

SECTION 23 81 29 - VRF Systems

1. GENERAL

- A. Variable Refrigerant Flow (VRF) HVAC system shall be a variable capacity, direct expansion (DX) field selectable Heat Pump or Heat Recovery engineered system unified within a single cabinet. The outdoor unit shall consist of one or more frames connected through a common 2-pipe Heat Pump or 3-pipe Heat Recovery refrigerant piping network and control communication wiring. Each system shall have single or multiple, inverter compressor(s). Each system shall be connected to multiple indoor units (ducted, non-ducted or mixed combinations) through a common refrigerant piping network and integrated system controls and communication network. Each indoor unit shall be controlled individually or as a group. Additionally, heat recovery systems shall be capable of simultaneous heating and cooling of individual zone(s).

2. DESIGN

- A. The design engineer shall consider/include the following items for the design.
1. Diverter box locations need to place in areas where acoustic disturbance is not a potential issue for concern.
 2. Include smart changeover functionality for cooling/heating switchover type systems.
 3. When configuring system design layout, group like spaces together that operate on similar schedules for combining on to a single unit
 4. VRF systems that are dependent on a UPS to protect from memory loss of system addressing during a power failure shall not be considered for design installation.
 5. Use brazed fittings for refrigeration piping connections.
 6. Space thermostat for VRF system control needs to be same VRF manufacturer for proper functionality. Central VRF controller needs to have full BACnet capability to communicate with campus JCI Metasys building management system. For smaller system installations – units to be connected via MSTP device, such as a Procon card and have ability for BACnet MSTP. For larger system installations – units to be connected and integrated to the BAS via BACnet IP.
 7. Designer to comply with ASHRAE 15 requirements when laying out system pipe routing and consideration of open/closed plenum spaces to meet code requirements. Consideration is to be given to the Section 7.2 requirements for a 50% reduction for institutional installations.
 8. All VRF systems shall include a low ambient kit.
 9. Mounting height for VRF condensing units with probable exposures shall accommodate snow/ice build-up concerns.
 10. VRF shall be provided with a 10-year warranty for compressors and mechanical parts.

3. CONSTRUCTION

A. The contractor/design engineer shall consider/include the following items for construction.

1. Contractor to have a minimum of (10) documented and successful installations of VRF systems with any of the acceptable manufacturers below and system sizes similar to current project installation size.
2. Contractor must be certified to install VRF system and must be certified with the specific manufacturer that is being installed on the project. Documentation of experience and certification is to be provided as part of the submittal process.
3. Manufacturer's representative shall attend preconstruction meeting. Rep shall also verify that the training certifications provided by the contractor are in order.
4. The contractor shall provide basis of design bid as specified and with specified products. If the contractor should wish to propose any alternate products to the basis of designed products, they shall provide a separate and complete bid detailing the proposed alternate products and the associated adjustment of price to support the change from basis of design products. The contractor bids the alternate product with full knowledge that the proposed product may not be acceptable or approved. In no event shall the contractor be entitled to additional compensation to supply such specified products, options, sequences or intents. Any and all additional cost, to any party, because of any product submitted on or supplied other than that of the original specified products shall be the responsibility of the contractor without recourse. Any product proposed as an alternate shall have been offered, as a VRF product, in the United States for a minimum of (5) years.
5. Label all system components, diverter boxes, and refrigeration piping per requirements of section 01 17 0 1 – Building Systems Labeling and Identification.
6. Upon job completion, contractor to provide the owner with a copy of approved submittal, Mobile service and diagnostic software (VRF system service diagnostics) software, project mechanical and control drawings, all as-built piping drawings including device controls addressing map and guide, O&M's, troubleshooting guides, service manuals and engineering manuals in PDF format. Provide any specialized repair tools needed for system maintenance.

4. MANUFACTURERS

- A. All equipment and components shall be new, and the manufacturer's current model.
- B. All parts and components shall be readily available in the USA.
- C. Acceptable Manufacturers:
 1. York, Mitsubishi, Hitachi

END OF SECTION