

Packaged Systems Overview

- Heat Transfer Systems
- Large Tank Immersion Heaters
- Steam and Hot Water Boilers
- Air Handlers and Load Banks

Applications

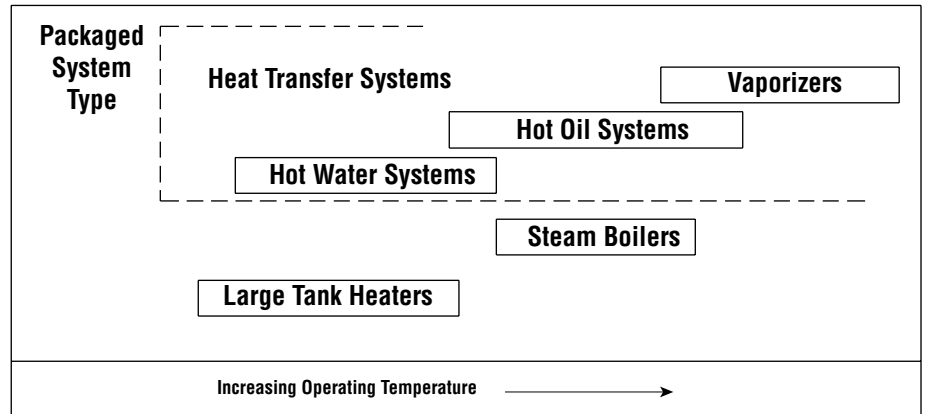
Chromalox Packaged Systems are safe, versatile and easy to use heating systems for commercial and industrial applications. Pre-engineered and constructed with carefully matched components, the systems provide easy installation and trouble-free operation in the end user's application.

Heat Transfer Systems — Chromalox Packaged Heat Transfer Systems come complete with integral controls and can be used to heat and pump hot or cold fluids such as water, water-glycol solutions and a wide variety of heat transfer fluids including Dowtherm®, Therminol® and Syltherm® 800. Optional cooling modules are available.

Large Tank Heating Systems — Chromalox Packaged Large Tank Heating Systems are uniquely designed to heat large storage tanks located above or below ground and containing highly viscous fluids or heat sensitive materials.

Steam & Hot Water Boilers — Chromalox Packaged Electric Steam and Hot Water Boilers are safe and versatile heat sources that produce low or high pressure steam or hot water for commercial and industrial processes and for comfort heating applications. Chromalox electric boilers can be used anywhere steam is required and electric power is available. They are packaged units that operate from existing distribution voltages, making installation simple.

Air Handlers — Chromalox Air Temperature Control Systems provide durable, accurate temperature control for large capacity temporary heating applications. Welded steel construction, tubular elements, and industrial fan offer superior durability and performance under heavy usage and rough environments.



Load Banks — Chromalox Load Banks provide durable, precise energy control for applications requiring from 1 kW to megawatt power capacity. Stainless steel construction and INCOLOY tubular elements offer superior durability and performance even with heavy usage and in extreme environments.

Application Engineering

The Chromalox sales and service organization has the technical capabilities and equipment to satisfy virtually any heating or heating and cooling requirement. To assist you in calculating requirements for the more common process applications, we use three computerized heat loss programs:

- Platen Mold and Die Heating Calculations
- Jacketed Vessel Heating Calculations
- Roll Heating Calculations.

All work is performed in the strictest confidence. The Chromalox organization is the most experienced and diversified manufacturer in the electric heating business. Whatever your heating requirements, you can depend on the technical know-how of your Chromalox field representatives. Backed by highly skilled engineers and modern manufacturing facilities, Chromalox field sales engineers can help determine your requirements and provide you with high quality equipment, properly selected, sized and applied.

Note — The Chromalox sales organization can provide its customers with heat loss calculations, design layouts and equipment recommendations as a courtesy and on a no-charge basis. Neither Chromalox or its factory representatives assume any liability for the final selection, suitability or performance of the heating equipment in the end application, except as defined in our published equipment warranty at the back of this catalog.

Standards & Specials

Chromalox has many standard and stock units which will fit many of the more common heating applications. However, Chromalox customers are not limited to "Standards". Chromalox specializes in designing systems to match specific process requirements and a special system designed for your unique application. Some of the more common special requirements include special ratings, sizes and configurations such as a multiple zone systems where each zone is an independent system of heating and cooling sections mounted on a common base.

Hundreds of other options are available including solid state temperature controllers with proportional or relay output, solid state sequencers, timers, alarms, solid state power controllers (SCR's), recorders, programmable controllers or recorders with digital communications linked to your computer or distributed process system (DPS).

Heat Transfer Systems

Application & Selection Guidelines

- Indirect Heating
- Packaged Systems
- Water and Water/Glycol Systems
- Non-Pressurized and Pressurized Heat Transfer Systems
- Vaporizers

Applications

Chromalox Heat Transfer Systems are used in process heating applications requiring closely controlled process temperatures. Systems are furnished complete with heaters, controls, pumps, valves and necessary plumbing and are used with:

Jacketed Vessels and Tanks — containing waxes, paraffin, exotic chemicals including those having exothermic reactions, hot melt adhesives, resins, varnishes, paints, dyestuffs, molasses, vegetable oils and many other chemical or petrochemical products.

Heated Rolls — for coating paper and paper products, spot carbonizing, vinyl bonding, bonding with hot melt adhesives, calendaring and laminating.

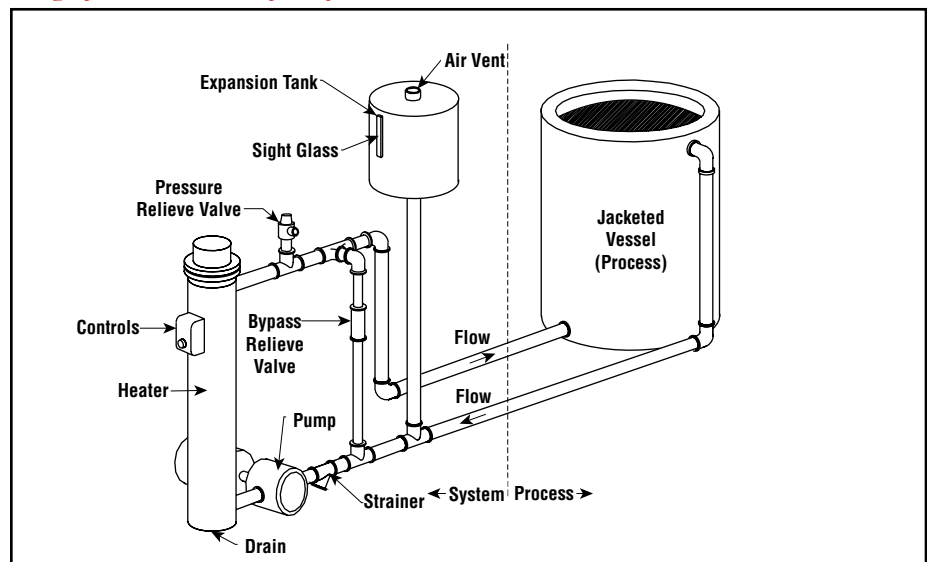
Heat Exchangers — for corrosive and noncorrosive fluids.

Platens, Dies and Molds — for laminating wood and plastics, forming of carbon products, epoxy materials and Fiberglas®, plastics extrusion, injection molding, molding rubber and plastic materials: vinyl bonding and bonding with hot melt adhesives.

Pipeline Tracing — of viscous materials such as paints, fuel oils, asphalt and many other chemical and petrochemical products for anti-freeze protection and/or maintaining pumping temperatures.

Industrial Systems — such as snow melting, comfort heating and hot water supply and as standby equipment for industrial and commercial applications in case the supply of other fuels is curtailed.

Simplified Heat Transfer System



Selection Guidelines

Chromalox Packaged Heat Transfer Systems can supply from 4 to 600 kW of heat energy at up to 750°F operating temperatures. The package selection is usually based on the operating temperature of the heated process (tank, rolls, platens, molds) and the heat energy requirements (kW) to maintain that temperature. Consult the Technical section to calculate the heat energy requirements or contact the nearest Chromalox Sales office for assistance.

When temperature and energy requirements are known, the recommended model of packaged heat transfer system can be estimated from the following Selection Guidelines. Further definitions and specifications follow on the next page.

Heat Transfer Systems

Application Data

Heat Transfer Systems can be categorized (grouped) by the type of fluid used in transferring the heat to the process. Water and Water/Glycol systems can be used for temperatures up to 300°F. Special heat transfer fluids and oils can operate up to 750°F and the fluid vaporizer systems utilize vapor phase heat energy to give a higher heat of 750°F with lower operating pressures (150 psig).

The Reference Guidelines and General Specifications give more information to help your selection. Detailed product information appears in the following pages.

Benefits & Advantages

Reliable and Proven Designs — Backed by 100 years of engineering and manufacturing of electric heating equipment, Chromalox electric fluid heat transfer systems are safe, versatile and easy to use, pre-engineered heating or heating and cooling systems which operate at existing distribution voltages (208 - 600 Volts).

Safe and Reliable Electrical Wiring — All wiring complies with the National Electrical Code.

Heat Transfer Systems — Reference Guidelines

Heat Transfer Fluid	Operating Pressure (psig)	Operating Temp. (°F)	Maximum kW ¹	Model	Page
Water	Atmospheric	300	48	CMX	D-5
	Atmospheric	250	800	MWS	D-6
	Atmospheric	250	800	MWSS	D-9
	Atmospheric	250	600	CWG	D-12
Oil	Atmospheric	550	24	CMXO	D-14
	Atmospheric	650	500	MOS	D-15
	Atmospheric	650	400	COS-B	D-18
	Atmospheric	600	600	PFC	D-20
Oil/Pressurized	200	750	600	CLS-A	D-22
System Options					D-24
Vapor	50	750	300	CHTV	D-28

1. Higher kW ratings available. Contact your Local Chromalox Sales office.

Heater Burnout Protection — Every heating chamber has an overtemperature cutout which will de-energize the heater in case of an overtemperature condition.

Matched Components — All Chromalox standard and special systems are pre-engineered with correctly sized and matched components such as pumping rate versus pipe line size, amperage draw versus electrical parts to ensure total system performance.

Optional Controls — All Chromalox heat transfer systems are available with the latest state-of-the-art solid state controls. These include micro-processor-based, recording and SCR power controllers that can control fluid temperatures to ± 1°F. For a complete selection of optional controls refer to the Controls section.

HEAT TRANSFER

Heat Transfer Systems — General Specifications

Model	System Type	Application	Operating Temp. (°F)	kW ²	Mbh ⁴	Max. Operating Pressure	ASME	Pressure Rating & Construction	Connection Type
CMX	Mold Temperature Controller	Water/Glycol	50 - 250 ¹	4.5 - 48	15.3 - 81.8	Atmospheric	N/A ³	125 Lb. Threaded	NPT
MWS	Heat Transfer Non-Pressurized	Water/Glycol	50 - 800	50 - 800	307 - 2,047	Atmospheric	Optional	150 Lb. Welded	Flanged
MWSS ⁶	Heat Transfer Non-Pressurized	Water/Glycol	50 - 800	50 - 800	307 - 2,047	Atmospheric	Optional	150 Lb. Welded	Flanged
CWG	Heat Transfer Non-Pressurized	Water/Glycol	50 - 250 ¹	6 - 600	20.5 - 2,047	Atmospheric	Optional	150 Lb. Welded	Flanged
CMXO	Heat Transfer Non-Pressurized	Heat Transfer Fluid/Oil	50 - 550	6 - 24	20.4 - 81.9	Atmospheric	N/A ³	125 Lb. Welded	NPT
MOS	Heat Transfer Non-Pressurized	Heat Transfer Fluid/Oil	50 - 650	50 - 500	171-512	Atmospheric	Optional	150 Lb. Welded	150 Lb. Flanged
COS	Heat Transfer Non-Pressurized	Heat Transfer Fluid/Oil	50 - 650	9 - 400	30.7 - 1,365	Atmospheric	Optional	150 Lb. Welded	150 Lb. Flanged
PFC	Heat Transfer Non-Pressurized	Heat Transfer Fluid/Oil	50 - 600	9 - 600	30.7 - 2,047	Atmospheric	Optional	150 Lb. Welded	150 Lb. Flanged
CLS	Heat Transfer Pressurized	Syltherm® 800	100 - 750	9 - 600	30.7 - 2,047	200 psig	Standard	300 Lb. Welded	300 Lb. Flanged
CHTV	Heat Transfer Vaporizer	Dowtherm® Therminol®	-20 - 750	15 - 300	51.2 - 1,024	150 psig	Standard	300 Lb. Welded	300 Lb. Flanged

1. Indicates standard models. Models available in other configurations.
2. Indicates standard design kW. Higher kW ratings available.
3. N/A indicates not available or not applicable.
4. Mbh is the ASME & ANSI standard for one thousand British Thermal Units per hour.
5. Similar to MWS, but all stainless steel construction

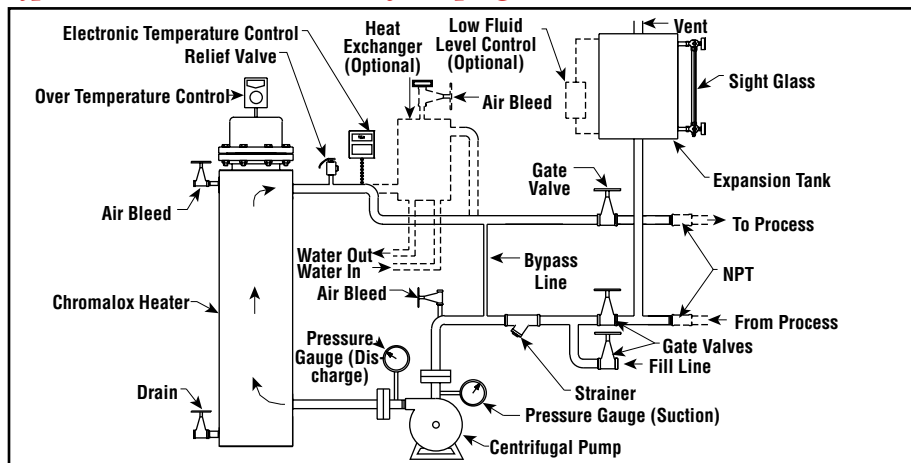
Other Notes — Use these selection guidelines as a reference to the availability of Chromalox Packaged Heat Transfer and Large Tank Heater Systems. If you cannot find a system with all of the features required for your application, contact your Local Chromalox Sales office.

Water Systems Technical & Application Data

- Water and Water/Glycol Solutions to 250°F
- 4.5 - 800 kW (15 - 2,047 Mbh)
- 120 - 600 V, Three Phase
- Heavy Duty 0.475 Copper Elements
- Cast Iron Bronze or Stainless Fitted Centrifugal Pumps
- Electronic Digital Temperature and Process Controls
- NEMA 1 Electrical Enclosure (STD) - NEMA 4 and 12 Explosion Resistant
- Integral Power Panels with Mechanical Contactors or SCR Power Control
- Optional Pressure Relief Valve
- ASME Section VIII Certification Available
- Optional Open or Closed-Loop Cooling Modules
- Optional Expansion Tank

Note — Mbh is ASME & ANSI standard for one thousand British Thermal Units per hour.

Typical CWG Water Heat Transfer Piping Schematic



Applications

Chromalox Water Heat Transfer Systems are used in process heating applications requiring closely controlled process temperatures. Systems are furnished complete with heaters, controls, pumps, valves, safety devices and necessary plumbing. They are used with injection molding machines and equipment, jacketed vessels, pipelines, heat tracing and other industrial or commercial processes. Water heat transfer systems can be used for special comfort heating applications.

Advantages

The primary advantage of using water as the heat transfer fluid is its low cost and availability. Water has a high specific heat and is an excellent heat transfer medium. In addition, water usually requires no special handling or disposal procedures.

Heating & Cooling Simplicity

Heating water is relatively simple and straight forward. Cooling can be incorporated into most water heat transfer applications by the simple addition of either open-loop or closed-loop cooling.

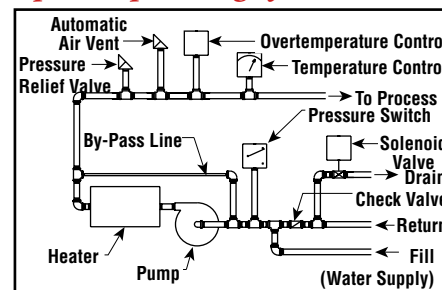
Open-Loop Cooling is the least expensive and the easiest to install. It requires makeup water during the cooling cycle which may be a disadvantage in locations with a limited water supply, or hard water.

Closed-Loop Cooling is usually more expensive initially than open-loop cooling, but has the advantage of reusing and conserving water. A cooling tower or refrigerated system is recommended.

Cooling Options

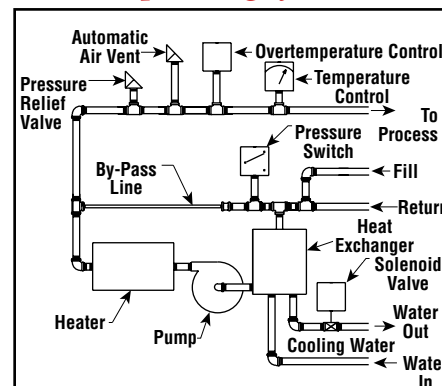
In open-loop cooling, hot water is circulated normally in the closed loop of the process piping. When the temperature of the fluid rises over the controller setpoint, an automatic solenoid valve opens allowing cool water to be injected into the process loop from the primary water supply. Excess hot water is discharged to the drain.

Open-Loop Cooling System



Closed-loop cooling uses a heat exchanger with water from a cooling tower or refrigerated system. Water is recirculated and conserved. No water is discharged down the drain.

Closed-Loop Cooling System



microTHERM[®]

CMX

Water Circulating Temperature Controller

- Water and Water/Glycol Solutions to 250°F
- 4.5 - 24 kW (15 - 82 Mbh)
- 240 and 480V, 3 Phase, 60 Hz
- 125 Lb Carbon Steel Construction
- Heavy Duty 0.430" Dia. INCOLOY[®] Sheath Elements
- 3/4 HP Cast Iron Bronze Fitted Centrifugal Pump (30 gpm @ 20 psi TDH)
- Electronic PID Temperature and Process Control (Dual Display)
- Built-in Diagnostics with Indicators for Pump Overload, Low Water Pressure and Overtemperature
- Compact, Portable Cabinet with Casters
- Features Easy Access Service
- NEMA 1 Electrical Enclosure with 120V Control Transformer
- Dual Pressure Gauges Monitor Pressure To and From Process
- Open or Closed-Loop Cooling (3.8 Ft² Heat Exchanger)
- Automatic Air Purge Valve
- Large Diameter (1-1/2" NPT) Process Piping Connections
- ASME 125 psig Relief Valve

Applications

Chromalox microTHERM™ CMX Series Circulating Water Temperature Controllers are compact, versatile and completely self-contained water heating and cooling systems. The CMX series products can be used in any application where precision temperature control of a heating and cooling water circulation system is needed. They are particularly useful in the plastics industry as mold temperature controllers.

- Injection Molding Machines — Thermoplastics and Thermosets
- Platens and Dies
- Rolls, Laminating and Calendering
- Pipeline Heating and Tracing
- Jacketed Vessels and Tanks

The 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. Even though microTHERM™ systems are sophisticated and state of the art, they are easy to use and require very little training to program and operate. Standard NPT threaded piping connections provide for convenient hook up to external piping.



Options

- **Alternate Voltages** available for 208 and 575V, 3 Phase, 60 Hz, and 240, 380 and 415V, 3 Phase, 50 Hz distribution systems
- **Alternate Pumps** rated 1.5, 3, 5 or 7.5 hp with pumping capacities to 80 gpm @ 70 psi TDH
- **Power Controllers** — Electronic Solid State (SCR)
- Surge Reduction Valve
- Digital Communication Interface
- Expanded Open or Closed-loop Cooling
- High Temperature Operation to 275°F
- Electrical Enclosure Door Interlock

HEAT TRANSFER

Specifications and Ordering Information

kW	Volts	Phase	Pump Motor (HP)	DIM (In.)			Cooling Type	Model	Stock	Part Number	Wt. (Lbs.)
				H	W	D					
4.5	240	3	3/4	29	15	25	Open Loop	CMX-250-4	NS	307418-032	200
4.5	480	3	3/4	29	15	25	Open Loop	CMX-250-4	NS	307418-033	200
4.5	240	3	3/4	29	15	25	Closed Loop	CMX-250-4C	NS	307418-042	215
4.5	480	3	3/4	29	15	25	Closed Loop	CMX-250-4C	NS	307418-043	215
9	240	3	3/4	29	15	25	Open Loop	CMX-250-9	NS	307418-034	200
9	480	3	3/4	29	15	25	Open Loop	CMX-250-9	S	307418-035	200
9	240	3	3/4	29	15	25	Closed Loop	CMX-250-9C	NS	307418-044	215
9	480	3	3/4	29	15	25	Closed Loop	CMX-250-9C	S	307418-045	215
12	240	3	3/4	29	15	25	Open Loop	CMX-250-12	NS	307418-036	200
12	480	3	3/4	29	15	25	Open Loop	CMX-250-12	S	307418-037	200
12	240	3	3/4	29	15	25	Closed Loop	CMX-250-12C	NS	307418-046	215
12	480	3	3/4	29	15	25	Closed Loop	CMX-250-12C	S	307418-047	215
18	240	3	3/4	29	15	25	Open Loop	CMX-250-18	NS	307418-038	200
18	480	3	3/4	29	15	25	Open Loop	CMX-250-18	S	307418-039	200
18	240	3	3/4	29	15	25	Closed Loop	CMX-250-18C	NS	307418-048	215
18	480	3	3/4	29	15	25	Closed Loop	CMX-250-18C	S	307418-049	215
24	240	3	3/4	29	15	25	Open Loop	CMX-250-24	NS	307418-040	200
24	480	3	3/4	29	15	25	Open Loop	CMX-250-24	S	307418-041	200
24	240	3	3/4	29	15	25	Closed Loop	CMX-250-24C	NS	307418-050	215
24	480	3	3/4	29	15	25	Closed Loop	CMX-250-24C	S	307418-051	215
36	480	3	3/4	29	15	25	N/A	CMX-250-36H	NS	307418-052	215
48	480	3	3/4	29	15	25	N/A	CMX-250-48H	S	307418-053	215

Stock Status: S = stock NS = non-stock
To Order—Specify model, volts, phase, kW, PCN, options and quantity.

"Under the U.S. Federal Safe Drinking Water Act, it is unlawful to install or use this product in any service that comes into contact with water for human consumption (including drinking, food or beverage preparation, hand washing, or teeth brushing). This product is intended exclusively for use in non-potable service."

MWS

Water and Water/Glycol System

- Heat Water and Water/Glycol Solutions to 300°F (150°C)
- 50 - 800 kW
- 240 V, 480 V and 600 V, 3 -Phase, 60 Hz
- Compact Footprint for Installation
- 150# Welded Steel Construction
- Long Life 0.475 in. (12.1 mm) dia. Copper Sheath Heating Elements
- High Temperature Centrifugal Pump - rated to 300°F (150°C)
- Electronic Digital Temperature and Process Control
- Discharge Pressure Gauge
- UL NEMA 12 Electrical Enclosure Complete with Contactors, Temperature Safety Limit, Transformers and Pilot Light(s)
- External Cold Expansion Tank (Optional)
- External Heat Exchanger (Optional)



Description

Chromalox MWS - Mid-Size Water/Glycol System - is engineered to operate to 300°F (150°C) with either water or water/glycol fluids. Its electric heating core assures responsive and precise temperature control in a space saving package. The system is suitable for a large range of heating needs with a compact design. The MWS operates in a closed loop system using a cold expansion tank (optional).

Applications

Chromalox MWS system is great for applications such as reactors, evaporators, dryers, platen presses, heat exchangers, roll heating, or any jacketed kettles / vessels / tanks.

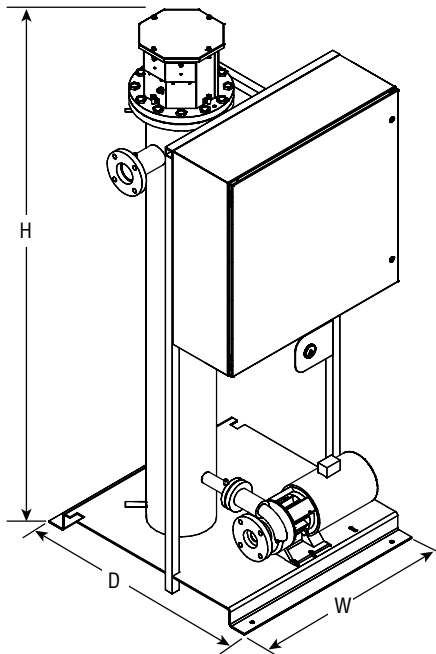
Hot water systems can be used in a variety of industries such as chemical, plastics, cosmetics, automotive, rubber, refining, pharmaceutical, non-woven / textiles/ fibers, aerospace, or any other industrial market.

Construction

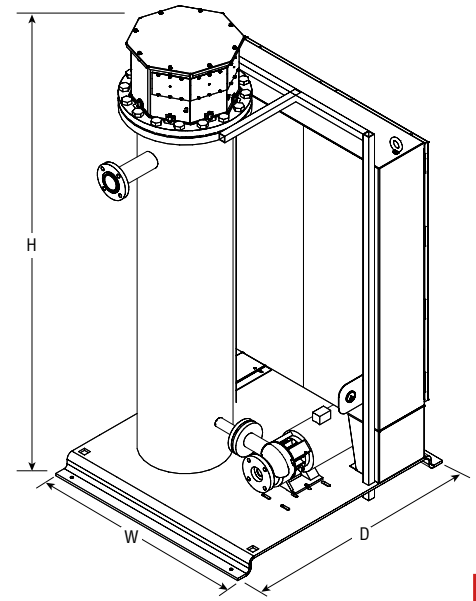
Chromalox MWS systems are ruggedly constructed for industrial applications. The heavy-duty, steel support base features channel grooves for forklift transport. The heater chamber is fully welded and houses Chromalox brand, long-lasting heating elements. The panel is fully UL-listed and assembled in-house. The pump is air-cooled with a mechanical seal, rated to 300°F (150°C). The final assembly is fully-shop tested prior to shipment.

WARNING — In hazardous areas, pipe surfaces could achieve temperatures high enough to cause auto-ignition of the hazardous material present. Consult Article 500 of the National Electric Code for further information on the maximum allowable temperature for a specific application.

MWS Water and Water/Glycol System *(cont'd.)*



**MWS 50-250 kW Unit
(Front View)**



**MWS 300-600 kW Unit
(Rear View)**

HEAT TRANSFER

Options

- Electronic Solid State (SCR) Trim Power Control
- Strainer
- Powder Coated or Stainless Steel Side Coverings
- Dedicated Fill Connection
- NEMA 4 or 4X (Stainless) Construction
- Class 1, Div 2 Hazardous Area Rating (with purge)
- Panel Disconnect Switch
- Heater On/Off Switch
- Suction Pressure Gauge
- Inlet / Outlet 150# Gate Valves
- Drain / Bleed Valves
- Digital Overtemperature Controller
- Relief Valve
- ASME Design & Certified, Section VIII, for 100 psi (7 bar) at 300°F (150°C)
- High Flow Pump (300 GPM, 450-800 kW only)
- Heat Exchanger (shipped loose for customer installation)
- Expansion Tank (shipped loose for customer installation)
- Liquid Level Switch for Expansion Tank

Unit Proportions

Unit Size	Weight (Lbs.)	Width (In.)	Depth (In.)	Height (In.)	Flow Rate ¹ GPM	Pressure ¹ TDH	Motor HP	Inlet/Outlet Connection	System Capacity (Gal.)
50 - 150 kW	900	36	42	96	60	100	3	2", 150#	25
175 - 250 kW	1400	36	42	96	120	100	5	3", 150#	35
300 - 400 kW	2000	48	54	96	200	100	10	3", 150#	55
450 - 600 kW	2600	48	54	96	200 ²	100 ²	10 ²	3", 150# ²	65
650 - 800 kW	3600	61	54	99	200 ²	100 ²	10 ²	3", 150# ²	85

¹ Refer to Pump Graph in instruction manual for full operating range.

² Option for 300 GPM 15 HP pump with 4", 150# inlet/outlet.

Standard Features

Electronic Process Control..... Precise process control
 Element Overtemperature Protection Protect elements and fluid from overheating
 Air-Cooled Mechanical Seal..... No external cooling needed
 Insulated Heating Chamber..... Maximize efficiency by minimizing heat loss
 Discharge Pressure Gauge..... Confirm pump operating performance
 Compact Footprint Space saving design
 Fully Pre-wired & Tested Ready to operate on site
 Centrifugal Pump Minimize piping configuration
 Temperature rating to 300°F (150°C)..... Covers most applications
 150# ANSI Flange Connection..... Easy fit up to installed piping
 Start / Stop buttons with Motor Starter..... Complete operating system
 Pilot Lights for Power, Heater, & Pump..... Visual indication of system operation

Benefits

MWS

Water and Water/Glycol System (cont'd.)

Ordering Information

To Order — Complete the Model Number using the Matrix provided.

MWS Mid-Size Water and Water Glycol System							
Code	Unit Temperature Rating ¹						
300	300°F (150°C)						
Code	Kilowatts						
50	50 kW	150	150 kW	300	300 kW	550	500 kW
75	75 kW	175	175 kW	350	350 kW	600	600 kW
100	100 kW	200	200 kW	400	400 kW	800	800 kW
125	125 kW	250	250 kW	500	500 kW		
Code	Enclosure Types						
E1	General Purpose						
E4	Moisture Resistant						
E4X	Moisture / Corrosion Resistant (Stainless Steel)						
E4NP	Class 1, Div 2 rating - Nitrogen Purge (by customer)						
Code	Option						
(Blank)	No Options						
ST	SCR Trim						
SR	Strainer ²						
GV	I/O Gate Valves ²						
FC	Dedicated Fill Connection ²						
DB	Drain / Bleed Valves						
PD	Panel Disconnect						
HW	Heater On/Off Switch						
SG	Suction Pressure Gauge						
DT	Digital Overtemp Control						
SV	Safety Relief Valve - 125psi						
PC	Power Coated Skins						
SS	Stainless Skins						
AE	ASME Designed & Certified						
HF	300 GPM Pump ³						
XX	Custom Feature						
Code	Voltage						
240	240 V (only available for 50 and 75 kW units)						
480	480 V						
600	600 V						
Code	Phase						
3P	Three-Phase						
Code	Kilowatts						
150	kW						
MWS - 300 - 150P - E4 GV 480V 3P 150kW Typical Model No.							

Example of Final Model Description: MWS-300-150P-E4GV 480V 1-3P 150kW

¹ Unit operating temperature based on 104°F (40°C) max. ambient, indoor environment

² When ordering more than one of these options, some items will be shipped loose to avoid damage during shipment. Simple assembly will be required for installation.

³ 300 GPM option comes with 15 HP motor and 4", 150# inlet/outlet connections.

MWSS

Water and Water/Glycol System

- Heat Water, Deionized Water, Demineralized Water, Distilled Water and Water/Glycol Solutions to 300°F (150°C)
- 50 - 800 kW
- 240 V, 480 V and 600 V, 3 -Phase, 60 Hz
- Compact Footprint for Installation
- 150# 304 Stainless Steel Construction
- Long Life 0.475 in. (12.1 mm) dia. 304 Stainless Steel Sheath Heating Elements
- High Temperature, Stainless Steel Centrifugal Pump - rated to 300°F (150°C)
- Electronic Digital Temperature and Process Control
- Discharge Pressure Gauge
- UL NEMA 12 Electrical Enclosure Complete with Contactors, Temperature Safety Limit, Transformers and Pilot Light(s)
- External Cold Expansion Tank (Optional)
- External Heat Exchanger (Optional)



Description

Chromalox MWSS offers internal stainless steel construction and is engineered to operate at 300°F (150°C). The MWSS Series is designed for high purity applications like deionized, demineralized or distilled water. The stainless steel construction provides superior corrosion protection. Its electric heating core assures responsive and precise temperature control in a space saving package. The system is suitable for a large range of heating needs with a compact design. The MWSS operates in a closed loop system using a cold expansion tank (optional).

Applications

Chromalox MWSS system is great for applications such as reactors, evaporators, dryers, platen presses, heat exchangers, roll heating, or any jacketed kettles / vessels / tanks.

Hot water systems can be used in a variety of industries such as chemical, plastics, cosmetics, automotive, rubber, refining, pharmaceutical, non-woven / textiles/ fibers, aerospace, or any other industrial market.

