SECTION 23 8146 - WATER-SOURCE UNITARY HEAT PUMPS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following types of water-source heat pumps:

1. Concealed horizontal or vertical units.

1.2 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories for each model.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Wiring Diagrams: Power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and maintenance data.

E. Special warranties.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. ASHRAE Compliance:

1. ASHRAE 15.
2. Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

C. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

D. Comply with NFPA 70.

E. Comply with safety requirements in UL 484 for assembly of free-delivery water-source heat pumps.

F. Comply with safety requirements in UL 1995 for duct-system connections.

1.4 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace refrigeration components of water-source heat pumps that fail in materials or workmanship within five 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:

1. Daikin.
2. Carrier Corporation.
3. Trane.
4. *WaterFurnace. (Addendum 1 – 7/31/2023)*

B. Description: Packaged water-source heat pump with temperature controls; factory assembled, tested, and rated according to AHRI-ISO-13256-1.

C. Cabinet and Chassis: G-60 Galvanized-steel casing with the following features:

1. Access panel for access and maintenance of internal components.
2. Knockouts for electrical and piping connections.
3. Flanged duct connections.
4. Cabinet Insulation: Glass-fiber liner, minimum 1/2 inch thick, complying with UL 181.
5. Condensate Drainage: Stainless-steel drain pan with condensate drain piping projecting through unit cabinet and complying with ASHRAE 62.1.
6. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
7. Sound Attenuation Package:
   a. Sound attenuating blanket over compressor.

D. Fan: Direct driven, centrifugal, with multispeed motor resiliently mounted in fan inlet.

1. General requirements for motors are specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
2. Motor: Multispeed, permanently lubricated, ECM motor.

E. Water Circuit:

1. Refrigerant-to-Water Heat Exchangers: Coaxial heat exchangers with copper water tube with enhanced heat-transfer surfaces inside a steel shell.

2. The coil shall be constructed to a working pressure of 500 psig on the waterside, and 600 psig on the refrigerant side.
3. Motorized Water Valve: Stop water flow through the unit when compressor is off.

F. Refrigerant-to-Air Coils: Copper tubes with aluminum fins.

G. Refrigerant Circuit Components:

1. Sealed Refrigerant Circuit: Charge with R-410A refrigerant.
2. Charging Connections: Service fittings on suction and liquid for charging and testing.
3. Reversing Valve: Pilot-operated sliding-type valve designed to be fail-safe in heating position with replaceable magnetic coil.
4. Compressor: Hermetic two stage scroll compressor installed on vibration isolators and housed in an acoustically treated enclosure with factory-installed safeties as follows:

    a. Antirecycle timer.
    b. High-pressure cutout.
    c. Low-pressure cutout or loss of charge switch.
    d. Internal thermal-overload protection.
    e. Low Refrigerant Suction Sensor
    f. Condenser Water Flow switch
    g. Condensate overflow switch to stop compressor with high condensate level in condensate drain pan.
    h. Leaving condensate water piping temperature sensor.

5. Refrigerant Piping Materials: ASTM B 743 copper tube with wrought-copper fittings and brazed joints.
6. Pipe Insulation: Refrigerant minimum 3/8-inch- thick, flexible elastomeric insulation on piping exposed to airflow through the unit. Maximum 25/50 flame-spread/smoke-development indexes according to ASTM E 84.
7. Refrigerant Metering Device: Capillary tube.
8. Refrigerant Metering Device: Thermostatic expansion valve

H. Hot-Gas Reheat: Unit(s) shall have dehumidification control using hot gas refrigerant reheat system. Reheat coil shall be aluminum microchannel hot gas reheat located downstream of the cooling coil.

I. Filters: 2” low leakage rack with 2” MERV 8 Filters.

J. Controls:

1. Unit shall be provided with a factory mounted microprocessor based unit controller and have the capability of preforming the sequence of control listed on the drawings. The following features shall also be incorporated.

    a. Condensate Overflow
    b. Condenser water flow sensor
    c. Condenser water solenoid valve
    d. Air filter differential pressure
    e. Brownout Detection
    f. Suction-Line Temp Sensor
    g. Timed override switch

2. The controller shall be provided with an I/O expansion board providing a means of adding I/O capabilities to the base controller.

3. BACnet Communications Module – The unit control shall communicate over BACnet communications network. The unit shall be capable of supporting full MSTP BACnet implementation. The physical interface to a BACnet BAS network shall be through an industry standard RS-485 transceiver capable of existing on an RS-485 network of up to 64 nodes.

4. Wall Mounted Temperature Sensor – Digitally Adjustable Display Sensor with LED display showing room temperature, room humidity, fan speed, system mode, and override occupancy. The dehumidification output contact shall have an adjustable set point and configurable deadband.

K. Electrical Connection: Single electrical connection with non-fused disconnect, with factory mounted and wired low voltage transformer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Concrete Bases: Install floor mounting units on 4-inch high concrete bases.

B. Suspend water-source heat pumps from structure with threaded steel rods and vibration isolators.

C. Install wall-mounting thermostats, and switch controls in electrical outlet boxes at heights to match lighting controls.

D. Drawings indicate general arrangement of piping, fittings, and specialties. Specific connection requirements are as follows:

1. Connect supply and return hydronic piping to heat pump with shut off valves and flexible hose connections.
2. Connect heat-pump condensate drain pan to indirect waste connection with condensate trap of adequate depth to seal against the pressure of fan. Install cleanouts in piping at changes of direction.

E. Install electrical devices furnished by manufacturer but not specified to be factory mounted.

F. Install piping adjacent to machine to allow service and maintenance.

END OF SECTION 23 8146