



Q-TEC™ QWS Series High Efficiency Geothermal/Water Source Packaged Step-Capacity Heat Pump — R-410A

2 to 5 Ton **2-Stage Compressors**
Extended Range Operation: 25° to 110°F EWT

The Q-TEC Series self contained packaged water-to-air heat pump is designed to be installed inside a building structure against an exterior exposed wall when ventilation option is selected. When no ventilation option is used, the QWS Series units can be installed in any interior space accessible to water supply system and condensate drain.

Q-TEC's design provides "whisper" quiet operation with total comfort for the occupants at high efficiency levels and eliminates the need for roof-mounted equipment and outside condensing units and can meet your specific architectural requirements.

Q-TEC's "quiet technology" provides extremely low indoor sound levels by using special components and materials in the construction of the unit. By using special motors and sound insulation we have built a heat pump system that is significantly quieter than competitive product available today.

Q-TEC is suitable for both new construction and renovation projects for schools, modular buildings and light commercial buildings. A variety of ventilation options are designed to address your project's indoor air quality.

The Q-TEC Series unique design allows all maintenance and service to be performed inside the building to facilitate multi-story installations. Access to air filters and controls is accomplished through a hinged front panel for easy accessibility. All Q-TEC Series models are built on heavy duty permanent rollers for easy installation and removal.

Engineered Features

Step Capacity Compressor:

Copeland step capacity (2-stage) scroll compressors are designed for increased efficiency, quieter operation and improved reliability for longer life.

Reduced Sound Level:

Compressor sound cover and double isolation grommets reduce sound levels. Discharge muffler used on all models.

R-410A Refrigerant:

Designed with R-410A (HFC) non-ozone depleting refrigerant in compliance with the Montreal protocol and 2010 EPA requirements.

Liquid Line Filter Drier:

Standard on all models.

Phase Rotation Monitor:

Standard on all 3 phase scroll compressors. Protects against reverse rotation if power supply is not properly connected.

Indoor Blower System:

All models feature a variable speed (ECM) motor providing super high efficiency, low sound levels and soft start capabilities. The motor is self adjusting to provide the proper airflow rate at high static pressure for ducted installations without user adjustment or wiring changes. Dual blower and 30-second ramp up and ramp-down on motor used for quiet operation.

High Efficiency Coaxial Water Coil:

Fully insulated to minimize sweating. Copper or cupro-nickel coils available. Copper coils approved for Ground Loop and Closed Loop Boiler / Tower only.

Fluid Flow Switch:

Provided for coaxial coil to protect against loss of water flow.

Double O-Ring Water Connections (Optional):

Positive water-tight connections with built-in union. 1" female NPT fittings also available.

Pumping System:

Unit can be connected to central piping/pumping system from well field, boiler/tower or optional pump module can be installed inside unit for individual earth loop applications.

Copper Tube/Aluminum Fin Evaporator Coil:

Grooved copper tubing and enhanced aluminum fins provide maximum heat transfer and high energy efficiency. Evaporator coil constructed with hydrophilic fin stock that seals fin surface against aluminum oxide formation, is resistant to mold and mildew growth (tested to ASTM D3273, no growth) and reduces beading of condensate on the fin surface.

Cabinet:

Constructed of 20 gauge pre-painted or vinyl laminated galvanized steel. Choice of either two tone vinyl finish with "slate" front panels and "platinum" cabinet for designer appearance, or painted steel. Vinyl finish is very resistant to scratching and marring and is very easy to clean. Tamper resistant fasteners are provided for access panels. Unit includes built-in rollers for easy installation into wall sleeve and removal for service if necessary. Hinged, lockable front panel for filter service and access to primary functional electrical controls.

Insulation:

Cabinet is fully insulated with foil covered, high density fiberglass insulation with sealed edge treatment and special sound deadening insulation material in the compressor section. All insulation is designed to resist mold and mildew growth and facilitate ease of cleaning.



Electrical Components:

Are easily accessible for routine inspection and maintenance through front service panels. Circuit breaker standard on all 208/230V models and toggle disconnect standard on all 460V models. Circuit breaker/toggle disconnect access is through lockable access panel. Lock and key provided as standard equipment.

Hot Water Coil:

A plenum mounted hot water coil is available for both duct-free and ducted applications.

Air Filter:

Two-inch pleated MERV 8 filter is standard.

Compressor Control Module:

Built-in off-delay timer adjustable from 30 seconds to 5 minutes. Two-minute on-delay if power interrupt. 120-second bypass for low pressure control, and both soft and manual lockouts for high and low pressure controls.

High Pressure Switch:

Protects refrigerant circuit against excessively high pressure.

Low Pressure Switch:

Provides loss of charge protection plus protects against freeze-up of coaxial coil during heating mode due to water flow or temperature problems. Two switches are installed, and the factory wired switch is for fresh water applications.

Stainless Steel Drain Pan:

Provides extended life of the evaporator drain pan for maximum corrosion resistance.

Side Trim Piece Extension – Optional:

Trim kits available for covering the space between unit and wall for spaces from 4" to 12".

Optional Ventilation Packages:

Optional energy recovery ventilator can provide up to 450 cfm of outside air and exhaust through the unit while maintaining indoor comfort and humidity levels. Other available options include commercial room ventilator with exhaust, and barometric damper without exhaust. Outside wall and ventilation sleeve are required for installations with ventilation option.

Modulating Dehumidification Circuit:

All models are able to remove moisture from the space being conditioned without providing significant cooling capacity. This allows for an area to be comfortable from a humidity stand point when outdoor temperature conditions are moderate. Efficiency and comfort are achieved by using compressor operation and a modulating water valve in this mode.

Specifications - 2 and 3 Ton

| MODELS | QW2S3DA | QW2S3DB | QW2S3DC | QW3S3DA | QW3S3DB | QW3S3DC |
|----------------------------------|---------------------------|-------------|---------|---------------------------|-------------|---------|
| ELECTRICAL RATING – 60 HZ | 230/208 - 1 | 230/208 - 3 | 460 - 3 | 230/208 - 1 | 230/208 - 3 | 460 - 3 |
| Operating Voltage Range | 197-253 | | 414-506 | 197-253 | | 414-506 |
| COMPRESSOR – CIRCUIT A | | | | | | |
| Voltage | 230/208 | | 460 | 230/208 | | 460 |
| Rated Load Amps | 11.7/13.0 | 6.5/7.2 | 3.9 | 15.6/17.4 | 11.6/12.9 | 6.4 |
| Branch Circuit Selection Current | 11.7 | 6.5 | 3.9 | 15.7 | 11.7 | 6.5 |
| Lock Rotor Amps | 58.3 | 55.4 | 28.0 | 83.0 | 73.0 | 38.0 |
| MOTOR & EVAPORATOR | | | | | | |
| Blower Motor HP/SPD | 1/3 / Variable | | | 1/2 / Variable | | |
| Blower Motor – Amps | 2.8 | | | 4.3 | | |
| Filter Sizes (inches) STD. | 1 - 16x20x2 & 1 - 16x16x2 | | | 1 - 16x20x2 & 1 - 16x16x2 | | |
| SHIPPING WEIGHT – LBS. | 530 | 530 | 550 | 535 | 535 | 555 |

Specifications - 4 and 5 Ton

| MODELS | QW4S3DA | QW4S3DB | QW4S3DC | QW5S3DA | QW5S3DB | QW5S3DC |
|----------------------------------|---------------------------|-------------|---------|---------------------------|-------------|---------|
| ELECTRICAL RATING – 60 HZ | 230/208 - 1 | 230/208 - 3 | 460 - 3 | 230/208 - 1 | 230/208 - 3 | 460 - 3 |
| Operating Voltage Range | 197-253 | | 414-506 | 197-253 | | 414-506 |
| COMPRESSOR – CIRCUIT A | | | | | | |
| Voltage | 230/208 | | 460 | 230/208 | | 460 |
| Rated Load Amps | 21.2/23.6 | 14.0/15.6 | 7.1 | 26.9/30.0 | 16.5/18.4 | 8.1 |
| Branch Circuit Selection Current | 22.0 | 14.6 | 7.2 | 27.0 | 16.6 | 9.0 |
| Lock Rotor Amps | 104 | 83.1 | 41 | 139.9 | 110 | 52 |
| MOTOR & EVAPORATOR | | | | | | |
| Blower Motor HP/SPD | 3/4 / Variable | | | 3/4 / Variable | | |
| Blower Motor – Amps | 6.8 | | | 6.8 | | |
| Filter Sizes (inches) STD. | 1 - 16x25x2 & 1 - 16x16x2 | | | 1 - 16x25x2 & 1 - 16x16x2 | | |
| SHIPPING WEIGHT – LBS. | 555 | 555 | 575 | 620 | 620 | 645 |

See Page 9 for Electrical Specifications

Indoor Blower Performance – CFM (0.00" through 0.50" H₂O)

| Model | Rated ESP. | Max. ESP ① | Blower Only ② | Rated 1st Stage | 2nd Stage Rated ④ |
|-------|------------|---------------|------------------|-----------------|----------------------|
| QW2S3 | 0.10 | 0.5 | 600 | 800 | 950 |
| QW3S3 | 0.15 | 0.5 | 675 | 900 | 1150 |
| QW4S3 | 0.20 | 0.5 | 825 | 1200 | 1450 |
| QW5S3 | 0.20 | 0.5 | 875 | 1400 | 1650 |

NOTE: These units are equipped with a variable speed (ECM) indoor motor that automatically adjusts itself to maintain approximately the same rate of indoor airflow in both heating and cooling, dry and wet coil conditions, and at both 230/208 or 460 volts.

- ① Maximum ESP (inches WC) shown is with 2" MERV 6 pleated filter.
- ② Continuous CFM the total airflow being circulated during continuous blower operation.
- ④ Rated CFM for ducted applications – required for maximum performance rating.

ISO 13256-1 Performance Data ①

| MODEL | System Capacity Modulation | Fluid Flow Rate GPM | Airflow CFM | Ground Loop Heat Pump Tested & Certified to ISO 13256-1 | | | |
|-------|----------------------------|---------------------|--------------|--|-----------|---|------|
| | | | | Cooling Brine Full Load 77°F Part Load 68°F | | Heating Brine Full Load 32°F Part Load 41°F | |
| | | | | Capacity BTUH | EER BTU/W | Capacity BTUH | COP |
| QW2S | Full Part | 7 | 950 800 | 25,000 | 17.2 | 19,800 | 3.7 |
| | | | | 19,600 | 22.6 | 15,400 | 3.9 |
| QW3S | Full Part | 8 | 1150 900 | 33,800 | 15.1 | 29,200 | 3.45 |
| | | | | 26,000 | 19.6 | 23,000 | 3.6 |
| QW4S | Full Part | 9 | 1450 1200 | 48,000 | 16.1 | 35,800 | 3.2 |
| | | | | 37,000 | 20.9 | 29,800 | 3.5 |
| QW5S | Full Part | 9 | 1650 1400 | 54,500 | 14.6 | 46,000 | 3.35 |
| | | | | 43,500 | 19.6 | 37,500 | 3.65 |

① ISO Standard 13256-1:1998, "Water to Air and Brine to Air Heat Pumps", which includes watt allowance for water pumping. Cooling capacity based on 80.6°F DB, 66.2°F WB entering air temperature. Heating capacity based on 68°F DB entering air temperature.

All 1-phase models meet the minimum efficiency requirements for Ground Loop applications. Currently, there is no ES efficiency program for 3-phase equipment or for Water Loop applications.

Correction Factors @ Increased Water Flows

| Rated Flow Plus | Cooling | | Heating | |
|-----------------|---------|-------|---------|-------|
| | BtuH | Watts | BtuH | Watts |
| 2 GPM | 1.005 | 0.988 | 1.006 | 1.002 |
| 3 GPM | 1.007 | 0.984 | 1.009 | 1.003 |
| 4 GPM | 1.008 | 0.979 | 1.011 | 1.003 |



- Intertek ETL Listed to Standard for Safety Heating and Cooling Equipment ANSI/UL 1995/CSA 22.2 No. 236-05, Fourth Edition.

* The AHRI Certified® mark indicates Bard Manufacturing Company participation in the AHRI Certification program. For verification of individual certified products, go to www.ahridirectory.org.

QW2S3D

Full Load Capacities based upon rated flow of 7 GPM of 15% methanol/mass at 950 CFM airflow.

COOLING FULL LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Sensible Capacity (MBtuH) | Sensible to Total Ratio | Power Input (KW) | Heat of Rejection (MBtuH) | EER |
|---------------------------|-------------------------|------------------------|---------------------------|-------------------------|------------------|---------------------------|------|
| 50° | 70° DB 59° WB | 23.3 | 17.4 | 0.74 | 0.9 | 26.0 | 22.1 |
| 60° | | 22.6 | 17.3 | 0.76 | 1.1 | 25.9 | 20.0 |
| 70° | | 22.0 | 17.3 | 0.79 | 1.2 | 25.7 | 17.9 |
| 80° | | 21.3 | 17.2 | 0.81 | 1.4 | 25.5 | 15.8 |
| 90° | | 20.7 | 17.2 | 0.83 | 1.6 | 25.4 | 13.7 |
| 100° | | 20.0 | 17.1 | 0.86 | 1.7 | 25.2 | 11.6 |
| 110° | 19.4 | 17.1 | 0.88 | 1.9 | 25.0 | 9.5 | |
| 50° | 75° DB 63° WB | 25.0 | 18.0 | 0.71 | 0.9 | 28.0 | 23.4 |
| 60° | | 24.3 | 18.0 | 0.74 | 1.1 | 27.8 | 21.2 |
| 70° | | 23.6 | 18.0 | 0.76 | 1.2 | 27.7 | 19.0 |
| 80° | | 23.0 | 18.0 | 0.78 | 1.4 | 27.5 | 16.8 |
| 90° | | 22.3 | 17.9 | 0.81 | 1.6 | 27.3 | 14.6 |
| 100° | | 21.6 | 17.9 | 0.83 | 1.7 | 27.2 | 12.4 |
| 110° | 20.9 | 17.9 | 0.85 | 1.9 | 27.0 | 10.2 | |
| 50° | 80° DB 67° WB | 26.8 | 18.6 | 0.69 | 0.9 | 30.0 | 24.7 |
| 60° | | 26.1 | 18.6 | 0.71 | 1.1 | 29.8 | 22.4 |
| 70° | | 25.4 | 18.7 | 0.74 | 1.3 | 29.7 | 20.1 |
| 80° | | 24.7 | 18.7 | 0.76 | 1.4 | 29.5 | 17.8 |
| 90° | | 24.0 | 18.7 | 0.78 | 1.6 | 29.4 | 15.5 |
| 100° | | 23.2 | 18.7 | 0.80 | 1.8 | 29.2 | 13.2 |
| 110° | 22.5 | 18.7 | 0.83 | 1.9 | 29.1 | 10.9 | |
| 50° | 85° DB 71° WB | 28.7 | 19.2 | 0.66 | 0.9 | 32.1 | 26.1 |
| 60° | | 28.0 | 19.3 | 0.69 | 1.1 | 32.0 | 23.7 |
| 70° | | 27.2 | 19.3 | 0.71 | 1.3 | 31.8 | 21.3 |
| 80° | | 26.5 | 19.3 | 0.73 | 1.4 | 31.7 | 18.9 |
| 90° | | 25.7 | 19.4 | 0.76 | 1.6 | 31.5 | 16.5 |
| 100° | | 25.0 | 19.4 | 0.78 | 1.8 | 31.4 | 14.1 |
| 110° | 24.2 | 19.5 | 0.80 | 1.9 | 31.3 | 11.7 | |

HEATING FULL LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Leaving Air Temp. (°F) | Power Input (KW) | Heat of Absorption (MBtuH) | COP |
|---------------------------|-------------------------|------------------------|------------------------|------------------|----------------------------|-----|
| 25° | 65° | 18.0 | 82.5 | 1.4 | 13.1 | 3.8 |
| 30° | | 19.4 | 84.0 | 1.4 | 14.4 | 4.0 |
| 40° | | 22.3 | 86.8 | 1.5 | 17.1 | 4.4 |
| 50° | | 25.2 | 89.6 | 1.5 | 19.9 | 4.8 |
| 60° | | 27.8 | 92.1 | 1.6 | 22.3 | 5.1 |
| 70° | | 30.4 | 94.7 | 1.7 | 24.6 | 5.4 |
| 80° | 33.1 | 97.2 | 1.7 | 27.0 | 5.6 | |
| 25° | 70° | 17.6 | 87.2 | 1.4 | 12.7 | 3.6 |
| 30° | | 19.0 | 88.5 | 1.5 | 14.0 | 3.8 |
| 40° | | 21.8 | 91.3 | 1.5 | 16.6 | 4.2 |
| 50° | | 24.6 | 94.0 | 1.6 | 19.3 | 4.6 |
| 60° | | 27.2 | 96.5 | 1.6 | 21.6 | 4.9 |
| 70° | | 29.8 | 99.0 | 1.7 | 23.9 | 5.1 |
| 80° | 32.3 | 101.5 | 1.8 | 26.2 | 5.3 | |
| 25° | 75° | 17.8 | 92.3 | 1.6 | 12.3 | 3.2 |
| 30° | | 19.2 | 93.7 | 1.6 | 13.6 | 3.4 |
| 40° | | 22.1 | 96.5 | 1.7 | 16.1 | 3.8 |
| 50° | | 24.9 | 99.3 | 1.8 | 18.7 | 4.2 |
| 60° | | 27.5 | 101.8 | 1.8 | 21.0 | 4.4 |
| 70° | | 30.1 | 104.3 | 1.9 | 23.2 | 4.6 |
| 80° | 32.7 | 106.9 | 2.0 | 25.4 | 4.8 | |

Full Load Capacities based upon rated flow of 7 GPM of 15% methanol/mass at 800 CFM airflow.

