CHROMALOX
Advanced Thermal Technologies

TANK HEATING SYSTEMS

THE BEST ELECTRIC HEAT AND CONTROL SOLUTION FOR YOUR PROCESS AND APPLICATION

For 100 years, we have solved more process heating challenges and created more unique, customized solutions than anyone.

Chromalox is devoted to providing you with the most cost-effective heat and control solution for your application to keep your revenue-generating processes on line. We excel at bringing our vast array of solutions and products to your most difficult heating problems no matter how extreme, corrosive, or hazardous your process and environmental conditions are. We have a virtually unlimited selection of heaters, controls, and configurations to ensure you get the exact equipment needed for your process and application.

A century of sustained leadership

The Early Years of Chromalox

It all began in 1915 when an electrical engineer named Edwin L. Wiegand invented and patented the very first metal-sheathed electric heater. Two years later, Mr. Wiegand founded Chromalox to deliver this breakthrough product to the market. Performing with unprecedented reliability, the patented heating element set the industry standard in value, quality, and dependability for electric heating. Today, those high standards continue as industries turn to Chromalox as their first choice in solving simple to complex electric heating applications.

Global Strength

Chromalox offers full design and engineering capabilities and is vertically integrated in manufacturing capabilities. This, plus more global third-party approvals than any other company in our industry, enables us to serve customers anywhere in the world.

Unrivaled Engineering

Our engineering support staff can help to integrate our products into your application and properly specify equipment so that you can be sure that the equipment will operate as required.

In the field, Chromalox has the largest and most experienced group of engineers available to assist you. The majority of our 300+ field sales representatives are degreed engineers, and all are experienced with Chromalox heating products and applications.

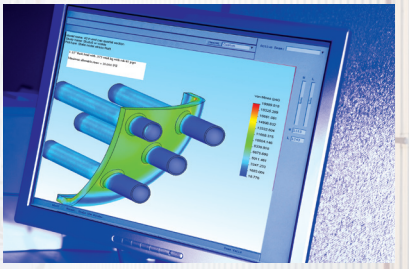
State-of-the-Art Manufacturing

Chromalox maintains six state-of-the-art manufacturing plants throughout the world with more than 634,000 ft² of manufacturing space. Our plants utilize automated machinery to ensure tightly controlled, repeatable quality standards. In addition to being vertically integrated, they also provide final assembly and functional testing.

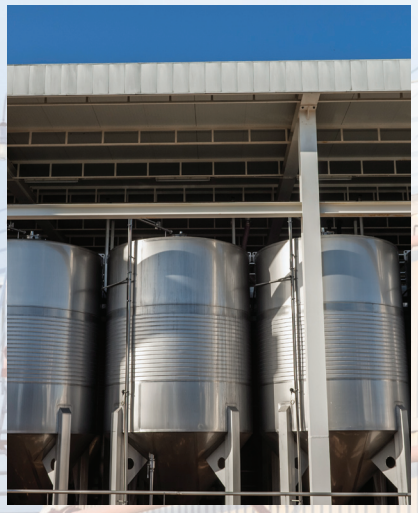
Our manufacturing capability features computer-controlled, automated machinery to help quality. With ASME welding capability in-house since 1953, Chromalox has gained more in-plant experience than any other electric heater manufacturer for high-quality welding. Our experience enables us to perform ASME welding at a level unsurpassed in our industry.

Broadest Third-Party Approvals

Chromalox is the only manufacturer with extensive systems manufacturing in North America, Europe, and Asia. Approvals and certifications include, but are not limited to, CE, NEC, UL, VDE, cUL, FM, CSA, MSHA, BASEEFA, Cenelec, ASME, PED, ATEX, GOST, and ISO 9001:2008.



CLEAN ELECTRIC TANK HEATING SOLUTIONS



Electric Heat Is the Right Choice

- Clean
- Pollution-free
- No open flames
- No additional plumbing connection
- Quiet operation
- Simple operation
- Better efficiencies
- Precision control

