Chromalox®
PRECISION HEAT AND CONTROL

# The Right Products and Solutions for Your Applications

COLD WEATHER PRODUCTS

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## Technical Section

# LUH
## Horizontal Blower Heater

E7061

- **2.6 - 45 kW**
- **8,900 - 153,000 Btuh**
- **208, 240, 277, 480 and 600 Volt**
- **1 or 3 Phase**
- **Wall or Ceiling Mounted Configurations**

### *Description*

Type LUH self-contained heater provides quiet, reliable fan-forced heating in all types of commercial and industrial applications.

### *Applications*

- Shipping and Receiving Areas
- Pump Houses
- Power Generating Stations
- Aircraft Hangers
- Factories
- Warehouses
- Garages

### *Construction*

**Die Formed Cabinet —** Heavy 18 gauge steel, phosphate undercoated for corrosion resistance and finished in almond polyester powder coat.

**Louvers —** Individually adjustable louvers direct air flow up or down as needed.

**Fintube Heating Elements** have corrosion resistant steel fins that are furnace brazed to the tubular element to assure long life and superior heat transfer.

**Fan Motor —** Totally enclosed fan motor is rated for continuous duty with built-in thermal cutout and operates on same voltage as the heating circuit.

**Dynamically Balanced Fan** is attached with rubber vibration insulators for smooth, quiet operation. Blade pitch is carefully selected so that the volume of air moved results in the optimum discharge air temperature.

### *Features*

- **Sub-divided Circuits with Individual Fuse Protection —** Standard on all heaters with a total current draw of 48 Amps or greater. The fuse compartment is conveniently located for easy access.
- **Integral 120V Control Transformer —** Standard on 480V models, eliminates the need for an external control source (24V optional).
- **Heavy Duty Magnetic Contactors** are standard on all models.
- **Thermal Cutouts** open the control circuit and disconnect power to the heating elements if overheating occurs. **Automatic Reset** allows the control circuit to reclose and restore power when temperature returns to normal.
- **Field Convertible —** Combination 208/240V and 1 or 3 phase operation through 10 kW.
- **Mounting Configurations —** Recessed welded fasteners on top of the heater cabinet are internally threaded for suspension of unit with threaded rods. Ceiling and Universal Wall Swivel brackets are optional. The ceiling bracket lets you mount heater directly to ceiling or over-head member, simply and easily. The swivel mounting allows you to readily adjust the direction of warm air flow for maximum comfort up to 180 degrees.

### *Optional Features (Factory Installed or Field Installation Kits)*

- **Summer Fan Switch Kit —** Field installable for circulating warm stratified air. Available for all models.
- **Thermostat Kit —** Field installable on all models. Range 40°F - 90°F.
- **Power Disconnect Kit —** Field installable switch enables power to be disconnected while servicing heater. 40, 80 and 100 Amp models available. Mounts in the back of the heater.
- **Ceiling Bracket** (shown above)
- **Wall Mounting Bracket**

### *Advantages*

- Self Contained
- Versatile, Flexible and High Performance
- Easy Installation
- Minimum Maintenance
- Long Life
- Attractive Appearance

Because it has individually adjustable discharge louvers to direct air flow, and can be wall or ceiling (plus swivel) mounted, the LUH heater may be used in a variety of heating applications:

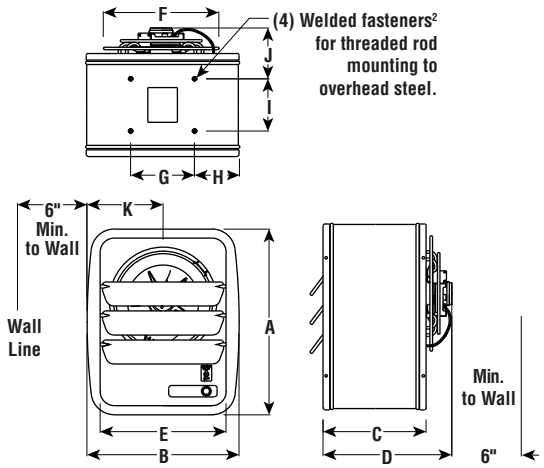
- Primary Heating
- Supplementary Heating
- Dual System Heating
- Spot Heating
- Entryway Air-Curtain Heating

*Refer to WR-80, RTC, WR-90 in the Controls section.*

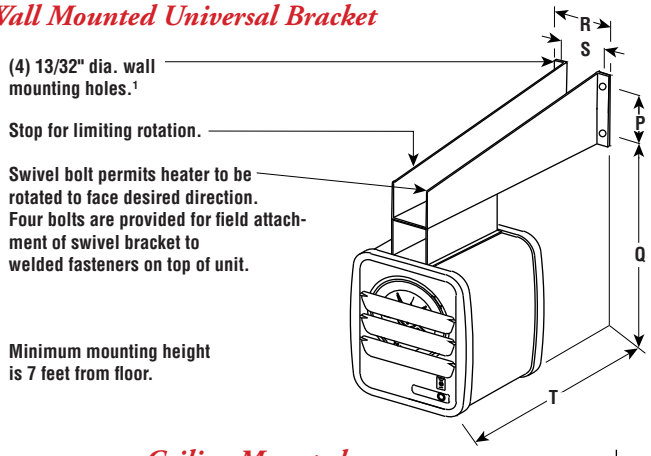
# LUH

## Horizontal Blower Heater *(cont'd.)*

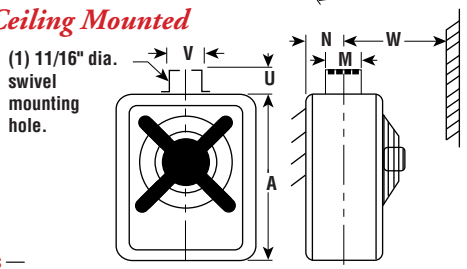
### *Dimensions (Inches)*




### *Wall Mounted Universal Bracket*




### *Ceiling Mounted*




### *Wall Mounted Heaters*

| Heater | Dimensions (In.) | | | | | Wall Bracket | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|
| | P | Q | R | S | T | | | | |
| LUH-02 to -05 | 1-3/4 | 21-1/2 | 6-3/4 | 5-1/2 | 14-15/16 | WUH-01A | 303474 | S | 3 |
| LUH-07, 10, 12, 15 | 2 | 28-7/16 | 9-1/2 | 8-3/8 | 22-1/4 | WUH-02 | 300484 | S | 5 |
| LUH-20, 25 | 2 | 32 | 9-1/2 | 8-3/8 | 22-1/4 | WUH-02 | 300484 | S | 7 |
| LUH-30, 35, 40, 45 | 5-1/2 | 28-11/16 | 5 | 3-1/2 | 33-1/4 | WUH-03 | 300492 | S | 10 |

**Notes** —
1. Wall mounting fasteners to be supplied by customer.
2. Threaded rod to be supplied by customer.

### *Ceiling Mounted Heaters*

| Heater | Dimensions (In.) | | | | | | | | | | | | | | | | Ceiling Bracket | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I | J | K | M | N | U | V | W | | | | |
| LUH-02 to -05 | 16 | 13-1/8 | 8-7/8 | 11-5/8 | 10-3/4 | 9-3/4 | 5-1/2 | 3-13/16 | 4-1/2 | 4-15/16 | 6-5/8 | 6 | 4-7/16 | 4 | 4-1/2 | 10-1/2 | WUH-04A | 303466 | S | 1 |
| LUH-07, 10, 12, 15 | 20-1/2 | 17-1/4 | 11-1/2 | 16-3/8 | 14-3/8 | 12-3/8 | 8-1/4 | 4-1/2 | 6-1/4 | 7-7/16 | 8-5/8 | 8 | 6-1/4 | 6 | 7-1/4 | 16 | WUH-05 | 300513 | S | 2 |
| LUH-20, 25 | 24 | 20-1/8 | 11-1/2 | 20-1/2 | 16-3/4 | 16 | 8-1/4 | 6 | 6-1/4 | 12 | 10-1/16 | 8 | 6-1/4 | 6 | 7-1/4 | 16 | WUH-05 | 300513 | S | 3 |
| LUH-30, 35, 40, 45 | 24 | 20-1/8 | 17 | 26 | 16-3/4 | 16 | 8-1/4 | 6 | 11-3/4 | 12 | 10-1/16 | 13-3/4 | 9-5/16 | 6 | 7-1/4 | 21 | WUH-06 | 300521 | S | 3 |

### *Optional Control Accessories & Remote Thermostats*

### *Fan Only Operation Kits*


Summer Fan Switch

Thermostat Kit

**Note** — A fan only operation (optional) is available by means of a built-in switch or by external control.

| Summer Fan Switch | (2 - 15 kW) | | (20 - 45 kW | | Stock | Wt. (Lbs.) |
|---|---|---|---|---|---|---|
| | Model | PCN | Model | PCN | | |
| **Internal 208 - 277V** | ISFS-02[2] | 305007 | **ISFS-02** | **305007** | **S** | 0.25 |
| **External[1] with Relay (24V control)** | ESFS-40 | 305015 | **ESFS-40A** | **305058** | **S** | 0.5 |
| **External[1] with Relay (120V control)** | ESFS-41 | 305023 | **ESFS-41A** | **305066** | **S** | 0.5 |
| External[1] with Relay (240V control) | ESFS-42 | 305031 | ESFS-42A | 305074 | NS | 0.5 |
| **External[1] with Relay (277V control)** | ESFS-47 | 305040 | — | — | **S** | 0.5 |

1. Kit includes wall plate (discard plate if switch is to be installed on heater).
2. Do not use for 480V rated heaters. 480V heaters require fan relay option with proper control voltage relay coil.

### *Thermostat Kits*

| Model | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|
| **LUH-TK1 (SPST)** | **301129** | **S** | 0.25 |
| **LUH TK2 (DPST)** | **300530** | **S** | 0.25 |

### *Power Disconnect Kits*

3 Pole, 600V Rating

| Model | Rating | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|---|
| **EDS-1** | 40 Amp* | **303431** | **S** | 0.5 |
| EDS-2 | 80 Amp | 303440 | NS | 0.5 |
| EDS-3 | 100 Amp | 303458 | NS | 1 |

* EDS-1 Rating for 480V or less is 50 Amp.

### *Mounting Limitations*

**Hazardous Atmosphere** — Unit heaters should not be used in potentially explosive atmospheres. **Corrosive Atmosphere** —The finish is not intended for direct salt spray exposure in marine applications or the highly corrosive atmospheres of greenhouses, swimming pools, chemical storage bins, etc. **Mounting Height** — Do not install unit heaters above recommended maximum mounting height. **Obstructions** must not block unit heater air inlet or discharge.

# LUH Horizontal Blower Heater *(cont'd.)*

## *Specifications and Ordering Information*

| Electrical (60 Hz) | | | | Motor | | | | | Air Delivery | | | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Ckt & Phase | Amps[4] | Volts | Phase | HP | RPM | CFM | FPM | Temp. Rise (°F) | Horiz. Throw (Ft.) | Mtg.[5] Height (Ft.) | Model | Stock | PCN | Wt. (Lbs.) |
| 2.6 | 208 | 1 - 1 | 13.1 | 208 | 1 | 1/40 | 1,650 | 410 | 880 | 21 | 12 | 8 | **LUH-02-81-34** | **S** | **303001** | 32 |
| 2.0/2.6 | 208/240 | 1 - 1 | 11.4[2] | 240 | 1 | 1/40 | 1,650 | 410 | 880 | 21 | 12 | 8 | **LUH-02-21-34** | **S** | **303010** | 32 |
| 2.6 | 277 | 1 - 1 | 9.6 | 277 | 1 | 1/30 | 1,550 | 360 | 770 | 24 | 12 | 8 | **LUH-02-71-35** | **S** | **303028** | 32 |
| 4 | 208 | 1 - 1 | 19.8 | 208 | 1 | 1/40 | 1,650 | 410 | 880 | 31 | 12 | 8 | **LUH-04-81-34** | **S** | **303036** | 32 |
| 4 | 208 | 1 - 3[3] | 11.7 | 208 | 1 | 1/40 | 1,650 | 410 | 880 | 31 | 12 | 8 | **LUH-04-83-34** | **S** | **303044** | 32 |
| 3/4 | 208/240 | 1 - 1 | 17.2[2] | 240 | 1 | 1/40 | 1,650 | 410 | 880 | 31 | 12 | 8 | **LUH-04-21-34** | **S** | **303052** | 32 |
| 3/4 | 208/240 | 1 - 3[3] | 10.2[2] | 240 | 1 | 1/40 | 1,650 | 410 | 880 | 31 | 12 | 8 | **LUH-04-23-34** | **S** | **303060** | 32 |
| 4 | 277 | 1 - 1 | 14.6 | 277 | 1 | 1/30 | 1,550 | 360 | 770 | 35 | 12 | 8 | **LUH-04-71-35** | **S** | **303079** | 32 |
| 4 | 480 | 1 - 3 | 5.1 | 480 | 1 | 1/35 | 1,550 | 380 | 815 | 33 | 12 | 8 | **LUH-04-43-32** | **S** | **303087** | 32 |
| 5 | 208 | 1 - 1 | 24.6 | 208 | 1 | 1/40 | 1,650 | 410 | 880 | 39 | 12 | 8 | **LUH-05-81-34** | **S** | **303095** | 32 |
| 5 | 208 | 1 - 3[3] | 14.5 | 208 | 1 | 1/40 | 1,650 | 410 | 880 | 39 | 12 | 8 | **LUH-05-83-34** | **S** | **303108** | 32 |
| 3.75/5 | 208/240 | 1 - 1 | 21.4 | 240 | 1 | 1/40 | 1,650 | 410 | 880 | 39 | 12 | 8 | **LUH-05-21-34** | **S** | **303116** | 32 |
| 3.75/5 | 208/240 | 1 - 3[3] | 12.6 | 240 | 1 | 1/40 | 1,650 | 410 | 880 | 39 | 12 | 8 | LUH-05-23-34 | NS | 303124 | 32 |
| 5 | 277 | 1 - 1 | 18.3 | 277 | 1 | 1/30 | 1,550 | 360 | 770 | 44 | 12 | 8 | LUH-05-71-35 | NS | 303132 | 32 |
| 5 | 480 | 1 - 3 | 6.3 | 480 | 1 | 1/35 | 1,550 | 380 | 815 | 42 | 12 | 8 | **LUH-05-43-32** | **S** | **303140** | 32 |
| 7.5 | 208 | 1 - 1[3] | 36.5 | 208 | 1 | 1/15 | 1,725 | 850 | 1,040 | 28 | 27 | 8 | LUH-07-81-34 | AS | 303159 | 50 |
| 7.5 | 208 | 1 - 3 | 21.3 | 208 | 1 | 1/15 | 1,275 | 850 | 1,040 | 28 | 27 | 8 | **LUH-07-83-34** | **S** | **303167** | 50 |
| 5.6/7.5 | 208/240 | 1 - 1[3] | 31.7[2] | 240 | 1 | 1/15 | 1,725 | 850 | 1,040 | 28 | 27 | 8 | **LUH-07-21-34** | **S** | **303175** | 50 |
| 5.6/7.5 | 208/240 | 1 - 3 | 18.5[2] | 240 | 1 | 1/15 | 1,725 | 850 | 1,040 | 28 | 27 | 8 | LUH-07-23-34 | AS | 303183 | 50 |
| 7.5 | 277 | 1 - 1 | 27.7 | 277 | 1 | 1/15 | 1,550 | 750 | 920 | 32 | 27 | 8 | LUH-07-71-35 | NS | 303191 | 50 |
| 7.5 | 480 | 1 - 3 | 9.9 | 480 | 3 | 1/15 | 1,725 | 850 | 1,040 | 28 | 27 | 8 | **LUH-07-43-32** | **S** | **303204** | 50 |
| 7.5 | 600 | 1 - 3 | 7.6 | 575 | 3 | 1/3 | 1,725 | 850 | 1,040 | 28 | 27 | 8 | LUH-07-63-32 | NS | — | 50 |
| 9.7 | 208 | 1 - 1[3] | 47.1 | 208 | 1 | 1/15 | 1,725 | 850 | 1,040 | 37 | 27 | 9 | LUH-10-81-34 | AS | 303212 | 50 |
| 9.7 | 208 | 1 - 3 | 27.4 | 208 | 1 | 1/15 | 1,725 | 850 | 1,040 | 37 | 27 | 9 | **LUH-10-83-34** | **S** | **303220** | 50 |
| 7.5/10 | 208/240 | 1 - 1[3] | 42.1[2] | 240 | 1 | 1/15 | 1,725 | 850 | 1,040 | 37 | 27 | 9 | **LUH-10-21-34** | **S** | **303239** | 50 |
| 7.5/10 | 208/240 | 1 - 3 | 24.5[2] | 240 | 1 | 1/15 | 1,725 | 850 | 1,040 | 37 | 27 | 9 | LUH-10-23-34 | AS | 303247 | 50 |
| 10 | 480 | 1 - 3 | 12.9 | 480 | 3 | 1/15 | 1,725 | 850 | 1,040 | 37 | 27 | 9 | **LUH-10-43-32** | **S** | **303255** | 50 |
| 10 | 600 | 1 - 3 | 10.6 | 575 | 3 | 1/3 | 1,725 | 850 | 1,040 | 37 | 27 | 9 | LUH-10-63-32 | NS | — | 50 |
| 12.5 | 208 | 1 - 3 | 35.2 | 208 | 1 | 1/15 | 1,725 | 850 | 1,040 | 47 | 27 | 9 | **LUH-12-83-34** | **S** | **303263** | 50 |
| 9.3/12.5 | 208/240 | 1 - 3 | 30.6 | 240 | 1 | 1/15 | 1,725 | 850 | 1,040 | 47 | 27 | 9 | LUH-12-23-34 | AS | 303271 | 50 |
| 12.5 | 480 | 1 - 3 | 15.9 | 480 | 3 | 1/15 | 1,725 | 850 | 1,040 | 47 | 27 | 9 | **LUH-12-43-32** | **S** | **303280** | 50 |
| 12.5 | 600 | 1 - 3 | 12.6 | 575 | 3 | 1/3 | 1,725 | 850 | 1,040 | 47 | 27 | 9 | LUH-12-63-32 | NS | — | 50 |
| 15 | 208 | 1 - 3 | 42.1 | 208 | 1 | 1/15 | 1,725 | 850 | 1,040 | 56 | 27 | 10 | LUH-15-83-34 | AS | 303298 | 50 |
| 11.25/15 | 208/240 | 1 - 3 | 36.6[2] | 240 | 1 | 1/15 | 1,725 | 850 | 1,040 | 56 | 27 | 10 | LUH-15-23-34 | NS | 303300 | 50 |
| 15 | 480 | 1 - 3 | 19.0 | 480 | 3 | 1/15 | 1,725 | 850 | 1,040 | 56 | 27 | 10 | **LUH-15-43-32** | **S** | **303319** | 50 |
| 15 | 600 | 1 - 3 | 15.6 | 575 | 3 | 1/3 | 1,725 | 850 | 1,040 | 56 | 27 | 10 | LUH-15-63-32 | NS | — | 50 |
| 14.5/19.4 | 208/240 | 1 - 3 | 48.0[2] | 240 | 3 | 1/3 | 1,725 | 1,240 | 1,160 | 53 | 31 | 11 | LUH-20-23-34 | NS | 303327 | 73 |
| 20 | 480 | 1 - 3 | 25.0 | 480 | 3 | 1/3 | 1,725 | 1,240 | 1,160 | 53 | 31 | 11 | **LUH-20-43-32** | **S** | **303335** | 73 |
| 20 | 600 | 1 - 3 | 19.6 | 575 | 3 | 1/3 | 1,725 | 1,240 | 1,160 | 53 | 31 | 11 | LUH-20-63-32 | NS | — | 73 |
| 25 | 480 | 1 - 3 | 31.0 | 480 | 3 | 1/3 | 1,725 | 1,350 | 1,260 | 60 | 31 | 12 | **LUH-25-43-32** | **S** | **303343** | 73 |
| 25 | 600 | 1 - 3 | 24.6 | 575 | 3 | 1/3 | 1,725 | 1,350 | 1,260 | 60 | 31 | 12 | LUH-25-63-32 | NS | — | 73 |
| 30 | 208 | 2 - 3 | 85.2 | 240 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 64 | 46 | 13 | LUH-30-83-34 | NS | 303351 | 106 |
| 22.5/30 | 208/240 | 2 - 3 | 74.0[2] | 240 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 64 | 46 | 13 | LUH-30-23-34 | NS | 303360 | 106 |
| 30 | 480 | 2 - 3 | 37.1 | 480 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 64 | 46 | 13 | **LUH-30-43-32** | **S** | **303378** | 106 |
| 30 | 600 | 2 - 3 | 29.6 | 575 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 64 | 46 | 13 | LUH-30-63-32 | NS | — | 106 |
| 26.25/35 | 208/240 | 2 - 3 | 86.0[2] | 240 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 71 | 45 | 14 | LUH-35-23-34 | NS | 303386 | 106 |
| 35 | 480 | 2 - 3 | 43.1 | 480 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 71 | 45 | 14 | **LUH-35-43-32** | **S** | **303394** | 106 |
| 35 | 600 | 2 - 3 | 34.7 | 575 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 71 | 45 | 14 | LUH-35-63-32 | NS | — | 106 |
| 28.5/38 | 208/240 | 2 - 3 | 93.3 | 240 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 84 | 44 | 15 | LUH-40-23-34 | NS | 303407 | 106 |
| 39 | 480 | 2 - 3 | 47.9 | 480 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 84 | 44 | 15 | **LUH-40-43-32** | **S** | **303415** | 106 |
| 40 | 600 | 2 - 3 | 39.7 | 575 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 84 | 44 | 15 | LUH-40-63-32 | NS | — | 106 |
| 45 | 480 | 2 - 3 | 55.1 | 480 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 94 | 42 | 17 | **LUH-45-43-32** | **S** | **303423** | 106 |
| 45 | 600 | 2 - 3 | 43.7 | 575 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 94 | 42 | 17 | LUH-45-63-32 | NS | — | 106 |

