

**Chromalox**<sup>®</sup>  
PRECISION HEAT AND CONTROL

Highly Refined Heating Solutions for  
the Bio-Pharmaceutical Industry



BIO-PHARMACEUTICAL

# VALUE ADDED

## CHROMALOX HAS YOUR HEAT AND CONTROL SOLUTIONS

With the broadest product line in the industry, Chromalox provides precision heat and control systems for more processes than anyone in the world. We provide solutions for industries as diverse as transportation, petrochemical, power generation, the military, . . . and bio-pharmaceuticals.



### ASSURING YOUR PROCESS PERFORMANCE WITH CHROMALOX



#### The Chromalox Difference

Some companies build heaters and controls. Chromalox does more. We provide value-added heating solutions throughout bio-pharmaceutical plants.

The difference between these two approaches is the difference between uncertainty and assurance. It's the difference between having a supplier who just sells equipment and having a partner who can help you save time and money even before startup, who works with you to maximize process efficiency and minimize downtime, and who provides the field service and technical support to get the job done. That's value-added. And you get it from Chromalox.



## TECHNOLOGIES THAT REFLECT AN UNDERSTANDING OF BIO-PHARMACEUTICALS PROCESSING



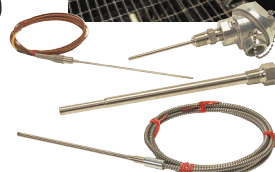
### Chromalox Understands Every Facet of the Process

From flanged immersion heaters for process water applications to self-regulating heat trace cable and controls that prevent overtemperature. From gas pre-heaters that provide a cost-effective means of pre-heating gases and gas mixtures used in bio-pharmaceutical processes to heat transfer fluid vaporizers for processes requiring high temperatures and low operating pressures. Our expertise, combined with the most stringent material and manufacturing standards you'll find in the industry, provides you with an array of products you can count on to perform at each critical process phase.



### Chromalox Meets Your Specific Challenges

With that kind of experience behind us, Chromalox understands the unique challenges that bioprocessing plant builders, managers, and maintenance personnel face. And we have the knowledge, experience base, local support, and technical skills to meet those challenges with you.



**CHROMALOX HAS A LONG HISTORY OF INNOVATION IN THE PROCESSING INDUSTRIES**

Chromalox has been developing better means of applying electrical heat for a variety of processing industries since 1915. That year, we introduced the world's first metal-sheathed heating element.

The growth of the biotechnology and pharmaceutical industries has been paralleled by the growth of another industry—bioprocessing. Chromalox understands the unique challenges of the processes involved in the creation and testing of bio-pharmaceutical products.

## Auxiliary Electric Steam Boilers

Chromalox auxiliary steam boilers can be placed anywhere steam is required and electricity is available. They are ideal for sterilization, jacketed reactors, or back-up for plant steam. They are simple to use, operate cleanly, and require minimal maintenance.



## Steam Superheaters

Chromalox circulation heaters also superheat steam, either for higher process temperatures or to clean the steam itself. Our smaller units also help make up line losses during transportation from central steam generation systems. High watt densities and operating temperatures are obtainable with Chromalox steam superheaters, thanks to the high quality of their INCOLOY® flanges and ASME-certified, INCOLOY® sheathes.



## Water and Oil Circulating Temperature Controllers

Chromalox microTHERM™ circulating water temperature controllers are compact, versatile, and completely self-contained water heating and cooling systems designed for precision temperature control of heating and cooling water circulation systems such as pipeline heating and tracing, and jacketed vessels and tanks. Built-in electronic temperature and process controller features separate PID algorithms for heat and cool control modes, dual display of setpoint and process temperatures, and simple configuration parameters with alphanumeric cues.



## Flanged Immersion Heaters

The stainless steel sheath elements and thermowells in our flanged immersion heaters are ideal for process water applications such as tank preheating or maintenance. A wide variety of ANSI and customized flanges are available, as are element lengths to 240 inches and ratings up to 500 kW. We can also rebuild large flanged heaters to reduce costs.



