**UNIFIED FACILITIES GUIDE SPECIFICATIONS**

**References are in agreement with UMRL dated January 2021**
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DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

SECTION 23 82 46.00 40

ELECTRIC UNIT HEATERS

**05/17**

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**USACE / NAVFAC / AFCEC / NASA** | **UFGS-23 82 46.00 40 (May 2017)**

**Preparing Activity: NASA** | **Superseding UFGS-23 82 46.00 40 (August 2014)**

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SECTION 23 82 46.00 40

ELECTRIC UNIT HEATERS
**05/17**

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**NOTE: This guide specification covers the requirements for electric unit heaters. Indicate on drawings the capacity, voltage, rating, control-circuit voltage, cfm, sizes, mounting height, and other pertinent data.**

**Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.**

**Remove information and requirements not required in respective project, whether or not brackets are present.**

**Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).**

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PART 1 GENERAL

Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM applies to work specified in this section.

1.1 REFERENCES

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**NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.**

**Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of**

**the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.**

**References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.**

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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 | (2009; Reprint Aug 2020) UL Standard for Safety Electric Duct Heaters |

## 1.2 ADMINISTRATIVE REQUIREMENTS

### 1.2.1 Preinstallation Meetings

The Contracting Officer will schedule a preinstallation meeting within [30] [_____] days of Contract Award. Provide the following for review and approval:

a. Submit fabrication drawings for electric heaters, indicating the fabrication and assembly details to be performed in the factory.

b. Submit manufacturer's instructions for electric heaters, stating the special provisions necessary to install equipment components and system packages. Detail the impedances, hazards and safety precautions within the special notices.

## 1.3 SUBMITTALS

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**NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a “G” to an item, if the submittal is sufficiently important or complex in context of the project.**

**For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the**

District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. **Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.**

**The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.**

**Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.**

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Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication Drawings

SD-03 Product Data

Performance Data; G[, [____]]

Electric Unit Heaters; G[, [____]]

Heating Element; G[, [____]]

Controls; G[, [____]]

Casings; G[, [____]]

Propellers and Motors; G[, [____]]

SD-08 Manufacturer's Instructions

Manufacturer's Instructions

## PART 2 PRODUCTS

### 2.1 SYSTEM DESCRIPTION

Provide suspended electric unit heaters, and arrange for the discharge of air as indicated.

Provide electric unit heaters with at least the indicated capacity and ensure that they conform to the requirements specified herein. Ensure that the electric unit heaters are factory-prewired and ready for field terminal connections.

Ensure products conform to the requirements of UL 1996 for electric unit heaters.

Submit performance data for electric heaters, including use life, test, system functional flows, safety features, and mechanical automated details.

## 2.2 COMPONENTS

### 2.2.1 Heating Element

Provide a heating element constructed of a resistance wire insulated by highly compacted refractory insulation protected by a sealed metallic-finned sheath. Provide component materials as follows:

a. Provide a resistance wire of not less than 20-helix wound alloy of approximately 80-percent nickel and 20-percent chromium.

b. Provide a refractory insulation of magnesium oxide with a resistance of not less than 50,000 ohms after exposure to an ambient temperature and humidity of 32 degrees C 90 degrees F and 85 plus or minus 5-percent relative humidity, respectively, for not less than 24 hours.

c. Provide a sheathing consisting 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 sheath containing refractory insulation and resistance wire and with external surfaces porcelainized.

[ Ensure that the maximum surface temperature of porcelain-protected steel sheathing is[ 370] [_____] degrees C [700] [_____] degrees F.

][Ensure that the maximum surface temperature of cast-aluminum sheathing is [260] [_____] degrees C [500] [_____] degrees F.

]2.2.2 Controls

[ Fit units up to and including 5 kilowatts with integral controls, including thermal overload cutout switches, necessary transformers, a liquid-vapor system, and low-mass bimetal thermostat as required. Provide a cutout switch that can be automatically reset.

][Provide the unit with a remote unfused disconnect switch that opens ungrounded conductors in the OFF position and a thermostat with integral controls, including thermal overload cutout switches, magnetic contactors, necessary transformers, and thermostat protection as required. Provide cutout switches that can be automatically reset.

] Provide wall-mounted thermostats complete with thermometer, mechanical high-limit stop, calibrated operator, and an adjustable heater to prevent override of space temperature with a range between 12 and 41 degrees C 55 and 105 degrees F and a differential not exceeding 1 degrees C 1.5 degrees F. Provide a thermostat rated for operation at 24 volts, 60 hertz. Provide transformers, wiring, and devices necessary to meet this requirement. Provide a casing finish in [brushed chrome] [satin chrome] [_____].

### 2.2.3 Propellers and Motors

Provide propellers with[ mill-aluminized][ galvanized-steel][ all-aluminum] blades statically and dynamically balanced to within 0.5 percent. Provide units with fan-inlet safety guards.

Ensure that propellers and motors are AMCA-certified for air performance and noise level.

Protect motors against damage by the heating element and resilient mount.

Ensure that propellers and motors conform to Section 26 60 13.00 40 LOW-VOLTAGE MOTORS for motors, except that load-matched and custom-designed motors may be used and be so identified on the shop drawings. For motors not so identified, conform to the requirements specified.

Subfractional and fractional custom-designed or applied motors may deviate from the preceding motor requirements as follows:

a. Shaded-pole motors rated less than 125 watt 1/6 horsepower may be used for direct-drive service.

b. Permanent split-capacitor, split-phase, and capacitor-start motors rated 185 watt 1/4 horsepower or less may be used for direct-drive service.

c. Split-phase and capacitor-start motors, rated 185 watt 1/4 horsepower or less, may be used for belt-drive service.

d. Motor bearings may be the manufacturer's standard prelubricated sleeve type but provide the motor with antifriction thrust bearings, when specified. Ensure that the lubricant provisions are for extended service, requiring replenishment not more than twice per year of continuous operation.

Provide the manufacturer's standard motor identification plate.

Provide the manufacturer's standard motor speed and control.

## PART 3 EXECUTION

### 3.1 INSTALLATION

Install unit heaters in accordance with the manufacturer's instructions at the mounting heights indicated.

#### 3.1.1 Casings

Provide casings with smoothly contoured propeller orifice rings of at least 20-gage cold-rolled carbon steel. Provide a casing surface finish with phosphate pretreatment, prime coating, and baked-enamel finish.

#### 3.1.2 Air Distribution

[ Fit vertical discharge units with louver-cone diffusers.

][Provide horizontal units with adjustable single- or double-deflection louvers.

]

### 3.2 FIELD QUALITY CONTROL

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

Cycle unit heaters five times, from start to operating thermal conditions to off, to verify adequacy of construction, system controls, and component performance.

Conduct an operational test for a minimum of 6 hours.

-- End of Section --