COOLING PART LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Sensible Capacity (MBtuH) | Sensible to Total Ratio | Power Input (KW) | Heat of Rejection (MBtuH) | EER |
|---------------------------|-------------------------|------------------------|---------------------------|-------------------------|------------------|---------------------------|------|
| 50° | 70° DB 59° WB | 19.0 | 15.0 | 0.78 | 0.5 | 20.6 | 28.0 |
| 60° | | 18.2 | 14.7 | 0.80 | 0.7 | 20.2 | 24.9 |
| 70° | | 17.4 | 14.5 | 0.83 | 0.8 | 19.8 | 21.8 |
| 80° | | 16.6 | 14.2 | 0.86 | 0.9 | 19.5 | 18.6 |
| 90° | | 15.8 | 14.0 | 0.89 | 1.1 | 19.1 | 15.5 |
| 100° | | 15.1 | 13.8 | 0.91 | 1.2 | 18.7 | 12.3 |
| 110° | 14.3 | 13.5 | 0.94 | 1.4 | 18.4 | 9.2 | |
| 50° | 75° DB 63° WB | 20.4 | 15.5 | 0.75 | 0.5 | 22.1 | 29.7 |
| 60° | | 19.6 | 15.3 | 0.78 | 0.7 | 21.7 | 26.4 |
| 70° | | 18.7 | 15.1 | 0.80 | 0.8 | 21.3 | 23.1 |
| 80° | | 17.9 | 14.8 | 0.83 | 1.0 | 21.0 | 19.8 |
| 90° | | 17.1 | 14.6 | 0.86 | 1.1 | 20.6 | 16.5 |
| 100° | | 16.2 | 14.4 | 0.89 | 1.2 | 20.2 | 13.2 |
| 110° | 15.4 | 14.2 | 0.91 | 1.4 | 19.8 | 9.9 | |
| 50° | 80° DB 67° WB | 21.9 | 16.1 | 0.72 | 0.5 | 23.7 | 31.5 |
| 60° | | 21.0 | 15.9 | 0.75 | 0.7 | 23.3 | 28.0 |
| 70° | | 20.1 | 15.6 | 0.78 | 0.8 | 22.9 | 24.5 |
| 80° | | 19.2 | 15.4 | 0.80 | 1.0 | 22.5 | 21.0 |
| 90° | | 18.4 | 15.2 | 0.83 | 1.1 | 22.1 | 17.5 |
| 100° | | 17.5 | 15.0 | 0.86 | 1.2 | 21.7 | 14.0 |
| 110° | 16.6 | 14.8 | 0.88 | 1.4 | 21.3 | 10.6 | |
| 50° | 85° DB 71° WB | 23.4 | 16.6 | 0.70 | 0.6 | 25.4 | 33.1 |
| 60° | | 22.5 | 16.4 | 0.72 | 0.7 | 25.0 | 29.5 |
| 70° | | 21.6 | 16.2 | 0.75 | 0.8 | 24.6 | 25.9 |
| 80° | | 20.6 | 16.0 | 0.78 | 1.0 | 24.2 | 22.2 |
| 90° | | 19.7 | 15.8 | 0.80 | 1.1 | 23.7 | 18.6 |
| 100° | | 18.8 | 15.6 | 0.83 | 1.3 | 23.3 | 14.9 |
| 110° | 17.8 | 15.4 | 0.86 | 1.4 | 22.9 | 11.3 | |

HEATING PART LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Leaving Air Temp. (°F) | Power Input (KW) | Heat of Absorption (MBtuH) | COP |
|---------------------------|-------------------------|------------------------|------------------------|------------------|----------------------------|-----|
| 25° | 65° | 11.1 | 77.8 | 1.1 | 7.3 | 3.1 |
| 30° | | 12.6 | 79.6 | 1.1 | 8.8 | 3.5 |
| 40° | | 15.7 | 83.2 | 1.1 | 11.9 | 4.2 |
| 50° | | 18.8 | 86.7 | 1.1 | 14.9 | 5.0 |
| 60° | | 21.0 | 89.3 | 1.1 | 17.1 | 5.5 |
| 70° | | 23.1 | 91.8 | 1.1 | 19.2 | 6.0 |
| 80° | 25.3 | 94.3 | 1.1 | 21.4 | 6.5 | |
| 25° | 70° | 10.8 | 82.5 | 1.1 | 7.1 | 2.9 |
| 30° | | 12.3 | 84.3 | 1.1 | 8.6 | 3.3 |
| 40° | | 15.3 | 87.8 | 1.1 | 11.5 | 4.0 |
| 50° | | 18.4 | 91.2 | 1.1 | 14.5 | 4.7 |
| 60° | | 20.5 | 93.7 | 1.1 | 16.6 | 5.2 |
| 70° | | 22.6 | 96.2 | 1.2 | 18.7 | 5.7 |
| 80° | 24.8 | 98.7 | 1.2 | 20.8 | 6.2 | |
| 25° | 75° | 11.0 | 87.7 | 1.2 | 6.9 | 2.6 |
| 30° | | 12.5 | 89.4 | 1.2 | 8.3 | 3.0 |
| 40° | | 15.5 | 93.0 | 1.3 | 11.2 | 3.6 |
| 50° | | 18.6 | 96.5 | 1.3 | 14.0 | 4.2 |
| 60° | | 20.7 | 99.0 | 1.3 | 16.1 | 4.7 |
| 70° | | 22.9 | 101.5 | 1.3 | 18.1 | 5.1 |
| 80° | 25.0 | 104.0 | 1.3 | 20.1 | 5.6 | |

QW3S3D

Full Load Capacities based upon rated flow of 8 GPM of 15% methanol/mass at 1150 CFM airflow.

COOLING FULL LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Sensible Capacity (MBtuH) | Sensible to Total Ratio | Power Input (KW) | Heat of Rejection (MBtuH) | EER |
|---------------------------|-------------------------|------------------------|---------------------------|-------------------------|------------------|---------------------------|------|
| 50° | 70° DB 59° WB | 35.3 | 25.7 | 0.72 | 1.4 | 39.6 | 21.4 |
| 60° | | 33.7 | 24.9 | 0.74 | 1.6 | 38.7 | 19.2 |
| 70° | | 32.0 | 24.1 | 0.75 | 1.9 | 37.7 | 17.0 |
| 80° | | 30.4 | 23.3 | 0.77 | 2.1 | 36.8 | 14.8 |
| 90° | | 28.8 | 22.5 | 0.78 | 2.4 | 35.9 | 12.6 |
| 100° | | 27.1 | 21.6 | 0.80 | 2.6 | 34.9 | 10.4 |
| 110° | | 25.5 | 20.8 | 0.81 | 2.9 | 34.0 | 8.2 |
| 50° | 75° DB 63° WB | 37.9 | 26.7 | 0.70 | 1.4 | 42.5 | 22.7 |
| 60° | | 36.2 | 25.9 | 0.71 | 1.7 | 41.6 | 20.4 |
| 70° | | 34.4 | 25.1 | 0.73 | 1.9 | 40.6 | 18.1 |
| 80° | | 32.7 | 24.3 | 0.74 | 2.1 | 39.6 | 15.8 |
| 90° | | 31.0 | 23.5 | 0.76 | 2.4 | 38.6 | 13.4 |
| 100° | | 29.3 | 22.7 | 0.77 | 2.6 | 37.7 | 11.1 |
| 110° | | 27.5 | 21.8 | 0.79 | 2.9 | 36.7 | 8.8 |
| 50° | 80° DB 67° WB | 40.7 | 27.7 | 0.67 | 1.4 | 45.6 | 24.0 |
| 60° | | 38.8 | 26.8 | 0.69 | 1.7 | 44.6 | 21.6 |
| 70° | | 37.0 | 26.0 | 0.70 | 1.9 | 43.6 | 19.2 |
| 80° | | 35.2 | 25.2 | 0.72 | 2.2 | 42.6 | 16.7 |
| 90° | | 33.3 | 24.4 | 0.73 | 2.4 | 41.6 | 14.3 |
| 100° | | 31.5 | 23.6 | 0.75 | 2.7 | 40.5 | 11.9 |
| 110° | | 29.6 | 22.8 | 0.77 | 2.9 | 39.5 | 9.4 |
| 50° | 85° DB 71° WB | 43.5 | 28.6 | 0.65 | 1.5 | 48.8 | 25.3 |
| 60° | | 41.6 | 27.8 | 0.66 | 1.7 | 47.8 | 22.8 |
| 70° | | 39.6 | 27.0 | 0.68 | 2.0 | 46.7 | 20.2 |
| 80° | | 37.7 | 26.1 | 0.70 | 2.2 | 45.6 | 17.7 |
| 90° | | 35.7 | 25.3 | 0.71 | 2.4 | 44.6 | 15.1 |
| 100° | | 33.8 | 24.5 | 0.73 | 2.7 | 43.5 | 12.6 |
| 110° | | 31.9 | 23.7 | 0.74 | 2.9 | 42.5 | 10.1 |

HEATING FULL LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Leaving Air Temp. (°F) | Power Input (KW) | Heat of Absorption (MBtuH) | COP |
|---------------------------|-------------------------|------------------------|------------------------|------------------|----------------------------|-----|
| 25° | 65° | 26.5 | 86.4 | 2.2 | 18.9 | 3.6 |
| 30° | | 28.7 | 88.1 | 2.2 | 20.9 | 3.8 |
| 40° | | 33.0 | 91.6 | 2.3 | 24.8 | 4.1 |
| 50° | | 37.3 | 95.0 | 2.5 | 28.7 | 4.4 |
| 60° | | 42.0 | 98.8 | 2.6 | 32.9 | 4.7 |
| 70° | | 46.7 | 102.6 | 2.7 | 37.2 | 5.0 |
| 80° | | 51.5 | 106.4 | 2.9 | 41.4 | 5.3 |
| 25° | 70° | 25.9 | 90.9 | 2.2 | 18.4 | 3.4 |
| 30° | | 28.1 | 92.6 | 2.3 | 20.3 | 3.6 |
| 40° | | 32.3 | 96.0 | 2.4 | 24.0 | 3.9 |
| 50° | | 36.5 | 99.4 | 2.5 | 27.8 | 4.2 |
| 60° | | 41.1 | 103.1 | 2.7 | 32.0 | 4.5 |
| 70° | | 45.7 | 106.8 | 2.8 | 36.1 | 4.8 |
| 80° | | 50.3 | 110.5 | 3.0 | 40.2 | 5.0 |
| 25° | 75° | 26.2 | 96.1 | 2.5 | 17.8 | 3.1 |
| 30° | | 28.4 | 97.8 | 2.6 | 19.7 | 3.2 |
| 40° | | 32.6 | 101.3 | 2.7 | 23.3 | 3.5 |
| 50° | | 36.9 | 104.7 | 2.8 | 27.0 | 3.8 |
| 60° | | 41.5 | 108.4 | 3.0 | 31.0 | 4.0 |
| 70° | | 46.2 | 112.2 | 3.2 | 35.0 | 4.3 |
| 80° | | 50.9 | 116.0 | 3.3 | 39.0 | 4.5 |

Full Load Capacities based upon rated flow of 8 GPM of 15% methanol/mass at 900 CFM airflow.

COOLING PART LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Sensible Capacity (MBtuH) | Sensible to Total Ratio | Power Input (KW) | Heat of Rejection (MBtuH) | EER |
|---------------------------|-------------------------|------------------------|---------------------------|-------------------------|------------------|---------------------------|------|
| 50° | 70° DB 59° WB | 27.4 | 20.4 | 0.73 | 0.7 | 29.7 | 28.0 |
| 60° | | 25.9 | 19.7 | 0.75 | 0.9 | 28.8 | 24.6 |
| 70° | | 24.4 | 19.0 | 0.78 | 1.2 | 27.9 | 21.2 |
| 80° | | 23.0 | 18.3 | 0.80 | 1.4 | 27.1 | 17.9 |
| 90° | | 21.5 | 17.7 | 0.83 | 1.6 | 26.2 | 14.5 |
| 100° | | 20.0 | 17.0 | 0.85 | 1.8 | 25.4 | 11.1 |
| 110° | | 18.5 | 16.3 | 0.87 | 2.0 | 24.5 | 7.7 |
| 50° | 75° DB 63° WB | 29.5 | 21.1 | 0.70 | 0.7 | 31.9 | 29.7 |
| 60° | | 27.9 | 20.5 | 0.73 | 0.9 | 31.0 | 26.1 |
| 70° | | 26.3 | 19.8 | 0.75 | 1.2 | 30.1 | 22.5 |
| 80° | | 24.7 | 19.1 | 0.78 | 1.4 | 29.2 | 19.0 |
| 90° | | 23.1 | 18.4 | 0.80 | 1.6 | 28.3 | 15.4 |
| 100° | | 21.5 | 17.8 | 0.82 | 1.8 | 27.4 | 11.9 |
| 110° | | 20.0 | 17.1 | 0.85 | 2.0 | 26.5 | 8.3 |
| 50° | 80° DB 67° WB | 31.6 | 21.9 | 0.68 | 0.7 | 34.2 | 31.4 |
| 60° | | 29.9 | 21.2 | 0.70 | 1.0 | 33.2 | 27.6 |
| 70° | | 28.2 | 20.5 | 0.73 | 1.2 | 32.3 | 23.9 |
| 80° | | 26.6 | 19.9 | 0.75 | 1.4 | 31.3 | 20.1 |
| 90° | | 24.9 | 19.2 | 0.78 | 1.6 | 30.4 | 16.4 |
| 100° | | 23.2 | 18.5 | 0.80 | 1.8 | 29.4 | 12.7 |
| 110° | | 21.5 | 17.9 | 0.82 | 2.0 | 28.5 | 8.9 |
| 50° | 85° DB 71° WB | 33.8 | 22.6 | 0.66 | 0.8 | 36.6 | 33.1 |
| 60° | | 32.1 | 21.9 | 0.68 | 1.0 | 35.6 | 29.2 |
| 70° | | 30.3 | 21.3 | 0.70 | 1.2 | 34.6 | 25.2 |
| 80° | | 28.5 | 20.6 | 0.73 | 1.4 | 33.6 | 21.3 |
| 90° | | 26.7 | 19.9 | 0.75 | 1.6 | 32.6 | 17.4 |
| 100° | | 24.9 | 19.3 | 0.77 | 1.9 | 31.6 | 13.5 |
| 110° | | 23.1 | 18.6 | 0.80 | 2.1 | 30.6 | 9.5 |

HEATING PART LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Leaving Air Temp. (°F) | Power Input (KW) | Heat of Absorption (MBtuH) | COP |
|---------------------------|-------------------------|------------------------|------------------------|------------------|----------------------------|-----|
| 25° | 65° | 18.7 | 84.2 | 1.6 | 13.0 | 3.4 |
| 30° | | 20.4 | 86.0 | 1.6 | 14.7 | 3.7 |
| 40° | | 23.7 | 89.4 | 1.7 | 17.9 | 4.2 |
| 50° | | 27.1 | 92.9 | 1.7 | 21.1 | 4.6 |
| 60° | | 30.6 | 96.5 | 1.8 | 24.5 | 5.1 |
| 70° | | 34.2 | 100.2 | 1.8 | 28.0 | 5.6 |
| 80° | | 37.7 | 103.8 | 1.8 | 31.4 | 6.1 |
| 25° | 70° | 18.3 | 88.8 | 1.6 | 12.7 | 3.3 |
| 30° | | 19.9 | 90.5 | 1.7 | 14.2 | 3.5 |
| 40° | | 23.2 | 93.9 | 1.7 | 17.3 | 4.0 |
| 50° | | 26.5 | 97.2 | 1.8 | 20.5 | 4.4 |
| 60° | | 29.9 | 100.8 | 1.8 | 23.8 | 4.9 |
| 70° | | 33.4 | 104.4 | 1.8 | 27.2 | 5.3 |
| 80° | | 36.9 | 107.9 | 1.9 | 30.5 | 5.8 |
| 25° | 75° | 18.5 | 94.0 | 1.8 | 12.3 | 2.9 |
| 30° | | 20.1 | 95.7 | 1.9 | 13.8 | 3.2 |
| 40° | | 23.4 | 99.1 | 1.9 | 16.8 | 3.6 |
| 50° | | 26.8 | 102.5 | 2.0 | 19.9 | 4.0 |
| 60° | | 30.3 | 106.1 | 2.0 | 23.1 | 4.4 |
| 70° | | 33.8 | 109.8 | 2.1 | 26.3 | 4.8 |
| 80° | | 37.3 | 113.4 | 2.1 | 29.6 | 5.2 |

QW4S3D

Full Load Capacities based upon rated flow of 9 GPM of 15% methanol/mass at 1450 CFM airflow.

COOLING FULL LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Sensible Capacity (MBtuH) | Sensible to Total Ratio | Power Input (KW) | Heat of Rejection (MBtuH) | EER |
|---------------------------|-------------------------|------------------------|---------------------------|-------------------------|------------------|---------------------------|------|
| 50° | 70° DB 59° WB | 47.6 | 33.5 | 0.70 | 1.8 | 53.2 | 21.7 |
| 60° | | 45.8 | 32.5 | 0.71 | 2.2 | 52.5 | 19.5 |
| 70° | | 44.0 | 31.5 | 0.72 | 2.5 | 51.7 | 17.3 |
| 80° | | 42.3 | 30.5 | 0.72 | 2.9 | 51.0 | 15.1 |
| 90° | | 40.5 | 29.5 | 0.73 | 3.3 | 50.3 | 12.9 |
| 100° | | 38.7 | 28.5 | 0.74 | 3.6 | 49.5 | 10.7 |
| 110° | | 36.9 | 27.6 | 0.74 | 4.0 | 48.8 | 8.5 |
| 50° | 75° DB 63° WB | 51.1 | 34.8 | 0.68 | 1.9 | 57.1 | 23.1 |
| 60° | | 49.2 | 33.8 | 0.69 | 2.2 | 56.4 | 20.7 |
| 70° | | 47.4 | 32.8 | 0.69 | 2.6 | 55.6 | 18.4 |
| 80° | | 45.5 | 31.8 | 0.70 | 2.9 | 54.9 | 16.1 |
| 90° | | 43.6 | 30.9 | 0.71 | 3.3 | 54.2 | 13.8 |
| 100° | | 41.8 | 29.9 | 0.72 | 3.6 | 53.4 | 11.5 |
| 110° | | 39.9 | 28.9 | 0.72 | 4.0 | 52.7 | 9.1 |
| 50° | 80° DB 67° WB | 54.8 | 36.0 | 0.65 | 1.9 | 61.2 | 24.4 |
| 60° | | 52.8 | 35.0 | 0.66 | 2.2 | 60.5 | 22.0 |
| 70° | | 50.8 | 34.0 | 0.67 | 2.6 | 59.7 | 19.5 |
| 80° | | 48.9 | 33.1 | 0.68 | 3.0 | 59.0 | 17.1 |
| 90° | | 46.9 | 32.1 | 0.69 | 3.3 | 58.2 | 14.6 |
| 100° | | 44.9 | 31.1 | 0.69 | 3.7 | 57.5 | 12.2 |
| 110° | | 43.0 | 30.2 | 0.70 | 4.0 | 56.7 | 9.8 |
| 50° | 85° DB 71° WB | 58.7 | 37.2 | 0.63 | 1.9 | 65.6 | 25.7 |
| 60° | | 56.6 | 36.2 | 0.64 | 2.3 | 64.8 | 23.1 |
| 70° | | 54.5 | 35.2 | 0.65 | 2.6 | 64.0 | 20.6 |
| 80° | | 52.4 | 34.3 | 0.65 | 3.0 | 63.3 | 18.1 |
| 90° | | 50.3 | 33.3 | 0.66 | 3.4 | 62.5 | 15.5 |
| 100° | | 48.2 | 32.4 | 0.67 | 3.7 | 61.7 | 13.0 |
| 110° | | 46.2 | 31.4 | 0.68 | 4.1 | 61.0 | 10.4 |

HEATING FULL LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Leaving Air Temp. (°F) | Power Input (KW) | Heat of Absorption (MBtuH) | COP |
|---------------------------|-------------------------|------------------------|------------------------|------------------|----------------------------|-----|
| 25° | 65° | 32.9 | 86.0 | 2.9 | 22.7 | 3.4 |
| 30° | | 35.6 | 87.7 | 3.0 | 25.1 | 3.5 |
| 40° | | 41.1 | 91.2 | 3.2 | 30.0 | 3.8 |
| 50° | | 46.6 | 94.8 | 3.3 | 34.9 | 4.1 |
| 60° | | 52.5 | 98.5 | 3.5 | 40.1 | 4.3 |
| 70° | | 58.4 | 102.3 | 3.7 | 45.3 | 4.6 |
| 80° | | 64.3 | 106.1 | 3.9 | 50.5 | 4.8 |
| 25° | 70° | 32.1 | 90.5 | 3.0 | 22.0 | 3.2 |
| 30° | | 34.8 | 92.2 | 3.1 | 24.4 | 3.3 |
| 40° | | 40.2 | 95.7 | 3.2 | 29.1 | 3.6 |
| 50° | | 45.5 | 99.1 | 3.4 | 33.8 | 3.9 |
| 60° | | 51.3 | 102.8 | 3.6 | 38.9 | 4.1 |
| 70° | | 57.1 | 106.5 | 3.8 | 44.0 | 4.4 |
| 80° | | 62.9 | 110.2 | 4.0 | 49.1 | 4.6 |
| 25° | 75° | 32.5 | 95.7 | 3.3 | 21.4 | 2.9 |
| 30° | | 35.2 | 97.5 | 3.4 | 23.7 | 3.0 |
| 40° | | 40.6 | 100.9 | 3.6 | 28.2 | 3.3 |
| 50° | | 46.0 | 104.4 | 3.8 | 32.8 | 3.5 |
| 60° | | 51.9 | 108.1 | 4.1 | 37.8 | 3.7 |
| 70° | | 57.7 | 111.9 | 4.3 | 42.7 | 3.9 |
| 80° | | 63.6 | 115.6 | 4.5 | 47.6 | 4.1 |

Full Load Capacities based upon rated flow of 9 GPM of 15% methanol/mass at 1200 CFM airflow.