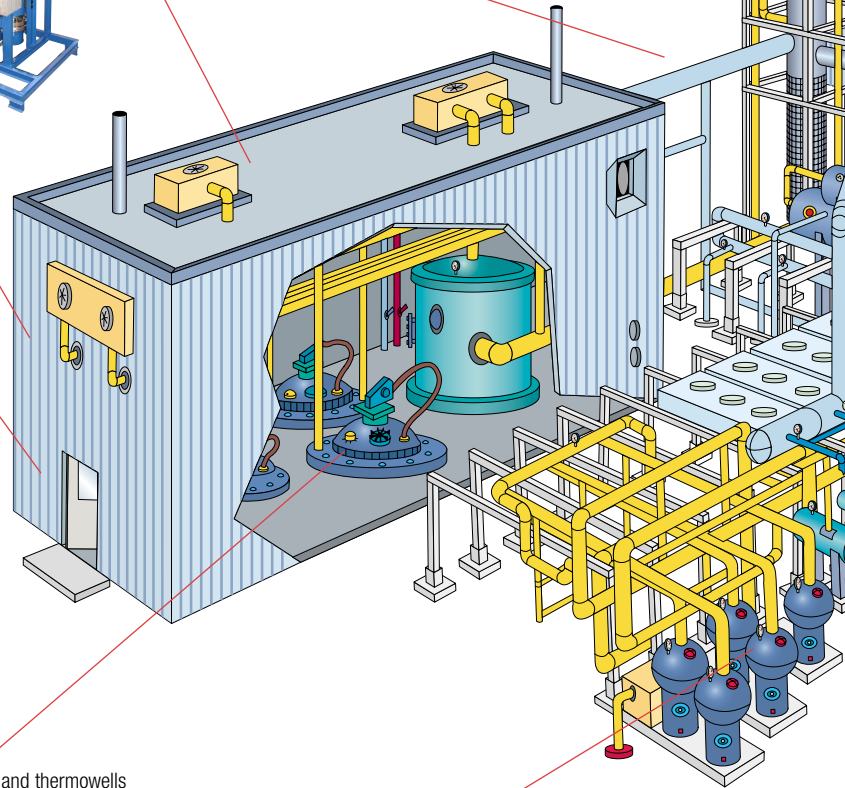
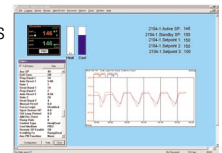
## Heat Trace Design Software

ChromaTrace 2.01 is electrical heat tracing systems design software that does IEEE-compliant calculations, provides a complete bill of materials, manages heat trace projects, and runs a variety of reports. It allows you to run "what ifs" to quickly find the most cost-effective solution. Product data sheets and manufacturers' cross-reference guidelines are provided on-screen for easy reference. And 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 processes-maintenance, with specific electrical loads in particular areas of the application.



## ChromaSoft™ Specview® Plus

This flexible, Windows®-based software is a simple solution for setup and data logging of Chromalox controllers with digital communications. It allows an operator to view and change any controller parameter from a remote computer. The operator can also monitor and record any controller parameter, logging data for future evaluation. An "Instrument View" is available that looks like the controller and displays the process variable and set point, and has functional pushbuttons. A "Trend Chart" utility enables the creation of a trend chart with multiple variables and scales on one or more charts on a single screen. Additional features include alarm monitoring and time stamping and a dynamic data exchange option.



## Circulation Heaters

Chromalox circulation heaters afford high-energy efficiency, fast heating, and uniform heat distribution for numerous plant heating applications. They also provide high turndown capability, tight outlet temperature control, and variable flow rates. And Chromalox offers a variety of electrical terminal enclosures to meet the unique requirements of bio-pharmaceutical facilities.



Windows is a registered trademark of Microsoft Corporation.  
INCOLOY® is a registered trademark of Inco Alloys International.

### Heat Trace Cable and Controls

Chromalox heat trace cable and controls can save energy and reduce maintenance as well as the risk of overtemperature in places like water injection and cooling modules. They provide reliable process temperature stability and freeze protection for pipes, valves, and tanks.

### Self-Regulating Heat Trace Cable

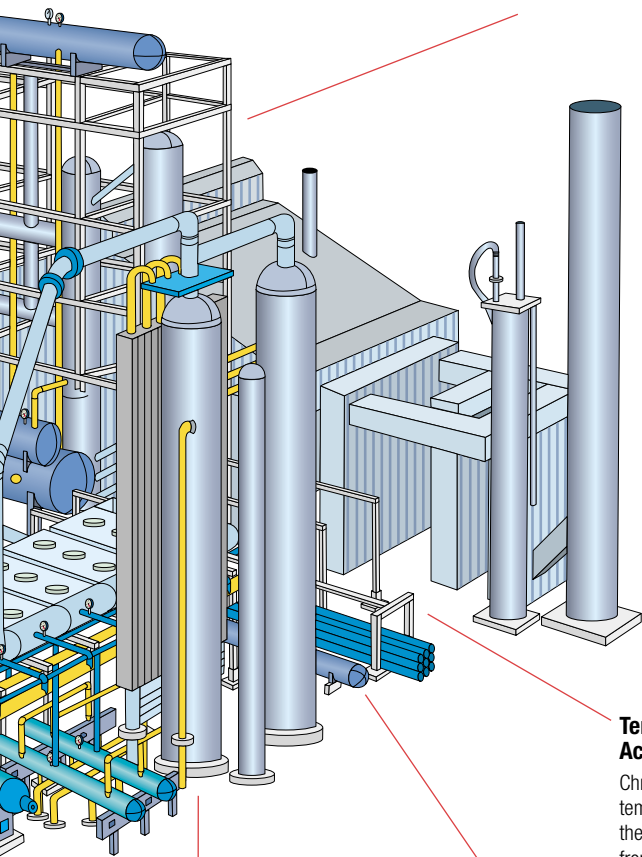
Provides reliability, is energy efficient, and permits single-layer overlapping to reduce risks of burnout. No. 16 AWG buss wires allow for long circuit lengths. Optional braiding provides groundpath while overcoat provides organic or inorganic chemical resistance. Also available exclusively from Chromalox is a high-temperature, small diameter cable that is ideally suited for tracing smaller-diameter instrument tubing and pipe.