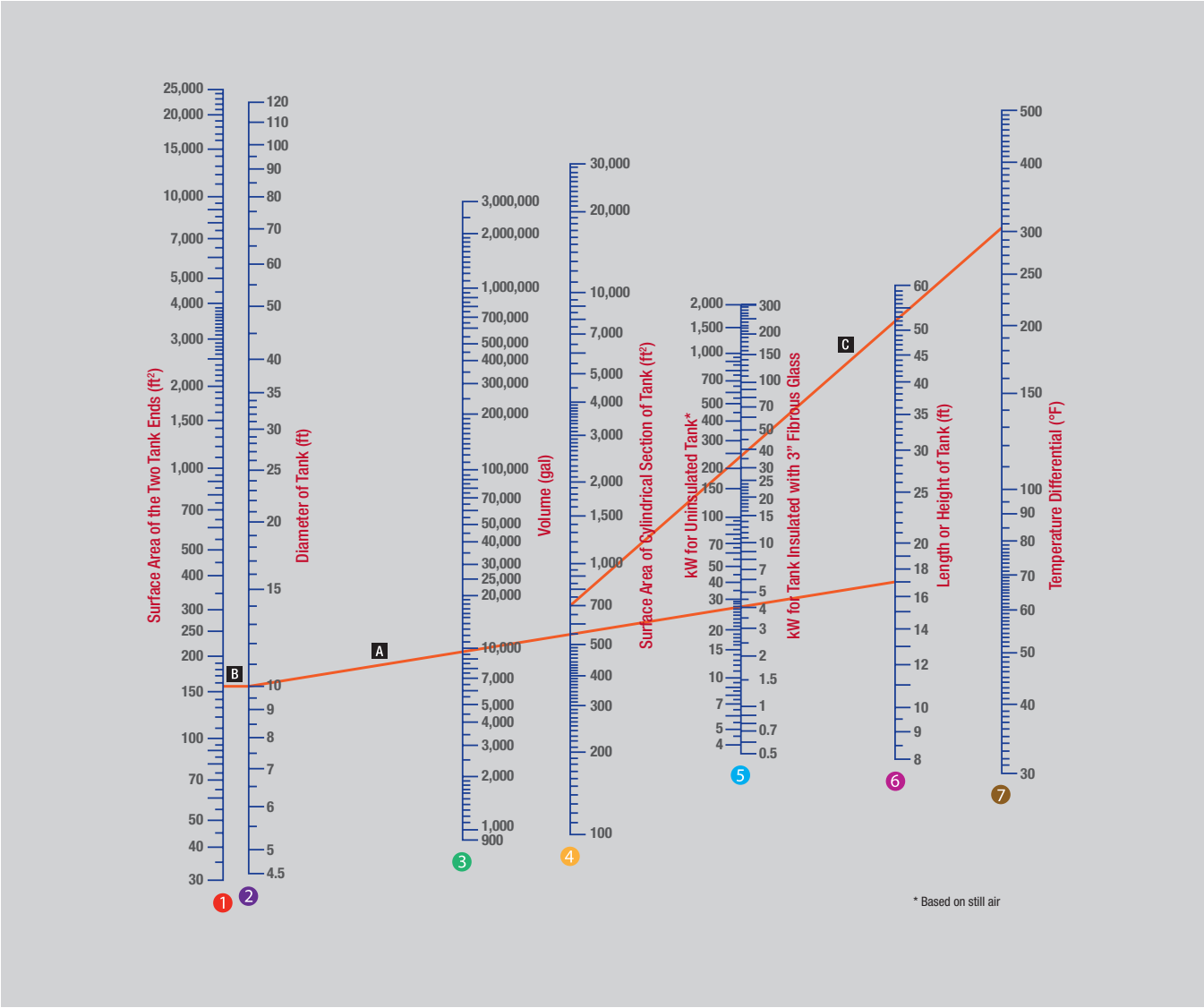
For Any Style of Tank . . .

- Vertical
- Fixed or floating roof
- Mobile
- Underground (UST)
- Tanker
- Horizontal
- API 614
- Hopper
- Above ground (AST)
- Railroad

For Any Application . . .

- Fire water
- Crude oil
- Fuel storage
- Biodiesel
- Linseed oil
- Lube oils
- Vegetable oils
- Animal fats
- Diesel
- Freeze protection
- Asphalt
- Petroleum
- Frac drilling fluids
- Fuel oil
- Pitch and tar
- Liquid sugar
- Molasses
- Glycerin

DETERMINE YOUR TANK HEATING NEEDS



1. Connect 10'-0" on scale 2 with 17'-0" on scale 6 by a straight line A. Intersecting this line with scale 4 will give the surface area of the cylindrical portion of the tank as approximately 550 ft². Note: Intersection of line A with scale 3 will show tank volume in gallons. (This is often helpful because the dimensions of the tank can be approximated if only the volume is known.)

2. To determine the total area of both heads of the tank, draw horizontal line B through 10' on scale 2 and read the area of both heads on scale 1 as 155 ft².

3. Adding the results of Step 1 and Step 2 will provide the total surface area of the tank: 705 ft². Connect 705 on scale 4 by a straight line C to 300°F (325°F minus 25°F) on scale 7 and read kW recommended where line C intersects scale 5. For a tank insulated with 3" fibrous glass, 35 kW will be required. An uninsulated tank will need about 240 kW.

Note: This nomograph can tell you the recommended kW for maintaining tank temperatures; additional heating capacity is needed to heat materials from a "cold start." Consult your Chromalox Representative for expert advice in determining the required additional capacity.