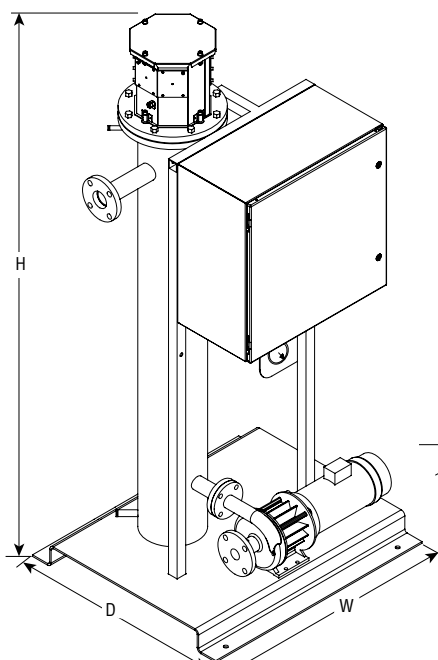
Construction

Chromalox MWSS systems are ruggedly constructed for industrial applications. The heavy-duty, steel support base features channel grooves for forklift transport. The heater chamber is fully welded and houses Chromalox brand, long-lasting heating elements. The panel is fully UL-listed and assembled in-house. The pump is air-cooled with a mechanical seal, rated to 300°F (150°C). The final assembly is fully-shop tested prior to shipment.

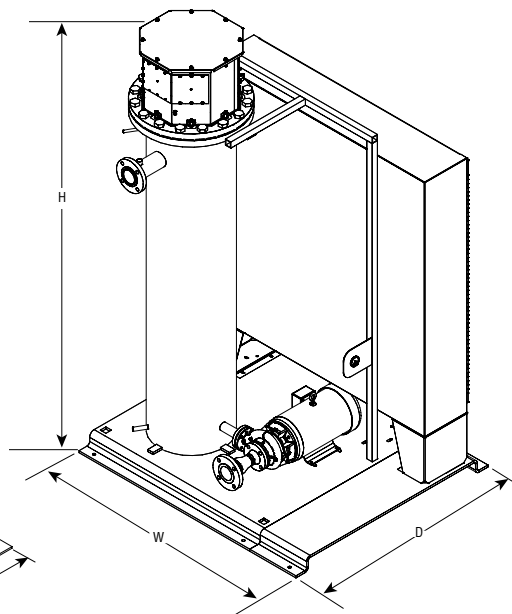
WARNING — In hazardous areas, pipe surfaces could achieve temperatures high enough to cause auto-ignition of the hazardous material present. Consult Article 500 of the National Electric Code for further information on the maximum allowable temperature for a specific application.

MWSS

Water and Water/Glycol System (cont'd.)



MWSS 50-250 kW Unit
(Front View)



MWSS 300-800 kW Unit
(Rear View)

Options

- Electronic Solid State (SCR) Trim Power Control
- Strainer
- Powder Coated or Stainless Steel Side Coverings
- Dedicated Fill Connection
- NEMA 4 Construction
- NEMA 4X Stainless Steel Construction*
- Class 1, Div 2 Hazardous Area Rating* (with purge)
- Panel Disconnect Switch
- Heater On/Off Switch
- Suction Pressure Gauge
- Inlet / Outlet 150# Gate Valves
- Drain / Bleed Valves
- Digital Overtemperature Controller
- Relief Valve
- ASME Design & Certified, Section VIII, for 100 psi (7 bar) at 300°F (150°C)
- High Flow Pump (300 GPM, 450-800 kW only)
- Heat Exchanger (shipped loose for customer installation)
- Expansion Tank (shipped loose for customer installation)
- Liquid Level Switch for Expansion Tank

* All internal & external items will be stainless steel material

Unit Proportions

Unit Size	Weight (Lbs.)	Width (In.)	Depth (In.)	Height (In.)	Flow Rate ¹ GPM	Pressure ¹ TDH	Motor HP	Inlet/Outlet Connection	System Capacity (Gal.)
50 - 150 kW	900	36	42	96	60	100	3	2", 150#	25
175 - 250 kW	1400	36	42	96	120	100	5	3", 150#	35
300 - 400 kW	2000	48	54	96	200	100	10	3", 150#	55
450 - 600 kW	2600	48	54	96	200 ²	100 ²	10 ²	3", 150# ²	65
650 - 800 kW	3600	61	54	99	200 ²	100 ²	10 ²	3", 150# ²	85

¹ Refer to Pump Graph in instruction manual for full operating range.

² Option for 300 GPM 15 HP pump with 4", 150# inlet/outlet.

Standard Features

Benefits

Stainless Steel Construction	Superior corrosion resistance
Electronic Process Control.....	Precise process control
Element Overtemperature Protection	Protect elements and fluid from overheating
Air-Cooled Mechanical Seal.....	No external cooling needed
Insulated Heating Chamber.....	Maximize efficiency by minimizing heat loss
Discharge Pressure Gauge.....	Confirm pump operating performance
Compact Footprint	Space saving design
Fully Pre-wired & Tested	Ready to operate on site
Centrifugal Pump	Minimize piping configuration
Temperature rating to 300°F (150°C).....	Covers most applications
150# ANSI Flange Connection.....	Easy fit up to installed piping
Start / Stop buttons with Motor Starter.....	Complete operating system
Pilot Lights for Power, Heater, & Pump.....	Visual indication of system operation

MWSS

Water and Water/Glycol System *(cont'd.)*

Ordering Information

To Order — Complete the Model Number using the Matrix provided.

MWSS Stainless Steel Water and Water/Glycol System

Code	Unit Temperature Rating ¹	
300	300°F (150°C)	
Code	Kilowatts	
50	50 kW	175 175 kW
75	75 kW	200 200 kW
100	100 kW	250 250 kW
125	125 kW	300 300 kW
150	150 kW	350 350 kW
400	400 kW	700 700 kW
500	500 kW	750 750 kW
550	500 kW	800 800 kW
600	600 kW	
650	650 kW	
Code	Enclosure Types	
E1	General Purpose	
E4	Moisture Resistant	
E4X*	Moisture / Corrosion Resistant	
E4NP*	Class 1, Div 2 rating - Nitrogen Purge	
Code	Option	
(Blank)	No Options	
ST	SCR Trim	
SR	Strainer ²	
GV	I/O Gate Valves ²	
FC	Dedicated Fill Connection ²	
DB	Drain / Bleed Valves	
PD	Panel Disconnect	
HW	Heater On/Off Switch	
SG	Suction Pressure Gauge	
DT	Digital Overtemp Control	
SV	Safety Relief Valve - 125psi	
PC	Power Coated Skins	
SS	Stainless Skins	
AE	ASME Designed & Certified	
HF	300 GPM Pump ³	
XX	Custom Feature	
Code	Voltage	
240	240 V (only available for 50 and 75 kW units)	
480	480 V	
600	600 V	
Code	Phase	
3P	Three-Phase	
Code	Kilowatts	
150	kW	

HEAT TRANSFER

MWSS- 300 - 150P - E4 GV 480V 3P 150 kW Typical Model No.

* E4X & E4NP Options feature all stainless steel construction on both internal and external features.

Example of Final Model Description: MWSS-300-150P-E4GV 480V 1-3P 150kW

¹ Unit operating temperature based on 104°F (40°C) max. ambient, indoor environment

² When ordering more than one of these options, some items will be shipped loose to avoid damage during shipment. Simple assembly will be required for installation.

³ 300 GPM option comes with 15 HP motor and 4", 150# inlet/outlet connections.

CWG

Hot Water Heat Transfer System

- Water and Water/Glycol Solutions to 250°F
- 6 - 400 kW (15 - 1,365 Mbh)
- 240, 480 and 550V, 3 Phase, 60 Hz
- 150 Lb Welded Steel Construction
- Heavy Duty 0.475" Dia. Copper Sheath Elements
- Cast Iron Bronze Fitted Centrifugal Pump with Cast Steel Strainer (Capacities to 200 gpm @ 100 psi TDH)
- Electronic Digital Temperature and Process Control
- NEMA 1 Electrical Enclosure with Circuit Breaker, On-Off Switches, Pilot Lights and 120V Control Transformer (Standard)
- NEMA 4, 12 and Explosion Resistant (Class I, Group D, Div. I see Note 1) Electrical Enclosures Available
- Dual Pressure Gauge Monitors Pump Inlet and Discharge Pressure
- Bypass Safety Relief Line Protects Pump (Blocked Flow)
- Manual Inlet and Outlet Valves for Isolation of Process
- Manual Air Bleed Drain Valves
- ASME 125 psig Relief Valve
- Optional ASME Certification to Section IV or VIII for 125 psig @ 250°F

Applications

Chromalox CWG Series Hot Water Heat Transfer Systems can be used in closed-loops with water or water-glycol mixtures to a maximum operating temperature of 250°F. Applications include heating only or heating and cooling of jacketed vessels, rolls, heat exchangers, platens, dies and molds requiring high and uniform temperature throughout the process.

Features

All exposed sides have heavy 16 gauge sheet metal panels for operator protection.

Special two-part epoxy paint, chemically resistant to heat transfer fluids, assures good looks and ease of cleaning for years.

Standard NPT threaded piping connections provide convenient hook up to external piping.

All electrical construction conforms to NEC standards with fusing on all internal circuits.

WARNING — In hazardous areas, pipe surfaces could achieve temperatures high enough to cause auto-ignition of the hazardous materials present. Consult Article 500 of the National Electrical Code for further information on the maximum allowable temperatures for a specific application.



Options

- Expansion Tank (recommended)
- Float and Level Switches
- Open and Closed-loop Cooling Modules
- Alternate Pumps and Pump Manufacturers
- Electronic Process Controls
- Solid State Power Controllers
- Electronic Sequencers, Recorders, Monitors and Time Clocks
- Other Voltages and Ratings to 1,200 kW Available

Specifications and Ordering Information

kW	System (Gal.)	Exp. Tank	Pump (HP)	Gpm	Dimensions (In.)			Model	Stock	PCN	Wt. (Lbs.)
					L	D	H				
6	3	12	1	25	36	35	48	CWG-250A-6	NS	—	600
9	3	12	1	25	36	35	48	CWG-250A-9	NS	—	600
12	3	12	1	25	36	35	48	CWG-250A-12	NS	—	800
15	3	12	1	25	36	35	65	CWG-250A-15	NS	—	800
18	3	12	1	25	36	35	65	CWG-250A-18	NS	—	800
24	6	18	1	25	36	35	65	CWG-250A-24	NS	—	1,000
30	6	18	1	25	36	35	65	CWG-250A-30	NS	—	1,000
40	6	30	1	25	36	35	65	CWG-250A-40	NS	—	1,000
60	10	30	1-1/2	50	44	38	65	CWG-250A-60	NS	—	1,300
80	10	30	1-1/2	50	44	38	65	CWG-250A-80	NS	—	1,400
100	10	30	1-1/2	50	44	38	65	CWG-250A-100	NS	—	1,500
125	15	42	5	90	62	46	65	CWG-250A-125	NS	—	1,700
150	16	42	5	90	62	46	65	CWG-250A-150	NS	—	1,800
200	18	42	5	90	62	46	65	CWG-250A-200	NS	—	1,900
250	23	80	7-1/2	150	62	46	65	CWG-250A-250	NS	—	2,000
300	28	80	7-1/2	150	62	46	84	CWG-250A-300	NS	—	2,200
350	30	80	10	200	62	46	84	CWG-250A-350	NS	—	2,200
400	32	80	10	200	62	46	84	CWG-250A-400	NS	—	2,200

Stock Status: S = stock NS = non-stock

To Order—Specify model, volts, phase, kW, PCN, options and quantity.

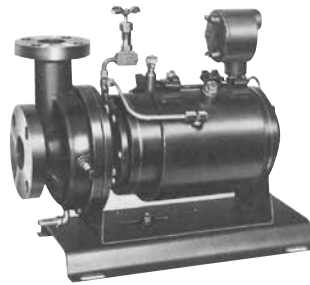
Oil Systems Technical & Application Data

- Heat Transfer Fluids and Oils to 750°F
- 4 - 600 kW (14 - 2,047 Mbh) Multiple Zone and Special System Designs to 1,200 kW or More
- 208 - 575V, 3 Phase, 60Hz
- Non-Pressurized (Atmospheric) and Pressurized Systems
- 150 Lb and 300 Lb Carbon Steel Construction - All Primary Loop Hydraulic Piping Welded Schedule 40 Steel Pipe
- Long Life 0.475" Dia. Steel Sheath Elements Welded to Flanges for Easy Service
- Positive Displacement and Centrifugal Pumps — Wide Selection of Pump Manufacturers Available
- NEMA 1, 4 and 12 Electrical Enclosures - Explosion Resistant Class I, Group D, Div. 1 Available
- Integral Power Panels with Mechanical Contactors or Optional Electronic SCR Controls and Sequencers
- Broad Selection of Mechanical and Electronic Process Controls
- ASME Section VIII Certification (Standard on CLD, CLS and CHTV Systems)
- Complete Line of Expansion Tanks, Cooling Modules, Accessories and Options

Options & Features

Special Pumps — Chromalox heat transfer systems can be built with an installed spare pump. The pump can be the same manufacturer as the standard or Chromalox will build the system using a pump from your preferred pump manufacturer. The types of pumps available include centrifugal (AVS type which conforms to ANSI standard B73.1), positive displacement, sealess (canned or magnetic drive) or turbine. Pump manufacturers include Allis-Chalmers, Aurora, Blackmer, Brown & Sharp, Burkes, Carver, Crane, Dean, Deming, Dickow, Dunham-Bush Fairbanks-Morris, Goulds, Haight, Ingersoll Rand, Konro KSB, Peerless, Roper, SiHi, Sundyne, Vican, Viking, Weinman, Worthington.

Special Crane Chempump® can be operated at 750°F, one of many optional types of pumps available.

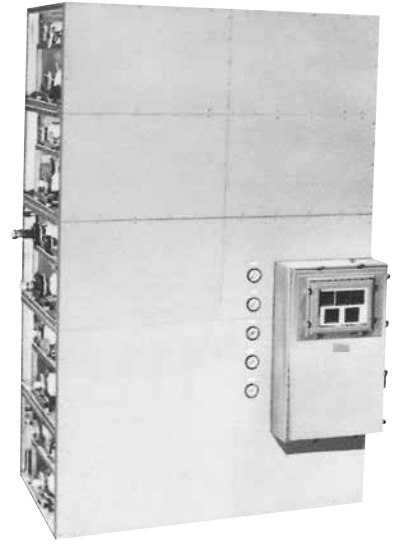


Standard and Special Heating and Cooling Systems — Many processes require cooling as well as heating. Examples are:

- The rapid cool down at the end of the process cycle for product handling
- Controlled cooling or tempering to maintain temperature due to an exothermic reaction.

Chromalox electric fluid heat transfer systems can be designed with a standard or special cooling cycle using the same heat transfer fluid. This can be accomplished either in an open (water system) or closed-loop cooling cycle by adding either a water-cooled, air-cooled or refrigerated heat exchanger in the piping loop. A system with mechanical refrigeration can be designed to operate between -20 and 750°F (-28 and 398°C).

Switching between the heating and cooling cycles can be set up for manual, semi-automatic or fully automatic operation. The method of switching can be as simple as manually turning valves or as sophisticated as a programmable controller linked to a computer or distributed process system (DPS).



Five zone ASME certified hot oil heat transfer system with remote controls emphasizes the expertise and capabilities of the Chromalox organization to meet the requirements of virtually any heat transfer application. The system has independent zones with a separate pump, motor, heater, heat exchanger and cooling module for each.

Lower Cost Construction — The major advantage of using heat transfer fluids instead of hot water or steam is the operating pressure at process temperature. Hot oil systems are preferred over hot water or steam for temperatures above 250°F to avoid the hazards and risks of the dangerously high pressures required to use high-temperature steam. There are many heat transfer fluids that operate to 650°F at atmospheric pressure. Other fluids operate to 750°F at less than 150 psig system pressures. Compare this to steam pressures and process temperatures in the following table.

Steam Temperature Vs. Pressure

Process Temperature (°F)	Steam Pressure (Psia)
406	250
467	500
510	750
545	1,000
572	1,250
596	1,500
635	2,000
652	2,250
695	3,000
707	3,250

Note — High system pressure means costly pressure retaining components. The low vapor pressures of heat transfer fluids simplify piping and vessel design and allow lower cost construction.

MicroTherm CMXO Circulating Oil Temperature Control System

- Heat Transfer Fluids to 550°F
- 6 - 24 kW (15 - 81Mbh)
- 240 and 480V, 3 Phase, 60 Hz
- Non-Pressurized (Atmospheric) Operation
- 0.430" Dia. Steel Sheath Elements
- 3 hp Centrifugal Pump
- Electronic Digital Temperature and Process Control
- NEMA 1 Electrical Enclosure
- Pressure Gauges Monitor Pressure To And From Process
- Compact, Portable Cabinet with Casters
- Integral Expansion Tank with Atmospheric Vent
- Optional Closed-Loop Cooling (3.2 Ft²)

Stocked Base Model:

Model	PCN
CMXO-550 18H 480 0000	214640

Applications

Chromalox Compact Oil Temperature Controllers are engineered to operate up to 550°F at atmospheric pressure (non-pressurized). They are particularly useful in the plastics industry for use with plastic materials that require higher temperatures than can be achieved by hot water systems.

- Injection Molding Machines — Thermoplastics and Thermosets
- Platens and Dies
- Rolls, Laminating and Calendering
- Pipeline Heating and Tracing
- Jacketed Vessels and Tanks

Features

This product is pre-piped with pump, heaters and expansion tank. 1.5" NPT piping connections for oil provide for convenient hook up to external high temperature hoses or piping. All wiring conforms to NEC requirements.



Specifications

Weight:.....355lbs
(does not include packaging)

Size:45"H x 19"W x 38"D

Ordering information

Model	
CMXO-550	
kW	
6, 9, 12, 18, 24*	*24kW in 480V only
Cooling	
H	Heat Only
C	Heat/Cool
Voltage	
240	240V 3PH
480	480V 3PH
Contactor or SCR	
0	Definite purpose contactor
2	SCR
Controller	
0	4081-UOSRR-23000 Controller
2	4082-RPSRR-44010 Controller
Enclosure disconnect	
0	None
1	Enclosure disconnect
Piping	
0	NPT
1	Flange
CMXO-550	24 C 480 2 0 0 0 Typical Model Number

MOS Hot Oil System

- Heat Transfer Fluids to 600°F (315°C) or 650°F (343°C)
- 50 - 500 kW
- 240, 480 and 600 V, 3 Phase, 60 Hz
- Compact Footprint for Installation
- Non-Pressurized (Atmospheric) Operation
- 150# Carbon Steel Construction
- Long Life 0.475 (12.1 mm) dia. Steel Sheath Heating Elements
- High Temperature Centrifugal Pump - Rated to 650°F (343°C)
- Electronic Digital Temperature and Process Control
- Discharge Pressure Gauge
- UL NEMA 12 Electrical Enclosure complete with Contactors, Temperature Safety Limit, Transformers, and Pilot Lights
- 650°F (343°C) Operation (Optional)
- External Cold Expansion Tank (Optional)
- External Heat Exchanger (Optional)



Description

Chromalox MOS Mid-Size Hot Oil System is engineered to operate to 600°F (315°C) standard, with an option for up to 650°F (343°C), at atmospheric pressure (non-pressurized). Its electric heating core assures responsive and precise temperature control in a space saving package. The system can be used with most types of heat transfer oils such as Paratherm®, Mobiletherm®, Therminol®, Dow Brands®, etc. The MOS operates in a closed loop system using a cold expansion tank (optional). A cold expansion tank can remove the need for a nitrogen (N₂) purge and reduces the degradation of heat transfer fluids.

Applications

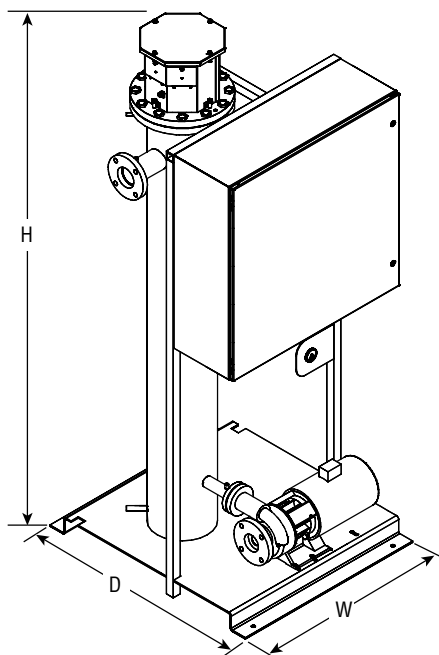
The Chromalox MOS system is great for applications such as reactors, evaporators, dryers, platen presses, heat exchangers, roll heating, or any jacketed kettles / vessels / tanks. Hot oil systems can be used in a variety of industries such as chemical, plastics, cosmetics, automotive, rubber, refining, pharmaceutical, non-woven / textiles/ fibers, aerospace, or any other industrial market.

Construction

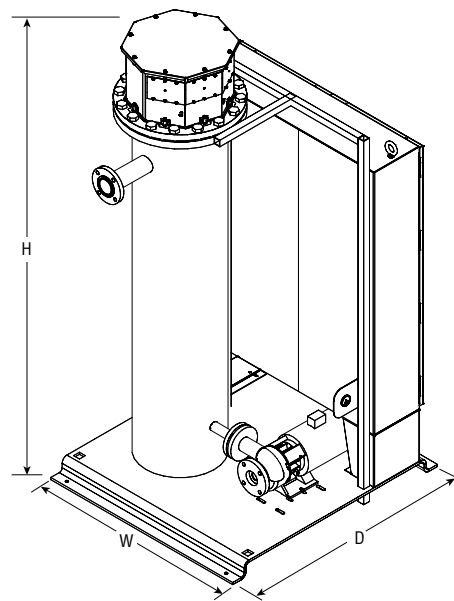
Chromalox MOS systems are ruggedly constructed for industrial applications. The heavy-duty, steel support base features channel grooves for forklift transport. The heater chamber is fully welded and houses only Chromalox brand, long-lasting heating elements. The panel is UL-listed and assembled in-house. The pump is air-cooled with a mechanical seal, rated to 650°F (343°C). The final assembly is fully-shop tested prior to shipment.

WARNING — In hazardous areas, pipe surfaces could achieve temperatures high enough to cause auto-ignition of the hazardous material present. Consult Article 500 of the National Electric Code for further information on the maximum allowable temperature for a specific application.

MOS Hot Oil System (cont'd.)



**MOS 50-150 kW Unit
(Front View)**



**MOS 175-500 kW Unit
(Rear View)**

Options

- 650°F (343°C) Operation
- Electronic Solid State (SCR) Power Control
- Strainer
- Powder Coated or Stainless Steel Side Coverings
- Dedicated Fill Connection
- NEMA 4 or 4X (Stainless) Construction
- Class 1, Div 2 Hazardous Area Rating (with purge)
- Panel Disconnect
- Heater On/Off Switch
- Suction Pressure Guage
- Inlet / Outlet #150 ANSI Gate Valves
- Drain / Bleed Valves
- Digital Overtemperature Controller
- ASME Designed and Certified, Section VIII, for 100 psi at 600/650°F (7 bar at 315/343°C)
- High Flow Pump (300 GPM, 350-500 kW units only)
- Heat Exchanger (shipped loose for installation)
- Expansion Tank (shipped loose for installation)
- Liquid Level Switch for Expansion Tank

Unit Proportions

Unit Size	Dry Weight (Lbs.)	Width (In.)	Depth (In.)	Height ¹ (In.)	Flow Rate ² GPM	Pressure ² TDH	Motor HP	Inlet/Outlet Connection	System Capacity (Gal.)
50 & 75 kW	900	36	42	96	80	130	5	2", 150#	25
100 - 150 kW	1400	36	42	96	120	130	7.5	3", 150#	35
175 - 300 kW	2600	48	54	96	200	130	10	3", 150#	65
350 - 500 kW	3500	48	54	96	200 ³	130	10 ³	3", 150# ³	85

¹ 650°F Option will add 8" to overall height.

² Refer to pump graph for full operating range

³ Option for 300 GPM 20 HP pump with 4", 150# inlet/outlet

Standard Features

Electronic Process Control.....	Precise process control
Element Overtemperature Protection	Protect elements and fluid from overheating
Air-Cooled Mechanical Seal.....	No external cooling needed
Insulated Heating Chamber.....	Maximize efficiency by minimizing heat loss
Discharge Pressure Gauge.....	Confirm pump operating performance
Compact Footprint	Space saving design
Fully Pre-wired & Tested	Ready to operate on site
Centrifugal Pump	Minimize piping configuration
Temperature rating to 600°F.....	Covers most applications
150# ANSI Flange Connections.....	Easy fit up to installed piping
Start / Stop buttons with Motor Starter.....	Complete operating system
Pilot Lights for Power, Heater, Pump	Visual indication of system operation

Benefits

MOS Hot Oil System (cont'd.)

Ordering Information

To Order — Complete the Model Number using the Matrix provided.

MOS Mid-Size Hot Oil System

Code Unit Temperature Rating¹

600	600°F (315°C)
650	650°F (343°C)

Code Kilowatts

50	50 kW	175	175 kW	400	400 kW
75	75 kW	200	200 kW	450	450 kW
100	100 kW	250	250 kW	500	500 kW
125	125 kW	300	300 kW		
150	150 kW	350	350 kW		

Code Enclosure Types

E1	General Purpose
E4	Moisture Resistant
E4X	Moisture Resistant / Corrosion Resistant (Stainless Steel)
E4NP	Class 1, Div 2 rating - Nitrogen Purge (by customer)

Code Option

(Blank)	No Options	SG	Suction Gauge
ST	SCR Trim	DT	Digital Overtemp Control
SR	Strainer ²	PC	Powder Coated Skins
GV	I/O Gate Valves ²	SS	Stainless Steel Skins
FC	Dedicated Fill Connection ²	AE	ASME D&C
DB	Drain / Bleed Valve	HF	300 GPM Pump ³
PD	Panel Disconnect	XX	Custom Feature
HW	Heater On/Off Switch		

Code Voltage

240	240 V	(Only available for 50 and 75 kW Units)
480	480 V	
600	600 V	

Code Phase

3P	Three-Phase
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Code Kilowatts

100	kW
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MOS- 600- 100P- E4 GV 480V - 3P 100 Typical Model Number

Example Description: MOS-600-100P-E4GV 480V 3P 100H

¹ Unit operating temperature based on 40°C (104°F) max. ambient, indoor environment

² When ordering more than one of these options, some items will be shipped loose to avoid damage during shipment. Simple assembly will be required for installation.

³ 300 GPM option comes with 20 HP motor and 4", 150# inlet/outlet connections.

COS-B Hot Oil System

- Heat Transfer Fluids¹ to 650°F
- 9 - 400 kW (31 - 1,365 Mbh)
- 240 and 480V, 3 Phase, 60 Hz²
- Non-Pressurized (Atmospheric) Operation
- 150 Lb Carbon Steel Construction
- Long Life 0.475" Dia. Steel Sheath Elements
- Positive Displacement, High-Temperature Pump with Inline Strainer
- Bypass Relief Valve Protects System (Factory Set 45 psi)
- Electronic Digital Temperature and Process Control
- Suction and Discharge Pressure Gauges Monitor Pump Performance
- NEMA 1 Electrical Enclosure Complete with Circuit Breaker, Contactors, Fusing, Switches, Transformers and Pilot Lights
- External Cold Expansion Tank (Optional) with Atmospheric Vent



Applications

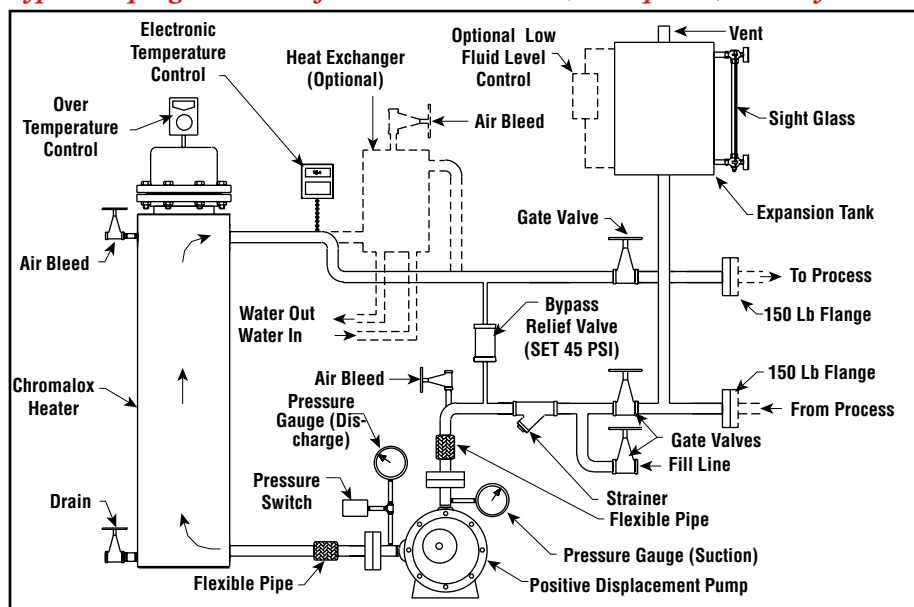
Chromalox COS Hot Oil Heat Transfer Systems are engineered to operate up to 650°F at atmospheric pressure (non-pressurized). They are used with Mobiltherm®, Ucon®, Caloria® and other medium temperature heat transfer fluids¹ which do not require pressurization to operate at temperature.

COS heat transfer systems use a cold expansion tank (optional) that is open to the atmosphere. A cold expansion tank eliminates the need for nitrogen (N₂) purging and reduces the tendency of heat transfer fluids to oxidize and deteriorate.

Construction

Chromalox COS systems are ruggedly constructed and completely self contained (except for the optional external expansion tank). All Chromalox hot oil heat transfer systems have similar components and construction features. All systems come complete with heaters, controls, pumps, valves, safety devices and necessary plumbing. Systems are factory tested and ready to operate.

Typical Piping Schematic for Non-Pressurized (Atmospheric) COS Systems



Notes —

1. For a complete list of compatible heat transfer fluids, contact your Local Chromalox Sales office.
2. Other voltages available, contact your Local Chromalox Sales office.

CLS-A Hot Oil System

- Heat Transfer Fluids¹ to 750°F
- 9 - 400 kW (31 - 1,365 Mbh)
(Up to 1,200 kW Optional)
- 240 and 480V, 3 Phase, 60 Hz
- Pressurized Operation — ASME Certified to 200 psig @ 750°F
- 300 Lb Carbon Steel Construction
- Long Life 0.475" Dia. Steel Sheath Elements
- High Temperature Centrifugal Pump with Water-Cooled Mechanical Seal
- Bypass Relief Line Protects System in Case of Blocked Flow
- Electronic Digital Temperature and Process Control
- Suction and Discharge Pressure Gauges Monitor Pump Performance
- NEMA 1 Electrical Enclosure Complete with Circuit Breaker, Contactors, Fusing, Switches, Transformers and Pilot Lights
- ASME Safety Relief Valve (Set @ 200 psig)
- External Pressurized Heated Expansion Tank (Optional) with Nitrogen (N₂) Purge



Applications

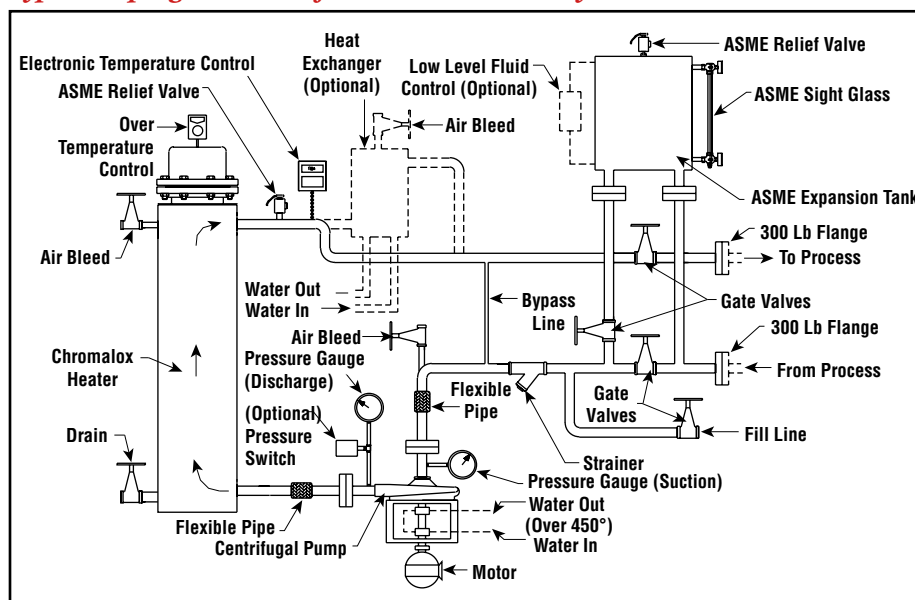
Chromalox CLS Hot Oil Heat Transfer Systems are engineered to operate up to 750°F at a pressure of 200 psig. They are used with Syltherm® 800 and other high temperature heat transfer fluids¹ which require heated lines to prevent crystallization of the media and pressurization to operate at temperature.

