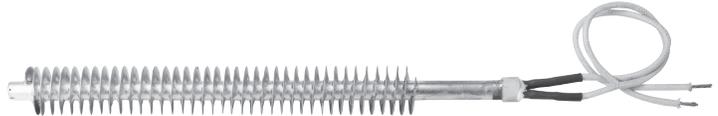


General Recommendations for the Use of Chromalox® Electric Heating Elements for Clamp-On, Oven and Air Duct Heating



CHROMALOX

Advanced Thermal Technologies

POO400-9
161-048339-001
April 2020

Chromalox Electric Heating Elements For Clamp-On

The electric heating element(s) supplied herein are ruggedly constructed and if properly installed, operated and maintained, are designed for long life and dependable, trouble-free service.

The following units are generally used in these applications: Tubular, Strip, Ring, Fin-Tubular and Fin-Strip.

General

⚠ WARNING

Users should install adequate controls and safety devices with their electric heating equipment. Where the consequences of failure may be severe, back-up controls are essential, including GFCI (Ground Fault Circuit Interrupters). Although the safety of the installation is the responsibility of the user, Chromalox will assist in identifying equipment options.

⚠ WARNING

FIRE HAZARD. Since heaters are capable of developing high temperatures, extreme care should be taken to:

- A. Avoid mounting heaters in an atmosphere containing combustible gases and vapors.
- B. Avoid contact between heaters and combustible materials.
- C. Keep combustible materials far enough away to be free of the effects of high temperatures.

Installation

⚠ WARNING

ELECTRIC SHOCK HAZARD. Disconnect all power before installing or servicing heater. Failure to do so could result in personal injury or property damage. Heater must be installed by a qualified person in accordance with the National Electrical Code, NFPA 70.

High heating efficiency, low sheath temperatures and long heater life result when electric heaters are properly installed.

INSTALLATION – CLAMP-ON

1. Clamp strip heaters securely, along their entire length, to smooth metal surface. Use utility clamps spaced 5" apart and 5/16" stainless steel studs or oversized steel studs for clamping. Retighten following initial heat-up. Allow for expansion. When more than one clamp is used, tighten clamps to

avoid bowing of heater, poor heat transfer and possible premature failure. Leave 1/2" space between heater ends clamped in line for expansion. Do not use mounting tabs for clamping to surface.

2. When strips are clamped to tank bottom for melting paraffin, waxes, asphalt, greases, etc., one or two strips should be clamped vertically to the tank side extending above the liquid level. This is necessary to open a passage to the tank surface for the initially melted material, and prevent build-up of pressure.
3. Clamp ring heaters to smooth metal surface. Use cast iron utility clamps with 1/4" MONEL® or stainless steel studs. Retighten following initial heat-up.
4. Tubular heaters are clamped the same as strips against the metal surface.
5. Allow a minimum of 1" air space between heaters and insulation.

Wiring

⚠ WARNING

ELECTRIC SHOCK HAZARD. Any installation involving electric heaters must be performed by a Qualified person and must be effectively grounded in accordance with the national electrical code to Eliminate shock hazard.

1. Electric wiring to heating elements must be installed in accordance with National Electrical Code or local electrical codes by a qualified person.
2. Temperatures at heater terminals may require use of high-temperature wire. Check factory for recommendations.
3. Maximum torque on strip heater terminals is 25 in-lbs.
4. An appropriately sized wrench should be used to hold the bottom nut while torquing in order to avoid movement that could loosen the terminal.
5. Maximum torque on secondary insulation bushings used in strip heater mounting is 40 in-lbs; (Part # 00036-001) PCN 255716

