SECTION 235523.16 - HIGH-INTENSITY, GAS-FIRED, RADIANT HEATERS

TIPS:

To view non-printing **Editor's Notes** that provide guidance for editing, click on Masterworks/Single-File Formatting/Toggle/Editor's Notes.

To read **detailed research, technical information about products and materials, and coordination checklists**, click on Masterworks/Supporting Information.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. High-intensity, infrared, gas-fired, radiant heaters.
2. Gas-fired, outdoor, infrared patio heaters.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings:

1. Signed, sealed, and prepared by or under the supervision of a qualified professional engineer.
2. Include plans, elevations, sections, and [**mounting**] [**attachment**] details.
3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
4. Detail fabrication and assembly of high-intensity, gas-fired, radiant heaters, as well as procedures and diagrams.
5. Include diagrams for power[**, signal, and control**] wiring.

C. Delegated-Design Submittal: For gas-fired, radiant heaters.

1. Include design calculations for seismic restraints.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, elevations, 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:

1. Structural members to which equipment will be attached.
2. Gas piping to heater installations
3. Thermostats and wiring to heaters.
4. Heater locations and clearance requirements.
5. Other suspended ceiling components:

a. Lighting fixtures.
b. Air outlets and inlets.
c. Sprinklers.
d. <**Insert item**>.

B. Field quality-control reports.

C. Sample Warranty: For manufacturer's special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For gas-fired, radiant heaters to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Igniter: [**One**] <**Insert number**> hot-surface burner igniter(s) for each style of high-intensity, gas-fired, radiant heater furnished.

1.7 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of radiant heaters that fail in materials or workmanship within specified warranty period.

1. Warranty Period: All warranty periods listed below are from date of Substantial Completion.

a. Ceramic Tiles: [**Three**] [**Five**] [**10**] [**15**] <**Insert number**> years.
b. Heater Components: [**One**] [**Three**] [**Five**] [**10**] <**Insert number**> year(s).

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with [**ANSI Z83.19A/CSA 2.35A**] [**ANSI Z83.26/CSA 2.37**].

1. CSA certified, with CSA Seal and certification number clearly visible on units.
2. UL listed and labeled, with UL label clearly visible on units.

B. 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 HIGH-INTENSITY, INFRARED, GAS-FIRED, RADIANT HEATERS <**Insert drawing designation**>

A. <Double click here to find, evaluate, and insert list of manufacturers and products.>

B. Factory-assembled, [**indoor**] [**outdoor**], overhead-mounted, electrically controlled, high-intensity, infrared, radiant heating units using gas combustion. Heater to have all necessary factory-installed wiring and piping required prior to field installation and startup.

C. Fuel Type: Design burner for [**natural**] [**propane**] gas having characteristics same as those of gas available at Project site.

D. Main Housing: Continuous, one-piece, [**aluminized**] [**stainless**]-steel unit without gaps between housing and reflectors.

E. Burner Assembly:

1. Modular, [**aluminized steel with powder-coat or similar finish**] [**stainless-steel**] plenum chamber [**coated with ceramic fiber insulation**]secured with stainless-steel retainers.

F. Emitter: Perforated ceramic tiles.

G. Reflector: [**One-sided, bright-polished aluminum**] [**High-grade steel with cold-bonded, polished-aluminum layer**] [**Aluminized steel**].

H. Ignition:

1. Manual Pilot: Self-energizing with no external power connection.
2. Direct Spark: [**24/25**] [**115/120**]-V ac, solid-state ignition module with spark electrode and flame sensor.
3. Potted circuitry.

I. Accessories:

1. [**Parabolic reflector**] [**Reflector extensions**].
2. Wire grid or expanded metal secondary emitter for increased efficiency.
3. Protective screen and heat-deflector shield.

4. Stainless-steel flexible connector with manual valve for gas supply.
5. Hanger chain with "S" hooks.
6. Preassembled chain suspension kit.
7. Rigid mounting kits.
8. Clearance warning plaque.
9. Two-stage operation.

J. Capacities and Characteristics:

1. Gas Input: <**Insert Btu/h (kW)**>.
2. Gas Output: <**Insert Btu/h (kW)**>.
3. Electrical Characteristics:

a. Volts: [**Millivolt**] [**24/25**] [**115/120**] <**Insert value**>.
b. Phase: Single.
c. Hertz: 60.
d. Full-Load Amperes: <**Insert value**>.
e. Minimum Circuit Ampacity: <**Insert value**>.
f. Maximum Overcurrent Protection: <**Insert amperage**>.