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

1. For motor data, see table.
2. 208V amperage is 86% of 240V value.
3. Models can be field wired for 1 or 3 phase.
4. Includes motor Amps.
5. Maximum mounting height for effective heat distribution. Minimum height is 7 feet.

**Other Notes —**

A. All heaters have built-in contactors and stock 480V models have built-in control transformers and contactor with 120V holding coils. All stock 208 and 240V models have 208/240V holding coils. All stock 277V models have 277V holding coils.
B. Optional contactors available with 120 or 24V holding coils on made-to-order models, contact your Local Chromalox Sales office.
C. When total heater capacity exceeds 48 Amps, built-in fusing is provided behind a hinged and latched door in the side which allows easy access.

# LUH Horizontal Blower Heater *(cont'd.)*

## *Recommended Control Options*

| PCN | Description | Kits | | | |
|---|---|---|---|---|---|
| | | Thermostat | Fan Only | Remote Fan | Dis-connect |
| 303001 | LUH-02-81-34-00 208V 1P 2.6kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303010 | LUH-02-21-34-00 240V 1P 2.6kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303028 | LUH-02-71-35-00 277V 1P 2.6kW | LUH-TK1 | ISFS-02 | ESFS-47 | EDS-1 |
| 303036 | LUH-04-81-34-00 208V 1P 4kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303044 | LUH-04-83-34-00 208V 3P 4kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303052 | LUH-04-21-34-00 240V 1P 4kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303060 | LUH-04-23-34-00 240V 3P 4kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303079 | LUH-04-71-35-00 277V 1P 4kW | LUH-TK1 | ISFS-02 | ESFS-47 | EDS-1 |
| 303087 | LUH-04-43-32-00 480V 3P 4kW | LUH-TK1 | ESFS-41 | ESFS-41 | EDS-1 |
| 303095 | LUH-05-81-34-00 208V 1P 5kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303108 | LUH-05-83-34-00 208V 3P 5kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303116 | LUH-05-21-34-00 240V 1P 5kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303124 | LUH-05-23-34-00 240V 3P 5kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303132 | LUH-05-71-35-00 277V 1P 5kW | LUH-TK1 | ISFS-02 | ESFS-47 | EDS-1 |
| 303140 | LUH-05-43-32-00 480V 3P 5kW | LUH-TK1 | ESFS-41 | ESFS-41 | EDS-1 |
| 303159 | LUH-07-81-34-00 208V 1P 7.5kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303167 | LUH-07-83-34-00 208V 3P 7.5kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303175 | LUH-07-21-34-00 240V 1P 7.5kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303183 | LUH-07-23-34-00 240V 3P 7.5kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303191 | LUH-07-71-35-00 277V 1P 7.5kW | LUH-TK1 | ISFS-02 | ESFS-47 | EDS-1 |
| 303204 | LUH-07-43-32-00 480V 3P 7.5kW | LUH-TK1 | ESFS-41 | ESFS-41 | EDS-1 |
| 303212 | LUH-10-81-34-00 208V 1P 10kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-2 |
| 303220 | LUH-10-83-34-00 208V 3P 10kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303239 | LUH-10-21-34-00 240V 1P 10kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-2 |
| 303247 | LUH-10-23-34-00 240V 3P 10kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303255 | LUH-10-43-32-00 480V 3P 10kW | LUH-TK1 | ESFS-41 | ESFS-41 | EDS-1 |
| 303263 | LUH-12-83-34-00 208V 3P 12.5kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303271 | LUH-12-23-34-00 240V 3P 12.5kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303280 | LUH-12-43-32-00 480V 3P 12.5kW | LUH-TK1 | ESFS-41 | ESFS-41 | EDS-1 |
| 303298 | LUH-15-83-34-00 208V 3P 15kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-2 |
| 303300 | LUH-15-23-34-00 240V 3P 15kW | LUH-TK1 | ISFS-02 | ESFS-42 | EDS-1 |
| 303319 | LUH-15-43-32-00 480V 3P 15kW | LUH-TK1 | ESFS-41 | ESFS-41 | EDS-1 |
| 303327 | LUH-20-23-34-00 240V 3P 20kW | LUH-TK1 | ISFS-02 | ESFS-42A | EDS-2 |
| 303335 | LUH-20-43-32-00 480V 3P 20kW | LUH-TK1 | ESFS-41A | ESFS-41A | EDS-1 |
| 303343 | LUH-25-43-32-00 480V 3P 25kW | LUH-TK1 | ESFS-41A | ESFS-41A | EDS-1 |
| 303351 | LUH-30-83-34-00 208V 3P 30kW | LUH-TK1 | ISFS-02 | ESFS-42A | EDS-3 |
| 303360 | LUH-30-23-34-00 240V 3P 30kW | LUH-TK1 | ISFS-02 | ESFS-42A | EDS-2 |
| 303378 | LUH-30-43-32-00 480V 3P 30kW | LUH-TK1 | ESFS-41A | ESFS-41A | EDS-1 |
| 303386 | LUH-35-23-34-00 240V 3P 35kW | LUH-TK1 | ISFS-02 | ESFS-42A | EDS-3 |
| 303394 | LUH-35-43-32-00 480V 3P 35kW | LUH-TK1 | ESFS-41A | ESFS-41A | EDS-2 |
| 303407 | LUH-40-23-34-00 240V 3P 40kW | LUH-TK1 | ISFS-02 | ESFS-42A | EDS-3 |
| 303415 | LUH-40-43-32-00 480V 3P 40kW | LUH-TK1 | ESFS-41A | ESFS-41A | EDS-2 |
| 303423 | LUH-45-43-32-00 480V 3P 45kW | LUH-TK1 | ESFS-41A | ESFS-41A | EDS-2 |

When ordering LUH heaters, specify the model number and corresponding PCN (Product Code Number). If controls or thermostat/fan options are required, designate these options in the model number when ordering, as shown below. Always specify voltage, phase and kW by listing them on the purchase order product specifications.

### Model Numbers

**Chromalox Horizontal Unit Heater**

**Heating Elements**

| | | | |
|---|---|---|---|
| **02** = 2.6 kW | **10** = 10.0 kW | **25** = 25.0 kW | **45** = 45.0 kW |
| **04** = 4.0 k W | **12** = 12.5 kW | **30** = 30.0 kW | |
| **05** = 5.0 kW | **15** = 15.0 kW | **35** = 35.0 kW | |
| **07** = 7.5 kW | **20** = 20.0 kW | **40** = 40.0 kW | |

**Heater Voltage and Phase**

| | |
|---|---|
| **81** = 208V, 1 Phase | **71** = 277V, 1 Phase |
| **83** = 208V, 3 Phase | **43** = 480V, 3 Phase |
| **21** = 240V, 1 Phase | **63** = 600V, 3 Phase |
| **23** = 240V, 3 Phase | |

**Control**

| | |
|---|---|
| **0 0** | No Contactor(s) |
| **3 0** | 24V Control Internal Transformer |
| **3 1** | 24V Control Externally Supplied |
| **3 2** | 120V Control Internal Transformer |
| **3 3** | 120V Control Externally Supplied |
| **3 4** | 208/240V Control Internally Supplied, No Transformer |
| **3 5** | 277V Control Internally Supplied |

**Control**

| | |
|---|---|
| **0 0** | No Thermostat, No Summer Fan Switch |
| **4 0** | Internal Thermostat Only |
| **4 1** | Internal Therm. and Internal Sum. Fan Sw. |
| **4 2** | External Sum. Fan Sw. Only (Not 480V) |
| **4 3** | External Sum. Fan Sw. and Fan Relay (All Volts) |
| **4 4** | Rem. Fan Sw. and Internal Therm. (Not 480V) |
| **4 5** | Rem. Fan Sw., Fan Relay and Int. Therm. (All Volts)D, E, F, G |
| **4 6** | Internal Sum. Fan Sw. (Not 480 V) |
| **4 7** | Internal Sum. Fan Sw., Fan Relay (All Volts) |

**Disconnect Switch**

| | |
|---|---|
| **1** | 40 Amp |
| **2** | 80 Amp |
| **3** | 100 Amp |

**LUH 05 21 34 41 1 Typical Model Number**

# HVH

## Horizontal or Vertical Discharge Fan Forced Unit Heater


- **2.6 - 15 kW**
- **8,900 – 51,180 Btuh**
- **208, 240, 277, 480 and 600 Volt**
- **1 or 3 Phase**
- **Vertical or Horizontal Airflow**
- **Wall or Ceiling Mounted Configurations**
- **UL Listed and CSA Certified (North America)**
- **CE Certified (Europe)**

### *Description*

Type HVH self-contained blower heater provides quiet, reliable fan-forced heating in all types of commercial and industrial applications.

### *Applications*

- Shipping and Receiving Areas
- Pump Houses
- Power Generating Stations
- Aircraft Hangars
- Factories
- Warehouses
- Garages

### *Construction*

**Cabinet** - Heavy 20 gauge steel, phosphate undercoated for corrosion resistance and finished in a two-tone gray polyester powder coat.

**Louvers** - Individually adjustable integral louvers direct air flow up or down as needed.

**Fintube Heating Elements** have corrosion resistant steel fins that are furnace brazed to the tubular heating element to assure long life and superior heat transfer.

**Fan Motor** - Totally enclosed fan motor is rated for continuous duty with built-in thermal cutout and operates on the same voltage as the heating circuit.

**Dynamically Balanced Fan** ensures smooth, quiet operation. Blade pitch is carefully selected so that the volume of air moved results in the optimum discharge air temperature. Pull-through air flow design draws air across heating elements for more even air flow distribution and cooler element operation.

### *Features*

- **Integral 24V Control Transformer** is standard on 480V models and eliminates the need for an external control source( 120V is optional).
- **Heavy Duty Magnetic Contactors** are standard on all models except 2.6 thru 5 kW single phase models, except for 480V models.
- **Linear Thermal Cutouts** open the control circuit and disconnect power to the heating elements if overheating occurs. Automatic Reset allows the control circuit to reclose and restore power when temperature returns to normal.
- **Field Convertible** — Combination 208/240V and 1 or 3 phase operation through 10 kW.

**VERSATILE MOUNTING CONFIGURATIONS**
**Vertical Discharge**
Recessed fasteners on the rear of the heater cabinet are internally threaded for suspension of unit in the vertical discharge mode with threaded rods.

**Horizontal Discharge**
**Ceiling Bracket** – The ceiling bracket allows you mount the heater directly to the ceiling or over-head member, simply and easily. The swivel mounting allows you to readily adjust the direction of warm air flow for maximum comfort up to 180˚ rotation.

**Wall Mounting Bracket** – The wall mounting brackets permits the heater to be rotated to face any direction.

### *Optional Features (Factory Installed or Field Installation Kits)*

**Summer Fan Switch Kit** — Field installable for circulating warm stratified air. Available for all models.

**Thermostat Kit** — Field installable on all models. Range 40˚F - 90˚F (55˚F-105˚F thermostat is available).

**Disconnect Switch** — Field installable switch enables power to be disconnected while servicing heater. 50 Amp rating mounts on the front of the heater

**Outlet Screen** — Prevents objects from coming in contact with fan

### *Factory Installed options*

- Pilot Light (recommended)
- Time Delay (heat on and off): Provides delay of fan operation until elements have warmed up. The fan stays on until cool.

