BuildingName
The Description of the Project
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SPECIFICATION DIVISION 23

NUMBER SECTION DESCRIPTION

DIVISION 23 HEATING, VENTILATING AND AIR CONDITIONING (HVAC)
SECTION 238245 - CHILLED BEAMS

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DIVISION 23 HEATING, VENTILATING AND AIR CONDITIONING (HVAC)
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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Standard General and Supplementary General Conditions, Division 1 Specification Sections, and other applicable Specification Sections including the Related Sections listed below, apply to this Section.

B. Related Sections:

1. Section 221113: Piping Materials and Methods.
2. Section 220523: Valves.
3. Section 220719: Mechanical Systems Insulation.
4. Section 232116: Hydronic Piping Specialties.
5. Section 230900: Mechanical Systems Controls.
6. Section 233100: HVAC Ducts and Casings.

1.2 SUMMARY

A. Section Includes

1. Passive Chilled Beams (Cooling and/or Heating)
2. Active Chilled Beams (Cooling and/or Heating)

1.3 SUBMITTALS

A. Product Data: Include manufacturer, catalog number, catalog illustrations, piping and details, materials of construction, accessories, operating and maintenance clearance requirements, dimensions, weights, rough-in requirements, component locations, component sizes, and location and size of each field connection. Include plenum gauge, grille gauge, grille removal method for access, mounting and hanging details, coil materials, tube size, tube wall thickness, fin gauge, and fin spacing.

Include octave band and A-weighted sound power data for each unit type at rated capacity.

B. Equipment Schedule: Include each unit with the following information:

1. Equipment tag.
2. Room Number Location.
3. Model number.
4. Manufacturer’s size designation.
5. Configuration (floor mount, wall mount, ceiling mount, recessed, suspended).
6. Coil total and sensible heat transfer capacity, entering and leaving water temperatures, fin spacing, water flow rate, and water pressure drop.
7. Primary airflow volume, unit primary airflow pressure drop, induced airflow, primary airflow supply temperature, and room airflow supply temperature.
8. Unit total and sensible cooling capacity.

C. Maintenance schedules and repair part numbers.

D. Warranty Documentation: Submit warranty documentation according to requirements of Contract Documents.

E. Shop Drawings

F. Installation, Operation and Maintenance Manuals

1.4 COORDINATION

A. Coordinate dimensions and arrangement with building elements including ceiling construction, light fixtures, duct connections, pipe entry location, and wall construction.

1.5 QUALITY ASSURANCE

A. Manufacturers and Products: The products and manufacturers specified in this Section establish the standard of quality for the Work. Subject to compliance with all requirements, provide specified products from the manufacturers named in Part 2.

B. Reference Standards: Products in this section shall be built, tested, and installed in compliance with the following quality assurance standards; latest editions, unless noted otherwise.

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. National Fire Protection Association (NFPA):
   a. 90A Standard for the Installation of Air Conditioning and Ventilating Systems.
   b. National Electrical Code
3. Underwriters Laboratories, Inc. (UL)
4. Standard 200: Methods of Testing Chilled Beams

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials and equipment raised off the floor on pallets and protected with coverings to prevent damage due to weather and construction activities. Store in areas that prevent damage due to freezing and extreme temperatures or sunlight. Arrange coverings to provide air circulation to avoid damage from condensation or chemical build-up. Protect from damage, dirt and debris at all times.

B. Packaging and Protection: Ship in plastic wrap for protection and cap pipe connections with plastic caps.

C. Identification: Ship each unit tagged with design/submittal tag number and installed room number.

1.7 WARRANTY

A. Provide a complete parts and labor warranty for a minimum of one year from the date of Substantial Completion unless indicated otherwise.

PART 2 - PRODUCTS

2.1 PASSIVE CHILLED BEAMS

A. Provide Chilled Beam performance and characteristics per schedule on drawings.

B. Description: The passive chilled beams shall utilize natural convection of room air across a water coil mounted within the unit to provide sensible cooling. The air shall be drawn from a ceiling cavity or the surrounding air in the occupied space, and pass through the coil and into the space below. A housing encloses the sides of the coil. Provide a return plenum if the unit is installed above the ceiling and air is drawn from the occupied space. Provide a grille to conceal the coil.

C. Coil: Seamless Copper tube mechanically expanded into aluminum fins. Provide 0.5" minimum tube diameter with 0.016" minimum wall thickness. The fins shall be a minimum of 0.006" thick and spaced no closer than 12 FPI. Provide soldered tube joints. The coil connections shall be at one end upturned 90 degrees for vertical connection and be the same size as the tube ready for solder connection. The coil shall have a minimum working pressure of 150 psi and each coil factory tested at a minimum of 225 psi. Coil shall be removable from the room side.