CLS systems use a pressurized hot expansion tank (optional) that is heated by hot heat transfer fluid flowing through it. The expansion tank is ASME coded for 650°F @ 200 psig with an ASME safety relief valve. Nitrogen (N₂) purging is required.

Construction

Chromalox CLS Hot Oil Heat Transfer Systems are ruggedly constructed and completely self contained (except for the optional external expansion tank). All CLS systems come complete with heaters, controls, pump valves, safety devices and necessary plumbing. The high temperature cast steel centrifugal pump is provided with a water cooled mechanical seal designed for continuous operation at a maximum temperature of 750°F. CLS systems are factory tested and ready to operate.

Typical Piping Schematic for Pressurized CLS Systems



WARNING — In hazardous areas, pipe surfaces could achieve temperatures high enough to cause auto-ignition of the hazardous materials present. Consult Article 500 of the National Electrical Code for further information on the maximum allowable temperatures for a specific application.

Note 1 — For a complete list of compatible heat transfer fluids, contact your Local Chromalox Sales office.

PFC-B Hot Oil System

- Heat Transfer Fluids¹ to 600°F
- 9 - 600 kW (31 - 2,047 Mbh)²
- 240 and 480V, 3 Phase, 60 Hz³
- Non-Pressurized (Atmospheric) Operation
- 150 Lb Carbon Steel Construction
- Long Life 0.475" Dia. Steel Sheath Elements
- High Temperature Centrifugal Pump with Labyrinth Seal Ring — Requires No External Cooling up to 600°F
- Bypass Relief Line Protects System in Case of Blocked Flow
- Electronic Digital Temperature and Process Control
- Suction and Discharge Pressure Gauges Monitor Pump Performance
- NEMA 1 Electrical Enclosure Complete with Circuit Breaker, Contactors, Fusing, Switches, Transformers and Pilot Lights
- External Cold Expansion Tank (Optional) with Atmospheric Vent



Applications

Chromalox PFC Hot Oil Heat Transfer Systems are engineered to operate up to 600°F at atmospheric pressure (non-pressurized). They are used with Mobiltherm®, Ucon®, Caloria® and other medium temperature heat transfer fluids¹ which do not require pressurization to operate at temperature.

PFC systems use a cold expansion tank (optional) that is open to the atmosphere. A cold expansion tank eliminates the need for nitrogen (N₂) purging and reduces the tendency of the heat transfer fluid to oxidize and deteriorate.

Construction

PFC systems are ruggedly constructed and completely self contained (except for the optional external expansion tank). They are similar to the COS system except they use a high temperature centrifugal pump instead of a positive displacement pump. The centrifugal pump has a labyrinth seal ring which does not require cooling up to its maximum operating temperature of 600°F. PFC systems come complete with heaters, controls, pumps, valves, safety devices and necessary plumbing. Systems are factory tested and ready to operate.

Specifications and Ordering Information

kW	Pump Rate ^A (GPM)	Pump Motor (HP)	Inlet/Outlet Pipe Size 150 Lb Fig	Dimensions (In.)								
				L	D	H	A	B	C	E	G	
9-30	40	3	1-1/2	54	35	77	24	12	36	6	50	
40	60	5	2	54	40	77	24	12	36	6	50	
60	80	5	2	54	40	81	24	11-1/4	36	5-1/2	50	
80	80	5	2	54	40	96	35	11-1/4	45	5-1/2	66	
100	120	7-1/2	3	54	40	96	36	13-1/2	48	6-1/2	66	
125-150	150	7-1/2	3	60	45	96	45	12	54	8	66	
200	150	7-1/2	3	60	45	96	45	12	57	8	66	
250-400	200	10	3	62	60	96	42	22	54	12	66	
450-600	350	15	4	84	60	96	45	22	57	12	66	

A. Pumping rate based on 100 ft. total discharge head (TDH) using heat transfer fluid with a viscosity of approximately 100 SSU @ 70°F.

Other Notes —

1. For a list of compatible heat transfer fluids, contact your Local Chromalox Sales office.
2. kW ratings above 600 (to 1,200 kW) available.
3. Other voltages to 575V available.

WARNING — In hazardous areas, pipe surfaces could achieve temperatures high enough to cause auto-ignition of the hazardous materials present. Consult Article 500 of the National Electrical Code for further information on the maximum allowable temperatures for a specific application.

PFC-B

Hot Oil System (cont'd.)

Features

Overtemperature Cutout protects elements and fluid from overheating

Electrical Interlock between pump motor and heating element contactors

Flexible Piping before and after pump absorbs vibration and prevents pump damage from thermal expansion

Inline 0.030 Mesh Strainer protects pump

Full Port Manual Gate Valves on all primary hydraulic piping minimize pressure drop

2 Inch Thermal Insulation around heating chambers minimizes heat loss

16 Gauge Painted Steel Panels on all exposed sides — powder coat heat resistant paint

Options

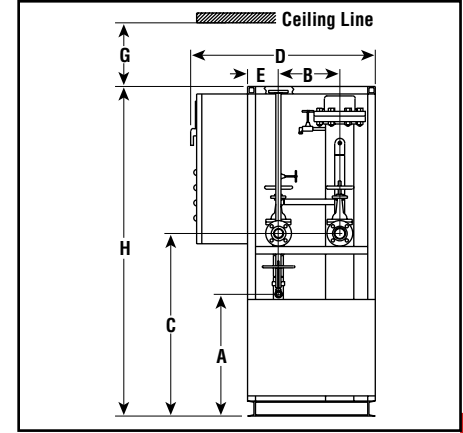
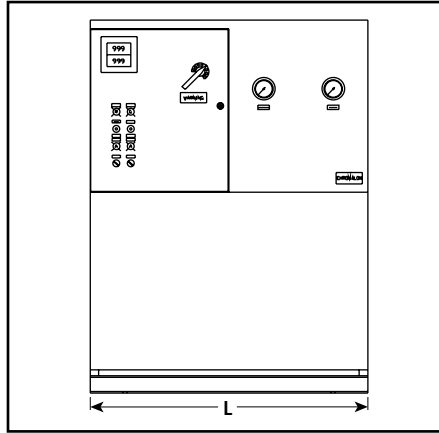
- Alternate Voltage and kW Ratings
- Microprocessor based PID or Ramp Soak Temperature Controls
- Electronic Solid State (SCR) Power Controllers
- Electronic Sequencers, Recorders, Monitors, Time Clocks and Digital Communication Interface available
- Mechanical Pump Seals and Special Pumps
- Type RJC Closed-loop Cooling Modules
- Expansion Tanks Matched to System (recommended)
- Float or Level Switches for Expansion Tank
- ASME Section VIII Certification 100 psi at 600°F

Electrical Enclosure Options

NEMA 1 enclosures and open drip proof motors are standard on all Chromalox hot oil systems. All systems (except OTCS) available with optional enclosures that comply with:

- NEMA 4/12 Weather Resistant/Oil and Dust Tight with TEFC motors
- Explosion Resistant Class I, Group D, Div. 1 with TEFC Explosion Resistant motors.

Dimensions (Inches)



Specifications and Ordering Information

kW	Volts	Btuh	Min. Rec. Expansion Tank (Gal.) ¹	System Volume (Gal.)	No. Heating Stages	Model ²	Stock	PCN	Wt. (Lbs.)
9	240	30,708	12	4	1	PFC-600B-9	NS	—	1,000
9	480	30,708	12	4	1	PFC-600B-9	NS	—	1,000
12	240	40,944	12	7	1	PFC-600B-12	NS	—	1,100
12	480	40,944	12	7	1	PFC-600B-12	NS	—	1,100
15	240	51,180	18	7	1	PFC-600B-15	NS	—	1,100
15	480	51,180	18	7	1	PFC-600B-15	NS	—	1,100
20	240	68,240	18	7	1	PFC-600B-20	NS	—	1,200
20	480	68,240	18	7	1	PFC-600B-20	NS	—	1,200
30	240	102,360	18	7	1	PFC-600B-30	NS	—	1,300
30	480	102,360	18	7	1	PFC-600B-30	NS	—	1,300
40	240	136,480	30	10	2	PFC-600B-40	NS	—	1,400
40	480	136,480	30	10	2	PFC-600B-40	NS	—	1,400
60	240	204,720	42	16	3	PFC-600B-60	NS	—	1,700
60	480	204,720	42	16	3	PFC-600B-60	NS	—	1,700
80	240	272,960	42	20	3	PFC-600B-80	NS	—	1,800
80	480	272,960	42	20	3	PFC-600B-80	NS	—	1,800
100	240	341,200	80	30	4	PFC-600B-100	NS	—	1,900
100	480	341,200	80	30	4	PFC-600B-100	NS	—	1,900
125	480	426,450	80	42	4	PFC-600B-125	NS	—	2,000
150	480	511,811	80	42	4	PFC-600B-150	NS	—	2,000
200	480	682,400	80	55	4	PFC-600B-200	NS	—	2,100
250	480	852,900	115	76	6	PFC-600B-250	NS	—	3,100
300	480	1,023,600	115	76	6	PFC-600B-300	NS	—	3,200
350	480	1,194,200	115	100	6	PFC-600B-350	NS	—	3,400
400	480	1,364,800	115	100	6	PFC-600B-400	NS	—	3,500
450	480	1,535,400	215	110	6	PFC-600B-450	NS	—	4,500
500	480	1,706,000	215	145	9	PFC-600B-500	NS	—	4,700
600	480	2,047,200	215	145	9	PFC-600B-600	NS	—	5,000

Stock Status: S = stock NS = non-stock

To Order—Specify model, volts, phase, kW, PCN, options and quantity.

1. Expansion tank size should be double the increase in volume due to thermal expansion of heat transfer fluid.
2. Does not include expansion tank; see System Options for details.

CLS-A Hot Oil System

- Heat Transfer Fluids¹ to 750°F
- 9 - 400 kW (31 - 1,365 Mbh)
(Up to 1,200 kW Optional)
- 240 and 480V, 3 Phase, 60 Hz
- Pressurized Operation — ASME Certified to 200 psig @ 750°F
- 300 Lb Carbon Steel Construction
- Long Life 0.475" Dia. Steel Sheath Elements
- High Temperature Centrifugal Pump with Water-Cooled Mechanical Seal
- Bypass Relief Line Protects System in Case of Blocked Flow
- Electronic Digital Temperature and Process Control
- Suction and Discharge Pressure Gauges Monitor Pump Performance
- NEMA 1 Electrical Enclosure Complete with Circuit Breaker, Contactors, Fusing, Switches, Transformers and Pilot Lights
- ASME Safety Relief Valve (Set @ 200 psig)
- External Pressurized Heated Expansion Tank (Optional) with Nitrogen (N₂) Purge



Applications

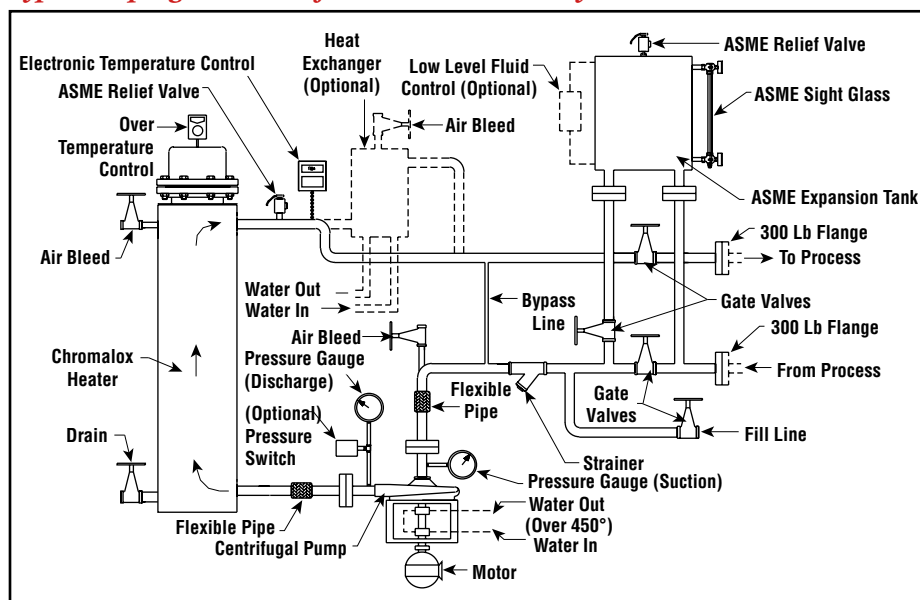
Chromalox CLS Hot Oil Heat Transfer Systems are engineered to operate up to 750°F at a pressure of 200 psig. They are used with Syltherm® 800 and other high temperature heat transfer fluids¹ which require heated lines to prevent crystallization of the media and pressurization to operate at temperature.

CLS systems use a pressurized hot expansion tank (optional) that is heated by hot heat transfer fluid flowing through it. The expansion tank is ASME coded for 650°F @ 200 psig with an ASME safety relief valve. Nitrogen (N₂) purging is required.

Construction

Chromalox CLS Hot Oil Heat Transfer Systems are ruggedly constructed and completely self contained (except for the optional external expansion tank). All CLS systems come complete with heaters, controls, pump valves, safety devices and necessary plumbing. The high temperature cast steel centrifugal pump is provided with a water cooled mechanical seal designed for continuous operation at a maximum temperature of 750°F. CLS systems are factory tested and ready to operate.

Typical Piping Schematic for Pressurized CLS Systems



WARNING — In hazardous areas, pipe surfaces could achieve temperatures high enough to cause auto-ignition of the hazardous materials present. Consult Article 500 of the National Electrical Code for further information on the maximum allowable temperatures for a specific application.

Note 1 — For a complete list of compatible heat transfer fluids, contact your Local Chromalox Sales office.

CLS-A

Hot Oil System (cont'd.)

Features

Overtemperature Cutout protects elements and fluid from overheating

Electrical Interlock between pump motor and heating element contactors

Flexible Piping before and after pump absorbs vibration and prevents pump damage from thermal expansion

Inline 0.030 Mesh Strainer protects pump

Full Port Manual Gate Valves on all primary hydraulic piping minimize pressure drop

2 Inch Thermal Insulation around heating chambers minimizes heat loss

16 Gauge Painted Steel Panels on all exposed sides — powder coat heat resistant paint

Options

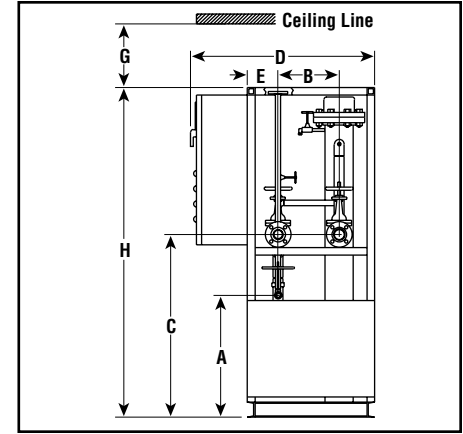
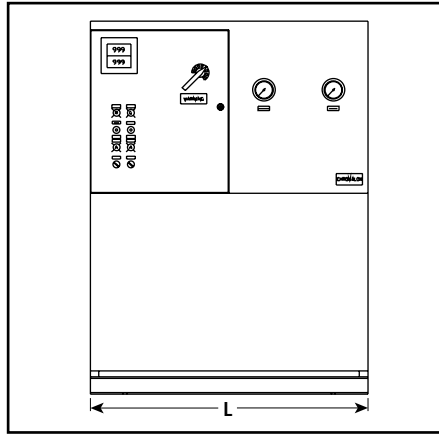
- Alternate Voltage and kW Ratings to 575 Volt and 1,200 kW
- Microprocessor based PID or Ramp Soak Temperature Controls
- Electronic Solid State (SCR) Power Controllers
- Electronic Sequencers, Recorders, Monitors, Time Clocks and Digital Communication Interface available
- Special Pumps and other Mechanical Seals
- Type RJC Closed-loop Cooling Modules
- Expansion Tanks Matched to System (recommended)
- Float or Level Switches for Expansion Tank

Electrical Enclosure Options

NEMA 1 enclosures and open drip proof motors are standard on all hot oil systems. All systems (except OTCS) available with optional enclosures that comply with:

- NEMA 4/12 Weather Resistant/Oil and Dust Tight with TEFC motors
- Explosion Resistant Class I, Group D, Div. 1 with TEFC Explosion Resistant motors.

Dimensions (Inches)



Dimensions (Inches)

kW	Pump Rate (GPM)	Pump Motor (HP)	Inlet/Outlet Pipe Size 300 Lb. Fig.	Dimensions (In.)							
				L	D	H	A	B	C	E	G
9-30	40	5	1-1/2	60	42	84	24	12	36	6	50
40	60	5	2	60	42	84	24	12	36	6	50
60	80	7-1/2	2	60	42	84	24	11-1/4	36	5-1/2	50
80	80	7-1/2	2	60	42	98	35	11-1/4	45	5-1/2	66
100	120	7-1/2	3	60	50	98	36	13-1/2	48	6-1/2	66
125-150	150	10	3	66	50	98	45	12	54	8	66
200	150	10	3	66	50	98	45	12	57	8	66
250-400	200	15	3	66	60	98	42	22	54	12	66

Specifications and Ordering Information

kW	Volts	Btuh	Min. Rec. Expansion Tank (Gal.) ¹	System Volume (Gal.)	No. Heating Stages	Model ²	Stock	PCN	Wt. (Lbs.)
9	240	30,708	12	4	1	CLS-750A-9	NS	—	1,500
9	480	30,708	12	4	1	CLS-750A-9	NS	—	1,500
12	240	40,944	12	7	1	CLS-750A-12	NS	—	1,500
12	480	40,944	12	7	1	CLS-750A-12	NS	—	1,500
15	240	51,180	18	7	1	CLS-750A-15	NS	—	1,500
15	480	51,180	18	7	1	CLS-750A-15	NS	—	1,500
20	240	68,240	18	7	1	CLS-750A-20	NS	—	1,500
20	480	68,240	18	7	1	CLS-750A-20	NS	—	1,500
30	240	102,360	18	7	1	CLS-750A-30	NS	—	1,600
30	480	102,360	18	7	1	CLS-750A-30	NS	—	1,600
40	240	136,480	30	10	2	CLS-750A-40	NS	—	1,700
40	480	136,480	30	10	2	CLS-750A-40	NS	—	1,700
60	240	204,720	42	16	3	CLS-750A-60	NS	—	2,000
60	480	204,720	42	16	3	CLS-750A-60	NS	—	2,000
80	240	272,960	42	20	3	CLS-750A-80	NS	—	2,100
80	480	272,960	42	20	3	CLS-750A-80	NS	—	2,100
100	240	341,200	80	30	4	CLS-750A-100	NS	—	2,200
100	480	341,200	80	30	4	CLS-750A-100	NS	—	2,200
125	480	426,450	80	42	4	CLS-750A-125	NS	—	2,300
150	480	511,811	80	42	4	CLS-750A-150	NS	—	2,400
200	480	682,400	80	55	4	CLS-750A-200	NS	—	2,500
250	480	852,900	115	76	6	CLS-750A-250	NS	—	3,500
300	480	1,023,600	115	76	6	CLS-750A-300	NS	—	3,600
350	480	1,194,200	115	100	6	CLS-750A-350	NS	—	3,800
400	480	1,364,800	115	100	6	CLS-750A-400	NS	—	3,900

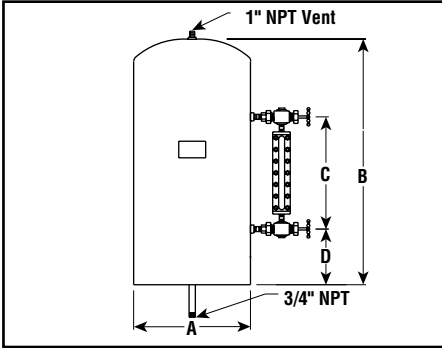
Stock Status: S = stock NS = non-stock
To Order—Specify model, volts, phase, kW, PCN, options and quantity.

1. Expansion tank size should be double the increase in volume due to thermal expansion of heat transfer fluid.
2. Does not include expansion tank; see System Options for details.

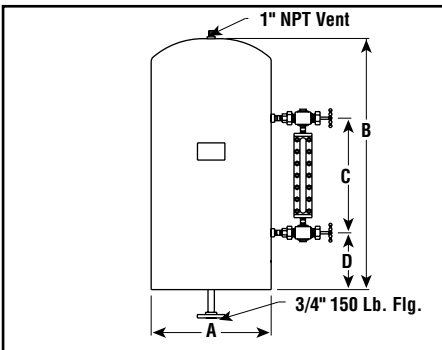
System Options Expansion Tanks

Dimensions (Inches)

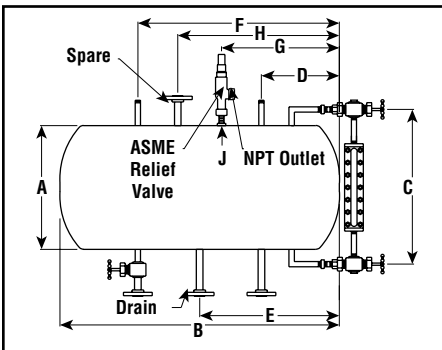
CWG



COS/PFC



CLS



Applications

An expansion tank is an essential component to all heat transfer systems. Heat transfer fluids expand with an increase in temperature. Expansion tanks allow for and contain the increase in volume due to temperature. In addition, cold expansion tanks provide a “seal” on the system reducing oxidation of the fluid. They also add to the net positive suction head (NPSH) on the inlet to the pump.

Sizing

Expansion tanks should be sized based on the amount of thermal expansion of the heat transfer fluid in the system. The actual size of the tank should be at least double the anticipated increase in fluid volume. Tank capacity should be increased if the process piping is extensive and contains a significant volume of fluid. The following tables indicate the typical tank sizes for most systems.

Steel Tanks Non-ASME rated 75 psig for MWS, CWG, MOS, COS and PFC Heat Transfer Systems — includes sight glass, 1" NPT vent and 3/4" NPT or 150 Lb. flanged system connection.

Tank Capacity (Gal.)	Dimensions (In.)				CWG			COS/PFC			Wt. Empty (Lbs.)
	A	B	C	D	kW	PCN	Stock	kW	PCN	Stock	
12	12	25-1/2	14	5-3/4	6-18	—	NS	9-12	099944	NS	32
18	12	37-1/2	20	8-3/4	24-30	—	NS	15-30	099952	NS	44
30	16	38-1/4	20	9-1/8	40-100	—	NS	40	099960	NS	65
42	20	35	20	7-1/2	125-200	—	NS	60-80	099979	NS	80
80	20	63	38	12-1/2	250-400	—	NS	100-200	099987	NS	120
115	24	63-3/8	38	12-1/2	—	—	NS	250-400	099995	NS	145
215	30	73-3/8	38	17-1/8	—	—	NS	450-600	—	NS	210

Stock Status: S = stock NS = non-stock

To Order—Specify tank capacity, system type, kW, PCN and quantity.

Steel Tanks ASME rated 200 psig @ 650°F for CLS Heat Transfer Systems — includes ASME relief valve, reflex type sight glass and two 1" 300 Lb. flanged system connections. Two 1/4" NPT fittings are provided for nitrogen (N₂) purge connections.

Tank Capacity (Gal.)	Dimensions (In.)										CLS			Wt. Empty (Lbs.)
	A	B	C	D	E	F	G	H	J	kW	PCN	Stock		
12	12	28	20	12	16	20	15	18	1	9	—	NS	50	
18	12	40	20	12	20	32	18	26	1	12-20	—	NS	60	
30	14	47	22	12	24	39	20	32	1	30	—	NS	70	
42	16	51	24	13	25	42	20	34	1	40	—	NS	105	
80	20	63	28	14	31	50	22	40	1	60-80	—	NS	205	
120	24	66	32	16	33	52	22	40	1	100-200	—	NS	310	
160	24	86	32	16	43	72	28	58	1-1/4	250-300	—	NS	350	
215	30	77	38	18	38	63	28	42	1-1/4	350-400	—	NS	405	
250	30	88	38	18	44	74	28	58	1-1/2	500-600	—	NS	540	

Stock Status: S = stock NS = non-stock

To Order—Specify tank capacity, system type, kW, PCN and quantity.

System Options Cooling Modules Float & Level Switches

Cooling Applications

Many processes require cooling as well as heating. Chromalox electric heat transfer systems can be designed with a cooling cycle using the same heat transfer fluid. This is accomplished by adding a water-cooled, air-cooled or refrigerated heat exchanger in the piping loop. By using mechanical refrigeration, systems can be designed to operate between -20 and 750°F (-28 and 398°C). Heat exchangers can be factory installed in MWS, CWG, MOS, COS, PFC, CLD and CLS systems.

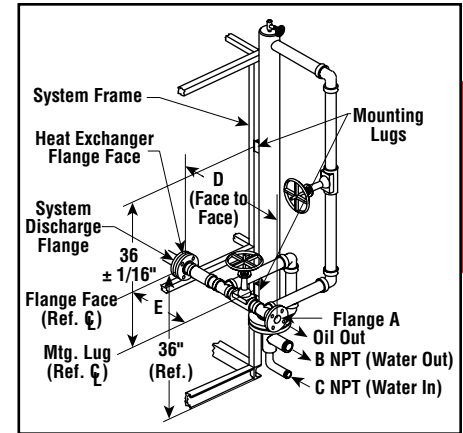
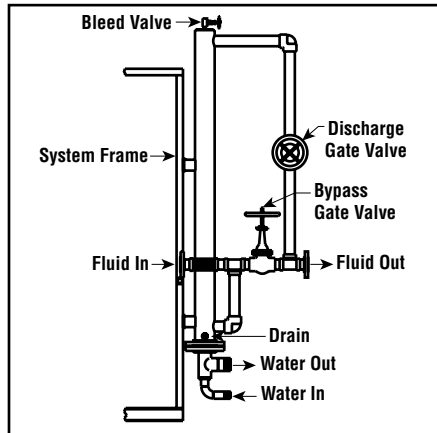
Stock Cooling Modules — On new or existing MOS, COS, PFC or PFV systems, Chromalox can supply an RJC type cooling module. RJC modules are oil-to-water heat exchangers providing rapid cool down of heat transfer fluid. RJC modules are designed as an “add on” to be installed in line with the system piping. The module can be bolted to the existing framework of the system and quickly connected in line with the discharge piping of the unit. Modules can be connected in series for additional cooling capacity.

Liquid Level Controls — A liquid level control or float switch can be mounted on an expansion tank to automatically shut down the heat transfer system in case of low fluid levels. Two different switches are available for non-pressurized systems (MWS, CWG, COS and PFC) and for pressurized systems (CLD and CLS).

They are available with NEMA IV weather resistant and NEMA VII explosion proof enclosures. The non-pressurized switch can be used with most heat transfer fluids having a minimum specific gravity of 0.85. The control designed for pressurized applications will work with all heat transfer fluids having a minimum specific gravity of 0.70.

Controls and Other Options — Specialized electronic and hydraulic control schemes are available using the latest proportional and digital control equipment. Contact your Local Chromalox Sales office for details on the many heat transfer equipment options and accessories.

Dimensions (Inches)

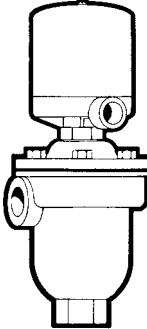


Specifications and Ordering Information

Cooling Capacity Surface Area (Ft ²)	Piping Connections and Dimensions (In.)					Estimated Sizing kW	Model	Stock	PCN	Wt. (Lbs.)
	1-1/2" Flg. (150 Lbs.) A	B	C	D	E					
10.8	1-1/2	1-1/2	1	29-1/2	14-1/8	9-30	RJC-12M1.5	NS	106964	294
10.8	2	1-1/2	1	29-1/2	14-1/8	40-80	RJC-12M2	NS	106972	310
19.78	2	2-1/2	1-1/4	29-1/2	13-1/8	40-80	RJC-20M2	NS	106980	390
25.35	2	2-1/2	1-1/4	29-1/2	13-1/8	40-80	RJC-25M2	NS	106999	442
25.35	3	2-1/2	1-1/4	29-1/2	13-1/8	100-400	RJC-25M3	NS	—	456

Stock Status: S = stock NS = non-stock
To Order—Specify model, system type, kW, PCN and quantity.

Liquid Level Control



Note — For Non-Pressurized CWG, COS and PFC Systems and for Pressurized CLD and CLS Systems

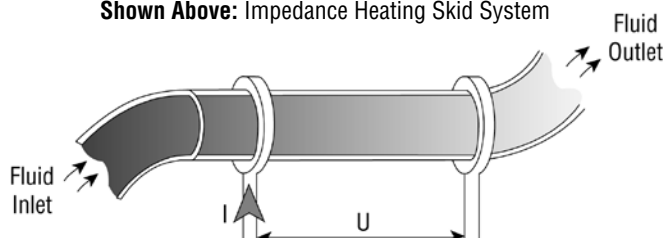
To Order — Specify system model, electrical enclosure and expansion tank size.

Impedance Heating System

- Uniform, Indirect Heating
- Distances of up to Several Miles in Length
- 1kW to Several MW of Power
- Low Voltage Operation in the Process (less than 50V)
- Temperatures to 1800°F
- Watt Densities up to 190 W/in²
- Hazardous Area Certifications Available



Shown Above: Impedance Heating Skid System



Shown Above: Heat Transfer and Process Liquifications

Description

Impedance style heating, through the Joule effect, uses the pipe itself as the heating source. This allows uniform heating around the process with minimal impact on the installation site.

Application – Heat Transfer & Process Liquifications

Impedance is a unique solution for raising the temperature of a process stream. Impedance uses the pipe itself to transfer heat, so no piping modifications are required. Common applications include fluids that are thermally sensitive and/or highly viscous. An impedance system is also ideally suited for fluids that may solidify in the piping and need liquefied prior to pumping. Impedance can gradually and evenly warm a process, such as paraffin, from a coagulated state to a fully liquid state for pumping.

Application - Heat Tracing and Freeze Protection

Impedance heating is perfectly suited for pipe maintenance temperatures. Applications include processes that require continuous, steady heat input or freeze protection for a fire water pumping system. Another common application is for corrosive environments where direct immersion heating is not desired.

Advantages

- **Accurate temperature control to $\pm 1^\circ\text{F}$** - Available SCR power control can accurately monitor and control desired temperature

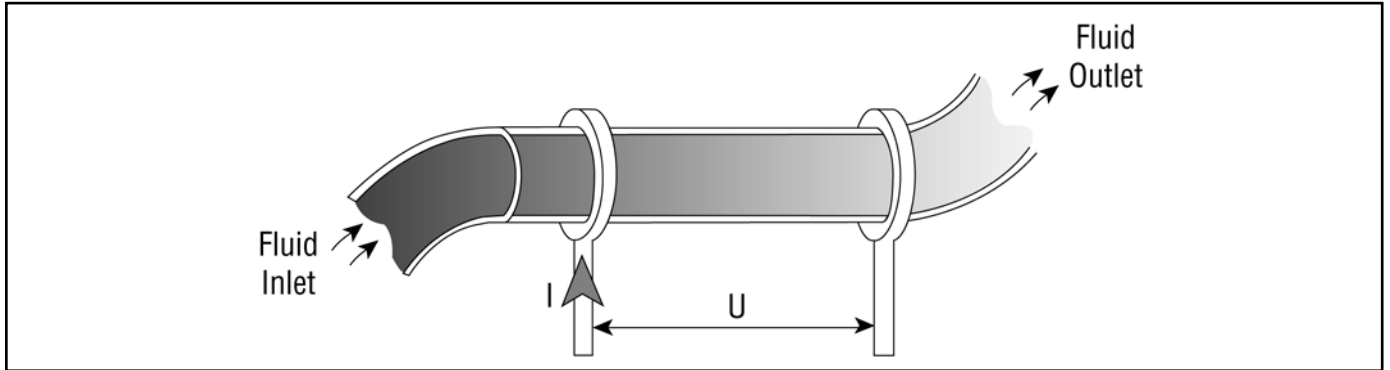
- **Uniform Heating** - rather than having localized 'hot spots' for transferring energy, Impedance heating allows for even, smooth heating along the entire circumference and length.
- **Simple Installation** - As compared to electric heating elements, additional piping, valves, wiring, etc are not needed to accommodate Impedance heating. Impedance utilizes the pipe itself and minimizes the amount of equipment needed.
- **Efficient, Compact area for heat transfer** - Impedance heating allows higher watt densities to be used due to increased velocities and lower pressure drops.
- **Indirect Heating Contact** - There are no concerns of corrosion on a heater sheath as the process is only heated by the pipe.
- **Can handle warm up or temperature maintenance conditions** - Impedance heating can be used for simply maintaining pipe temperatures or adding additional power to heat-up liquid flow. Impedance can also be used to liquify coagulated fluids when re-starting a system.
- **No routine maintenance needed** - Impedance has no moving parts that require servicing or that can cause costly shutdowns on operations.
- **No double jacketing** - Steam or oil traced lines have additional hazards of frozen lines, or leaky connections. Impedance totally eliminates these concerns.

