

## Heat Transfer Systems

### Application & Selection Guidelines

- Indirect Heating
- Packaged Systems
- Water and Water/Glycol Systems
- Non-Pressurized and Pressurized Heat Transfer (oil) 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, calendering and laminating.

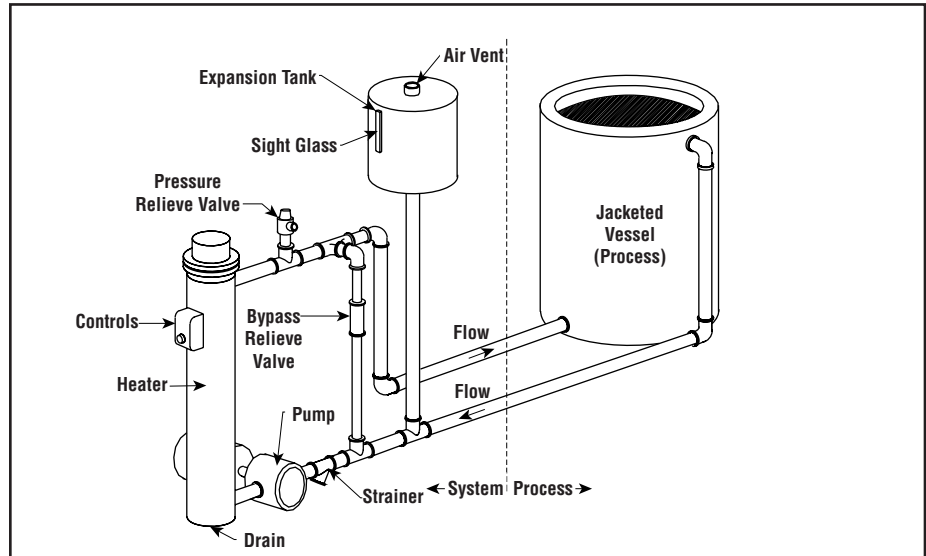
**Heat Exchangers** — for corrosive and noncorrosive fluids.

**Platens, Dies and Molds** — for laminating wood and plastics, forming of carbon products, epoxy materials and Fibreglas®, 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

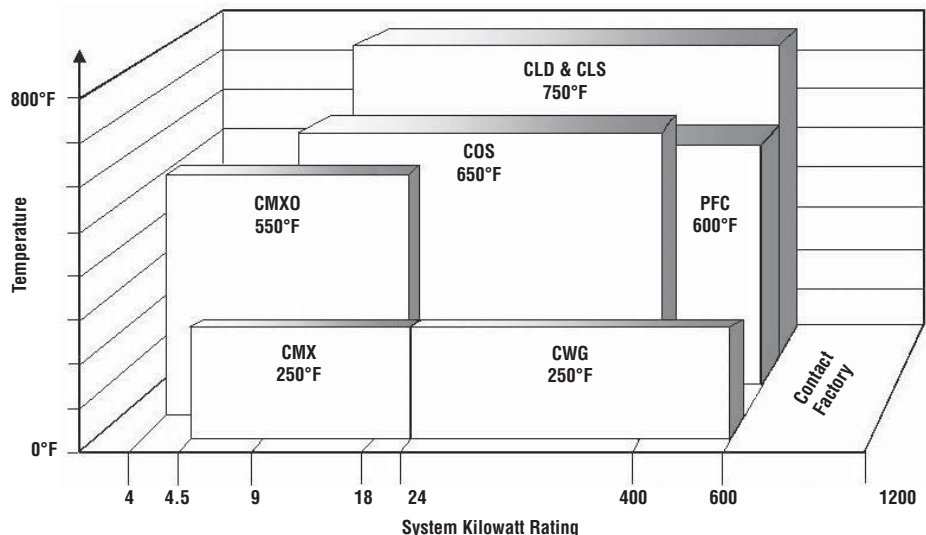


#### Selection Guidelines

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 — Selection Guidelines



**Note** — Higher Kilowatt and Vapor Systems also available. Contact your Local Chromalox Sales office.

## 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 250°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 more than 80 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 <sup>1</sup>	Model	Page
Water	Atmospheric	250	24	Systems CMX CWG	D-4
	Atmospheric	250	600		D-5 D-6
Oil	Atmospheric	550	24		Systems CMXO COS-B PFC
	Atmospheric	650	400	D-8	
	Atmospheric	600	600	D-9 D-11	
Oil/Pressurized	150 200	750 750	600 600	CLD-A CLS-A	
Vapor	50	750	300	CHTV	D-21
System Options					D-17
Ordering Information					D-22
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 over-temperature 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 microprocessor-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 Systems — General Specifications