COOLING PART LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Sensible Capacity (MBtuH) | Sensible to Total Ratio | Power Input (KW) | Heat of Rejection (MBtuH) | EER |
|---------------------------|-------------------------|------------------------|---------------------------|-------------------------|------------------|---------------------------|------|
| 50° | 70° DB 59° WB | 36.2 | 27.0 | 0.74 | 1.0 | 39.2 | 27.3 |
| 60° | | 34.7 | 26.2 | 0.75 | 1.3 | 38.6 | 24.2 |
| 70° | | 33.3 | 25.4 | 0.76 | 1.6 | 38.1 | 21.1 |
| 80° | | 31.9 | 24.7 | 0.78 | 1.9 | 37.6 | 17.9 |
| 90° | | 30.5 | 23.9 | 0.79 | 2.2 | 37.0 | 14.8 |
| 100° | | 29.0 | 23.2 | 0.80 | 2.5 | 36.5 | 11.7 |
| 110° | | 27.6 | 22.4 | 0.81 | 2.8 | 35.9 | 8.5 |
| 50° | 75° DB 63° WB | 38.8 | 28.0 | 0.72 | 1.0 | 42.1 | 29.0 |
| 60° | | 37.3 | 27.3 | 0.73 | 1.3 | 41.5 | 25.7 |
| 70° | | 35.8 | 26.5 | 0.74 | 1.6 | 41.0 | 22.4 |
| 80° | | 34.3 | 25.7 | 0.75 | 1.9 | 40.4 | 19.1 |
| 90° | | 32.8 | 25.0 | 0.76 | 2.2 | 39.9 | 15.8 |
| 100° | | 31.3 | 24.2 | 0.77 | 2.5 | 39.3 | 12.5 |
| 110° | | 29.8 | 23.5 | 0.79 | 2.8 | 38.8 | 9.2 |
| 50° | 80° DB 67° WB | 41.7 | 29.0 | 0.69 | 1.0 | 45.1 | 30.7 |
| 60° | | 40.1 | 28.2 | 0.70 | 1.3 | 44.6 | 27.2 |
| 70° | | 38.5 | 27.5 | 0.71 | 1.6 | 44.0 | 23.7 |
| 80° | | 36.9 | 26.8 | 0.73 | 1.9 | 43.5 | 20.2 |
| 90° | | 35.3 | 26.0 | 0.74 | 2.2 | 42.9 | 16.8 |
| 100° | | 33.7 | 25.3 | 0.75 | 2.5 | 42.3 | 13.3 |
| 110° | | 32.1 | 24.5 | 0.76 | 2.8 | 41.8 | 9.8 |
| 50° | 85° DB 71° WB | 44.6 | 29.9 | 0.67 | 1.0 | 48.3 | 32.3 |
| 60° | | 42.9 | 29.2 | 0.68 | 1.3 | 47.7 | 28.7 |
| 70° | | 41.2 | 28.5 | 0.69 | 1.6 | 47.2 | 25.0 |
| 80° | | 39.5 | 27.7 | 0.70 | 2.0 | 46.6 | 21.4 |
| 90° | | 37.9 | 27.0 | 0.71 | 2.3 | 46.0 | 17.8 |
| 100° | | 36.2 | 26.3 | 0.73 | 2.6 | 45.5 | 14.1 |
| 110° | | 34.5 | 25.5 | 0.74 | 2.9 | 44.9 | 10.5 |

HEATING PART LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Leaving Air Temp. (°F) | Power Input (KW) | Heat of Absorption (MBtuH) | COP |
|---------------------------|-------------------------|------------------------|------------------------|------------------|----------------------------|-----|
| 25° | 65° | 24.4 | 83.8 | 2.1 | 16.8 | 3.4 |
| 30° | | 26.4 | 85.4 | 2.2 | 18.8 | 3.6 |
| 40° | | 30.5 | 88.6 | 2.2 | 22.8 | 4.0 |
| 50° | | 34.7 | 91.7 | 2.3 | 26.7 | 4.5 |
| 60° | | 39.5 | 95.5 | 2.3 | 31.5 | 5.0 |
| 70° | | 44.4 | 99.3 | 2.4 | 36.2 | 5.5 |
| 80° | | 49.3 | 103.1 | 2.4 | 41.0 | 6.0 |
| 25° | 70° | 23.8 | 88.4 | 2.2 | 16.3 | 3.2 |
| 30° | | 25.8 | 89.9 | 2.2 | 18.3 | 3.4 |
| 40° | | 29.8 | 93.0 | 2.3 | 22.1 | 3.8 |
| 50° | | 33.9 | 96.1 | 2.3 | 26.0 | 4.3 |
| 60° | | 38.7 | 99.8 | 2.4 | 30.6 | 4.8 |
| 70° | | 43.4 | 103.5 | 2.4 | 35.2 | 5.2 |
| 80° | | 48.2 | 107.2 | 2.5 | 39.8 | 5.7 |
| 25° | 75° | 24.1 | 93.6 | 2.5 | 15.8 | 2.9 |
| 30° | | 26.1 | 95.1 | 2.5 | 17.7 | 3.1 |
| 40° | | 30.2 | 98.3 | 2.5 | 21.4 | 3.5 |
| 50° | | 34.2 | 101.4 | 2.6 | 25.2 | 3.9 |
| 60° | | 39.1 | 105.2 | 2.7 | 29.6 | 4.3 |
| 70° | | 43.9 | 108.9 | 2.7 | 34.1 | 4.7 |
| 80° | | 48.8 | 112.6 | 2.8 | 38.6 | 5.2 |

QW5S3D

Full Load Capacities based upon rated flow of 9 GPM of 15% methanol/mass at 1650 CFM airflow.

COOLING FULL LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Sensible Capacity (MBtuH) | Sensible to Total Ratio | Power Input (KW) | Heat of Rejection (MBtuH) | EER |
|---------------------------|-------------------------|------------------------|---------------------------|-------------------------|------------------|---------------------------|------|
| 50° | 70° DB 59° WB | 57.4 | 39.7 | 0.69 | 2.4 | 64.8 | 20.4 |
| 60° | | 54.8 | 38.3 | 0.70 | 2.8 | 63.4 | 18.3 |
| 70° | | 52.2 | 37.0 | 0.71 | 3.2 | 61.9 | 16.3 |
| 80° | | 49.6 | 35.6 | 0.72 | 3.6 | 60.5 | 14.2 |
| 90° | | 47.0 | 34.2 | 0.73 | 4.0 | 59.0 | 12.1 |
| 100° | | 44.4 | 32.9 | 0.74 | 4.4 | 57.6 | 10.1 |
| 110° | | 41.7 | 31.5 | 0.75 | 4.8 | 56.1 | 8.0 |
| 50° | 75° DB 63° WB | 61.7 | 41.2 | 0.66 | 2.4 | 69.6 | 21.6 |
| 60° | | 58.9 | 39.9 | 0.67 | 2.8 | 68.1 | 19.5 |
| 70° | | 56.1 | 38.5 | 0.69 | 3.2 | 66.6 | 17.3 |
| 80° | | 53.4 | 37.1 | 0.70 | 3.6 | 65.1 | 15.1 |
| 90° | | 50.6 | 35.8 | 0.71 | 4.1 | 63.6 | 12.9 |
| 100° | | 47.8 | 34.4 | 0.72 | 4.5 | 62.1 | 10.7 |
| 110° | | 45.1 | 33.0 | 0.73 | 4.9 | 60.6 | 8.6 |
| 50° | 80° DB 67° WB | 66.2 | 42.7 | 0.64 | 2.5 | 74.6 | 22.9 |
| 60° | | 63.2 | 41.3 | 0.65 | 2.9 | 73.1 | 20.6 |
| 70° | | 60.3 | 40.0 | 0.66 | 3.3 | 71.5 | 18.3 |
| 80° | | 57.3 | 38.6 | 0.67 | 3.7 | 69.9 | 16.0 |
| 90° | | 54.5 | 37.2 | 0.69 | 4.1 | 68.4 | 13.7 |
| 100° | | 51.5 | 35.9 | 0.70 | 4.5 | 66.8 | 11.5 |
| 110° | | 48.5 | 34.5 | 0.71 | 4.9 | 65.3 | 9.2 |
| 50° | 85° DB 71° WB | 70.8 | 44.1 | 0.62 | 2.5 | 79.9 | 24.1 |
| 60° | | 67.7 | 42.7 | 0.63 | 2.9 | 78.3 | 21.7 |
| 70° | | 64.6 | 41.4 | 0.64 | 3.3 | 76.6 | 19.3 |
| 80° | | 61.5 | 40.0 | 0.65 | 3.7 | 75.0 | 17.0 |
| 90° | | 58.4 | 38.6 | 0.66 | 4.1 | 73.4 | 14.6 |
| 100° | | 55.3 | 37.3 | 0.67 | 4.5 | 71.8 | 12.2 |
| 110° | | 52.2 | 35.9 | 0.69 | 4.9 | 70.1 | 9.8 |

HEATING FULL LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Leaving Air Temp. (°F) | Power Input (KW) | Heat of Absorption (MBtuH) | COP |
|---------------------------|-------------------------|------------------------|------------------------|------------------|----------------------------|-----|
| 25° | 65° | 42.1 | 88.6 | 3.5 | 29.7 | 3.5 |
| 30° | | 45.3 | 90.4 | 3.6 | 32.6 | 3.7 |
| 40° | | 51.9 | 94.1 | 3.8 | 38.4 | 3.9 |
| 50° | | 58.4 | 97.8 | 4.1 | 44.1 | 4.2 |
| 60° | | 64.6 | 101.3 | 4.3 | 49.6 | 4.4 |
| 70° | | 70.8 | 104.7 | 4.5 | 55.1 | 4.6 |
| 80° | | 77.0 | 108.2 | 4.7 | 60.6 | 4.8 |
| 25° | 70° | 41.1 | 93.1 | 3.6 | 28.9 | 3.4 |
| 30° | | 44.3 | 94.9 | 3.7 | 31.7 | 3.5 |
| 40° | | 50.7 | 98.5 | 3.9 | 37.3 | 3.8 |
| 50° | | 57.1 | 102.0 | 4.2 | 42.9 | 4.0 |
| 60° | | 63.2 | 105.4 | 4.4 | 48.2 | 4.2 |
| 70° | | 69.2 | 108.9 | 4.6 | 53.5 | 4.4 |
| 80° | | 75.3 | 112.3 | 4.8 | 58.9 | 4.6 |
| 25° | 75° | 41.6 | 98.3 | 4.0 | 28.0 | 3.0 |
| 30° | | 44.8 | 100.1 | 4.2 | 30.7 | 3.2 |
| 40° | | 51.3 | 103.8 | 4.4 | 36.1 | 3.4 |
| 50° | | 57.7 | 107.4 | 4.7 | 41.6 | 3.6 |
| 60° | | 63.9 | 110.8 | 4.9 | 46.7 | 3.8 |
| 70° | | 70.0 | 114.3 | 5.2 | 51.9 | 4.0 |
| 80° | | 76.1 | 117.7 | 5.4 | 57.1 | 4.1 |

Full Load Capacities based upon rated flow of 9 GPM of 15% methanol/mass at 1400 CFM airflow.

COOLING PART LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Sensible Capacity (MBtuH) | Sensible to Total Ratio | Power Input (KW) | Heat of Rejection (MBtuH) | EER |
|---------------------------|-------------------------|------------------------|---------------------------|-------------------------|------------------|---------------------------|------|
| 50° | 70° DB 59° WB | 45.1 | 33.0 | 0.73 | 1.3 | 49.1 | 26.2 |
| 60° | | 42.8 | 31.6 | 0.74 | 1.7 | 47.8 | 23.1 |
| 70° | | 40.4 | 30.2 | 0.75 | 2.0 | 46.5 | 20.0 |
| 80° | | 38.1 | 28.8 | 0.76 | 2.4 | 45.3 | 16.9 |
| 90° | | 35.7 | 27.3 | 0.77 | 2.8 | 44.0 | 13.8 |
| 100° | | 33.3 | 25.9 | 0.78 | 3.1 | 42.7 | 10.7 |
| 110° | | 31.0 | 24.5 | 0.79 | 3.5 | 41.4 | 7.6 |
| 50° | 75° DB 63° WB | 48.5 | 34.3 | 0.70 | 1.3 | 52.8 | 27.8 |
| 60° | | 46.0 | 32.8 | 0.71 | 1.7 | 51.4 | 24.5 |
| 70° | | 43.5 | 31.4 | 0.72 | 2.0 | 50.1 | 21.3 |
| 80° | | 41.0 | 30.0 | 0.73 | 2.4 | 48.7 | 18.0 |
| 90° | | 38.5 | 28.6 | 0.74 | 2.8 | 47.4 | 14.7 |
| 100° | | 35.9 | 27.1 | 0.75 | 3.2 | 46.0 | 11.4 |
| 110° | | 33.4 | 25.7 | 0.77 | 3.5 | 44.7 | 8.1 |
| 50° | 80° DB 67° WB | 52.0 | 35.5 | 0.68 | 1.3 | 56.6 | 29.4 |
| 60° | | 49.3 | 34.0 | 0.69 | 1.7 | 55.2 | 26.0 |
| 70° | | 46.7 | 32.6 | 0.70 | 2.1 | 53.8 | 22.5 |
| 80° | | 44.0 | 31.2 | 0.71 | 2.4 | 52.3 | 19.1 |
| 90° | | 41.3 | 29.7 | 0.72 | 2.8 | 50.9 | 15.6 |
| 100° | | 38.7 | 28.3 | 0.73 | 3.2 | 49.5 | 12.2 |
| 110° | | 36.0 | 26.8 | 0.74 | 3.5 | 48.1 | 8.7 |
| 50° | 85° DB 71° WB | 55.7 | 36.6 | 0.65 | 1.4 | 60.6 | 31.0 |
| 60° | | 52.9 | 35.2 | 0.66 | 1.7 | 59.1 | 27.4 |
| 70° | | 50.0 | 33.7 | 0.67 | 2.1 | 57.6 | 23.8 |
| 80° | | 47.2 | 32.3 | 0.69 | 2.5 | 56.1 | 20.2 |
| 90° | | 44.4 | 30.8 | 0.70 | 2.8 | 54.7 | 16.5 |
| 100° | | 41.5 | 29.4 | 0.71 | 3.2 | 53.2 | 12.9 |
| 110° | | 38.7 | 27.9 | 0.72 | 3.6 | 51.7 | 9.3 |

HEATING PART LOAD

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Leaving Air Temp. (°F) | Power Input (KW) | Heat of Absorption (MBtuH) | COP |
|---------------------------|-------------------------|------------------------|------------------------|------------------|----------------------------|-----|
| 25° | 65° | 30.6 | 85.3 | 2.6 | 21.5 | 3.5 |
| 30° | | 33.1 | 86.9 | 2.6 | 23.8 | 3.7 |
| 40° | | 38.1 | 90.2 | 2.7 | 28.5 | 4.1 |
| 50° | | 43.1 | 93.5 | 2.8 | 33.2 | 4.5 |
| 60° | | 48.0 | 96.8 | 2.9 | 37.9 | 4.9 |
| 70° | | 53.0 | 100.1 | 3.0 | 42.7 | 5.2 |
| 80° | | 58.0 | 103.4 | 3.1 | 47.4 | 5.6 |
| 25° | 70° | 29.9 | 89.8 | 2.7 | 20.8 | 3.3 |
| 30° | | 32.4 | 91.4 | 2.7 | 23.1 | 3.5 |
| 40° | | 37.2 | 94.6 | 2.8 | 27.7 | 3.9 |
| 50° | | 42.1 | 97.8 | 2.9 | 32.2 | 4.3 |
| 60° | | 47.0 | 101.1 | 3.0 | 36.8 | 4.6 |
| 70° | | 51.8 | 104.3 | 3.1 | 41.4 | 5.0 |
| 80° | | 56.7 | 107.5 | 3.1 | 46.0 | 5.3 |
| 25° | 75° | 30.3 | 95.0 | 3.0 | 20.2 | 3.0 |
| 30° | | 32.7 | 96.6 | 3.0 | 22.4 | 3.2 |
| 40° | | 37.6 | 99.9 | 3.1 | 26.9 | 3.5 |
| 50° | | 42.6 | 103.1 | 3.2 | 31.3 | 3.8 |
| 60° | | 47.5 | 106.4 | 3.3 | 35.7 | 4.2 |
| 70° | | 52.4 | 109.7 | 3.4 | 40.2 | 4.5 |
| 80° | | 57.3 | 112.9 | 3.5 | 44.6 | 4.8 |

Water Coil Pressure Drop (Fresh Water)

| Model | QW2S3 & QW3S3 | | QW4S3 | | QW5S3 | |
|-------|---------------|---------|-------|---------|-------|---------|
| | PSID | Ft. Hd. | PSID | Ft. Hd. | PSID | Ft. Hd. |
| 3 | 0.1 | 0.23 | | | | |
| 4 | 0.6 | 1.38 | 0.9 | 2.08 | | |
| 5 | 3.1 | 7.26 | 1.4 | 3.23 | | |
| 6 | 5.7 | 13.19 | 3.6 | 8.39 | | |
| 7 | 8.3 | 19.13 | 7.3 | 16.80 | 6.7 | 15.52 |
| 8 | 10.9 | 25.07 | 10.9 | 25.21 | 10.0 | 22.97 |
| 9 | 13.4 | 31.00 | 14.6 | 33.61 | 13.2 | 30.42 |
| 10 | | | 18.2 | 42.02 | 16.4 | 37.87 |
| 11 | | | 21.9 | 50.43 | 19.6 | 45.32 |
| 12 | | | 25.5 | 58.83 | 22.9 | 52.77 |
| 13 | | | 29.1 | 67.24 | 26.1 | 60.22 |
| 14 | | | 32.8 | 75.65 | 29.3 | 67.67 |
| 15 | | | | | 32.6 | 75.12 |
| 16 | | | | | 35.8 | 82.57 |
| 17 | | | | | 39.0 | 90.02 |
| 18 | | | | | | |

NOTE:

For pump options 3, 4 and 5 add 1.5 head to Table values as allowance for QW*S internal piping.