### *Advantages*

- Self Contained
- Versatile, Flexible and High Performance
- Easy Installation
- Minimum Maintenance
- Long Life
- Attractive Appearance

Because it has individually adjustable discharge louvers to direct air flow, and can be wall or ceiling (plus swivel) mounted, the HVH heater may be used in a variety of heating applications:

- Primary Heating
- Supplementary Heating
- Dual System Heating
- Spot Heating
- Entryway Air-Curtain Heating

# HVH

## Horizontal or Vertical Discharge Fan Forced Unit Heater *(cont'd.)*

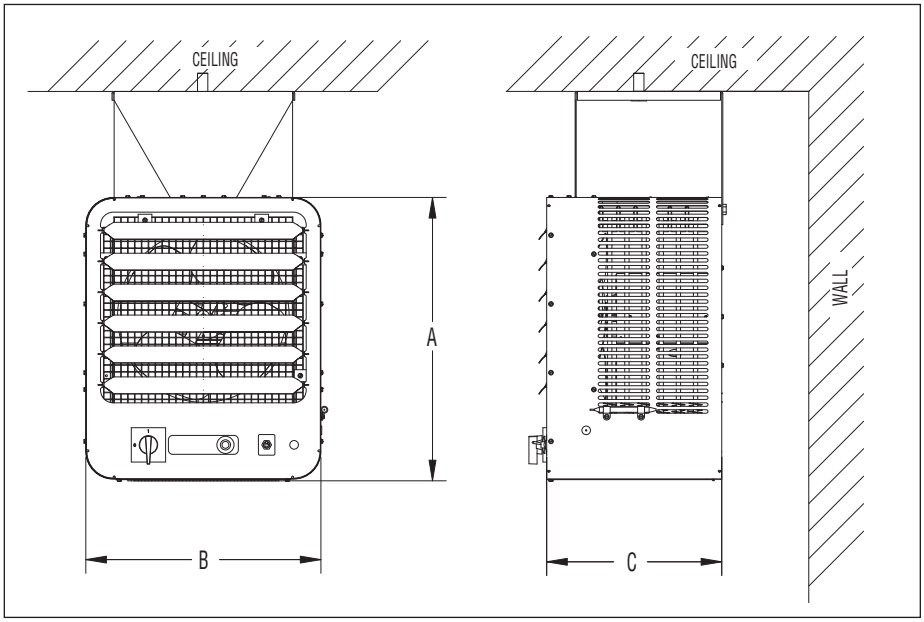
### *Thermostat Kits (40-90°F)*

| Model | Rating | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|---|
| TK-5 | SPST | 219475 | S | 0.25 |
| TK-6 | DPST | 219483 | S | 0.25 |

### *Power Disconnect Kit (3 Pole 600V)*

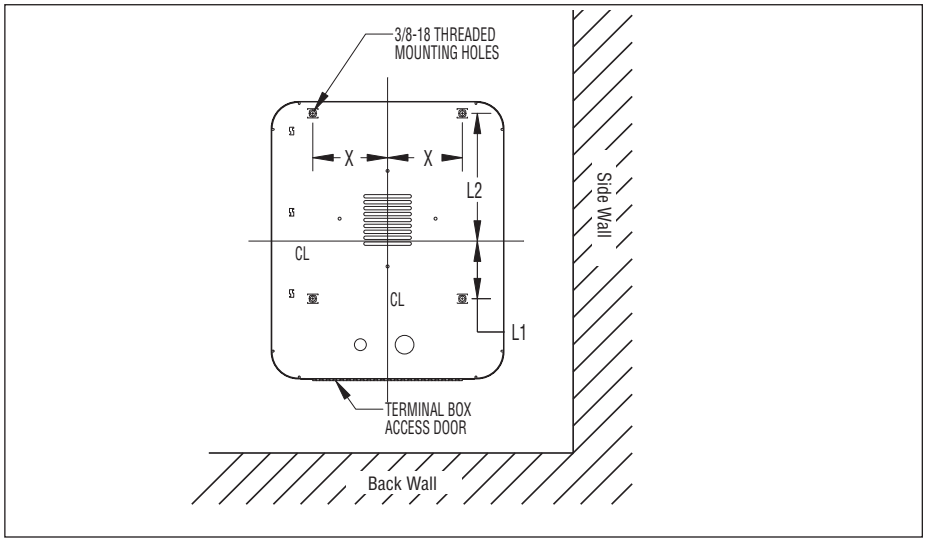
| Model | Rating | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|---|
| HDS-1 | 50 Amps | 219491 | S | 0.5 |

### *Horizontal Discharge*




| Heater | Dimensions (In.) | | |
|---|---|---|---|
| | A | B | C |
| HVH-02 to 05 | 16-1/8 | 13 | 10 |
| HVH-07 to 15 | 20-5/8 | 17-1/8 | 12-3/4 |

### *Rod Thread Type and Spacing Dimensions for Horizontal discharge*




| Unit | Rod Thread Type | Dimensions (In.) | | |
|---|---|---|---|---|
| | | $L_1$ | $L_2$ | X |
| 2-5 kW | 3/8 - 16 | 2-7/8 | 7-1/8 | 3-3/4 |
| 7-1/2 - 15 kW | 3/8 - 16 | 4-5/16 | 9-3/8 | 5-1/2 |

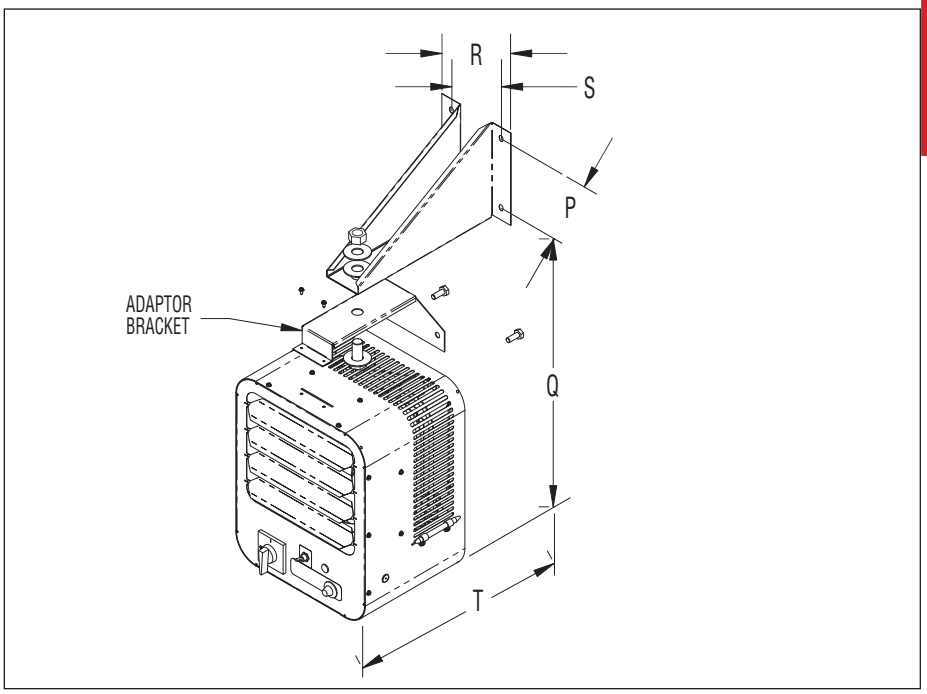
### *Mounting Limitations*

***Hazardous Atmosphere*** — Unit heaters should not be used in potentially explosive atmospheres. ***Corrosive Atmosphere*** —The finish is not intended for direct salt spray exposure in marine applications or the highly corrosive atmospheres of greenhouses, swimming pools, chemical storage bins, etc. ***Mounting Height*** — Do not install unit heaters above recommended maximum mounting height. Obstructions must not block unit heater air inlet or discharge.

# HVH

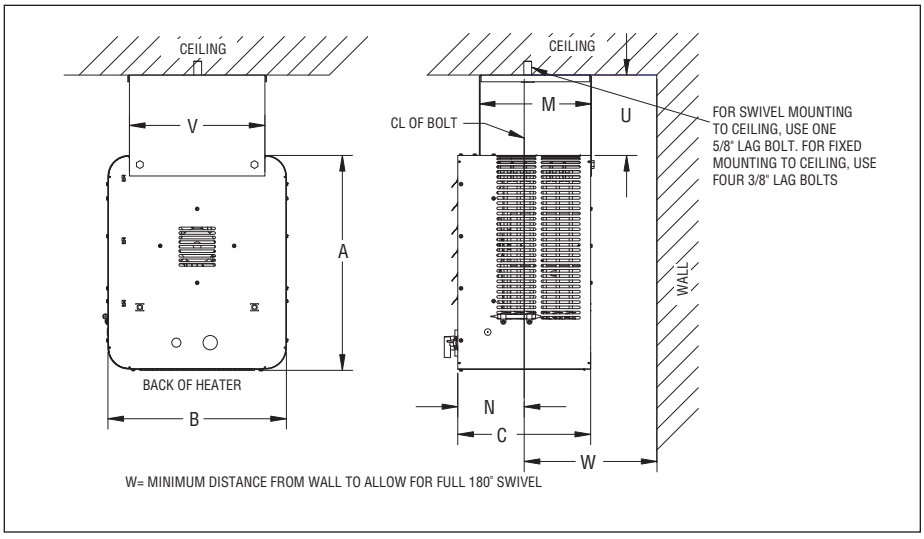
## Horizontal or Vertical Discharge Fan Forced Unit Heater *(cont'd.)*

### *Optional Wall Swivel Mounting Bracket*




| Bracket Model No. | PCN | Dimensions (In.) | | | | | Bracket Wt. (lbs.) | Use With |
|---|---|---|---|---|---|---|---|---|
| | | P | Q | R | S | T | | |
| HVW-1 | 219416 | 6-1/6 | 18-7/8 | 7 | 5 | 17-5/8 | 3-3/4 | HVH-02, 04, 05 |
| HVW-2 | 219424 | 6-1/6 | 23-1/4 | 7 | 5 | 18-5/8 | 6-1/2 | HVH-07, 10, 15 |

### *Optional Ceiling Swivel Mounting Bracket*




| Bracket Model No. | PCN | Dimensions (In.) | | | | | | | | Wt. (lbs.) | Use With |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | M | N | U | V | W | | |
| HVC-1 | 219432 | 16-1/8 | 13 | 10 | 8-3/8 | 5-3/4 | 7-3/4 | 9-3/4 | 12 | 4 | HVH-02, 04, 05 |
| HVC-2 | 219440 | 20-5/8 | 17-1/8 | 12-3/4 | 10-3/4 | 6-3/4 | 7-3/4 | 12 | 12 | 8 | HVH-07, 10, 12, 15 |

### *Optional Fan Only Kits*

| Description | Model | PCN | Stock | Wt. (lbs.) |
|---|---|---|---|---|
| Fan switch (no relay) | HVF-01 | **219504** | **S** | 0.25 |
| Fan switch (24V relay) | HVF-02 | 219512 | NS | 0.5 |
| Fan switch (120V relay) | HVF-03 | 219520 | NS | 0.5 |

# HVH Horizontal or Vertical Discharge Fan Forced Unit Heater *(cont'd.)*

## *Specifications and Ordering Information*

| Electrical (60 Hz) | | | | Motor | | | | | Air Delivery | | | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Ckt & Phase | Amps[4] | Volts | Phase | HP | RPM | CFM | FPM | Temp. Rise (°F) | Horiz. Throw (Ft.) | Mtg.[5] Height (Ft.) | Model | Stock | PCN | Wt. (Lbs.) |
| 2.6 | 208 | 1 - 1 | 13.1 | 208 | 1 | 1/40 | 1,650 | 410 | 880 | 21 | 12 | 8 | **HVH-02-81-00** | **S** | **219096** | 32 |
| 2/2.6 | 208/240 | 1 - 1 | 11.4[2] | 240 | 1 | 1/40 | 1,650 | 410 | 880 | 21 | 12 | 8 | **HVH-02-21-00** | **S** | **219109** | 32 |
| 2.6 | 277 | 1 - 1 | 9.6 | 277 | 1 | 1/30 | 1,550 | 360 | 770 | 24 | 12 | 8 | **HVH-02-71-00** | **S** | **219117** | 32 |
| 4 | 208 | 1 - 1 | 19.8 | 208 | 1 | 1/40 | 1,650 | 410 | 880 | 31 | 12 | 8 | **HVH-04-81-00** | **S** | **219125** | 32 |
| 4 | 208 | 1 - 3[3] | 11.7 | 208 | 1 | 1/40 | 1,650 | 410 | 880 | 31 | 12 | 8 | **HVH-04-83-34** | **S** | **219133** | 32 |
| 3/4 | 208/240 | 1 - 1 | 17.2[2] | 240 | 1 | 1/40 | 1,650 | 410 | 880 | 31 | 12 | 8 | **HVH-04-21-00** | **S** | **219141** | 32 |
| 3/4 | 208/240 | 1 - 3[3] | 10.2[2] | 240 | 1 | 1/40 | 1,650 | 410 | 880 | 31 | 12 | 8 | **HVH-04-23-34** | **S** | **219150** | 32 |
| 4 | 277 | 1 - 1 | 14.6 | 277 | 1 | 1/30 | 1,550 | 360 | 770 | 35 | 12 | 8 | **HVH-04-71-00** | **S** | **219168** | 32 |
| 4 | 480 | 1 - 3 | 5.1 | 480 | 1 | 1/35 | 1,550 | 380 | 815 | 33 | 12 | 8 | **HVH-04-43-30** | **S** | **219176** | 32 |
| 5 | 208 | 1 - 1 | 24.6 | 208 | 1 | 1/40 | 1,650 | 410 | 880 | 39 | 12 | 8 | **HVH-05-81-00** | **S** | **219184** | 32 |
| 5 | 208 | 1 - 3[3] | 14.5 | 208 | 1 | 1/40 | 1,650 | 410 | 880 | 39 | 12 | 8 | **HVH-05-83-34** | **S** | **219192** | 32 |
| 3.75/5 | 208/240 | 1 - 1 | 21.4 | 240 | 1 | 1/40 | 1,650 | 410 | 880 | 39 | 12 | 8 | **HVH-05-21-00** | **S** | **219205** | 32 |
| 3.75/5 | 208/240 | 1 - 3[3] | 12.6 | 240 | 1 | 1/40 | 1,650 | 410 | 880 | 39 | 12 | 8 | **HVH-05-23-34** | **S** | **219213** | 32 |
| 5 | 277 | 1 - 1 | 18.3 | 277 | 1 | 1/30 | 1,550 | 360 | 770 | 44 | 12 | 8 | **HVH-05-71-00** | **S** | **219221** | 32 |
| 5 | 480 | 1 - 3 | 6.3 | 480 | 1 | 1/35 | 1,550 | 380 | 815 | 42 | 12 | 8 | **HVH-05-43-30** | **S** | **219230** | 32 |
| 7.5 | 208 | 1 - 1[3] | 36.5 | 208 | 1 | 1/15 | 1,725 | 850 | 1040 | 28 | 27 | 8 | **HVH-07-81-34** | **S** | **219248** | 50 |
| 7.5 | 208 | 1 - 3 | 21.3 | 208 | 1 | 1/15 | 1,725 | 850 | 1040 | 28 | 27 | 8 | **HVH-07-83-34** | **S** | **219256** | 50 |
| 5.6/7.5 | 208/240 | 1 - 1[3] | 31.7[2] | 240 | 1 | 1/15 | 1,725 | 850 | 1040 | 28 | 27 | 8 | **HVH-07-21-34** | **S** | **219264** | 50 |
| 5.6/7.5 | 208/240 | 1 - 3 | 18.5[2] | 240 | 1 | 1/15 | 1,725 | 850 | 1040 | 28 | 27 | 8 | **HVH-07-23-34** | **S** | **219272** | 50 |
| 7.5 | 277 | 1 - 1 | 27.7 | 277 | 1 | 1/15 | 1,550 | 750 | 920 | 32 | 27 | 8 | **HVH-07-71-30** | **S** | **219280** | 50 |
| 7.5 | 480 | 1 - 3 | 9.9 | 480 | 3 | 1/15 | 1,725 | 850 | 1040 | 28 | 27 | 8 | **HVH-07-43-30** | **S** | **219299** | 50 |
| 7.5 | 600 | 1 - 3 | 7.6 | 575 | 3 | 1/3 | 1,725 | 850 | 1040 | 28 | 27 | 8 | HVH-07-63-30 | NS | — | 50 |
| 9.7 | 208 | 1 - 1[3] | 47.1 | 208 | 1 | 1/15 | 1,725 | 850 | 1040 | 37 | 27 | 9 | **HVH-10-81-34** | **S** | **219301** | 50 |
| 9.7 | 208 | 1 - 3 | 27.4 | 208 | 1 | 1/15 | 1,725 | 850 | 1040 | 37 | 27 | 9 | **HVH-10-83-34** | **S** | **219310** | 50 |
| 7.5/10 | 208/240 | 1 - 1[3] | 42.1[2] | 240 | 1 | 1/15 | 1,725 | 850 | 1040 | 37 | 27 | 9 | **HVH-10-21-34** | **S** | **219328** | 50 |
| 7.5/10 | 208/240 | 1 - 3 | 24.5[2] | 240 | 1 | 1/15 | 1,725 | 850 | 1040 | 37 | 27 | 9 | **HVH-10-23-34** | **S** | **219336** | 50 |
| 10 | 480 | 1 - 3 | 12.9 | 480 | 3 | 1/15 | 1,725 | 850 | 1040 | 37 | 27 | 9 | **HVH-10-43-30** | **S** | **219344** | 50 |
| 10 | 600 | 1 - 3 | 10.6 | 575 | 3 | 1/3 | 1,725 | 850 | 1040 | 37 | 27 | 9 | HVH-10-63-30 | NS | — | 50 |
| 12.5 | 208 | 1 - 3 | 35.2 | 208 | 1 | 1/15 | 1,725 | 850 | 1040 | 47 | 27 | 9 | **HVH-12-83-34** | **S** | **219352** | 50 |
| 9.3/12.5 | 208/240 | 1 - 3 | 30.6 | 240 | 1 | 1/15 | 1,725 | 850 | 1040 | 47 | 27 | 9 | **HVH-12-23-34** | **S** | **219360** | 50 |
| 12.5 | 480 | 1 - 3 | 15.9 | 480 | 3 | 1/15 | 1,725 | 850 | 1040 | 47 | 27 | 9 | **HVH-12-43-30** | **S** | **219379** | 50 |
| 12.5 | 600 | 1 - 3 | 12.6 | 575 | 3 | 1/3 | 1,725 | 850 | 1040 | 47 | 27 | 9 | HVH-12-63-30 | NS | — | 50 |
| 15 | 208 | 1 - 3 | 42.1 | 208 | 1 | 1/15 | 1,725 | 850 | 1040 | 56 | 27 | 10 | **HVH-15-83-34** | **S** | **219387** | 50 |
| 11.25/15 | 208/240 | 1 - 3 | 36.6[2] | 240 | 1 | 1/15 | 1,725 | 850 | 1040 | 56 | 27 | 10 | **HVH-15-23-34** | **S** | **219395** | 50 |
| 15 | 480 | 1 - 3 | 19.0 | 480 | 3 | 1/15 | 1,725 | 850 | 1040 | 56 | 27 | 10 | **HVH-15-43-30** | **S** | **219408** | 50 |
| 15 | 600 | 1 - 3 | 15.6 | 575 | 3 | 1/3 | 1,725 | 850 | 1040 | 56 | 27 | 10 | HVH-15-63-30 | NS | — | 50 |

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

1. For motor data, see table.
2. 208V amperage is 86% of 240V value.
3. Models can be field wired for 1 or 3 phase.
4. Includes motor Amps.
5. Maximum mounting height for effective heat distribution. Minimum height is 7 feet.