General Information

1. Strip heaters of equal wattage and voltage may be series connected for use on a power supply up to 480 volts. Where the power supply is greater than 480 volts (600 volt max.) series connections may be used but secondary insulation bushings must be provided.
2. Ring heaters of equal wattage and voltage with a surface temperature of less than 1000°F may be series connected for use on a power supply up to 240 volts maximum.
3. Tubular heaters of equal wattage and voltage can be series connected for use on a maximum power supply of 480 volts. Heaters for use above 480 volts must be equipped at the factory with special high voltage terminal insulation.
4. Use iron or steel sheathed heaters for temperatures up to 750°F maximum sheath temperature. Use chrome steel sheathed rings or strips for temperatures up to 1200°F maximum sheath temperature. Use alloy or Inconel® sheathed tubular heaters for temperatures up to 1500°F maximum sheath temperature. The sheath temperature is the highest temperature on the surface of the heater when operating.
5. Do not bend or form strip heaters. Do not bend tubular heaters on inside radii of less than 4". When it is required to bend or curve strips or dish rings, or bend tubulars on small radii, consult our factory.
6. Use seamless strips where condensation, spray, oil or fumes are present.
7. Protect terminals from drippings, spray, condensation or spillover. Provide adequate electrical clearance.
8. Use manganese nickel wire or alloy bus bar for making electrical connections within the heater itself, and for bringing leads out through the insulating jacket to a cooler region where insulated copper wire may be attached.

Maintenance

⚠ WARNING

ELECTRIC SHOCK HAZARD. Disconnect all power before installing or servicing heater. Failure to do so could result in personal injury or property damage. Heater must be installed by a qualified person in accordance with the national electrical code, NFPA 70.

1. Periodically clean terminals of dust and corrosion to maintain good electrical connections and to permit rapid heat dissipation. Use airblast and be careful to avoid damage to mica insulation.
2. Check for loose terminal connections.

Chromalox Electric Heating Elements For Oven Heating – Air Ducts

The electric heating element(s) supplied herein are ruggedly constructed and if properly installed, operated and maintained, are designed for long life and dependable, trouble-free service.

General

Temperature regulating and temperature limiting controls are recommended to be used with electric heaters to control the heating process and safeguard the electric heaters from excessive temperatures that can damage heaters.

⚠ WARNING

FIRE HAZARD. Since heaters are capable of developing high temperatures, extreme care should be taken to:

- A. Avoid mounting heaters in an atmosphere containing combustible gases and vapors.
- B. Avoid contact between heaters and combustible materials.
- C. Keep combustible materials far enough away to be free of the effects of high temperatures.

Installation

⚠ WARNING

ELECTRIC SHOCK HAZARD. Disconnect all power before installing or servicing heater. Failure to do so could result in personal injury or property damage. Heater must be installed by a qualified person in accordance with the National Electrical Code, NFPA 70.

High heating efficiency, low sheath temperatures and long heater life result when electric heaters are properly installed.

INSTALLATION – OVEN HEATING

1. When mounting the strip heaters vertically, locate the terminals at the bottom or cooler parts of the oven. Allow for expansion and contraction by loosely bolting the top mounting tab. Secure the bottom tab firmly.
2. In a forced air system, the width of the strip should be parallel to the direction of air flow.
3. For horizontal installation of strips, the tab on the terminal end should be firmly connected and the opposite end loosely connected to allow for expansion and contraction.

4. Mount strips on edge in horizontal installation across the bottom and along the sides on the oven, allowing 3" minimum air space between the heaters and the bottom of the oven and 1" from the oven wall to allow for proper circulation of heated air. For large ovens, allow a 6" minimum clearance.
5. In horizontal mounting, install a protective screen or grill above the strips at the bottom of the oven.
6. Support long iron sheathed strips on 36" centers and chrome steel sheathed strips on 24" centers to prevent sagging.

INSTALLATION – AIR DUCTS

1. Locate protective thermostat on downstream side of heaters near the top of the duct and close to the heated portion of the heaters.
2. Mount heaters with terminals at the duct bottom to prevent overheating.
3. Where condensation, spray, oil or fumes are present use seamless finstrips, type SSEF, with the terminals placed outside of the air duct.
4. As a safety feature in advent of abnormal temperatures, it is suggested to use a thermal cutout in conjunction with thermostatic control.