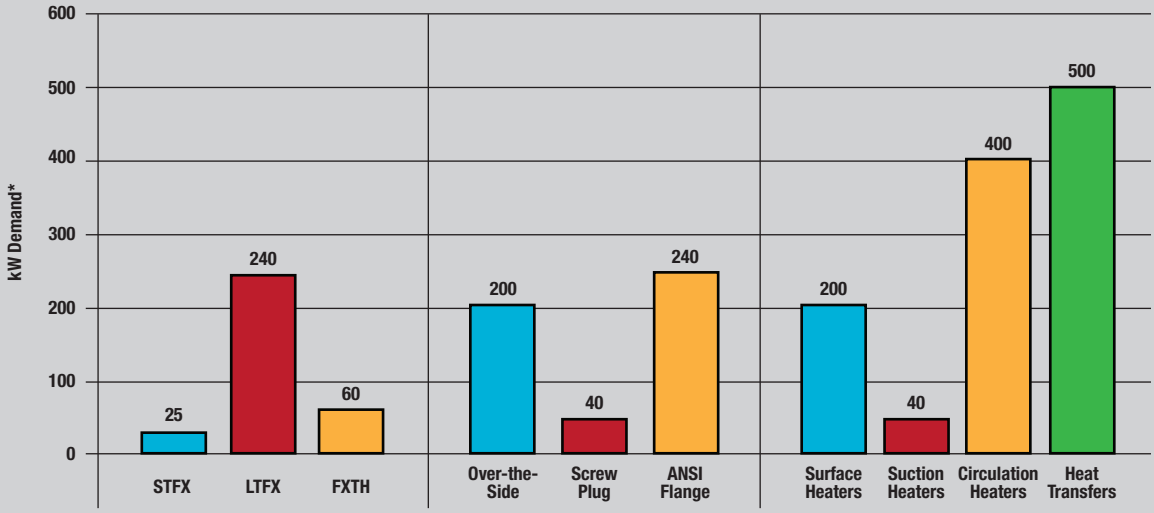
SELECT YOUR TANK HEATER STYLE

Product Selection Criteria

Replaceable-Element Heaters
Perfect for easy maintenance and processing-critical applications.

Direct Immersion Heaters
Offer the lowest cost design with selection of fast-ship products.

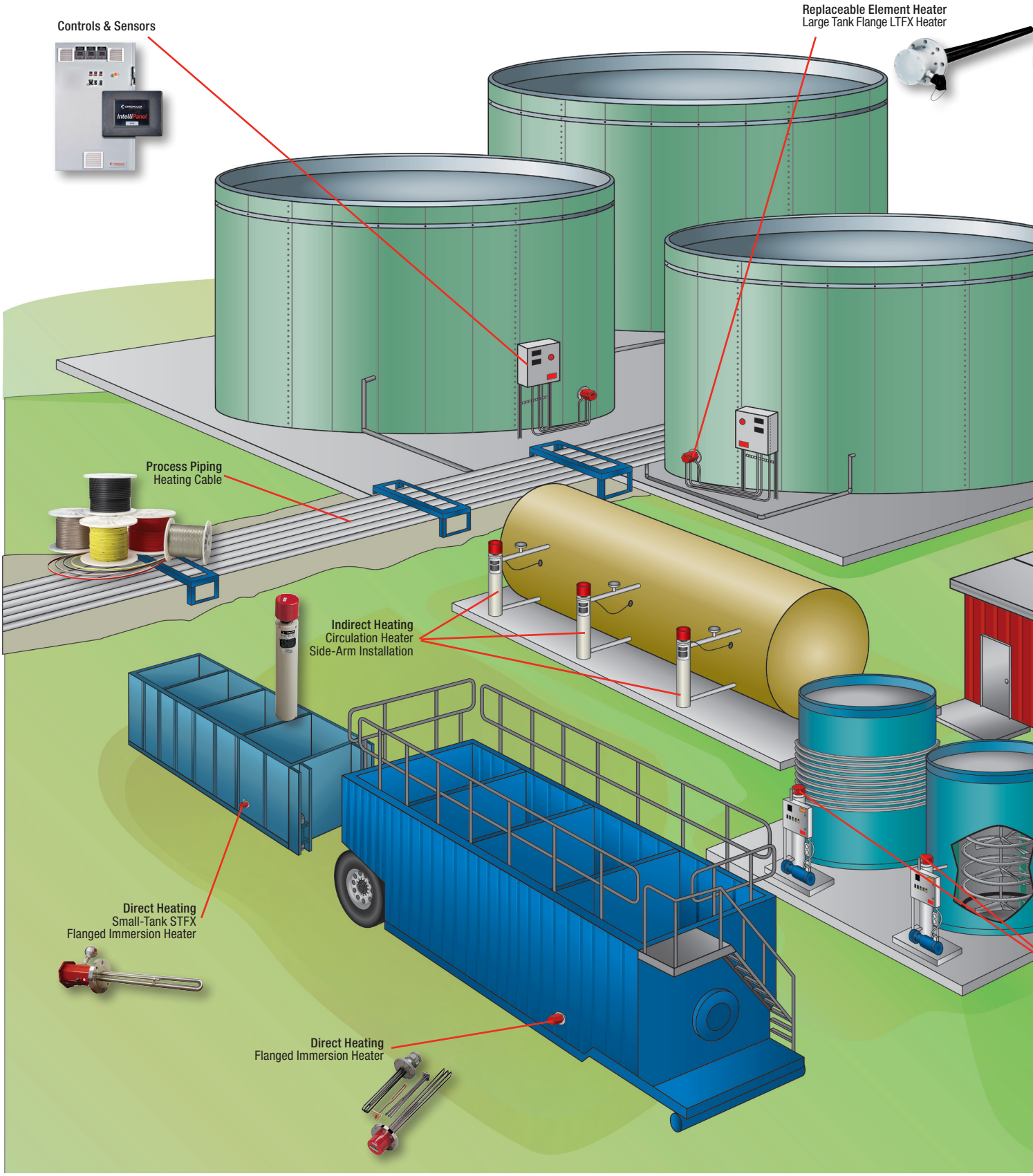
Indirect Heaters
Allow heating for existing storage tanks or uniquely designed configurations.



