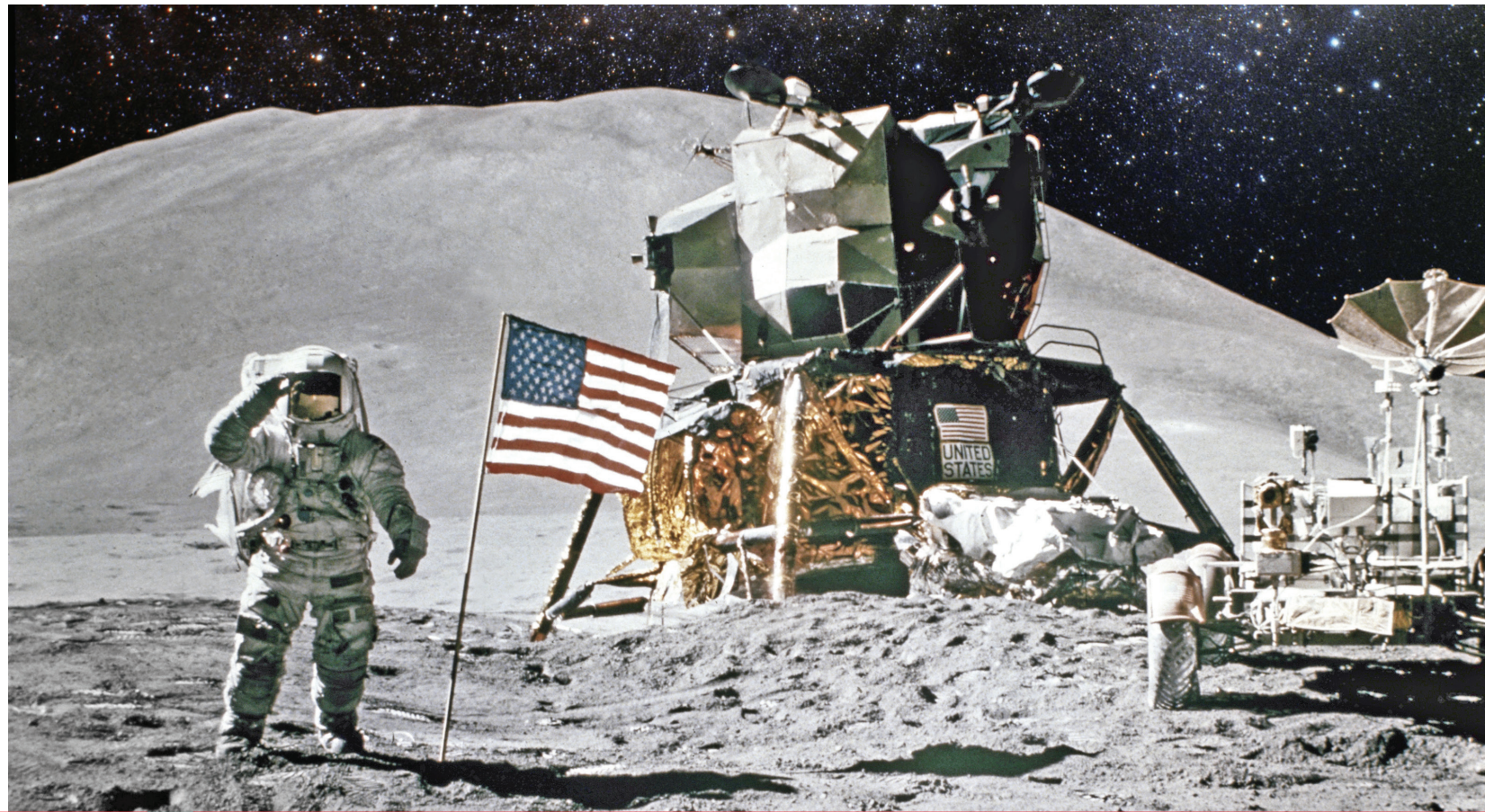




TEMPERATURE MANAGEMENT SOLUTIONS



A CENTURY OF INNOVATION.

