SECTION 23 82 43

ELECTRIC DUCT HEATERS
08/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

UNDERWRITERS LABORATORIES (UL)

UL 1996	(2004; Rev Dec 2006) Standard for Electric Duct Heaters

1.2 GENERAL REQUIREMENTS

Section 26 00 00.00 20 BASIC ELECTRICAL MATERIALS AND METHODS applies to work specified in this section.

Submit Manufacturer's Instructions for duct heaters including special provisions required to install equipment components and system packages. Special notices shall detail impedances, hazards and safety precautions.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Submit Equipment and Performance Data for duct heaters in accordance with paragraph entitled, "General Requirements," of this section.

Submit manufacturer's catalog data for the following items:

Duct Heaters

SD-08 Manufacturer's Instructions

Submit Manufacturer's Instructions for duct heaters in accordance with paragraph entitled, "General Requirements," of this section.

PART 2 PRODUCTS

2.1 PRODUCT STANDARDS

Duct heaters shall conform to the requirements of UL 1996.

2.2 DESCRIPTION

Duct heaters shall have the capacity indicated, plus or minus 5 percent.

Duct heaters shall be factory prewired, ready for field terminal connections.

2.3 HEATING ELEMENTS AND ENCLOSURES

Install heating elements with a framework complete with terminal, and construct junction boxes of mill-aluminized or galvanized carbon steel. A magnetic contactor shall be provided in a separate enclosure insulated from the duct at duct heater location or at a separate, remote location.

Gasketing shall be 1/16-inch thick non-asbestos woven-cloth tape.

Flange depth shall be suitable for duct insulation provided. Insulate terminal junction box to prevent elevated temperatures.

Sheathed heating-element construction shall consist of a resistance wire insulated by highly compacted refractory insulation protected by a sealed metallic-finned sheath. Component materials shall be as follows:

Resistance wire shall be a helix-wound alloy approximately 80 percent nickel and 20 percent chromium.

Refractory insulation shall be magnesium oxide. Subject element to a dielectric test of twice the element rated voltage plus 1,000 volts applied between terminal and sheath for a period of 1 minute.

Sheathing shall consist of aluminum fins cast around an internal steel sheath containing refractory insulation and resistance wire or carbon-steel fins permanently attached to a tubular carbon-steel or corrosion-resistant steel sheath containing refractory insulation and resistance wire and with all external surfaces porcelainized.

Wattage density shall not exceed 90 watts per linear inch of heated element length or not greater than 22 watts per square inch.

Open heating-element construction shall consist of a helix-wound resistance wire alloy approximately 80 percent nickel and 20 percent chromium. Wattage density shall not exceed 50 watts per linear inch of heated element. Element support shall minimize abrasion and sagging. Safety screens shall be provided on both upstream and downstream sides of heater elements.

Provide dummy elements or include other provisions similar to open area perforated screens if required to uniformly distribute airflow across heater face.

2.4 CONTROLS

Furnish units with integral overheat cutouts for primary and secondary protection. Automatic-reset primary cutout shall be the disk type and suitable for the electrical service scheduled.

Disk type manual-reset secondary cutouts shall be provided and wired in series with each circuit.

Bulb type manual-reset secondary cutouts shall be provided and actuate integral magnetic backup contactors.

Bulb type manual-reset secondary cutouts shall be provided and deenergize each circuit directly.

Provide indicating light(s) to show:

Heater on

Each circuit on

Heater assemblies rated at 45 amperes and larger shall have the heater assembly subdivided and fused. Fuse each subdivided 45-ampere heater load section. In circuits of less than 45 amperes, fuse appropriate sections.

Magnetic contactors other than integral overheat-cutout associated units shall be remotely located as indicated and shall be UL-approved.

Construct step controllers for sequencing heater loads of UL-approved components and include the following:

Delay to prevent line surge when energizing loads

Individual fusing of each step

Intercomponent wiring to terminals for field connection

Cabinet

PART 3 EXECUTION

3.1 INSTALLATION

Install duct heaters in accordance with the manufacturer's instructions and locate duct heaters to permit access to the heater after installation.

3.2 FIELD TESTING

Demonstrate that duct heaters operate satisfactorily in the presence of the Contracting Officer.

Duct heaters shall be cycled five times, from start to operating thermal conditions to off, to verify adequacy of construction, system controls, and component performance.

-- End of Section --