

# Chromalox®

## Installation Instructions

### SERVICE REFERENCE

DIVISION 4	SECTION GEN
SALES REFERENCE (Supersedes P00400-6)	P00400-7
161-048339-001	
DATE	DECEMBER, 2006

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



### 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:**

- Avoid mounting heaters in an atmosphere containing combustible gases and vapors.
- Avoid contact between heaters and combustible materials.
- 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

- 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.

- 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.
- 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.
- Tubular heaters are clamped the same as strips against the metal surface.
- Allow a minimum of 1" air space between heaters and insulation.

## CHROMALOX ELECTRIC HEATING ELEMENTS FOR CLAMP-ON (cont'd)

### 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. 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.

## CHROMALOX ELECTRIC HEATING ELEMENTS FOR OVEN HEATING – AIR DUCTS (cont'd)

### 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

#### **⚠ 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.

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Chromalox warrants only that the Products and parts manufactured by Chromalox, when shipped, and the work performed by Chromalox when performed, will meet all applicable specification and other specific product and work requirements (including those of performance), if any, and will be free from defects in material and workmanship under normal conditions of use. All claims for defective or nonconforming (both hereinafter called defective) Products, parts or work under this warranty must be made in writing immediately upon discovery, and in any event, within one (1) year from delivery, provided, however all claims for defective Products and parts must be made in writing no later than eighteen (18) months after shipment by Chromalox. Defective and nonconforming items must be held for Chromalox's inspections and returned to the original f.o.b. point upon request. THE FOREGOING IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES WHATSOEVER, EXPRESS, IMPLIED AND STATUTORY, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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