THE CHROMALOX DIFFERENCE

When it comes to temperature management solutions, some companies are suppliers who just sell equipment. Our approach is to be a partner dedicated to providing you with the best electric heat and control solution for your process and application, solving even the most demanding and complex heating challenges: a partner who can meet your high expectations with solutions designed to exceed specifications, mitigates risk, operate within a defined budget; a partner who can provide sustainable solutions that can be installed efficiently, and require minimal design iterations.

PIONEERS IN ELECTRIC HEAT & CONTROL

We invented electric heating technology with the introduction of the first metal-sheathed heating element 100 years ago. Since that first innovation, we've created an industry and evolved from technologies of just a few kilowatts to those that meet the highly specialized requirements of virtually any industrial process and application.

It is our mission to find elegant solutions to the most demanding and complex challenges. These solutions help our customers improve their operating processes and enhance productivity. This mission, and our investment in research and development in new technologies, will shape the future of industrial process heating as we continue to pioneer a new century of innovation.

YOUR TRUSTED PARTNER

Our approach is to be a partner dedicated to providing you with the best electric heat and control solution for your process or application.

We are responsive, with a sense of urgency and a bias for action. From the moment a customer need is identified, Chromalox acts quickly to deliver the best solution while giving thorough, thoughtful, careful attention to detail. By limiting design iterations, meeting project timelines, and automating our manufacturing process, we deliver a satisfying customer experience and an efficient heating solution.