### Constant Wattage Cable

Provides constant heat output to 350°F. Rugged construction can withstand steam cleaning while de-energized. Optional tinned-copper braid permits use in some hazardous areas. Fluoropolymer jackets available for corrosive applications. Can be cut to maximum circuit length.

### Mineral Insulated Cable

Ideal for the most rugged pipe tracing applications to 1,200°F. INCOLOY® or copper sheath materials resist damage, are fire resistant, and provide for good electrical ground. Custom configurations available with single- or dual-conductor cable. Chromalox mineral insulated cable is fire-resistant and does not support combustion. It also provides reliable electrical ground for safe operation.



### IntelliTRACE™ Controls

A complete control solution for heat trace applications with a modular design for selection of only the features needed for specific heat trace installations, minimizing the purchase price and simplifying system configuration. Single-channel system using microprocessor-based control. Comes completely pre-wired and assembled. Easily programmed standard features further simplifies installation, startup, and use. Each unit comes in a NEMA 4X glass-fiber-reinforced enclosure with a current transformer to measure operating current. Optional GFI modules have a shutdown contactor and illuminated reset switch. A terminal block is used for field connections on all units.

### Custom Power Control Panels

Panels engineered with solid-state controls built to the most rigid standards and sized for virtually any application or specification. Select from many NEMA-type enclosures, single- or three-phase load requirements, voltages, transformers, fusing, firing cards, and more. We can design the power control panel best-suited for your specific application.

### Temperature Controls, Sensors, and Accessories

Chromalox has the thermocouple sensors, electronic PID temperature controls, and SCR power panels to minimize the possibility of heater damage from operation during overtemperature conditions.



### Vaporizers

Heat transfer fluid vaporizers are suited for processes requiring high temperatures and low operating pressures. They transfer more heat energy per pound of heat transfer medium than comparable liquid phase systems.



### Gas Pre-Heaters

Chromalox gas pre-heaters provide a cost-effective means for pre-heating gases and gas mixtures used in bio-pharmaceutical processes. In addition to standard stainless steel enclosures, moisture- and explosion-resistant enclosures are also available. Sturdy INCOLOY® sheath elements permit higher watt densities and operating temperatures. Use of thermocouple sensors, electronic PID temperature controls, and SCR panels provide precise control of gas temperatures.

- Capital equipment can represent as much as 40 percent of a new bioprocessing facility. Whether you are designing a pilot plant or looking for production-scale bioprocessing equipment, Chromalox can help you optimize your ancillary equipment to keep your total installed costs to a minimum. Our equipment is used as part of the basic support equipment for
- Purified gas and air delivery
  - Purified water
  - Chemical delivery
  - Steam and gas injection systems
  - Control equipment for monitoring and logging process temperatures
  - Reactor process control
  - Fermenter temperature maintenance

# VALUE ADDED

**LOCAL TECHNICAL SUPPORT, CUSTOM DESIGN**

The industry's largest and most experienced group of engineers are right there in the field with you. The majority of our 300+ field sales representatives are degreed engineers, and all are experienced with 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.

## ADDING VALUE WITH UNRIVALED DESIGN CAPABILITIES, SERVICE, AND SUPPORT



### Chromalox Can Save You Time and Money Even Before Startup

#### Lower maintenance and installation expenses

Chromalox electric process heaters require minimal cleaning and calibration. Our standardized designs reduce your installed cost as well as your eventual replacement cost. From heater assemblies and skid fabrication to integration with controls and sensors, our complete engineered systems reduce installation labor, reduce startup time, and ensure proper operation to specifications.

#### Reduced insurance premiums

Using Chromalox ASME- and FM-certified electric package systems may result in lower insurance premiums for you—lower than those offered to competitors using fuel-fired boiler systems.