Additional feet head allowance for external piping to loop must be included and determined by others.

Required Flow Rates for Ground Loop Installations

| | QW2S | QW3S | QW4S | QW5S |
|--|------|------|------|------|
| Flow rate required GPM Methanol, Propylene Glycol or Ethanol ① | 7 | 8 | 9 | 9 |

① See Antifreeze table below.

Antifreeze Percentages by Volume for Ground Loop Installations ①

| Type | Minimum Temperature for Freeze Protection | | | |
|--------------------------------------|---|---------------|---------------|---------------|
| | 10°F (-12.2°C) | 15°F (-9.4°C) | 20°F (-6.7°C) | 25°F (-3.9°C) |
| Methanol | 25% | 21% | 16% | 10% |
| Ethanol ② | 29% | 25% | 20% | 14% |
| 100% USP Food Grade Propylene Glycol | 27% | 24% | 20% | 13% |

① Loop antifreeze protection must be determined based on loop design and geographic location.

② Must not be denatured with any petroleum based product.

Unit Charge Rates

| UNIT | Std. Unit - Lbs. | Dehum. Units - Lbs. |
|---|------------------|---------------------|
| QW2S3 - High Efficiency Step Capacity Geothermal Indoor Heat Pump | 6.1875 | 6.1875 |
| QW3S3 - High Efficiency Step Capacity Geothermal Indoor Heat Pump | 6.00 | 6.00 |
| QW4S3 - High Efficiency Step Capacity Geothermal Indoor Heat Pump | 7.0625 | 7.0625 |
| QW5S3 - High Efficiency Step Capacity Geothermal Indoor Heat Pump | 7.625 | 7.625 |

Ventilation System Packages — Optional

Q-TEC models are designed to provide optional ventilation packages to meet all of your ventilation and indoor air quality requirements. All ventilation packages are factory installed. If no option is ordered, the ventilation intake and exhaust are sealed with a blank-off plate.

NOTE: A ventilation wall sleeve QWVS42 with outdoor louver grille is required for all installations that intend to utilize one of the built-in ventilation options of the QW*S Series heat pumps. If a ventilation option is not to be utilized, do not order ventilation wall sleeve.

COMMERCIAL ROOM VENTILATOR (Option V)

OPTIONAL

The built-in commercial room ventilator is internally mounted and allows outside ventilation air, up to 50% of the total airflow rating of the unit, to be introduced through the ventilation louver grille. It includes a built-in exhaust air damper. Spring return on power loss or deactivation. The commercial room ventilator (CRV) is a simple and innovative approach to improving the indoor air quality by providing fresh air intake and exhaust capability through the CRV. The damper can be easily adjusted to control the amount of fresh air supplied into the building. The CRV can be controlled by indoor blower operation or field controlled based on room occupancy. Complies with ANSI/ASHRAE Standard 62.1 "Ventilation for Acceptable Indoor Air Quality".

COMMERCIAL ROOM VENTILATOR (Option W)

OPTIONAL

The built-in commercial room ventilator is internally mounted and allows outside ventilation air, up to 50% of the total airflow rating of the unit, to be introduced through the ventilation louver grille. It includes a built-in exhaust air damper. Spring return on power loss or deactivation. The commercial room ventilator (CRV) is a simple and innovative approach to improving the indoor air quality by providing fresh air intake and exhaust capability through the CRV. The damper can be easily adjusted to control the amount of fresh air supplied into the building. The CRV can be controlled by indoor blower operation or field controlled based on room occupancy. Complies with ANSI/ASHRAE Standard 62.1 "Ventilation for Acceptable Indoor Air Quality". Option W has 0 - 10 VDC actuator for DDC control by others.

ENERGY RECOVERY VENTILATOR (Option R)

OPTIONAL

The energy recovery ventilator (ERV) is a highly innovative approach to meeting indoor air quality ventilation requirements as established by ANSI/ASHRAE Standard 62.1. The ERV is internally mounted and allows up to 450 CFM (depending upon speed setting) of fresh air and exhaust through the unit while maintaining superior indoor comfort and humidity levels. In most cases this can be accomplished without increasing equipment sizing or operating costs. Heat transfer efficiency is up to 64% during summer and 79% during winter conditions.

The ERV consists of a unique "rotary energy recovery cassette" that provides effective sensible and latent heat transfer capabilities during summer and winter conditions. Various control schemes are addressed including limiting ventilation during building occupancy only. The ERV has a filter for the exhaust air to keep the rotary wheels clean and free of any debris introduced through the room return air grille. The intake and exhaust rates can be independently selected. Factory set on medium intake and low exhaust. Intake and exhaust air paths have shut-off dampers to eliminate the ingress of outside air when ventilation system is off.

ENERGY RECOVERY VENTILATOR (Option S)

OPTIONAL

The energy recovery ventilator (ERV) is a highly innovative approach to meeting indoor air quality ventilation requirements as established by ANSI/ASHRAE Standard 62.1. The ERV is internally mounted and allows up to 450 CFM (depending upon speed setting) of fresh air and exhaust through the unit while maintaining superior indoor comfort and humidity levels. In most cases this can be accomplished without increasing equipment sizing or operating costs. Heat transfer efficiency is up to 64% during summer and 79% during winter conditions.

The ERV consists of a unique "rotary energy recovery cassette" that provides effective sensible and latent heat transfer capabilities during summer and winter conditions. Various control schemes are addressed including limiting ventilation during building occupancy only. The ERV has a filter for the exhaust air to keep the rotary wheels clean and free of any debris introduced through the room return air grille. The intake and exhaust rates can be independently selected. Factory set on medium intake and low exhaust. Intake and exhaust air paths have shut-off dampers to eliminate the ingress of outside air when ventilation system is off.

Equipped with Intelligent Frost Control that cycles the ventilation air intake damper closed for 4 minutes out of every 32 minutes of ERV operation when the outdoor air is below 10°F. This sequence allows the ERV to operate with zero outdoor air intake and allows conditioned room air to defrost any accumulated frost if present on the cassette wheels.

ENERGY RECOVERY VENTILATOR (Option T)

OPTIONAL

The energy recovery ventilator (ERV) is a highly innovative approach to meeting indoor air quality ventilation requirements as established by ANSI/ASHRAE Standard 62.1. The ERV is internally mounted and allows up to 450 CFM (depending upon speed setting) of fresh air and exhaust through the unit while maintaining superior indoor comfort and humidity levels. In most cases this can be accomplished without increasing equipment sizing or operating costs. Heat transfer efficiency is up to 64% during summer and 79% during winter conditions.

The ERV consists of a unique "rotary energy recovery cassette" that provides effective sensible and latent heat transfer capabilities during summer and winter conditions. Various control schemes are addressed including limiting ventilation during building occupancy only. The ERV has a filter for the exhaust air to keep the rotary wheels clean and free of any debris introduced through the room return air grille. The intake and exhaust rates can be independently selected. Factory set on medium intake and low exhaust. Intake and exhaust air paths have shut-off dampers to eliminate the ingress of outside air when ventilation system is off.

Additional controls to permit lower ventilation intake airflow (105 - 225 CFM based on selected intake blower speed and room tightness) and controlled by an occupancy signal, and then can increase to maximum of 450 CFM and controlled by CO₂ input signal.

ELECTRICAL SPECIFICATIONS

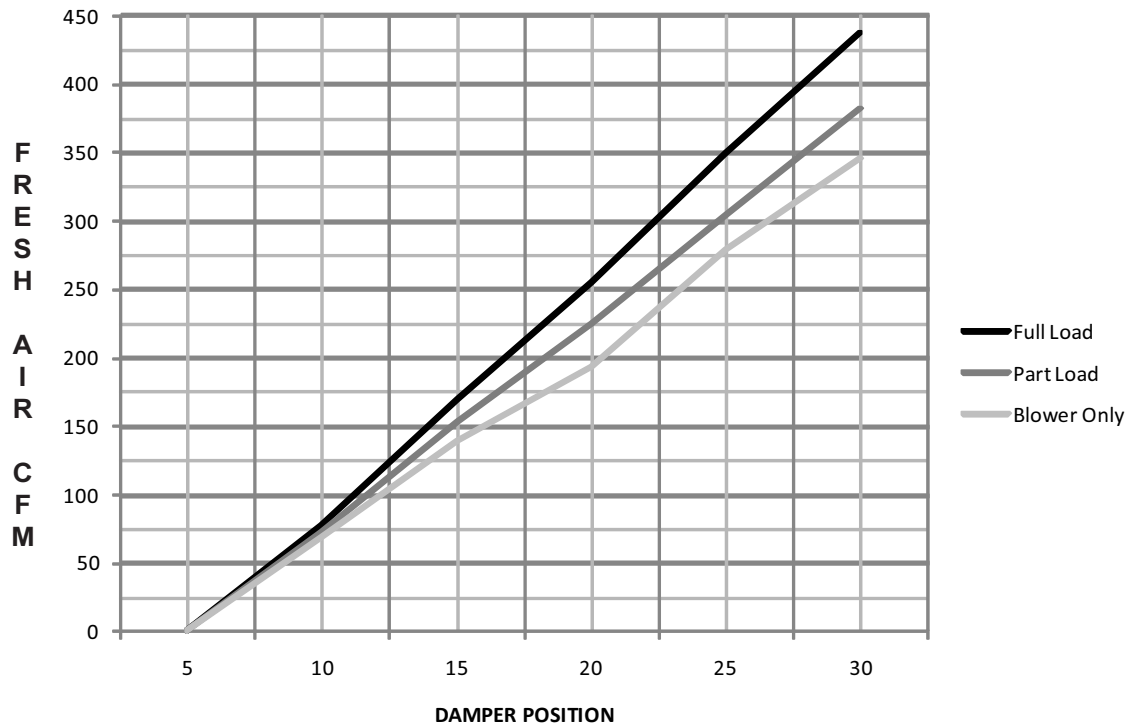
| MODEL | RATED VOLTS & PHASE | NO. FIELD POWER CIRCUITS | ③ MINIMUM CIRCUIT AMPACITY | ① MAXIMUM EXTERNAL FUSE OR CIRCUIT BREAKER | ② FIELD POWER WIRE SIZE | ② GROUND WIRE SIZE |
|-----------|---------------------|--------------------------|----------------------------|--|-------------------------|--------------------|
| QW2S3DA0Z | 230/208-1 | 1 | 20 | 30 | 10 | 10 |
| QW2S3DB0Z | 230/208-3 | 1 | 14 | 20 | 12 | 12 |
| QW2S3COZ | 460-3 | 1 | 9 | 15 | 14 | 14 |
| QW3S3DA0Z | 230/208-1 | 1 | 27 | 40 | 8 | 10 |
| QW3S3DB0Z | 230/208-3 | 1 | 22 | 30 | 10 | 10 |
| QW3S3DC0Z | 460-3 | 1 | 13 | 15 | 14 | 14 |
| QW4S3DA0Z | 230/208-1 | 1 | 37 | 50 | 8 | 10 |
| QW4S3DB0Z | 230/208-3 | 1 | 28 | 35 | 8 | 10 |
| QW4S3DC0Z | 460-3 | 1 | 17 | 20 | 12 | 14 |
| QW5S3DA0Z | 230/208-1 | 1 | 43 | 60 | 6 | 10 |
| QW5S3DB0Z | 230/208-3 | 1 | 30 | 40 | 8 | 10 |
| QW5S3DC0Z | 460-3 | 1 | 15 | 20 | 12 | 12 |

① Maximum size of the time delay fuse or HACR type circuit breaker for protection of field wiring conductors.

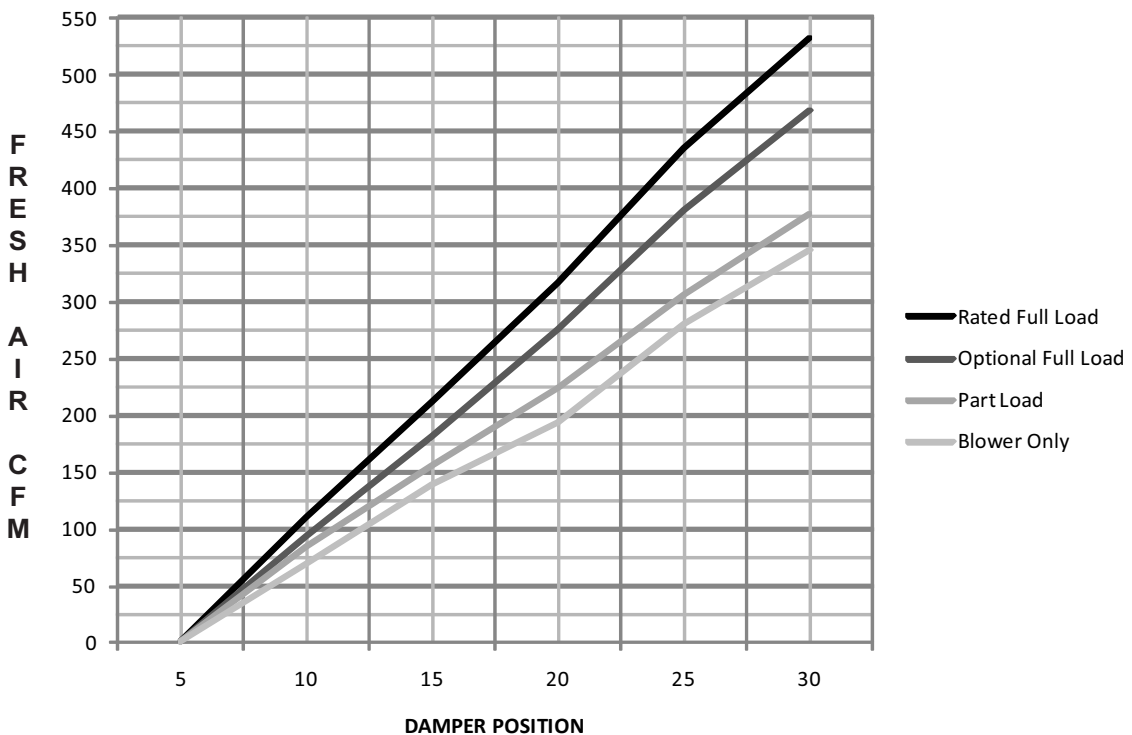
② Based on 75°C copper wire. All wiring must conform to the National Electrical Code and all local codes.

③ These "Minimum Circuit Ampacity" values are to be used for sizing the field power conductors. Refer to the National Electrical Code (latest revision) article 310 for power conductor sizing.

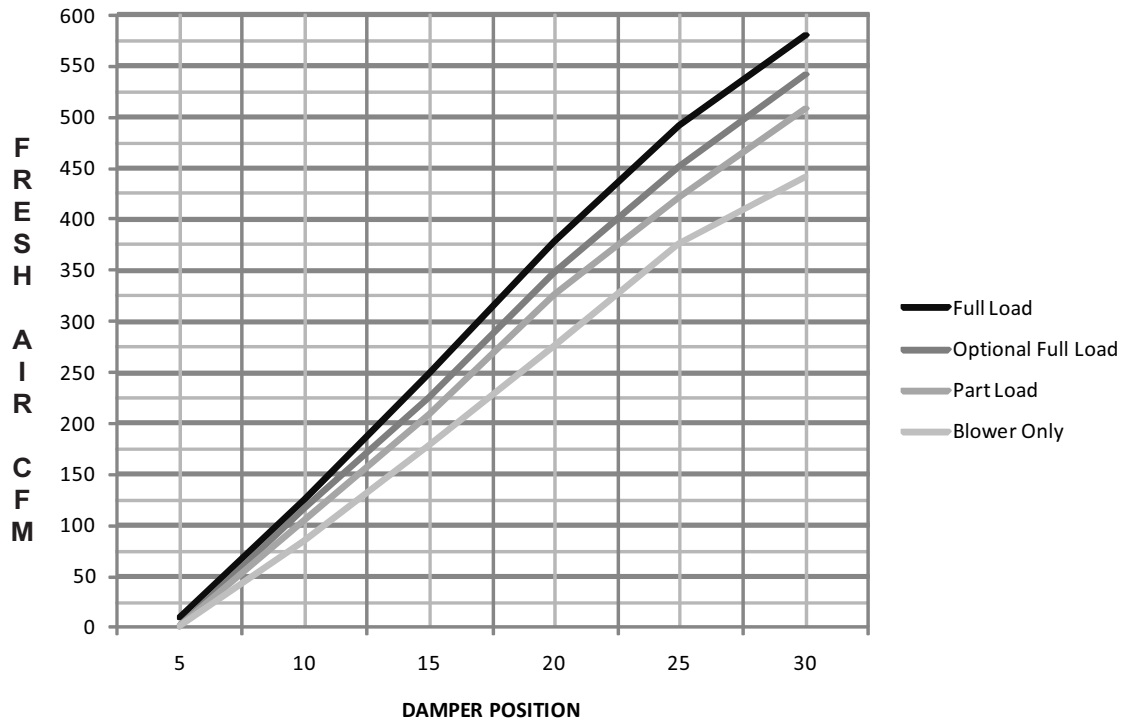
QW2S CRV AIRFLOW VS. DAMPER POSITION



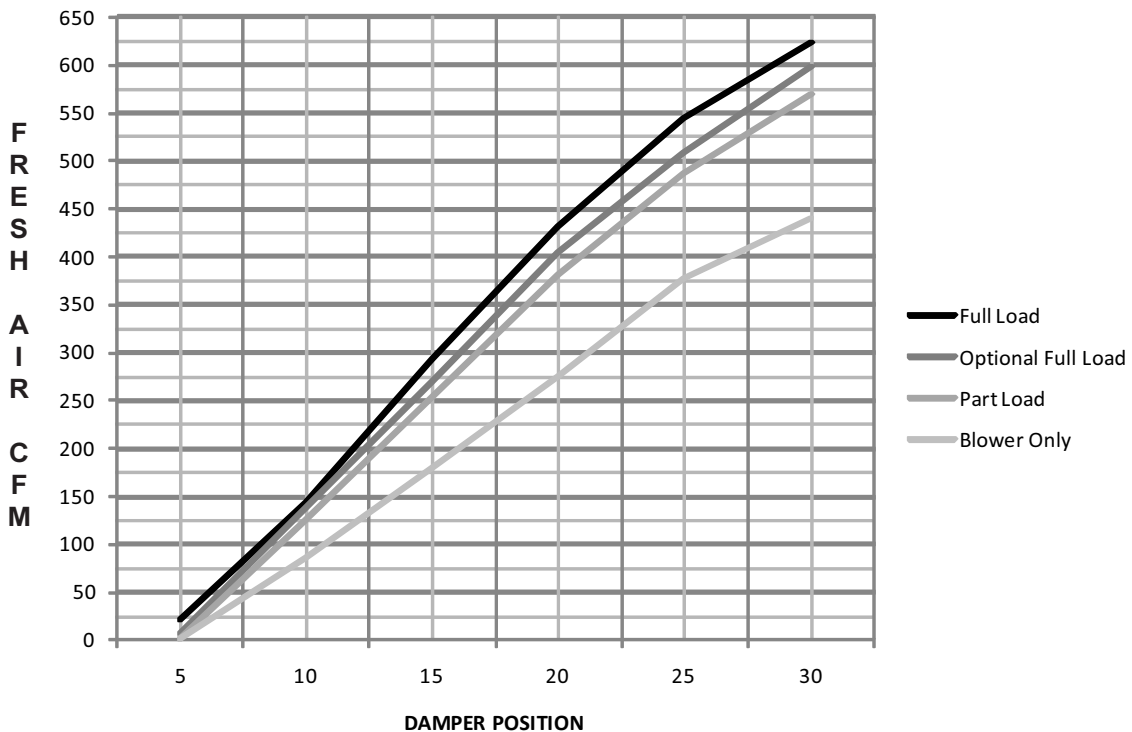
QW3S CRV AIRFLOW VS. DAMPER POSITION



QW4S CRV AIRFLOW VS. DAMPER POSITION



QW5S CRV AIRFLOW VS. DAMPER POSITION



Energy Recovery Ventilator Performance Tables

SUMMER COOLING PERFORMANCE (INDOOR DESIGN CONDITIONS 75°DB/62°WB)