Chromalox®

Specification Data Sheet Impedance Heating System

Form 234

Customer Name: _____ Quote No.: _____ Date: _____



Note — Drawing Is For Illustration Purposes Only.

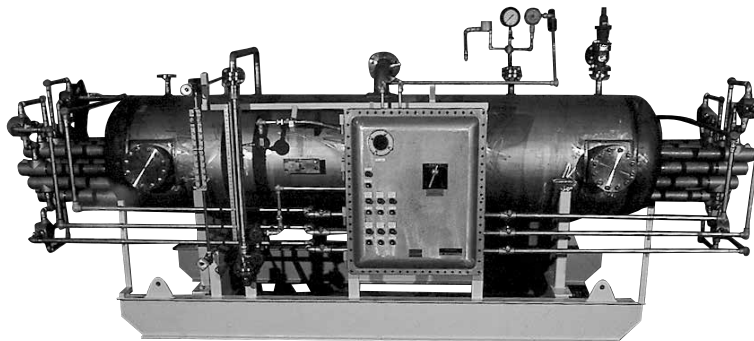
<i>Process Data</i>	<i>Insulation Data</i>
1. NAME OF FLUID:	1. INSULATION MATERIAL:
2. TYPE OF PROCESS: <input type="checkbox"/> Gas <input type="checkbox"/> Liquid	2. INSULATION "K" FACTOR:
3. WORKING PRESSURE: _____ psig.	3. THICKNESS: _____ Inches
	4. JACKETING MATERIAL:
<i>Complete Information for Section A or Section B</i>	<i>Environmental Data</i>
A. Pipe Maintenance	1. LOCATION: <input type="checkbox"/> Indoor <input type="checkbox"/> Outdoor
1. MAINTENANCE TEMPERATURE: _____ (°F)	2. MAXIMUM WIND SPEED: _____ Mph
	3. MINIMUM AMBIENT TEMP.: _____ (°F)
B. Process Heat Up	4. HAZARDOUS LOCATIONS: (If Yes, Specify) <input type="checkbox"/> Yes <input type="checkbox"/> No
1. INLET TEMPERATURE: _____ (°F)	Class:
2. OUTLET TEMPERATURE: _____ (°F)	Division:
3. FLOW RATE: _____ lb/hr	Group:
4. FLUID DENSITY: _____ lb/ft ³	T-Rating:
5. SPECIFIC HEAT: _____ Btu/lb°F	
6. WILL PROCESS CHANGE STATE? (If Yes, Specify)	Controls
Melting Point: _____ (°F)	1. CONTACTOR OR SCR:
Heat of Fusion _____ Btu/lb	2. NEMA ENCLOSURE RATING:
Viscosity of Liquid State	3. OTHER DESIRED FEATURES:
Viscosity of Solid State	
Density in Liquid State _____ lb/ft ³	Other
Density in Solid State _____ lb/ft ³	1. KW (If Known):
	2. AVAILABLE VOLTAGE:
	3. PHASE:
Pipe Data	
1. MATERIAL:	
2. LENGTH: _____ Feet	
3. OUTSIDE DIAMETER: _____ Inches	
4. THICKNESS: _____ Inches	

Please include a piping diagram for complex systems.

IMPEDANCE HEATING SYSTEM

CHTV

Heat Transfer Fluid Vaporizer



- Heat Transfer Fluids (Vapor Phase) to 750°F
- 15 - 300 kW (51 - 1,024 Mbh)
- 240 and 480V, 3 Phase, 60 Hz
- Pressurized Operation — ASME Certified to Section VIII, Div. 1 150 psig @ 750°F
- 300 Lb Carbon Steel Construction
- OCE Open Coil Elements Removable w/o Draining Tank
- Hartford Loop Piping Prevents Siphoning of Fluid in Gravity Return Systems
- Pressure Control and Sequencer for Process Control
- Operating Pressure Gauge
- Over-Pressure Cutout Switch
- Fluid Level Switch Locks Out Heating Elements if Low-Fluid Level Occurs
- Reflex Type High Pressure Liquid Level Sight Glass
- 5" Dia. Dial Type Thermometer with Thermowell
- ASME Relief Valve
- NEMA 1 Electrical Enclosure Complete with Circuit Breaker, Contactors, Fusing, Switches, Transformers and Pilot Lights

WARNING — In hazardous areas, pipe surfaces could achieve temperatures high enough to cause auto-ignition of the hazardous materials present. Consult Article 500 of the National Electrical Code for further information on the maximum allowable temperatures for a specific application.

Applications

Chromalox CHTV Heat Transfer Fluid Vaporizers are designed for use in textile, chemical, petrochemical and other industries requiring high temperatures and low operating pressures in their manufacturing processes. They operate to 750°F using Dowtherm® A or J, Therminol® VP-1 and other organic vapor phase heat transfer fluids.

Advantages

Vapor systems transfer more heat energy per pound of heat transfer medium than comparable liquid phase systems. As the fluid vapor condenses to a liquid in the process piping, it releases the latent heat of vaporization. Unlike steam, heat transfer fluids operate at relatively low pressures at elevated temperatures. Dowtherm® A only has a pressure of 102 psia @ 695°F.

Features

No pumps are needed for gravity return systems. Low operating pressures. Hartford loop piping for gravity return systems. Wiring and fusing conform to NEC requirements.

Options

- Alternate Voltage and kW Ratings
- Electronic Solid State (SCR) Power Controllers. Digital Communication Interface available
- Condensate Return Pumps
- NEMA 4 (CHTVW) or Class I, Group D, Div. 1 Electrical Enclosures (CHTVX) available
- Available without Control Panel or without Hartford Loop Piping
- Other Applications for Fluid Vaporization including Kerosene, Propane or Gasoline and Cryogenic Applications for Liquefied Natural Gas and Nitrogen

Specifications and Ordering Information

kW	Btuh	Operating Vol. (Gal.)	Dimensions (In.)			Tank Dia.	No. Circ.	Model	Stock	PCN	Wt. (Lbs.)
			H	W	D						
15	51,180	15.7	50	36	80	16	1	CHTV-316-15	NS	—	750
20	68,240	19.4	50	36	94	16	1	CHTV-316-20	NS	—	850
25	78,500	23.6	50	36	110	16	1	CHTV-316-25	NS	—	975
30	102,360	27.2	50	36	124	16	1	CHTV-316-30	NS	—	1,075
40	136,480	35.6	50	36	156	16	2	CHTV-316-40	NS	—	1,375
50	157,000	43.5	50	36	186	16	2	CHTV-316-50	NS	—	1,600
40	136,480	75	60	48	95	24	2	CHTV-624-40	NS	—	1,400
50	157,000	106	60	48	111	24	2	CHTV-624-50	NS	—	1,650
60	204,720	137	60	48	125	24	2	CHTV-624-60	NS	—	1,800
75	235,500	168	60	48	149	24	3	CHTV-624-75	NS	—	2,150
100	341,200	218	60	48	187	24	3	CHTV-624-100	NS	—	2,600
100	341,200	218	66	54	111	30	3	CHTV-1230-100	NS	—	2,650
125	392,500	222	66	54	129	30	4	CHTV-1230-125	NS	—	3,000
150	511,800	263	66	54	149	30	4	CHTV-1230-150	NS	—	3,400
175	549,500	300	66	54	167	30	6	CHTV-1230-175	NS	—	3,850
200	682,400	340	66	54	187	30	6	CHTV-1230-200	NS	—	4,300
225	767,700	379	72	60	149	36	6	CHTV-1836-225	NS	—	5,000
250	853,000	417	72	60	162	36	6	CHTV-1836-250	NS	—	5,600
275	938,300	455	72	60	175	36	6	CHTV-1836-275	NS	—	6,000
300	1,023,600	490	72	60	187	36	6	CHTV-1836-300	NS	—	6,400

Stock Status: S = stock NS = non-stock
To Order—Specify model, volts, phase, kW, options and quantity.

Large Tank Heaters

Application & Equipment Selection

- Type OCE Open Coil Elements in 2" and 3" Schedule 40 NPS Pipe
- Type STFX Small Tank Flange Heaters
- Type LTFX Large Tank Flange Heaters
- Type FXTH Flexible Tank Heaters for Oil and Viscous Liquids
- Type RSTO Immersion Heaters with Integrated Control Panel
- 4 - 240 kW (13.6 - 819 Mbh)
- 208 - 600V, 3 Phase

WARNING — In hazardous areas, pipe surfaces could achieve temperatures high enough to cause auto-ignition of hazardous materials present. Consult Article 500 of the National Electrical Code for further information on the maximum allowable temperatures for a specific application.

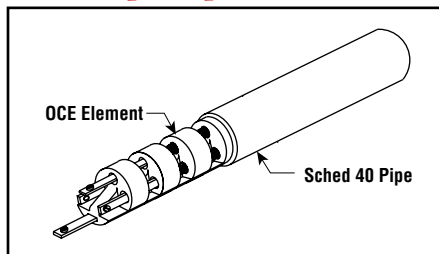
Applications

A major portion of the heating operations in large storage tanks can be performed at night during off peak power rates. Frequently, only small amounts of heat are required to sustain temperature levels in the tank during the daytime. Using Chromalox packaged control centers, large tank heating systems can be operated with little or no manual attention. The needed heat can be applied economically and automatically by using strategically located thermostats to monitor tank temperatures and energize the heaters. The heating operation may be fully automated by using time clocks to program the start and stop of both off peak and daytime heating functions.

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

OCE Open Coil Elements — Heavy gauge resistance wire coils are mounted into high density electrical ceramics. The ceramics are strung on a continuous support bar to provide sufficient rigidity to insert the assembly into a 2 or 3" Schedule 40 NPS steel pipe. Pipes are installed into tanks or vessels by the end user. NEMA 4 terminal enclosure kits are available for field installation.

OCE — Open Pipe Heater

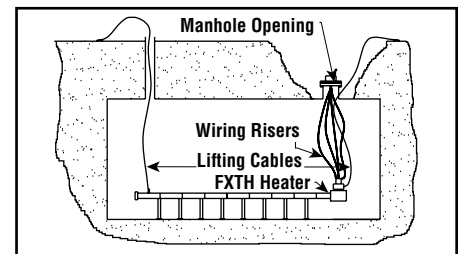


Equipment

Chromalox offers a number of cost effective solutions to the challenge of heating materials in large storage tanks. In addition to flanged immersion heaters, over-the-side heaters, circulation heaters, steam boilers, heat transfer systems and heat tracing cables which are described in other sections of this catalog, Chromalox offers three uniquely designed heating systems for large storage tanks. These specialty products can be installed in above or below ground tanks made of steel, concrete or Fiberglass®. Equipment selection ranges from simple OCE Pipe Insert Heaters to larger RSTO Unitary Immersion Heaters to the FXTH Flexible Tank Heater.

FXTH Flexible Tank Heaters — are particularly useful when the storage tank to be heated is under ground or the tank ends are inaccessible for installation of more conventional heaters. FXTH heaters can be installed through the normal manhole opening of many large tanks without requiring any modifications to the tank itself.

FXTH — Flexible Tank Heater



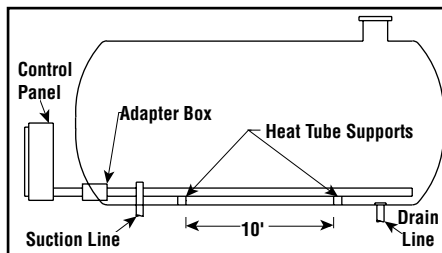
Large Tank Heaters

Application & Equipment Selection

(cont'd.)

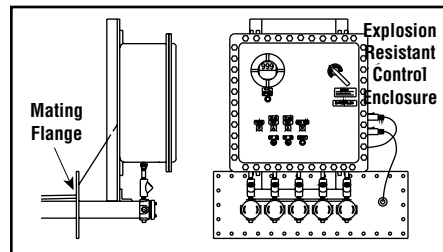
RSTO – Unitary Immersion Heaters

Metal sheath or open coil elements are inserted into an assembly of 3" Schedule 40 NPS steel pipes. The pipes are welded into an adapter box for convenient field welding of the entire assembly to the header of a steel tank. The heaters are self contained with built-in controls mounted in a weather proof electrical enclosure.



Optional Heaters

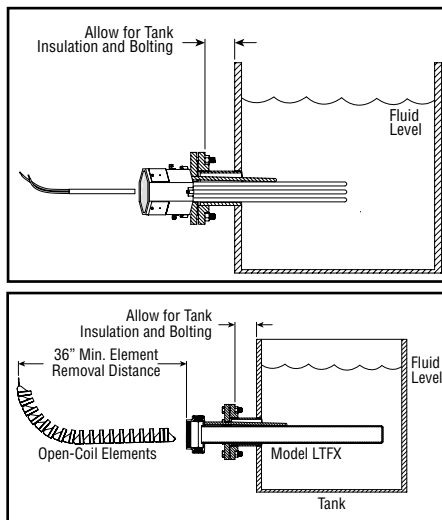
STFX, LTFX and RSTO Immersion Heaters are available with explosion resistant electrical enclosures and/or adapter flanges in place of the adapter box.



WARNING — In hazardous areas, pipe surfaces could achieve temperatures high enough to cause auto-ignition of hazardous materials present. Consult Article 500 of the National Electrical Code for further information on the maximum allowable temperatures for a specific application.

Flange Heaters

STFX, Small Tank and LTFX Large Tank Flange Heaters allow tank heating elements to be changed without draining the tank. They provide low watt density heating over a large surface area while providing precise temperature control.

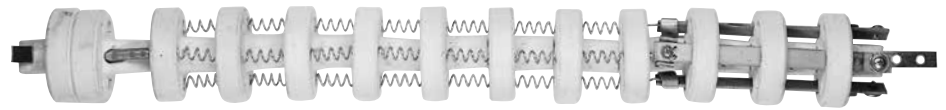


Large Tank Heaters — Selection Guidelines

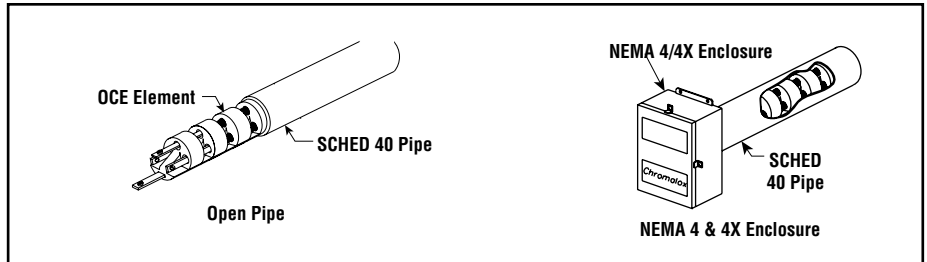
Model	System Type	Application	Operating Temp. (°F)	kW	Mbh	Construction	Page
OCE	Open Coil Elements	Pipe Insert	0 - 750	4 - 20	13.6 - 68.2	N/A	D-28
STFX	Small Tank Flange Heater	Above Ground Storage Tank	0 - 750	1 - 25	3.4 - 85	ANSI Flange	D-29
LTFX	Large Tank Flange Heater	Above Ground Storage Tank	0 - 750	4 - 240	13.6 - 816	ANSI Flange	D-30
FXTH	Large Tank Flexible	Below Ground Storage Tank	50 - 225	6 - 60	20.5 - 204.7	NPT and Welded	D-31
RSTO	Large Tank Unitary Immersion	Viscous Fluid	50 - 400	15 - 72	51.2 - 245.7	Welded	D-35

OCE Open Coil Elements

- 1-7/8 and 2-3/4" Outside Dia.
- 60 - 320" (5 - 26 Ft.) Lengths
- 4 - 20 kW Single Element Ratings
- 3 - 12 W/in² (Pipe Surface)
- 240 and 480V, Three Phase (600V available)
- For Use In Horizontal 2 or 3" Schedule 40 NPS Pipe



Typical Applications



Features

Rugged Construction — Insulating supports are made of high density electrical ceramic

Easy Installation — Only 3 feet is required for installation or removal in cramped areas

Highly Flexible — Can be bent in a vertical plane on a minimum 12" radius

Continuous Support Bar positions the ceramic insulators and provides sufficient rigidity for handling and installation in pipe

Heavy Gauge Bus Bars provide spacing of heated section away from terminal area

Heavy Gauge Resistance Wire provides reliable service and long element life

Special Ratings and Lengths available

CAUTION — OCE elements should never be mounted in a vertical position as the resistance wire will sag causing uneven heating and short circuits. Allow 3/8" per foot of heater length for expansion. Users should install temperature regulating controls, fusing and backup safety devices.

Applications

Chromalox OCE Open Coil Element assemblies are specifically designed to fit inside standard 2 or 3" Schedule 40 NPS pipe for use in tank and pipe heating. They can also be used inside metal tubing. (Requires 1/8" min. clearance between ceramic and inside tube wall.)

An OCE heater assembly installed inside a Schedule 40 NPS pipe provides uniform heat over a large surface area. This method of indirect heating lowers the watt density or heat flux on the surface area of the pipe in contact with the heated media, reducing the tendency to coke or breakdown heat sensitive materials.

Specifications and Ordering Information

kW	Watt' Density	Pipe Size (NPS)	Length (In.)	Cold End (In.)	Model		Stock	Wt. (Lbs.)
					240V 3 Phase	480V 3 Phase		
4	10	2"	60	8	OCE-05040-2-24-3	OCE-05040-2-48-3	NS	8
8	12	2"	96	6	OCE-08080-2-24-3	OCE-08080-2-48-3	NS	12
12	12	2"	144	6	OCE-12120-2-24-3	OCE-12120-2-48-3	NS	18
20	12	2"	240	6	Not Available	OCE-20200-2-48-3	NS	30
5	7.8	3"	66	8	Not Available	OCE-06050-3-48-3	NS	9
5.6	3	3"	184	15	OCE-15056-3-24-3	OCE-15056-3-48-3	NS	33
6	3	3"	188	15	OCE-15060-3-24-3	OCE-15060-3-48-3	NS	35
6.5	3	3"	206	15	OCE-17065-3-24-3	OCE-17065-3-48-3	NS	38
6.7	3	3"	212	15	OCE-17067-3-24-3	OCE-17067-3-48-3	NS	39
6.9	3	3"	219	15	OCE-19069-3-24-3	OCE-19069-3-48-3	NS	40
7.2	3	3"	230	15	OCE-19072-3-24-3	OCE-19072-3-48-3	NS	42
7.5	3	3"	236	15	OCE-19075-3-24-3	OCE-19075-3-48-3	NS	43
10	4	3"	236	15	OCE-19100-3-24-3	OCE-19100-3-48-3	NS	43
12.5	5	3"	236	15	OCE-19125-3-24-3	OCE-19125-3-48-3	NS	43
7.6	3	3"	242	15	OCE-20076-3-24-3	OCE-20076-3-48-3	NS	44
8	3	3"	242	15	OCE-20080-3-24-3	OCE-20080-3-48-3	NS	44
8	3	3"	255	15	OCE-21080-3-24-3	OCE-21080-3-48-3	NS	47
9	3	3"	284	15	OCE-23090-3-24-3	OCE-23090-3-48-3	NS	52
9.6	3	3"	308	15	OCE-25096-3-24-3	OCE-25096-3-48-3	NS	56
10	3	3"	314	15	OCE-26100-3-24-3	OCE-26100-3-48-3	NS	58
10.3	3	3"	320	15	OCE-26103-3-24-3	OCE-26103-3-48-3	NS	59

Stock Status: S = stock NS = non-stock

To Order— Specify model, volts, phase, kW, length, cold end and quantity.

1. Watt Density based on the outside surface area of 2 or 3" Schedule 40 NPS pipe.
2. Alternate voltages available, contact your Local Chromalox Sales office.

Other Note — Optional NEMA 4 or 4X Enclosure Kit for field installation.

Ordering Guidelines

Open Coil Heaters

Ordering Information

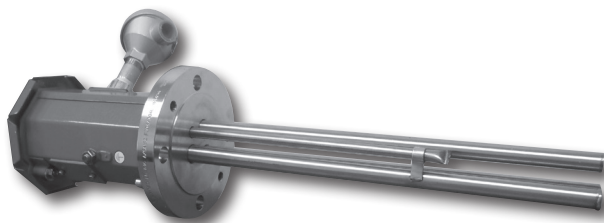
To Order—
Specify model, volts, phase, kW, PCN (where available) and options desired. Complete model number using the matrix provided.

Model	Large Tank Heating Systems								
OCE	Open Coil Element								
	Code	Length (nearest Ft.)							
	19	19							
		Code	Wattage						
		125	12.5 kW (use actual kilowatt in three digits i.e. 5 kW=050 or 0.5 kW=005)						
			Code	Pipe Size (Schedule 40)					
			2	2" NPS					
			3	3" NPS					
				Code	Voltage				
				20	208	24	240	38	380
				41	415	48	480	57	575
					Code	Phase			
					1	Single			
					3	Three			
OCE	19	125	3	24	3	Typical Model Number			

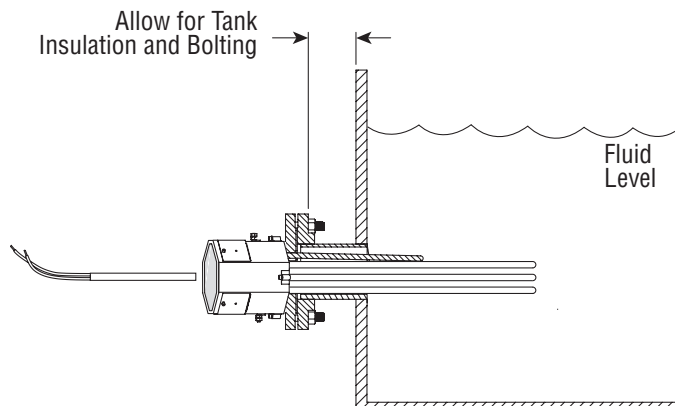
Note — NEMA 4 or 4X terminal enclosure kit is available for field installation by contacting your Local Chromalox Sales office.



STFX Small Tank Flange Heater



- 304 Stainless Steel Element Sheath
- Carbon Steel Flange Construction
- 3" to 12" 150# Flange Size
- Moisture Resistant Terminal Housing (NEMA 4/IP66)
- Third Party Certified
- 1 - 25 kW Unit Ratings
- 240 V, 480 V, or 600 V, Three Phase, Single Circuit
- 24" (610 mm) Immersion Lengths
- 5, 10, 20, or 40 w/in² (1, 1.6, 3.5 & 6.2 w/cm²) Pipe Surface
- Standard Over-Temperature Protection - Type J Thermocouple
- ASME Design and Certification Available
- Matching Control Panels Available



Description

Chromalox STFX style units allow heating elements to be changed without draining the tank. This is ideal for smaller, critical system storage units that need to remain filled for continuous operation and storage.

Applications

STFX units provide replaceable-element design in a compact setting, while providing precise temperature control. 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.

Advantages

- **No Tank Draining Required** - Replaceable style heating elements can be inspected or changed without draining the tank. This reduces costs and production downtime.
- **Quick & Easy Installation** - A standard ANSI flange provides a straightforward mating connection with no special modifications required.
- **Stocked Replacement Elements** - Standardized heater cores allow for multiple heater element replaceability with a minimum number of parts.
- **Third-Party Certifications** - Terminal housings are CSA approved.

- **Easy Element Maintenance** - Replaceable-style elements can be easily changed by one person with no special tooling required.

- **Clean, Pollution-Free Electric Heat** - Unlike gas or steam heat, STFX units have no open flames, no additional plumbing connection, quiet operation, and better efficiencies. In addition, they can be precisely controlled and operation is simple.

- **Overtemperature Sensor** - Each unit is equipped with a type J thermocouple for overtemperature sensing on the pipe wall.

- **Matching Control Panel** - Each unit can be matched with a corresponding control panel to ensure seamless operation.

Options

- 304 or 316 Stainless Steel Flange
- 316 or INCOLOY 800 Element Sheath
- Alternate Voltage and kW Ratings
- Explosion/Moisture Resistant Terminal Housing
- Optional direct mounting of Chromalox controls
- Customized immersion lengths for unique sized tanks.
- Alternate materials for corrosive applications

SMALL TANK

STFX

Small Tank Flange Heater *(cont'd.)*

Steel Flange, 304 Stainless Steel applications

Model Specifications - 40 w/in² (6.2 w/cm²) Applications

Heater Model	Volts	kW	Immersion Length In. (mm)	Circuits	Phase	ANSI Flange Size	Number of Heater Tubes	Heater Part Number	Replacement Element Part Number	Matching Control Panel Model
STFXS-01-002P-E4	480	2.0	24 (610)	1	1	3" - 150#	1	306608-001	306675-001	484211-003
STFXS-03-006P-E4	480	6.0	24 (610)	1	3	3" - 150#	3	306608-002	306675-001	484211-003
STFXS-06-012P-E4	480	12.0	24 (610)	1	3	4" - 150#	6	306608-003	306675-001	484211-003
STFXS-09-018P-E4	480	18.0	24 (610)	1	3	5" - 150#	9	306608-004	306675-001	484211-003
STFXS-12-024P-E4	480	24.0	24 (610)	1	3	6" - 150#	12	306608-005	306675-001	484211-003
STFXS-01-001P6-E4	600	1.6	24 (610)	1	1	3" - 150#	1	306608-006	306675-002	4468-30511-9010(1)
STFXS-03-004P7-E4	600	4.7	24 (610)	1	3	3" - 150#	3	306608-007	306675-002	4468-30511-9010(1)
STFXS-06-009P4-E4	600	9.4	24 (610)	1	3	4" - 150#	6	306608-008	306675-002	4468-30511-9015(1)
STFXS-09-014P-E4	600	14.0	24 (610)	1	3	5" - 150#	9	306608-009	306675-002	4468-30511-9025(1)
STFXS-12-018P7-E4	600	18.7	24 (610)	1	3	6" - 150#	12	306608-010	306675-002	4468-30511-9035(1)

Model Specifications - 20 w/in² (3.1 w/cm²) Applications

Heater Model	Volts	kW	Immersion Length In. (mm)	Circuits	Phase	ANSI Flange Size	Number of Heater Tubes	Heater Part Number	Replacement Element Part Number	Matching Control Panel Model
STFXS-03-003P-E4	480	3.0	24 (610)	1	3	3" - 150#	3	306608-011	306675-002	484211-003
STFXS-06-006P-E4	480	6.0	24 (610)	1	3	4" - 150#	6	306608-012	306675-002	484211-003
STFXS-09-009P-E4	480	9.0	24 (610)	1	3	5" - 150#	9	306608-013	306675-002	484211-003
STFXS-12-012P-E4	480	12.0	24 (610)	1	3	6" - 150#	12	306608-014	306675-002	484211-003
STFXS-24-024P-E4	480	24.0	24 (610)	1	3	8" - 150#	24	306608-015	306675-002	484211-003
STFXS-03-003P2-E4	600	3.2	24 (610)	1	3	3" - 150#	3	306608-016	306675-001	4468-30511-9010(1)
STFXS-06-006P3-E4	600	6.3	24 (610)	1	3	4" - 150#	6	306608-017	306675-001	4468-30511-9010(1)
STFXS-09-009P4-E4	600	9.4	24 (610)	1	3	5" - 150#	9	306608-018	306675-001	4468-30511-9015(1)
STFXS-12-012P5-E4	600	12.5	24 (610)	1	3	6" - 150#	12	306608-019	306675-001	4468-30511-9015(1)
STFXS-24-025P-E4	600	25.0	24 (610)	1	3	8" - 150#	24	306608-020	306675-001	4468-30511-9035(1)

Application Recommended w/in²

Oil	w/in ² (w/cm ²)	Water
-----	40 (6.2)	Water or Water/Glycol Mix
Light Weight	20 (3.1)	Mildly Corrosive
Medium Weight	10 (1.6)	Severely Corrosive
Heavy Weight	5 (1)	-----

Note: To maximize heater life, the unit selection requires critical engineering judgement by the plant engineer in the selection of proper heater materials and watt density.

STFX Small Tank Flange Heater *(cont'd.)*

Steel Flange, 304 Stainless Steel applications

Model Specifications - 10 w/in² (1.6 w/cm²) Applications

Heater Model	Volts	kW	Immersion Length In. (mm)	Circuits	Phase	ANSI Flange Size	Number of Heater Tubes	Heater Part Number	Replacement Element Part Number	Matching Control Panel Model
STFXS-03-001P5-E4	240	1.5	24 (610)	1	3	3" - 150#	3	306608-021	306675-001	4468-30511-9010(1)
STFXS-06-003P-E4	240	3.0	24 (610)	1	3	4" - 150#	6	306608-022	306675-001	4468-30511-9010(1)
STFXS-12-006P-E4	240	6.0	24 (610)	1	3	6" - 150#	12	306608-023	306675-001	4468-30511-9020(1)
STFXS-24-012P-E4	240	12.0	24 (610)	1	3	8" - 150#	24	306608-024	306675-001	4468-30511-9040(1)
STFXS-36-018P-E4	240	18.0	24 (610)	1	3	10" - 150#	36	306608-025	306675-001	4468-30511-9060(1)
STFXS-48-024P-E4	240	24.0	24 (610)	1	3	12" - 150#	48	306608-026	306675-001	4468-30511-9080(1)
STFXS-03-001P6-E4	600	1.6	24 (610)	1	3	3" - 150#	3	306608-027	306675-002	4468-30511-9010(1)
STFXS-06-003P2-E4	600	3.2	24 (610)	1	3	4" - 150#	6	306608-028	306675-002	4468-30511-9010(1)
STFXS-12-006P3-E4	600	6.3	24 (610)	1	3	6" - 150#	12	306608-029	306675-002	4468-30511-9010(1)
STFXS-24-012P5-E4	600	12.5	24 (610)	1	3	8" - 150#	24	306608-030	306675-002	4468-30511-9015(1)
STFXS-36-018P8-E4	600	18.8	24 (610)	1	3	10" - 150#	36	306608-031	306675-002	4468-30511-9025(1)
STFXS-48-025P1-E4	600	25.1	24 (610)	1	3	12" - 150#	48	306608-032	306675-002	4468-30511-9035(1)

SMALL TANK

Model Specifications - 5 w/in² (1 w/cm²) Applications

Heater Model	Volts	kW	Immersion Length In. (mm)	Circuits	Phase	ANSI Flange Size	Number of Heater Tubes	Heater Part Number	Replacement Element Part Number	Matching Control Panel Model
STFXS-03-000P8-E4	240	0.75	24 (610)	1	3	3" - 150#	3	306608-033	306675-002	4468-30511-9010(1)
STFXS-06-001P5-E4	240	1.5	24 (610)	1	3	4" - 150#	6	306608-034	306675-002	4468-30511-9010(1)
STFXS-12-003P-E4	240	3.0	24 (610)	1	3	6" - 150#	12	306608-035	306675-002	4468-30511-9020(1)
STFXS-24-006P-E4	240	6.0	24 (610)	1	3	8" - 150#	24	306608-036	306675-002	4468-30511-9040(1)
STFXS-36-009P-E4	240	9.0	24 (610)	1	3	10" - 150#	36	306608-037	306675-002	4468-30511-9060(1)
STFXS-48-012P-E4	240	12.0	24 (610)	1	3	12" - 150#	48	306608-038	306675-002	4468-30511-9080(1)
STFXS-06-001P6-E4	600	1.6	24 (610)	1	3	4" - 150#	6	306608-039	306675-001	4468-30511-9010(1)
STFXS-12-003P2-E4	600	3.2	24 (610)	1	3	6" - 150#	12	306608-040	306675-001	4468-30511-9010(1)
STFXS-24-006P3-E4	600	6.3	24 (610)	1	3	8" - 150#	24	306608-041	306675-001	4468-30511-9010(1)
STFXS-36-009P4-E4	600	9.4	24 (610)	1	3	10" - 150#	36	306608-042	306675-001	4468-30511-9015(1)
STFXS-48-012P5-E4	600	12.5	24 (610)	1	3	12" - 150#	48	306608-043	306675-001	4468-30511-9015(1)

Application Recommended w/in² (w/cm²)

Oil	w/in ² (w/cm ²)	Water
-----	40 (6.2)	Water or Water/Glycol Mix
Light Weight	20 (3.1)	Mildly Corrosive
Medium Weight	10 (1.6)	Severely Corrosive
Heavy Weight	5 (1)	-----

Note: To maximize heater life, the unit selection requires critical engineering judgement by the plant engineer in the selection of proper heater materials and watt density.

