

Mechanical Specifications

Vertical Stack Water Source Heat Pumps

Models VHNA, VHNM and VHNS

General

Furnish and install Vertical Stack Water Source Heat Pumps where indicated on the plans and in the specifications, with required mounting components and accessories. All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery. Units shall be ETL certified for the United States and Canada in compliance with UL/ANSI Standard 1995 and CSA C22.2 No. 236-05, and be tested in accordance with ANSI/ARI/ASHRAE/ISO Standard 13256-1.

Construction

All unit cabinet panels shall be fabricated of 20-gauge galvanized steel panels. All cabinet panels shall be insulated with ½" thick 2 lb density matt-faced fiberglass [½" thick foil faced fiberglass with scrim and taped edges to prevent any fibers from reaching the airstream] [½" thick elastomeric closed cell foam insulation]. Insulation shall conform to NFPA 90A for fire, smoke and melting, and comply with a 25/50 Flame Spread and Smoke Developed Index per ASTM E-84 or UL 723. Additionally, insulation shall comply with Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21.

All unit panels shall have knockouts for supply air openings and riser slots to facilitate the field conversion of riser location and supply air grille location.

- Option: Supply air opening knockouts shall be factory sealed and left in place during shipping and staging at the job site.

The removable perimeter bypass with Allen lock [hinged perimeter bypass with Allen lock] [hinged perimeter bypass with key lock] [removable perimeter bypass with Allen lock] [removable louvered with Allen lock] front access panel shall be fabricated of not less than 18-gauge [16-gauge] [14-gauge] cold rolled steel.

The front panel mounts within a frame that is flush with the wall. A front panel that protrudes from the wall is not acceptable.

- Option: Provide an architectural grade double deflection [single deflection] [double deflection opposed blade damper] aluminum discharge grille.

Painted finish

All front return panels, mounting frames and supply air grilles shall be finished with a standard ivory epoxy powder coat paint. Optional colors can be selected from the Zehnder Rittling Color Chart. Liquid coat paint shall not be acceptable. Custom colors are also available with the submission of a color chip for color match.

- Option: For units with multiple outlets, include a sheet metal baffle, insulated on 2 sides, inside the discharge plenum to break the sight lines between the two discharge outlets and to attenuate room noise that could be transmitted through the openings.

Power

Units shall not exceed scheduled power consumption.

Fan and motor

Unit fan shall be dynamically balanced, forward curved, DWDI centrifugal type constructed of galvanized steel for corrosion resistance. Motors shall be 208-230V/60Hz/1Ph [277V/60Hz/1Ph] permanent split-capacitor [electronically commutated high-efficiency, programmable brushless DC], totally enclosed, tap wound for 2-speed, permanently lubricated sleeve bearing, type with automatic reset integral thermal overload protection and resiliently mounted. High static motors are available for ducted applications. Shaded pole motors are not acceptable. Single speed motors are not acceptable. Prior to shipping, all motors shall be assembled, factory tested and installed in the unit

The fan/motor assembly shall be constructed of 18-gauge galvanized steel and installed in a z-channel mounting frame for ease of sliding fan/motor deck in and out through the front panel. Each fan/motor assembly shall be fastened by no more than 2 screws. The motor shall have a quick connect to allow service and removal without the need for tools.

Chassis

The chassis consists of a compressor, complete refrigeration and water piping circuits, copper coaxial heat exchanger and incorporates a coated hydrophilic aluminum air coil for enhanced condensate drainage. A rotary or scroll compressor utilizes R-410A refrigerant. All units are equipped with two drop down service legs to support the chassis when testing or servicing is required. All units feature wheels on the bottom of the chassis that allow for easy installation and removal during installation or servicing. Front facing refrigerant test ports are accessible without removing the chassis.

Drain pan

Primary condensate drain pans shall be single wall, 20-gauge stainless steel for superior corrosion resistance. Drain pans shall be of one piece construction and be positively sloped in 2 directions for condensate removal. An easily removable rubber p-trap shall be furnished, factory piped to the condensate drain riser, held in place by 2 compression clamps. A condensate level sensor is provided to eliminate power to unit if drain pan becomes clogged.