**Other Notes —**

A. All heaters have built-in contactors except 2.6 thru 5 kW single phase models, and stock 480V models have built-in control transformers and contactors with 24V holding coils. All 208 and 240V 3 phase models, 4kW and above, have 208/240V holding coils. All stock 277V models have 277V holding coils.

B. Optional contactors holding coil voltages of 24V or 120V and control voltage transformers, are available as made-to-order models for all heater ratings.

# HVH Horizontal or Vertical Discharge Fan Forced Unit Heater *(cont'd.)*

## *Recommended Control Options*

| Heater | | Heater Compatible, Field Installable, Accessory Options | | | | | | | | | | | Factory Installable Options | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Model No. | PCN | HVW-1 219416 | HVW-2 219424 | HVC-1 219432 | HVC-2 219440 | HVS-1 219459 | HVS-2 219467 | TK-5 219475 | TK-6 219483 | HDS-1 219491 | HVF-01 219504 | HVF-02 219512 | HFD-1** | PL-1** |
| HVH-02-81-00 | 219096 | X | | X | | X | | | X | X | | | | X |
| HVH-02-21-00 | 219109 | X | | X | | X | | | X | X | | | | X |
| HVH-02-71-00 | 219117 | X | | X | | X | | | X | X | | | | |
| HVH-04-81-00 | 219125 | X | | X | | X | | | X | X | | | | X |
| HVH-04-83-34 | 219133 | X | | X | | X | | X | | X | X | | | X |
| HVH-04-21-00 | 219141 | X | | X | | X | | | X | X | | | | X |
| HVH-04-23-34 | 219150 | X | | X | | X | | X | | X | X | | | X |
| HVH-04-71-00 | 219168 | X | | X | | X | | | X | X | | | | |
| HVH-04-43-30 | 219176 | X | | X | | X | | X | | X | X | | X | X |
| HVH-05-81-00 | 219184 | X | | X | | X | | | X | X | | | | X |
| HVH-05-83-34 | 219192 | X | | X | | X | | X | | X | X | | | X |
| HVH-05-21-00 | 219205 | X | | X | | X | | | X | X | | | | X |
| HVH-05-23-34 | 219213 | X | | X | | X | | X | | X | X | | | X |
| HVH-05-71-00 | 219221 | X | | X | | X | | | X | X | | | | |
| HVH-05-43-30 | 219230 | X | | X | | X | | X | | X | X | | X | X |
| HVH-07-81-34 | 219248 | | X | | X | | X | X | | X | X | | | X |
| HVH-07-83-34 | 219256 | | X | | X | | X | X | | X | X | | | X |
| HVH-07-21-34 | 219264 | | X | | X | | X | X | | X | X | | | X |
| HVH-07-23-34 | 219272 | | X | | X | | X | X | | X | X | | | X |
| HVH-07-71-30 | 219280 | | X | | X | | X | X | | X | X | | | |
| HVH-07-43-30 | 219299 | | X | | X | | X | X | | X | X | X | X | X |
| HVH-10-81-34 | 219301 | | X | | X | | X | X | | X | X | | | X |
| HVH-10-83-34 | 319310 | | X | | X | | X | X | | X | X | | | X |
| HVH-10-21-34 | 219328 | | X | | X | | X | X | | X | X | | | X |
| HVH-10-23-34 | 219336 | | X | | X | | X | X | | X | X | | | X |
| HVH-10-43-30 | 219344 | | X | | X | | X | X | | X | X | X | X | X |
| HVH-12-83-34 | 219352 | | X | | X | | X | X | | X | X | | | X |
| HVH-12-23-34 | 219360 | | X | | X | | X | X | | X | X | | | X |
| HVH-12-43-30 | 219379 | | X | | X | | X | X | | X | X | X | X | X |
| HVH-15-83-34 | 219387 | | X | | X | | X | X | | X | X | | | X |
| HVH-15-23-34 | 219395 | | X | | X | | X | X | | X | X | | | X |
| HVH-15-43-30 | 219408 | | X | | X | | X | X | | X | X | X | X | X |

**Notes:**
*Includes all field installable options
**HFD-1 is a fan delay on/fan delay off
***PL-1 is a green pilot light indicating power to heater

# HVH Horizontal or Vertical Discharge Fan Forced Unit Heater *(cont'd.)*

When ordering HVH heaters, specify the model number and corresponding PCN (Product Code Number). If controls (thermostat, fan switch, transformer, disconnect) or other options are required, designate these options in the model number when ordering, as shown below. Always specify voltage, phase and kW by listing them on the purchase order specifications.

**HVH — Horizontal or Vertical Discharge Blower Heater**

**kW**

| | |
|---|---|
| **02** | 2.6 kW |
| **04** | 4.0 k W |
| **05** | 5.0 kW |
| **07** | 7.5 kW |
| **10** | 10.0 kW |
| **12** | 12.5 kW |
| **15** | 15.0 kW |

**Volts**

| | |
|---|---|
| **2** | 240V |
| **4** | 480V |
| **6** | 600V |
| **7** | 277V |
| **8** | 208V |
| **A** | 220V |
| **B** | 380V |
| **C** | 400V |
| **D** | 415V |

**Phase**

| | |
|---|---|
| **1** | 1 |
| **3** | 3 |

**Control**

| | |
|---|---|
| **00** | No Contactor |
| **30** | Contactor with 24V Transformer |
| **31** | Contactor with 24V Externally Supplied |
| **32** | Contactor with 120V Transformer |
| **33** | Contactor with 120V Externally Supplied |
| **34** | Contactor with 208/240V Internally Supplied |
| **35** | Contactor with 277V Internally Supplied |

**Intergral Thermostat**

| | |
|---|---|
| **0** | None |
| **TL** | 40-90˚F Range |
| **TH** | 55-105˚F Range |

**Disconnect Switch**

| | |
|---|---|
| **0** | None |
| **D** | Yes |

**Fan Only Switch**

| | |
|---|---|
| **00** | None |
| **FI** | Internal (In Heater) |
| **FE** | External (On Wall) |

**Time Delay**

| | |
|---|---|
| **0** | None |
| **R** | Yes |

**Pilot Light**

| | |
|---|---|
| **0** | None |
| **P** | Yes |

**Outlet Screen**

| | |
|---|---|
| **0** | None |
| **S** | Yes |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **HVH** | **05** | **2** | **1** | **34** | **TL** | **D** | **FI** | **-0** | **-0** | **-0** | **Typical Model Number** |

# KUH
## Horizontal Blower Heater

- **20 - 45 kW**
- **68,000 - 153,000 Btuh**
- **208, 240, 277, 480 and 600 Volt**
- **1 or 3 Phase**
- **Wall or Ceiling Mounted Configurations**

### *Description*

Type KUH self-contained heater provides quiet, reliable fan-forced heating in all types of commercial and industrial applications.

### *Applications*

- Shipping and Receiving Areas
- Pump Houses
- Power Generating Stations
- Aircraft Hangars
- Factories
- Warehouses
- Garages

### *Construction*

**Die Formed Cabinet —** Heavy 18 gauge steel, phosphate undercoated for corrosion resistance and finished in gray polyester powder coat.

**Louvers —** Individually adjustable louvers direct air flow up or down as needed.

**Fintube Heating Elements** have corrosion resistant steel fins that are furnace brazed to the tubular heating element to assure long life and superior heat transfer.

**Fan Motor —** Totally enclosed fan motor is rated for continuous duty with built-in thermal cutout and operates on same voltage as the heating circuit.

**Dynamically Balanced Fan** is attached with rubber vibration insulators for smooth, quiet operation. Blade pitch is carefully selected so that the volume of air moved results in the optimum discharge air temperature.

### *Features*

- **Sub-divided Circuits with Individual Fuse Protection —** Standard on all heaters with a total current draw of 48 Amps or greater. The fuse compartment is conveniently located for easy access.
- **Integral 24V Control Transformer —** Standard on 480V models, eliminates the need for an external control source.
- **Heavy Duty Magnetic Contactors** are standard on all models.
- **Thermal Cutouts** open the control circuit and disconnect power to the heating elements if overheating occurs. **Automatic Reset** allows the control circuit to reclose and restore power when temperature returns to normal.
- **Mounting Configurations —** Recessed welded fasteners on top of the heater cabinet are internally threaded for suspension of unit with threaded rods. Ceiling and Universal Wall Swivel brackets are optional. The ceiling bracket lets you mount heater directly to ceiling or over-head member, simply and easily. The swivel mounting allows you to readily adjust the direction of warm air flow for maximum comfort up to 180 degrees.

### *Optional Features (Factory Installed or Field Installation Kits)*

**Summer Fan Switch Kit —** Field installable for circulating warm stratified air. Available for all models.

**Thermostat Kit —** Field installable on all models. Range 40°F - 90°F.

**Disconnect Switch —** Field installable switch enables power to be disconnected while servicing heater. 40, 80 and 100 Amp models available. Mounts in the back of the heater.

- **Ceiling Bracket** (shown above)
- **Wall Mounting Bracket**

### *Advantages*

- Self Contained
- Versatile, Flexible and High Performance
- Easy Installation
- Minimum Maintenance
- Long Life
- Attractive Appearance

Because it has individually adjustable discharge louvers to direct air flow, and can be wall or ceiling (plus swivel) mounted, the KUH heater may be used in a variety of heating applications:

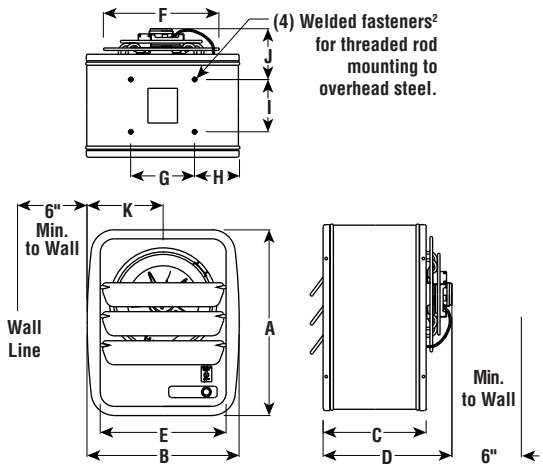
- Primary Heating
- Supplementary Heating
- Dual System Heating
- Spot Heating
- Entryway Air-Curtain Heating

*Refer to WR-80, RTC, WR-90, WT-121, WT-122 and WTL-121 in the Controls section.*

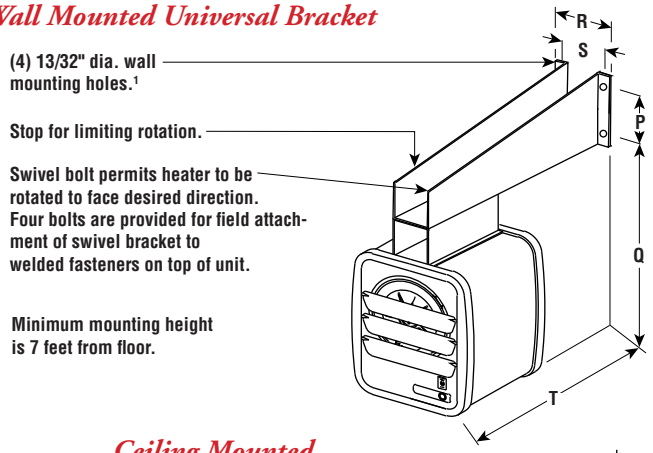
# KUH

## Horizontal Blower Heater *(cont'd.)*

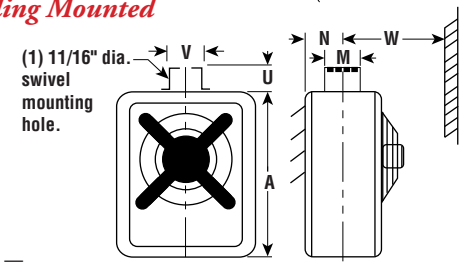
### *Dimensions (Inches)*




### *Wall Mounted Universal Bracket*




### *Ceiling Mounted*




### *Wall Mounted Heaters*

| Heater | Dimensions (In.) | | | | | Wall Bracket | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|
| | P | Q | R | S | T | | | | |
| KUH-20, 25 | 2 | 32 | 9-1/2 | 8-3/8 | 22-1/4 | BUH-02A | 304506 | S | 7 |
| KUH-30, 35, 40, 45 | 5-1/2 | 28-11/16 | 5 | 3-1/2 | 33-1/4 | BUH-03A | 304514 | S | 10 |

**Notes** —
1. Wall mounting fasteners to be supplied by customer.
2. Threaded rod to be supplied by customer.

### *Ceiling Mounted Heaters*

| Heater | Dimensions (In.) | | | | | | | | | | | | | | | | Ceiling Bracket | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I | J | K | M | N | U | V | W | | | | |
| KUH-20, 25 | 24 | 20-1/8 | 11-1/2 | 20-1/2 | 16-3/4 | 16 | 8-1/4 | 6 | 6-1/4 | 12 | 10-1/16 | 8 | 6-1/4 | 6 | 7-1/4 | 16 | BUH-05A | 304477 | S | 3 |
| KUH-30, 35, 40, 45 | 24 | 20-1/8 | 17 | 26 | 16-3/4 | 16 | 8-1/4 | 6 | 11-3/4 | 12 | 10-1/16 | 13-3/4 | 9-5/16 | 6 | 7-1/4 | 21 | BUH-06A | 304485 | S | 3 |

### *Optional Control Accessories & Remote Thermostats*

### *Fan Only Operation Kits*


Summer Fan Switch

Thermostat Kit

**Note** — A fan only operation (optional) is available by means of a built-in switch or by external control.

| Summer Fan Switch | (2 - 15 kW) | | (20 - 45 kW) | | Stock | Wt. (Lbs.) |
|---|---|---|---|---|---|---|
| | Model | PCN | Model | PCN | | |
| Internal 208- 277V | ISFS-02[2] | 305007 | ISFS-02 | 305007 | S | 0.25 |
| External[1] with Relay (24V control) | ESFS-40 | 305015 | ESFS-40A | 305058 | S | 0.5 |
| External[1] with Relay (120V control) | ESFS-41 | 305023 | ESFS-41A | 305066 | S | 0.5 |
| External[1] with Relay (240V control) | ESFS-42 | 305031 | ESFS-42A | 305074 | S | 0.5 |
| External[1] with Relay (277V control) | ESFS-47 | 305040 | — | — | S | 0.5 |

1. Kit includes wall plate (discard plate if switch is to be installed on heater).
2. Do not use for 480V rated heaters. 480V heaters require fan relay option with proper control voltage relay coil.

### *Thermostat Kits*

| Model | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|
| KUH-TK3 (SPST) 40° to 90°F | 302519 | S | 0.25 |
| KUH TK4 (DPST) 40° to 90°F | 302527 | S | 0.25 |

### *Power Disconnect Kits*

3 Pole, 600V Rating

| Model | Rating | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|---|
| KDS-1 | 40 Amp* | 304434 | NS | 0.5 |
| KDS-2 | 80 Amp | 304442 | NS | 0.5 |
| KDS-3 | 100 Amp | 304450 | NS | 1 |

* KDS-1 Rating for 480V or less is 50 Amp.

### *Mounting Limitations*

***Hazardous Atmosphere*** — Unit heaters should not be used in potentially explosive atmospheres. ***Corrosive Atmosphere*** — The finish is not intended for direct salt spray exposure in marine applications or the highly corrosive atmospheres of greenhouses, swimming pools, chemical storage bins, etc. ***Mounting Height*** — Do not install unit heaters above recommended maximum mounting height. ***Obstructions*** must not block unit heater air inlet or discharge.

# KUH Horizontal Blower Heater *(cont'd.)*

## *Specifications and Ordering Information*

| Electrical (60 Hz) | | | | Motor | | | | | Air Delivery | | | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Ckt & Phase | Amps[4] | Volts | Phase | HP | RPM | CFM | FPM | Temp. Rise (°F) | Horiz. Throw (Ft.) | Mtg.[5] Height (Ft.) | Model | Stock | PCN | Wt. (Lbs.) |
| 14.5/19.4 | 208/240 | 1 - 3 | 48.0[2] | 240 | 3 | 1/3 | 1,725 | 1,240 | 1,160 | 53 | 31 | 11 | KUH-20-23-34 | NS | 304320 | 73 |
| 20 | 480 | 1 - 3 | 25.0 | 480 | 3 | 1/3 | 1,725 | 1,240 | 1,160 | 53 | 31 | 11 | **KUH-20-43-30** | **S** | **304338** | 73 |
| 20 | 600 | 1 - 3 | 19.6 | 575 | 3 | 1/3 | 1,725 | 1,240 | 1,160 | 53 | 31 | 11 | KUH-20-63-30 | NS | — | 73 |
| 25 | 480 | 1 - 3 | 31.0 | 480 | 3 | 1/3 | 1,725 | 1,350 | 1,260 | 60 | 31 | 12 | **KUH-25-43-30** | **S** | **304346** | 73 |
| 25 | 600 | 1 - 3 | 24.6 | 575 | 3 | 1/3 | 1,725 | 1,350 | 1,260 | 60 | 31 | 12 | KUH-25-63-30 | NS | — | 73 |
| 30 | 208 | 2 - 3 | 85.2 | 240 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 64 | 46 | 13 | **KUH-30-83-34** | **S** | **304354** | 106 |
| 22.5/30 | 208/240 | 2 - 3 | 74.0[2] | 240 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 64 | 46 | 13 | KUH-30-23-34 | NS | 304362 | 106 |
| 30 | 480 | 2 - 3 | 37.1 | 480 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 64 | 46 | 13 | **KUH-30-43-30** | **S** | **304370** | 106 |
| 30 | 600 | 2 - 3 | 29.6 | 575 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 64 | 46 | 13 | KUH-30-63-30 | NS | — | 106 |
| 26.25/35 | 208/240 | 2 - 3 | 86.0[2] | 240 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 71 | 45 | 14 | KUH-35-23-34 | NS | 304389 | 106 |
| 35 | 480 | 2 - 3 | 43.1 | 480 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 71 | 45 | 14 | **KUH-35-43-30** | **S** | **304397** | 106 |
| 35 | 600 | 2 - 3 | 34.7 | 575 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 71 | 45 | 14 | KUH-35-63-30 | NS | — | 106 |
| 28.5/38 | 208/240 | 2 - 3 | 93.3 | 240 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 84 | 44 | 15 | KUH-40-23-34 | NS | 304400 | 106 |
| 39 | 480 | 2 - 3 | 47.9 | 480 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 84 | 44 | 15 | **KUH-40-43-30** | **S** | **304418** | 106 |
| 40 | 600 | 2 - 3 | 39.7 | 575 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 84 | 44 | 15 | KUH-40-63-30 | NS | — | 106 |
| 45 | 480 | 2 - 3 | 55.1 | 480 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 94 | 42 | 17 | **KUH-45-43-30** | **S** | **304426** | 106 |
| 45 | 600 | 2 - 3 | 43.7 | 575 | 3 | 1/3 | 1,725 | 1,555 | 1,450 | 94 | 42 | 17 | KUH-45-63-30 | NS | — | 106 |

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

1. For motor data, see table.
2. 208V amperage is 86% of 240V value.
3. Models can be field wired for 1 or 3 phase.
4. Includes motor Amps.
5. Maximum mounting height for effective heat distribution. Minimum height is 7 feet.