| Ambient O.D. | VENTILATION RATE 450 CFM 65% EFFICIENCY | | | | | | | VENTILATION RATE 375 CFM 66% EFFICIENCY | | | | | | VENTILATION RATE 300 CFM 67% EFFICIENCY | | | | | | |
|-----------------|--|---|-------|-------|-------|-------|------|--|-------|-------|-------|-------|------|--|-------|------|-------|-------|------|-------|
| | DB/WB | F | VLT | VLS | VLL | HRT | HRS | HRL | VLT | VLS | VLL | HRT | HRS | HRL | VLT | VLS | VLL | HRT | HRS | HRL |
| 105 | 75 | | 21465 | 14580 | 6884 | 13952 | 9477 | 4475 | 17887 | 12150 | 5737 | 11805 | 8018 | 3786 | 14310 | 9720 | 4590 | 9587 | 6512 | 3075 |
| | 70 | | 14580 | 14580 | 0 | 9477 | 9477 | 0 | 12150 | 12150 | 0 | 8018 | 8018 | 0 | 9720 | 9720 | 0 | 6512 | 6512 | 0 |
| | 65 | | 14580 | 14580 | 0 | 9477 | 9477 | 0 | 12150 | 12150 | 0 | 8018 | 8018 | 0 | 9720 | 9720 | 0 | 6512 | 6512 | 0 |
| 100 | 80 | | 31590 | 12150 | 19440 | 20533 | 7897 | 12635 | 26325 | 10125 | 16200 | 17374 | 6682 | 10692 | 21060 | 8100 | 12960 | 14110 | 5427 | 8683 |
| | 75 | | 21465 | 12150 | 9314 | 13952 | 7897 | 6054 | 17887 | 10125 | 7762 | 11805 | 6682 | 5123 | 14310 | 8100 | 6210 | 9587 | 5427 | 4160 |
| | 70 | | 12352 | 12150 | 202 | 8029 | 7897 | 131 | 10293 | 10125 | 168 | 6793 | 6682 | 111 | 8235 | 8100 | 135 | 5517 | 5427 | 90 |
| | 65 | | 12150 | 12150 | 0 | 7897 | 7897 | 0 | 10125 | 10125 | 0 | 6682 | 6682 | 0 | 8100 | 8100 | 0 | 5427 | 5427 | 0 |
| | 60 | | 12150 | 12150 | 0 | 7897 | 7897 | 0 | 10125 | 10125 | 0 | 6682 | 6682 | 0 | 8100 | 8100 | 0 | 5427 | 5427 | 0 |
| 95 | 80 | | 31590 | 9720 | 21870 | 20533 | 6318 | 14215 | 26325 | 8100 | 18225 | 17374 | 5345 | 12028 | 21060 | 6480 | 14580 | 14110 | 4341 | 9768 |
| | 75 | | 21465 | 9720 | 11744 | 13952 | 6318 | 7634 | 17887 | 8100 | 9787 | 11805 | 5345 | 6459 | 14310 | 6480 | 7830 | 9587 | 4341 | 5246 |
| | 70 | | 12352 | 9720 | 2632 | 8029 | 6318 | 1711 | 10293 | 8100 | 2193 | 6793 | 5345 | 1447 | 8235 | 6480 | 1755 | 5517 | 4341 | 1175 |
| | 65 | | 9720 | 9720 | 0 | 6318 | 6318 | 0 | 8100 | 8100 | 0 | 5345 | 5345 | 0 | 6480 | 6480 | 0 | 4341 | 4341 | 0 |
| | 60 | | 9720 | 9720 | 0 | 6318 | 6318 | 0 | 8100 | 8100 | 0 | 5345 | 5345 | 0 | 6480 | 6480 | 0 | 4341 | 4341 | 0 |
| 90 | 80 | | 31590 | 7290 | 24300 | 20533 | 4738 | 15794 | 26325 | 6075 | 20250 | 17374 | 4009 | 13365 | 21060 | 4860 | 16200 | 14110 | 3256 | 10854 |
| | 75 | | 21465 | 7290 | 14175 | 13952 | 4738 | 9213 | 17887 | 6075 | 11812 | 11805 | 4009 | 7796 | 14310 | 4860 | 9450 | 9587 | 3256 | 6331 |
| | 70 | | 12352 | 7290 | 5062 | 8029 | 4738 | 3290 | 10293 | 6075 | 4218 | 6793 | 4009 | 2784 | 8235 | 4860 | 3375 | 5517 | 3256 | 2261 |
| | 65 | | 7290 | 7290 | 0 | 4738 | 4738 | 0 | 6075 | 6075 | 0 | 4009 | 4009 | 0 | 4860 | 4860 | 0 | 3256 | 3256 | 0 |
| | 60 | | 7290 | 7290 | 0 | 4738 | 4738 | 0 | 6075 | 6075 | 0 | 4009 | 4009 | 0 | 4860 | 4860 | 0 | 3256 | 3256 | 0 |
| 85 | 80 | | 31590 | 4860 | 26730 | 20533 | 3159 | 17374 | 26325 | 4050 | 22275 | 17374 | 2672 | 14701 | 21060 | 3240 | 17820 | 14110 | 2170 | 11939 |
| | 75 | | 21465 | 4860 | 16605 | 13952 | 3159 | 10793 | 17887 | 4050 | 13837 | 11805 | 2672 | 9132 | 14310 | 3240 | 11070 | 9587 | 2170 | 7416 |
| | 70 | | 12352 | 4860 | 7492 | 8029 | 3159 | 4870 | 10293 | 4050 | 6243 | 6793 | 2672 | 4120 | 8235 | 3240 | 4995 | 5517 | 2170 | 3346 |
| | 65 | | 4860 | 4860 | 0 | 3159 | 3159 | 0 | 4050 | 4050 | 0 | 2672 | 2672 | 0 | 3240 | 3240 | 0 | 2170 | 2170 | 0 |
| | 60 | | 4860 | 4860 | 0 | 3159 | 3159 | 0 | 4050 | 4050 | 0 | 2672 | 2672 | 0 | 3240 | 3240 | 0 | 2170 | 2170 | 0 |
| 80 | 75 | | 21465 | 2430 | 19035 | 13952 | 1579 | 12372 | 17887 | 2025 | 15862 | 11805 | 1336 | 10469 | 14310 | 1620 | 12690 | 9587 | 1085 | 8502 |
| | 70 | | 12352 | 2430 | 9922 | 8029 | 1579 | 6449 | 10293 | 2025 | 8268 | 6793 | 1336 | 5457 | 8235 | 1620 | 6615 | 5517 | 1085 | 4432 |
| | 65 | | 4252 | 2430 | 1822 | 2764 | 1579 | 1184 | 3543 | 2025 | 1518 | 2338 | 1336 | 1002 | 2835 | 1620 | 1215 | 1899 | 1085 | 814 |
| | 60 | | 2430 | 2430 | 0 | 1579 | 1579 | 0 | 2025 | 2025 | 0 | 1336 | 1336 | 0 | 1620 | 1620 | 0 | 1085 | 1085 | 0 |
| 75 | 70 | | 12352 | 0 | 12352 | 8029 | 0 | 8029 | 10293 | 0 | 10293 | 6793 | 0 | 6793 | 8235 | 0 | 8235 | 5517 | 0 | 5517 |
| | 65 | | 4252 | 0 | 4252 | 2764 | 0 | 2764 | 3543 | 0 | 3543 | 2338 | 0 | 2338 | 2835 | 0 | 2835 | 1899 | 0 | 1899 |
| | 60 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

WINTER HEATING PERFORMANCE (INDOOR DESIGN CONDITIONS 70°F DB)

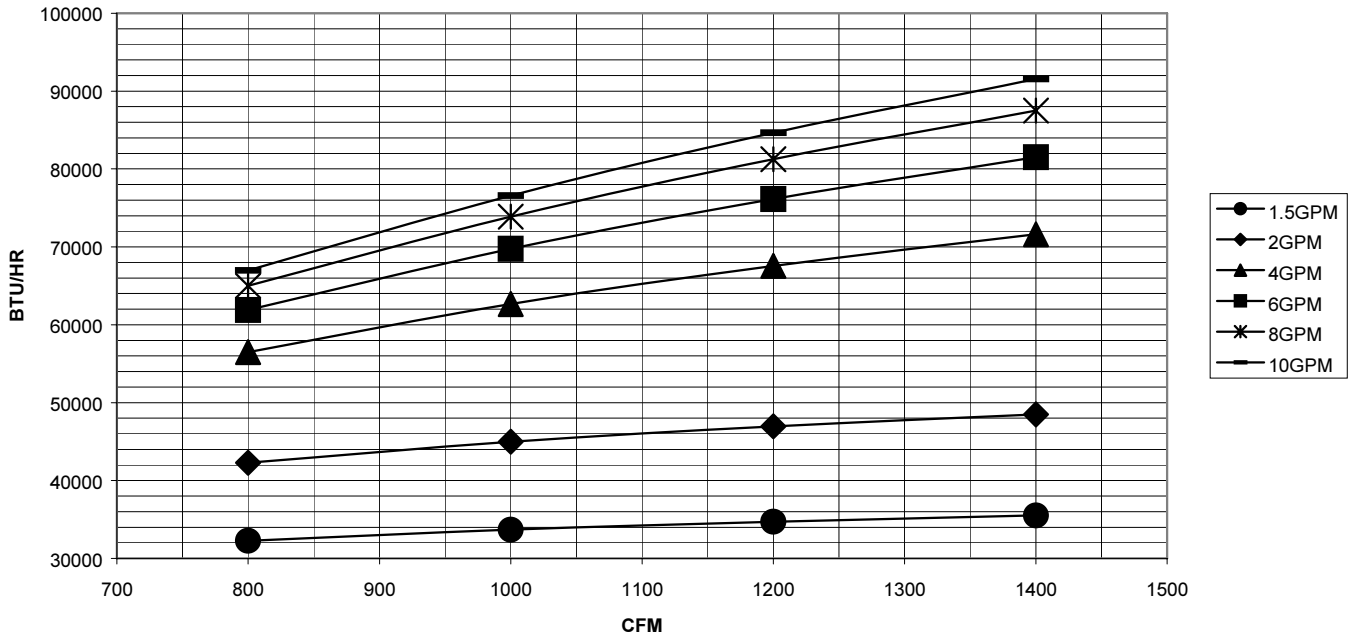
| Ambient O.D. | VENTILATION RATE | | | | | | | | |
|-----------------|---------------------------|-------|------|---------------------------|-------|------|---------------------------|-------|------|
| | 450 CFM 80% EFFICIENCY | | | 375 CFM 81% EFFICIENCY | | | 300 CFM 82% EFFICIENCY | | |
| DB/°F | VLT | HRS | VLS | VLT | HRS | VLS | VLT | HRS | VLS |
| 65 | 2430 | 1944 | 486 | 2025 | 1640 | 385 | 1620 | 1328 | 292 |
| 60 | 4860 | 3888 | 972 | 4050 | 3280 | 770 | 3240 | 2656 | 583 |
| 55 | 7290 | 5832 | 1458 | 6075 | 4920 | 1154 | 4860 | 3985 | 875 |
| 50 | 9720 | 7776 | 1944 | 8100 | 6561 | 1539 | 6480 | 5313 | 1166 |
| 45 | 12150 | 9720 | 2430 | 10125 | 8201 | 1924 | 8100 | 6642 | 1458 |
| 40 | 14580 | 11664 | 2916 | 12150 | 9841 | 2309 | 9720 | 7970 | 1750 |
| 35 | 17010 | 13608 | 3402 | 14175 | 11481 | 2693 | 11340 | 9298 | 2041 |
| 30 | 19440 | 15552 | 3888 | 16200 | 13122 | 3078 | 12960 | 10627 | 2333 |
| 25 | 21870 | 17496 | 4374 | 18225 | 14762 | 3463 | 14580 | 11955 | 2624 |
| 20 | 24300 | 19440 | 4860 | 20250 | 16402 | 3848 | 16200 | 13284 | 2916 |
| 15 | 26730 | 21384 | 5346 | 22275 | 18042 | 4232 | 17820 | 14612 | 3208 |
| 10 | 29160 | 23328 | 5832 | 24300 | 19683 | 4617 | 19440 | 15941 | 3499 |
| 5 | 31590 | 25272 | 6318 | 26325 | 21323 | 5002 | 21060 | 17269 | 3791 |
| 0 | 34020 | 27216 | 6804 | 28350 | 22964 | 5387 | 22680 | 18598 | 4082 |
| -5 | 36450 | 29160 | 7290 | 30375 | 24604 | 5771 | 24300 | 19926 | 4374 |
| -10 | 38880 | 31104 | 7776 | 32400 | 26244 | 6156 | 25920 | 21254 | 4666 |

NOTE: Sensible performance only is shown for winter application.

LEGEND:

- VLT = Ventilation Load - Total
- VLS = Ventilation Load - Sensible
- VLL = Ventilation Load - Latent
- HRT = Heat Recovery - Total
- HRS = Heat Recovery - Sensible
- HRL = Heat Recovery - Latent
- WVL = Winter Ventilation Load
- WHR = Winter Heat Recovery

Optional Hot Water Coil Performance – Heating Capacity @ 180°F Water & 70°F Return Air



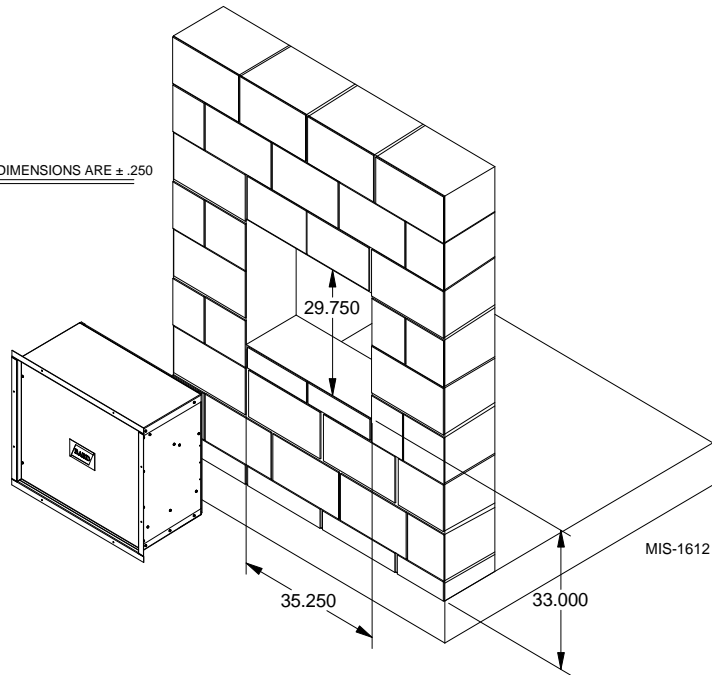
Hot Water Coil Correction Factors

| Entering Air Temp (F) | Entering Water Temperature (F) | | | | | | | | | | |
|-----------------------|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 |
| 50 | 0.455 | 0.545 | 0.636 | 0.727 | 0.818 | 0.909 | 1.000 | 1.091 | 1.182 | 1.273 | 1.364 |
| 55 | 0.409 | 0.500 | 0.591 | 0.682 | 0.773 | 0.864 | 0.955 | 1.045 | 1.136 | 1.227 | 1.318 |
| 60 | 0.363 | 0.455 | 0.545 | 0.636 | 0.727 | 0.818 | 0.909 | 1.000 | 1.091 | 1.182 | 1.273 |
| 65 | 0.318 | 0.409 | 0.500 | 0.591 | 0.682 | 0.773 | 0.864 | 0.955 | 1.045 | 1.136 | 1.227 |
| 70 | 0.272 | 0.363 | 0.455 | 0.545 | 0.636 | 0.727 | 0.818 | 0.909 | 1.000 | 1.091 | 1.182 |
| 75 | 0.227 | 0.318 | 0.409 | 0.500 | 0.591 | 0.682 | 0.773 | 0.864 | 0.955 | 1.045 | 1.136 |
| 80 | 0.182 | 0.272 | 0.363 | 0.455 | 0.545 | 0.636 | 0.727 | 0.818 | 0.909 | 1.000 | 1.091 |

