

# Chromalox<sup>®</sup>

PRECISION HEAT AND CONTROL

Precision Electric Heating Components, Controls, Cable,  
and Systems Technologies for Industrial Applications





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## INTRODUCTION

### **Chromalox® Has the Electric Heating and Control Technologies for Your Applications!**

#### **Our High-Quality Systems Are Used Across a Broad Spectrum of Industries**

With the broadest product line in the industry, Chromalox provides heat and control systems for more processes than anyone in the world. We meet the needs of industries as diverse as transportation, pharmaceuticals, chemical processing, oil and gas exploration, power generation, and the military. Chromalox systems and components have earned more third-party approvals than any other company—from ISO 9001, UL, CSA, FM, and ATEX to CE and ASME.

#### **Our Stock and Delivery Capabilities Keep Your Operation Up and Running**

Chromalox maintains an inventory of nearly one million items. We also operate the fastest delivery system in the business. We can ship any component or system we stock within 24 hours through our chromalox.com electronic direct order entry system. Orders entered in our website by 4:00 P.M. CT can be shipped the same day. In addition, factory offices, stocking representatives, and over 2,000 authorized distributors carry Chromalox systems and components for same-day pickup.

#### **Local Technical Support Helps You Get the Job Done**

We don't just provide products. We provide support. The industry's largest and most experienced group of engineers is right there in the field with you. The majority of our 300+ field sales representatives are degreed engineers, and all are experienced with all Chromalox heating products and applications. Our innovative design engineers are ready to work with your local Chromalox representative to custom-build a precision heating and control system for any application need you have.

#### **Chromalox Service Solutions Help Ensure Optimum Performance and Extended Product Life**

As the world's most comprehensive manufacturer of electric heat and control products, Chromalox offers customized service solutions ranging from startup and training, to ongoing maintenance diagnostics, to emergency response. As the designer and manufacturer, we have complete knowledge of your product. We know your systems from the component parts on up. So who better can maximize your investment with proper maintenance and assessment strategies than Chromalox?

## HOT OIL AND WATER SYSTEMS



- Power ratings: 9 to 1,200 kW
- Voltages: 208 to 600 V, single- or 3-phase

Chromalox hot oil and water systems are self-contained heating and cooling packages that provide direct or indirect process heating to temperatures of 750°F (400°C). These systems meet ASME codes and are pre-engineered to include temperature and power controls, expansion tanks, heat exchangers, pumps, valves, gauges, and all necessary piping. This eliminates component selection and assembly. Select from oil or water temperature control systems for circulation in a closed-loop process.

## COMPACT HOT OIL AND WATER SYSTEMS

- Power ratings: 4 to 48 kW
- Voltages: 240, 480, and 600 V single- or 3-phase

Chromalox compact hot oil and water systems are fully equipped, portable packages capable of reaching operating temperatures of 550°F (290°C). Available in a wide variety of sizes, kW ratings, and voltages for many processes. Choose from the latest state-of-the-art solid-state controls. Many models in stock.



## BOILERS AND STEAM GENERATORS



- Power ratings: 3 to 1,600 kW (10.2 to 5,459 BTU/hr)
- Voltages: 120 to 600 V, single- or 3-phase
- Capacities: Up to 5,000 lb (2,275 kg) of steam/hr @ 250 psig (1 MPa)

Constructed to ASME, PED, KOSHA, or SELO code of carbon or stainless steel with fiberglass insulation, Chromalox boilers and steam generators are efficient energy management systems that provide low- or high-pressure hot water or steam for industrial processes and comfort heating. NPT or flanged connections are available. Optional transformers, water feed, and blow-down equipment are also available and in stock. Chromalox has the engineering expertise to design and manufacture large-capacity electric boilers to meet a variety of applications.

# HEAT TRANSFER SYSTEMS

Chromalox heat transfer systems are safe, versatile, user-friendly heating systems for process heating applications requiring closely controlled process temperatures. Pre-engineered and constructed with carefully matched components, these systems provide easy installation and trouble-free operation in the end-user's application.

Typical applications include:

- Jacketed vessels and tanks
- Heated rolls
- Heat exchangers
- Platens, dies, and molds
- Sterilization

## HORIZONTAL ELECTRIC VAPORIZERS



- Power ratings: 15 to 1,500 kW
- Voltages: 208 to 600 V, single- or 3-phase

Chromalox horizontal electric vaporizers are designed for use with Dowtherm,\* Therminol,\* and other organic fluids to transfer heat at high temperatures and low pressures. They are pre-engineered, pre-wired, and pre-piped packages designed for flexible, dependable, and efficient operation. All units are ASME-certified to 150 psi (1 MPa) at 750°F (400°C) with 300 lb (133 kg) construction throughout. Seal-welded element design eliminates leaks and improves serviceability on the heater. Units available with over-pressure, process, remote, or skid-mounted controls. Optional NEMA weather- and explosion-resistant enclosures are also available.