STFX

Small Tank Flange Heater *(cont'd.)*

Ordering Information

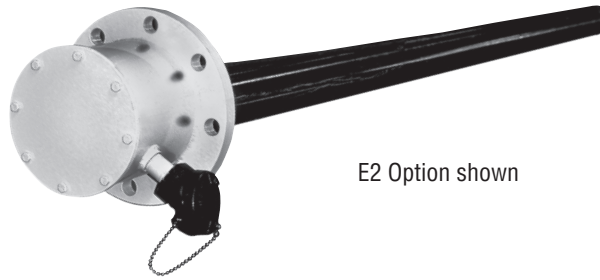
To Order— Complete model number using the matrix provided.

Model	Small Tank Heating Systems									
STFX	Small Tank Flange Heater									
Code	Thermowell Material									
S	304 Stainless Steel									
I	Incoloy 800									
X	Other Material									
Code	Flange Material									
(Blank)	Carbon Steel									
S	304 Stainless Steel									
X	Other Material									
Code	Number of Thermowells									
01	One	05	Five							
02	Two	06	Six							
03	Three	07	Seven							
04	Four	08	Eight							
Code	Wattage									
004P5	4.5 kW (use actual kilowatt in three digits)									
Code	Terminal Housing Style									
E4	Moisture Resistant									
E2	Explosion / Moisture Resistant									
Code	Non-Standard Feature									
(Blank)	Catalog PCN item									
XX	Custom Feature									
Code	Voltage									
208	208 V	240	240 V	380	380 V					
415	415 V	480	480 V	600	600 V					
Code	Number of circuits									
1	One	3	Three							
2	Two	4	Four							
Code	Phase									
1P	Single Phase									
3P	Three Phase									
Code	Kilowatts									
4.5	kW									
STFX	S	S	-03	-004P5	-E4	480V	1	-3P	4.5kW	Typical Model Number

Example of Final Model Description: STFXSS-03-004P5-E4 480V 1-3P 4.5kW

Note — Shaded sections of the model build table are not a finite list. Items such as Number of Tubes, Length, Wattage, and Voltage should be adjusted to match design.

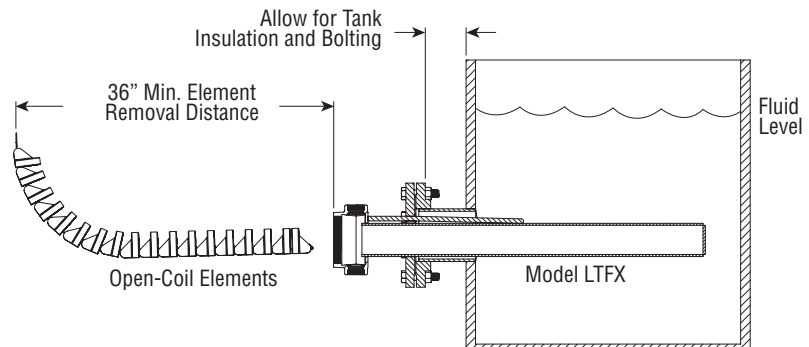
LTFX Large Tank Flange Heater



E2 Option shown



- Carbon or Stainless Steel Construction
- 4" to 14" 150# Flange Size
- Moisture Resistant (IP66) or Explosion / Moisture Resistant Terminal Housing
- Third Party Certified
- 4 - 240 kW Unit Ratings
- 5' - 25' Immersion Lengths
- 9 - 12 W/in² (Pipe Surface)
- 480V Three Phase (600V Available)
- Standard Type J Thermocouple for Over-Temperature Protection
- Matching Control Panels Available (Pre-Mounting Option Available)
- ASME Design and Certification Available
- Custom Flange Sizes, kW Rating, or Voltages Available



Description

Chromalox LTFX style units allow tank heating elements to be changed without draining the tank. This is ideal for large capacity tanks that must remain filled for continuous operation and storage.

Applications

LTFX units 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, glycerin, animal fats, vegetable oils, fuel oils, or similar types of liquids.

Note: Horizontal mount only.

Advantages

- **No Tank Draining Required** - Open-coil (OCE) style heating elements can be inspected or changed without draining the tank. This reduces costs and production downtime.
- **Quick & Easy Installation** - Standard ANSI flange provides a straightforward mating connection and requires no special modifications.
- **Third Party Certifications** - Moisture Resistant Housings are CSA Certified. Explosion / Moisture Resistant Housings carry both CSA and ATEX approvals for hazardous locations (see table for specific listings).
- **Minimal Spacing Required** - Open-coil (OCE) style elements can be bent to a vertical plane during removal, with as little as 36" of clearance between tanks, walls or other obstructions. This allows more efficient use of factory floor space.

- **Clean, Pollution Free Electric Heat** - Unlike gas or steam heat, LTFX units have no open flames, no additional plumbing connection, quiet operation, and better operating efficiencies. In addition, electric heat can be precisely controlled with Chromalox control panels.

- **Matching Control Panel** - Each unit can be matched with a corresponding control panel to ensure seamless operation. Control panels can be provided separately or installed directly on the LTFX unit.

- **Provided Overtemperature Sensor** - Each unit comes equipped with a type J thermocouple for overtemperature sensing on the pipe wall.

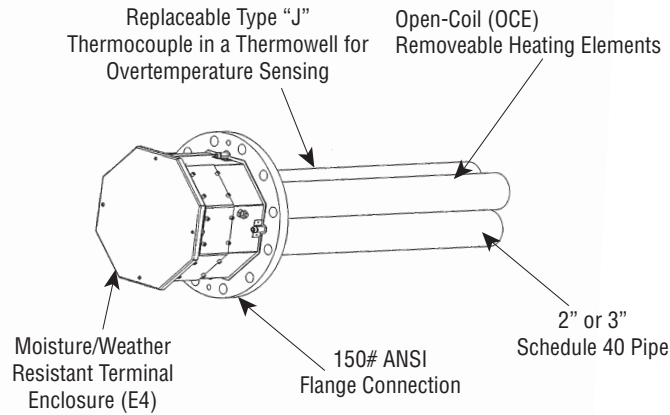
Options

- **Universal Support Stand** - Support stand helps to ensure ease of installation and minimize on-site fabrication. (Shipped separately)
- Alternate Voltage and kW Ratings
- Larger ANSI style flanges available (up to 36", 300#)
- Optional pre-assembly with Chromalox control panel
- Lower watt densities for highly viscous material
- Customized immersion lengths and/or flanges for custom sized tanks are available

LARGE TANK

LTFX

Large Tank Flange Heater *(cont'd.)*



Model Specifications – E4 Moisture Resistant Housing

Heater Model	kW	Volts	Phase	Circuits	Immersion Length (In.)	ANSI Flange Size	Number of Tubes	Nominal Tube Diameter	Watt Density (Outside)	Matching Control Panel	
										PCN	Model
LTFX-125-004E4	4	480	3	1	60	4" - 150#	1	2"	10	484211-003	CPCA-SI-75EV
LTFX-128-008E4	8	480	3	1	96	4" - 150#	1	2"	12	484211-003	CPCA-SI-75EV
LTFX-1212-012E4	12	480	3	1	144	4" - 150#	1	2"	12	484211-003	CPCA-SI-75EV
LTFX-2212-024E4	24	480	3	1	144	6" - 150#	2	2"	12	484211-003	CPCA-SI-75EV
LTFX-3212-036E4	36	480	3	1	144	6" - 150#	3	2"	12	484211-003	CPCA-SI-75EV
LTFX-2325-060E4	60	480	3	1	300	8" - 150#	2	3"	9	484211-003	CPCA-SI-75EV
LTFX-3325-090E4	90	480	3	3	300	10" - 150#	3	3"	9	n/a	4432-348-51100
LTFX-4325-120E4	120	480	3	2	300	10" - 150#	4	3"	9	n/a	4432-280-51100
LTFX-6325-180E4	180	480	3	3	300	12" - 150#	6	3"	9	n/a	4432-380-51100
LTFX-8325-240E4	240	480	3	4	300	14" - 150#	8	3"	9	n/a	4432-480-51100

Note — The above heater and panel units are sold and shipped separately. Horizontal mount only.

Model Specifications – E2 Explosion/Moisture Resistant Housing

Heater Model	kW	Volts	Phase	Circuits	Immersion Length (In.)	ANSI Flange Size	Number of Tubes	Nominal Tube Diameter	Watt Density (Outside)	Matching Control Panel	
										PCN	Model
LTFX-125-004E2	4	480	3	1	66	4" - 150#	1	2"	9	Note: Explosion Resistant Control Panels are available. However, installing the control panel outside the hazardous location may offer significant cost savings. Please refer to section 'H' of the catalog for available panel options.	
LTFX-128-008E2	8	480	3	1	96	4" - 150#	1	2"	12		
LTFX-1212-012E2	12	480	3	1	144	4" - 150#	1	2"	12		
LTFX-3210-024E2	24	480	3	1	120	8" - 150#	3	2"	9		
LTFX-3215-036E2	36	480	3	1	180	8" - 150#	3	2"	9		
LTFX-3225-060E2	60	480	3	1	300	8" - 150#	3	2"	9		
LTFX-4225-090E2	90	480	3	2	300	10" - 150#	4	2"	10		
LTFX-8215-120E2	120	480	3	2	180	12" - 150#	8	2"	12		
LTFX-9220-180E2	180	480	3	3	240	14" - 150#	9	2"	11		

Note — The above heater and panel units are sold and shipped separately. Horizontal mount only.

Optional Accessories

PCN	Description
308355	12" - Type "J" T/C for customer install
308064	12" - RTD for customer install
308670	Thermowell for T/C or RTD
327783	Type J Extension wire, 100 ft.
308873	Type J Extension wire, 200 ft.
327791	Type J Extension wire, 500 ft.
308881	Type J Extension wire, 1000 ft.
308144	RTD Extension wire, 50 ft.
308152	RTD Extension wire, 200 ft.
308160	RTD Extension wire, 1000 ft.
073139-031	Universal Support Stand (Stainless Steel)
073139-032	Universal Support Stand (Carbon Steel)

Note — Chromalox adjustable support stand helps to ensure ease of installation and minimal on-site fabrication.

LTFX

Large Tank Flange Heater *(cont'd.)*

Ordering Information

To Order— Complete model number using the matrix provided.

Model	Large Tank Heating Systems															
LTFX	Large Tank Flange Heater															
	Code	Tube and Flange Material														
	(Blank)	Carbon Steel														
	SS	304 Stainless Steel														
	M	Other Material														
	Code	Control Panel Mounting														
	(Blank)	Panel Provided Separately														
	P	Control Panel Mounted on Unit														
	Code	Number of Heating Tubes														
	3	Number of Heating Tubes in ANSI Flange														
	Code	Tube Diameter														
	2	2" NPS														
	3	3" NPS														
	Code	Length (nearest Ft.)														
	25	Heating Tube Immersion Length														
	Code	Kilowatt Rating of Unit (three digits)														
	090	kW														
	Code	Terminal Housing Style (Refer to Certification Table for Third Party Listings)														
	E4	Moisture Resistant														
	E2	Explosion/Moisture Resistant														
	Code	Non-Standard Feature														
	(Blank)	Catalog PCN Item														
	XX	Custom Feature														
	Code	Voltage														
	208	208	415	415												
	240	240	480	480												
	380	380	575	575												
	Code	Number of Circuits														
	1	One	3	Three												
	2	Two	4	Four												
	Code	Phase														
	1P	Single														
	3P	Three														
	Code	Kilowatts														
	90	kW														
LTFX	-	-	-	3	3	25	-	090	E4	-	480V	3	-	3P	90	Typical Model Number

LARGE TANK

Note —





Shaded sections of the model build table are not a finite list. Items such as Number of Tubes, Length, Wattage, and Voltage should be adjusted to match design.

LTFX

Large Tank Flange Heater *(cont'd.)*



Certifications

E4 Moisture Resistant Enclosure Certifications

	North America Designation(s)	Canadian Designation(s)	European Designation(s)	International Designation(s)
Rating	NEMA 4	NEMA 4	IP66	IP66
Agency(s)	 		 Manufacturers declaration	Manufacturers declaration



E2 Moisture Resistant/Explosion Proof Enclosure Certifications

	North America Designation(s)	Canadian Designation(s)	European Designation(s)	International Designation(s)
Rating	Explosion Resistant	Explosion Resistant	Explosion Resistant	Explosion Resistant
Agency(s)	CSAus	CSA	ATEX	IECEX
Ratings*	Class I, Div. 1 Groups B, C & D	Class I, Div. 1 Groups B, C & D	 0359  II 2 G Ex d IIB+H2 Gb T1 to T6	Ex d IIB+H2 Gb T1 to T6
	Class II, Div. 1 Groups E, F & G	Class II, Div. 1 Groups E, F & G	IP66	IP66
	Class I Zone 1 AEx d IIB + H2 Gb T1 to T6	Class I Zone 1 Ex d IIB + H2 Gb T1 to T6		
-50°C < Ta < +60°C				



*Note: Temps over T3 (200°C) require stand-offs for third-party listing. Refer to IECEX and ATEX certificates for stand-off dimensions.

FXTH

Flexible Tank Immersion Heater

- 12 - 40 Ft. Immersed Length (1, 2 or 3 Flexible Assemblies)
- 6 - 60 kW (20 - 204 Mbh)
- 240 and 480V, Three Phase (600V Available)
- Low Watt Density, High Wattage
- Installs through Manhole in Tank above or below ground. (14" Dia. Min.)
- Optional NEMA 4 (WCC) Control Center



Optional Control Panel³

Applications

Chromalox FXTH Immersion Heaters provide low watt density heating for such materials as asphalt, fuel oil, pitch and tar, liquid sugar, molasses, lube oils, linseed oil and other heat sensitive materials. FXTH heaters can be installed through the manhole opening in existing large tanks above or below ground without welding, cutting or cleaning. FXTH heaters can be used in steel, concrete and Fibreglas[®] tanks or in open top process tanks.

Features

No Tank Modification Required — Installs through normal manhole opening

No Hot Spots or Carbonization — Heat is evenly spread along the bottom of the tank

Weather Proof Terminal Enclosure contains process and overtemperature thermocouples. Overtemperature thermowell is attached to heater sheath (one per tube)

Basic Heater Assembly includes flexible pipe, terminal enclosure, 14 foot risers, two lifting cables and 4 inch high sludge legs

Optional Control Panel³ with weather proof (WCC) electrical enclosure completely wired with indicating electronic process control, fail- safe overtemperature controls, master circuit breaker, contactors, fuses, pilot lights, switches and 120V control transformer. Other control options include recorders, time clock, audible alarm and mounting legs.

Specifications and Ordering Information

kW	Manhole		No. Tubes	W/In ²	Model		Stock	Wt. (Lbs.)
	Size (In.)	Length (Ft.)			240V 3 Phase ¹	480V 3 Phase ¹		
6	14	12	1	4.1	FXTH-11206B-24	FXTH-11206B-48	NS	79
8	14	15	1	4.4	FXTH-11508B-24	FXTH-11508B-48	NS	97
10	14	15	1	5.4	FXTH-11510B-24	FXTH-11510B-48	NS	97
12	14	15	1	6.5	FXTH-11512B-24	FXTH-11512B-48	NS	97
10	14	20	1	4.1	FXTH-12010B-24	FXTH-12010B-48	NS	127
12	14	20	1	4.9	FXTH-12012B-24	FXTH-12012B-48	NS	127
15	14	20	1	6.1	FXTH-12015B-24	FXTH-12015B-48	NS	127
18	14	27	1	5.4	FXTH-12718B-24	FXTH-12718B-48	NS	170
21	14	30	1	5.7	FXTH-13021B-24	FXTH-13021B-48	NS	190
24	14	32	1	6.1	FXTH-13224B-24	FXTH-13224B-48	NS	205
27	14	35	1	6.3	FXTH-13527B-24	FXTH-13527B-48	NS	225
30	14	40	1	6.1	FXTH-14030B-24	FXTH-14030B-48	NS	250
12	18	12	2	4.1	FXTH-21212B-24	FXTH-21212B-48	NS	157
16	18	15	2	4.4	FXTH-21516B-24	FXTH-21516B-48	NS	194
20	18	15	2	5.4	FXTH-21520B-24	FXTH-21520B-48	NS	194
24	18	15	2	6.5	FXTH-21524B-24	FXTH-21524B-48	NS	194
20	18	20	2	4.1	FXTH-22020B-24	FXTH-22020B-48	NS	253
24	18	20	2	4.9	FXTH-22024B-24	FXTH-22024B-48	NS	253
30	18	20	2	6.1	FXTH-22030B-24	FXTH-22030B-48	NS	253
36	18	27	2	5.4	FXTH-22736B-24	FXTH-22736B-48	NS	340
42	18	30	2	5.7	FXTH-23042B-24	FXTH-23042B-48	NS	380
48	18	32	2	6.1	FXTH-23248B-24	FXTH-23248B-48	NS	405
54	18	35	2	6.3	FXTH-23554B-24	FXTH-23554B-48	NS	440
60	18	40	2	6.1	FXTH-24060B-24	FXTH-24060B-48	NS	500
18	24	12	3	4.1	FXTH-31218B-24	FXTH-31218B-48	NS	236
30	24	15	3	5.4	FXTH-31530B-24	FXTH-31530B-48	NS	291
36	24	15	3	6.5	FXTH-31536B-24	FXTH-31536B-48	NS	291
30	24	20	3	4.1	FXTH-32030B-24	FXTH-32030B-48	NS	370
36	24	20	3	4.9	FXTH-32036B-24	FXTH-32036B-48	NS	370
45	24	20	3	6.1	FXTH-32045B-24	FXTH-32045B-48	NS	370

Stock Status: S = stock NS = non-stock

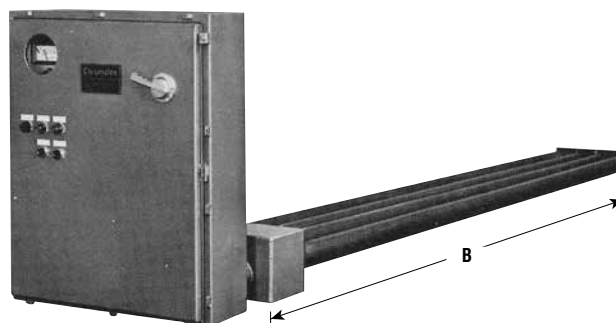
To Order—Specify model, volts, phase, kW, options and quantity.

1. Other voltages available, contact your Local Chromalox Sales office.
2. Special ratings, extra riser height, terminal enclosure manhole adapters and separate low-temperature alarm contacts available.
3. Matching control panels (model WCC) available with a wide variety of options.

RSTO

Unitary Electric Immersion Heater

- 15 - 26 Ft. Immersed Length
- 15 - 72 kW (51 - 246 Mbh)
- 240 and 480V, Three Phase (600V Available)
- 3 W/in² on Pipe (Heating) Surface
- Weather Proof Electrical Enclosure
- Holding Temperatures 175 - 375°F (Optional Control 20 - 120°F)



Features

Easy Maintenance and Service — Flexible OCE elements can be bent in a vertical plane on a 12 inch minimum radius and require only 3 feet for installation or removal.

Weather Proof Electrical Enclosure completely wired with safety interlocked circuit breaker, overtemperature controls, pilot lights

and switches. Electronic process temperature control mounted in door and accessible from outside the enclosure. Optional time clock.

Optional Explosion Resistant Electrical Enclosures for hazardous locations, special construction material, stainless steel and others.

Applications

Chromalox RSTO and RST Unitary Electric Immersion Heaters provide low watt density heating over a large heated surface with precise temperature control for such materials as asphalt, fuel oil, pitch and tar, liquid sugar, molasses, lube oils, linseed oil and other heat sensitive materials. Unitary heaters are installed in large tanks above or below ground (requires access to one tank end).

RSTO immersion heaters are recommended for general purpose applications and cramped locations. Open coil (OCE) heating elements are housed in 3" Schedule 40 NPS steel pipe and are removable without draining the tank. A liquid-tight adapter box⁵ is provided for welding the heater assembly to the tank header.

Specifications and Ordering Information

Tank Cap. (Gal.)	kW	Hold Temp (°F)	DIM ¹ B (Ft.)	No. Tubes	Model ³		Stock	Wt. (Lbs.)
					240V ² 3 Phase	480V ² 3 Phase		
8,000	15	175	19	2	RSTO-21915B-24	RSTO-21915B-48	NS	560
8,000	20	225	19	2	RSTO-21920B-24	RSTO-21920B-48	NS	560
8,000	25	275	19	2	RSTO-21925B-24	RSTO-21925B-48	NS	560
8,000	30	325	15	5	RSTO-52030B-24	RSTO-52030B-48	NS	1,100
8,000	38	375	19.5	5	RSTO-52038B-24	RSTO-52038B-48	NS	1,300
10,000	18	175	15	3	RSTO-31518B-24	RSTO-31518B-48	NS	635
10,000	24	225	15	4	RSTO-41524B-24	RSTO-41524B-48	NS	905
10,000	36	325	15	6	RSTO-61536B-24	RSTO-61536B-48	NS	1,270
10,000	45	375	14.5	8	RSTO-81545B-24	RSTO-81545B-48	NS	1,710
12,000	20	175	17	3	RSTO-31720B-24	RSTO-31720B-48	NS	695
12,000	26	225	16.5	4	RSTO-41726B-24	RSTO-41726B-48	NS	925
12,000	32	275	16.5	5	RSTO-51732B-24	RSTO-51732B-48	NS	1,135
12,000	40	325	17	6	RSTO-61740B-24	RSTO-61740B-48	NS	1,440
12,000	48	375	17.5	7	RSTO-71848B-24	RSTO-71848B-48	NS	1,620
15,000	22	175	18.7	3	RSTO-31922B-24	RSTO-31922B-48	NS	725
15,000	30	225	19	4	RSTO-41930B-24	RSTO-41930B-48	NS	1,055
15,000	36	275	18.5	5	RSTO-51936B-24	RSTO-51936B-48	NS	1,230
15,000	45	325	19	6	RSTO-61945B-24	RSTO-61945B-48	NS	1,530
15,000	56	375	20.5	7	RSTO-72156B-24	RSTO-72156B-48	NS	1,830
20,000	24	175	19.6	3	RSTO-32024B-24	RSTO-32024B-48	NS	755
20,000	36	225	23	4	RSTO-42336B-24	RSTO-42336B-48	NS	1,205
20,000	48	275	25	5	RSTO-52548B-24	RSTO-52548B-48	NS	1,605
20,000	60	325	25.5	6	RSTO-62660B-24	RSTO-62660B-48	NS	1,790
20,000	72	375	26	7	RSTO-72672B-24	RSTO-72672B-48	NS	2,260

Stock Status: S = stock NS = non-stock
To Order—Specify model, volts, phase, kW, overall immersed "B" length and quantity.

1. Heated length is 4" shorter than B dimension.
2. Other voltages available, contact your Local Chromalox Sales office.
3. Suffix "T" indicates optional 7 day 24 hour time clock.
Suffix "F" indicates flange mounting instead of adapter box.
4. Special ratings, immersion lengths and configurations available.
5. Optional adapter flange available in place of adapter box. Complete details and dimensions of adapter box, adapter flange and enclosures are available from your Local Chromalox Sales office.

Ordering Guidelines

Large Tank Heaters

Ordering Information

To Order—
Specify model, volts, phase, kW, PCN (where available) and options desired. Complete model number using the matrix provided.

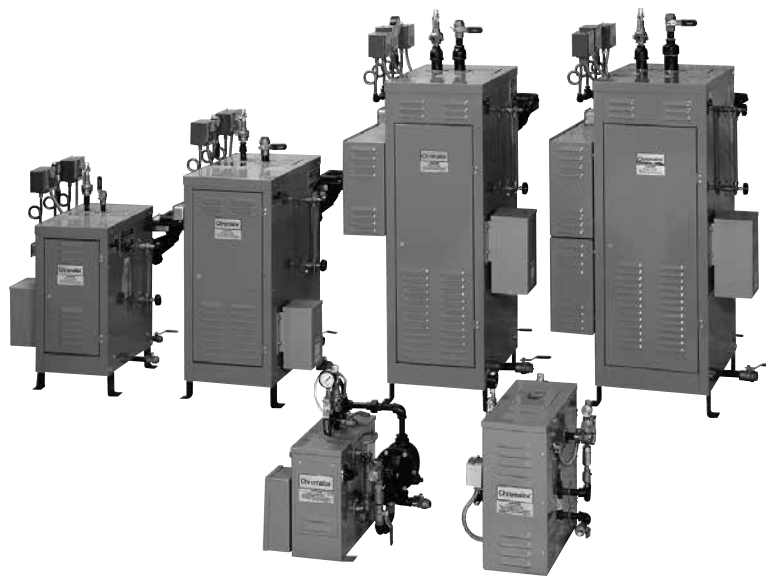
Model	Large Tank Heating Systems								
FXTH	Flexible Tank Immersion Heater with Open Coil Elements								
RSTO	Unitary Electric Immersion Heater with Open Coil (OCE) Elements								
	Code	Number of Heating Tubes							
	3	1	2	3	4	5	6	7	(FXTH up to 3)
		Code	Length (nearest Ft.)						
		19	19						
			Code	Wattage					
			22	22 kW (use actual Kilowatt-round to kW i.e. 23.7kW=24)					
			Code	Latest Modification					
			B	B					
			Code	Voltage (3 phase only)					
			20	208	24	240	38	380	
			41	415	48	480	57	575	
			Code	Options					
			F	Flange Mounting (RST and RSTO)					
			T	Time Clock (RST and RSTO)					
			WCC	WCC Control Panel (FXTH)					
			XX	Other Options					
RSTO	3	19	22	B	24	F	Typical Model Number		

Note — Refer to large tank heating systems product pages in this section for details, version letter and available options.

LARGE TANK

Steam Boilers Overview

- Steam Pressures to 235 psig
- Hot Water Temp. to 240°F
- Steam Capacities to 4,890 Lbs/Hr and 235 psig
- 3 - 1,620 kW (10 - 5,527 Mbh)
- 120 - 600 Volt, 1 & 3 Phase



Applications

Chromalox Packaged Electric Steam and Hot Water Boilers are safe and versatile heat sources that produce low or high pressure steam or hot water for commercial and industrial processes and for comfort heating applications. Chromalox electric boilers can be used anywhere steam is required and electric power is available. They are packaged units that operate from existing distribution voltages, making installation simple.

Electric boiler applications encompass all types of commercial and industrial enterprises such as hospitals, breweries, surgical centers, bakeries, utilities, etc. Chromalox electric boilers are used for food processing, humidification, sterilization, process drying and particularly in the manufacture of chemicals, paints, paper, textiles, petroleum products, pharmaceuticals and plastics. Some specific applications include:

- Supplying steam for storage tanks and jacketed vessels to process waxes, paraffin, glues, resins, varnishes, dyestuffs, molasses and vegetable oils.

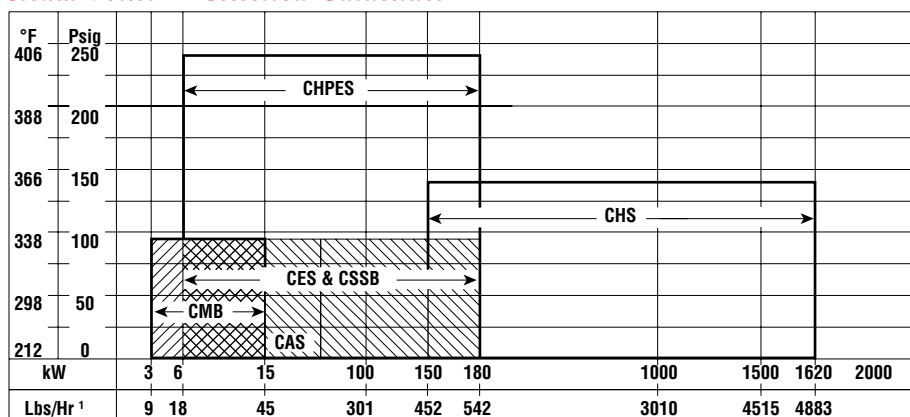
- Supplying steam for reaction and distillation vessels, retorts, autoclaves and sterilizers.
- Supplying steam for pipe tracing, to keep viscous materials flowing in asphalt plants, in fuel oil lines, jacketed pumps, strainers and valves and provide antifreeze protection.
- Supplying steam to heat rolls for paper coating, calendering, laminating, corrugating and embossing.
- Supplying steam heat for platens, dies and molds used for laminating wood and plastics, molding and forming of elastomers and plastic materials, plastic extrusions and curing of epoxies and Fiberglas® materials.
- Supplying steam for comfort heating and humidification.

Boiler Selection

Chromalox steam boilers are available in the following ranges to accommodate any process or application: 3 to 1620 kW, 9 to 4883 pounds of dry saturated steam per hour, 0 to 235 psig.

Boiler selection is usually based on the operating pressure (psig) and steaming capacity (Lbs/Hr). When the pressure or temperature and kilowatt rating or Lbs./Hr. of steam requirements are known, the recommended boiler can be determined from the following Boiler Selection Chart. If these operating parameters are not known, contact your Local Chromalox Sales office for assistance in calculating the steam requirements and for recommendations on the proper size steam boiler.

Steam Boiler — Selection Guidelines



Notes —

1. Mbh is ASME & ANSI standard for thousand British thermal units per hour.

Steam Boilers Selection Guidelines

With the pressure and capacity known, continue the selection process by consulting the detailed product pages for the models listed in the accompanying table.

Steam Boilers — Selection Guidelines

Maximum Pressure (psig)	Maximum Temp. (°F)	kW	Description	Model	Page
90	331	3 - 15	Compact	CMB	D-45
90	331	16 - 20	Special	CAS	D-46
90	331	6 - 180	Vertical	CES-B	D-47
90	331	6 - 180	Stainless Steel	CSSB-A	D-49
135	358	150 - 1,620	High Capacity	CHS	D-51
235	401	6 - 180	Medium Pressure	CHPES-A	D-53
Optional Equipment					D-55
Custom Engineering & Manufacturing					D-58

Advantages

Chromalox Packaged Electric Boilers offer the advantage of electricity as the heat source to provide low or high pressure steam or hot water. Building and installation costs are reduced substantially over fuel fired boilers since fuel tanks, chimneys, flues, vents and complex piping required for fossil fuel fired boilers are eliminated.

Packaged boilers comply with all the requirements of relevant UL and CSA Standards and the Canadian Registration (CRN). Boilers are completely assembled and tested under operating conditions to rigid quality standards prior to release for shipment. Chromalox electric boilers are ready to install and need only a water feed source and an electric power hook-up to produce fast, economical high-quality steam. Energy conversion efficiencies approaching 100% are possible.

Cleanliness — No fumes or products of combustion. Boilers may be installed in alcoves, under counters or in other restricted spaces.

Simple, Safe Operation — Most electric boilers can be operated by custodial personnel with a minimum of training.

Fast Start Up and Recovery — Boilers can be turned on and be up to pressure within minutes. Long warm up times or complicated start up procedures are unnecessary.

Minimal Maintenance — Electric boilers only require a periodic or daily “blow down” to maintain their efficiency. (An optional automatic blow down system can be purchased to ensure continuous reliability of planned maintenance.)

Reduced Operating Costs — Electric boilers can provide steam “on demand” using automatically controlled electric power. Operating costs can be controlled by reducing or eliminating “idling” or “standby” operation when the boiler is not needed.