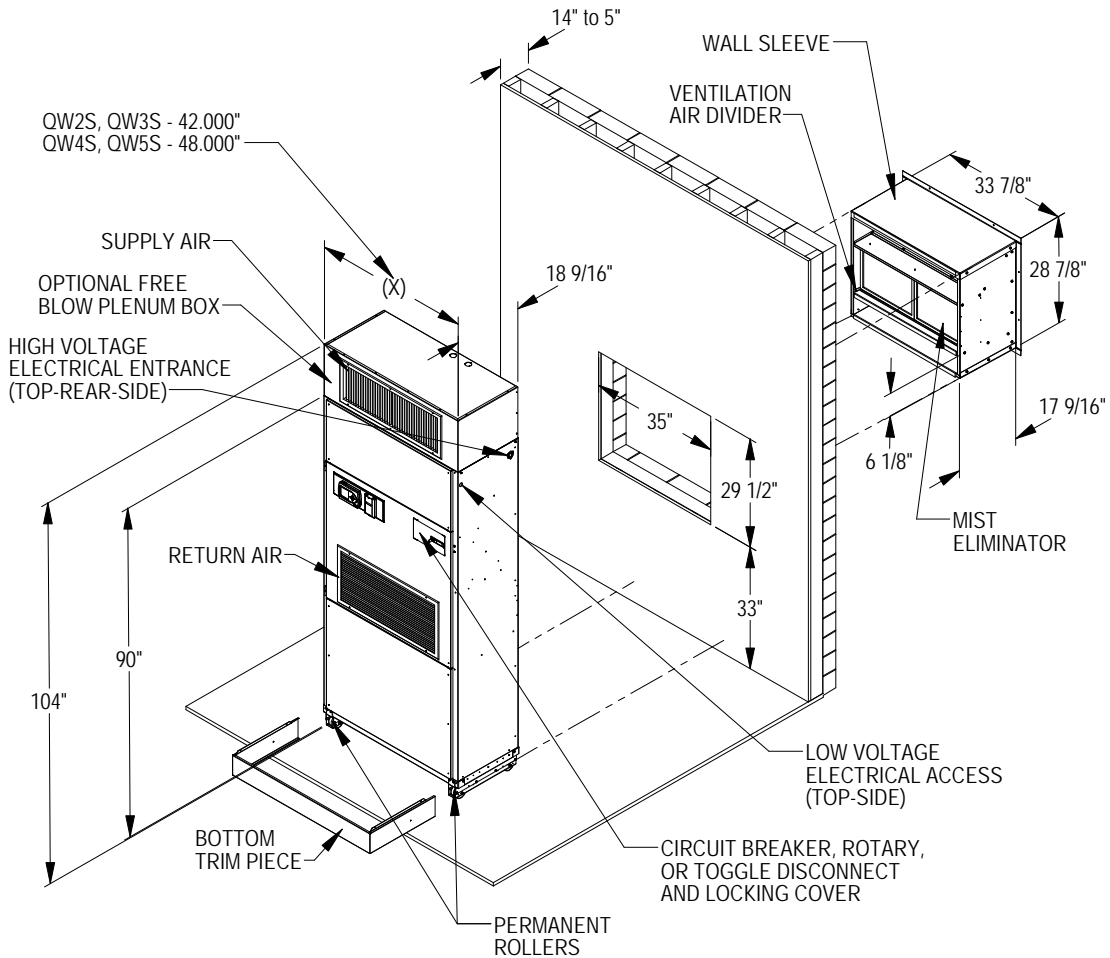
Installation Overview of Ventilation Wall Sleeve

Exterior Wall View

NOTE: OPENING DIMENSIONS ARE $\pm .250$



NOTE: Wall opening and wall sleeve required only when one of the ventilation options is utilized. Installations not utilizing any ventilation option can be made in any interior space accessible to electrical supply, water supply system and condensate drain.

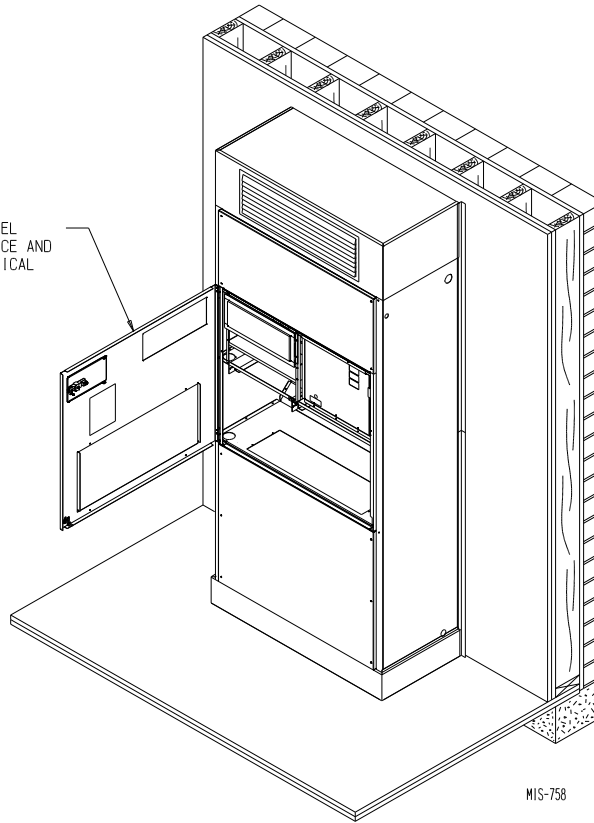


MIS-2739 B

Unit and Wall Sleeve Opening

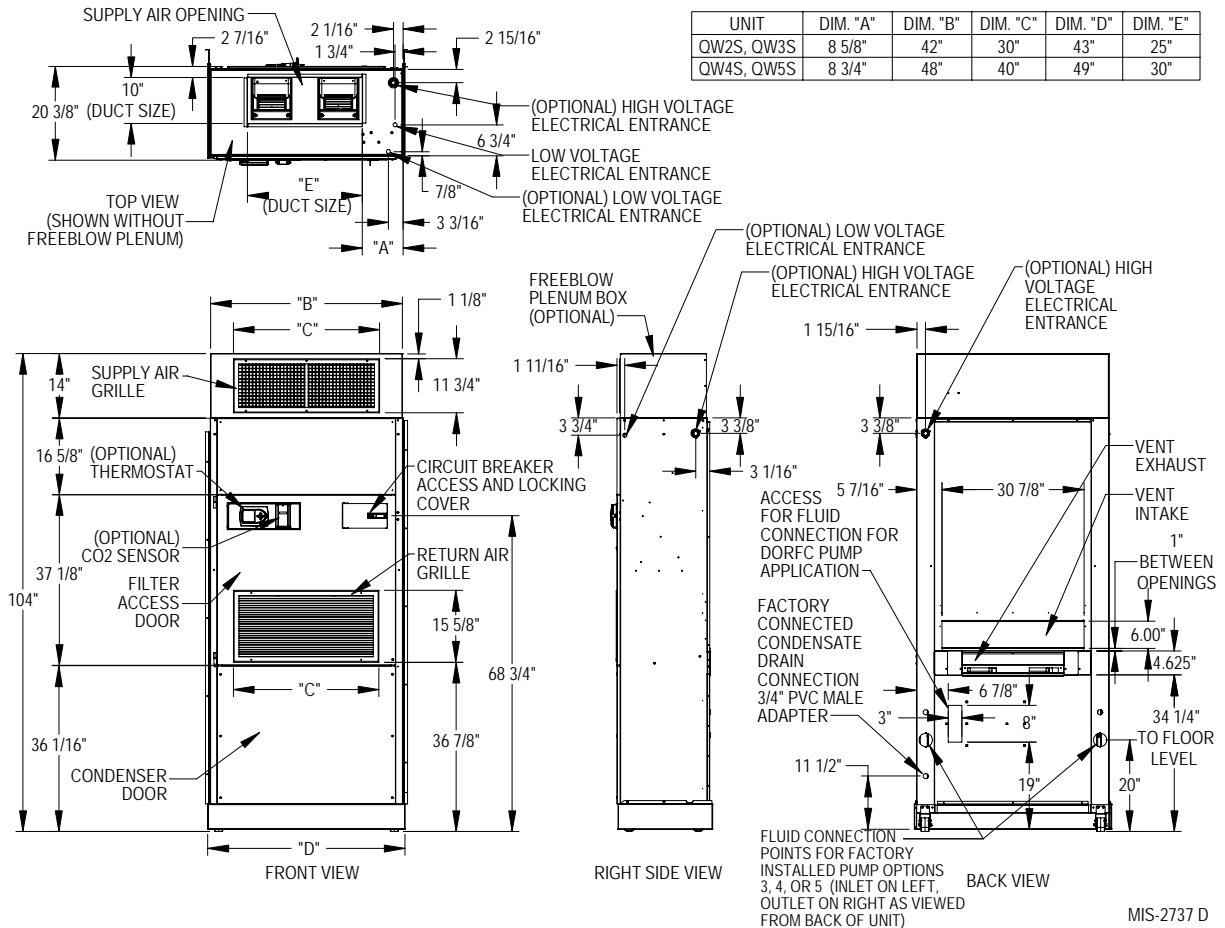
Installation Overview – Unit Installed with Free Blow Plenum Box

HINGED FRONT PANEL FOR FILTER SERVICE AND ACCESS TO ELECTRICAL CONTROLS.



MIS-758

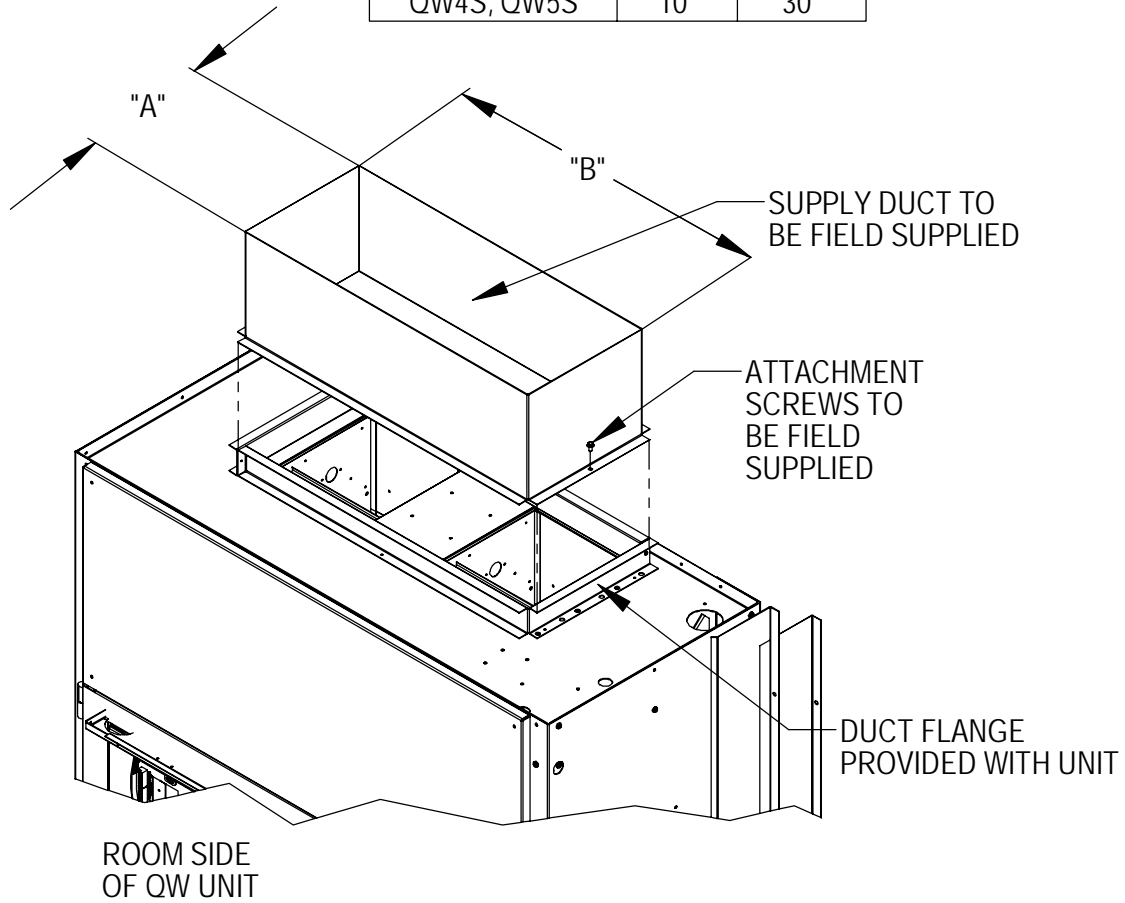
Dimensions of Basic Unit for Architectural and Installation Requirements (Nominal)



MIS-2737 D

Supply Duct Connections for Ducted Installations

| MODEL | "A" | "B" |
|------------|-----|-----|
| QW2S, QW3S | 10" | 25" |
| QW4S, QW5S | 10" | 30" |



MIS-2742 A

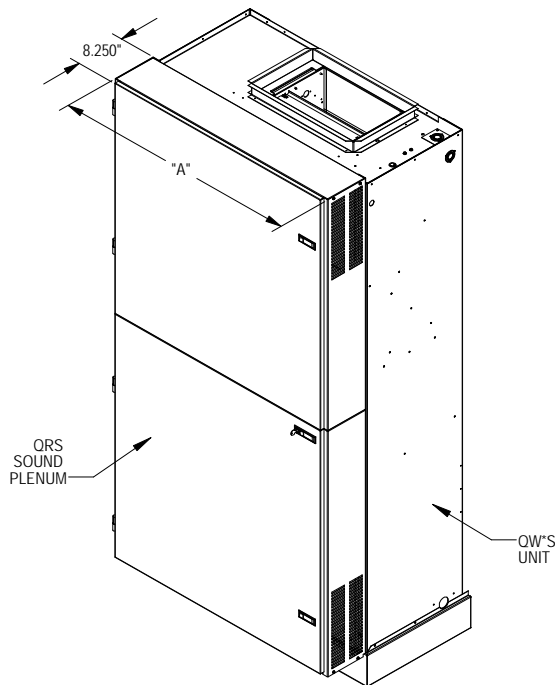
QRS-Series Sound Plenum

The QRS3 - QRS5 Series Sound Plenum has been designed for use with QW*S units. Installation is quick and easy with removal/replacement of six existing screws from the unit cabinet. Once installed the sound plenum enhances the current quiet operation of the Q-TEC Series units, and the hinged door with cam locks (one lockable) provides easy access to the basic Q-TEC system. Model selection is based on equipment cabinet size and finish.

| Sound Plenum Part Number | Plenum Finish | Compatible with Equipment Selection |
|----------------------------|--|-------------------------------------|
| QRS3-X QRS3-4 QRS3-V | Painted Steel - Beige Painted Steel - Buckeye Gray Texture Vinyl ① | QW2S & QW3S |
| QRS5-X QRS5-4 QRS5-V | Painted Steel - Beige Painted Steel - Buckeye Gray Texture Vinyl ① | QW4S & QW5S |

① Front Panels Slate Finish; Side Panels Gray Paint.

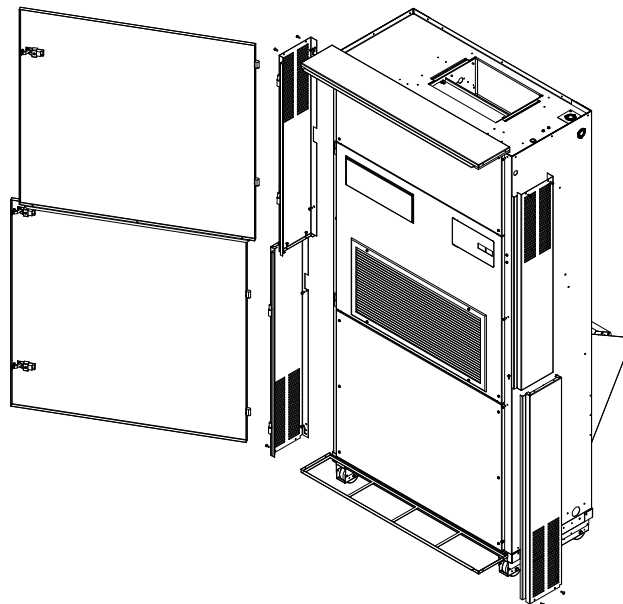
| UNIT | DIM. "A" |
|------|----------|
| QRS3 | 42" |
| QRS5 | 48" |



MIS-2794

Features:

- Compatible with new or existing QWS units.
- Removable cam latch hinged doors, with center latch lockable.
- Easy unit service design.
- Sound absorbing insulation.
- Reduces equipment operating levels and general muffling of basic unit operation. Actual sound reduction may vary depending upon site variables.



MIS-2267

QRASP – Series Return Air Sound Plenum

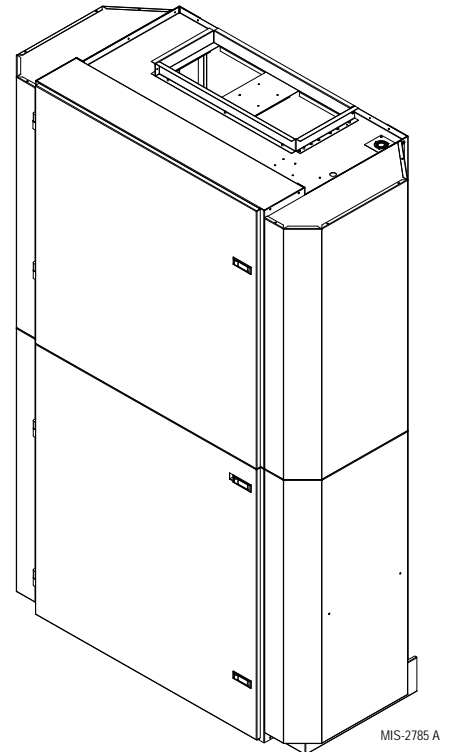
The QRASP3 - QRASP5 Series Sound Plenum has been designed for use with sound absorbing side panels. It is similar in design to the QSP Sound Plenum, but also incorporates additional sound attenuation panels on both sides as shown. Installation is quick and easy with removal/replacement of six existing screws from the unit cabinet. Once installed the sound plenum enhances the current quiet operation of the Q-TEC Series units, and the hinged door with cam locks (one lockable) provides easy access to the basic Q-TEC system. Model selection is based on equipment cabinet size and finish.

| Sound Plenum Part Number | Plenum Finish | Compatible with Equipment Selection |
|----------------------------------|--|-------------------------------------|
| QRASP3-X QRASP3-4 QRASP3-V | Painted Steel - Beige Painted Steel - Buckeye Gray Texture Vinyl ① | QW2S & QW3S |
| QRASP5-X QRASP5-4 QRASP5-V | Painted Steel - Beige Painted Steel - Buckeye Gray Texture Vinyl ① | QW4S & QW5S |

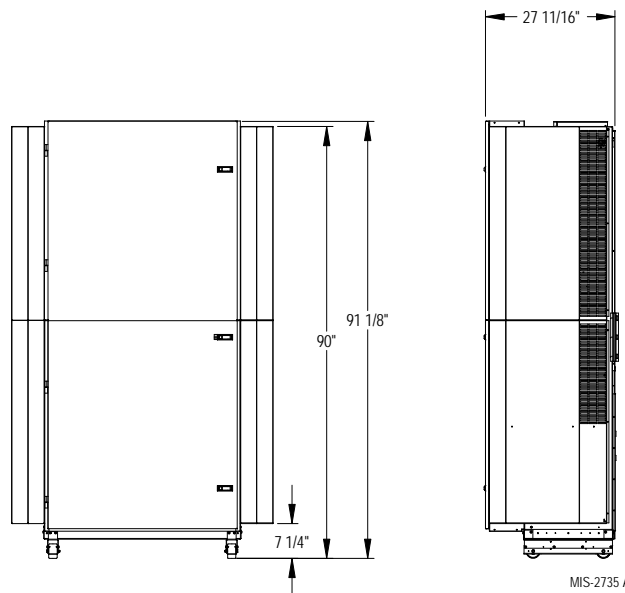
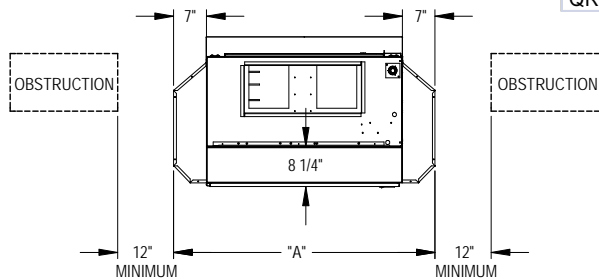
① Front Panels Slate Finish; Side Panels Gray Paint.