## LARGE TANK HEATING SYSTEMS



- Power ratings: Up to 240 kW
- Voltages: 208 to 600 V, single- or 3-phase

Chromalox tank heaters are pre-engineered packages employing metal-sheathed tubular or ceramic-insulated, open-coil pipe insert heating components for use in 2- and 3-inch (50- and 75-millimeter) nominal pipe sizes. This unique construction allows heating elements to be changed without draining the tank. These heating components are combined with temperature and power controls and safety cutouts for a complete tank heating system. Chromalox tank heaters are well-suited for applications in the chemical/petrochemical industry, including bulk oil storage and asphalt heating. Outdoor, weather-resistant, and explosion-rated control enclosures are available. Options include special ratings, lengths to 40 feet (12 meters), replacement parts, and back-up controls. Separate insert heaters are also available.

## AIR HANDLERS



- Heating capacity: 50, 100, and 150 kW
- Voltage: 480 and 600 V, 3-phase, 60 Hz
- Fan output: 3,000, 5,000, and 7,000 SCFM (5,097, 8,495, and 11,893 m<sup>3</sup>/hr)

Chromalox air temperature control systems provide durable, accurate temperature control for large-capacity temporary heating applications. Welded steel construction, tubular elements, and industrial fans offer superior durability and performance under heavy usage and rough environments. Applications include temporary on-site comfort heat for large-capacity special events, interim comfort heating during commercial construction prior to permanent HVAC installation, and spot heating for personnel and freeze protection for equipment in the event of plant shutdowns.

\*Dowtherm is a registered trademark of The Dow Chemical Company.  
Therminol is a registered trademark of Monsanto Company.



## LOAD BANKS



- Power ratings: 100 to 1,000 kW
- Voltages: 240, 480, and 600 V, 3-phase, 60 Hz
- Steps/load control resolution: 1 or 10 kw

Used to provide precise energy control for loading dissipation needs, Chromalox load banks feature selectable control to 1 kW and provide such features as stainless steel construction, enclosed heating elements, NEMA 3R outdoor protection, and industrial motor/fan. Many options are available by request, such as dual-voltage, multifunction digital readout, camlok connectors, or remote control. Applications include diesel generator testing, braking resistor for inverter drive, base loading, battery discharge, or uninterruptible power supply (UPS) testing.

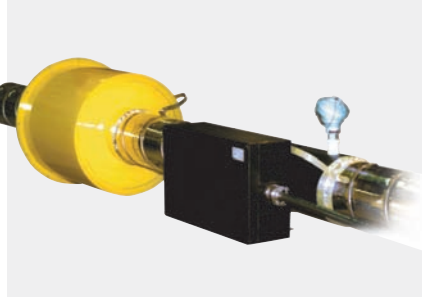
## SKIN-EFFECT HEATING SYSTEMS



- Temperatures: Up to 300°F (150°C)
- Circuit length: Up to 15 miles (25 kilometers)

Skin-effect heating is used specifically for providing indirect heat to long runs of piping from a single electrical supply source. It is an easy-to-use arrangement, comprised of a heating tube, skin-effect cable, junction boxes, transformer, and control panel, that provides conductive heating direct to the wall of a process pipe. The small steel heating tube is bonded on the pipe to be heated. Skin-effect electric cable placed inside the tube conducts the voltage to the end of the pipe. The current returns via the small heating tube, but only through the internal thickness as defined by the laws of Kelvin and Maxwell. Supply connections are made in special boxes. Heat input can be adjusted to handle a range of thermal viscosities. The indirect heating arrangement allows it to be used with any potentially corrosive process. Installation can be above-ground, buried, or submerged.

## IMPEDANCE HEATING SYSTEMS



- Power ratings: 1 kW to several MW
- Voltages: <50 V (After transformer step-down of 480 or 600 V)
- Temperatures: Up to 1,800°F (980°C)

Impedance heating employs the "Joule Effect" to produce and directly transfer heat from the entire circumference and length of pipe to the material being heated. It can be used for proper temperature maintenance as well as to raise fluid temperature. Utilizing the pipe itself and minimum equipment, installation is simple. Temperature control is highly accurate—to within  $\pm 1^\circ\text{F}$  ( $\pm 1^\circ\text{C}$ )—and higher watt densities—up to  $190 \text{ W/in.}^2$  ( $30 \text{ W/cm}^2$ )—can be used due to increased velocities with lower pressure drops.

# PROCESS HEATERS

Heat processing applications vary widely from industry to industry. Chromalox has a process heating solution for nearly every application: immersion heaters that can apply heat at virtually 100% efficiency to water, oils, viscous materials, solvents, process solutions, and gases; circulation heaters that are designed to heat a flowing medium using in-line or side-arm piping configurations; process air heaters that can apply heat not only by electrically heated air, but even special atmospheres such as argon or nitrogen; and process radiant heaters that transfer energy through space, without the presence of a medium, for maximum efficiency.

## SCREW PLUG IMMERSION HEATERS



- Screw plug size: 1/2, 3/4, 1, 1 1/4, 2, and 2 1/2 in. NPT (12.75, 19, 25, 32, 50, and 65 mm)
- Power ratings: Up to 40 kW
- Screw plug material: Brass, steel, or stainless steel
- Sheath material: Copper, steel, stainless steel or INCOLOY.\*

Screw plug immersion heaters consist of tubular elements in a threaded hex plug. Some models are provided with a thermowell for the temperature control sensor and a variety of electrical enclosures for electrical connections. They screw directly through threaded openings in tank walls to heat liquids, viscous fluids, forced air, and gases by direct contact. A patented 360° rotatable housing is available on most models to facilitate easy conduit connections. Many models in stock.