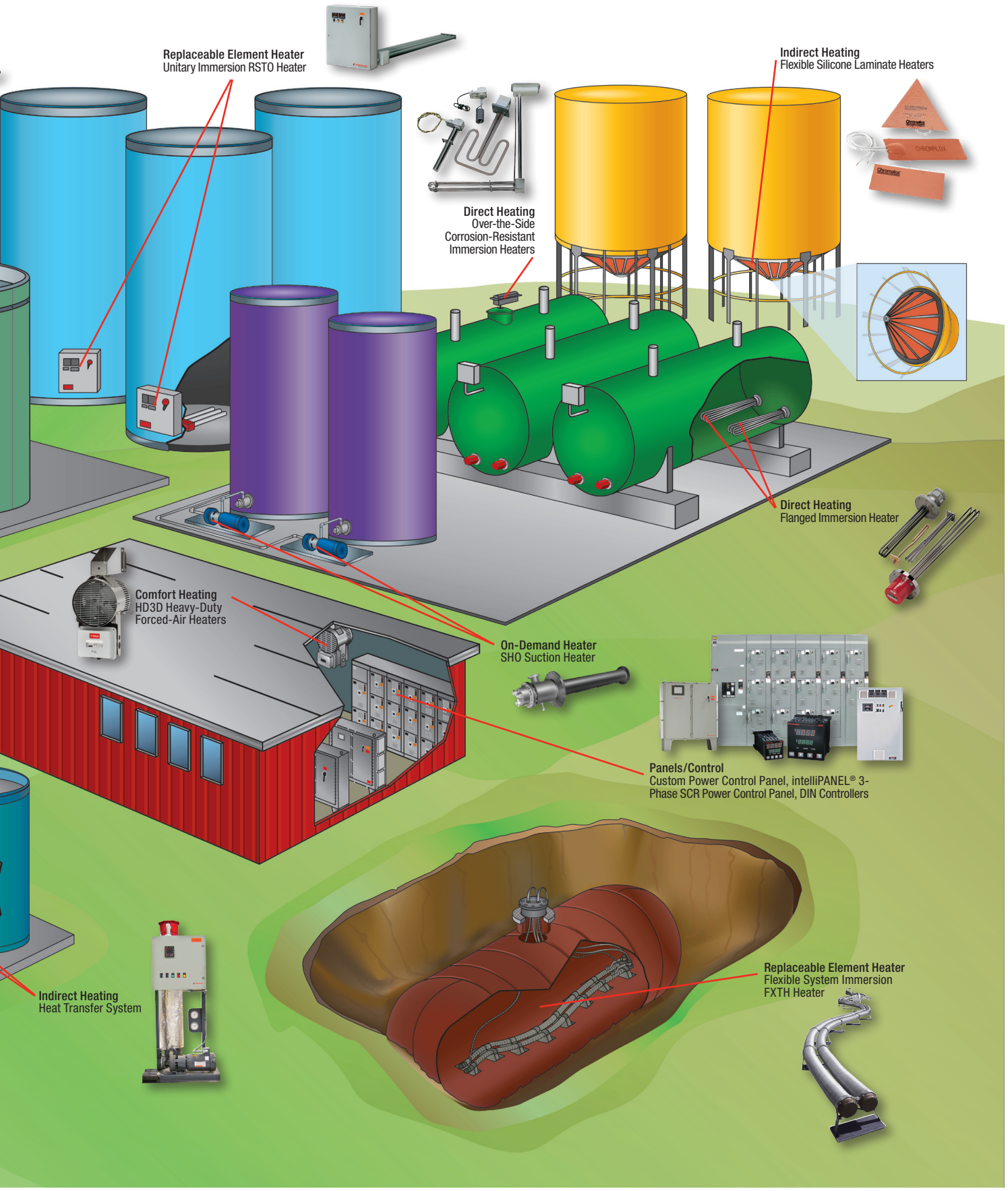
	STFX	LTFX	FXTH	Over-the-Side	Screw Plug	ANSI Flange	Surface Heaters	Suction Heaters	Circulation Heaters	Heat Transfers
New Tank	x	x	x	x	x	x	x			x
Existing Tank			x	x	x	x	x	x	x	x
Above Ground	x	x	x	x	x	x	x	x	x	x
Below Ground			x	x				x		
Easy Maintenace	x	x	x						x	x
Corrosive Fluids	x	x	x				x	x	x	x
Heat-Up Applications	x	x	x			x			x	x
Hazardous Areas	x	x	x	x	x	x		x	x	x
Irregular Shapes				x			x	x	x	x
Fast-Ship Delivery	x				x	x	x			

*Higher kW rating can be provided for most products. The selection chart is a general guide for determining product style. Consult your Chromalox representative for expert advice in choosing the best product for your application.

WHATEVER YOUR PROCESS..., WHATEVER YOUR APPLICA



TION... IF YOU HAVE A TANK, CHROMALOX HAS A HEATER



REPLACEABLE-ELEMENT TANK HEATERS

Products for Easy Maintenance and Critical Applications

Chromalox offers four electric heating systems for storage tanks that feature unique replaceable-element design. The heating elements can be removed and replaced without draining the tank—in most cases by one person with no special tools. This feature can save time and money as well as help maintain peak performance efficiency when the heating elements are replaced on a scheduled maintenance basis.

The systems can be installed in above- or below-ground tanks made of steel, concrete, or fiberglass.

Complete with Chromalox controls, these replaceable-element tank heating systems can be operated with little or no manual attention. Heat can be applied by using strategically located sensors to monitor tank temperatures and energize the heaters. The heating operation may be fully automated by using timers and controllers to program the start and stop of both off-peak and daytime heating functions.

In addition to operating convenience, Chromalox replaceable-element tank electric heating systems require very little upkeep and are practically maintenance-free. The result is substantially reduced operating costs over alternative heating methods.