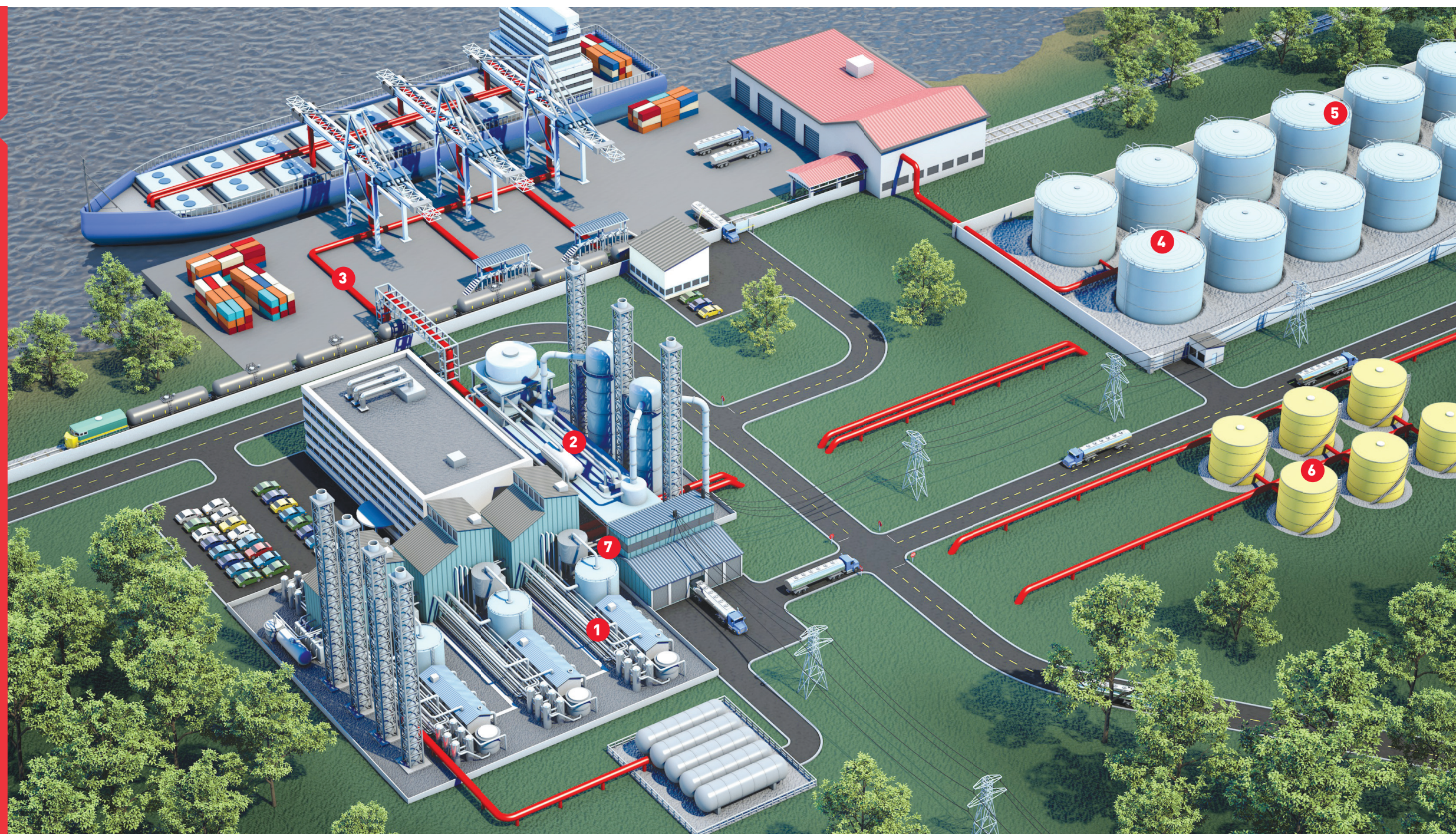
UNCOMPROMISING QUALITY

Our constant focus on quality improvement provides our customers with a competitive advantage. Implemented statistical process control, investment in manufacturing automation, ISO 9001:2011 certification, and compliance to stringent third-party approvals demonstrate our world-class commitment.



ADVANCED PROCESS SOLUTIONS FOR EVERY APPLICATION.

We deliver complete Temperature Management Solutions for your most challenging process heating, freeze protection and winterization applications. We excel at employing our vast array of products and application knowledge to deliver the most cost effective, reliable and safe solutions to protect your revenue generating processes. No matter how extreme, corrosive or hazardous your process or environmental conditions, we have a solution tailored to exceed your performance specifications, meet your budget expectations, and minimize risk to your operations. Our engineering, manufacturing and site service personnel stand ready to deliver complete Temperature Management Solutions for the Chemical, Petrochemical, Power Generation, Oil & Gas and Water Treatment markets.



1 FREEZE PROTECTION

Keep Pipes and Tanks from Freezing

Chromalox Heat Trace provides energy efficient, reliable heating to safely keep pipes and tanks from freezing in the most extreme conditions.

- ▶ Self-Regulating Heat Trace
- ▶ Constant Wattage Heat Trace
- ▶ Mineral Insulated Heat Trace
- ▶ IntelliTrace Control Systems
- ▶ Heat Trace Connection Accessories

2 PROCESS TEMPERATURE MAINTENANCE

Maintain Process Temperature of Pipes and Tanks

Chromalox Heat Trace provides energy efficient, reliable heating to safely maintain process temperatures in the most extreme conditions.

- ▶ Self-Regulating Heat Trace
- ▶ Constant Wattage Heat Trace
- ▶ Mineral Insulated Heat Trace
- ▶ IntelliTrace Control Systems
- ▶ Heat Trace Connection Accessories

3 LONG LINE TEMPERATURE MAINTENANCE

Maintain Process Temperature Transfer Piping

Long Line Heating cable provides safe, reliable heating to maintain process temperatures on transfer piping in the most extreme conditions.

- ▶ Long Line Heat Trace
- ▶ Long Line Controls
- ▶ Long Line Connection Accessories
- ▶ IntelliTrace Control Systems

4 TANK FOUNDATION HEATING

Maintain Slab Temperature to Prevent Frost Heave

Chromalox Heat Trace provides energy efficient, reliable heating to safely maintain slab temperature and prevent frost heaving in the most extreme conditions.

- ▶ Self-Regulating Heat Trace
- ▶ Constant Wattage Heat Trace
- ▶ Mineral Insulated Heat Trace
- ▶ IntelliTrace Control System
- ▶ Heat Trace Connection Accessories

5 CONTROL AND POWER DISTRIBUTION

Monitor and Control Heat Trace Systems

No company offers a more intelligent line of Heat Trace controls than Chromalox. Our smart controls help manage your heat trace system cost effectively, safely and reliably.

