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DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING

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SECTION 23 82 45

CHILLED BEAMS

PART 1 GENERAL

1.1 REFERENCES

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING
ENGINEERS (ASHRAE)

ASHRAE 55 (2004; Int 1:2005; Errata:2006; Int
2:2007; Errata:2007; Addendas A, B:2008;
Addendas D - G:2009) Thermal Environmental
Conditions for Human Occupancy

ASME INTERNATIONAL (ASME)

ASME B16.22 (2001; R 2010) Standard for Wrought Copper
and Copper Alloy Solder Joint Pressure
Fittings

ASTM INTERNATIONAL (ASTM)

ASTM B 88 (2009) Standard Specification for Seamless
Copper Water Tube

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2008; AMD 1 2008) National Electrical
Code - 2008 Edition

1.2 DESCRIPTION OF SYSTEM

Section includes passive and active chilled beams.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation;
submittals not having a "G" designation are for information only. When
used, a designation following the "G" designation identifies the office
that will review the submittal for the Government. Submit the following in
accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

1.4 PRODUCT DATA

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chilled beams.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories for chilled beams.

1.5 SHOP DRAWINGS

For Chilled Beams:

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

1.6 SAMPLES

Samples for Initial Selection: For units with factory-applied finishes.

Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.

1. Chilled-Beam Finishes: 12 inches long by unit width.

1.7 PRODUCT SCHEDULE

For chilled beams. Use same designations indicated on Drawings.

1.8 DELEGATED DESIGN SUBMITTAL

For chilled beams.

Include design calculations for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.

1.9 COORDINATION DRAWINGS

Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

Coordination Drawings:

Suspended ceiling components.
Structural members to which chilled beams will be attached.
Size and location of initial access modules for acoustical tile.
Location of chilled beams including other building components integrated into chilled-beam configuration including the following:

- Lighting fixtures.
- Air outlets and inlets.
- Speakers.
- Sprinklers.
- Access panels.

Items penetrating finished ceiling including the following:

- Lighting fixtures.
- Air outlets and inlets.
- Speakers.
- Sprinklers.
- Access panels.
- Perimeter moldings.
- Chilled-beam frames.

1.10 REPORTS

Submit field quality control reports.

1.11 WARRANTY

Submit sample warranty for manufacturer.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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.

2.2 ACTIVE CHILLED BEAMS

2.2.1 Manufacturers

Subject to compliance with requirements, provide products by one of the following:

- Dadanco USA.
- Halton Company
- Semco Incorporated; a Flakt-Wood company.
- Swegon Inc.
- Trox USA Inc.
- Or approved equal.

2.2.2 Standards

Comply with ASHRAE 55.

2.2.3 Description

Sheet metal with primary air plenum, secondary chilled-water coil and heating-water coil assembly, and mounting-bracket supports suitable for lay-in installation flush with T-bar ceiling grid.

2.2.4 Components

Other building components integrated into chilled-beam configuration including the following:

- Air inlets.
- Access panels.
- Drain pan (linear beam).

Panel: Minimum 0.0375-inch-thick, galvanized-steel sheet.

Factory Piping: ASTM B 88, Type L copper tube with ASME B16.22 wrought-copper fittings and brazed joints.

Hydronic Coils: Copper tube, with mechanically bonded 0.006-inch-thick, aluminum fins spaced no closer than 0.1 inch, rated for a minimum working pressure of 200 psig and a maximum entering-water temperature of 220 degrees F. Include manual air vent and drain valve.

- a. Cooling Coil: NPS 1/2.
- b. Heating Coil: NPS 1/2.

Number of Nozzles: Four.

Electrical Connections: Nonheating, high-temperature, insulated-copper leads.

2.2.5 Exposed Metal Finish

Sheet metal with baked enamel Silk-screened finish to match appearance of acoustical ceiling tiles as selected by Architect.

Color: Manufacturer's custom paint color as selected by Architect.
Surface-Mounted Trim: Sheet metal with baked-enamel finish in manufacturer's custom paint color as selected by Architect.

2.2.6 Capacities and Characteristics

1. Nominal Panel Size: 12 by 48 inches and 24 by 48 inches.
2. Nominal Depth: 12 inches maximum.
3. Room Temperature for Cooling: 75 deg F.
4. Cooling Capacity: in Btu/h (see drawing).
5. Chilled-Water Inlet Temperature: 56 deg F or above the dewpoint temperature.
6. Average Chilled-Water Temperature: 58 deg F.
7. Chilled-Water Flow: in gpm (see drawing).
8. Room Temperature for Heating: 72 deg F.
9. Heating Capacity: in Btu/h (see drawing).
10. Heating-Water Inlet Temperature: 140 deg F or lower.
11. Heating-Water Flow: in gpm (see drawing).
12. Average Heating-Water Temperature: (see drawing).

2.3 CONTROLS AND SAFETIES

- A. Wall Thermostat: Bimetal sensing elements calibrated from 55 to 90 deg F; with contacts suitable for control-voltage circuit, and manually operated on-off switch with contactors, relays, and control transformers.
- B. Dew Point Sensor: Wall mounted and concealed with set point and contacts suitable for control-voltage circuit, and manually operated on-off switch with contactors, relays, and control transformers.

2.4 ACCESSORIES

- A. Purging Nipple: Copper, with threaded end connection.
- B. Chilled-Beam Unit Frame: Aluminum, silk-screened finish to match appearance of acoustical ceiling panels selected by Architect and baked-enamel finish.
 1. Color: Manufacturer's custom paint color, selected by Architect.
- C. Flexible Water-Connector Hose: 39 inches long.
- D. Access Door: Hinged with four spring-loaded cabinet roller latches.

2.5 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Finish chilled beams after assembly.

C. Appearance of Finished Work: Variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

Examine areas to receive chilled beams for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

Examine roughing-in for hot- and chilled-water piping to verify actual locations of piping connections before installation.

Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

Install lay-in ceiling-mounted chilled-beam units level and plumb.

Coordinate layout and installation of chilled beams and suspension-system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, communications system, security system, and partition assemblies.

Install continuous-thread hanger rods of size required to support chilled-beam weight.

Comply with NECA 1.

Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

Sprinklers: Comply with requirements for sprinkler-head installation.

Lighting Fixtures: Comply with requirements for lighting-fixture installation.

Speakers: Comply with requirements for speaker installation.

3.3 CONNECTIONS

A. Comply with requirements for piping specification. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to chilled beams, allow space for service and maintenance.

C. Comply with requirements for ductwork specification. Drawings indicate general arrangement of ductwork.

D. Make piping and ductwork connections of chilled-beam unit.

3.4 IDENTIFICATION

- A. Identify hydronic piping and valves. Comply with Specifications.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

- 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

- 2. Test and adjust thermostatic controls and equipment. Replace damaged and malfunctioning controls and equipment.

C. Chilled beam will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.6 ADJUSTING

A. Adjust initial temperature set points.

B. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to four visits to Project during other-than-normal occupancy hours for this purpose.

-- End of Section --