Electric Hot Water & Steam Boilers — General Specifications

Model	Description	Operating Pressure (psig)	Temp. (°F)	kW	Mbh ²	Vessel Pressure Rating (psig)	Connection Type
CMB	Compact Steam Boiler	0 - 90	212 - 331	3 - 15	10 - 51	100	NPT
CES-B	Vertical Steam Boiler	0 - 90	212 - 331	6 - 180	21 - 614	100	NPT
CAS	Special Steam Boiler	0 - 90	212 - 331	16 - 20	55 - 68	100	NPT
CSSB-A	Stainless Steel Steam Boiler	0 - 90	212 - 331	6 - 180	21-614	100	NPT
CHPES-A	Medium Pressure Vertical Steam Boiler	0 - 235	212 - 401	6 - 180	21-614	250	NPT
CHS	High Capacity Horizontal Steam Boiler	0 - 135	212 - 358	150 - 1,620	512-5,527	150	NPT and Flanged
GCH ¹	Steam Superheater	0 - 150	212 - 800	1 - 350	3-1,194	150	NPT or Flanged

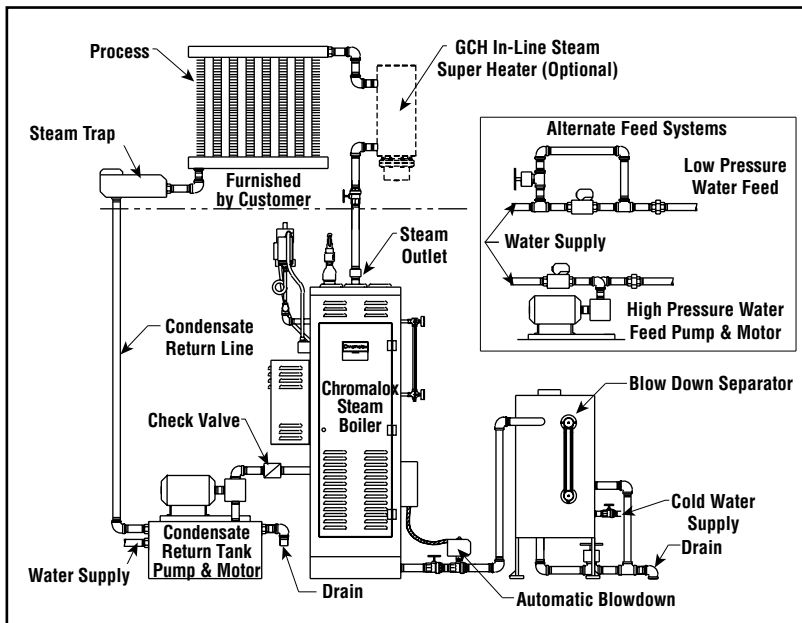
Notes —

1. See Circulation Heater section.
2. Mbh is ASME & ANSI standard for thousand British thermal units per hour.

Steam Boilers Features

- Steam Pressures to 235 psig
- Hot Water Temp. to 240°F
- Steam Capacities to 4,890 Lbs/Hr @ 235 psig
- 3 - 1,620 kW (10 - 5,527 Mbh)
- 120 - 600 Volt, 1 & 3 Phase
- Pressure Vessels Carbon or Stainless Steel ASME Section I
Carbon Steel ASME Section IV (CRN Available)
- Copper or INCOLOY® Sheath Heating Elements
- Mechanical (Float) and/or Electronic (Probe) Water Level and Limit Controls
- Optional Control Transformers, Water Feed Systems and Blow Down Equipment
- Third Party (UL, CSA) Listing, Recognition or Certification

Typical Closed-Loop System



Note — Blow down separators and/or condensate return systems (optional equipment) may be necessary in some installations. Check local and state codes.

Features

Chromalox Electric Steam Boilers are efficient energy management systems with specially designed heater bundles which provide maximum element to water contact and uniform circulation. Low or high pressure steam is generated in pressure vessels designed to minimize “carry over” of moisture and impurities into the steam distribution system. Chromalox packaged boilers are compact in size with a small foot print and are ideal for “point of use” applications in areas with limited space. They are available in many sizes from stock.

Heating Methods

Most steam heating applications can be grouped into two categories, **open loop** and **closed loop**. In an **open-loop system**, the waste steam and condensate are not recovered and are exhausted to the drain. These are called “pass through” systems and are frequently used for sterilizers. In a **closed-loop system**, the waste steam and condensate are recovered and recycled through the boiler. Closed loop systems are the most efficient and cost effective and are recommended for most applications. (See above illustration.)

Reliability — A rigid Quality Control Program

is maintained to assure compliance with the ASME Code, Underwriters Laboratories, Inc. requirements and engineering design specifications. Each boiler is tested under power for functional conformance, is subject to a high potential dielectric test, hydrostatic pressure test and must pass a Quality Control inspection before being released for shipment.

Optional Equipment

- Condensate Returns
- Blow Down Separators
- Vacuum Breakers
- Cold Water Feeds
- Sequencers
- Control Transformers

Custom Engineering

Chromalox can design and manufacture your Packaged Electric Steam and Hot Water Boilers. Contact your Local Chromalox Sales office.

Note — Refer to Optional Equipment in this section.



CMB Compact Steam Boiler

- Steam Pressures to 90 psig
- Steam Capacity
(9 - 45 Lbs/Hr @ 0 - 90 psig)
- 3 - 15 kW (10 - 51 Mbh)
- 120, 208, 240 and 480 Volt,
1 & 3 Phase (600V Available)
- ASME Section I Pressure Vessel
Carbon Steel Code "M"
(100 psig) (CRN Available)
- 0.430" Dia. Copper Sheath
Heating Elements with
Run Dry Protection
- Automatic Mechanical Float
Valve Water Feeder with Inlet
Check Valve³
- Electronic Low Water Cutoff
(Single Probe)
- Water Level Sight Glass and
Blow Down Drain Valve
- Pressure Gauge (0 - 160 psig)
- ASME Safety Relief Valve

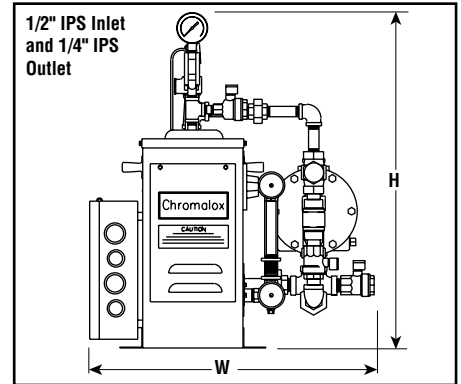
Applications

CMB Low Pressure Steam Generator — Delivers 9 to 45 lbs. of steam per hour at 0 - 90 psig, and is used in many manufacturing processes. The CMB's small size and small capacity make it an ideal "point of use" steam source in industrial plants, computer rooms, laboratories, hospitals, jewelry stores, steam rooms and other spot heating applications. The CMB is also ideal for stand-by operations which require small amounts of steam or humidification during off season periods when the main plant boiler may be shut down.

All CMB steam generators are inspected to rigid quality standards. They are factory tested under operating conditions and are ready to operate.



Dimensions (Inches)
CMB-3



Features

Pressure/Temperature Control easily adjusts operating pressure. Pilot light indicates when boiler is on and element is heating.

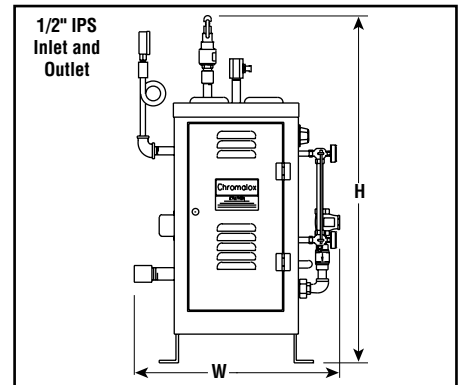
Steam Pressure Gauge provides visual indication of steam pressure.

Mechanical Float Valve Water Feeder can be connected directly to water main, eliminating complicated feed water piping³.

Water Level Sight Glass allows constant visual observation of water level in the generator.

Safe, Reliable Operation is assured by a separate low water cutoff that shuts down the generator if it accidentally runs low on water.

CMB-6 through -15



Specifications and Ordering Information

Steam ¹ Lbs/Hr	Bhp	kW	Volts ²	Ph	Dimensions (In.)			Model	Stock	Wt. (Lbs.)
					W	L	H			
9	0.3	3	120	1	17	15	23	CMB-3	NS	68
9	0.3	3	208	1	17	15	23	CMB-3	NS	68
9	0.3	3	240	1	17	15	23	CMB-3	NS	68
9	0.3	3	208	3	17	15	23	CMB-3	NS	68
9	0.3	3	240	3	17	15	23	CMB-3	NS	68
9	0.3	3	480	3	17	15	23	CMB-3	NS	68
18	0.61	6	208	1	20	30	37	CMB-6	NS	165
18	0.61	6	240	1	20	30	37	CMB-6	NS	165
18	0.61	6	480	1	20	30	37	CMB-6	NS	165
18	0.61	6	208	3	20	30	37	CMB-6	NS	165
18	0.61	6	240	3	20	30	37	CMB-6	NS	165
18	0.61	6	480	3	20	30	37	CMB-6	NS	165
27	0.91	9	208	3	20	30	37	CMB-9	NS	165
27	0.91	9	240	3	20	30	37	CMB-9	NS	165
27	0.91	9	480	3	20	30	37	CMB-9	NS	165
36	1.22	12	208	3	20	30	37	CMB-12	NS	165
36	1.22	12	240	3	20	30	37	CMB-12	NS	165
36	1.22	12	480	3	20	30	37	CMB-12	NS	165
45	1.52	15	208	3	20	30	37	CMB-15	NS	165
45	1.52	15	240	3	20	30	37	CMB-15	NS	165
45	1.52	15	480	3	20	30	37	CMB-15	NS	165

Stock Status: S = stock NS = non-stock
To Order—Specify model, volts, phase, kW and PCN.

1. At 212°F with 50°F feed water.
2. Other voltages are available. Contact your Local Chromalox Sales office.
3. For proper operation, the automatic water feed control unit requires a water supply pressure of 10 psig greater than the operating pressure of the steam generator.

"Under the U.S. Federal Safe Drinking Water Act, it is unlawful to install or use this product in any service that comes into contact with water for human consumption (including drinking, food or beverage preparation, hand washing, or teeth brushing). This product is intended exclusively for use in non-potable service."

CAS

Special Process & OEM Steam Boiler

- Steam Pressures to 90 psig¹
- Steam Capacity (48 - 60 Lbs/Hr @ 0 - 90 psig)
- 16 - 20 kW (55 - 68 Mbh)
- 208, 240 and 480 Volt, 1 & 3 Phase (600V Available)
- ASME Section I Code "M" Pressure Vessel Carbon Steel (100 psig) (CRN Available)
- 0.430 Dia. Copper Sheath Heating Elements
- Two Pressure Controls — Operating and Automatic Reset High Limit
- Electronic Water Feed Control with Low Water Cutoff (Dual Probe)
- Automatic Solenoid Water Inlet Valve with In-line Check Valve
- Water Level Sight Glass and Blow Down Drain Valve
- Pressure Gauge (0 - 160 psig)
- ASME Safety Relief Valve



CAS Boilers are also used in food, plastics, rubber and pharmaceutical processing.

All CAS Boilers are inspected to rigid quality standards. They are factory tested under actual operating conditions and are ready to operate.

Features

Pressure Control easily adjusts operating pressure.

Steam Pressure Gauge provides visual indication of steam pressure.

On/Off Switch with Pilot Light indicating boiler is energized and operational.

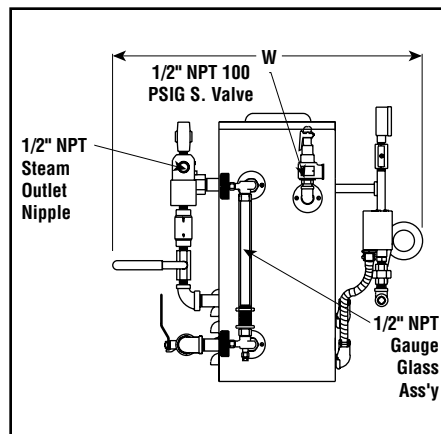
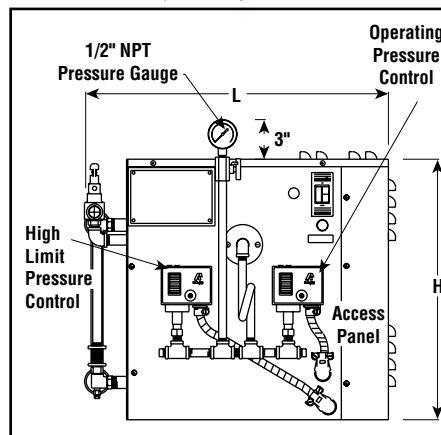
Water Level Sight Glass allows constant visual observation of boiler's water level.

Automatic Solenoid Water Inlet Valve can be connected directly to water main, eliminating complicated feed water piping⁴. Integral control relay (rated 1/3 Hp 120V) for external high pressure water feed pump and motor.

Electronic Water Feed Control Probe is located in an isolator tube to assure true boiler water level readings during operation.

Safe, Reliable Operation assured by a low water cutoff that shuts down the boiler if it accidentally runs low on water.

Dimensions (Inches)



Applications

CAS Steam Boilers are specifically designed for use where space requirements are limited. The compact construction and low profile permit the CAS boiler to fit under hospital and research laboratory steam sterilizers. CAS boilers are easily adapted to garment presses, dry cleaning and other textile equipment. With an optional solenoid actuated steam gun, the CAS becomes a perfect tool for shrink fitting upholstery fabrics in furniture and automobile after market industries.

Specifications and Ordering Information

Steam ² Lbs/Hr	Bhp	kW	Volts ³	Ph	Amps ³	Dimensions (In.)			Model	Stock	PCN	Wt. (Lbs.)
						W	L	H				
60	2	20	208	1	96.2	16	21	18	CAS-20CM	NS	—	160
60	2	20	208	3	55.6	16	21	18	CAS-20CM	NS	109217	160
60	2	20	240	1	83.3	16	21	18	CAS-20CM	NS	—	160
60	2	20	240	3	48.2	16	21	18	CAS-20CM	NS	109225	160
60	2	20	480	3	24.1	16	21	18	CAS-20CM	NS	025283	160

Stock Status: S = stock NS = non-stock
To Order—Specify model, volts, phase, kW and PCN.

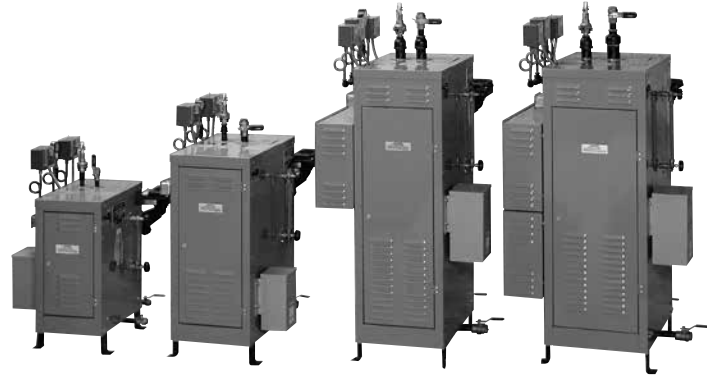
1. Optional trim of 15, 30 and 50 psig available.
2. At 212°F with 50°F feed water.
3. Other voltages are available, contact your Local Chromalox Sales office.
4. For proper operation, the automatic water feed solenoid valve requires a water supply pressure of 10 psig greater than the operating pressure of the boiler.

CES-B Vertical Steam Boiler

- Steam Pressures to 135 psig
- Steam Capacity
(18 - 542 Lbs/Hr @ 0 - 135 psig)
- 6 - 180 kW (21 - 614 Mbh)
- 208, 240 and 480 Volt,
1 & 3 Phase (600 V Available)
- ASME Section I Pressure Vessel
Carbon Steel Code "M"
(100 psig) (CRN Available)
- 0.430 Dia. Copper Sheath
Heating Elements
- One or Two Operating Controls
Manual Reset High Limit
- Mechanical Float Water Feed
Control with Low Water Cutoff
- Pressure Gauge, Water Level
Sight Glass and Blow Down
Drain Valve(s)
- ASME Safety Relief Valve
- Optional Transformer

Applications

CES-B Medium Capacity Steam Boilers are sized to match the most common requirements for steam in many commercial applications, laboratories, hospitals and industrial plants. CES-B boilers are ideal for stand-by operations requiring high pressure steam in remote areas of an industrial plant which might incur excessive pipe losses or expensive piping costs to supply from a central steam supply. They are ideal for off season periods when steam is needed for critical processes or humidification when the main boiler is shut down.



Features

CES-B Stock Steam Boilers are Trimmed at 100 psig for operation to 90 psig — They are also available (on order) with 15, 30, 50 and 150 psig trim. Boilers trimmed at 150 psig can be operated up to 135 psig corresponding to 353°F. Boilers trimmed at 150 psig use a special ASME Section I, Code "S" pressure vessel. All catalog CES boilers are UL Listed and CSA Certified.

Optional Equipment

Auxiliary Electronic Low Water Cutoff — This option is required by some state or local boiler codes.

Low or High Pressure Water Feed or Condensate Return System for boiler water feed.

Heavy Duty Vacuum Breaker prevents siphoning of condensate in condensate return systems.

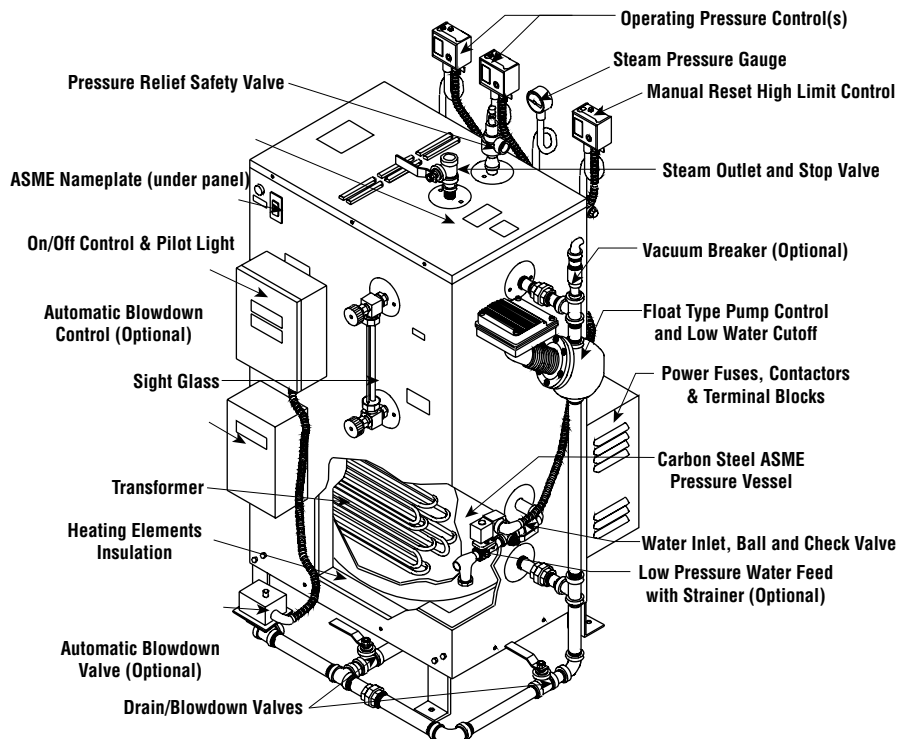
Automatic Blow Down System eliminates daily manual blow-down maintenance.

Blow Down Separator for blow down of a boiler where steam and hot water cannot be discharged directly into a drain.

Electronic Water Level Control with automatic water feed and low water cutoff (dual probe).

Proportional Control with electronic solid state sequencer for modulated pressure control.

Typical CES-B Construction



Note — A water feed system or condensate return system is required. See Optional Equipment.

CES-B

Vertical Steam Boiler (cont'd.)

Specifications and Ordering Information

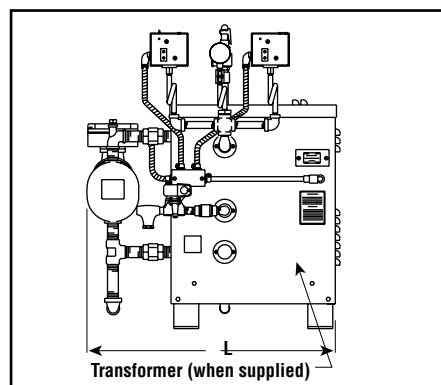
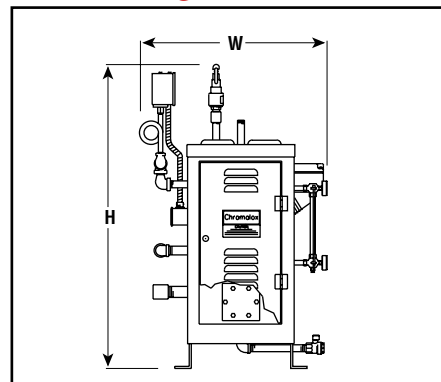
Steam ¹ Lbs/Hr	Bhp	kW	Volts ²	Ph	3 Ph ² Amps	Service ⁴ Wire Size	Dimensions (In.)			Model	Stock	Wt. (Lbs.)
							W	L ⁵	H			
CES-B with One Operating Pressure Control and a 1 kVA Transformer³												
18.1	0.61	6	208	3	17	12	23	31	35	CES-006B	NS	230
18.1	0.61	6	240	3	15	12	23	31	37	CES-006B	NS	230
18.1	0.61	6	480	3	8	12	23	31	37	CES-006B	NS	230
27.1	0.92	9	208	3	25	10	23	31	37	CES-009B	NS	235
27.1	0.92	9	240	3	22	10	23	31	37	CES-009B	NS	235
27.1	0.92	9	480	3	11	12	23	31	37	CES-009B	NS	235
36.2	1.22	12	208	3	34	8	23	31	37	CES-012B	NS	240
36.2	1.22	12	240	3	29	10	23	31	37	CES-012B	NS	240
36.2	1.22	12	480	3	15	12	23	31	37	CES-012B	NS	240
51.2	1.73	17	208	3	48	6	23	31	37	CES-018B	NS	245
51.2	1.73	17	240	3	42	6	23	31	37	CES-018B	NS	245
51.2	1.73	17	480	3	21	12	23	31	37	CES-018B	AS	245
72.3	2.45	24	208	3	67	4	28	35	44	CES-024B	NS	300
72.3	2.45	24	240	3	58	4	28	35	44	CES-024B	NS	300
72.3	2.45	24	480	3	29	10	28	35	44	CES-024B	NS	300
87.4	2.95	29	208	3	81	3	28	35	44	CES-030B	NS	310
87.4	2.95	29	240	3	70	4	28	35	44	CES-030B	NS	310
87.4	2.95	29	480	3	35	8	28	35	44	CES-030B	NS	310
102.5	3.47	34	208	3	95	2	28	35	44	CES-036B	NS	315
102.5	3.47	34	240	3	82	3	28	35	44	CES-036B	NS	315
102.5	3.47	34	480	3	41	6	28	35	44	CES-036B	NS	315
138.7	4.69	46	208	3	128	2/0	28	35	44	CES-048B	NS	320
138.7	4.69	46	240	3	111	1	28	35	44	CES-048B	NS	320
138.7	4.69	46	480	3	56	6	28	35	44	CES-048B	NS	320
174.8	5.91	58	208	3	161	3/0	28	35	44	CES-060B	NS	380
174.8	5.91	58	240	3	140	2/0	28	35	44	CES-060B	NS	380
174.8	5.91	58	480	3	70	4	28	35	44	CES-060B	NS	380
205	6.93	68	208	3	189	250 MCM	28	35	44	CES-072B	NS	390
205	6.93	68	240	3	164	3/0	28	35	44	CES-072B	NS	390
205	6.93	68	480	3	82	3	28	35	44	CES-072B	NS	390
CES-B with Two Operating Pressure Controls and a 1.5 kVA Transformer³												
307	10.4	102	208	3	284	400 MCM	32	38	58	CES-100B	NS	625
307	10.4	102	240	3	246	350 MCM	32	38	58	CES-100B	NS	625
307	10.4	102	480	3	123	1/0	32	38	58	CES-100B	NS	625
410	13.6	136	240	3	327	600 MCM	32	38	64	CES-135B	NS	785
410	13.6	136	480	3	164	3/0	32	38	64	CES-135B	NS	785
475	16.1	158	240	3	379	700 MCM	32	38	64	CES-160B	NS	785
475	16.1	158	480	3	190	250 MCM	32	38	64	CES-160B	NS	785
542	18.4	180	240	3	433	2-300 MCM	32	38	64	CES-180B	NS	790
542	18.4	180	480	3	217	300 MCM	32	38	64	CES-180B	NS	790

Stock Status: S = stock NS = non-stock
To Order—Specify model, volts, phase, kW and PCN, if applicable.

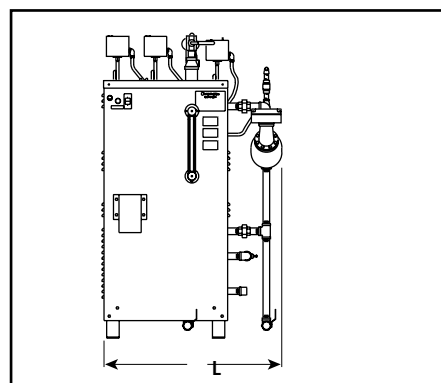
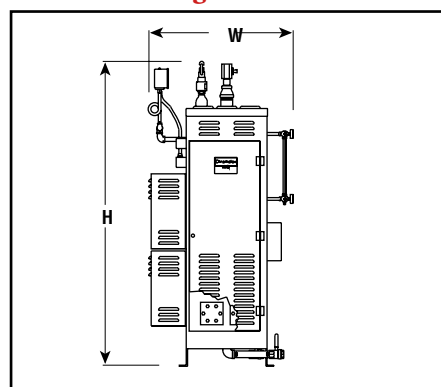
- Steaming capacity based on producing saturated steam at 212°F with 50°F feed water.
- Single phase and other voltages available. Contact your Local Chromalox Sales office.
- All boilers have 120V/1/60Hz control circuit. 220V/1/50Hz circuits are available for export boilers.
- Copper 90°C AWG unless indicated otherwise. Contact your Local Chromalox Sales office for the size and number of contactors.
- Allow 21" for element removal and 10" around boiler for service access. Add 2" to width dimension for optional transformer.

Dimensions (Inches)

CES-6B through -18B



CES-24B through -180B



Plumbing Connections

Boiler	NPT	
	Water Inlet	Steam Outlet
CES 6-18	1/2	1/2
CES 24-72	3/4	1
CES 100	3/4	1-1/2
CES 135-180	3/4	2

"Under the U.S. Federal Safe Drinking Water Act, it is unlawful to install or use this product in any service that comes into contact with water for human consumption (including drinking, food or beverage preparation, hand washing, or teeth brushing). This product is intended exclusively for use in non-potable service."



CSSB-A Stainless Steel Vertical Steam Boiler

- Steam Pressures to 90 psig
- Steam Capacity
(18 - 542 Lbs/Hr @ 0 - 90 psig)
- 6 - 180 kW (21 - 614 Mbh)
- 208, 240 and 480 Volt,
1 & 3 Phase (600V Available)
- ASME Section I Pressure Vessel
Stainless Steel Code "M"
(100 psig) (CRN Available)
- 0.430 Dia. INCOLOY® Sheath
Heating Elements
- One or Two Operating Controls
Manual Reset High Limit
- Float Water Feed Control
with Low Water Cutoff
- Pressure Gauge, Water Level
Sight Glass and Blow Down
Drain Valve(s)
- ASME Safety Relief Valve

Applications

CSSB All Stainless Steel Steam Boilers are specifically designed for use where the purity of the heating fluid must be maintained. Typical applications include sterilizers and autoclaves in research, biological and pharmaceutical laboratories and humidification equipment for the electronics industry (solid state substrates).

CSSB boilers utilize de-ionized, demineralized or distilled water to provide pure steam, free of minerals or undesirable chemical additives. Pure steam eliminates the possibility of carry over of contaminants into the process.

Note — A water feed system supplying distilled, de-ionized or demineralized water is required on all CSSB boilers. (See Caution note.)



Features

Stainless Steel Construction — Pressure vessel and all wetted parts are made of 304 stainless steel for operation with pure water. Type 316 stainless steel construction is available.

Low Water Cutoff and Level Control — Float type constructed of stainless steel automatically maintains correct water level in the boiler and shuts down the boiler if the level drops below safe operating limits.

Operating Controls — All stainless steel pressure controls provide accurate regulation of steam pressure.

High Pressure Limit Control — All stainless steel manual reset pressure limit control shuts down boiler if operating pressure exceeds set point.

Water Level Sight Glass — Furnished with stainless steel valves, provides for constant visual observation of the water level in the boiler.

Pressure Gauge, Safety Valve, Drain and Blow Down Valves are constructed of stainless steel for compatibility with basic boiler.

CSSB Steam Boilers are Trimmed at 100 psig for operation to 90 psig and come complete, factory tested and ready to operate. Boilers are available (on order) with 15, 30 and 50 psig. All catalog CSSB boilers are UL Listed.

Optional Equipment

All optional equipment (except blow down separator) is available in stainless steel construction for compatibility with the basic boiler.

Auxiliary Low Water Cutoff uses vertical ball float with electronic control. This option is required by some state or local boiler codes.

Proportional Control with electronic solid state sequencer for modulated pressure control.

Low or High Pressure Water Feed System (Required) for mounting on boiler or remote installation.

Heavy Duty Vacuum Breaker prevents siphoning of condensate from condensate return systems.

Automatic Blow Down System eliminates need for daily manual blow-down maintenance.

Blow Down Separator for blow down of a boiler where steam and hot water cannot be discharged directly into a drain. Blow down separator uses city water for cooling.

CAUTION — The use of chlorinated or regular tap water in stainless steel boilers is specifically prohibited by the ASME Code. The feed water for CSSB boilers must be distilled, de-ionized or demineralized water with a minimum specific resistivity of 1 megohm/cm. Failure to use the correct type of water will damage the equipment and void the factory warranty.

CSSB-A

Stainless Steel Vertical Steam Boiler (cont'd.)

Specifications and Ordering Information

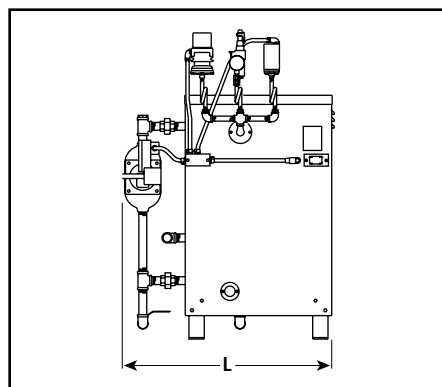
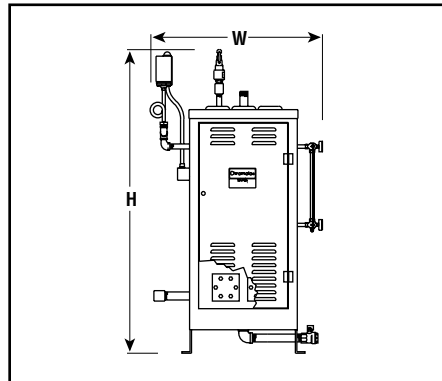
Steam ¹ Lbs/Hr	Bhp	kW	Volts ²	Ph	3 Ph ² Amps	Service Wire Size	DIM (In.)			Model	Stock	PCN	Wt. (Lbs.)
							W	L ⁵	H				
CSSB-A with One Operating Pressure Control³ (Transformer Optional)													
18.1	0.61	6	208	3	17	12	23	31	37	CSSB-006A	NS	—	230
18.1	0.61	6	240	3	15	12	23	31	37	CSSB-006A	NS	—	230
18.1	0.61	6	480	3	8	12	23	31	37	CSSB-006A	NS	—	230
27.1	0.92	9	208	3	25	10	23	31	37	CSSB-009A	NS	—	235
27.1	0.92	9	240	3	22	10	23	31	37	CSSB-009A	NS	—	235
27.1	0.92	9	480	3	11	12	23	31	37	CSSB-009A	NS	—	235
36.2	1.22	12	208	3	34	8	23	31	37	CSSB-012A	NS	—	240
36.2	1.22	12	240	3	29	10	23	31	37	CSSB-012A	NS	—	240
36.2	1.22	12	480	3	15	12	23	31	37	CSSB-012A	NS	—	240
51.2	1.73	17	208	3	48	6	23	31	37	CSSB-018A	NS	—	245
51.2	1.73	17	240	3	42	6	23	31	37	CSSB-018A	NS	—	245
51.2	1.73	17	480	3	21	12	23	31	37	CSSB-018A	NS	—	245
72.3	2.45	24	208	3	67	4	28	35	44	CSSB-024A	NS	—	300
72.3	2.45	24	240	3	58	4	28	35	44	CSSB-024A	NS	—	300
72.3	2.45	24	480	3	29	10	28	35	44	CSSB-024A	NS	—	300
87.4	2.95	29	208	3	81	3	28	35	44	CSSB-030A	NS	—	310
87.4	2.95	29	240	3	70	4	28	35	44	CSSB-030A	NS	—	310
87.4	2.95	29	480	3	35	8	28	35	44	CSSB-030A	NS	—	310
102.5	3.47	34	208	3	95	2	28	35	44	CSSB-036A	NS	—	315
102.5	3.47	34	240	3	82	3	28	35	44	CSSB-036A	NS	—	315
102.5	3.47	34	480	3	41	6	28	35	44	CSSB-036A	NS	—	315
138.7	4.69	46	208	3	128	2/0	28	35	44	CSSB-048A	NS	—	320
138.7	4.69	46	240	3	111	1	28	35	44	CSSB-048A	NS	—	320
138.7	4.69	46	480	3	56	6	28	35	44	CSSB-048A	NS	—	320
174.8	5.91	58	208	3	161	3/0	28	35	44	CSSB-060A	NS	—	380
174.8	5.91	58	240	3	140	2/0	28	35	44	CSSB-060A	NS	—	380
174.8	5.91	58	480	3	70	4	28	35	44	CSSB-060A	NS	—	380
205	6.93	68	208	3	189	250 MCM	28	35	44	CSSB-072A	NS	—	390
205	6.93	68	240	3	164	3/0	28	35	44	CSSB-072A	NS	—	390
205	6.93	68	480	3	82	3	28	35	44	CSSB-072A	NS	—	390
CSSB-A with Two Operating Pressure Controls³ (Transformer Optional)													
307	10.4	102	208	3	284	400 MCM	32	38	58	CSSB-100A	NS	—	625
307	10.4	102	240	3	246	350 MCM	32	38	58	CSSB-100A	NS	—	625
307	10.4	102	480	3	123	1/0	32	38	58	CSSB-100A	NS	—	625
410	13.6	136	240	3	327	600 MCM	32	38	64	CSSB-135A	NS	—	785
410	13.6	136	480	3	164	3/0	32	38	64	CSSB-135A	NS	—	785
475	16.1	158	240	3	379	700 MCM	32	38	64	CSSB-160A	NS	—	785
475	16.1	158	480	3	190	250 MCM	32	38	64	CSSB-160A	NS	—	785
542	18.4	180	240	3	433	2-300 MCM	32	38	64	CSSB-180A	NS	—	790
542	18.4	180	480	3	217	300 MCM	32	38	64	CSSB-180A	NS	—	790

Stock Status: S = stock NS = non-stock
To Order—Specify model, volts, phase and kW.