Small Tank Flange (STFX) Heaters

Chromalox® STFX units provide replaceable-element design in a compact setting so they are ideal for smaller, critical system tanks that need to remain filled for continuous operation and storage.

These units comply with API-614 and can be used for such materials as lube oil, fire water storage, water solutions, asphalt, water/glycol, diesel, acidic solutions, ethanol, bio-diesel (B-100), glycerin, animal fats, vegetable oils, fuel oils, or similar types of liquids. Units are CSA-certified and can be provided with ASME.

Installation is quick and easy. A standard carbon steel ANSI flange provides a straightforward mating connection with no special modifications required.

Standardized 304 stainless steel heater cores allow for multiple heater element replaceability with a minimum number of parts.

Each unit is equipped with a Type J thermocouple for overtemperature sensing on the pipe wall. A control panel can be matched to each unit to ensure seamless operation.

Large Tank Flange (LTFX) Heaters

LTFX heaters provide low-watt-density heating over a large surface area while providing precise temperature control for such materials as fire water storage, asphalt, diesel lube oils, ethanol, bio-diesel fuel, glycerin, animal fats, vegetable oils, fuel oils, or similar types of liquids.

LTFX heating systems are inserted into an assembly of Schedule 40 NPS carbon steel or stainless steel pipe. This rugged construction is well-suited for corrosive applications. Alternative materials such as titanium, INCOLOY*, and 316 stainless steel are also available on request.

Minimal-space open-coil-element (OCE) style elements can be bent during insertion or removal to a vertical plane with as little as 12 inches (305 millimeters) of clearance. Each unit comes equipped with a Type J thermocouple for temperature sensing on the pipe wall and can be matched with a corresponding control panel, mounted separately or installed directly on the LTFX heater, to ensure seamless operation. The Standard ANSI flange provides a straightforward mating connection with no special modifications for quick and easy installation.

*INCOLOY is the registered trademark of Huntington Alloys Corporation.

Unitary Immersion (RSTO) Heaters

Chromalox® RSTO unitary electric immersion systems provide low-watt-density heating for viscous materials such as asphalt, fuel oil, pitch and tar, liquid sugar, molasses, lube oils, linseed oil, and other heat-sensitive materials. They can be installed in above-ground tanks. RSTO heater systems with open-coil-element (OCE) heaters are recommended for cramped locations because the open-coil heating elements can be bent in a vertical plane on a 12-inch (305-millimeter) minimum radius and require only 3 feet (1 meter) for installation or removal.

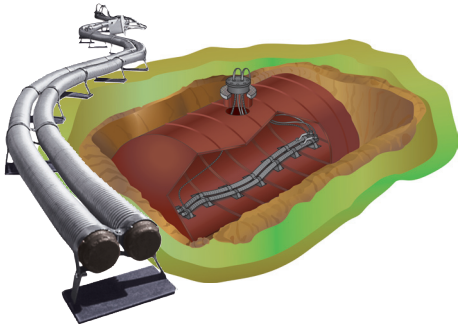
The heating elements are inserted into an assembly of 3-inch Schedule 40 NPS carbon steel or stainless steel pipes. The heaters are self-contained with built-in temperature and power controls mounted in a weatherproof electrical enclosure. A liquid-tight adapter box is provided for welding the heater assembly to the tank header.

Flexible Tank (FXTH) Heaters

Chromalox® FXTH heaters provide low-watt-density heating for viscous materials such as asphalt, fuel oil, pitch and tar, liquid sugar, molasses, lube oils, linseed oil, and other heat-sensitive materials. These heaters are particularly useful for storage tanks that are underground or when the tank ends are inaccessible for installation of more conventional heaters. They can be installed through the normal manhole opening of many large tanks above or below ground without requiring modification to the tank itself. Chromalox® FXTH heaters can be used in steel, concrete, and fiberglass tanks or in open-top process tanks.

The basic heater assembly consists of carbon steel flexible pipe, terminal enclosure, 14-foot (4.28-meter) risers, two lifting cables, and 4-inch (102-millimeter) high sludge legs. Stainless steel is also available.

Heat is evenly spread along the bottom of the tank. Its low profile provides maximum use of the tank volume and maintains heat even at low levels. High wattage at low watt density provides plenty of capacity without overheating the material.



Replaceable-Element Heaters Specifications

	Watt Density W/in.² (W/cm²)	Power Rating kW	Voltage Vac	Operating Temperatures °F (°C)	Flange Size in. 150 lb	Immersion Length ft (m)
STFX	5, 10, 20, 40 (0.8, 1.6, 3.1, 6.2)	1 to 25	120 to 600	0 to 750 (-18 to 399)	3 to 12	2 (0.610)
LTFX	9 to 12 (1.4 to 1.9)	4 to 240	240 to 600	0 to 750 (-18 to 399)	4 to 14	5 to 25 (1.5 to 7.6)
RSTO	3 (0.5)	15 to 72	240 to 600	50 to 400 (10 to 204)	—	15 to 26 (4.6 to 7.9)
FXTH	4.1 to 6.5 (0.6 to 1.0)	6 to 60	240 to 600	50 to 225 (10 to 107)	—	12 to 40* (3.7 to 12)*

*1, 2, or 3 assemblies.