- ▶ IntelliTrace Controls
- ▶ ITC Heat Trace Controls
- ▶ ISC Heat Trace Control Software
- ▶ Control Monitoring and Power Distribution Skids

6 WIRELESS TEMPERATURE SENSING

Wireless Sensing of Process Temperatures for Control and Monitoring

Chromalox wireless sensor technology allows users to sense process temperatures without the heavy cost of wire and conduit. The wireless sensors are directly integrated with the IntelliTrace line of Heat Trace Controls and provide safe, reliable temperature measurement for the most demanding heat trace control applications.

- ▶ Wireless Sensors
- ▶ IntelliTrace Controls
- ▶ ISC Heat Trace Control Software

7 INSTRUMENTATION AND SAMPLE LINES

Freeze Protection or Process Maintenance of Instrumentation and Sampling Lines

Chromalox Pre-Traced, Pre-Insulated tube bundles, and Instrument Enclosures offer the superior quality of Chromalox heaters to keep any media from freezing or at process temperature.

- ▶ Tube Bundle
- ▶ Instrument Enclosure
- ▶ IntelliTrace Controls
- ▶ Heat Trace Connection Accessories



OUR BUSINESS IS INNOVATION.

Chromalox is more than just a product manufacturer. Our suite of technologies enables new solutions to our customers' ever-increasing challenges. We don't just manufacture—we create. Here are the latest technological innovations from Chromalox.



XTREMEDUTY™

XtremeDuty™ technology is a suite of custom-engineered thermal solutions that feature engineering, material, and proprietary control technologies designed for the most extreme environmental and process conditions.

Products design, engineered, and manufactured with Chromalox® XtremeDuty™ technology carry the safety and security of stringent third-party certifications, and are subjected to intense performance and endurance testing through our in-house and partner test labs.

The benefits of XtremeDuty thermal solutions include:

- ▶ Low maintenance
- ▶ Superior performance
- ▶ Safe operation
- ▶ Corrosion resistance
- ▶ Faster startup
- ▶ Moisture resistance
- ▶ Hazardous area approved

POWER^V™

Power^V™ technology is an innovative Chromalox technology that leverages the benefits of higher voltage to provide increased efficiency and cost savings, while providing the benefits of zero emissions.

Power^V technology is available for Chromalox heat trace cable, industrial heaters and systems, and temperature and power control products.

Benefits of Chromalox® Power^V™ technology include:

- ▶ Decreased installation costs with fewer connection points and components. Increases efficiency by reducing energy losses I²R.
- ▶ Reduced infrastructure requirements with condensed product footprint and weight.
- ▶ Simplified, time-saving maintenance inspections.
- ▶ Clean operation with no regulatory compliance issues.

DRIMEG™

DriMeg™ technology encompasses a suite of advanced moisture control barriers, scientifically proven materials, proprietary manufacturing processes, and innovative control schemes that prevent, reduce, and eliminate moisture from electric heating elements. DriMeg technology enables end users problem-free startups and safe, worry-free operation while eliminating costly maintenance and downtime.

C2I™

C2I™ technology is an integrated intelligent network of advanced control technologies, component products, and systems from Chromalox that delivers superior system process integrity by utilizing exclusive control algorithms and engineered . C2i technology reduces both installation and operation costs while mitigating system risk and supporting process optimization.

Among the benefits of C2i technology are:

- ▶ Reduced operating costs with advanced, continuous condition monitoring.
- ▶ Lowered risk with proprietary control algorithms and engineered technologies.
- ▶ Decreased installation costs by minimizing material and labor content.
- ▶ Process optimization with developed control systems.

REDSAGE™

Drawing on more than 100 years of institutional learning, hundreds of thousands of designs on file, and leveraging industry-leading proprietary design software, Chromalox is able to provide best-in-class products with the most value and the shortest lead times.

We call this knowledge base RedSage™ Application Engineering Collective Intelligence System. It provides:

- ▶ Design modeling and simulation for research and development.
- ▶ Process and application design systems for estimating and quoting.
- ▶ Product life cycle management. Product design systems to speed engineering to production handoffs.



**UNRIVALED DESIGN. PRECISE ENGINEERING.
QUICK PROCUREMENT AND INSTALL.**

FRONT-END ENGINEERING DESIGN ASSISTANCE

With more experience than anyone else in the industry, our engineering support staff can help to properly specify equipment that will get the job done right the first time.