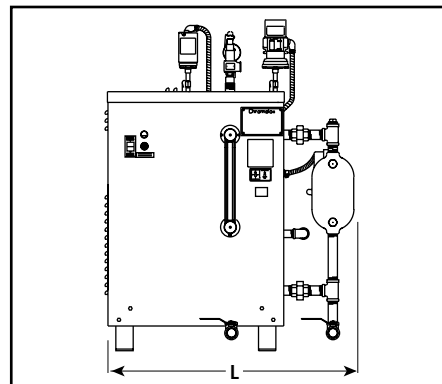
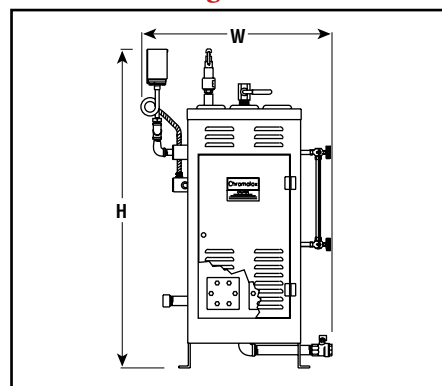
- Steaming capacity based on producing saturated steam at 212°F with 50°F feed water.
- Single phase and other voltages available. Contact your Local Chromalox Sales office.
- All boilers have 120V/1/60Hz control circuit. 220V/1/50Hz circuits are available for export boilers.
- Copper 90°C AWG unless indicated otherwise. Contact your Local Chromalox Sales office for the size and number of contactors.
- Allow 21" for element removal and 10" around boiler for service access. Add 2" to width dimension for optional transformer.

Dimensions (Inches)

CSSB-6A through -18A



CSSB-24A through -72A



Plumbing Connections

Boiler	NPT	
	Water Inlet	Steam Outlet
CSSB 6-18	1/2	1/2
CSSB 24-72	3/4	1
CSSB 100	3/4	1-1/2
CSSB 135-180	3/4	2

CHS

High Capacity Horizontal Steam Boiler

- Steam Pressures to 135 psig
- Steam Capacity (452 - 4,882 Lbs/Hr @ 0 - 135 psig)
- 150 - 1,620 kW (512 - 5,527 Mbh)
- 208, 240 and 480 Volt, 1 & 3 Phase (600V Available)
- ASME Section I Pressure Vessel Carbon Steel Code "S" (150 psig) (CRN Available)
- 0.475 Dia. Copper Sheath Heating Elements
- Two or Three Operating Controls with Contactor Panels (150 - 300 kW)
- Proportional Operating Control with Sequencer and Contactor Panels (above 300 kW)
- Manual Reset High Limit Control with Stop at 90% of Safety Valve Setting
- Mechanical Float Water Feed Control with Low Water Cutoff
- Auxiliary Low Water Cutoff (Solid State) Control
- Pressure Gauge, Water Level Sight Glass and Double Blow Down Drain Valves
- ASME Safety Relief Valve (Two on Boilers Over 1,100 kW)



Applications

CHS High Capacity Steam Boilers are uniquely designed for larger commercial applications, laboratories, hospitals and industrial plants. CHS boilers are ideal for stand-by operations requiring high pressure steam in remote areas of an industrial plant which might incur excessive pipe losses or expensive piping costs to supply from a central steam supply. CHS boilers are particularly suited for use in off season periods when steam is needed for critical processes or humidification and the main boiler is shut down.

Features

CHS Stock Boilers are Trimmed at 150 psig for operation up to 135 psig corresponding to 353°F. They are also available with 15, 30, 50 and 100 psig trim. All catalog CHS boilers are UL Listed.

Water Feed (Pump) Control and Low Water Cutoff (McDonnell Miller #157) automatically maintains correct water level and shuts off the boiler when the water level in the boiler drops below safe limits.

Water Level Sight Glass allows for constant visual observation of the water level in the boiler during operation.

Auxiliary Low Water Cutoff — Solid state control board with low voltage probe provides backup protection for low water level in the boiler.

Steam Pressure Gauge with a range to 250 psig provided for visual indication of steam pressure.

Long Life Heating Elements — Conservatively rated flange mounted 0.475" dia. copper sheath heating elements provide uniform water circulation and long life.

Full Port Blow Down Drain Valves — Two heavy duty gate or ball valves connected in series for high pressure are supplied for boiler blow down.

Integral Electrical Controls and Power Panels with fuses and contactors mounted in heavy gauge control cabinet(s) with hinged doors and captive fasteners.

Control Circuits are 120V/1/60 Hz (Standard) — 220V/1/50 Hz control circuits are available for export boilers. Transformers are optional.

Manual On-Off Switch allows boiler control and power circuits to be shut down locally.

Pilot Light visually indicates when boiler control circuit is energized and the boiler is operating.

Fiberglas® Insulation material around the entire pressure vessel minimizes heat loss and helps reduce energy costs.

Plumbing Connections

Boiler	Water Inlet (NPT)	Steam Outlet (150 Lb. Flanged)
CHS 150-420	1	4"
CHS 495-945	1	6"
CHS 1080-1620	1-1/2	6"

A water feed or condensate return system is required on all CHS boilers. See Optional Equipment.

BOILERS

CHS

High Capacity Horizontal Steam Boiler *(cont'd.)*

Low Pressure Feed Water Systems for boilers up to 540 kW. Feed water must be at least 10 psi greater than the operating pressure of the boiler. (Condensate return systems are recommended for higher kW boilers.)

High Pressure Feed Water Systems for boilers up to 300 kW. (Condensate return systems are recommended for higher kW boilers.)

Condensate Return System for recovery of steam condensate for boiler water feed. (Recommended for all CHS boilers.)

Heavy Duty Vacuum Breaker prevents siphoning of condensate in condensate return systems.

Automatic Blow Down System eliminates need for daily manual blow-down maintenance.

Blow Down Separator for blow down of a boiler where steam and hot water cannot be discharged directly into a drain. Blow down separators are available with optional pressure gauge and/or temperature gauge.

Transformers for control circuit power (up to 2.0 kVA).

Low Pressure Trim for 15, 30, 50 and 100 psig.

Ammeter for visual indication of line current and boiler electrical load.

Pilot Lights for visual indication of sequencer operation and element staging.

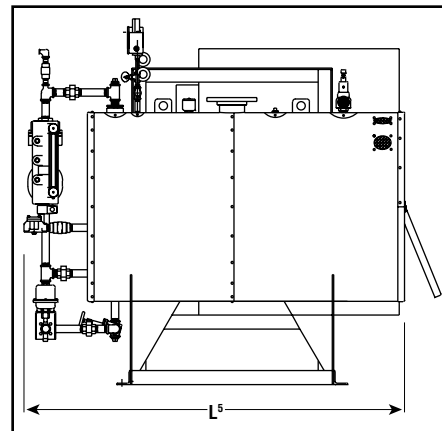
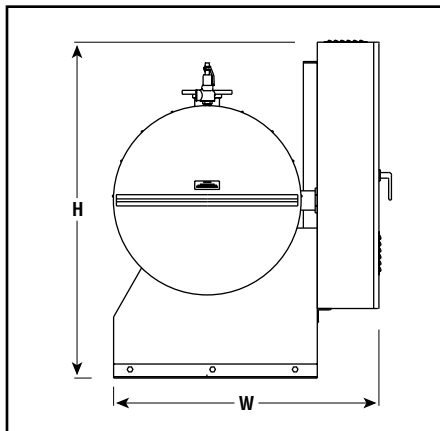
Motor Starter for feed water pumps or condensate return system.

Proportional Control with electronic solid state sequencer for modulated pressure control.

Higher Pressure Trim up to 300 psig available on special order.

Contact your Local Chromalox Sales office for detailed information on these and other options for CHS boilers.

Dimensions (Inches)



Specifications and Ordering Information

Steam ¹ Lbs/Hr	Bhp	kW	3 Ph ² Volts ²	Amps ²	Service Wire ⁴ No. & Size	Dimensions (In.)			Model	Stock	Wt. (Lbs.)
						W	L ³	H			
CHS with Two Operating Pressure Controls (Two Stages)											
452	15.3	150	240	361	2 - 4/0	48	67	61	CHS-150A	NS	1,300
452	15.3	150	480	181	1 - 4/0	48	67	61	CHS-150A	NS	1,300
543	18.4	180	240	433	2 - 250 MCM	48	67	61	CHS-180A	NS	1,320
543	18.4	180	480	217	1 - 250 MCM	48	67	61	CHS-180A	NS	1,320
633	21.4	210	240	506	2 - 350 MCM	48	67	61	CHS-210A	NS	1,380
633	21.4	210	480	253	1 - 350 MCM	48	67	61	CHS-210A	NS	1,380
723	24.5	240	240	578	2 - 500 MCM	48	67	61	CHS-240A	NS	1,420
723	24.5	240	480	289	1 - 400 MCM	48	67	61	CHS-240A	NS	1,420
CHS with Three Operating Pressure Controls (Three Stages)											
814	27.6	270	240	650	2 - 600 MCM	48	67	61	CHS-270A	NS	1,480
814	27.6	270	480	325	1 - 600 MCM	48	67	61	CHS-270A	NS	1,480
904	30.6	300	240	722	2 - 600 MCM	48	67	61	CHS-300A	NS	1,530
904	30.6	300	480	361	1 - 600 MCM	48	67	61	CHS-300A	NS	1,530
CHS with Proportional Operating Pressure Control and Sequencer(s)											
1,085	36.7	360	480	433	2 - 250 MCM	48	67	61	CHS-360A	NS	1,600
1,266	42.9	420	480	506	2 - 350 MCM	48	67	61	CHS-420A	NS	1,700
1,492	50.5	495	480	596	2 - 500 MCM	54	85	61	CHS-495A	NS	2,100
1,628	55.1	540	480	650	2 - 600 MCM	54	85	61	CHS-540A	NS	2,200
1,899	64.3	630	480	758	2 - 700 MCM	54	85	61	CHS-630A	NS	2,300
2,170	73.5	720	480	866	3 - 400 MCM	54	85	61	CHS-720A	NS	2,800
2,441	82.7	810	480	975	3 - 600 MCM	54	85	61	CHS-810A	NS	3,000
2,848	96.4	945	480	1,137	3 - 700 MCM	54	85	61	CHS-945A	NS	3,200
3,255	110	1,080	480	1,299	4 - 500 MCM	75	85	61	CHS-1080A	NS	3,400
3,662	124	1,215	480	1,461	4 - 700 MCM	75	85	61	CHS-1215A	NS	3,600
4,069	138	1,350	480	1,624	5 - 600 MCM	75	85	61	CHS-1350A	NS	3,800
4,476	152	1,485	480	1,785	5 - 700 MCM	81	85	61	CHS-1485A	NS	4,000
4,883	165	1,620	480	1,949	6 - 600 MCM	81	85	61	CHS-1620A	NS	4,200

To Order—Specify model, volts, phase, kW, trim and Certification if required.

1. Steaming capacity based on producing saturated steam at 212°F with 50°F feed water.
2. All boilers are connected for three phase. Other voltages and ratings available.
3. Allow 32" for element removal on CHS 150 - 420 and 54" for CHS 495 - 1,620.
4. Copper 90°C AWG unless indicated otherwise. Contact your Local Chromalox Sales office for number and size of contactors.

"Under the U.S. Federal Safe Drinking Water Act, it is unlawful to install or use this product in any service that comes into contact with water for human consumption (including drinking, food or beverage preparation, hand washing, or teeth brushing). This product is intended exclusively for use in non-potable service."

CHPES-A Medium Pressure Vertical Steam Boiler

- Steam Pressures to 235 psig
- Steam Capacity
(18 - 542 Lbs/Hr @ 0 - 235 psig)
- 6 - 180 kW (21 - 614 Mbh)
- 208, 240 and 480 Volt, 1 & 3
Phase (600V Available)
- ASME Section I Pressure Vessel
Carbon Steel Code "S" (250 psig)
(CRN Available)
- 0.430 Dia. Copper Sheath
Heating Elements
- One or Two Operating Controls
Manual Reset High Limit
- Mechanical Float Water Feed
Control with Low Water Cutoff
- Pressure Gauge, Water Level
Sight Glass and Blow Down
Drain Valve(s)
- ASME Safety Relief Valve

Applications

CHPES Medium Pressure Steam Boilers can be used wherever steam and process temperatures up to 400°F are required. CHPES boilers produce steam at pressures and temperatures considerably higher than CES models which are limited to 135 psig and 359°F.

CHPES Boilers are Ideal for stand-by operations requiring steam in remote areas of an industrial plant which might incur excessive pipe losses or expensive piping costs to supply from a central steam supply. They are ideal for off season periods when steam is needed for critical processes when the main boiler is shut down.



CHPES Boilers are Trimmed at 250 psig for operation up to 235 psig, come complete, factory tested and ready to operate. CHPES boilers are UL Listed.

Features

250 Lb Medium Pressure Construction

— Pressure vessel is manufactured to the requirements of ASME Section I and code stamped "S".

Water Feed (Pump) Control and Low Water Cutoff (McDonnell Miller #194) automatically maintains correct water level and shuts off the boiler when the water level in the boiler drops below safe limits.

Operating Controls — Pressure control(s) provide accurate regulation of steam pressure.

High Limit Pressure Control — Manual reset pressure limit control shuts down boiler if maximum operating pressure is exceeded.

Water Level Sight Glass — Provides for constant visual observation of the water level in the boiler.

Steam Pressure Gauge with a range to 600 psig provided for visual indication of steam pressure.

Drain and Blow Down Valves — Facilitate cleaning the boiler during blow down sequence.

Optional Equipment

Auxiliary Electronic Low Water Cutoff — Solid State control board with low voltage probe provides backup protection for low water level in the boiler. This option is required by some state or local boiler codes.

Proportional Control with electronic solid state sequencer for modulated pressure control.

Electronic Level Control with automatic water feed and low water cutoff (dual probe). Low cost alternative to mechanical float type water feed control and low water cutoff.

High Pressure Water Feed System for remote installation.

Condensate Return System for recovery of steam condensate for boiler water feed.

Heavy Duty Vacuum Breaker prevents siphoning of condensate in condensate return systems.

Automatic Blow Down System eliminates need for daily manual blow-down maintenance.

Blow Down Separator for blow down of a boiler where steam and hot water cannot be discharged directly into a drain.

Note — A water feed or condensate return system is required on all CHPES boilers. See Optional Equipment.

CHPES-A

Medium Pressure

Vertical Steam Boiler (cont'd.)

Specifications and Ordering Information

Steam ¹ Lbs/Hr	Bhp	kW	Volts ²	Ph	3 Ph ² Amps	Service ⁴ Wire Size	Dimensions (In.)			Model	Stock	PCN	Wt. (Lbs.)
							W	L ⁵	H				
CHPES with One Operating Pressure Control³ (Transformer Optional)													
18.1	0.61	6	208	3	17	12	23	31	37	CHPES-006A	NS	—	400
18.1	0.61	6	240	3	15	12	23	31	37	CHPES-006A	NS	—	400
18.1	0.61	6	480	3	8	12	23	31	37	CHPES-006A	NS	—	400
27.1	0.92	9	208	3	25	10	23	31	37	CHPES-009A	NS	—	430
27.1	0.92	9	240	3	22	10	23	31	37	CHPES-009A	NS	—	430
27.1	0.92	9	480	3	11	12	23	31	37	CHPES-009A	NS	—	430
36.2	1.22	12	208	3	34	8	23	31	37	CHPES-012A	NS	—	430
36.2	1.22	12	240	3	29	10	23	31	37	CHPES-012A	NS	—	430
36.2	1.22	12	480	3	15	12	23	31	37	CHPES-012A	NS	—	430
51.2	1.73	17	208	3	48	6	23	31	37	CHPES-018A	NS	—	430
51.2	1.73	17	240	3	42	6	23	31	37	CHPES-018A	NS	—	430
51.2	1.73	17	480	3	21	12	23	31	37	CHPES-018A	NS	—	430
72.3	2.45	24	208	3	67	4	28	35	44	CHPES-024A	NS	—	520
72.3	2.45	24	240	3	58	4	28	35	44	CHPES-024A	NS	—	520
72.3	2.45	24	480	3	29	10	28	35	44	CHPES-024A	NS	—	520
87.4	2.95	29	208	3	81	3	28	35	44	CHPES-030A	NS	—	520
87.4	2.95	29	240	3	70	4	28	35	44	CHPES-030A	NS	—	520
87.4	2.95	29	480	3	35	8	28	35	44	CHPES-030A	NS	—	520
102.5	3.47	34	208	3	95	2	28	35	44	CHPES-036A	NS	—	520
102.5	3.47	34	240	3	82	3	28	35	44	CHPES-036A	NS	—	520
102.5	3.47	34	480	3	41	6	28	35	44	CHPES-036A	NS	—	520
138.7	4.69	46	208	3	128	2/0	28	35	44	CHPES-048A	NS	—	630
138.7	4.69	46	240	3	111	1	28	35	44	CHPES-048A	NS	—	630
138.7	4.69	46	480	3	56	6	28	35	44	CHPES-048A	NS	—	630
174.8	5.91	58	208	3	161	3/0	28	35	44	CHPES-060A	NS	—	640
174.8	5.91	58	240	3	140	2/0	28	35	44	CHPES-060A	NS	—	640
174.8	5.91	58	480	3	70	4	28	35	44	CHPES-060A	NS	086510	640
205	6.93	68	208	3	189	250 MCM	28	35	44	CHPES-072A	NS	—	640
205	6.93	68	240	3	164	3/0	28	35	44	CHPES-072A	NS	—	640
205	6.93	68	480	3	82	3	28	35	44	CHPES-072A	NS	—	640
CHPES with Two Operating Pressure Controls³ (Transformer Optional)													
307	10.4	102	208	3	284	400 MCM	32	38	64	CHPES-100A	NS	—	1,250
307	10.4	102	240	3	246	350 MCM	32	38	64	CHPES-100A	NS	—	1,250
307	10.4	102	480	3	123	1/0	32	38	64	CHPES-100A	NS	109410	1,250
410	13.6	136	240	3	327	600 MCM	32	38	64	CHPES-135A	NS	—	1,400
410	13.9	136	480	3	164	3/0	32	38	64	CHPES-135A	NS	—	1,400
475	16.1	158	240	3	379	700 MCM	32	38	64	CHPES-160A	NS	—	1,450
475	16.1	158	480	3	190	250 MCM	32	38	64	CHPES-160A	NS	—	1,450
542	18.4	180	240	3	433	2-300 MCM	32	38	64	CHPES-180A	NS	—	1,500
542	18.4	180	480	3	217	300 MCM	32	38	64	CHPES-180A	NS	—	1,500

Stock Status: S = stock NS = non-stock
To Order—Specify model, volts, phase, kW and PCN.

- Steaming capacity based on producing saturated steam at 212°F with 50°F feed water.
- Single phase and other voltages available. Contact your Local Chromalox Sales office.
- All boilers have 120V/1/60Hz control circuit. 220V/1/50Hz circuits are available for export boilers.
- Copper 90°C AWG unless indicated otherwise. Refer to the instruction sheet for the number of contactors.
- Allow 21" for element removal and 10" around boiler for service access. Add 2" to width dimension for optional transformer.

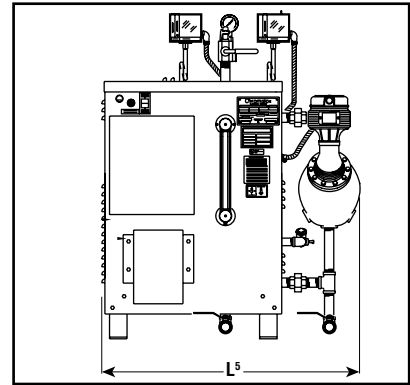
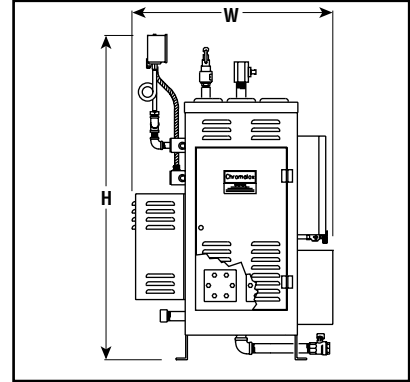
"Under the U.S. Federal Safe Drinking Water Act, it is unlawful to install or use this product in any service that comes into contact with water for human consumption (including drinking, food or beverage preparation, hand washing, or teeth brushing). This product is intended exclusively for use in non-potable service."

Plumbing Connections

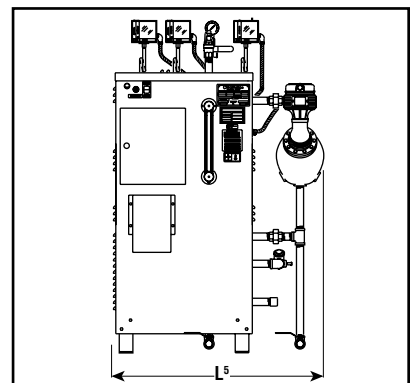
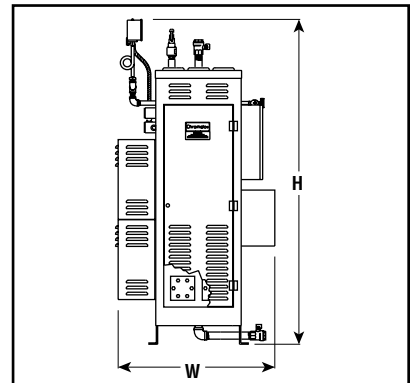
Boiler	NPT	
	Water Inlet	Steam or Water Outlet
CHPES 6-18	1/2	1/2
CHPES 24-72	3/4	1
CHPES 100	3/4	1-1/2
CHPES 135-180	3/4	2

Dimensions (Inches)

CHPES-6A through -18A

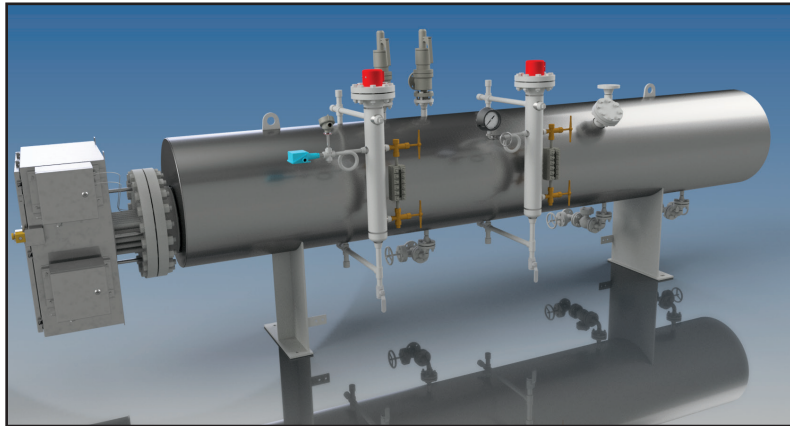


CHPES-24A through -180A



MVSGI High-Capacity Steam Generator

- Steam Pressures to 250 psig or 450 psig (17.2 Barg or 31 Barg)
- Steam Capacity from 3,466 to 33,032 lbs / hr
- 1,150 - 10,960 kW
- 117 - 1,114 bhp
- 3,924 - 37,393 Mbh
- 4,160 - 6,600 Volts, 3ph
- ASME Section I Pressure Vessel Carbon Steel, Code "S"
- INCOLOY® 800 Sheath Heating Elements
- 0-100% Proportional Power Control
- Two ASME Safety Relief Valve(s)
- High Pressure Limit Switch with Manual Reset
- Mechanical Float Water Feed Control with Low Water Cutoff Control
- Auxiliary Low Water Cutoff Control
- Pressure Gauge, Water Level Sight Glass and Double Blow Down Drain Valves



Description

MVSGI high capacity steam generators are uniquely designed for larger industrial applications. The use of medium voltage ranges allows for an economical installation, along with highly efficient operation.

MVSGI Generators are ideal for stand-by operations requiring high pressure steam in remote areas of the plant, which might incur excessive pipe heating losses or expensive piping runs from a traditional, centralized steam supply.

MVSGI Generators are particularly suited for use in off season periods when steam is needed for critical processes or humidification during main Generator shutdowns.

Features

- **Advanced power control** provides an operating range of 0-100% of Generator capacity. Solid state power components, along with optimized logic control, allow for an almost infinite number of step controls. This setup delivers instantaneous power conversion to heat energy and ensures all available power is directly delivered to the process.
- **Standard Trim Pressures** at 250 psig (406°F) or 450 psig (460°F) to meet most application demands.
- **Water Feed Control and Low Water Cutoff** automatically maintains the correct water level and shuts off the generator if the level drops below safe limits.

- **Auxiliary Low Water Cutoff** provides backup protection if the water level drops below safe limits.
- **Water Level Sight Glass** provides for visual observation of the water level.
- **Steam Pressure Gauge** provides for visual indication of steam pressure
- **Long Life Chromalox DirectConnect™ Heating Elements** provide uniform direct immersion heating for rapid heat up and efficient power delivery.
- **Two Full Port Blow Down Drain Valves** are provided to accommodate blowdown to ensure clean vessel operation.
- **Vessel Insulation and Jacketing** is provided around the entire pressure vessel to reduce energy loss and ensure efficient heater operation.
- **Anti-Condensation Heater** for element terminal enclosure is provided to prevent internal moisture accumulation.
- **Inspection Port** provided for easy access during routine maintenance schedules.
- **Pre-installed Spare Element Capacity** to ensure full kW operation can be available during critical operation periods.

MVSGI High-Capacity Steam Generator (con'td.)

Options

Deaerator System

Feedwater can contain dissolved gases. Dissolved oxygen and carbon dioxide can be especially corrosive to steam piping, valves, and other parts due to oxide formations and carbonic acid.

Deaerators are used to remove such gases and help minimize corrosion throughout the steam network. Each setup is unique so contact Chromalox to help properly size a system for your application.

Generator Feed Unit

Larger generator systems require a feed system to provide the proper amount of make-up and return water during various loads, and ensure the the correct liquid level in the generator.

A properly designed system is critical to minimize factors such as under/overflow, temperature shock, and corrosion, all while maintaining operational flexibility.

Each setup is unique so contact Chromalox to help you properly size a system for your application.

Auto Blowdown System

Sediment, minerals, and other contaminants left behind in a generator vessel can reduce operational efficiency and ultimately lead to a shortened operating life.

Regularly schedule blowdowns can help eliminate such conditions and ensure operational readiness.

Refer to the Accessory section for more details

Steam Superheater

Electric in-line heaters are ideal for increasing steam quality and ensuring 'dry' steam is available for distribution.

Proportional power control is used to ensure only the heat needed is provided for the system.

Superheaters can be provided pre-mounted or separate for installation at needed locations.

Vacuum Breakers

Vacuum Breakers are added to prevent the siphoning of condensate from the system during shutdowns.

UL and/or IEC Ratings

Available on applicable product designs

Higher or Lower Pressure Ratings

Standard Size Specifications

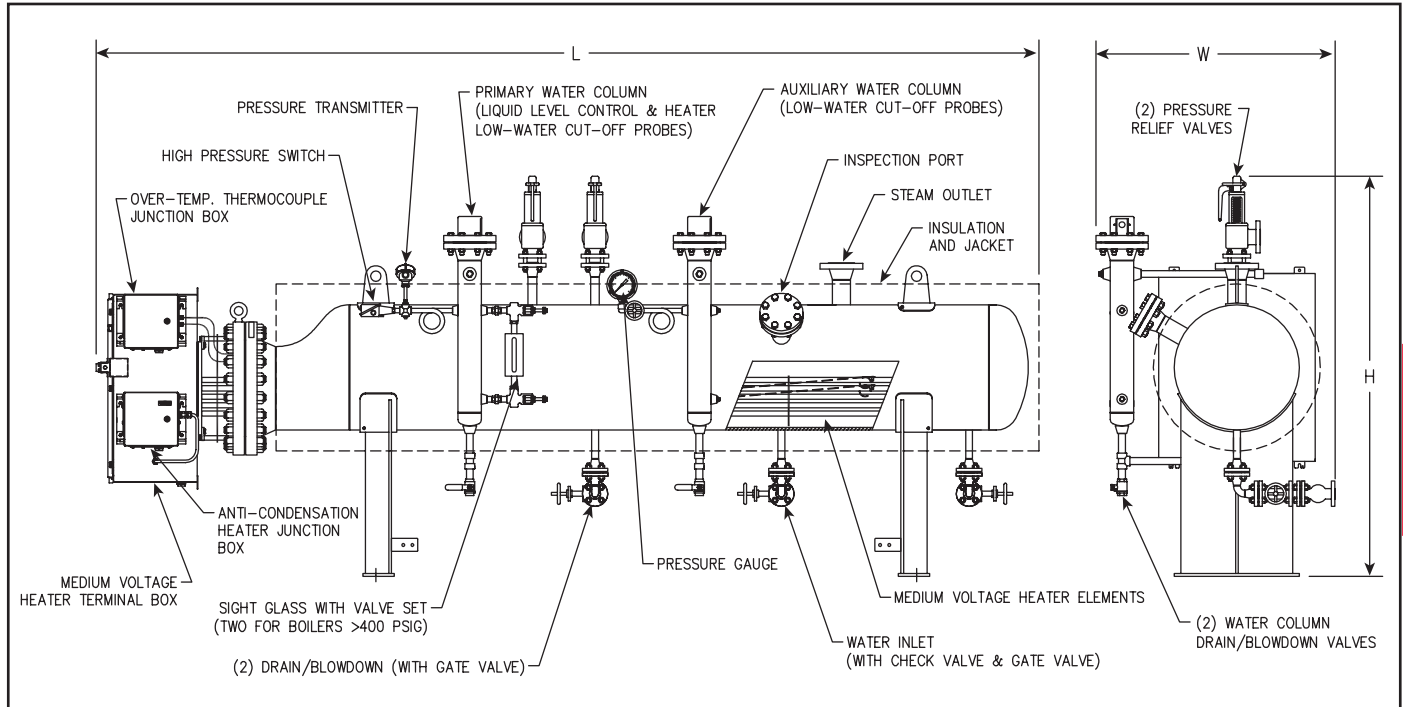
Steam Capacity			Heat Rating		Pressure & Temperature Ratings				Part Number				
Steam lb/hr	Mbh	bhp	kW	Volts	Design Parameters		Max. Operating Conditions						
3,466	3,924	117	1150	4160	250psig@406°F	17.2barg@207°C	235psig@401°F	16.2barg@205°C	022-307547-001				
6,932	7,847	234	2300						022-307547-002				
13,864	15,694	468	4600						022-307547-003				
20,796	23,541	701	6900						022-307547-004				
5,485	6,209	185	1820	6600					450psig@460°F	31.0barg@237°C	423psig@454°F	29.1barg@234°C	022-307547-101
11,001	12,453	371	3650										022-307547-102
22,001	24,906	742	7300										022-307547-103
33,032	37,393	1,114	10960										022-307547-104
3,466	3,924	117	1150	4160	450psig@460°F	31.0barg@237°C	423psig@454°F	29.1barg@234°C					022-307547-201
6,932	7,847	234	2300										022-307547-202
13,864	15,694	468	4600										022-307547-203
20,796	23,541	701	6900										022-307547-204
5,485	6,209	185	1820	6600					450psig@460°F	31.0barg@237°C	423psig@454°F	29.1barg@234°C	022-307547-301
11,001	12,453	371	3650										022-307547-302
22,001	24,906	742	7300										022-307547-303
33,032	37,393	1,114	10960										022-307547-304

*Generator and Control units can be mounted separately or together based on site location conditions.

