

**SECTION 23 82 33  
CONVECTORS**

SPEC WRITER NOTES:

1. Use this section only for NCA projects.
2. Delete between // // if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.
3. The spec writer shall review the Physical Security Design Manual for VA Facilities to determine and include any Life Safety requirements called out.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies electric baseboard radiators, electric finned-tube radiators and electric convectors.
- B. A complete listing of common acronyms and abbreviations are included in Section 23 05 11, COMMON WORK RESULTS FOR HVAC.

**1.2 RELATED WORK**

SPEC WRITER NOTE: Retain one of two paragraphs below.

- A. //Section 01 00 01, GENERAL REQUIREMENTS (Major NCA Projects).//
- B. //Section 01 00 02, GENERAL REQUIREMENTS (Minor NCA Projects).//
- C. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- D. Section 01 42 19, REFERENCE STANDARDS.
- E. Section 01 81 13, SUSTAINABLE DESIGN REQUIREMENTS.
- F. //Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS.//

SPEC WRITER NOTE: If Section 13 05 41 is included in this project the section shall be obtained from VA Masters.

- G. //Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS.//
- H. Section 23 05 11, COMMON WORK RESULTS FOR HVAC: General mechanical requirements and items which are common to more than one section of Division 23.
- I. //Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.//
- J. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW).
- K. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

**1.3 APPLICABLE PUBLICATIONS**

SPEC WRITER NOTE: Make material requirements agree with requirements specified in the referenced Applicable Publications. Verify and update the publication list to that which applies to the project, unless the reference applies to all mechanical systems. Publications that apply to all mechanical systems may not be specifically referenced in the body of the specification, but, shall form a part of this specification.

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. National Fire Protection Association (NFPA):  
70-2014.....National Electrical Code (NE)
- C. Underwriters Laboratories (UL):  
499-2014.....Standard for Electric Heating Appliances  
1030-2015.....Standard for Sheathed Heating Elements  
2021-2015.....Standard for Fixed and Location-Dedicated  
Electric Room Heaters

**1.4 SUBMITTALS**

- A. Submittals, including number of required copies, shall be submitted in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Information and material submitted under this section shall be marked "SUBMITTED UNDER SECTION 23 82 33, CONVECTORS", with applicable paragraph identification.
- C. Manufacturer's Literature and Data including: Full item description and optional features and accessories. Include dimensions, weights, materials, applications, standard compliance, model numbers, size, and capacity.
- D. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each type of product indicated.
- E. 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. Location and size of each field connection.
  - 2. Location and arrangement of integral controls.

3. Enclosure joints, corner pieces, access doors, and other accessories.
  4. Wiring Diagrams: Power, signal, and control wiring.
- F. Color Samples for Initial Selection: For units with factory-applied color finishes.
- G. Complete operating and maintenance manuals including wiring diagrams, technical data sheets, information for ordering replacement parts, and troubleshooting guide:
1. Include complete list indicating all components of the systems.
  2. Include complete diagrams of the internal wiring for each item of equipment.
  3. Diagrams shall have their terminals identified to facilitate installation, operation and maintenance.
- H. //Completed System Readiness Checklist provided by the Commissioning Agent and completed by the contractor, signed by a qualified technician and dated on the date of completion, in accordance with the requirements of Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.//
- I. //Submit training plans and instructor qualifications in accordance with the requirements of Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.//

#### **1.5 QUALITY ASSURANCE**

- A. Refer to paragraph QUALITY ASSURANCE, in Section 23 05 11, COMMON WORK RESULTS FOR HVAC.

#### **1.6 AS-BUILT DOCUMENTATION**

SPEC WRITER NOTE: Coordinate O&M Manual requirements with Section 01 00 01, GENERAL REQUIREMENTS (Major NCA Projects) or Section 01 00 02, GENERAL REQUIREMENTS (Minor NCA Projects). O&M manuals shall be submitted for content review as part of the close-out documents.

- A. Submit manufacturer's literature and data updated to include submittal review comments and any equipment substitutions.
- B. Submit operation and maintenance data updated to include submittal review comments, substitutions and construction revisions shall be //in electronic version on CD or DVD// inserted into a three ring binder. All aspects of system operation and maintenance procedures, including applicable piping isometrics, wiring diagrams of all circuits, a written description of system design, control logic, and sequence of operation shall be included in the operation and maintenance manual.