## FLANGED IMMERSION HEATERS

- Length: Up to 20 ft (6 m)
- Power ratings: Up to 2,000 kW
- Flange material: Brass, steel, or stainless steel
- Sheath material: Copper, steel, stainless steel, or INCOLOY\*

Ideal for generating steam and heating gases and liquids in pressure vessels and tanks, flanged immersion heaters are hairpin-bent tubular elements welded or brazed into a flange and provided with electrical enclosures. Chromalox flanged immersion heaters are available in a wide selection of flange sizes and with a variety of electrical enclosures. Most units are UL-listed and CSA-certified or can have ATEX certification. ASME or PED code construction is also available for high-pressure applications. Chromalox can also rebuild large flanged heaters to save you money. Many models in stock.



## OVER-THE-SIDE CORROSION-RESISTANT IMMERSION HEATERS



- Heating element material: Copper, steel, stainless steel, cast iron, INCOLOY,\* titanium, Teflon\* (fluoropolymer), quartz, and ceramic
- Mounting configurations: L-shaped, side/top mount, and deep tank installation
- Power ratings: Up to 200 kW

Over-the-side immersion heaters are designed for installation in the top of the tank with the heated portion directly immersed along the side or at the bottom. They take up little space, eliminate the need for tank penetrations, are easily removed for service, and provide ample working space inside the tank. Custom-configured elements evenly distribute heat by direct contact in numerous applications, including acid and alkali solutions. Many models in stock.



## CIRCULATION HEATERS



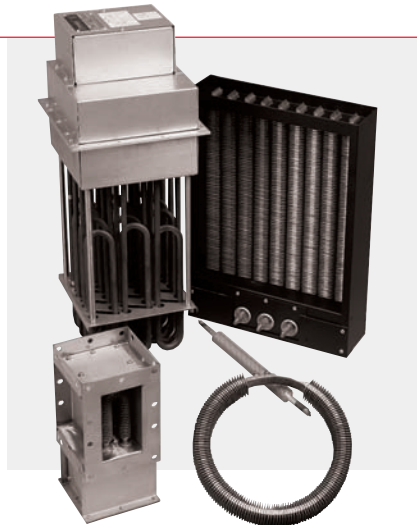
- Pressure resistance: To 5,000 psi (34.5 MPa)
- Maximum temperature: Up to 1,400°F (760°C)
- Power ratings: Up to 2,000 kW

Chromalox circulation heaters are packaged units consisting of a screwplug or flanged immersion heater mounted in a thermally insulated heating chamber for efficient heating of a flowing medium by in-line or side-arm operation. Thermocouple sensors can be provided to connect to most any controller. Select from many terminal enclosures, sheath and vessel materials, flanged connections, and controls. Chromalox offers optional ASME, PED, KOSHA, and SELO certification. Many models in stock.

## PROCESS AIR HEATERS

- Maximum temperature: 1,200°F (650°C)
- Power ratings: Up to 3.2 MW
- Voltage: Up to 600 V

Process air heaters in stock and custom designs are employed in heating air or other gases in ducts, autoclaves, or ovens. Sheathed tubular, finned tubular, and finned strip elements consistently outperform gas, oil, and open coil electric units in both heating efficiency and safety. Elements are available separately for use in OEM equipment. Special materials and custom designs are available for marine applications, power plants, or hazardous applications.



Typical applications include:

- Cleaning and rinsing tanks
- Process fluid heating
- Fuel oil heating
- Air and gas heating
- Curing ovens
- Thermoforming
- Embossing
- Spot heating

## PROCESS RADIANT HEATERS



- Watt densities: Up to 5.76 kW/ft<sup>2</sup> (61.5 kW/m<sup>2</sup>)
- Element source temperatures: Up to 4,000°F (2,200°C)
- Element materials available: Quartz, ceramic, and INCOLOY\*

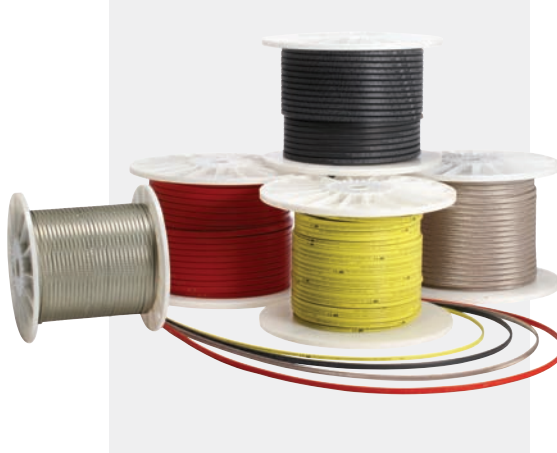
Process radiant heaters include a large selection of elements, fixtures, and panels for the best solution where heated process air or direct contact is impossible, impractical, or undesirable. Drying, curing, preheating, shrinking, and thermoforming are frequent applications. Chromalox sensors and controls are available to provide single-source heating systems suited to your application.

\*INCOLOY is a registered trademark of Huntington Alloys Corporation.  
Teflon is a registered trademark of E.I. du Pont de Nemours and Company.