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MVSGI High-Capacity Steam Generator *(con'td.)*

Typical Layout & Dimensions



HEAT TRANSFER

Standard Size Specifications

Steam Capacity			Heat Rating		Dimensions & Weights (in/mm, lbs/kg)*					
Steam lb/hr	Mbh	bhp	kW	Volts	Width	Length	Height	Dry Weight	Oper. Weight	Part Number
3,466	3,924	117	1150	4160	46/1169	217/5512	77/1956	4200/1906	590/2677	022-307547-001
6,932	7,847	234	2300	4160	55/1397	218/5538	87/2210	6200/2813	9100/4128	022-307547-002
13,864	15,694	468	4600	4160	66/1677	220/5588	101/2566	11200/5081	15900/7213	022-307547-003
20,796	23,541	701	6900	4160	76/1931	222/5639	115/2921	16500/7485	24300/11023	022-307547-004
5,485	6,209	185	1820	6600	55/1397	218/5538	87/2210	5700/2586	8600/3901	022-307547-101
11,001	12,453	371	3650	6600	66/1677	220/5588	101/2566	10500/4763	15200/6895	022-307547-102
22,001	24,906	742	7300	6600	76/1931	228/5792	121/3074	18400/8347	27200/12338	022-307547-103
33,032	37,393	1,114	10960	6600	82/2083	229/5817	121/3074	22600/10252	34200/15513	022-307547-104
3,466	3,924	117	1150	4160	46/1169	217/5512	77/1956	4700/2132	6400/2903	022-307547-201
6,932	7,847	234	2300	4160	55/1397	218/5538	87/2210	6900/3130	9800/4446	022-307547-202
13,864	15,694	468	4600	4160	66/1677	220/5588	101/2566	12800/5806	17500/7938	022-307547-203
20,796	23,541	701	6900	4160	76/1931	222/5639	115/2921	18800/8528	26500/12021	022-307547-204
5,485	6,209	185	1820	6600	55/1397	218/5538	87/2210	6400/2903	9300/4219	022-307547-301
11,001	12,453	371	3650	6600	66/1677	220/5588	101/2566	12200/5534	16800/7621	022-307547-302
22,001	24,906	742	7300	6600	76/1931	228/5792	121/3074	20900/9481	29700/13472	022-307547-303
33,032	37,393	1,114	10960	6600	82/2083	229/5817	121/3074	25100/11386	36600/16602	022-307547-304

*Generator and Control units can be mounted separately or together based on site location conditions.

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Steam Boilers Optional Equipment

Condensate Return Systems

Chromalox condensate return systems are used wherever condensed steam can be collected for reuse in the boiler. Significant energy can be saved by returning hot condensate to the boiler for feed water. The condensed water is free from corroding minerals and contains a substantial amount of heat energy which does not have to be replenished.

CAUTION — When a condensate system is used, a vacuum breaker must always be installed on the boiler to prevent the boiler from flooding during shut down.

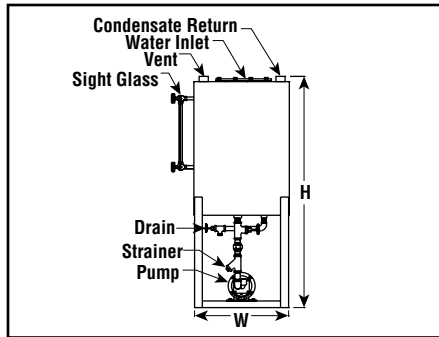
Low and Medium Pressure Condensate Return Systems (150 psig maximum). Chromalox condensate return systems (except model HPCS 3003) are designed for use with steam boilers operating up to 150 psig steam pressures. The condensate systems consist of an 11 gauge steel tank, motor, pump, float valve, sight glass and associated plumbing. A 1/2" inlet is located on the tank for connection to a local water supply for make up water. A "vent" is located on the top of the tank and is open to the atmosphere. The "return" connection is plumbed to the trapped condensate return line from the process.

The condensate tank has an internal ball check valve, a float and float arm which mechanically opens a valve, allowing make up water to enter the tank as the original supply is depleted. The outlet of the pump is plumbed to the boiler water inlet check valve. The pump motor is wired to the boiler feed water control or motor starter. No further adjustments and/or plumbing are required other than plumbing the condensate tank drain and drain valve to a proper waste connection.

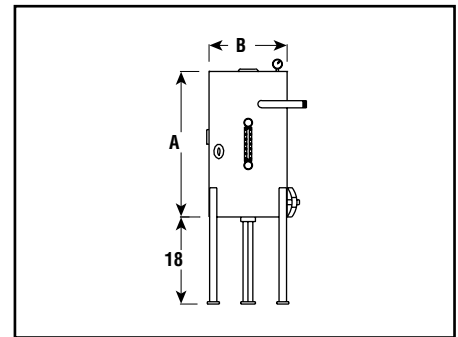
High Pressure Condensate Return Systems (250 psig maximum). The Chromalox HPCS3003 high pressure (250 psig maximum) condensate return system is specifically designed for use with the CHPES-6 through 180 kW boilers whenever condensate is to be returned for reuse.

The high pressure condensate return system consists of a 30 gallon tank with an internal make up water float valve, a 3 Hp three phase motor (motor voltage will match the boiler's voltage), a special high-pressure pump and a sight glass. A motor starter and fuses can be supplied as an option. Installation requires wiring and field plumbing to the boiler with minimum 1/2" NPT piping rated at 250 psig.

ES38038V Condensate Return System



CBS-1 Blow Down Separator — Dimensions (Inches)



Condensate Return System Selection

For Use On	Storage Tank Max.		Motor			Dimensions (In.)			Model	Stock	PCN	Wt. (Lbs.)
	Gal.	psig	Volts	Ph	Hp	L	W	H				
CES 6 -100	26	110	115/230	1	1/3	14-1/2	14-1/2	48	ES38083V	NS	109372	125
CES 135 -180	33	130	115/230	1	1/2	14-1/2	14-1/2	54	ES38084V	NS	109399	240
CHS 150 - 300	33	150	115/230	1	3/4	14-1/2	14-1/2	54	HS38019V	NS	—	260
CHS 360 - 810	46	150	230/460	3	3	14-1/2	14-1/2	66	HS38031V	NS	—	310
CHS 945 -1215	50	150	230/460	3	5	20	50	40	HS38039H	NS	—	365
CHS 1320 -1620	Contact Factory for Recommendations											
CHPES 6 -180	30	235	230/460	3	3	34-1/4	41-1/2	21	HPCS3003H	NS	109428	310
CSSB 6 -180	Stainless steel boilers require de-ionized water. Contact your Local Chromalox Sales office.											

Stock Status: S = stock NS = non-stock

To Order — Specify model number of condensate system, boiler model number, volts, phase, kW, PCN if applicable, and quantity.

Note —

A. Connections (NPT): Pump Out = 1", Tank Return = 1-1/4"

B. All motors can operate on 208V. Systems for boilers larger than 810 kW have horizontal tanks. Use ES38084V for all CES boilers with 135 psig trim.

Blow Down Separators

Many state and municipal boiler codes do not permit discharge of boiler blow down directly into city sewers. Chromalox blow down separators separate liquid from vapor during blow down and prevent the dangerous discharge of live steam down city drains. The separator accepts water and flash steam from the boiler blow down, reducing temperatures and pressures to safe levels for subsequent discharge to the sewer.

The separator is kept half full of cold water before each blow down. The design utilizes a water seal at the outlet which permits the system to introduce cold water from the bottom to mix with the hot water and boiler steam blow down inside the separator. Flash steam is absorbed by the cold water and allowed to pass to the outside through a vent. Chromalox blow down separator CBS is built and stamped to Section VIII of the ASME Code.

Blow down separators require only plumbing from the boiler blow down, hook-up to a cold water supply line and connection to a drain. No electrical connections are required. Order options include a 0 - 30 psig pressure gauge, 0 - 200°F temperature gauge and a water sight glass gauge assembly.

Blow Down Separator Selection

Boiler	Boiler kW	DIM.		NPT		PCN	Wt. (Lbs.)
		A	B	Inlet	Outlet		
CBS	6 - 200	24	16	1	1-1/2	109250	230
CBS	201 - 500	36	24	1	2-1/2	—	260
CBS	501 - 1000	48	36	1-1/4	3	—	290
CBS	1001 - 1620	72	42	1-1/2	3-1/2	—	320

Vacuum Breaker Systems

After boiler shut down, the steam inside the vessel condenses as the shell cools. This creates a vacuum which will siphon water into the boiler from the water feed or condensate return system, flooding the boiler. A vacuum breaker permits outside air to enter into the shell to relieve the vacuum, thus preventing excess water from being drawn into the vessel. The vacuum breaker consists of a valve with a spring loaded disc and associated piping, factory plumbed to the boiler. They can be used on all Chromalox boilers.

Vacuum Breaker Selection

Model	Use With Boiler	Max. Pressure (psig)	PCN
ES89369	CES	150	109479
ES89369SS	CSSB	150	—
HPES 89369	CHPES	300	109760

Steam Boilers Optional Equipment (cont'd.)

Cold Water Feed Systems

Automatic water feed is required on all CES, CHPES, CHS and CSSB steam boilers. Water feed systems are available for low pressure and high pressure applications. Low pressure or solenoid feed systems may be used when the incoming water line pressure is at least 10 psig greater than the boiler operating pressure. High pressure or pump and motor feed must be used when the boiler operating pressure is greater than 10 psig less than incoming water line pressure.

A selection of different models is available depending on the size and pressure rating of the boiler. The correct water feed system may be determined from the following chart:

Water Feed System Selection

Boiler	Pressure	
	Low	High
CES 6-72	ES99117	ES38002/ES38020
CES 100-180	ES99117	ES38020
CSSB 6-72	ES99117SS	ES38002SS
CSSB 100-180	ES99117SS	ES38020SS
CHPES 6-180	—	ES38020HP
CHS 150	HS99117	ES38020
CHS 180-300	HS99117	ES38021
CHS 360-1620	Note 1	Note 1

Low-Pressure Water Feed Systems

Low pressure cold water feed systems supply makeup water to the boiler where incoming water line pressure is 10 psig or greater than the operating pressure of the boiler.

ES99117 — Low-Pressure Water Feed System 0 to 90 psig. ES99117 piping is 1/2" NPT and is completely factory plumbed and wired. The systems consists of strainer, solenoid valve and check valve. The solenoid valve is 120V/1/50 - 60 Hz. For CSSB boilers specify ES99117-SS with all stainless steel construction.

HS99117 — Low-Pressure Water Feed System for larger boilers 0 to 150 psig. The HS99117 is similar to ES99117 except piping is 1" NPT and a bypass system with a manual valve is provided for initial fill of larger boilers.

Notes —

- For larger systems, use a condensate return system.
- System equipped with two motorized ball valves for pressures above 100 psig.
- High pressure feed systems ES38002 (SS), ES38020 (SS) and ES99157 can be mounted on CES & CSSB boiler enclosures.

HS99117 — Low Pressure Water Feed



ES38002 — High Pressure Water Feed



81025 — Blow Down Kit for CHPES



High-Pressure Water Feed Systems

High pressure cold water feed systems are used to maintain constant water level in the boiler when boiler operating pressure is equal to or greater than the incoming water line pressure.

ES38002 — System 0 - 90 psig — This water feed system is a separate pump and motor assembly requiring field plumbing and wiring to the boiler.³ The piping is 1/2" NPT and the assembly includes a 1/4 Hp 120V/1/60 motor and pump piping, a strainer and a solenoid valve. The assembly is mounted on rubber shocks, secured on a steel base mounting plate. A flexible 18" high pressure hose with fittings is included for connection to boiler and a cable for electrical connection. For CSSB boilers 6 to 72 kW (stainless steel) and de-ionized water, specify **ES38002-SS**³.

ES38020 — System 0 - 135 psig — This system is similar to ES38002 except it has 1/2" NPT piping and a 1/3 Hp 120V/1/60 motor and pump.³ For CSSB boilers 72 to 180 kW (stainless steel) and de-ionized water, specify **ES38020-SS**³.

HS38021 — System 0 - 135 psig — This system is similar to ES38002 except it has 1" NPT piping and a 3/4 Hp 120V/1/60 motor for greater capacity.

ES38020HP System 0 - 235 psig — This high pressure cold water feed system can be used with all CHPES boilers where the condensate is not returned. Installation requires plumbing and wiring between the pump assembly and the boiler. The system consists of a 3/4 Hp 208/230/460V, 3ø motor, a positive displacement type pump, 1/2" NPT piping, strainer and solenoid valve.

Automatic Blow Down Systems

Chromalox engineering recommends a factory-installed automatic blow down unit. Automatic blow down systems can:

- Save Labor Costs
- Extend Life of Boiler
- Automatically Start the Boiler in the Morning
- Automatically Shut the Boiler Down at Night
- Automatically Blow it Down Each Working Day
- Be Programmed to Skip Days and Week-ends.

The heart of the Chromalox automatic blow down unit is a motor-driven, straight-through, self-cleaning ball valve with Teflon® seats and stainless steel trim. It handles dirty fluids and particles without a strainer or other cleaning device. The ball valve and boiler are controlled by an electronic unit with a time clock and pilot lights which indicate when the drain valve is open or closed and when the boiler is on or off. Blow down can also be done manually, at any time, by means of a push button switch which momentarily de-energizes the boiler and opens the drain valve. The blow down system may be installed on any steam boiler regardless of size or operating duty cycle. Select from the following chart:

Automatic Blow Down System Selection

Model	Pipe Use With Boiler	NPT	Press. psig	Wt. (Lbs.)
81015A	CES 6-18, CHS-150	1/2	150	46
81015B	CES 24-180	1	150	46
81015B	CHS 150-420	1	150	46
81015SS	All CSSB	1	150	46
81115	CHS 495-630	1-1/2	150	46
81215	CHS 720-1,620	2	150	50
81025 ²	All CHPES	1	250	50

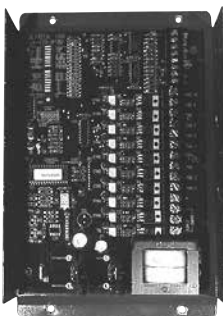
Steam Boilers Optional Equipment (cont'd.)

Electric Element Sequencers

Sequencers are designed to apply power to large kW boilers in progressive stages. Automatic sequencing provides accurate and cost effective control, saving energy and minimizing wear and tear on electrical components. Sequencing extends the life of the individual heating elements by rotating the load evenly across all element bundles. Reacting to an input signal from a factory installed proportional pressure control, the sequencer energizes and de-energizes each heating element circuit through individual power contactors. The sequencer programs a delay before start up and between each subsequent step to eliminate power surges. Once up to power and pressure, the load is "fine-tuned" for close pressure control, with a minimum of over-shoot or droop. Each sequencer is pre-set to match the specific boiler and system requirements. In case of power interruption, the sequencer restarts with all steps de-energized. Electronic solid state sequencers are available with up to 20 steps or stages for efficient operation of any size Chromalox boiler.

Electronic Sequencer Operation — Solid state progressive sequencers provide accurate electronic control of multistage loads of the type used in Chromalox steam boilers. They feature progressive circular sequencing (first-on, first-off) which equalizes the operating time of each load and contactor. The control gives visual indication of each energized stage by means of integral solid state light emitting diodes. In the event of power interruption, all heating elements are immediately de-energized for safety. When power resumes, the control will restage the loads one at a time.

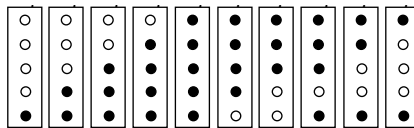
Electronic Solid State Sequencer (Control Board)



Circular sequencer operation and staging can be visualized by the referring to following illustration. The "O" represents an element bundle in the de-energized position. The "●" represents an element bundle which has been energized by the sequencer.

Visualization of Progressive Circular Sequencing

Progression → → →

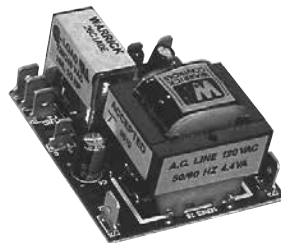


O = Stage "OFF" ● = Stage "ON"

Electronic Auxiliary Low Water Cutoff

An auxiliary low water cutoff can be used as a safe and reliable backup to the primary low water cutoff control and is required by some state and local boiler codes. Auxiliary low water cutoff is provided by an electronic device with a solid state amplifier and a solid state switch for operating the mechanical control relay. Operation is accomplished by sensing a minute current flow between submerged contact probe and the boiler shell. When water level falls below safe operating level, the boiler is shut down. Auxiliary low water cutoffs are standard on all CHS type steam boilers.

Electronic Level Control



Note — For single probe auxiliary low water cutoff (shown with plug-in control relay).

Note — Electronic auxiliary low water cutoffs are not appropriate for use with CSSB or other boilers using demineralized, de-ionized or distilled water. Contact your Local Chromalox Sales office for information on available stainless steel low water float switches for use with electronic auxiliary low water cutoffs.

Transformers

Transformers for control circuits and pump motors can be supplied to eliminate the need for separate 120 Vac power for control circuits. Transformer primary voltage will match boiler power voltage. Transformer secondary voltage will be 120 Vac unless otherwise specified.

Transformer Selection — To select transformer size, simply find the sum of all component kVA requirements to be powered by the transformer. A CES-72A with ES38083V condensate return system and 81015B automatic blow down system would require:

Basic Boiler	1/4 kVA
ES38083V	3/4 kVA
81015B	1/2 kVA
Total Required	1-1/2 kVA

Factory Mounted & Wired Transformer



Transformer Sizing — Basic Boiler

Basic Boiler	Min. kVA Required
CMB 6, 15	1/4
CES, CHPES, CSSB 6-72	1/4
CES 100-180, CHPES 100	1/2
CHS 150-420	1/2
CHS 495-630	3/4
CHS 720-1620	1
Minimum size transformer offered is 1.0 kVA.	

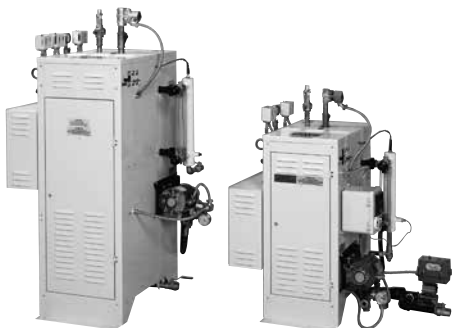
Transformer Sizing-Option Loading

Option	Additional kVA Required
Water Feed Systems	
ES99117 (SS), HS991117	1/4
ES38002 (SS), ES38020 (SS)	3/4
ES99157	1
HS38021, ES38020HP	1-1/2
Automatic Blow Down Systems	
81015A, B, SS	1/2
81115, 81215	1/2
81025	1
Condensate Return Systems	
ES38083V	3/4
ES38084V	1
All 3-phase Condensate Return Systems (3 pole motor starter required)	1/4

Steam Boilers Custom Engineering & Manufacturing

Chromalox has the engineering capability to custom design packaged boilers at low cost for original equipment manufacturers or users. In addition to industrial applications, we have extensive experience with commercial cooking, dry cleaning and laundry equipment, medical sterilizers and bakery humidification applications. If your requirements are not met with our standard product line or available optional features, contact your Local Chromalox Sales office for technical assistance. Examples of custom boilers are shown:

Custom Steam Boiler for use by an original equipment manufacturer of sterilizers. Other custom boilers are available with capacities to 30 kW and fit almost any size sterilizer commonly used in hospitals and surgical centers. Custom boilers can be supplied as a UL Recognized Component and CSA Certified. Also available in stainless steel.



CMB Custom Steam Boiler equipped with a steam gun. A solenoid valve operated by a foot switch makes this boiler ideal for shrink fitting of upholstery in the furniture and automobile after market industries. UL Listed and CSA Certified.



Related Chromalox Products

In addition to custom steam and hot water boilers, there are literally thousands of other Chromalox products that can be used to provide hot water or steam. A few related products are:



CMX Circulating Water Temperature Controller is a "state of the art" hot water heating and circulating unit for use in the plastics and other industries for mold temperature control. Portable and completely self contained.



MWS Mid-Size Water/Glycol System - is engineered to operate to 300°F (150°C) with either water or water/glycol fluids. Its electric heating core assures responsive and precise temperature control in a space saving package. The system is suitable for a large range of heating needs with a compact design. The MWS operates in a closed loop system using a cold expansion tank (optional).



NWH and NWHIS Water Circulation Heaters can be used for water heating in pass-through or side-arm applications. Model NWH is used for city and tap water heating. Model NWHIS is constructed of stainless steel and is used for pure water and mildly corrosive solution heating.



GCHI and GCHIS Gas Circulation Heaters can be used for superheating of steam. Model GCHI is usable to 750°F operating temperatures. Model GCHIS is constructed of stainless steel and is usable to 1200°F operating temperatures.

Refer to the **Catalog Index** for these and other related products, or contact your Local Chromalox Sales office for application assistance.

HACS

Air Temperature Control Electric Heating System



- **Portable, Forced Air Temperature Control System**
- **50, 100, and 150 kW Heating Capacity**
- **480 V, 3 Phase, 60 Hz (600V Available)**
- **Corrosion Resistant Painted Steel Construction**
- **Heavy Duty 0.475" Dia. INCOLOY® Sheath Tubular Elements**
- **3,000 – 7,000 SCFM of Airflow from Industrial-Grade Fans**
- **Multi-stage Contactor System for Accurate Temperature Control**
- **NEMA 4 Electrical Enclosure for Outdoor Weather Protection**
- **Fork Lift Accessible**
- **Four-Point Lug Lifting System**
- **Use with Standard 20" Flexible Duct**
- **Stackable to Maximize Storage**
- **Emergency Stop Button and Fan Delay on Shutdown**
- **Optional SCR Power Control System for High Accuracy**

Description

Chromalox Air Temperature Control Systems provide durable, accurate temperature control for large capacity temporary heating applications. Welded steel construction, tubular elements, and industrial fan offer superior durability and performance under heavy usage and rough environments.

Applications

- Temporary on-site comfort heat for large capacity special events.
- Interim comfort heating system during commercial construction prior to permanent HVAC installation.
- Curing plaster and drying of paint in commercial construction.
- Spot heating for personnel and freeze protection for equipment in the event of a plant shutdown.

Options

- Special Voltage and Wattage requirements
- Special Form Factor and Envelope
- SCR Power Control Panel
- 304 Stainless Steel Construction
- Variable Speed Fan Motor
- Camlok Power Connections
- Voltmeter, Ammeter, and kW Meters
- Phase Reversal Switch

Advantages

- Chromalox Electric Heating Systems are environmentally friendly, 100% efficient, and produce zero emissions.
- Electrically generated heat produces no moisture, and therefore no humidity.
- INCOLOY® sheathed tubular heating elements provide long life and durability during transport and setup.
- Painted Carbon Steel construction ensures weather resistance, with Stainless Steel available for extreme environments.
- Multi-stage, contactor-based control system for accurate temperature control.
- High limit temperature control and low limit airflow control ensures proper safety during operation.
- All electrical enclosures are easily accessible and are protected to NEMA 4 construction.
- Chromalox HACS systems are built to resist the rough handling and transportation of the rental market. Various control and fan options allow for maximum flexibility to meet the varying needs of rental companies and their clients.

Standard Models

kW	BTU	Volts	Phase	Dimensions (In.)			Rated Airflow	Motor HP	Model	Stock	Wt. (Lbs.)
				L	D	H					
50	170,600	480	3	72	48	50	3,000 SCFM @ 2" WG	2	HACS-0501CCP4	NS	1,700
100	341,200	480	3	75	49	50	5,000 SCFM @ 2" WG	5	HACS-1002CCP4	NS	1,780
150	511,800	480	3	80	55	50	5,000 SCFM @ 5" WG	7-1/2	HACS-1503CCP4	NS	1,930

Stock Status: S = stock NS = non-stock
To Order—Specify model, volts, phase, kW, PCN and quantity.

HACS

Air Temperature Control Electric Heating System *(cont'd.)*

Code	Options
A	Variable Speed Fan Motor*
B	Camlok Power Connections
C	Phase Reversal Switch
D	Running Time Meter
E	Multifunction Digital Meter (Amps, Volts and Watts/Phase)
F	Single-Volt Meter with Phase Selection Switch
G	Three-Volt Meters
H	Single Ammeter with Phase Selection Switch
I	3 Ammeters
J	kW Meter
K	Control Panel Cooling Fan
L	Anticondensation Heater

*SCR Control Method is required for selecting Variable Speed Fan Motor option.

Note: Add each letter as suffix to model number. Use all that apply.



Ordering information

Model	
HACS	Air Temperature Control System
Code	Power/Kilowatt Rating
050	50 kW
100	100 kW
150	150 kW
Code	Fan Output
1	3,000 SCFM @ 2" WG
2	5,000 SCFM @ 2" WG
3	5,000 SCFM @ 5" WG
4	7,000 SCFM @ 5" WG
Code	Control Method
C	Multi-Circuit Contactor Control
S	SCR Power Control
Code	Outer Skin
CP	Carbon Steel, Painted
SS	Stainless Steel
Code	Voltage
4	480 Vac
6	600 Vac
HACS-	100 3 C CP 4 Typical Model Number

Accessories

FX-20 Flexible Duct

Chromalox heavy duty, flexible duct is constructed of 100% polyester based fabric and is 20" diameter and 25' long. It is built for use in rugged environments and is suitable for temperatures from -40 to 220°F. The duct is internally supported with a steel wire helix. It can be used on the air intake end of the heater and will not collapse under the negative pressure.

Model	Description	Stock	PCN	Wt (lbs)
FX-20	20" Dia. Flexible Duct 25'	S	295865	45

Flexible Duct Splice Kit

The flexible duct splice kit is designed to splice two or more 25' lengths of flexible duct to create longer lengths.

Model	Description	Stock	PCN	Wt (lbs)
FDS-20	20" Dia. Duct Splice Kit	S	295881	40

Duct Clamp (not shown)

The stainless steel band is designed to fit over the flexible duct for a secure attachment to the adapter ring or flexible duct splice.

Model	Description	Stock	PCN	Wt (lbs)
DC-20	20" Dia. Duct Clamp	S	295890	3

EDU

Load Bank Energy Dissipation Units

- Portable, Forced Air Cooled Energy Dissipation Unit
- 100 – 1000 kW Resistive Capacity
- 240 or 480 V, 3-Phase, 60 Hz (600V Available)
- Corrosion Resistant Stainless Steel Construction
- Heavy Duty 0.475" Dia. INCOLOY® Sheath Tubular Elements
- 1 kW or 10 kW Load Step Resolution
- NEMA 3R Electrical Enclosure for Outdoor Protection
- Standard Digital Keypad and Display for Load Switching
- Optional Voltage/Dual Voltage and Wattage
- Optional Multifunction Digital Readout Meter (V, A, kW, Hz)
- Optional Selector Switches or Push Buttons for Load Switching
- Optional Load Management Module for Combined Loads up to 5 MW



Description

Chromalox EDU Load Banks provide durable, precise energy control for applications requiring from 1 kW to megawatt power capacity. Stainless steel construction and INCOLOY tubular elements offer superior durability and performance even with heavy usage and in extreme environments.

Applications

Applications include factory or field testing of diesel generators, braking resistors for inverter drives, base loading of remote or standby power plants, battery discharge testing, and UPS testing.

Advantages

- INCOLOY sheathed tubular heating elements provide long life under harsh environments.
- Stainless steel construction of a Chromalox load bank ensures strength and corrosion-resistance.
- A multi-stage, contactor-based control system with 1 kW resolution ensures accurate control.
- High limit temperature control and low limit airflow control ensures proper safety.
- All electrical enclosures are protected to NEMA 3R construction.
- Chromalox EDU Load Banks can be used to satisfy National Fire Protection Association (NFPA) requirements for emergency and standby power systems.

Options

- Special Voltage and Wattage Requirements
- Voltmeter, Ammeter, and kW Meters
- Load Management Module for 5 MW
- Remote Control with 25 ft. Cord
- "Wrong Voltage Applied" Indicator
- Camlok Power Connections
- Phase Reversal Switch
- Fan Delay Switch
- CE Approved Models Available

EDU

Load Bank Energy Dissipation Units

(cont'd.)

Code Options

A	Multifunction Digital Meter Amps, Volts and Watts/Phase
B	Single-Volt Meter with Phase Selection Switch
C	Three-Volt Meters
D	Single Ammeter with Phase Selection Switch
E	3 Ammeters
F	kW Meter
G	Control Panel Cooling Fan
H	Anticondensation Heater
I	Load Management Module for 5 MW
J	Remote Control with 25 ft. Cord
K	"Wrong Voltage Applied" Indicator
L	Camlok Power Connections
M	Phase Reversal Switch
N	Fan Delay Switch

Ordering information

Model	
EDU	Load Bank Energy Dissipation Unit
Code	Power/Kilowatt Rating
01	100 kW
02	200 kW
03	300 kW
04	400 kW
05	500 kW
06	600 kW
08	800 kW
10	1000 kW
Code	Mounting
1	Castor Mounted (Standard up to 500 kW)
2	Skid Mounted (Standard 600 - 1,000 kW)
3	Trailer Mounted
Code	Steps/Load Control Resolution
1	1 kW (Standard)
2	10 kW
Code	Load Switching Scheme
TG	Toggle selector switches
PB	Push buttons
KE	Keypad mounted on unit (Standard)
RE	Remote control with cord
Code	Voltage
1	120 Vac
2	208 Vac
3	208/240 Vac
4	240 Vac
5	240/480 Vac
6	277 Vac
7	380 Vac
8	480 Vac
EDU	05 3 1 KE 4
Typical Model Number	

Standard Models

kW	Volts	Phase	Dimensions (In.)			Model	Stock	Wt. (Lbs.)
			L	D	H			
100	480	3	45	34	26	EDU-0111KE8	NS	450
200	480	3	47	41	33	EDU-0211KE8	NS	550
300	480	3	49	45	41	EDU-0311KE8	NS	890
400	480	3	55	45	65	EDU-0411KE8	NS	1,110
500	480	3	55	49	73	EDU-0511KE8	NS	1,215
600	480	3	51	65	71	EDU-0621KE8	NS	1,775
800	480	3	79	69	83	EDU-0821KE8	NS	2,000
1000	480	3	79	69	83	EDU-1021KE8	NS	2,210

EDP

Portable Load Bank Energy Dissipation Units

- Portable, Forced Air Cooled Energy Dissipation Unit
- 115 kW Resistive Capacity
- Dual Voltage Capability Rated for 100% @ 240/480 V, 3 Ph, 60 Hz
75% @ 208 V, 3 Ph, 60 Hz
- Lightweight Aluminum Construction
- Compact Helical Open Coil Elements
- 5 kW Load Step Resolution
- Toggle Switches for Load Switching
- Standard Camlok Power Connections
- Standard Multifunction Digital Readout Meter (V, A, kW, Hz)
- 480/240/208 Volt Selector Switch
- General Purpose Enclosure for Indoor Use



Description

The Chromalox EDP Portable Load Bank is specially designed for flexibility and ease-of-use. Its compact, lightweight design packs a lot of power and options.

Applications

The features of the EDP make it ideal for applications involving small AC power systems, including factory testing of generators, UPS systems, battery banks, and turbines.

Advantages

- Compact Helical Open Coil heating elements provide a compact design that fits a maximum amount of power into the smallest possible space.

- An aluminum exterior ensures the corrosion-resistant characteristics needed for rough environments while making the EDP as light as possible.
- A Multi-stage, contactor-based control system with 5 kW resolution ensures accurate control.
- Dual voltage capability allows for 100% of the rated load to be applied at both 240 V and 480 V. The EDP will also operate with 75% of rated load at 208 V.
- High limit temperature control ensures immediate shutdown in case of overheating.
- Chromalox EDP Load Banks can be used to satisfy National Fire Protection Association (NFPA) requirements for emergency and standby power systems.

LOADBANKS

Standard Models

Model	Selectable Output			Dimensions (In.)			PCN	Stock	Wt. (Lbs.)
	kW	Volts	Phase	L	D	H			
EDP-0115TG5	115	480	3	14-1/2	32	25	161904	NS	95
	115	240	3						
	86	208	3						

Note: Dimensions in inches.

