90 (50) | 100 (56) | 110 (61) | 120 (67) | 130 (72) | 140 (78) | 150 (83) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Factor | .417 (.418) | .500 (.493) | .583 (.582) | .667 (.657) | .750 (.746) | .833 (.836) | .917 (.910) | 1.00 (1.00) | 1.08 (1.08) | 1.17 (1.16) | 1.25 (1.24) |