

Duct Heaters



Easily Adapted to Many Non-Pressurized HVAC Systems

Constructed of sturdy 0.430 in. (11 mm) diameter Tubular heating elements mounted to a 1/4 in. (6 mm) thick steel flange, duct heaters are easily adapted to many non-pressurized air-heating systems.

They are easily installed in applications requiring a wide range of temperature versus air flow combinations.

The modular duct heater offers increased reliability. The individual modules are removable through the housing of the assembly, which eliminates the need to pull the complete heater from the duct work. This reduces downtime costs because the heating elements can be replaced individually. Performance improvements include quicker response time and reduced infiltration from the air stream being heated into the electrical enclosure.

Phoenix duct heaters offer advantages over gas or oil fired and open coil electric units with:

- Installation flexibility—no flues or fuel lines
- 100 percent energy efficient—no energy loss up the flue
- Universal availability of electricity
- Resistance coil in sheath is protected from corrosive environments

Performance Capabilities

- Watt densities to 40 W/in² (6.2 W/cm²)
- Recommended process temperatures from -20 to 1200°F (-29 to 650°C)
- Catalog P/N wattages to 225kW
- Voltages to 600VAC

Features and Benefits

Long life alloy 840 sheath

- Resists corrosion/oxidation while protecting resistance coils against contamination

MgO insulation filled elements compacted to rock hard density

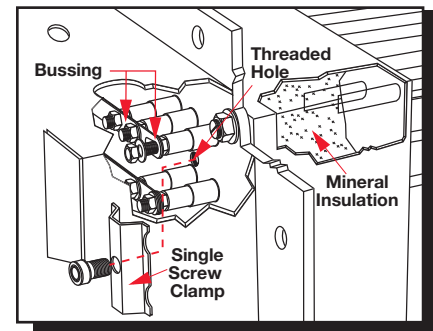
- Maximizes dielectric strength, heat transfer and life

Field replaceable heating elements

- Permits easy service and reduces downtime. Element change-out is made simple by a single screw clamp (D SERIES only)

3 1/2 in. (90 mm) thick mineral insulation

- Keeps wiring cooler and reduces heat loss



Silicone resin seals rated to 221°F (105°C)

- Protects elements against moisture and other contaminants

General purpose terminal enclosure

- Offers easy access to wiring

1/4 in. (6 mm) inside diameter thermowell

- Accepts an optional Type J or K thermocouple for accurate sheath temperature sensing (D SERIES only)

Rigid stainless steel supports

- Prevents element sagging or deformation in various mounting positions

1/4 in. (6 mm) thick steel flange with 3/8 in. (9.5 mm) diameter mounting holes

- Easily bolts to the duct wall

tubular hairpins are repressed (recompacted) after bending to assure MgO density

- Eliminates hot spots and electrical insulation voids

Stock heaters feature from 3 to 60 elements

- Meets a wide variety of kilowatt demands

One or three phase voltages

- Meets local power supplies

Maximum 48 amperes per circuit

- Complies with National Electrical Code (NEC)

Duct heaters with general purpose enclosures meet UL® and CSA component recognition to 480

and 600VAC maximum respectively—UL® and CSA file numbers are E52951 and 31388



Typical Applications

- Drying ovens
- Autoclaves
- Furnaces
- Load banks
- Heat treating
- Reheating
- HVAC
- Paint drying

Options

Wattages/Voltages

To meet specific application needs, voltage and wattage combinations outside stock product parameters are available.

Terminal Enclosures

In addition to the standard, general purpose terminal enclosure, Phoenix offers the following optional terminal enclosures to meet specific application requirements:

- Moisture resistant
- Explosion resistant
- High-temperature stand-off enclosures

Sheath Material

Phoenix duct heaters can be built with the following sheath materials:

- 304, 316, 321 SS
- Alloy 800 and 840
- Laminated alloy 600 (high-temp)
- Hastelloy® C276

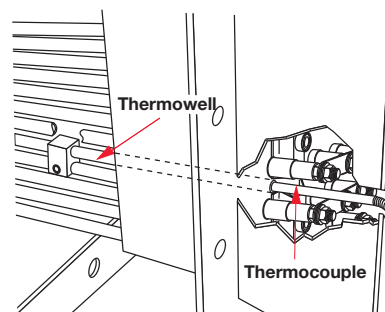
Thermocouples

Type J or **K** thermocouples, inserted in the thermowell, accurately sense element sheath temperature for over-temperature conditions.

To sense process temperature, the sensing element should be located downstream from the duct heater. This will eliminate incorrect sensing caused by radiant heat.

Thermocouples are supplied with 120 in. (3050 mm) leads, longer lead lengths are available (this applies to "D" SERIES only). Unless otherwise specified, thermocouples are supplied with temperature ranges detailed on the *Thermocouple Types* chart.

Using a thermocouple requires an appropriate temperature and power controller. These must be purchased separately. Phoenix offers a wide variety of temperature and power controllers to meet virtually all applications. Temperature controllers can be configured to accept process variable inputs, too.



Duct heater thermowell holds the thermocouple for sensing sheath temperature.

Thermocouple Types

ASTM Type	Conductor Characteristics		Recommended ^① Temperature Range	
	Positive	Negative	°F	(°C)
J	Iron (Magnetic)	Constantan (Non-magnetic)	0 to 1000	(-20 to 540)
K	Chromel® (Non-magnetic)	Alumel® (Magnetic)	0 to 2000	(-20 to 1100)

① **Type J** and **Type K** thermocouples are rated 32 to 1382°F and 32 to 2282°F (0-750°C and 0-1250°C), respectively. Phoenix does not recommend exceeding temperature ranges shown on this chart for the tubular product line.

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