Features:

- Compatible with new or existing QW*S units.
- Removable cam latch hinged doors, with center latch lockable.
- Easy unit service design.
- Incorporates additional sound absorbing side panels.
- Sound absorbing insulation.
- Reduces equipment operating levels and general muffling of basic unit operation. Actual sound reduction may vary depending upon site variables.



| UNIT | DIM A |
|--------|-----------|
| QRASP3 | 55 13/16" |
| QRASP5 | 61 13/16" |



Bard QW2S2 Series Q-TEC Sound Data Matrix (dBA @ 10 feet)

| Bard | Duct Free | | | | | | | | | | Ducted | | | | | | | | | | | | | | | |
|----------------------|---------------|---------|---------|---------|---------|------------|---------|---------|---------|---------|---------------|---------|---------|---------|---------|---------------|---------|---------|---------|---------|------------|---------|---------|---------|---------|--|
| | QPBS42 | | | | | QPBS42 | | | | | Return Grille | | | | | Return Grille | | | | | Ducted | | | | | |
| | Return Grille | | | | | QRS Plenum | | | | | QRS Plenum | | | | | QRS Plenum | | | | | QRS Plenum | | | | | |
| | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | |
| Supply Air Treatment | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Return Air Treatment | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vent Option CRV | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ventilation Only | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Port Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Integrated dBA | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound Power | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vent Option ERV | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blower Only | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Port Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Integrated dBA | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound Power | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | | | | | | | | | | | | | | | | | |

Results Referenced Were Recorded In The Bard Manufacturing Company, Inc. Sound Lab Facility
 Actual Field Application Results May Vary With Classroom Design and Construction Methods
 2/17/2013

Bard QW2S2 Series Q-TEC Sound Data Matrix (dBA @ 5 feet)

| Bard | Duct Free | | | | | | | | | | Ducted | | | | | | | | | | | | | | | |
|----------------------|---------------|---------|---------|---------|---------|------------|---------|---------|---------|---------|---------------|---------|---------|---------|---------|---------------|---------|---------|---------|---------|------------|---------|---------|---------|---------|--|
| | QPBS42 | | | | | QPBS42 | | | | | Return Grille | | | | | Return Grille | | | | | Ducted | | | | | |
| | Return Grille | | | | | QRS Plenum | | | | | QRS Plenum | | | | | QRS Plenum | | | | | QRS Plenum | | | | | |
| | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | |
| Supply Air Treatment | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Return Air Treatment | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vent Option CRV | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ventilation Only | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Port Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Integrated dBA | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound Power | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vent Option ERV | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blower Only | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Port Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Integrated dBA | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound Power | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | | | | | | | | | | | | | | | | | |

Results Referenced Were Recorded In The Bard Manufacturing Company, Inc. Sound Lab Facility
 Actual Field Application Results May Vary With Classroom Design and Construction Methods
 11/14/2013

Bard QW3S2 Series Q-TEC Sound Data Matrix (dBA @ 10 feet)

| Bard | Duct Free | | | | | | | | | | Ducted | | | | | | | | | | | | | | | | | | |
|-----------------------|---------------|---------|---------|---------|---------|------------|---------|---------|---------|---------|--------------------|---------|---------|---------|---------|---------------|---------|---------|---------|---------|------------|---------|---------|---------|---------|------------|--|--|--|
| | QPBS42 | | | | | QPBS42 | | | | | Duct Free Silencer | | | | | Ducted | | | | | Ducted | | | | | | | | |
| | Return Grille | | | | | QRS Plenum | | | | | QRS Plenum | | | | | Return Grille | | | | | QRS Plenum | | | | | QRS Plenum | | | |
| | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | | | | |
| Supply Air Treatment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Return Air Treatment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vent Option CRV | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ventilation Only | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Part Load | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Integrated dBA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound Power Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vent Option ERV | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blower Only | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Part Load | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Integrated dBA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound Power Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

1 Integrated values calculated per ANSI/ASHRAE 51.2.60-2009 Part 2, Section 5.2.2.1, Table 2 Triple Mode Type 3 HVAC System Duty Cycles: Ventilation 58%, Part Load 25%, Full Load 17%
 2 Integrated Sound Values are also applicable for use in learning spaces for CHPS and LEED schools; EQ Prerequisite 3 - Minimum Acoustical Performance, OPTION 1. Using methods prescribed in ANSI S12.60, classroom must achieve a maximum background noise level of 45 dBA.
 3 All data recorded at rated CFM per Bard product specifications.
 Actual Field Application Results May Vary With Classroom Design and Construction Methods
 10/28/2013

Bard QW3S2 Series Q-TEC Sound Data Matrix (dBA @ 5 feet)

| Bard | Duct Free | | | | | | | | | | Ducted | | | | | | | | | | | | | | | | | | |
|-----------------------|---------------|---------|---------|---------|---------|------------|---------|---------|---------|---------|--------------------|---------|---------|---------|---------|---------------|---------|---------|---------|---------|------------|---------|---------|---------|---------|------------|--|--|--|
| | QPBS42 | | | | | QPBS42 | | | | | Duct Free Silencer | | | | | Ducted | | | | | Ducted | | | | | | | | |
| | Return Grille | | | | | QRS Plenum | | | | | QRS Plenum | | | | | Return Grille | | | | | QRS Plenum | | | | | QRS Plenum | | | |
| | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | | | | |
| Supply Air Treatment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Return Air Treatment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vent Option CRV | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ventilation Only | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Part Load | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Integrated dBA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound Power Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vent Option ERV | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blower Only | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Part Load | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Integrated dBA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound Power Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

1 Integrated values calculated per ANSI/ASHRAE 51.2.60-2009 Part 2, Section 5.2.2.1, Table 2 Triple Mode Type 3 HVAC System Duty Cycles: Ventilation 58%, Part Load 25%, Full Load 17%
 2 Integrated Sound Values are also applicable for use in learning spaces for CHPS and LEED schools; EQ Prerequisite 3 - Minimum Acoustical Performance, OPTION 1. Using methods prescribed in ANSI S12.60, classroom must achieve a maximum background noise level of 45 dBA.
 3 All data recorded at rated CFM per Bard product specifications.
 Actual Field Application Results May Vary With Classroom Design and Construction Methods
 10/28/2013

Bard QW4S2 Series Q-TEC Sound Data Matrix (dBA @ 10 feet)

| Bard | Duct Free | | | | | | | | | | Ducted | | | | | | | | | | | | | | | |
|----------------------|---------------|---------|---------|---------|---------|------------|---------|---------|---------|---------|--------------------|---------|---------|---------|---------|---------------|---------|---------|---------|---------|------------|---------|---------|---------|---------|--|
| | QPBS48 | | | | | QPBS48 | | | | | Duct Free Silencer | | | | | Ducted | | | | | | | | | | |
| | Return Grille | | | | | QRS Plenum | | | | | QRASPS Plenum | | | | | Return Grille | | | | | QRS Plenum | | | | | |
| | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | |
| Supply Air Treatment | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Return Air Treatment | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vent Option CRV | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ventilation Only | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Part Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Integrated dBA | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound Power | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vent Option ERV | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blower Only | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Part Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Integrated dBA | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound Power | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | | | | | | | | | | | | | | | | | |

1 Integrated values calculated per ANSI/ASHRAE 51.2-60/2009 Part 2, Section 5.2.2.1, Table 2 Triple Mode Type 3 HVAC System Duty Cycles: Ventilation 58%, Part Load 25%, Full Load 17%
 2 Integrated Sound Values are also applicable for use in learning spaces for CHPS and LEED schools; EQ Prerequisite 3 - Minimum Acoustical Performance, OPTION 1. Using methods prescribed in ANSI S12.60, classroom must achieve a maximum background noise level of 45 dBA.
 3 All data recorded at rated CFM per Bard product specifications.
 Actual Field Application Results May Vary With Classroom Design and Construction Methods
 9/27/2013

Bard QW4S2 Series Q-TEC Sound Data Matrix (dBA @ 5 feet)

| Bard | Duct Free | | | | | | | | | | Ducted | | | | | | | | | | | | | | | |
|----------------------|---------------|---------|---------|---------|---------|------------|---------|---------|---------|---------|--------------------|---------|---------|---------|---------|---------------|---------|---------|---------|---------|------------|---------|---------|---------|---------|--|
| | QPBS48 | | | | | QPBS48 | | | | | Duct Free Silencer | | | | | Ducted | | | | | | | | | | |
| | Return Grille | | | | | QRS Plenum | | | | | QRASPS Plenum | | | | | Return Grille | | | | | QRS Plenum | | | | | |
| | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | ERV Off | 300 CFM | 375 CFM | 450 CFM | 450 CFM | |
| Supply Air Treatment | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Return Air Treatment | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vent Option CRV | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ventilation Only | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Part Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Integrated dBA | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound Power | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vent Option ERV | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blower Only | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Part Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full Load | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Integrated dBA | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound Power | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | | | | | | | | | | | | | | | | | |

1 Integrated values calculated per ANSI/ASHRAE 51.2-60/2009 Part 2, Section 5.2.2.1, Table 2 Triple Mode Type 3 HVAC System Duty Cycles: Ventilation 58%, Part Load 25%, Full Load 17%
 2 Integrated Sound Values are also applicable for use in learning spaces for CHPS and LEED schools; EQ Prerequisite 3 - Minimum Acoustical Performance, OPTION 1. Using methods prescribed in ANSI S12.60, classroom must achieve a maximum background noise level of 45 dBA.
 3 All data recorded at rated CFM per Bard product specifications.
 Actual Field Application Results May Vary With Classroom Design and Construction Methods
 9/27/2013

Bard QW5S2 Series Q-TEC Sound Data Matrix (dBA @ 10 feet)

| Bard | Duct Free | | | | | Ducted | | | | |
|----------------------------------|-------------------------|----------------------|-------------------------|-------------------------------------|-------------------------|---------------|------------------|---------------|------------------|-------------------------|
| | QPBS48 Return Grille | QPBS48 QRS Plenum | QPBS48 QRASPS Plenum | Duct Free Silencer QRASPS Plenum | Ducted Return Grille | QRS Plenum | Ducted Plenum | Ducted QRS | Ducted Plenum | Ducted QRASPS Plenum |
| Vent Option CRV | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM |
| Ventilation Only | 41.6 | 40.1 | 38.7 | 37.8 | 37.2 | 35.4 | 35.4 | 35.4 | 35.4 | 34.7 |
| Part Load | 46.5 | 45.8 | 45.4 | 43.1 | 43.0 | 41.4 | 41.4 | 41.4 | 41.4 | 39.9 |
| Full Load | 47.5 | 46.6 | 46.4 | 43.9 | 45.1 | 43.3 | 43.3 | 43.3 | 43.3 | 41.4 |
| Integrated dBA | 44.6 | 43.7 | 43.1 | 41.1 | 41.3 | 39.6 | 39.6 | 39.6 | 39.6 | 38.1 |
| Sound Power Full Load | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | |
| Vent Option ERV | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM |
| Blower Only | 42.0 | 40.3 | 38.7 | 38.0 | 37.8 | 36.1 | 36.1 | 36.1 | 36.1 | 34.0 |
| Part Load | 47.2 | 47.4 | 47.9 | 43.4 | 42.9 | 42.7 | 42.7 | 42.7 | 42.7 | 39.5 |
| Full Load | 48.3 | 48.5 | 49.9 | 44.1 | 44.3 | 45.2 | 45.2 | 45.2 | 45.2 | 41.9 |
| Integrated dBA | 45.2 | 45.7 | 46.2 | 41.3 | 41.3 | 40.9 | 40.9 | 40.9 | 40.9 | 38.0 |
| Sound Power Full Load | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | |
| | 39.6 | 53.8 | | | | 39.6 | 53.8 | | | 56.8 |

Results Referenced Were Recorded In The Bard Manufacturing Company, Inc. Sound Lab Facility
Actual Field Application Results May Vary With Classroom Design and Construction Methods
9/27/2013

1 Integrated values calculated per ANSI/ASA S12.60-2009 Part 2, Section 5.2.2.1, Table 2 Triple Mode Type 3 HVAC System Duty Cycles: Ventilation 80%, Part Load 25%, Full Load 17%
2 Integrated Sound Values are also applicable for use in learning spaces for CHPS and LEED schools; EQ Prerequisite 3 - Minimum Acoustical Performance, OPTION 1. Using methods prescribed in ANSI S12.60, classroom must achieve a maximum background noise level of 45 dBA.
3 All data recorded at rated CFM per Bard product specifications.

Bard QW5S2 Series Q-TEC Sound Data Matrix (dBA @ 5 feet)

| Bard | Duct Free | | | | | Ducted | | | | |
|----------------------------------|-------------------------|----------------------|-------------------------|-------------------------------------|-------------------------|---------------|------------------|---------------|------------------|-------------------------|
| | QPBS48 Return Grille | QPBS48 QRS Plenum | QPBS48 QRASPS Plenum | Duct Free Silencer QRASPS Plenum | Ducted Return Grille | QRS Plenum | Ducted Plenum | Ducted QRS | Ducted Plenum | Ducted QRASPS Plenum |
| Vent Option CRV | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM |
| Ventilation Only | 43.0 | 41.2 | 39.5 | 38.3 | 39.8 | 36.5 | 36.5 | 36.5 | 36.5 | 35.8 |
| Part Load | 47.8 | 46.5 | 46.0 | 44.6 | 45.6 | 42.7 | 42.7 | 42.7 | 42.7 | 41.3 |
| Full Load | 48.6 | 47.5 | 44.8 | 45.0 | 47.6 | 44.4 | 44.4 | 44.4 | 44.4 | 42.6 |
| Integrated dBA | 45.9 | 44.5 | 43.1 | 42.2 | 43.9 | 40.8 | 40.8 | 40.8 | 40.8 | 39.4 |
| Sound Power Full Load | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | |
| Vent Option ERV | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM | 450 CFM |
| Blower Only | 42.5 | 44.7 | 46.4 | 41.6 | 39.8 | 37.5 | 37.5 | 37.5 | 37.5 | 34.9 |
| Part Load | 48.6 | 49.1 | 49.5 | 46.2 | 47.8 | 45.3 | 45.3 | 45.3 | 45.3 | 40.7 |
| Full Load | 49.3 | 49.5 | 50.4 | 47.2 | 48.4 | 45.6 | 45.6 | 45.6 | 45.6 | 43.4 |
| Integrated dBA | 46.3 | 47.2 | 48.2 | 44.4 | 44.1 | 41.9 | 41.9 | 41.9 | 41.9 | 39.3 |
| Sound Power Full Load | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | |
| | 42.5 | 44.7 | 46.4 | 41.6 | 39.8 | 37.5 | 37.5 | 37.5 | 37.5 | 34.9 |
| Blower Only | 48.6 | 49.1 | 49.5 | 46.2 | 47.8 | 45.3 | 45.3 | 45.3 | 45.3 | 40.7 |
| Part Load | 49.3 | 49.5 | 50.4 | 47.2 | 48.4 | 45.6 | 45.6 | 45.6 | 45.6 | 43.4 |
| Full Load | 46.3 | 47.2 | 48.2 | 44.4 | 44.1 | 41.9 | 41.9 | 41.9 | 41.9 | 39.3 |
| Integrated dBA | | | | | | | | | | |
| Sound Power Full Load | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | |
| | 42.5 | 44.7 | 46.4 | 41.6 | 39.8 | 37.5 | 37.5 | 37.5 | 37.5 | 34.9 |
| Blower Only | 48.6 | 49.1 | 49.5 | 46.2 | 47.8 | 45.3 | 45.3 | 45.3 | 45.3 | 40.7 |
| Part Load | 49.3 | 49.5 | 50.4 | 47.2 | 48.4 | 45.6 | 45.6 | 45.6 | 45.6 | 43.4 |
| Full Load | 46.3 | 47.2 | 48.2 | 44.4 | 44.1 | 41.9 | 41.9 | 41.9 | 41.9 | 39.3 |
| Integrated dBA | | | | | | | | | | |
| Sound Power Full Load | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | |
| | 42.5 | 44.7 | 46.4 | 41.6 | 39.8 | 37.5 | 37.5 | 37.5 | 37.5 | 34.9 |
| Blower Only | 48.6 | 49.1 | 49.5 | 46.2 | 47.8 | 45.3 | 45.3 | 45.3 | 45.3 | 40.7 |
| Part Load | 49.3 | 49.5 | 50.4 | 47.2 | 48.4 | 45.6 | 45.6 | 45.6 | 45.6 | 43.4 |
| Full Load | 46.3 | 47.2 | 48.2 | 44.4 | 44.1 | 41.9 | 41.9 | 41.9 | 41.9 | 39.3 |
| Integrated dBA | | | | | | | | | | |
| Sound Power Full Load | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | |
| | 42.5 | 44.7 | 46.4 | 41.6 | 39.8 | 37.5 | 37.5 | 37.5 | 37.5 | 34.9 |
| Blower Only | 48.6 | 49.1 | 49.5 | 46.2 | 47.8 | 45.3 | 45.3 | 45.3 | 45.3 | 40.7 |
| Part Load | 49.3 | 49.5 | 50.4 | 47.2 | 48.4 | 45.6 | 45.6 | 45.6 | 45.6 | 43.4 |
| Full Load | 46.3 | 47.2 | 48.2 | 44.4 | 44.1 | 41.9 | 41.9 | 41.9 | 41.9 | 39.3 |
| Integrated dBA | | | | | | | | | | |
| Sound Power Full Load | | | | | | | | | | |
| Outdoor @ 10 Feet | | | | | | | | | | |

Results Referenced Were Recorded In The Bard Manufacturing Company, Inc. Sound Lab Facility
Actual Field Application Results May Vary With Classroom Design and Construction Methods
9/27/2013

1 Integrated values calculated per ANSI/ASA S12.60-2009 Part 2, Section 5.2.2.1, Table 2 Triple Mode Type 3 HVAC System Duty Cycles: Ventilation 80%, Part Load 25%, Full Load 17%
2 Integrated Sound Values are also applicable for use in learning spaces for CHPS and LEED schools; EQ Prerequisite 3 - Minimum Acoustical Performance, OPTION 1. Using methods prescribed in ANSI S12.60, classroom must achieve a maximum background noise level of 45 dBA.
3 All data recorded at rated CFM per Bard product specifications.