The operations and maintenance manual shall include troubleshooting techniques and procedures for emergency situations. Notes on all special systems or devices shall be included. A List of recommended spare parts (manufacturer, model number, and quantity) shall be furnished. Information explaining any special knowledge or tools the owner will be required to employ shall be inserted into the As-Built documentation.

- C. The installing contractor shall maintain as-built drawings of each completed phase for verification; and, shall provide the complete set at the time of final systems certification testing. As-built drawings are to be provided, and a copy of them in Auto-CAD version //\_\_\_\_// provided on CD or DVD. Should the installing contractor engage the testing company to provide as-built or any portion thereof, it shall not be deemed a conflict of interest or breach of the 'third party testing company' requirement.
- D. Certification documentation shall be provided to COR 10 working days prior to submitting the request for final inspection. The documentation shall include all test results, the names of individuals performing work for the testing agency on this project, detailed procedures followed for all tests, and certification that all results of tests were within limits specified.

## **PART 2 - PRODUCTS**

### **2.1 ELECTRIC BASEBOARD RADIATORS**

- A. Description: Factory-packaged units constructed according to UL 499, UL 1030, and UL 2021.
  - 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.
- B. Heating Elements: Nickel-chromium-wire heating element enclosed in metallic sheath mechanically bonded to fins, with high-temperature cutout and sensor running the full length of the element. Element supports shall eliminate thermal expansion noise.
- C. Wall-Mounted Back and End Panel: Minimum 1.1 mm (0.045 inch) thick steel.
- D. Support Brackets: Locate a maximum 900 mm (36 inches) spacing to support front panel and element.
- E. Finish: Baked enamel finish in manufacturer's //standard// //custom// color as selected by Architect.

- F. Enclosures: Minimum 0.85 mm (0.033 inch) thick steel, removable front cover.
- G. Unit Controls: //Integral line-voltage thermostat// //Integral electronic thermostat// //Remote line-voltage thermostat//.
- H. Accessories:
  1. Filler sections without a heating element matching the adjacent enclosure.
  2. Integral disconnect switch.

## 2.2 ELECTRIC FINNED-TUBE RADIATORS

- A. Description: Factory-packaged units constructed according to UL 499, UL 1030, and UL 2021.
  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.
- B. Heating Elements: Nickel-chromium-wire heating element enclosed in metallic sheath mechanically bonded into fins, with high-temperature cutout and sensor running the full length of the element. Element supports shall eliminate thermal expansion noise.
- C. Front Panel: Minimum 1.1 mm (0.045 inch) thick steel.
- D. Wall-Mounting Back Panel: Minimum 0.85 mm (0.033 inch) thick steel, full height, with full-length channel support for front panel without exposed fasteners.
- E. Floor-Mounting Pedestals: Conceal conduit for power and control wiring at maximum 900 mm (36 inch) spacing. Pedestal-mounting back panel shall be solid panel matching front panel.
- F. Support Brackets: Locate at maximum 900 mm (36 inch) spacing to support front panel and element.
- G. Finish: Baked enamel finish in manufacturer's custom color as selected by Architect.
- H. Damper: Knob-operated internal damper at enclosure outlet.
- I. Access Doors: Factory made, permanently hinged with tamper-resistant fastener, minimum size 150 mm by 175 mm (6 inches by 7 inches), integral with enclosure.
- J. Enclosure Style: //Sloped// //Flat// top.
  1. Front Inlet Grille: Punched louver; painted to match enclosure.
  2. //Top// //Front// Outlet Grille: Punched louver; painted to match enclosure.

- K. Unit Controls: Integral //line-voltage thermostat// //low-voltage relay and control transformer for remote thermostat//.
- L. //Accessories: Integral disconnect switch, filler sections, corners, relay sections, and splice plates all matching the enclosure and grille finishes.//