# HEAT TRACE AND CONTROLS

Heat trace is used to counteract the heat loss from process equipment and piping through its insulation. Chromalox offers a variety of heat trace systems for temperature maintenance and freeze protection in cooling water lines, steam or condensate return lines, compressed-air lines, fire protection lines, storage tanks, and valves. Chromalox heat trace systems can also be used to prevent solution precipitation and the increase of viscosity or solidification of product. In addition, Chromalox offers heat trace and controls for roof and gutter de-icing.

## SELF-REGULATING CABLE



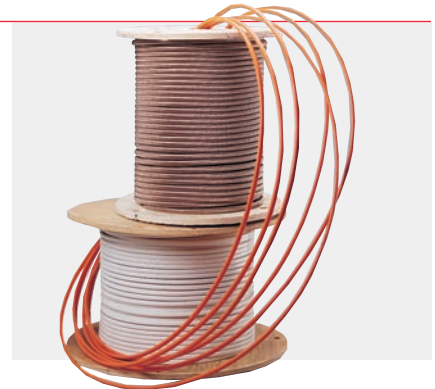
- Circuit lengths: To 780 ft (240 M)
- Process maintenance temperature: Up to 302°F (150°C)
- Exposure temperature: Up to 420°F (215°C)
- Power ratings: 3, 5, 8, 10, 15, and 20 W/ft (10, 16, 26, 32, 48, and 65 W/m)
- Voltages: 120 and 208 to 277 V

Self-regulating cable for ordinary and hazardous environments prevents pipe freezing and maintains process temperatures. Constructed of a semiconductive heater matrix extruded between parallel buss wires, the self-regulating cable adjusts its output to independently respond to temperatures along its length. This heat trace cable can be single-layer overlapped. It is flexible and can be cut to length in the field. Cable can be used in Division 1 and Division 2 hazardous areas.

## CONSTANT-WATTAGE CABLE

- Circuit lengths: To 780 ft (238 m)
- Process maintenance temperature: Up to 350°F (175°C)
- Power ratings: 4, 8, and 12 W/ft (13, 26, and 39 W/m)
- Voltages: 120, 208 to 277, and 480 V

Constant-wattage cable provides process temperature maintenance and freeze protection. Its rugged construction can tolerate exposure temperatures to 392°F (200°C). Fluoropolymer jackets are available for corrosive environments. Cable is flexible, can be cut to length in the field, and can be used in Division 2 hazardous areas.



## MINERAL-INSULATED CABLE



- Circuit lengths: To 1,000 ft (305 m)
- Process maintenance temperature: Up to 900°F (480°C)
- Power ratings: 5 to 50 W/ft (16 to 162 W/m)
- Voltages: 120 to 600 V

Mineral-insulated cable is suitable for the most demanding heat trace applications. Its INCOLOY® sheath resists damage, is fire-resistant, and provides a reliable electrical ground. Chromalox mineral-insulated cable can be used in Division 1 and 2 hazardous areas.

## SELF-REGULATING FREEZE PROTECTION CABLE

- Maximum circuit length: 660 ft (200 m)
- Power ratings: 3, 5, and 8 W/ft (10, 16, and 26 W/m)
- Voltages: 120 and 208 to 277 V

Chromalox self-regulating freeze protection cable is ideal for warming metal and plastic pipes in commercial construction, institutional buildings, and some industrial freeze protection applications. Its self-regulating polymer core varies output along its entire length, saving energy and eliminating hotspots along pipes. It can be cut to length in the field and single-overlapped without overheating the cable. Cable can be used in non-hazardous areas only.



## INSTALLATION KITS AND ACCESSORIES



Installation kits and accessories include all of the necessary components for straight or tee splices, power connection boxes, and water-resistant end-seal terminations for heat trace installation. Installation tape, pipe straps, and caution labels are available from our Econo, Duro, and U series accessories.

## CLASS 1, DIVISION 1 CABLE AND ACCESSORIES

Chromalox offers heat trace that is Factory Mutual approved for Class I, Division I, Group B, C, and D environments (hazardous gas and vapor) as well as Class II, Division I, Group E, F, and G (combustible dusts) and Class III, Division I environments. It can be cut-to-length and spliced in the field, and single-overlapped without burnout. Higher current capacity means longer circuit lengths – up to 780 feet (238 meters). Chromalox hazardous environment cable is fully compatible with our intelliTRACE™ modular process controls.



Typical applications include:

- Pipe freeze protection
- Process temperature regulation
- Frost heave protection
- Roof and gutter de-icing

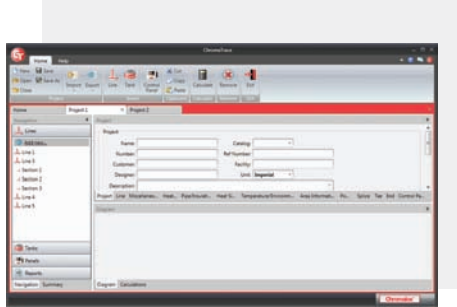
## MODULAR HEAT TRACE CONTROL SYSTEMS



The Chromalox intelliTRACE™ and weatherTRACE™ control systems are complete control solutions for heat trace applications, providing temperature control, monitoring, and power management in one package. The modular design of the control panel and components allows selection of only those features needed for a specific heat trace installation, minimizing cost and simplifying system configuration. The systems employ microprocessor-based controls and come pre-wired and assembled. Options include a choice of AC line voltages (120, 208, 240, 277, and 480), RS-485 communications interface, and Ground Fault Indicator alarms. Single-loop and multi-loop units are available. Multi-loop intelliTRACE panels feature a simple color touchscreen operator panel. Both retrofit easily into existing systems.