COMPREHENSIVE ENGINEERING CAPABILITIES

Our complete engineered systems reduce installation labor, reduce startup time, and ensure proper operation to specification. Chromalox provides engineering assistance by integrating our products into your application, offering a full range of engineering capabilities.

ACCESS TO UNMATCHED INVENTORY

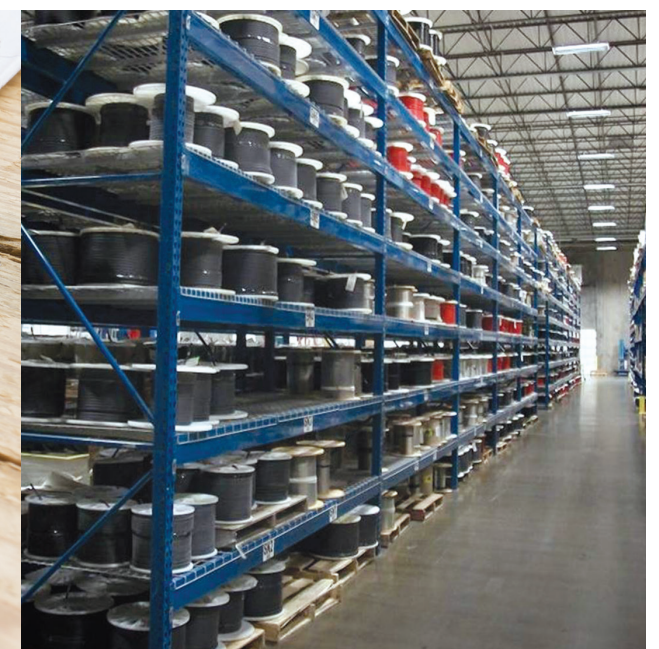
Chromalox maintains a complete inventory of heat trace cable, controls, and heat trace accessories. There are thousands of items in stock. We also operate the fastest delivery system in the business. We are capable of accepting orders for project-quantity volume and shipping the same or next day the order is received. Chromalox will not only help you select the right components for your equipment or electric thermal process, we will get you up and running and keep you up and running.

LEADING THE INDUSTRY

Chromalox maintains six state-of-the-art manufacturing plants throughout the world with more than 634,000 square feet (30,000 square meters) of manufacturing space. Our plants use automated machinery to ensure tightly controlled, repeatable quality standards. Our facilities are vertically integrated and also provide final assembly and functional testing. Chromalox maintains numerous global product and plant certifications.

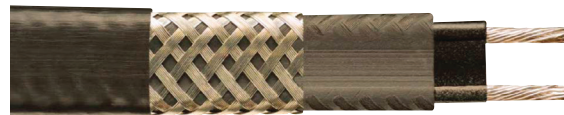
GLOBAL THIRD-PARTY APPROVALS

Decades of providing electric heating solutions for more process industries around the world than anyone else is the basis for meeting international certifications, codes, and standards. Our products have earned more global third-party approvals than any other company in our industry.



RELIABLE & EFFICIENT: SELF-REGULATING HEAT TRACE

Self-Regulating Heat Trace Cable provides safe, reliable for freeze protection and process maintenance of pipes, valves, and tanks in the most xtreme conditions.



APPLICATIONS

- ▶ Power generating plants – trace steam condensate lines and other chemical additive lines
- ▶ Refineries – maintain petroleum and by-products at process temperature
- ▶ Well pads – maintain temperature of steam piping for steam- assisted gravity drainage, and provide freeze protection and temperature maintenance of drilling mud distribution piping
- ▶ Chemical plants – maintain process temperatures of chemical raw materials and additives, and chemical cleaning agents
- ▶ Petrochemical plants – counteract heat loss from process equipment and piping through its insulation, prevent solution precipitation, prevent increase of product viscosity or solidification, and provide freeze protection
- ▶ Food processing plants – maintain viscosity of products in processes such as chocolate, oils, and tallow
- ▶ Wastewater treatment facilities – prevent the precipitation of NaOH from solutions
- ▶ Asphalt lines – prevent unacceptable viscosity increase or solidification
- ▶ Storage tanks – prevent freezing of contents and ensure products are stored at proper temperature
- ▶ Instrument and sample lines – maintain temperature and prevent freezing to ensure correct data analysis
- ▶ Division 1 and Division 2 hazardous location applications – maintain temperature of processes in a variety of hazardous and corrosive environments