DIRECT IMMERSION HEATERS

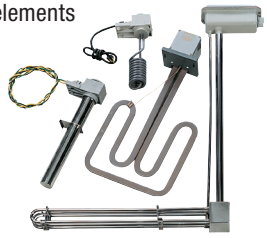
Because they heat by direct contact with water, oils, viscous materials, solvents, and solutions, direct immersion heaters can achieve virtually 100 percent energy efficiency. Various temperature control options permit very tight process temperature control. Many models are in stock, including models for specialized applications such as high-pressure and hazardous areas. Custom-engineered designs are also available.

Screw Plug Immersion Heaters

Screw plug immersion heaters consist of tubular heating 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.

Over-the-Side Immersion Heaters

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. Mounting configurations include L-shaped, side-mount, top-mount, and deep-tank installation.



Flanged Immersion Heaters

Ideal for heating 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. Many models are in stock.

Direct Immersion Heaters Specifications

	Watt Density W/in.^{2} (W/cm^2)	Power Rating kW	Voltage Vac	Heated Length in. (m)	Riser Length in. (m)
Screw Plug	Up to 85 (13.2)	Up to 40	120 to 600	Up to 54 (1.4)	—
Over-the-Side	Up to 70 (10.9)	Up to 200	120 to 600	Up to 64 (1.6)	Up to 144 (3.7)
Flanged	Up to 75 (11.6)	500+	120 to 600	Up to 120 (3.1)	—

	Screw Plug Material	Flange Material	Element Sheath Material	No. of Elements	Screw Plug Size in.	Flange in. 150 lb.
Screw Plug	Steel, Brass, 304 Stainless	—	Copper, 304 Stainless, INCOLOY*, Steel	1 to 3	½ to 2½	—
Over-the-Side	—	—	Copper, Steel, Stainless Steel, Cast Iron, INCOLOY*, Titanium, Teflon* (Fluoropolymer) Quartz, Ceramic	3 to 9	—	—
Flanged	—	Steel, Brass, 304 Stainless	Copper, Steel, 304 Stainless, INCOLOY*	3 to 45	—	3 to 14

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

INDIRECT HEATING

A distinct advantage of indirect heating is that the heater can be serviced without draining the tank. The use of flexible silicone laminate heaters and strip heaters on the tank wall enables the use of lower watt densities because the heat is spread over a larger surface. Using circulation heaters can limit the overheat conditions that can occur with some materials when using direct immersion heating.

Flexible Silicone Laminate Heaters

Versatile Chromalox flexible silicone laminate heaters 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.

Strip Heaters

Rugged and easy to install, these units transfer heat either by conduction or by convection. Strip heater widths range from 0.5 to 2.5 inches (12.75 to 63.5 millimeters) and lengths to 72 inches (1.8 meters). Units bolt or clamp to many surfaces. Many sheath materials, termination styles, operating temperatures, sizes, voltages, wattage ratings, and mounting devices are available.

Circulation Heaters

Chromalox circulation heaters are packaged units consisting of a 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 are in stock.

Heat Transfer Systems

Chromalox heat transfer systems are safe, versatile, user-friendly heating systems for process tank heating applications requiring closely controlled process temperatures. Engineered and constructed with carefully matched components, these systems provide easy installation and trouble-free operation in your application.

Indirect Heaters Specifications

	Watt Density W/in.² (W/cm²)	Power Rating kW	Voltage Vac	Maximum Temperature °F (°C)
Flexible	Up to 40 (6.2)	Up to 0.6	120 to 600	390 (200)
Strip	Up to 38 (6)	Up to 3	120 to 480	1,500 (815)
Circulation	20 to 100 (3.1 to 15.5)	0.5 to 500+	120 to 600	1,500 (815)
Heat Transfer	—	6 to 600+	240 to 600	750 (399)

PROCESS PIPING

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 of 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.

Self-Regulating Low-Temperature Heat Trace Cable

Intended for ordinary and hazardous environments, this heat trace cable prevents pipe freezing and maintains process temperatures. It is constructed of a semi-conductive heater matrix extruded between parallel buss wires and can adjust its output to independently respond to temperature along its length.

Constant-Wattage Heat Trace Cable

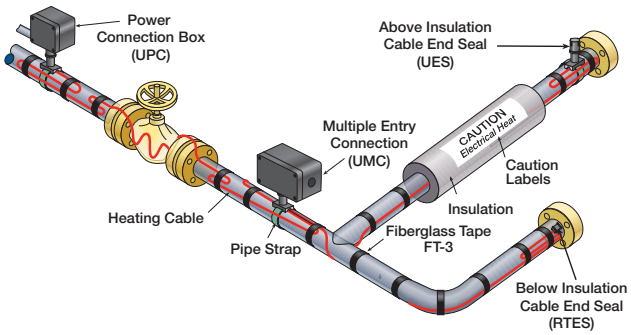
This cable provides freeze protection and process temperature maintenance, but with rugged construction can tolerate exposure temperatures to 392°F (200°C). Fluoropolymer jacketing is available for corrosive environments.

Mineral-Insulated Heat Trace Cable

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.

Heat Trace Controls and Accessories

As part of a complete solution for heat trace applications, Chromalox offers temperature control, monitoring, and power management in one package: the advanced Chromalox® IntelliTrace® control panel. Other available accessories include all of the necessary components needed to complete your installation, such as splices, power connection boxes, and water-resistant end-seal terminations.