## HEAT TRACE SYSTEMS DESIGN SOFTWARE

ChromaTrace software is an indispensable tool for designing and managing heat trace projects. It does all of the IEEE-compliant calculations and allows you to run “what-ifs” to quickly find the most cost-effective solution. The software determines the exact equipment and quantities needed, and provides their part numbers. Product data sheets and manufacturer’s cross-reference guidelines are provided on-screen for easy reference. ChromaTrace helps manage hundreds of drawings for several heat trace projects and even ties pipe and tank data to specific drawings, identifying which pipes are freeze-protected or process-maintenance, with specific electrical loads in particular areas of the application.



\*INCOLOY is a registered trademark of Huntington Alloys Corporation.  
NOTE: Consult the National Electric Code for classification of your hazardous area before selecting cable.

## TEMPERATURE CONTROLS



From basic electromechanical thermostats to single- and multi-loop, microprocessor-based temperature controllers, Chromalox offers precisely the required level of simplicity or sophistication. Advanced models feature PID operating modes for heating and/or cooling; fuzzy logic control; dual-output/dual-alarm protection; NEMA 4X front panels; ramp/soak programming; and digital communications and software.

From multi-loop electronic controls to stock and custom control panels, Chromalox can design the right system for your plant's needs. We are the only heating element supplier offering a complete line of electronic heat trace controls and control panels.

Typical applications include:

- Process temperature maintenance
- Freeze protection
- Reactors for chemical and pharmaceutical industries
- Environment chambers and refrigeration
- Food processing/preparation
- Resistive/inductive heating

## MONITORS AND OVERTEMPERATURE CONTROLLERS

Chromalox monitors and overtemperature controllers are designed to protect expensive process equipment with models offering alarm relay outputs; DIN rail mounting; digital LED displays; thermocouple and RTD inputs; NEMA 4X front panels; and digital communications. UL-, cUL-, and FM-approved models are available.



## SCR POWER CONTROL COMPONENTS



SCR power control components are easily integrated into electric resistance heating applications and deliver high-precision power modulation and smooth power output. Zero-crossover and phase-angle-fired configurations are available that drive single- and three-phase loads to 1600 kW. Features include current limiting, over-current trip, LED status indicators, I<sup>2</sup>T fusing, and shorted SCR detection. Models are UL-, cUL-, CE-, and DEMKO-approved.



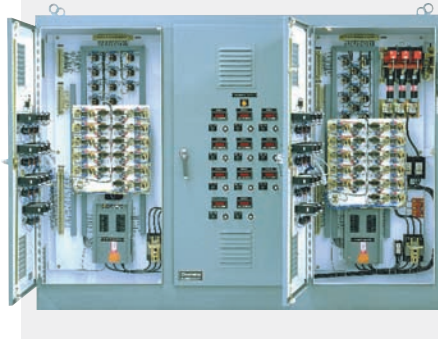
## STANDARD POWER CONTROL PANELS



Chromalox stocks more standard power control panels than any other supplier in more sizes and configurations. Every pre-engineered, ISO 900:2008-approved panel is ready for installation Chromalox eliminates the hassle and time expenditure needed to select, obtain, and assemble components. Our standard power control panels are available with NEMA 4, 4X, 7, and 12 enclosures and integrated temperature and overtemperature controls. They are pre-configured with SCR power controls or contactors, transformers, firing cards, and fuses, switches, indicators, and special labeling. Units are UL- and cUL-certified.

## CUSTOM POWER CONTROL PANELS

At our ISO 9001- and UL 508-certified facility, Chromalox custom power control panels are engineered with solid-state controls and sized to virtually any application or specification. Used by the U.S. military for its shipboard systems, Chromalox custom power control panels are available in many NEMA-type enclosures, for single- or three-phase load requirements, and a variety of voltages, contactors, and SCR power controllers. Circuit fusing, current-sensing relays, ground fault breakers, and circuit ammeters can be tailored to your requirements.



## intelliPANEL™ 3-PHASE SCR POWER CONTROL PANEL

The industry's first process/power control with a color touchscreen flat panel display provides simplified configuration settings and local monitoring that greatly reduces setup time compared to DIN-style controllers and conventional PLC systems. It features a graphic user interface and simple programming functions. It is loaded with diagnostic features ranging from voltmeters, ammeters, and wattmeters to ground fault monitoring and trending, resistance monitoring, and temperature alarms. The advanced intelliPANEL™ design provides standard panel ratings from <100 to 1200 amps with voltage ranges of 208 to 600 Vac, three-phase power.



## SENSORS AND ACCESSORIES



Sensors range from bare thermocouples and RTDs to the most sophisticated infrared non-contact sensors that directly, consistently, and accurately measure product temperature. Stock accessories include thermowells, wiring, indicating meters, timers, and recorders in addition to electromechanical contactors, thermostats, and thermostats.