**Other Notes —**

A. All heaters have built-in contactors, and stock 480V models have built-in control transformers and contactor with 24V holding coils. All stock 208 and 240V models have 208/240V holding coils. All stock 277V models have 277V holding coils.
B. Optional contactors available with 24V holding coils on made-to-order models, contact your Local Chromalox Sales office.
C. When total heater capacity exceeds 48 Amps, built-in fusing is provided behind a hinged and latched door in the side which allows easy access.

# KUH
## Horizontal Blower Heater *(cont'd.)*

### *Recommended Control Options*

| PCN | Description | Kits | | | Dis-connect |
|---|---|---|---|---|---|
| | | Only Thermostat | Fan Only | Remote Fan | |
| 304320 | KUH-20-23-34 240V 3P 20kW | KUH-TK3 | ISFS-02 | ESFS-42A | KDS-2 |
| 304338 | KUH-20-43-30 480V 3P 20kW | KUH-TK3 | ESFS-40A | ESFS-40A | KDS-1 |
| 304346 | KUH-25-43-30 480V 3P 25kW | KUH-TK3 | ESFS-40A | ESFS-40A | KDS-1 |
| 304354 | KUH-30-83-34 208V 3P 30kW | KUH-TK3 | ISFS-02 | ESFS-42A | KDS-3 |
| 304362 | KUH-30-23-34 240V 3P 30kW | KUH-TK3 | ISFS-02 | ESFS-42A | KDS-2 |
| 304370 | KUH-30-43-30 480V 3P 30kW | KUH-TK3 | ESFS-40A | ESFS-40A | KDS-1 |
| 304389 | KUH-35-23-34 240V 3P 35kW | KUH-TK3 | ISFS-02 | ESFS-42A | KDS-3 |
| 304397 | KUH-35-43-30 480V 3P 35kW | KUH-TK3 | ESFS-40A | ESFS-40A | KDS-2 |
| 304400 | KUH-40-23-34 240V 3P 40kW | KUH-TK3 | ISFS-02 | ESFS-42A | KDS-3 |
| 304418 | KUH-40-43-30 480V 3P 40kW | KUH-TK3 | ESFS-40A | ESFS-40A | KDS-2 |
| 304426 | KUH-45-43-30 480V 3P 45kW | KUH-TK3 | ESFS-40A | ESFS-40A | KDS-2 |

When ordering KUH heaters, specify the model number and corresponding PCN (Product Code Number). If controls or thermostat/fan options are required, designate these options in the model number when ordering, as shown below. Always specify voltage, phase and kW by listing them on the purchase order product specifications.

**Model Numbers**

**Chromalox Horizontal Unit Heater**

**Heating Elements**

| | | | |
|---|---|---|---|
| **20** | 20.0 kW | **40** | 40.0 kW |
| **25** | 25.0 kW | **45** | 45.0 kW |
| **30** | 30.0 kW | | |
| **35** | 35.0 kW | | |

**Heater Voltage and Phase**

| | | | |
|---|---|---|---|
| **81** | 208V, 1 Phase | **71** | 277V, 1 Phase |
| **83** | 208V, 3 Phase | **43** | 480V, 3 Phase |
| **21** | 240V, 1 Phase | **63** | 600V, 3 Phase |
| **23** | 240V, 3 Phase | | |

**Control**

| | |
|---|---|
| **00** | No Contactor(s) |
| **30** | 24V Control Internal Transformer |
| **31** | 24V Control Externally Supplied |
| **32** | 120V Control Internal Transformer |
| **33** | 120V Control Externally Supplied |
| **34** | 208/240V Control Internally Supplied, No Transformer |
| **35** | 277V Control Internally Supplied |

**Control**

| | |
|---|---|
| **00** | No Thermostat, No Summer Fan Switch |
| **40** | Internal Thermostat Only |
| **41** | Internal Therm. and Internal Sum. Fan Sw. |
| **42** | External Sum. Fan Sw. Only (Not 480 V) |
| **43** | External Sum. Fan Sw. and Fan Relay (All Volts) |
| **44** | Rem. Fan Sw. and Internal Therm. (Not 480 V) |
| **45** | Rem. Fan Sw., Fan Relay and Int. Therm. (All Volts)D, E, F, G |
| **46** | Internal Sum. Fan Sw. (Not 480 V) |
| **47** | Internal Sum. Fan Sw., Fan Relay (All Volts) |

**Disconnect Switch**

| | |
|---|---|
| **1** | 40 Amp |
| **2** | 80 Amp |
| **3** | 100 Amp |

| | | | | | | |
|---|---|---|---|---|---|---|
| **KUH** | **20** | **43** | **31** | **41** | **1** | **Typical Model Number** |

# UB
## High Capacity Horizontal Blower Heater

- **2 - 50 kW**
- **6,820 - 170,600 Btuh**
- **120, 208, 240, 277, 480 and 550 Volt**
- **1 or 3 Phase**
- **Wall or Ceiling Mounted Configurations**

### *Description*

Rugged, industrial UB heaters are ideal for factories, warehouses, garages or any other area that requires a high volume of forced-air heat.

### *Applications*

- Entryway Air-Curtain Heating
- Power Generating Stations
- Factories
- Freeze Protection of Machinery

### *Construction (2 - 50 kW models)*

**Painted Finish —** For attractive appearance and corrosion resistance.

**Cabinet —** 16 gauge steel cabinet construction supported with an 18 gauge base assembly and finished in almond powder.

**Louvers —** Adjustable discharge grille to direct the air flow up or down.

**Heavy Gauge Rear Wire Grille** protects against accidental contact with rapidly rotating fan blade.

**Metal Sheath Fintube® Heating Elements —** The electric heat bank - Chromalox patented metal sheath Fintube® heating elements. Heat radiation fins are corrosion-resistant copper-clad steel, furnace brazed to the tubular heating elements to assure superior heat transfer. Wide spacing prevents clogging. Air is evenly drawn across the circumferential elements preventing hot spots and prolonging element life.

**Rugged Motor and Dynamically Balanced Fan** provides a high volume of hot air.

**Integral Automatic Reset Thermal Cutout** for fast heat response and overheat protection.

### *Features (2 - 20 kW models)*

**Fan Only Operation —** UB-23 and UB-32, (excluding the 120V UB-32), have a separate fan control switch for circulating air during summer months.

**Totally Enclosed Fan Motor —** Continuous duty with built-in automatic reset thermal overload protection operates on same voltage as supplied to the heater, except on 480 and 550 volt where motor is either 115 or 230 volts. All motors are single phase with sleeve bearings.

Heaters with model numbers having a suffix "T" include a transformer to stepdown the voltage for operating the fan motor.

External contactor is not necessary with heaters having a model number suffix "R".

**Wall or Ceiling Mounting Brackets** are available separately for field installation depending on mounting arrangement desired.

### *Features (25 - 50 kW models)*

**Universal Wall & Ceiling Mounting Bracket** is included to provide flexibility in the mounting arrangement.

**Fan Interlock —** Fan motor contactor includes a set of auxiliary contacts to prevent heating elements from being energized unless contacts of fan motor contactor are closed.

**Thermal Fan Delay** allows fan motor to continue to operate after heating thermostat has been satisfied to maximize transfer of generated heat to space being heated and extend operating life of heating elements.

**Built-in Controlling Contactors and Line Fusing —** All heaters drawing 48 Amps or greater are sub-divided into two (2) circuits with built-in line fuses and controlling contactors. Units drawing less than 48 Amps have built-in contactors only, line fusing must be provided externally. All units regardless of amperage rating have built-in fuse protection for the motor and transformer.

**Integral 120V Control Circuit —** 120 volt power for the control circuit is provided from the unit mounted transformer to eliminate the need to run separate power to the unit for control.

**Heavy Duty 1/3 HP Motor** operates at 1,550 RPM on line voltage. Motor has built-in thermal overload protection, permanently lubricated ball bearings and factory installed line fuses for maximum trouble-free service life.

### *Advantages*

- Low Maintenance
- High Capacity
- Primary Heating
- Supplementary Heating
- Dual System Heating
- Long Horizontal Air Throw
- Long Life

*Refer to WR-80, WR-90 in the Controls section.*

# UB

## High Capacity Horizontal Blower Heater *(cont'd.)*

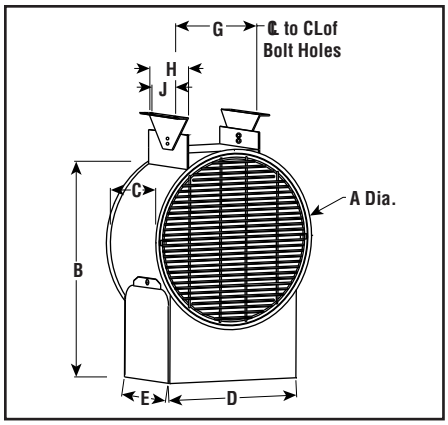
### *Mounting Kits*

**For 2 -20 kW Heaters - Order Separately**

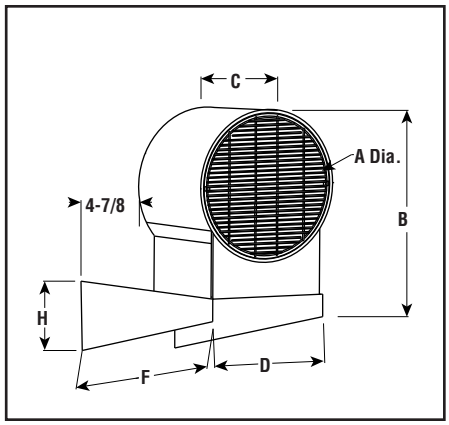
| Heater | Model | PCN |
|---|---|---|
| **Ceiling Mounting Brackets** | | |
| UB-23 and 32 | 1-44419 | 264330 |
| UB-502 and 752 | 2-44419 | 264348 |
| UB-1002, 1252, 1502 and 2002 | 3-44419 | 264356 |
| **Wall Mounting Brackets** | | |
| UB-23 and 32 | WUB-1 | 264305 |
| UB-502 and 752 | WUB-3 | 264313 |
| UB-1002, 1252, 1502 and 2002 | WUB-4 | 264321 |

**For 25 - 50 kW Heaters - a Universal Wall & Ceiling Mounting Bracket is included.**

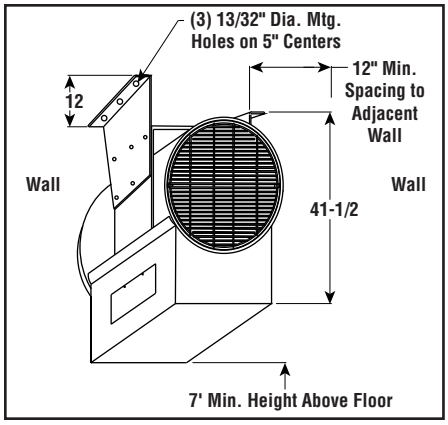
### *Ceiling Mounting Kit (2-20 kW) — Dimensions (Inches)*



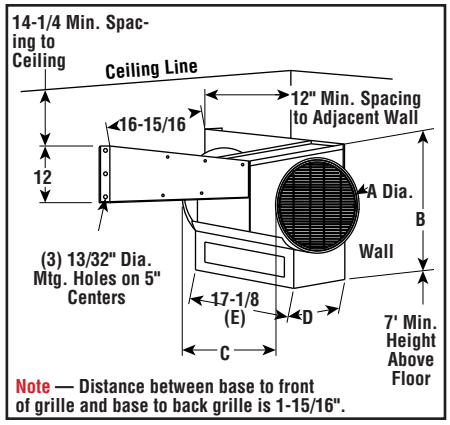

### *Wall Mounting Kit (2-20 kW) — Dimensions (Inches)*




### *Ceiling Mounting Kit (25-50 kW) — Dimensions (Inches)*




### *Wall Mounting Kit (25-50 kW) — Dimensions (Inches)*




### *Dimensions (Inches)*

| Model | Dimensions (In.) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | J |
| UB-23 | 10-3/8 | 13-1/2 | 8 | 6-7/16 | 3 | 11-3/8 | 9-7/16 | 6 | 4 |
| UB-32 | 10-3/8 | 13-1/2 | 8 | 6-7/16 | 3 | 11-3/8 | 9-7/16 | 6 | 4 |
| UB-502 | 13-5/8 | 17-3/16 | 13 | 8-7/16 | 7-9/16 | 15-9/16 | 11-7/8 | 8 | 6 |
| UB-752 | 13-5/8 | 17-3/16 | 13 | 8-7/16 | 7-9/16 | 15-9/16 | 11-7/8 | 8 | 6 |
| UB-1002 | 17-1/8 | 20-3/4 | 15-3/16 | 11-3/4 | 9-5/16 | 17-5/32 | 12-1/4 | 10 | 8 |
| UB-1252 | 17-1/8 | 20-3/4 | 15-3/16 | 11-3/4 | 9-5/16 | 17-5/32 | 12-1/4 | 10 | 8 |
| UB-1502 | 17-1/8 | 20-3/4 | 15-3/16 | 11-3/4 | 9-5/16 | 17-5/32 | 12-1/4 | 10 | 8 |
| UB-2002 | 17-1/8 | 20-3/4 | 15-3/16 | 11-3/4 | 9-5/16 | 17-5/32 | 12-1/4 | 10 | 8 |
| UB-2502 | 17-1/8 | 23-5/16 | 21 | 14 | 17-1/8 | 17-5/32 | 18-15/16 | 10 | 8 |
| UB-3002 | 17-1/8 | 23-5/16 | 21 | 14 | 17-1/8 | 17-5/32 | 18-15/16 | 10 | 8 |
| UB-3502 | 21-1/8 | 27-5/16 | 21 | 17-7/16 | 17-1/8 | 17-5/32 | 22-15/16 | 10 | 8 |
| UB-4002 | 21-1/8 | 27-5/16 | 21 | 17-7/16 | 17-1/8 | 17-5/32 | 22-15/16 | 10 | 8 |
| UB-4502 | 21-1/8 | 27-5/16 | 21 | 17-7/16 | 17-1/8 | 17-5/32 | 22-15/16 | 10 | 8 |
| UB-5002 | 21-1/8 | 27-5/16 | 21 | 17-7/16 | 17-1/8 | 17-5/32 | 22-15/16 | 10 | 8 |