Wiring

⚠ WARNING

ELECTRIC SHOCK HAZARD. Any installation involving electric heaters must be performed by a qualified person and must be effectively grounded in accordance with the National Electrical Code to eliminate shock hazard.

1. Electric wiring to heating elements must be installed in accordance with National Electrical Code or local electrical codes by a qualified person.
2. Temperatures at heater terminals may require use of high-temperature wire. Check factory for recommendations.

General Information

1. Strips of equal wattage and voltage can be series connected for a maximum of 480 volts. If a higher voltage (600 volt max.) is necessary use the same series connections and use secondary insulation bushings.
2. Use iron or steel sheathed heaters for temperatures up to 750°F maximum sheath temperature. Use chrome steel sheathed strips for temperatures up to 1200°F maximum sheath temperature. Use alloy or Inconel® sheathed tubular heaters for temperatures up to 1500°F maximum sheath temperature. The sheath temperature is the highest temperature on the surface of the heater when operating.
3. Do not bend or form strips.
4. Use manganese nickel wire or alloy bus bar for making electrical connections where temperatures are above 350°F. Insulated copper wire may be used in the cooler region.
5. Terminals should always be in the coolest part of the oven. If oven temperature is over 800°F the terminals should be placed outside the oven if possible. If not possible, weld electrical connections to heater terminals. Protect terminals from welding flux.
6. Tubulars are to be mounted the same as strips and supported on 24" centers.

Maintenance

Read this First

Disconnect power before performing any maintenance or repair. Allow element to cool below 140°F (60°C) before performing maintenance or repair. Maintenance and repair should be performed only by qualified personnel.

Preventative Maintenance

Dust and moisture contamination are typically the largest contributors to a heating elements premature failure.

To avoid failure from overheating, it is recommend that a regular maintenance routine include cleaning the element and element cover with compressed air. Routinely check wiring for signs of overheating or damage. Ensure that all electrical spacings are intact.

Storage

It is also important to ensure that while in storage, the heating element is kept in a dry area. If this cannot be accomplished, it is recommended that the elements be sealed in a moisture resistant bag or wrapped with plastic. A desiccant should also be placed near the element terminals during storage.

Dryout Procedure or Low Megohm Readings

Moisture contamination can be removed from heating elements in the field using several methods. For un-installed heaters, simply place the heater in an 200°F (94°C) oven for 1 hour.

Drying Out an Installed Heater

Energize the heater at approximately 1/2 the rated voltage (1/4 Wattage). Operating the heater under these conditions produces enough heat in the elements to drive the moisture out while reducing the risk of overheating the equipment. However, even at 1/4 wattage it is possible to overheat and damage the equipment

or the heated media. The temperatures of the element sheath material, heated media and associated process equipment must still be limited to safe values. Failure to limit sheath temperatures could permanently damage the elements and void the equipment warrantee. If the heater has an over temp control or sensor, use this device to limit the operating temperature (sheath temperature) to safe limits during the dry out process. Continue the process until the heater circuits read 1.0 Megohm or higher.

Note: If the heater has a phase angle SCR control, set the SCR controller manually for 1/2 on. This procedure will produce 1/4 wattage while limiting the peak voltage applied to the heater to approximately 1/2 rated voltage.

Troubleshooting

If after properly following startup procedure, recheck all wire connections. If heaters still do not operate it is most likely due to failure of the internal heating coil and the element must be replaced.

⚠ WARNING

ELECTRIC SHOCK HAZARD. Disconnect all power before installing or servicing heater. Failure to do so could result in personal injury or property damage. Heater must be installed by a qualified person in accordance with the National Electrical Code, NFPA 70.

1. Periodically clean terminals of dust and corrosion to maintain good electrical connections and to permit rapid heat dissipation. Use airblast and be careful to avoid damage to mica insulation.
2. Check for loose terminal connections.

Limited Warranty:

Please refer to the Chromalox limited warranty applicable to this product at <http://www.chromalox.com/customer-service/policies/termsofsale.aspx>.

Chromalox
103 Gamma Drive
Pittsburgh, PA 15238
(800) 443-2640
www.chromalox.com