Model	System Type	Application	Operating Temp. (°F)	kW <sup>2</sup>	Mbh <sup>5</sup>	Max. Operating Pressure	ASME	Pressure Rating & Construction	Connection Type
CMX	Mold Temperature Controller	Water/Glycol	50 - 250 <sup>1</sup>	4.5 - 24	15.3 - 81.8	Atmospheric	N/A <sup>3</sup>	125 Lb. Threaded	NPT
CWG	Heat Transfer Non-Pressurized	Water/Glycol	50 - 250 <sup>1</sup>	6 - 600	20.5 - 2,047	Atmospheric	Optional	150 Lb. Welded	NPT
WMHTS <sup>4</sup>	Heat Transfer Multiple Zone	Water/Glycol	50 - 250 <sup>1</sup>	6 - 1,200	20.5 - 4,094	125 psig	Optional	150 Lb. Welded	NPT or Flanged
CMXO	Heat Transfer Non-Pressurized	Heat Transfer Fluid/Oil	50 - 550	6 - 24	20.4 - 81.9	Atmospheric	N/A <sup>3</sup>	125 Lb. Welded	NPT
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
CLD	Heat Transfer Pressurized	Heat Transfer Fluid/Oil	50 - 750	9 - 600	30.7 - 2,047	150 psig	Standard	300 Lb. Welded	300 Lb. Flanged
CLS	Heat Transfer Pressurized	Syltherm <sup>®</sup> 800	100 - 750	9 - 600	30.7 - 2,047	200 psig	Standard	300 Lb. Welded	300 Lb. Flanged
OMHTS <sup>4</sup>	Heat Transfer Multiple Zone	Heat Transfer Fluid/Oil	50 - 750	9 - 1,200	30.7 - 4,094	200 psig	Optional	300 Lb. Welded	300 Lb. Flanged
CHTV	Heat Transfer Vaporizer	Dowtherm <sup>®</sup> Therminol <sup>®</sup>	-20 - 750	15 - 300	51.2 - 1,024	150 psig	Standard	300 Lb. Welded	300 Lb. Flanged

1. Indicates standard design and pressure. Models available to 300°F.
2. Indicates standard design kW. Higher kW ratings available.
3. N/A indicates not available or not applicable.
4. Contact your Local Chromalox Sales office.
5. Mbh is the ASME & ANSI standard for one thousand British Thermal Units per hour.

**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.

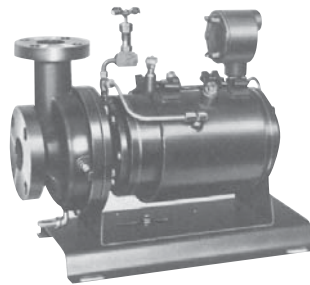
## Oil Systems Technical & Application Data

- 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, sealless (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.*

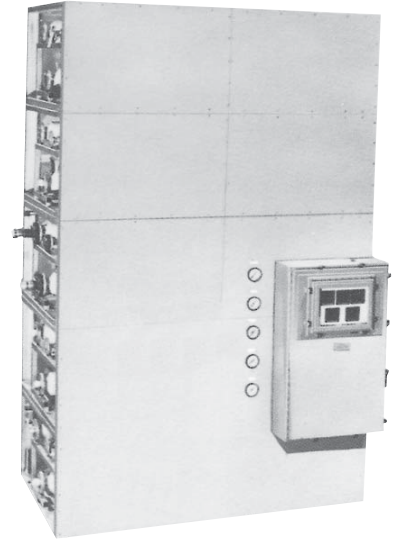


**Standard and Special Heating and Cooling Systems** — Many processes require cooling as well as heating. Examples are:

- 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.