Optional Accessories — Must be Used for Each Installation with Ventilation Options

Ventilation Wall Sleeves:

QWVS42 Ventilation wall sleeve for walls up to 14 inches thick. **NOTE:** Unless they are to be field-supplied, side trim kit must be ordered for all installations.

Ventilation Louvers:

- QLW-10 Standard Clear Painted Enamel Finish for vent option
- QLW-20 Standard Medium Bronze Painted Enamel Finish for vent option
- QLW-30 Standard Dark Bronze Painted Enamel Finish for vent option
- QLW-* Optional Louver Finishes available (See Form S3508)

Contact your Bard Sales Representative for Custom Finish Louver information

Side Trim Kits — Required for All Installations Unless Field-Supplied

NOTE: The following accessory items must be selected so the finish (color) is matched to the QWS model that they will be used with.

Side Trim Extension Kits:

| Model | Color | Model | Color | Model | Color | Model | Color | Space from back of unit to wall | Unit Compatibility |
|-----------|----------------|-----------|------------|-----------|-------------|-----------|-------------|---------------------------------|--------------------|
| QSTX-V-6 | Platinum Vinyl | QSTX-4-6 | Gray Paint | QSTX-X-6 | Beige Paint | QSTX-1-6 | White Paint | 4" to 6" | All |
| QSTX-V-8 | Platinum Vinyl | QSTX-4-8 | Gray Paint | QSTX-X-8 | Beige Paint | QSTX-1-8 | White Paint | 6" to 8" | All |
| QSTX-V-10 | Platinum Vinyl | QSTX-4-10 | Gray Paint | QSTX-X-10 | Beige Paint | QSTX-1-10 | White Paint | 8" to 10" | All |
| QSTX-V-12 | Platinum Vinyl | QSTX-4-12 | Gray Paint | QSTX-X-12 | Beige Paint | QSTX-1-12 | White Paint | 10" to 12" | All |

Optional Accessories — Additional Items as Determined by Job Specifications

Duct-Free Plenum Boxes:

| Model | Color | Model | Color | Model | Color | Space from back of unit to wall | Unit Compatibility |
|------------|----------------|------------|------------|------------|-------------|---------------------------------|--------------------|
| QPB42-V | Platinum Vinyl | QPB42-4 | Gray Paint | QPB42-X | Beige Paint | QPB42-1 | White Paint |
| QPBS42-V | Platinum Vinyl | QPBS42-4 | Gray Paint | QPBS42-X | Beige Paint | QPBS42-1 | White Paint |
| QPBS42-V-8 | Platinum Vinyl | QPBS42-4-8 | Gray Paint | QPBS42-X-8 | Beige Paint | QPBS42-1-8 | White Paint |
| QPB48-V | Platinum Vinyl | QPB48-4 | Gray Paint | QPB48-X | Beige Paint | QPB48-1 | White Paint |
| QPBS48-V | Platinum Vinyl | QPBS48-4 | Gray Paint | QPBS48-X | Beige Paint | QPBS48-1 | White Paint |
| QPBS48-V-8 | Platinum Vinyl | QPBS48-4-8 | Gray Paint | QPBS48-X-8 | Beige Paint | QPBS48-1-8 | White Paint |

Top Fill Systems for Finishing Plenum Boxes to Ceilings:

| Model | Color | Model | Color | Model | Color | Space from back of unit to wall | Unit Compatibility |
|-------------|----------------|-------------|------------|-------------|-------------|---------------------------------|--------------------|
| QPBX42-9-V | Platinum Vinyl | QPBX42-9-4 | Gray Paint | QPBX42-9-X | Beige Paint | QPBX42-9-1 | White Paint |
| QPBX42-10-V | Platinum Vinyl | QPBX42-10-4 | Gray Paint | QPBX42-10-X | Beige Paint | QPBX42-10-1 | White Paint |
| QPBX48-9-V | Platinum Vinyl | QPBX48-9-4 | Gray Paint | QPBX48-9-X | Beige Paint | QPBX48-9-1 | White Paint |
| QPBX48-10-V | Platinum Vinyl | QPBX48-10-4 | Gray Paint | QPBX48-10-X | Beige Paint | QPBX48-10-1 | White Paint |

Cabinet Extensions for Ducted Applications:

| Model | Color | Model | Color | Model | Color | Space from back of unit to wall | Unit Compatibility |
|----------|----------------|----------|------------|----------|-------------|---------------------------------|--------------------|
| QCX10A-V | Platinum Vinyl | QCX10A-4 | Gray Paint | QCX10A-X | Beige Paint | QCX10A-1 | White Paint |
| QCX15A-V | Platinum Vinyl | QCX15A-4 | Gray Paint | QCX15A-X | Beige Paint | QCX15A-1 | White Paint |

Hot Water Coils with Plenum Boxes:

| Model | Color | Model | Color | Model | Color | Space from back of unit to wall | Unit Compatibility |
|-------------|----------------|-------------|------------|-------------|-------------|---------------------------------|--------------------|
| QPBHW42-F-V | Platinum Vinyl | QPBHW42-F-4 | Gray Paint | QPBHW42-F-X | Beige Paint | QPBHW42-F-1 | White Paint |
| QPBHW48-F-V | Platinum Vinyl | QPBHW48-F-4 | Gray Paint | QPBHW48-F-X | Beige Paint | QPBHW48-F-1 | White Paint |
| QPBHW42-D-V | Platinum Vinyl | QPBHW42-D-4 | Gray Paint | QPBHW42-D-X | Beige Paint | QPBHW42-D-1 | White Paint |
| QPBHW48-D-V | Platinum Vinyl | QPBHW48-D-4 | Gray Paint | QPBHW48-D-X | Beige Paint | QPBHW48-D-1 | White Paint |

NOTE: The same top fill system and cabinet extensions can be used with hot water coil plenum boxes as with standard plenum boxes.

① 8" Plenum Box height may affect sound level of supply air and unit.

WATER CONNECTION OPTIONS

Female National Pipe Thread (NPT) Connections (Piping Option "P")

1" Female National Pipe Thread (NPT) copper fitting connections at inlet and outlet of co-axial water coil. No internal pump options available with piping option "P".

Double O-Ring Water Connections (Piping Option "X")

IMPORTANT NOTE: Water coils can be equipped with male half of double O-ring fittings and a mating half must be used. No other type of fitting will mate up. The DORFC Flow Centers also have double O-ring connections on both heat pump and loop sides of flow center.

Depending upon pump and piping options ordered, additional double O-ring fittings and hose may be required. Fittings are available for threaded, barbed, soldered and fusion connections.



Elbow, 1" MPT X Double O-ring with 1/4" Port and Pressure/Temperature Test Plugs
DORMP1-90



1" MPT X Double O-ring
DORMP1-S



1" FPT X Double O-ring
DORFP1-S

Elbow, 1" MPT X Double O-ring with 1/4" Port and 1/4" Brass Pipe Plugs
DORMP1-90P



Elbow, 1" Hose Barb X Double O-ring with 1/4" Port and Pressure/Temperature Test Plugs
DORB1-90-4HC



1" Hose Barb X Double O-ring
DORB1-S-4HC



1-1/4" Socket Fusion X Double O-ring
DORF125-S



1" Copper Sweat X Double O-ring with 1/4" FPT Port & Pressure/Temperature Test Plugs
DORS1-S

Elbow, 1" Hose Barb X Double O-ring with 1/4" Port and 1/4" Brass Pipe Plugs
DORB1-90P-4HC

Individual Double O-Ring Fitting Packs (Qty 2 per pack)

| | |
|----------------------|--|
| DORMP1-90 | (2) 1" MPT 90° double o-ring elbows with 1/4" FPT ports and 8603-026 pressure/temperature test plugs |
| DORMP1-90P | (2) 1" MPT 90° double o-ring elbows with 1/4" FPT ports and 1/4" brass pipe plugs |
| DORMP1-S | (2) 1" MPT straight double o-ring fittings |
| DORFP1-S | (2) 1" FPT straight double o-ring fittings |
| DORB1-90-4HC | (2) 1" barbed 90° double o-ring elbows with 1/4" FPT ports, 8603-026 pressure/temperature test plugs and (4) SS 1" hose clamps |
| DORB1-90P-4HC | (2) 1" barbed 90° double o-ring elbows with 1/4" FPT ports, 1/4" brass pipe plugs and (4) SS 1" hose clamps |
| DORB1-S-4HC | (2) 1" barbed straight double o-ring fittings with (4) 1" SS hose clamps |
| DORF125-S | (2) 1.25" fusion straight double o-ring fittings |
| DORS1-S | (2) 1" copper sweat straight double o-ring fittings with 1/4" FPT ports and 8603-026 pressure/temperature test plugs |

| | | |
|----------------------|---------------|--|
| Optional Hose | HK1-25 | (1) 25' section of 1" ID 150 PSI hose |
|----------------------|---------------|--|

Flow Centers & Individual Pumps w/Double O-Ring Connections (See Pump Ratings Below)

| Pump Option | Pump Model | No. of Pumps | Description | Installation Method |
|-------------|------------|--------------|--|------------------------|
| 3 | UPS15-42F | 1 | Pump with Isolation Valves, 230V-60Hz-1Ph, Piped to Rear of Cabinet, Double O-ring Connections | Factory installed only |
| 5 | UPS26-99FC | 1 | Pump with Isolation Valves, 230V-60Hz-1Ph, Piped to Rear of Cabinet, Double O-ring Connections | |



DORFC-2



UPS26

Flow Center and Individual Pump Accessories

| Bard Part Number | Required Quantity | Description | Used With |
|------------------|-------------------|--|---|
| QWRK | 1 | Consists of control relay, two 3A circuit breakers, all wiring and all installation parts | Included with factory installed DORFC Flow Centers and UPS Pumps. Order only if field installing any flow center or pump. |
| QWHK | 1 | Consists of two 1" x 33" 200 PSIG hoses with SS braided sheathing and fitted with straight double o-ring fittings one end and 90° elbow double o-ring fittings with P/T ports installed on opposite end. | Included with units for factory installed DORFC's. Order only if field installing DORFC. |

① This is factory installed if flow center or pump is factory installed.

Loop Pump Modules and Individual Pump Capacities ① ②

| For Use with QWS Models ③ | Pump Option | Pump Model | No. of Pumps | No. of Speeds | Speed | WATER FLOW in GPM | | | | | | | | | | | |
|---------------------------|-------------|------------|--------------|---------------|-----------------------|----------------------|--------------------|----------------------|--------------------|---------------------|---------------------|-------------------|-------------------|-----------------|-------------------|-----------------|-----------------|
| | | | | | | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| ALL | 1 | DORFC-1 | 1 | 1 | Single | 29.5 | 29 | 28.5 | 28 | 27.5 | 26.5 | 25.5 | 24.5 | 23 | 22.5 | 22 | 21 |
| ALL | 2 | DORFC-2 | 2 | 1 | Single | 59 | 58 | 57 | 56 | 55 | 53 | 51 | 49 | 46 | 45 | 44 | 42 |
| QW2 - 3S | 3 | UPS15-42F | 1 | 3 | High Medium Low | 12.1 6.8 — | 11.5 5.7 — | 10.7 4.5 — | 9.7 — — | 8.8 — — | 8 — — | — — — | — — — | — — — | — — — | — — — | — — — |
| QW2 - 3S | 4 | UP26-64F | 1 | 1 | Single | 21.5 | 21 | 20 | 19 | 18 | 17 | 16.5 | 16 | 15 | 14 | 13 | 12.5 |
| QW3 - 5S | 5 | UPS26-99FC | 1 | 3 | High Medium Low | 29.5 23.5 15.3 | 29 22.2 13.8 | 28.5 21.5 12.4 | 28 20.3 10.9 | 27.5 19.5 9.8 | 26.5 18.5 8.4 | 25.5 17.8 — | 24.5 16.5 — | 23 15.3 — | 22.5 14.3 — | 22 13.3 — | 21 12.4 — |

① Pump output shown in feet head @ GPM at top of columns.

② Refer to Water Coil Pressure Drop table (Page 8) for feet head allowances for basic QW*S complete system. Additional feet head allowance from basic unit to main piping loop must be included and determined by others.

③ Pump options shown can be factory installed in models as shown. Suitability of each must be determined by others based on QWS requirements, plus the loop design requirements designed by others.

Ground Loop Service Accessories for Installations with DORFC Flow Centers

| Heat Pump Model | Bard Part Number | Required Quantity | Description |
|-----------------|------------------|-------------------|---|
| | | DORCL1-90 | Each |
| | CLB1-S | Each | (2) 1" straight barbed quick-connect cam-lever female fittings to connect to DORCL1-90 fittings above |
| | GGK-1 | Each | (1) Geo-Gooser w/shut-off valve, 0-100 PSI gauge, garden hose connection, P/T fitting 1/8" probe |
| | DORGHMT | Each | (2) Double o-ring x male garden hose adapter fitting for loop flow center (to burp/boost loop) |



1" Cam Lever Male X Double O-ring DORCL1-90



CLB1-S

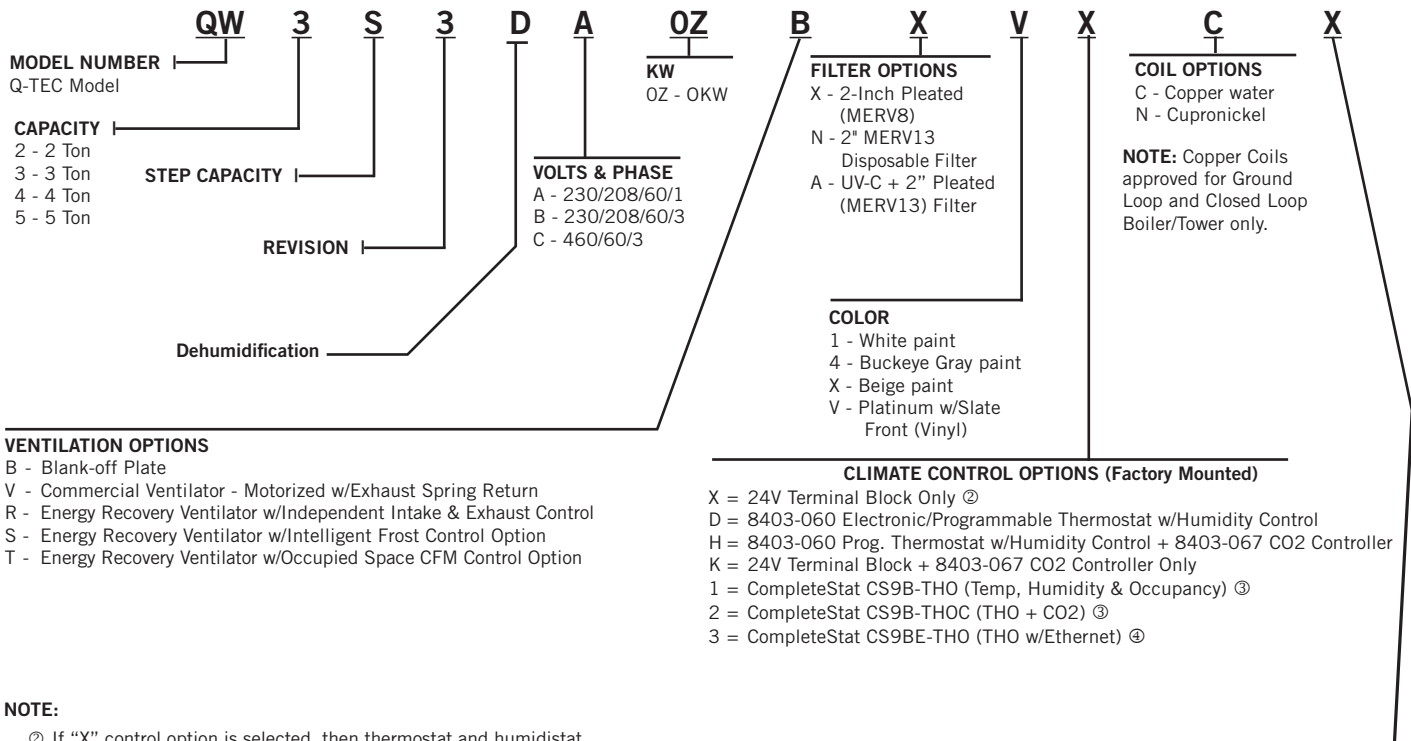


Garden Hose Male X O-ring (single) Adapter DORGHMT



GGK-1

QW*S Step Capacity Series Q-TEC Geothermal HP Model Nomenclature



NOTE:

- ② If "X" control option is selected, then thermostat and humidistat, if applicable, or DDC control system must be field supplied.
- ③ CS9B-THO and -THOC are BACnet w/shielded twisted pair wiring.
- ④ CS9BE-THO and -THOC are BACnet w/shielded twisted pair wiring and Ethernet port.
- ⑤ Not available for Dehumidification Models.

FACTORY INSTALLED PUMP & PIPING OPTIONS

- X - None; all pump & water connections field installed, requires field piping to the coaxial water coil using double o-ring fittings, which must be ordered separately.
- P - None; all pump & water connections field installed, requires field piping to the coaxial water coil 1" Female NPT wrought copper fittings.
- 3 - Single Grundfos UPS15-42F pump, isolation valves both ends, piped with copper to double o-ring fittings back corners of unit
- 5 - Single Grundfos UPS26-99-FC pump, isolation valves both ends, piped with copper to double o-ring fittings back corners of unit

See Pages 23, 24 & 25 for Additional Required and Optional Field Installed Accessories

Optional Field Installed Hard Start Kits for 1-Phase Models ①

| Unit Model | Field Installed Part Number |
|---------------|-----------------------------|
| QW2S3D-A only | SK111 |
| QW3S3D-A only | SK111 |
| QW4S3D-A only | SK118 |
| QW5S3D-A only | SK118 |

① Start Capacitor and potential relay start kit can be used with all -A single phase models only. Increases starting torque 9x. Not used on -B or -C three phase models.

Optional Field Installed Evap. Drain Pan Overflow Kit

| Part Number | Description |
|-------------|---|
| 8620-219 | 24VAC 0.4A SPST NC Switch to shutdown compressor. Can be converted to NO action to use for alarm circuit. |



Bard Manufacturing Company, Inc.
Bryan, Ohio 43506
www.bardhvac.com

Due to our continuous product improvement policy, all specifications subject to change without notice.

| |
|--|
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| Supersedes: 0720 |