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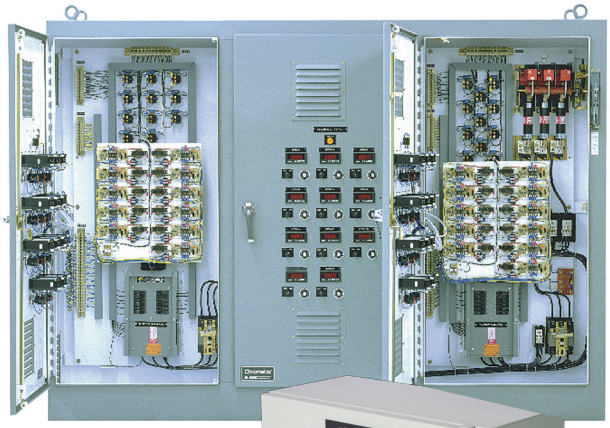
PANELS/CONTROLS/SENSORS

From sensors to multi-loop electronic controls to standard and custom control panels, Chromalox will design the ideal system for your plant application.

We are the only process heating company offering a complete line of both process heaters and heat trace controls. This includes our basic, low-cost temperature controllers to our more sophisticated control systems like the Chromalox® IntelliPanel™ 3-phase SCR power control panel. The advanced IntelliPanel design features unique color touchscreen technology that simplifies configuration settings and local monitoring, reducing setup time. It provides fingertip access to advanced diagnostics, trending, and monitoring along with measurement instruments, alarm configurations, control algorithms, startup, and troubleshooting.

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 thermoswitches.



THE CHROMALOX DIFFERENCE

Chromalox Meets Your Most Demanding and Complex Challenges

We invented electric heating technology, created an industry, and pioneered applications in new markets for the past 100 years. We are problem solvers who help our customers by innovating and developing new thermal technologies that will improve their operating processes and enhance productivity. We are dedicated to and excel at finding and applying elegant solutions to the most demanding and complex challenges. This and our investment in research and development in new technologies will shape the future of industrial heating as we continue to pioneer a new century of innovation.

Chromalox Can Improve Your Operating Costs

Our standardized designs can reduce your installed cost as well as your eventual replacement cost. Our electric process heaters require minimal maintenance and calibration. Using Chromalox third-party-certified electric package systems results in reduced insurance premiums for you—lower than those offered to competitors using fuel-fired systems.

Chromalox Can Improve Your Process Efficiency

Chromalox control panels, coupled with the precision and reliability of Chromalox heaters, optimize temperature control and shrink variations in efficiencies. Chromalox power controls, SCRs, and proprietary software precisely sequence heaters, balance electrical loads, control soft starts, and correct power factors, providing process control and operating efficiency.

RESOURCES TO GET THE JOB DONE

Unmatched Stock … Rapid Delivery

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 electronic order entry system at chromalox.com. Same-day delivery is available for many items. In addition, factory offices, stocking representatives, and over 500 authorized distributors carry Chromalox components and systems for same-day pickup and delivery. For assistance, call 1-800-443-2640.

Technical Assistance at www.chromalox.com

Go to www.chromalox.com anytime, day or night, for valuable information in product literature, product specs, training manuals, and technical documentation. You'll find answers to questions about anything from electronic temperature controllers and fluids, to material compatibility, corrosion, and wire sizing.

CHROMALOX SERVICE SOLUTIONS ENSURE OPTIMUM PERFORMANCE AND EXTEND PRODUCT LIFE

From startup and training to ongoing maintenance diagnostics and emergency response, we offer customized service solutions to ensure the quality and continued success of your process.

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. You will save time and know that your product was installed correctly.

Emergency Service

Emergency on-site service is also available when the situation demands it. Chromalox understands the importance of being prepared and ready to produce. That's why our service technicians are available 24x7 and will come to you anywhere in the world.

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

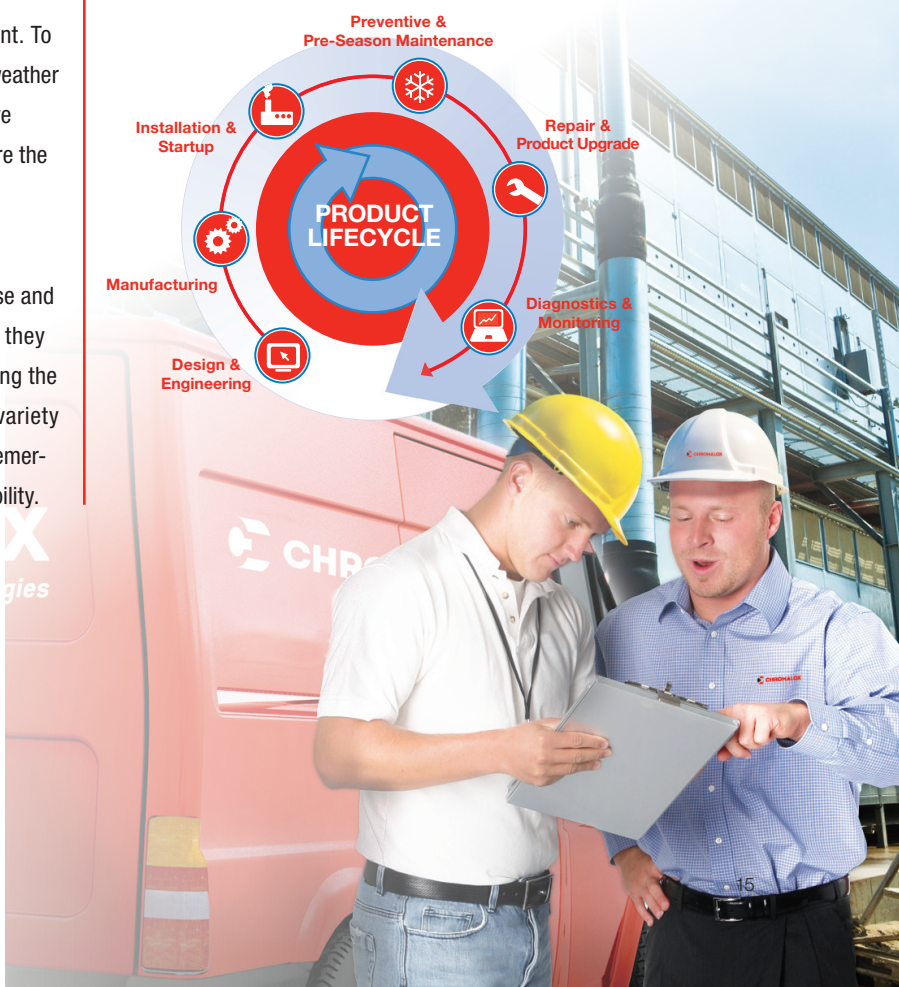
Chromalox comprehensive service solutions also include a selection of professional services to help integrate, operate, and service Chromalox heating and control equipment for your application.