# UB High Capacity Horizontal Blower Heater *(cont'd.)*

| Electrical (60 Hz) | | | | Motor | | | | | Air Delivery | | | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | Amps | Volts | Phase | HP | RPM | CFM | FPM | Temp. Rise (°F) | Horiz. Throw (Ft.) | Mtg. Height (Ft.) | Model | Stock | PCN | Wt. (Lbs.) |
| 2 | 120 | 1 | 16.7 | 115 | 1 | 1/15 | 1,550 | 316 | 657 | 21 | 10 | 8 | **UB-23** | **S** | **261403** | 13.5 |
| 2 | 208 | 1 | 9.6 | 208 | 1 | 1/15 | 1,550 | 316 | 657 | 21 | 10 | 8 | **UB-23** | **S** | **261411** | 13.5 |
| 2 | 240 | 1 | 8.3 | 230 | 1 | 1/15 | 1,550 | 316 | 657 | 21 | 10 | 8 | **UB-23** | **S** | **261420** | 13.5 |
| 3 | 120 | 1 | 25 | 115 | 1 | 1/15 | 1,550 | 316 | 657 | 31 | 10 | 8 | **UB-32** | **S** | **261438** | 13.5 |
| 3 | 208 | 1 | 14.4 | 208 | 1 | 1/15 | 1,550 | 316 | 657 | 31 | 10 | 8 | **UB-32** | **S** | **261446** | 13.5 |
| 3 | 240 | 1 | 12.5 | 230 | 1 | 1/15 | 1,550 | 316 | 657 | 31 | 10 | 8 | **UB-32** | **S** | **261454** | 13.5 |
| 5 | 120 | 1 | 41.7 | 115 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | UB-502 | NS | 261462 | 43 |
| 5 | 208 | 1 | 24 | 208 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | **UB-502** | **S** | **261489** | 43 |
| 5 | 240 | 1 | 20.8 | 230 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | **UB-502** | **S** | **261500** | 43 |
| 5 | 550[1] | 3 | 5.3 | 230 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | UB-502 | NS | 285368 | 43 |
| 5 | 240 | 1 | 20.8 | 230 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | UB-502R | NS | 264250 | 43 |
| 5 | 550[1] | 3 | 5.3 | 115 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | UB-502 | AS | 266685 | 43 |
| 5 | 208 | 3 | 13.9 | 208 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | **UB-502** | **S** | **261497** | 43 |
| 5 | 240 | 3 | 12 | 230 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | **UB-502** | **S** | **261518** | 43 |
| 5 | 240 | 3 | 12 | 230 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | UB-502R | NS | 269755 | 43 |
| 5 | 480 | 1 | 10.4 | 115 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | UB-502 | AS | 261526 | 43 |
| 5 | 480 | 1 | 10.4 | 230 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | UB-502 | AS | 269114 | 43 |
| 5 | 480 | 3 | 6 | 115 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | UB-502 | NS | 261534 | 43 |
| 5 | 480 | 3 | 6 | 115 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | **UB-502T** | **S** | **269704** | 51 |
| 5 | 480 | 3 | 6 | 230 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | UB-502 | NS | 265199 | 43 |
| 5 | 480 | 3 | 6 | 115 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | UB-502R | NS | 264268 | 43 |
| 5 | 480 | 3 | 6 | 230 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12-1/2 | 8 | **UB-502T** | **S** | **264233** | 51 |
| 7.5 | 208 | 1 | 36.1 | 208 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | UB-752 | NS | 261569 | 43 |
| 7.5 | 208 | 3 | 20.8 | 208 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | **UB-752** | **S** | **261577** | 43 |
| 7.5 | 240 | 1 | 31.3 | 230 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | **UB-752** | **S** | **261585** | 43 |
| 7.5 | 240 | 3 | 18.1 | 230 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | UB-752 | AS | 261593 | 43 |
| 7.5 | 240 | 3 | 18.1 | 230 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | UB-752R | NS | 264276 | 43 |
| 7.5 | 480 | 1 | 15.6 | 115 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | UB-752 | AS | 261606 | 43 |
| 7.5 | 480 | 1 | 15.6 | 230 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | UB-752 | AS | 269122 | 43 |
| 7.5 | 480 | 3 | 9 | 115 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | **UB-752** | **S** | **261614** | 43 |
| 7.5 | 480 | 3 | 9 | 230 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | UB-752 | AS | 265228 | 43 |
| 7.5 | 480 | 3 | 9 | 230 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | UB-752R | AS | 264292 | 43 |
| 7.5 | 480 | 3 | 9 | 115 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | **UB-752T** | **S** | **265324** | 51 |
| 7.5 | 480 | 3 | 9 | 115 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | UB-752R | AS | 264284 | 43 |
| 7.5 | 480 | 3 | 9 | 230 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | **UB-752T** | **S** | **264241** | 51 |
| 7.5 | 550[1] | 3 | 7.9 | 115 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | UB-752 | NS | 266693 | 43 |
| 7.5 | 550 | 3 | 7.9 | 230 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 8 | UB-752 | AS | 285376 | 43 |
| 10 | 208[1] | 1 | 48.1 | 208 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 9 | UB-1002 | AS | 261622 | 48 |
| 10 | 208 | 3 | 27.8 | 208 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 9 | **UB-1002** | **S** | **261630** | 48 |
| 10 | 240 | 1 | 41.7 | 230 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 9 | **UB-1002** | **S** | **261649** | 48 |
| 10 | 240 | 3 | 24.1 | 230 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 9 | **UB-1002** | **S** | **261657** | 48 |
| 10 | 480 | 1 | 20.1 | 115 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 9 | UB-1002 | AS | 261665 | 48 |
| 10 | 480 | 3 | 12 | 115 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 9 | **UB-1002** | **S** | **261673** | 48 |
| 10 | 480 | 1 | 20.8 | 230 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 9 | UB-1002 | AS | 265244 | 48 |
| 10 | 550[1] | 3 | 10.5 | 115 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 9 | UB-1002 | AS | 266706 | 48 |
| 10 | 480 | 3 | 12 | 230 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 9 | **UB-1002** | **S** | **265236** | 48 |
| 10 | 550[1] | 3 | 10.5 | 230 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 9 | UB-1002 | AS | 285350 | 48 |
| 10 | 480 | 3 | 12 | 115 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 9 | **UB-1002T** | **S** | **277843** | 56 |
| 10 | 480 | 3 | 12 | 230 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 9 | **UB-1002T** | **S** | **277851** | 56 |
| 12.5 | 208 | 3 | 34.7 | 208 | 1 | 1/15 | 1,050 | 1,180 | 800 | 36 | 40 | 9 | UB-1252 | AS | 261681 | 48 |
| 12.5 | 240[1] | 1 | 52.1 | 230 | 1 | 1/15 | 1,050 | 1,180 | 800 | 36 | 40 | 9 | UB-1252 | AS | 261690 | 48 |
| 12.5 | 240 | 3 | 30.1 | 230 | 1 | 1/15 | 1,050 | 1,180 | 800 | 36 | 40 | 9 | UB-1252 | NS | 261702 | 48 |
| 12.5 | 480 | 1 | 26 | 115 | 1 | 1/15 | 1,050 | 1,180 | 800 | 36 | 40 | 9 | UB-1252 | AS | 261710 | 48 |
| 12.5 | 480 | 1 | 26 | 230 | 1 | 1/15 | 1,050 | 1,180 | 800 | 36 | 40 | 9 | UB-1252 | AS | 265260 | 48 |
| 12.5 | 480 | 3 | 15.1 | 115 | 1 | 1/15 | 1,050 | 1,180 | 800 | 36 | 40 | 9 | UB-1252 | AS | 261729 | 48 |
| 12.5 | 480 | 3 | 15.1 | 230 | 1 | 1/15 | 1,050 | 1,180 | 800 | 36 | 40 | 9 | UB-1252 | AS | 265252 | 48 |
| 15 | 208 | 3 | 41.7 | 208 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 10 | UB-1502 | NS | 261737 | 52 |
| 15 | 240[1] | 1 | 62.5 | 230 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 10 | UB-1502 | AS | 261745 | 52 |
| 15 | 240 | 3 | 36.1 | 230 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 10 | **UB-1502** | **S** | **261753** | 52 |
| 15 | 480 | 1 | 31.3 | 115 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 10 | UB-1502 | AS | 261761 | 52 |
| 15 | 480 | 1 | 31.3 | 230 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 10 | UB-1502 | AS | 265279 | 52 |
| 15 | 480 | 3 | 18.1 | 115 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 10 | **UB-1502** | **S** | **261770** | 52 |
| 15 | 480 | 3 | 18.1 | 230 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 10 | UB-1502 | AS | 265295 | 52 |
| 15 | 480 | 3 | 18.1 | 115 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 10 | **UB-1502T** | **S** | **266677** | 60 |
| 15 | 550[1] | 3 | 15.8 | 115 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 10 | **UB-1502** | **S** | **264364** | 52 |
| 19.9 | 240 | 3 | 47.9 | 230 | 1 | 1/15 | 1,050 | 1,330 | 900 | 42 | 45 | 11 | UB-2002 | NS | 261809 | 52 |
| 20 | 480 | 1 | 41.7 | 115 | 1 | 1/15 | 1,050 | 1,330 | 900 | 42 | 45 | 11 | UB-2002 | AS | 261817 | 52 |
| 20 | 480 | 1 | 41.7 | 230 | 1 | 1/15 | 1,050 | 1,330 | 900 | 42 | 45 | 11 | UB-2002 | NS | 265287 | 52 |
| 20 | 480 | 3 | 24.1 | 115 | 1 | 1/15 | 1,050 | 1,330 | 900 | 42 | 45 | 11 | **UB-2002** | **S** | **261825** | 52 |
| 20 | 480 | 3 | 24.1 | 230 | 1 | 1/15 | 1,050 | 1,330 | 900 | 42 | 45 | 11 | UB-2002 | AS | 265308 | 52 |
| 20 | 480 | 3 | 24.1 | 115 | 1 | 1/15 | 1,050 | 1,330 | 900 | 42 | 45 | 11 | **UB-2002T** | **S** | **285384** | 60 |
| 20 | 550[1] | 3 | 21 | 115 | 1 | 1/15 | 1,050 | 1,330 | 900 | 42 | 45 | 11 | **UB-2002** | **S** | **264372** | 52 |

# UB High Capacity Horizontal Blower Heater *(cont'd.)*

| Electrical (60 Hz) | | | | Motor | | | | | Air Delivery | | | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | Amps | Volts | Phase | HP | RPM | CFM | FPM | Temp. Rise (°F) | Horiz. Throw (Ft.) | Mtg. Height (Ft.) | Model | Stock | PCN | Wt. (Lbs.) |
| 25 | 240 | 3 | 60.2 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332558 | 185 |
| 25 | 240 | 3 | 60.2 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332566 | 185 |
| 25 | 240 | 3 | 60.2 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332574 | 185 |
| 25 | 240 | 3 | 60.2 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332582 | 185 |
| 25 | 480 | 3 | 30.1 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332590 | 185 |
| 25 | 480 | 1 | 52.1 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332603 | 185 |
| 25 | 480 | 1 | 52.1 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332611 | 185 |
| 25 | 480 | 1 | 52.1 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332620 | 185 |
| 25 | 480 | 1 | 52.1 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332638 | 185 |
| 25 | 480 | 3 | 30.1 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332646 | 185 |
| 25 | 480 | 3 | 30.1 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332654 | 185 |
| 25 | 480 | 3 | 30.1 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332662 | 185 |
| 25 | 480 | 3 | 30.1 | 460 | 3 | 1/3 | 1,725 | 1,450 | 920 | 57 | 48 | 12 | UB-2502 | NS | 332670 | 185 |
| 25 | 480 | 3 | 30.1 | 460 | 3 | 1/3 | 1,725 | 1,450 | 920 | 57 | 48 | 12 | **UB-2502** | **S** | **332689** | 185 |
| 25 | 480 | 3 | 30.1 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332697 | 185 |
| 25 | 550 | 3 | 26.3 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332700 | 185 |
| 25 | 550 | 3 | 26.3 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332718 | 185 |
| 25 | 550 | 3 | 26.3 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332726 | 185 |
| 25 | 575 | 3 | 26.3 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332734 | 185 |
| 25 | 575 | 3 | 26.3 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332742 | 185 |
| 25 | 575 | 3 | 26.3 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332750 | 185 |
| 25 | 575 | 3 | 26.3 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332769 | 185 |
| 25 | 600 | 3 | 24.1 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332777 | 185 |
| 25 | 600 | 3 | 24.1 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332785 | 185 |
| 25 | 600 | 3 | 24.1 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332793 | 185 |
| 25 | 600 | 3 | 24.1 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 64 | 48 | 12 | UB-2502 | NS | 332806 | 185 |
| 30 | 240 | 3 | 72.3 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332814 | 185 |
| 30 | 240 | 3 | 72.3 | 115 | 1 | 1/3 | 1.550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332822 | 185 |
| 30 | 240 | 3 | 72.3 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332830 | 185 |
| 30 | 240 | 3 | 72.3 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332849 | 185 |
| 30 | 480 | 1 | 62.5 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332857 | 185 |
| 30 | 480 | 1 | 62.5 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332865 | 185 |
| 30 | 480 | 1 | 62.5 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332873 | 185 |
| 30 | 480 | 1 | 62.5 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332881 | 185 |
| 30 | 480 | 3 | 36.1 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332890 | 185 |
| 30 | 480 | 3 | 36.1 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332902 | 185 |
| 30 | 480 | 3 | 36.1 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332910 | 185 |
| 30 | 480 | 3 | 36.1 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332929 | 185 |
| 30 | 480 | 3 | 36.1 | 460 | 3 | 1/3 | 1,725 | 1,450 | 920 | 69 | 48 | 13 | UB-3002 | NS | 332937 | 185 |
| 30 | 480 | 3 | 36.1 | 460 | 3 | 1/3 | 1,725 | 1,450 | 920 | 69 | 48 | 13 | **UB-3002** | **S** | **332945** | 185 |
| 30 | 550 | 3 | 31.5 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332953 | 185 |
| 30 | 550 | 3 | 31.5 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332961 | 185 |
| 30 | 550 | 3 | 31.5 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332970 | 185 |
| 30 | 550 | 3 | 31.5 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332988 | 185 |
| 30 | 575 | 3 | 30.2 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 332996 | 185 |
| 30 | 575 | 3 | 30.2 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 333008 | 185 |
| 30 | 575 | 3 | 30.2 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 333016 | 185 |
| 30 | 575 | 3 | 30.2 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 333024 | 185 |
| 30 | 600 | 3 | 28.9 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 333032 | 185 |
| 30 | 600 | 3 | 28.9 | 115 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 333040 | 185 |
| 30 | 600 | 3 | 28.9 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 333059 | 185 |
| 30 | 600 | 3 | 28.9 | 230 | 1 | 1/3 | 1,550 | 1,300 | 825 | 77 | 48 | 13 | UB-3002 | NS | 333067 | 185 |
| 35 | 240 | 3 | 84.3 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333075 | 210 |
| 35 | 240 | 3 | 84.3 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333083 | 210 |
| 35 | 480 | 1 | 72.9 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333091 | 210 |
| 35 | 480 | 1 | 72.9 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333104 | 210 |
| 35 | 480 | 1 | 72.9 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333112 | 210 |
| 35 | 480 | 1 | 72.9 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333120 | 210 |
| 35 | 480 | 3 | 42.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333139 | 210 |
| 35 | 480 | 3 | 42.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333147 | 210 |
| 35 | 480 | 3 | 42.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333155 | 210 |
| 35 | 480 | 3 | 42.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333163 | 210 |
| 35 | 480 | 3 | 42.2 | 460 | 3 | 1/3 | 1,725 | 2,800 | 1,165 | 42 | 54 | 14 | UB-3502 | NS | 333171 | 210 |
| 35 | 480 | 3 | 42.2 | 460 | 3 | 1/3 | 1,725 | 2,800 | 1,165 | 42 | 54 | 14 | **UB-3502** | **S** | **333180** | 210 |
| 35 | 550 | 3 | 36.8 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333198 | 210 |
| 35 | 550 | 3 | 36.8 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333200 | 210 |
| 35 | 550 | 3 | 36.8 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333219 | 210 |
| 35 | 550 | 3 | 36.8 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333227 | 210 |
| 35 | 575 | 3 | 35.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333235 | 210 |
| 35 | 575 | 3 | 35.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333243 | 210 |
| 35 | 575 | 3 | 35.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333251 | 210 |
| 35 | 575 | 3 | 35.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333260 | 210 |
| 35 | 600 | 3 | 33.7 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333278 | 210 |

# UB High Capacity Horizontal Blower Heater

| Electrical (60 Hz) | | | | Motor | | | | | Air Delivery | | | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | Amps | Volts | Phase | HP | RPM | CFM | FPM | Temp. Rise (°F) | Horiz. Throw (Ft.) | Mtg. Height (Ft.) | Model | Stock | PCN | Wt. (Lbs.) |
| 35 | 600 | 3 | 33.7 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333286 | 210 |
| 35 | 600 | 3 | 33.7 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333294 | 210 |
| 35 | 600 | 3 | 33.7 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 47 | 54 | 14 | UB-3502 | NS | 333307 | 210 |
| 40 | 480 | 1 | 83.3 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333315 | 210 |
| 40 | 480 | 1 | 83.3 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333323 | 210 |
| 40 | 480 | 1 | 83.3 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333331 | 210 |
| 40 | 480 | 1 | 83.3 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333340 | 210 |
| 40 | 480 | 3 | 48.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333358 | 210 |
| 40 | 480 | 3 | 48.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333366 | 210 |
| 40 | 480 | 3 | 48.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333374 | 210 |
| 40 | 480 | 3 | 48.2 | 230 | 1 | 1/3 | 1,500 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333382 | 210 |
| 40 | 480 | 3 | 48.2 | 460 | 3 | 1/3 | 1,725 | 2,800 | 1,165 | 48 | 54 | 15 | UB-4002 | NS | 333390 | 210 |
| 40 | 480 | 3 | 48.2 | 460 | 3 | 1/3 | 1,725 | 2,800 | 1,165 | 48 | 54 | 15 | **UB-4002** | **S** | **333403** | 210 |
| 40 | 550 | 3 | 42 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333411 | 210 |
| 40 | 550 | 3 | 42 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333420 | 210 |
| 40 | 550 | 3 | 42 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333438 | 210 |
| 40 | 550 | 3 | 42 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333446 | 210 |
| 40 | 575 | 3 | 40.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333454 | 210 |
| 40 | 575 | 3 | 40.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333462 | 210 |
| 40 | 575 | 3 | 40.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333470 | 210 |
| 40 | 575 | 3 | 40.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333489 | 210 |
| 40 | 600 | 3 | 38.5 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333497 | 210 |
| 40 | 600 | 3 | 38.5 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333500 | 210 |
| 40 | 600 | 3 | 38.5 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333518 | 210 |
| 40 | 600 | 3 | 38.5 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 53 | 54 | 15 | UB-4002 | NS | 333526 | 210 |
| 45 | 480 | 1 | 93.8 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333534 | 210 |
| 45 | 480 | 1 | 93.8 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333542 | 210 |
| 45 | 480 | 3 | 54.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333550 | 210 |
| 45 | 480 | 3 | 54.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333569 | 210 |
| 45 | 480 | 3 | 54.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333577 | 210 |
| 45 | 480 | 3 | 54.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333585 | 210 |
| 45 | 480 | 3 | 54.2 | 460 | 3 | 1/3 | 1,725 | 2,800 | 1,165 | 54 | 54 | 17 | UB-4502 | NS | 333593 | 210 |
| 45 | 480 | 3 | 54.2 | 460 | 3 | 1/3 | 1,725 | 2,800 | 1,165 | 54 | 54 | 17 | UB-4502 | NS | 333606 | 210 |
| 45 | 550 | 3 | 47.3 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333614 | 210 |
| 45 | 550 | 3 | 47.3 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333622 | 210 |
| 45 | 550 | 3 | 47.3 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333630 | 210 |
| 45 | 550 | 3 | 47.3 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333649 | 210 |
| 45 | 575 | 3 | 45.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333657 | 210 |
| 45 | 575 | 3 | 45.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333665 | 210 |
| 45 | 575 | 3 | 45.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333673 | 210 |
| 45 | 575 | 3 | 45.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333681 | 210 |
| 45 | 600 | 3 | 43.4 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333690 | 210 |
| 45 | 600 | 3 | 43.4 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333702 | 210 |
| 45 | 600 | 3 | 43.4 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333710 | 210 |
| 45 | 600 | 3 | 43.4 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 60 | 54 | 17 | UB-4502 | NS | 333729 | 210 |
| 50 | 480 | 3 | 60.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333737 | 210 |
| 50 | 480 | 3 | 60.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333745 | 210 |
| 50 | 480 | 3 | 60.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333753 | 210 |
| 50 | 480 | 3 | 60.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333761 | 210 |
| 50 | 480 | 3 | 60.2 | 460 | 3 | 1/3 | 1,725 | 2,800 | 1,165 | 60 | 54 | 17 | UB-5002 | NS | 333770 | 210 |
| 50 | 480 | 3 | 60.2 | 460 | 3 | 1/3 | 1,725 | 2,800 | 1,165 | 60 | 54 | 17 | **UB-5002** | **S** | **333788** | 210 |
| 50 | 550 | 3 | 52.5 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333796 | 210 |
| 50 | 550 | 3 | 52.5 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333809 | 210 |
| 50 | 550 | 3 | 52.5 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333817 | 210 |
| 50 | 550 | 3 | 52.5 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333825 | 210 |
| 50 | 575 | 3 | 50.3 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333833 | 210 |
| 50 | 575 | 3 | 50.3 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333841 | 210 |
| 50 | 575 | 3 | 50.3 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333850 | 210 |
| 50 | 575 | 3 | 50.3 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333868 | 210 |
| 50 | 600 | 3 | 48.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333876 | 210 |
| 50 | 600 | 3 | 48.2 | 115 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333884 | 210 |
| 50 | 600 | 3 | 48.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333892 | 210 |
| 50 | 600 | 3 | 48.2 | 230 | 1 | 1/3 | 1,550 | 2,500 | 1,040 | 67 | 54 | 17 | UB-5002 | NS | 333905 | 210 |