CERTIFICATIONS AND APPROVALS

- ▶ ATEX/IECEX
 - ▶ EEx'e' for use in Zone 1 and 2 Hazardous Areas
- ▶ UL
 - ▶ Ordinary Area
- ▶ FM/CSA
 - ▶ Class 1 Div 1 & 2
- ▶ CE
- ▶ ABS
- ▶ KOSHA
- ▶ CQST
- ▶ Temperature Class T2C to T6

HEAT TRACES SPECS

- ▶ Circuit Lengths: Up to 750 ft (280m)
- ▶ Process Maintenance Temperature: Up to 302°F (150°C)
- ▶ Max 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, 208 - 277V

COST-EFFECTIVE & CAPABLE: HEAT TRACE CONNECTION ACCESSORIES

Chromalox offers a full line of connection kits and accessories that are 3rd party approved and are designed for fast, easy installation and safe, reliable operation.



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HEAT TRACE CONNECTION ACESORIES

- ▶ U Series (Div. 2 Hazardous for Self-Regulating and Constant Wattage Cables)
- ▶ HL Series (Div.1 Hazardous for Self-Regulating Cable)
- ▶ DL Series (Div. 2 Hazardous for Self-Regulating and Constant Wattage Cables)
- ▶ MI Series (Connection Accessories for MI Cables)
- ▶ EL Series (Heat Shrink Accessories for Ordinary Area Applications for Self-Regulating and Constant Wattage)

CUSTOM & COMPREHENSIVE: HEAT TRACE CONTROL, MONITORING, AND POWER DISTRIBUTION SKID PACKAGES

ITLS/ITAS, ITC, DTS, HEAT TRACE SKIDS

Chromalox is the only manufacturer of electric heat trace and heating systems that also offers a complete line of electric heat and process controls.



CHROMALOX ELECTRIC HEAT & PROCESS CONTROL CAPABILITIES

- Temperature and Process Control**
 - ▶ The IntelliTRACE Series is a micro-processor based Control/Monitoring and Power Management system for Ambient Sensing, Line Sensing or a combination of Line and Ambient Sensing Heat Trace Applications and is suitable for use in ordinary and hazardous areas.
- Power Control**
 - ▶ From simple mechanical contactors to advanced SCRs with full parameter diagnostics and safety features, zero cross and phase angle firing modes, electronic resettable fuses, a full complement of communication protocols, and powerful configuration software, Chromalox has the right design for your power control needs.
- Power Distribution Skid Systems**
 - ▶ Chromalox Heat Trace control skids integrate control and monitoring panels like the ITLS / ITAS series with a power distribution panel, and transformer on a rugged steel frame. These skid systems are prewired, designed to minimize required space and provide site contractors with plug and play installation. Simply land supply power wiring on the transformer and bring load wiring from the heat trace junction boxes to the internal heat trace power terminal strip. Skids can be customized to your specifications for area class, circuit count, footprint, and type of equipment included.
- Sensors**
 - ▶ RTD
 - ▶ J & K thermocouples
 - ▶ Bayonet thermocouples
 - ▶ Special-purpose sensors
 - ▶ Custom sensors



CERTIFICATIONS AND APPROVALS

- Certifications**
 - ▶ NEC
 - ▶ IEC
- Approvals**
 - ▶ UL
 - ▶ cUL
 - ▶ CE

INNOVATIVE SOLUTIONS: WIRELESS SENSING

Chromalox wireless temperature sensing solutions for Heat Trace provides a fully integrated wireless temperature sensing solution for Heat Trace applications in ordinary and hazardous areas.



SYSTEM

Wireless sensing can greatly reduce installation costs and more easily solve geographically and structurally challenging sensing applications. Chromalox provides fully integrated wireless temperature sensing solutions for heat trace applications in ordinary and hazardous areas. Whether you are designing a new heat trace system, expanding an existing one, or need to optimize your process and are considering wireless temperature sensing, the Chromalox® IntelliTRACE® ITLS and TAS heat trace control panels are an ideal choice.