NOTE: Consult the National Electric Code for classification of your hazardous area before selecting your controls.



# INDUSTRIAL COMFORT HEATERS

Chromalox electric comfort heaters provide efficient, economical heat for commercial and industrial applications. Convection, forced-air, and radiant heaters provide safe, clean, fast heat. Their heavy-duty construction affords long, dependable service.

Typical applications include:

- Heating industrial work areas
- Machinery freeze protection
- Heating warehouse and storage areas
- Heating and freeze protection in sewage treatment plants
- Pipe thawing
- Shipboard heating

## GENERAL-PURPOSE BLOWERS



- Power ratings: 2.6 to 50 kW
- Voltages: 208 to 600 V, single- and 3-phase

Heavy-gauge steel blowers trimmed in a polyester powder coat come in horizontal or vertical configurations that can be ceiling- and wall-mounted. Adjustable louvers direct airflow. Chromalox general-purpose blowers meet UL, CSA, NEC, CE, and OSHA requirements. Various built-in control options are available.

## GENERAL-PURPOSE CONVECTION

- Power ratings: 250 W to 5 kW
- Voltages: 120 to 600 V, single- and 3-phase

General-purpose convection heaters are designed to be wall-mounted in isolated areas, crane cabs, shop offices, and plants. These heavy-gauge steel units are coated with corrosion-resistant powder coat. Various models include thermostats, and tamper-proof construction. Most models meet UL, CSA, and CE requirements.



## HEAVY-DUTY BLOWER



- Power ratings: 2 to 50 kW
- Voltages: 120 to 575 V

Heavy-duty forced-air heaters feature heavy-duty construction for use in dirty, corrosive environments. Some models are available with NEMA 4X control enclosures and stainless steel construction to resist dirt contamination and chemical attack, and can be hosed down. Chromalox heavy-duty heaters are UL-listed and meet NEC and OSHA requirements. Some models are CSA-certified.

## HAZARDOUS DUTY



- Power ratings: 1.6 to 35 kW
- Voltages: 120 to 600 V, single- or 3-phase

Hazardous-duty convection and forced-air blower-type heaters are designed for rugged industrial use in the presence of potentially flammable or explosive gases, vapors, powdered metals, or dusts in locations such as sewage treatment plants, petroleum refineries, and chemical processing plants. Numerous control options are available. Units are UL-listed, and CSA-, CE-, and ATEX-certified models are available for wall or ceiling mounting. Consult the National Electric Code for classification of your hazardous area before selecting your heater. GOST certification is now available on certain models.

## RADIANT HEATERS

- Power ratings: 500 W to 13.5 kW
- Voltages: 120 to 600 V, single- and 3-phase

Radiant heaters provide virtually instantaneous, dependable heat for tough-to-heat areas. They are designed for fixed mounting and will maintain an isolated comfort level within a larger, cooler area. Heavy-duty, metal-sheathed elements resist impact and vibration and are ideal for high-abuse applications. Chromalox also offers several accessories such as GFCI, tip-over switches, and cable kits. Units are UL-listed and CSA-certified.



## PORTABLE HEATERS



- Power ratings, forced air: 2 to 60 kW
- Voltages: 208, 240, 480, and 600 V, single- and 3-phase

Clean, odor-free portable heaters are available in two forced-air designs. Both are constructed for heavy-duty service and can be easily moved to virtually any location where instant heat is required. Forced-air designs are ideal for worker comfort, drying and curing, thawing pipes and machinery, and where temporary, localized heat is necessary.

## COMPONENT HEATERS

Component heaters by themselves meet many heating needs. They can also be integrated into more complex heating systems providing a complete thermal solution for your heating requirements.

Shape and size most often are the determining factor in most heater applications. Chromalox carries the widest selection of standard component heaters in many shapes, sizes, and wattages.

Typical applications include:

- Free/forced-air heating
- Oil, heat transfer fluid heating
- Die and platen heating
- Condensation prevention
- Commercial cooking equipment
- Degreasing/rinse tanks

## TUBULAR ELEMENTS



- Maximum temperature: 1,600°F (870°C)
- Voltages: Up to 600 V

Tubular heating elements are versatile and transfer heat exceptionally well by conduction, convection, or radiant heating to heat liquids, air, gases, and surfaces. Round, triangular, flat press, and formed bends are made to customer requirements. A multitude of sheath materials are available. More than 20 optimal terminations and many stocked accessories are available. Can be furnished as UL-listed and CSA-certified. VDE and CE certification are also available.