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

1. Not UL Listed.

**Other Note —** Up to 600V available, contact your Local Chromalox Sales office.

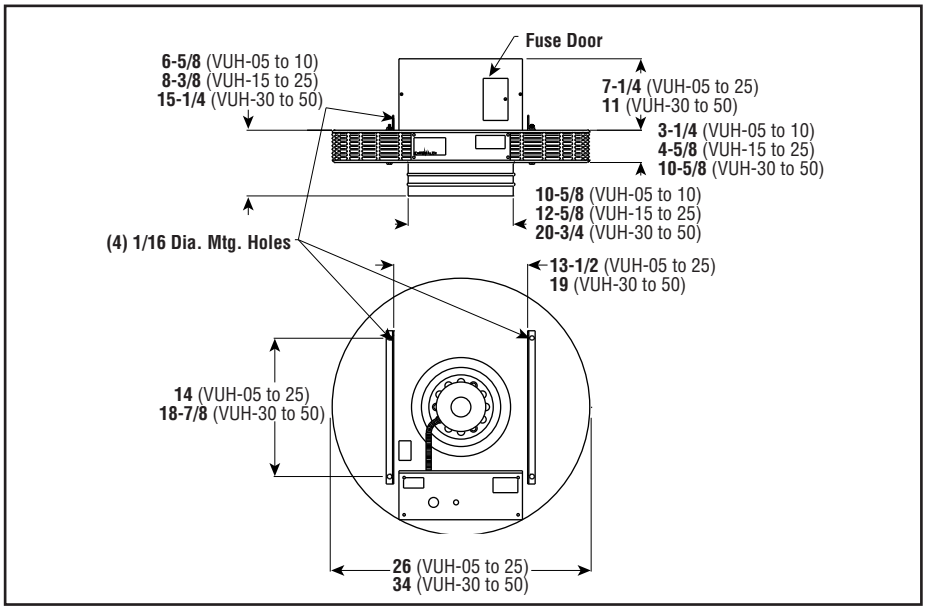
# VUH
## Vertical Delivery Blower Heater

- **5 - 50 kW**
- **17,060 - 170,600 Btuh**
- **208, 240, 277 and 480 Volt**
- **1 or 3 Phase**
- **Diffusers Optional**

### *Description*

Versatile, high performance VUH heaters can be used for complete primary, supplementary or dual system heating applications in all types of commercial and industrial applications. They direct warm air downward, and are particularly applicable in high bay industrial buildings where columns, towering machinery or warehouse stock would obstruct good horizontal movement of air. Four types of optional diffuser designs can be used to produce a variety of air distribution patterns.

### *Dimensions (Inches)*




### *Applications*

- Shipping and Receiving Areas
- Power Generating Stations
- Aircraft Hangers
- Warehouses
- Garages
- High Bay Areas

### *Features*

**Sub-divided Circuits with Individual Fuse Protection —** Standard on all heaters with a total current draw of 48 Amps or greater and are electrically balanced. The fuse compartment is conveniently located for easy access.

**Integral 120V Control Transformer —** Standard on 480V models, eliminates the need for an external control source (24V optional).

**Heavy Duty Magnetic Contactors —** No external contactors are needed; integral, 3-pole, magnetic contactors are standard on all models.

**Thermal Cutouts** open the control circuit and disconnect power to the heating elements if overheating occurs. **Automatic Reset** allows the control circuit to reclose and restore power when the temperature returns to normal levels.

**Suspension Mount with Hangers or Brackets —** VUH heaters have top angle brackets with four (4) mounting holes for suspension mounting of heaters from ceiling with hangers, or rigid angle brackets. The junction box/control compartment is located on the top housing for overhead wiring.

### *Optional Features*

**Diffusers —** Radial, Cone, Louver and Anemostat diffusers are available to direct heat coverage.

**Fan Only Relay**

### *Advantages*

- Clean and Reliable
- Easy Maintenance
- Built-in Controls
- Attractive Appearance

# VUH
## Vertical Delivery Blower Heater *(cont'd.)*

### *Construction*

**Cabinet —** Heavy 18 gauge steel, phosphate undercoated for corrosion resistance.

**Finish —** An almond powder coat provides a good, clean appearance complementary to modern structures.

**Metal Sheath Fintube® Heating Elements —** The electric heat bank - Chromalox patented metal sheath Fintube® heating elements. They are shock proof! Heat radiation fins are corrosion-resistant copper-clad steel, furnace brazed to the tubular heating elements to assure superior heat transfer. They don't come loose! Wide spacing prevents clogging. Air is evenly drawn across the circumferential elements preventing hot spots and prolonging element life.

**Fan Motor** stays cool. A baffle isolates it from the heat radiation of the heating elements. VUH motors run smoothly with low vibration and noise. They're mounted with vibration isolators. Thermal overload protection includes automatic reset. (These totally enclosed units operate on the same line power as the heating bank. Connect direct to the power contactor... no need for separate internal or external motor control components.)

**Dynamically Balanced Fan** for smooth, quiet operation. Blade pitch is carefully selected so that the volume of air moved results in the optimum discharge air temperature.

### *Specifications and Ordering Information*

| Electrical (60 Hz) | | | | Motor | | | | Air Delivery | | | Mtg. Height (Ft.) | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Ckt & Phase | Amps | Volts | Phase | HP | RPM | CFM | FPM | Outlet Temp. (°F) | | Model | Stock | PCN | Wt. (Lbs.) |
| 5 | 208 | 1 - 1/3 | 24/14 | 208 | 1 | 1/25 | 1,550 | 450 | 730 | 102 | 10 | **VUH-05-83** | **S** | **300548** | 48 |
| 5 | 240 | 1 - 1/3 | 21/12 | 240 | 1 | 1/25 | 1,550 | 450 | 730 | 102 | 10 | VUH-05-23 | NS | 300556 | 48 |
| 5 | 277 | 1 - 1 | 18 | 277 | 1 | 1/25 | 1,550 | 450 | 730 | 102 | 10 | **VUH-05-71** | **S** | **300564** | 48 |
| 5 | 480 | 1 - 3 | 6 | 480 | 1 | 1/25 | 1,550 | 450 | 730 | 102 | 10 | VUH-05-43 | NS | 300572 | 48 |
| 7.5 | 208 | 1 - 1/3 | 36/21 | 208 | 1 | 1/25 | 1,550 | 550 | 880 | 102 | 12 | **VUH-07-83** | **S** | **300580** | 48 |
| 7.5 | 240 | 1 - 1/3 | 32/18 | 240 | 1 | 1/25 | 1,550 | 550 | 880 | 102 | 12 | VUH-07-23 | NS | 300599 | 48 |
| 7.5 | 277 | 1 - 1 | 27 | 277 | 1 | 1/25 | 1,550 | 550 | 880 | 102 | 12 | VUH-07-71 | NS | 300601 | 48 |
| 7.5 | 480 | 1 - 3 | 9 | 480 | 1 | 1/25 | 1,550 | 550 | 880 | 102 | 12 | VUH-07-43 | NS | 300610 | 48 |
| 9.8 | 208 | 1 - 1/3 | 42/27 | 208 | 1 | 1/25 | 1,550 | 712 | 1,160 | 104 | 14 | **VUH-10-83** | **S** | **300628** | 48 |
| 10 | 240 | 1 - 1/3 | 42/24 | 240 | 1 | 1/25 | 1,550 | 712 | 1,160 | 104 | 14 | VUH-10-23 | NS | 300636 | 48 |
| 10 | 277 | 1 - 1 | 36 | 277 | 1 | 1/25 | 1,550 | 712 | 1,160 | 104 | 14 | VUH-10-71 | NS | 300644 | 48 |
| 10 | 480 | 1 - 3 | 12 | 480 | 1 | 1/25 | 1,550 | 712 | 1,160 | 104 | 14 | **VUH-10-43** | **S** | **300652** | 48 |
| 15 | 208 | 1 - 3 | 42 | 208 | 3 | 1/6 | 1,725 | 1,300 | 1,600 | 93 | 25 | **VUH-15-83** | **S** | **300660** | 85 |
| 15 | 240 | 1 - 3 | 36 | 240 | 3 | 1/6 | 1,725 | 1,300 | 1,600 | 93 | 25 | **VUH-15-23** | **S** | **300679** | 85 |
| 15 | 480 | 1 - 3 | 18 | 480 | 3 | 1/6 | 1,725 | 1,300 | 1,600 | 93 | 25 | **VUH-15-43** | **S** | **300687** | 85 |
| 19.5 | 240 | 1 - 3 | 47 | 240 | 3 | 1/6 | 1,725 | 1,300 | 1,600 | 104 | 23 | **VUH-20-23** | **S** | **300695** | 85 |
| 20 | 480 | 1 - 3 | 24 | 480 | 3 | 1/6 | 1,725 | 1,300 | 1,600 | 104 | 23 | **VUH-20-43** | **S** | **300708** | 85 |
| 25 | 480 | 1 - 3 | 30 | 480 | 3 | 1/6 | 1,725 | 1,300 | 1,600 | 115 | 20 | **VUH-25-43** | **S** | **300716** | 85 |
| 30 | 208 | 2 - 3 | 83 | 208 | 3 | 1/3 | 1,140 | 2,500 | 1,200 | 96 | 33 | VUH-30-83 | NS | 300724 | 250 |
| 30 | 240 | 2 - 3 | 72 | 240 | 3 | 1/3 | 1,140 | 2,500 | 1,200 | 96 | 33 | VUH-30-23 | NS | 300732 | 250 |
| 30 | 480 | 2 - 3 | 36 | 480 | 3 | 1/3 | 1,140 | 2,500 | 1,200 | 96 | 33 | **VUH-30-43** | **S** | **300740** | 250 |
| 38.5 | 240 | 2 - 3 | 93 | 240 | 3 | 1/3 | 1,140 | 2,500 | 1,200 | 108 | 30 | VUH-40-23 | NS | 301110 | 250 |
| 39 | 480 | 2 - 3 | 47 | 480 | 3 | 1/3 | 1,140 | 2,500 | 1,200 | 108 | 30 | **VUH-40-43** | **S** | **300759** | 250 |
| 50 | 480 | 2 - 3 | 60 | 480 | 3 | 1/3 | 1,140 | 2,500 | 1,200 | 120 | 27 | **VUH-50-43** | **S** | **300767** | 250 |

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

**Notes —**

A. VUH-05, 07 and 10 models 208 and 240V are factory wired for 3 phase operation and field convertible for 1 phase operation. Line and Amp ratings include motor Amps.

B. All stock 208 and 240V models have built-in contactors with 208/240V holding coils. All stock 277 and 480V models have built-in control transformer and contactors with 120V holding coil.

C. Fan only option is available for external control. Motor voltage is isolated through a motor relay which must be purchased separately. Control is pilot-duty 120V circuits. Optional heat recovery thermostat for economical recovery of stratified air may be used in conjunction with the fan only option by means of an ARR-219 thermostat. Thermostat to be mounted externally on the VUH junction box with capillary extended away from the heater to sense true ceiling air temperature.

D. All heaters are also available on special order with 24 or 120V relay holding coils with a built-in transformer. All models are also available with 24 or 120V relay holding coils for wiring to a separate 24 or 120V control circuit.

E. VUH-30, 40 and 50 models are equipped as standard with two integral relays. These heaters are shipped as standard for two-stage control but relay holding coil terminals may be jumpered in the field for single-stage control, if desired.

F. All fan motors are totally enclosed with thermal overload protection. 1/25 and 1/6 HP motors are all angle sleeve bearing type. 1/3 HP motors are ball bearing type.

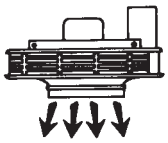
G. Outlet temperature is based on 60°F entering air.

# VUH Vertical Delivery Blower Heater *(cont'd.)*

## *Diffuser Selection & Heat Coverage*

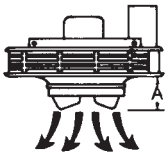
### Without Diffuser

VUH heaters are used without a diffuser where a straight downflow air pattern is required. However, any diffuser can be added to the basic heater.



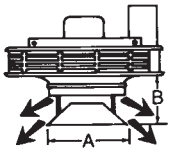
### Radial

VUR increases floor coverage. Has adjustable fins which, when turned to a vertical position, direct air downward in a pattern tighter than that of a heater without a diffuser. The heater can be mounted 15 to 20% higher than a heater with no diffuser, and will still maintain the same coverage at floor level. Conversely, when the fins are tilted to a 45° angle, floor coverage of warmed air is up to 25% greater (than no diffuser) at relatively low mounting heights.



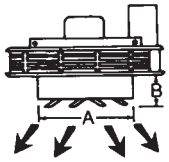

### Cone

VUC permits low mounting of the heater. Throws air outward over large area rather than downward. Cone can be lowered or raised to change the air flow pattern.



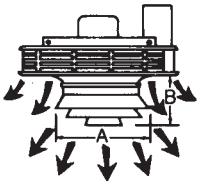

### Louver

VUL permits directional (straight line) air flow such as in air curtain applications over doorways. Gives rectangular coverage. Louvers can be turned in either direction.




### Anemostat

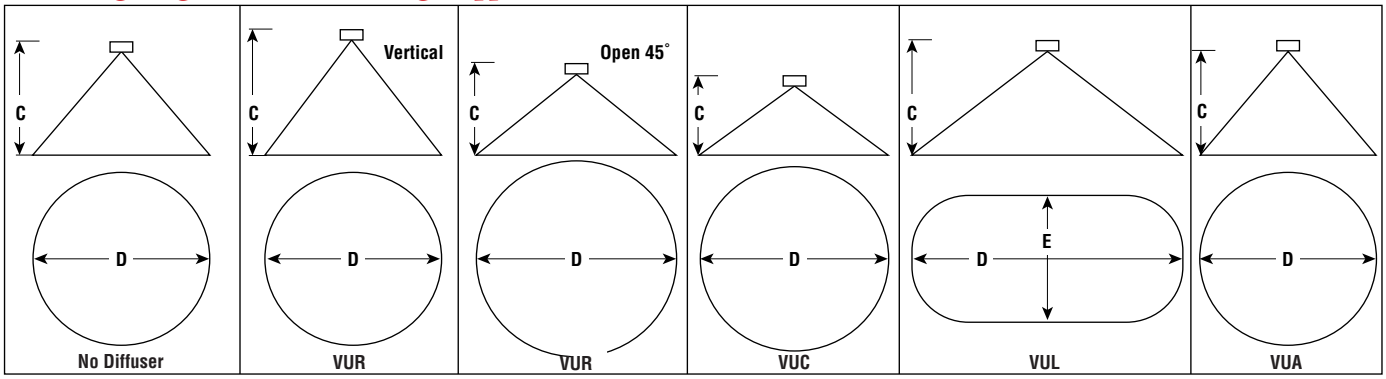
VUA "comfort" diffuser gives draft-free air movement at low mounting heights. Floor coverage is same as heaters with no diffusers.