### 2.3 ELECTRIC CONVECTORS

- A. Description: Factory-packaged units constructed according to UL 499, UL 1030, and UL 2021.
  - 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.
- B. Heating Elements: Nickel-chromium-wire heating element enclosed in metallic sheath mechanically bonded into fins, with high-temperature cutout and sensor running the full length of element. Element supports shall eliminate thermal expansion noise.
- C. Front and Top Panel: Minimum 1.35 mm (0.053 inch) thick steel with exposed corners rounded; removable front panels with tamper-resistant fasteners braced and reinforced for stiffness.
- D. Wall-Mounting Back and End Panels: Minimum 1.1 mm (0.045 inch) thick steel.
- E. Floor-Mounting Pedestals: Conceal conduit for power and control wiring at maximum 900 mm (36 inch) spacing. Pedestal-mounting back panel shall be solid panel matching front panel.
- F. Support Brackets: Locate at maximum 900 mm (36 inch) spacing to support front panel and element.
- G. Insulation: 15 mm (1/2 inch) thick, fibrous glass on inside of the back of the enclosure.
- H. Finish: Baked-enamel finish in color as selected by Architect.
- I. Damper: Knob-operated internal damper.
- J. Access Doors: Factory made, permanently hinged with tamper-resistant fastener, minimum size 150 mm by 175 mm (6 inches by 7 inches), integral with enclosure.
- K. Enclosure Style: //Sloped// //Flat// top.
  - 1. Front Inlet Grille: Punched louver; painted to match enclosure.
  - 2. //Top// //Front// Outlet Grille: Punched louver; painted to match enclosure.
- L. Unit Controls: Integral //line-voltage thermostat// //low-voltage relay and control transformer for remote thermostat//.

- M. //Accessories: Integral disconnect switch, recessing flanges finished to match enclosure or overlapping front cover for fully recessed units, and rubber gaskets to seal cabinet at wall.//

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. If an installation is unsatisfactory to the COR, the Contractor shall correct the installation at no additional cost or time to the Government.

#### **3.2 EXAMINATION**

- A. Examine areas to receive convection heating units for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in for electrical connections to verify actual locations before convection heating unit installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.3 BASEBOARD RADIATOR INSTALLATION**

- A. Install units level and plumb.
- B. Install enclosure continuously around corners, using outside and inside corner fittings.
- C. Join sections with splice plates and filler pieces to provide continuous enclosure.
- D. Install enclosure continuously from wall to wall.
- E. Terminate enclosures with manufacturer's end caps except where enclosures are indicated to extend to adjoining walls.

#### **3.4 FINNED-TUBE RADIATOR INSTALLATION**

- A. Install units level and plumb.
- B. Install enclosure continuously around corners, using outside and inside corner fittings.
- C. Join sections with splice plates and filler pieces to provide continuous enclosure.
- D. Install enclosure continuously from wall to wall.
- E. Terminate enclosures with manufacturer's end caps, except where enclosures are indicated to extend to adjoining walls.

#### **3.5 CONVECTOR INSTALLATION**

- A. Install units level and plumb.

**3.6 CONNECTIONS**

- A. Ground electric convection heating units according to Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.
- B. Connect wiring according to Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW).

**3.7 FIELD QUALITY CONTROL**

- A. Perform the following field tests and inspections and prepare test reports:
  - 1. Operational Test: After electrical circuitry has been energized, start units to confirm proper convection heating unit operation.
  - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Remove and replace convection heating units that do not pass tests and inspections and retest as specified above.

**3.8 //SEISMIC BRACING**

- A. Where applicable provide Seismic bracing as required under specification Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS.//

**3.9 STARTUP AND TESTING**

- A. Make tests as recommended by product manufacturer and listed standards and under actual or simulated operating conditions and prove full compliance with design and specified requirements. Tests of the various items of equipment shall be performed simultaneously with the system of which each item is an integral part.
- B. When any defects are detected, correct defects and repeat test at no additional cost or time to the Government.
- C. //The Commissioning Agent will observe startup and contractor testing of selected equipment. Coordinate the startup and contractor testing schedules with the COR and Commissioning Agent. Provide a minimum notice of 10 working days prior to startup and testing.//

**3.10 //COMMISSIONING**

- A. Provide commissioning documentation in accordance with the requirements of Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.
- B. Components provided under this section of the specification will be tested as part of a larger system.//



**3.11 DEMONSTRATION AND TRAINING**

- A. Provide services of manufacturer's technical representative for //four// // // hour//s// to instruct each VA personnel responsible in the operation and maintenance of units.
- B. //Submit training plans and instructor qualifications in accordance with the requirements of Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.//

- - - END - - -