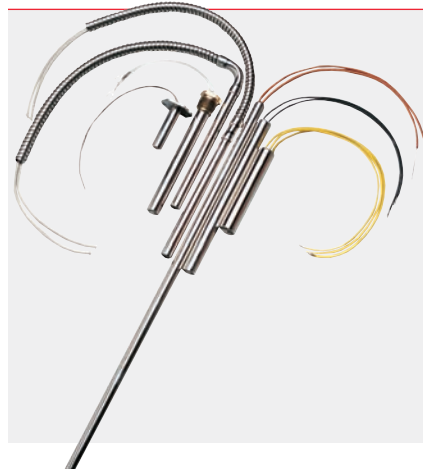
## STRIP/RING/DISC ELEMENTS

- Maximum sheath temperature: 1,500°F (815°C)
- Watt density: Up to 38 W/in.<sup>2</sup> (6 W/cm<sup>2</sup>)

Rugged and easy to install, these units transfer heat by either conduction or convection to heat liquids, air, gases, and surfaces. Applications include drying, melting, baking, or curing. Strip heaters range from 0.5 inch to 2.5 inches (12.75 to 63.5 millimeters) wide and lengths to 72 inches (1.8 meters). Units bolt or clamp to many surfaces. Ring heaters can be nested to provide concentrated heat in small areas. Many sheath materials, termination styles, operating temperatures, sizes, voltages, wattage ratings, and mounting devices are available. Disc units are solid design and are available from 2¼ to 3¼ inches (57 to 83 millimeters) in diameter.



## CARTRIDGE ELEMENTS



- Diameters: 0.125 to 1.25 in. (3.175 to 31.75 mm)
- Maximum sheath temperature: 1,600°F (870°C)
- Watt density: 25 to 262 W/in.<sup>2</sup> (4 to 40 W/cm<sup>2</sup>)

Cartridge heaters are inserted into drilled holes to heat metal parts or small spaces. Chromalox provides an array of sizes, wattage ratings, voltages, lead, and mounting options. Optional end seals resist contaminants and moisture from entering the heater as operating temperatures increase.

## BAND ELEMENTS



- Maximum temperature: 1,500°F (815°C)
- Watt density: Up to 50 W/in.<sup>2</sup> (7.75 W/cm<sup>2</sup>)

Band heaters grip tightly to cylindrical surfaces to supply uniform heat transfer. Chromalox band heaters are flexible and come in one- or two-piece construction for easy installation and removal. Stainless steel braids and conduit protect terminations and resist contamination.

## THIN BLADE HEATER ELEMENTS

- Length: Up to 10 ft (3 m)
- Profile: 0.235 x 1 in. (6 x 25 mm)
- Maximum temperature: 1,200°F (650°C)
- Watt density: Up to 75 W/in.<sup>2</sup> (11.5 W/cm<sup>2</sup>)

Thin blade elements provide more surface area than standard tubular elements for greater wattage or lower watt densities. Chromalox thin blade heating elements can be configured for immersion heating, conduction, or convection. A variety of sheath materials is available. Three-wire construction within the element provides uniform heating. Single- or three-phase current terminations are available with a 120- to 480-volt range.



## SILICONE LAMINATE/FLEXIBLE ELEMENTS



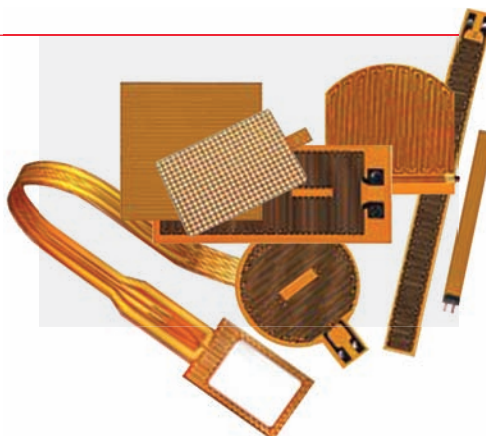
- Maximum temperature: 390°F (200°C)
- Voltage: Up to 600 V

Versatile Chromalox silicone laminate/flexible elements find use in applications requiring low to medium temperatures. Rugged construction of lightweight material provides chemical and moisture resistance. Wire elements are durable and wound precisely within the structure for optimal performance. A variety of electrical, shape, and contour fittings meets a broad range of specifications.

## KAPTON® FLEXIBLE HEATERS

- Temperature range: -319° to 500°F (-196° to 260°C)
- Watt density: Up to 50 W/in.<sup>2</sup> (7.75 W/cm<sup>2</sup>)
- Sizes: Up to 16 x 23 in. (406 x 584 mm)

Kapton flexible heaters are constructed of an organic polymer with very high dielectric capabilities, making them ideal for extreme temperature environments while providing superior resistance to most solvents, oils, even radiation. They are marked by fast warm-ups and quick response. Heating elements are etched foil with solder terminal, connector, or lead terminations. A limitless range of shapes, sizes, and wattages is available.





# CHROMALOX SERVICE SOLUTIONS

## CHROMALOX SERVICE SOLUTIONS ENSURE OPTIMUM PERFORMANCE AND EXTEND PRODUCT LIFE



### Startup and Commissioning

New equipment startups can often delay project timelines. Minimize any chance for costly setbacks by having a Chromalox qualified engineer for on-site startup and commissioning the mechanical, electrical, instrumentation, and control equipment for any system we have built, anywhere in the world. They will assist with initial equipment startup and perform a complete review of the installed system to ensure optimized integration into your facility, increasing overall efficiency.



### Chromalox Cold Weather Contracts

Cold weather can be a strain on much of your system's equipment. To help you avoid unplanned downtimes that can occur due to cold weather Chromalox offers a package of pre-season planning and preventive maintenance services to ensure proper equipment operation before the cold weather strikes.