D. Housing: Galvanized or galvannealed. 20 gauge thickness minimum. When exposed provide polyester powder coat of standard white or custom color when indicated. Provide color selection with submittal.

E. Grille: Perforated galvanized or galvannealed. 20 gauge thickness minimum. Provide polyester powder coat of standard white or custom color when indicated. Provide color selection with submittal. Grille shall be hinged and removable without special tools.

F. Return Plenum: Provide an integrated return plenum. Plenum shall be galvanized or galvannealed. 20 gauge thickness minimum. When exposed provide polyester powder coat of standard white or custom color when indicated. Provide color selection with submittal.

G. Trim: Provide a minimum of four hanging brackets to support the chilled beam with threaded rod or cable from above. Provide trim for lay-in ceiling grid or hard ceiling based on ceiling type.

H. Manufacturers: Price, Dadanco, Krueger, Titus.

2.2 ACTIVE CHILLED BEAMS

A. Description: Primary air is supplied to the chilled beam plenum and injected at a high velocity so that room air is induced across a water coil mounted within the unit to provide sensible cooling or heating. The induced air shall mix with primary air and shall be supplied into the space through integrated discharge slot(s). A housing encloses the sides of the coil. A plenum with nozzles form the supply plenum and discharge slots. A grille is provided to conceal the coil.

B. Coil: Seamless Copper tube mechanically expanded into aluminum fins. Provide 0.5” minimum tube diameter with 0.016” minimum wall thickness. The fins shall be a minimum of 0.006” thick and spaced no closer than 12 FPI. Provide soldered tube joints. The coil connections shall be at one end upturned 90 degrees for vertical connection and be the same size as the tube ready for solder connection. The coil shall have a minimum working pressure of 150 psi and each coil factory tested at a minimum of 225 psi. Coil shall be removable from the room side.

C. Housing: Galvanized or galvannealed. 20 gauge thickness minimum. When exposed provide polyester powder coat of standard white or custom color when indicated. Provide color selection with submittal.

D. Grille: Perforated galvanized or galvannealed. 20 gauge thickness minimum. Provide polyester powder coat of standard white or custom color when indicated. Provide color selection with submittal. Grille shall be hinged and removable without special tools.

E. Supply Plenum: Provide integrated supply plenum with top or side, oval or round, duct connections. Plenum shall be galvanized or galvannealed. 20 gauge thickness minimum. When exposed provide polyester powder coat of standard white or custom color when indicated. Provide color selection with submittal. Provide pressure tap for measuring plenum pressure and flow curve on side of plenum. Seal plenum so there are no detectible leakage by hand at 1" sp.

F. Trim: Provide a minimum of four hanging brackets to support the chilled beam with threaded rod or cable from above. Provide trim for lay-in ceiling grid or hard ceiling based on ceiling type. Provide coanda wings, 6 inch wide minimum, for open ceiling installations. Coanda wings shall be 20 gauge minimum galvanized or galvannealed and coated to match the grille.

G. Manufacturers: Price, Dadanco, Krueger, Titus.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Review and examine conditions affecting work. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Commissioning: Review and perform required commissioning activities in the pre-construction phases.

3.2 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.
2. Test unit operation with thermostat in all modes of operation.
3. Remove and replace malfunctioning units and retest as specified above.

Engineer shall verify that the Mechanical Systems Controls SPECIFICATION DESCRIBES controls start-up for terminal units.

B. Coordinate controls start-up for terminal units with the Mechanical Systems Controls Specifications.

3.3 HANGER AND SUPPORT INSTALLATION

A. Comply with applicable SMACNA HVAC Duct Construction Standards and Hanger and Support construction standards, and applicable Division 23 Sections.

B. Support Chilled Beam

C. s independently from adjacent ductwork. Ensure supports do not interfere with accessibility of other equipment, e.g., access to Chilled Beam DDC control enclosure. Do not hang TUs from piping, other ducts or equipment.

D. Support chilled beams from the structure above using cable designed for equipment support unless other indicated.

E. Provide sway brace for chilled beams not in ceilings, hung with cable, and connected with flexible duct and pipe.

3.4 CHILLED BEAM INSTALLATION

A. Install Chilled Beams in accordance with manufacturer recommendations, Contract Drawings, and reviewed submittals.

B. Label unit according to the applicable detail.

C. Position Chilled beams to comply with clearance requirements and for ease of maintenance.

D. Install Chilled Beams using flexible pipe connections and flexible duct specified in other specification sections.

3.5 COMMISSIONING

A. Perform the commissioning activities as outlined in the Division 01 Section Commissioning and other requirements of the Contract Documents.

3.6 SYSTEM START-UP

A. After start-up and operation, sensors and controllers shall be cleaned.

3.7 ADJUSTING, CLEANING, PROTECTION

A. Protect Chilled Beams throughout the entire construction period, until Commissioning and Substantial Completion.

END OF SECTION 233600