#### Broadest third-party approval

Chromalox is the only manufacturer with extensive systems manufacturing in the U.S. and Europe. Approvals and certifications include, but are not limited to, CE, NEC, UL, VDE, cUL, FM, CSA, MSHA, BASEEFA, Cenelec, ASME, PED, ATEX, GOST, and ISO9000.

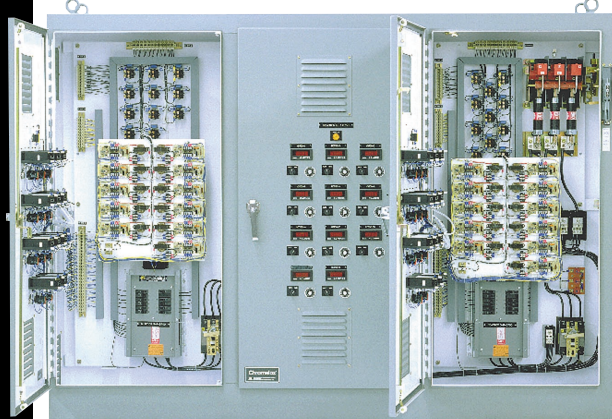
#### Lower training costs

Our in-house engineering and software capabilities allow us to design simple operator interfaces. These advanced designs can reduce your business' training time and expense, as well as increase repeatable operation. In addition, Chromalox has available training tools and resources to assist you in installation, startup, and operation.

### Chromalox Can Improve Your Process Efficiency

#### Custom design for special needs

Chromalox can design heating solutions for any spatial requirement you might face. Our engineers will custom-design the right product to meet your unique application needs. If an element, sensor, control, or packaged system that we carry in stock doesn't exactly fit your needs, we'll custom-build it—either by expertly adapting an existing product or by designing and manufacturing a completely new one. We are responsive partners, eager to help you produce prototypes for new products and systems. With our experienced design engineers and extensive manufacturing capabilities, we'll work with you to develop innovative designs in the shortest possible turnaround times.



### Reducing process variation

Control panels coupled with heaters optimize temperature control and shrink variations in efficiencies, allowing a better burn.

### Flattening out electrical fluctuations

Chromalox power controls, SCRs, and proprietary software precisely sequence heaters, balance electrical loads, control soft starts, and correct power factors.

### Chromalox Can Help Minimize Your Downtime

#### Quick parts replacement

Chromalox maintains vast inventories of repair and replacement parts for immediate shipment and same-day or next-day delivery. Our toll-free service line can answer your questions quickly at 1-800-368-2493.

#### Tightening process control with enhanced diagnostics

Chromalox offers proprietary controls and software for shorted SCRs, ground fault, current monitoring, partial load failure detection, and other failure modes. These provide process controls and alarms that protect your processes and equipment.

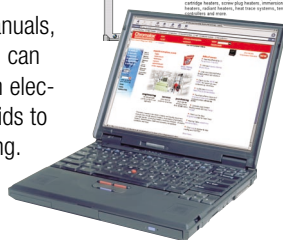
#### Support marked by prompt, expert troubleshooting

In addition to information available in product literature and at our website, factory and local engineers can offer answers that return your equipment to service quickly. Call 1-800-443-2640 for the representative closest to you. Or visit chromalox.com.

### Technical Assistance on the Internet at [www.chromalox.com](http://www.chromalox.com)

#### Answering your questions 24 hours a day, 7 days a week

This website offers product specs, training manuals, and technical documentation day or night. You can find answers to questions about anything from electronic temperature controllers, pumps, and fluids to material compatibility, corrosion, and wire sizing.



# VALUE ADDED

## 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 [chromalox.com](http://chromalox.com) electronic direct order entry system.

Same-day delivery is available for many items. In addition, factory offices, stocking representatives, and over 2,000 authorized distributors carry Chromalox systems and components for same-day pickup.

# Chromalox Value-Added Products and Services Are Available Worldwide

## Worldwide Customer Service

Argentina	Ecuador	Iran	Puerto Rico
Australia	Egypt	Israel	R.O.C. (Taiwan)
Austria	El Salvador	Japan	Russia
Belgium	England	Korea	Saudi Arabia
Bolivia	France	Kuwait	Singapore
Brazil	Germany	Lebanon	Sweden
Canada	Greece	Malaysia	Switzerland
Chile	Guatemala	Mexico	Thailand
China	Honduras	Netherlands	Turkey
Colombia	Hong Kong	Nicaragua	United Arab Emirates
Costa Rica	Iceland	Norway	United States
Dominican Republic	India	Pakistan	Venezuela
	Indonesia	Peru	

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