SYSTEM COMPONENTS

- ▶ ITLS/ITAS Heat Trace Control panel with WirelessHART certified components.
- ▶ Rosemount® 248 Wireless Temperature Transmitter
- ▶ RTD Sensor



COMPREHENSIVE SERVICE & SUPPORT.

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. No one can maximize your investment with proper maintenance and assessment strategies better than Chromalox.



STARTUP AND COMMISSIONING

Minimize any chance for costly setbacks by having Chromalox qualified engineering on-site to startup and commission any system we have built, anywhere in the world. They will perform a complete review of the installed system to ensure optimized integration into your facility. You will save time and know your product was installed correctly.

EMERGENCY SERVICE

Emergency on-site service is also available when the situation demands it. That's why our service technicians are available 24x7 and will come to you anywhere in the world.

CHROMALOX COLD WEATHER CONTRACTS

To help you avoid unplanned downtimes that can occur due to cold weather, Chromalox offers a package of preseason planning and preventive maintenance services to ensure proper equipment operation before that cold weather strikes.

CHROMALOX SERVICE CONTRACTS

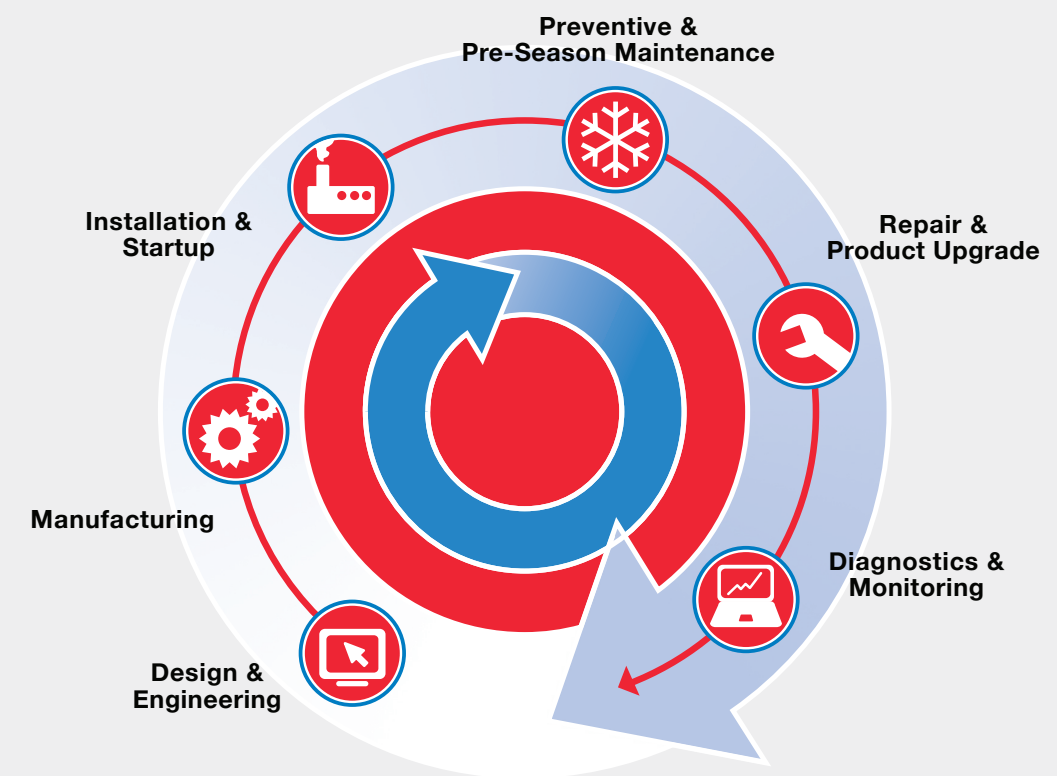
Chromalox Service Contracts deliver efficient emergency response and preventive maintenance, helping to eliminate problems before they arise.

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.

- ▶ FEED Study and Process Evaluation services
- ▶ Training
- ▶ Diagnostics and Troubleshooting

PRODUCT LIFE CYCLE



CHROMALOX WORLDWIDE LOCATIONS



- Sales Offices
- Manufacturing Facilities

Chromalox Headquarters

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www.chromalox.com

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email: sales@chromalox.com
www.chromalox.com

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