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

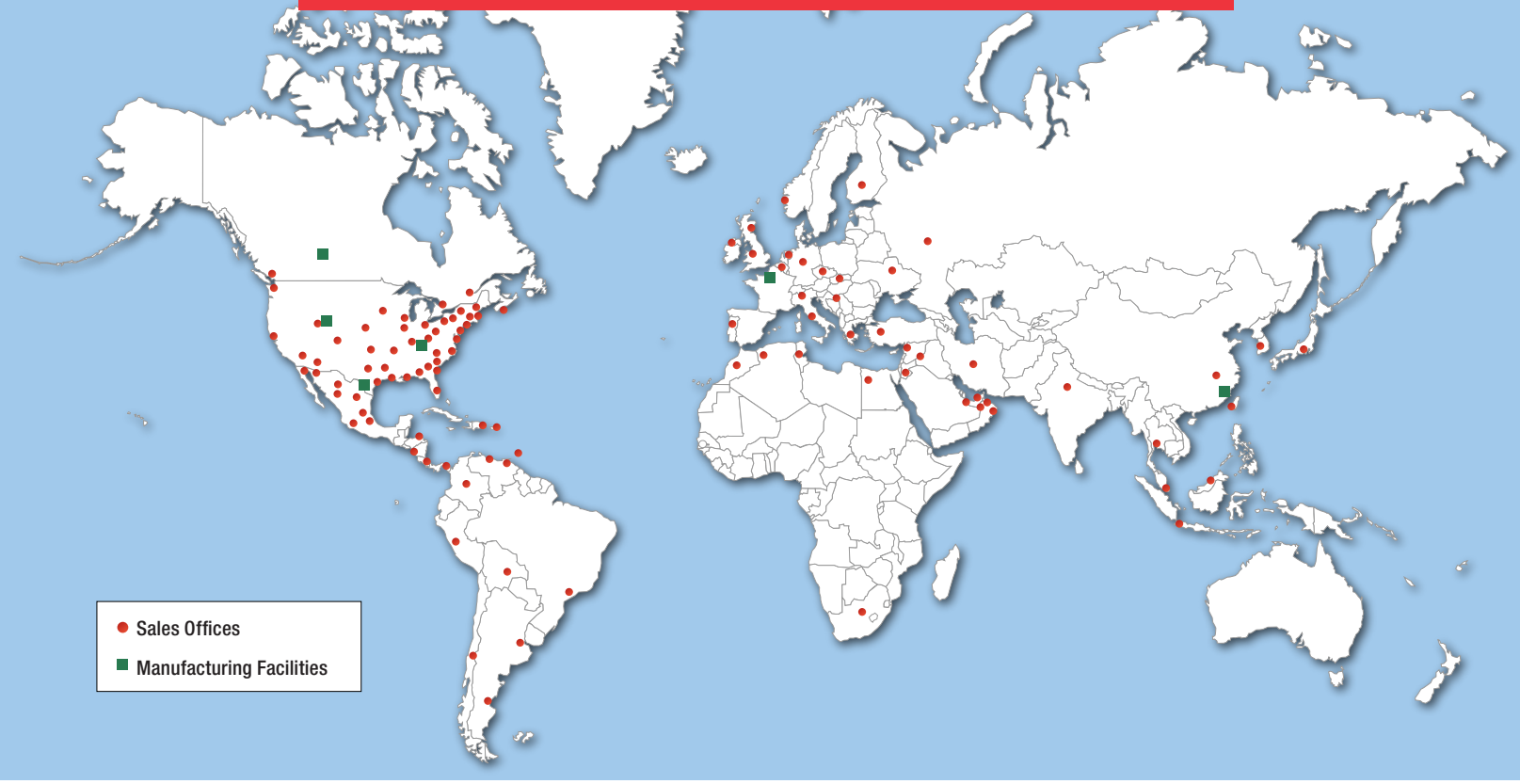
Training: Chromalox offers on-site training of your personnel to help ensure that your Chromalox equipment is properly operated. Expertly trained personnel can better achieve the best results in your process, as well as optimize equipment service life and maximize intervals between required maintenance.

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 1-800-443-2640



CHROMALOX WORLDWIDE LOCATIONS



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