### Chromalox Service Contracts

Chromalox Service Contracts deliver efficient emergency response and preventive maintenance, helping to eliminate problems before they arise. Chromalox field service personnel are experts at maximizing the performance of your process heat and control systems with a variety of on-site services including multi-point inspections, guaranteed emergency response times, site reports, and replacement parts availability.

### Professional Services

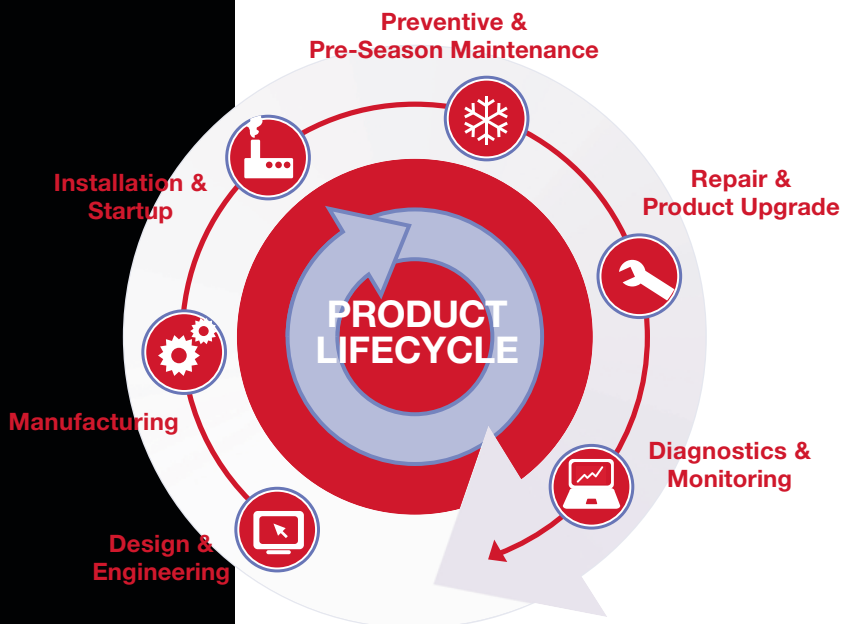
Chromalox comprehensive service solutions also include a selection of professional services to help integrate, operate, and service Chromalox heating and control equipment for your application.

**Isometric Drawings:** Chromalox will generate 2D and 3D drawings that show how Chromalox heating and control products are integrated into your application.

**Training:** Chromalox offers on-site training of your personnel to help ensure that your Chromalox equipment is properly operated. Expertly trained personnel can better achieve the best results in your process, as well as optimize equipment service life and maximize intervals between required maintenance.

**Diagnostics and Troubleshooting:** Our experienced engineering staff can help to optimize your process. They are well-versed in diagnosing and correcting process issues, and can custom-design heaters and controls that meet your exacting requirements.

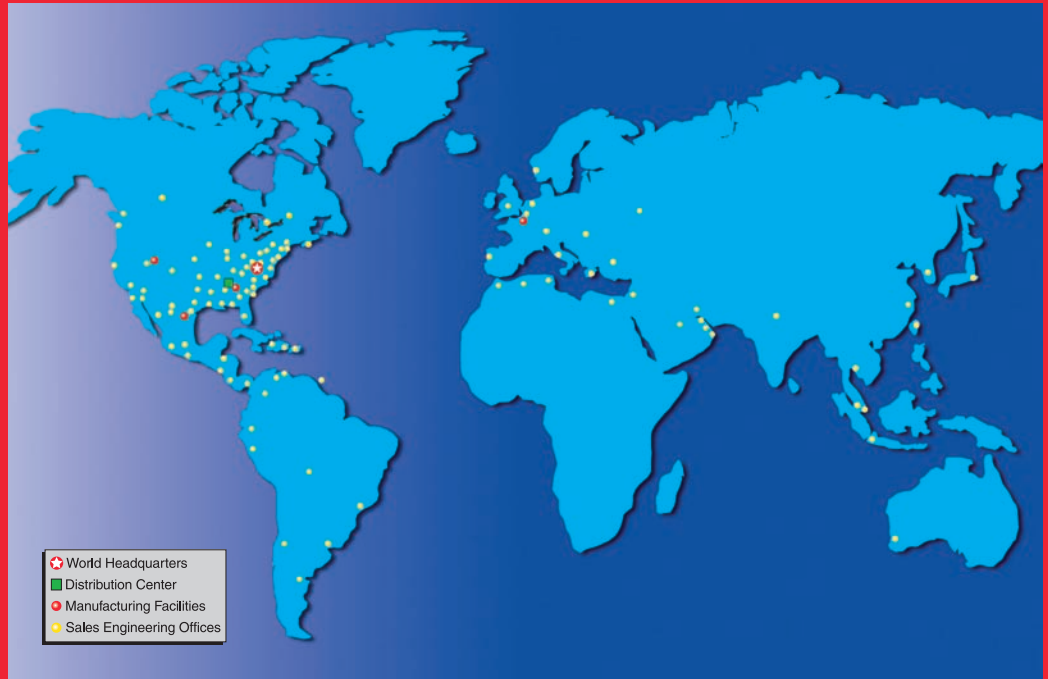
**For any Chromalox Service Solution call your local sales office.**







# Chromalox Value-Added Products and Services Are Available Worldwide



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