K. Mounting Angle: <**Insert value**> degrees.

2.3 GAS-FIRED, OUTDOOR, INFRARED PATIO HEATERS <**Insert drawing designation**>

A. <Double click here to find, evaluate, and insert list of manufacturers and products.>

B. Factory-assembled, [**indoor**] [**outdoor**], overhead-mounted, electrically controlled, high-intensity, infrared, radiant heating units using gas combustion. Heater to have all necessary factory-installed wiring and piping required prior to field installation and startup.

C. Fuel Type: Design burner for [**natural**] [**propane**] gas having characteristics same as those of gas available at Project site.

D. Main Housing: Continuous, one-piece, [**aluminized**] [**stainless**]-steel unit without gaps between housing and reflectors.

1. Air vents with cooling channels.
2. Air louvers.
3. Decorative grill.

E. Burner Assembly:

1. Modular, [**aluminized-steel with powder-coat or similar finish**] [**stainless-steel**] plenum chamber [**coated with ceramic fiber insulation**]secured with stainless-steel retainers.

F. Emitter: Perforated ceramic tiles.

G. Reflector: [**Polished stainless steel**] <**Insert material**>.

H. Ignition:

1. Direct Spark: [**24/25**] [**115/120**]-V ac, solid-state ignition module with spark electrode and flame sensor.
2. Potted circuitry.

I. Accessories:

1. Wire grid or expanded metal secondary emitter for increased efficiency.
2. Protective screen and heat-deflector shield.
3. Stainless-steel flexible connector with manual valve for gas supply.
4. Hanger chain with "S" hooks.
5. Preassembled chain suspension kit.
6. Rigid mounting kits.
7. Clearance warning plaque.

J. Capacities and Characteristics:

1. Gas Input: <**Insert Btu/h (kW)**>.
2. Gas Output: <**Insert Btu/h (kW)**>.
3. Electrical Characteristics:

a. Volts: [**24/25**] [**115/120**] <**Insert value**>.
b. Phase: Single.
c. Hertz: 60.
d. Full-Load Amperes: <**Insert value**>.
e. Minimum Circuit Ampacity: <**Insert value**>.
f. Maximum Overcurrent Protection: <**Insert amperage**>.

K. Mounting Angle: <**Insert value**> degrees.

2.4 CONTROLS AND SAFETIES

A. Failure Safeguards: 100 percent main gas shutoff on [**pilot**] [**pilot or power**] failure.

B. Thermostat: Devices and wiring are specified in Section 230923.27 "Temperature Instruments."

C. Thermostat: Single-stage, wall-mounted type with 50 to 90 deg F (10 to 32 deg C) operating range and fan on switch.

1. Control Transformer: Integrally mounted.

D. Thermostat: Two-stage, wall-mounted type with 50 to 90 deg F (10 to 32 deg C) operating range and fan on switch.

1. Control Transformer: Integrally mounted.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine structures, substrates, areas and conditions, with Installer present, for compliance with requirements for installation tolerances, required clearances, and other conditions affecting performance of the Work.

B. Examine roughing-in for fuel-gas piping to verify actual locations of piping connections before equipment installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Equipment Mounting: Install gas-fired, infrared heaters with continuous-thread hanger rods and spring hangers[**with vertical-limit stop**] of size required to support weight of heaters.

1. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
2. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."
3. Comply with requirements for hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Equipment Installation: Install gas-fired, radiant heaters and associated gas features and systems according to [**NFPA 54**] [**CSA B149.1**].

C. Suspended Units: [**Suspend from substrate using chain hanger kits and building attachments**] [**Mount to substrate using rigid mounting kits or brackets, supplied by manufacturer or manufactured**].

1. Restrain the unit to resist seismic acceleration. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
2. Comply with requirements for hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

D. Maintain manufacturers' recommended clearances for combustibles.

3.3 CONNECTIONS

A. Gas Piping: Comply with [**Section 231123 "Facility Natural-Gas Piping."**] [**Section 231126 "Facility Liquefied-Petroleum Gas Piping."**] Connect gas piping to gas train inlet; provide union with enough clearance for burner removal and service.

1. Gas Connections: Connect gas piping to radiant heaters according to [**NFPA 54**] [**CSA B149.1**].

B. Where installing piping adjacent to gas-fired, radiant heaters, allow space for service and maintenance.

C. Electrical Connections: Comply with applicable requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

1. Install electrical devices furnished with heaters but not specified to be factory mounted.

3.4 ADJUSTING

A. Adjust initial-temperature set points.

B. Adjust burner and other unit components for optimum heating performance and efficiency.

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. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
2. Verify bearing lubrication.
3. Verify proper motor rotation.
4. Test Reports: Prepare a written report to record the following:

a. Test procedures used.
b. Test results that comply with requirements.
c. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

C. Gas-fired, radiant heaters will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION 235523.16