The primary drain pan shall be externally insulated with elastomeric closed cell foam insulation. The insulation shall carry no more than a 25/50 Flame Spread and Smoke Developed Rating per ASTM E-84 and UL 723 and an Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21. Internally sprayed insulation will not be acceptable.

Coils

The air coil shall optimize rows to meet the specified capacity. Coils shall have 3/8" OD seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and aluminum fin. Minimum copper tube thickness shall be 0.012".

Fins shall have high efficiency aluminum surface with hydrophillic coating optimized for heat transfer, air pressure drop and carryover. Minimum fin thickness shall be 0.0045". Lanced fins shall not be acceptable.

All coils shall be tested at 300 PSIG with helium & rated for a max. 600 PSIG working pressure.

Coil casing shall be fabricated from galvanized steel [stainless steel].

Filters

All units shall be furnished with a washable nylon type filter [1" nominal glass fiber throwaway] filter. Filters are held in place by four (4) filter clips and shall be tight fitting to prevent air bypass.

Electrical

Units shall be furnished with single point power connection. All electrical terminations to be made in terminal strip. The factory mounted terminal wiring strip consists of a multiple position screw terminal block to facilitate wiring terminations for the electric control valve and thermostat. The control box shall contain a 50VA transformer, 24V secondary voltage with 2A low voltage circuit breaker, 2-pole compressor contactor and microprocessor controller.

The reversing valve, fan motor and unit safety controls wiring shall be connected to the microprocessor for unit operation and monitoring. The units shall be name-plated for use with time delay fuses or HACR circuit breakers.

The unit controls shall be 24V and provide heating or cooling as required by the remote thermostat. The microprocessor can accept either a standard 24V digital, non-programmable thermostat [digital, programmable thermostat] [digitally communicating thermostat with IR remote control operation] designed to control up to two independently energized fan speeds. Thermostat will be provided with wiring harness complete with quick connect and pre-wired to terminal blocks.

- Option: Provide a service disconnect switch to isolate power from the unit during maintenance.

Primary internal wiring and testing shall be conducted at the factory. All units shall be shipped with wiring diagrams.

Hose kits

- Option: Provide a standard factory assembled and mounted ½" [3/4"] 2-way, on/off, 24V normally closed zone valve. Control valve shall be wired to terminal blocks through quick connect to allow service and replacement of valves. Maximum entering water temperature on the control valve shall be 200°F, and maximum operating pressure shall be 300 PSIG.
- Option: Piping packages shall include stainless steel braided hoses to allow for thermal expansion within the unit cabinet. The hose shall be EPDM inner lined and Kevlar® reinforced, with stainless steel FNPT swivels and/or fittings. The hoses shall be rated for a maximum 450 PSIG working pressure at 250°F, and shall conform to NFPA 90A and carry no more than a 25/50 Flame Spread and Smoke Developed Rating, per ASTM E-84 and UL 723.

- Option: Provide a y-strainer with pressure-temperature ports (P/T) on supply line.
- Option: Provide a fixed flow control device with pressure-temperature ports (P/T) on return line.

Piping packages shall be completely factory assembled including interconnecting pipe and factory tested for leaks.

Risers

Furnish chilled and hot water supply and return risers mounted to the unit. Risers shall be Type-M seamless copper tube and include 3" deep swaged connections at the top for connection to the unit above. Slip couplings are not acceptable.

- Option: Provide Type-L copper risers that meet or exceed the requirements stated above.

Risers shall be insulated with ½" closed cell foam insulation covering the entire riser. Insulation shall conform to NFPA 90A and carry no more than a 25/50 Flame Spread and Smoke Developed Rating, per ASTM E-84 and UL 723.

- Option: Provide ¾" closed cell foam insulation that meets or exceeds the requirements stated above.
- Option: Risers to be provided without insulation.

Condensate drain risers shall be Type-M seamless copper tube and meet the requirements stated above.

- Option: Risers shall be factory fabricated, bundled, and tagged separate from the heat pump units, allowing for shipment and installation of risers prior to the heat pumps.

Units shall be manufactured in accordance with ISO 9001:2008 standards established and maintained by Zehnder Rittling.