## *Diffuser — Specifications*

| Heater | Radial | | | Cone | | | | Louver | | | | Anemostat | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Model | A | Wt. (Lbs.) | Model | A | B | Wt. (Lbs.) | Model | A | B | Wt. (Lbs.) | Model | A | B | Wt. (Lbs.) |
| VUH-05 to -10 | VUR-ES | 5 | 4 | – | – | – | – | – | – | – | – | VUA-ES | 17 | 5-7/8 | 4 |
| VUH-05 to -15 | – | – | – | VUC-S | 16 | 13-1/4 | 3 | VUL-S | 16-1/8 sq | 7-1/4 | 9 | – | – | – | – |
| VUH-15 | VUR-S | 6-5/8 | 4 | – | – | – | – | – | – | – | – | VUA-S | 17-1/8 | 11-1/4 | 4 |
| VUH-20 to -25 | VUR-S | 6-5/8 | 4 | VUC-S | 16 | 13-1/4 | 3 | VUL-S | 16-1/8 sq | 7-1/4 | 9 | VUA-S | 19-1/4 | 11-1/4 | 4 |
| VUH-30 to -50 | VUR-L | 9-1/2 | 8 | VUC-L | 22-1/2 | 16-7/8 | 7 | VUL-L | 22-1/8 sq | 7-1/4 | 14 | VUA-L | 30-1/2 | 15-1/2 | 11 |

## *Mounting Heights & Floor Coverage (Approximate Dimensions in Feet)*




| Heater | Dimensions (Ft.) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No Diffuser | | VUR | | VUR Open 45° | | VUC | | VUL | | | VUA | |
| | C | D | C | D | C | D | C | D | C | D | E | C | D |
| VUH-05 | 10 | 26 | 12 | 26 | 11 | 32 | 10 | 30 | 10 | 40 | 18 | 10 | 26 |
| VUH-07 | 12 | 30 | 14 | 30 | 12.5 | 36 | 12 | 35 | 12 | 46 | 21 | 12 | 30 |
| VUH-10 | 14 | 39 | 17 | 39 | 16 | 46 | 14 | 44 | 14 | 59 | 27 | 14 | 39 |
| VUH-15 | 25 | 41 | 29 | 41 | 20 | 47 | 18 | 44 | 25 | 61 | 28 | 25 | 40 |
| VUH-20 | 23 | 43 | 26.5 | 43 | 19 | 48 | 17 | 46 | 23 | 64 | 29 | 23 | 43 |
| VUH-25 | 20 | 45 | 23 | 45 | 17 | 49 | 15 | 48 | 20 | 66 | 30 | 20 | 45 |
| VUH-30 | 33 | 64 | 38 | 64 | 23 | 73 | 29 | 70 | 33 | 94 | 43 | 33 | 67 |
| VUH-40 | 30 | 66 | 35 | 66 | 23 | 73 | 20 | 70 | 30 | 96 | 44 | 30 | 69 |
| VUH-50 | 27 | 69 | 31 | 69 | 21 | 73 | 19 | 72 | 27 | 99 | 45 | 27 | 70 |

**Notes —** A. Mounting height and floor coverage data is approximate and depends upon the heater location and its surroundings, such as obstructions, drafts etc.
B. Specific location and mounting height will vary with the installation.

# VUH

## Vertical Delivery Blower Heater *(cont'd.)*

### *Diffuser Accessories — Specifications and Ordering Information*

| Model | Description | kW | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|
| **VUR-ES** | **Radial Diffuser** | **5-10** | **S** | **300775** | 2 |
| VUR-S | Radial Diffuser | 15-25 | AS | 300783 | 2 |
| VUR-L | Radial Diffuser | 30-50 | AS | 300791 | 2 |
| **VUC-S** | **Cone Diffuser** | **5-25** | **S** | **300804** | 2 |
| VUC-L | Cone Diffuser | 30-50 | NS | 300812 | 2 |
| **VUL-S** | **Louver Diffuser** | **5-25** | **S** | **300820** | 2 |
| VUL-L | Louver Diffuser | 30-50 | AS | 300839 | 2 |
| VUA-ES | Anemostat Diffuser | 5-10 | NS | 300847 | 2 |
| VUA-S | Anemostat Diffuser | 15-25 | NS | 300855 | 2 |
| VUA-L | Anemostat Diffuser | 30-50 | NS | 300863 | 2 |

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

### Model Numbers

**Vertical Unit Heater**

**Heating Elements**

| | | | |
|---|---|---|---|
| **02** | 2.6 kW | **20** | 20.0 kW |
| **04** | 4.0 k W | **25** | 25.0 kW |
| **05** | 5.0 kW | **30** | 30.0 kW |
| **07** | 7.5 kW | **35** | 35.0 kW |
| **10** | 10.0 kW | **40** | 40.0 kW |
| **12** | 12.5 kW | **45** | 45.0 kW |
| **15** | 15.0 kW | | |

**Heater Voltage and Phase**

| | | | |
|---|---|---|---|
| **81** | 208V, 1 Phase | **71** | 277V, 1 Phase |
| **83** | 208V, 3 Phase | **43** | 480V, 3 Phase |
| **21** | 240V, 1 Phase | **63** | 600V, 3 Phase |
| **23** | 240V, 3 Phase | | |

**Control**

| | |
|---|---|
| **00** | No Contactor(s) |
| **30** | 24V Control Internal Transformer |
| **31** | 24V Control Externally Supplied |
| **32** | 120V Control Internal Transformer |
| **33** | 120V Control Externally Supplied |
| **34** | 208/240V Control Internally Supplied, No Transformer |
| **35** | 277V Control Internally Supplied (Available only on 277 V Heaters) |

**Fan Relay**

| | |
|---|---|
| **00** | No Fan Relay |
| **45** | Fan Relay Provided |

| | | | | | |
|---|---|---|---|---|---|
| **VUH** | **05** | **21** | **34** | **00** | **Typical Model Number** |

# HD3D

## Hose Down Corrosion Resistant Blower Heater

- **2 - 39 kW**
- **6,800 - 133,110 Btuh**
- **120, 208, 240, 277, 480 and 575 Volt**
- **1 & 3 Phase**
- **Built-in Controls**
- **Vertical or Horizontal Airflow**
- **Wall or Ceiling Mounted Configurations**


### *Advantages*

Because it has an adjustable discharge grille to direct air flow, and can be wall or ceiling (plus swivel) mounted, the HD3D heater may be used in a variety of heating applications:

- Primary Heating
- Supplementary Heating
- Dual System Heating
- Spot Heating
- Entryway Air-Curtain Heating
- Freeze Protection

### *Description*

This reliable, rugged, self-contained HD3D heater is an ideal heat source for freeze protection or comfort heat in dusty/dirty/corrosive non-hazardous environments. Standard HD3D heaters include low profile stainless steel wall/ceiling mounting brackets that can be used to mount directly to a wall for horizontal airflow perpendicular to the wall. These brackets can also be used to mount the heater directly to the ceiling for vertical airflow.

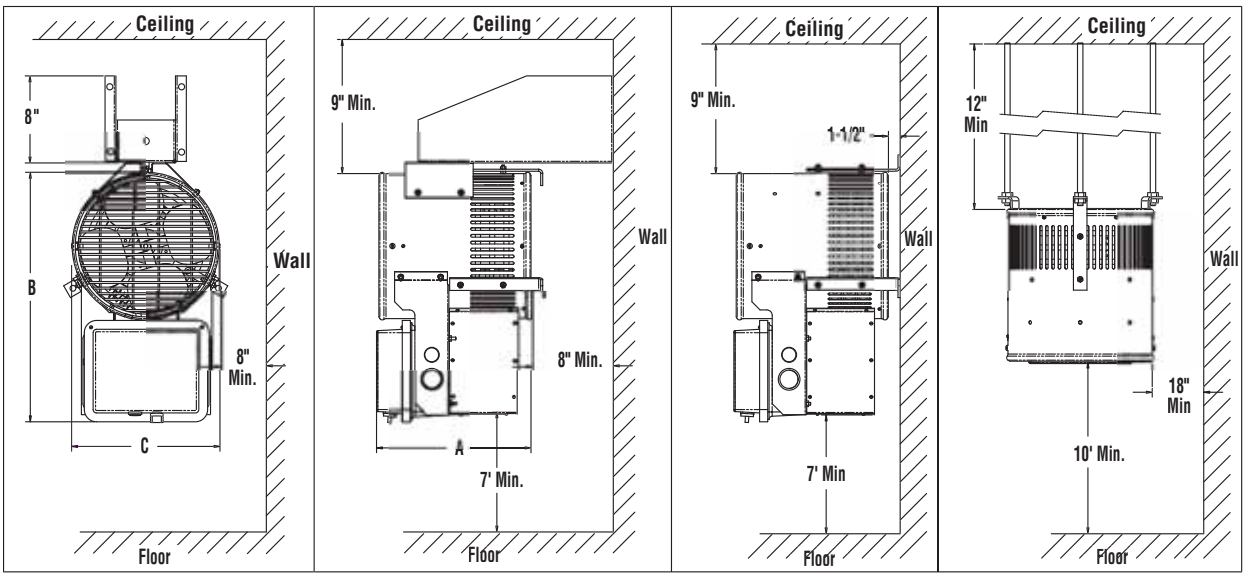
### *Applications*

Waste Water Treatment Plants, Coal Handling Areas, Food Processing Plants, Foundries, Steel Mills, Cement Plants, Ships, Construction Sites, Car Washes, Swimming Pool Areas, Canneries, Hose Down (for cleaning). Corrosion Resistant for Harsh Environments and Dairies.

### *Dimensions (Inches)*

| kW | Volts | Phase | A | B | C |
|---|---|---|---|---|---|
| 2.0 - 7.5 | All | 1, 3 | 13-1/2 | 24-1/2 | 15 |
| 10.0 - 20.0 | All | 1, 3 | 17-1/4 | 28 | 15-1/8 |
| 25.0 - 39.0 | 480, 575 | 3 | 21-1/4 | 32-1/4 | 19-1/2 |

### *Dimensions (Inches)*



# HD3D
## Hose Down Corrosion Resistant Blower Heater *(cont'd.)*

### *Construction*

**Roll Formed Case** is constructed of 20 gauge corrosion resistant type 304 stainless steel.

**Adjustable Discharge Grille** directs air flow up or down as needed.

**NEMA 4X Control Enclosure** houses the heater controls, contactors and control voltage transformer, easily accessible from front of heater.

**Heating Elements** — High quality, long-life, Stainless Steel Fintube® (type 316) offers maximum resistance to corrosion.

**Totally Enclosed Motor** — The motor is permanently lubricated, ball bearing type and is epoxy painted for moisture and corrosion resistance.

**Dynamically Balanced Fan** — Aluminum fan is epoxy coated and provides optimum air flow across the heating elements.

### *Features*

**Transformer** provides a 120V control circuit (24V optional). Standard on all units except 2 kW and 3 kW, 120V.

**Heavy Duty Contactors** for heating circuit and motor are included. (Not furnished on 120V, 2 and 3 kW units)

**Automatic Reset Thermal Cutout** is provided for fast heat response and overheat protection.

**Fan Time Delay Relay** dissipates residual heat build-up after shutdown.

**Low Profile Fixed Wall & Ceiling Mounting Bracket** (Non Swiveling)

### *Optional Features*

- Integral Thermostat*
  - 40˚F to 90˚F (This Thermostat Range Supplied Unless Otherwise Specified)
  - 55°F to 105°F
- Pilot Light*
  - Green Indicates Power On
- Selector Switch (3 position) — Heater On,* Off or Fan Only Operation for Heater
- Manual Reset Cutout
- Epoxy Painted Stainless Steel Case
- 24V Control Circuit

### *Accessories*

#### *Universal Swivel Wall & Ceiling Brackets Ordering Information*

| Model | PCN | Used With | Stock Status |
|---|---|---|---|
| USB-1 | **520604** | HD3D 200 to 750 | **S** |
| USB-2 | **520612** | HD3D 1000 to 2000 | **S** |
| USB-3 | **520620** | HD3D 2500 to 4000 | **S** |

#### *External Drip Sheilds Ordering Information*

| Model | PCN | Used With | Stock Status |
|---|---|---|---|
| HD3DS-1 | **520639** | HD3D 200 to 750 | **S** |
| HD3DS-2 | **520647** | HD3D 1000 to 2000 | **S** |
| HD3DS-3 | **520655** | HD3D 2500 to 4000 | **S** |

#### *Field Installable Disconnect Kit*

The disconnect kit consists of a complete liquid tight assembly, including a 3-pole 48 Amp Switch, power terminal block and all the hardware to mount to the main heater enclosure. Positive action to remove all power from enclosure.

#### *Ordering Information*

| Model | PCN | Used With | Stock Status |
|---|---|---|---|
| DS-50HD | **520663** | All | **S** |

# HD3D

## Hose Down Corrosion Resistant Blower Heater *(cont'd.)*

### *Specifications and Ordering Information*

| Electrical (60 Hz) | | | | Motor | | | | | Air Delivery | | | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | Amps | Volts | Phase | HP | RPM | CFM | FPM | Temp. Rise (°F) | Horiz. Throw (Ft.) | Mtg. Height** (Ft.) | Model | Stock | PCN | Wt. (Lbs.) |
| 2 | 120 | 1 | 16.7 | 115 | 1 | 1/15 | 1,050 | 405 | 430 | 21 | 12 | 7 | HD3D-200 | NS | 520014 | 45 |
| 2 | 208 | 1 | 9.6 | 208 | 1 | 1/15 | 1,050 | 405 | 430 | 21 | 12 | 7 | HD3D-200 | NS | 520022 | 45 |
| 2 | 240 | 1 | 8.3 | 240 | 1 | 1/15 | 1,050 | 405 | 430 | 21 | 12 | 7 | HD3D-200 | NS | 520030 | 45 |
| 2 | 277 | 1 | 7.2 | 277 | 1 | 1/15 | 1,050 | 405 | 430 | 21 | 12 | 7 | HD3D-200 | NS | 520049 | 45 |
| 3 | 120 | 1 | 25.0 | 115 | 1 | 1/15 | 1,050 | 405 | 430 | 31 | 12 | 7 | HD3D-300 | NS | 520057 | 45 |
| 3 | 208 | 1 | 14.4 | 208 | 1 | 1/15 | 1,050 | 405 | 430 | 31 | 12 | 7 | HD3D-300 | NS | 520065 | 45 |
| 3 | 240 | 1 | 12.5 | 240 | 1 | 1/15 | 1,050 | 405 | 430 | 31 | 12 | 7 | HD3D-300 | NS | 520073 | 45 |
| 3 | 277 | 1 | 10.8 | 277 | 1 | 1/15 | 1,050 | 405 | 430 | 31 | 12 | 7 | HD3D-300 | NS | 520081 | 45 |
| 5 | 208 | 1 | 24.0 | 208 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12 | 7 | HD3D-500 | NS | 520090 | 50 |
| 5 | 240 | 1 | 20.8 | 240 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12 | 7 | HD3D-500 | NS | 520102 | 50 |
| 5 | 277 | 1 | 18.1 | 277 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12 | 7 | HD3D-500 | NS | 520110 | 50 |
| 5 | 480 | 1 | 10.4 | 480 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12 | 7 | HD3D-500 | NS | 520129 | 50 |
| 5 | 208 | 3 | 13.9 | 208 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12 | 7 | HD3D-500 | NS | 520137 | 50 |
| 5 | 240 | 3 | 12.0 | 240 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12 | 7 | HD3D-500 | NS | 520145 | 50 |
| 5 | 480 | 3 | 6.0 | 480 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12 | 7 | **HD3D-500†** | **S** | **520153** | 50 |
| 5 | 480 | 3 | 6.0 | 480 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12 | 7 | **HD3D-500 TSP*†** | **S** | **520161** | 51 |
| 5 | 575 | 3 | 5.0 | 575 | 1 | 1/15 | 1,050 | 405 | 430 | 40 | 12 | 7 | HD3D-500 | NS | 520170 | 50 |
| 7.5 | 208 | 1 | 36.1 | 208 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 7 | HD3D-750 | NS | 520188 | 50 |
| 7.5 | 240 | 1 | 31.3 | 240 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 7 | HD3D-750 | NS | 520196 | 50 |
| 7.5 | 277 | 1 | 27.1 | 277 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 7 | HD3D-750 | NS | 520209 | 50 |
| 7.5 | 480 | 1 | 15.6 | 480 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 7 | HD3D-750 | NS | 520217 | 50 |
| 7.5 | 208 | 3 | 20.8 | 208 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 7 | HD3D-750 | NS | 520225 | 50 |
| 7.5 | 240 | 3 | 18.1 | 240 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 7 | HD3D-750 | NS | 520233 | 50 |
| 7.5 | 480 | 3 | 9.0 | 480 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 7 | **HD3D-750†** | **S** | **520241** | 50 |
| 7.5 | 480 | 3 | 9.0 | 480 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 7 | **HD3D-750 TSP*†** | **S** | **520250** | 51 |
| 7.5 | 575 | 3 | 7.5 | 575 | 1 | 1/15 | 1,050 | 590 | 640 | 37 | 13 | 7 | HD3D-750 | NS | 520268 | 50 |
| 10 | 240 | 1 | 41.7 | 240 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 7 | HD3D-1000 | NS | 520276 | 60 |
| 10 | 277 | 1 | 36.1 | 277 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 7 | HD3D-1000 | NS | 520284 | 60 |
| 10 | 480 | 1 | 20.8 | 480 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 7 | HD3D-1000 | NS | 520292 | 60 |
| 10 | 208 | 3 | 27.8 | 208 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 7 | HD3D-1000 | NS | 520305 | 60 |
| 10 | 240 | 3 | 24.1 | 240 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 7 | HD3D-1000 | NS | 520313 | 60 |
| 10 | 480 | 3 | 12.0 | 480 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 7 | **HD3D-1000†** | **S** | **520321** | 60 |
| 10 | 480 | 3 | 12.0 | 480 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 7 | **HD3D-1000 TSP*†** | **S** | **520330** | 61 |
| 10 | 575 | 3 | 10.1 | 575 | 1 | 1/15 | 1,050 | 1,180 | 800 | 28 | 40 | 7 | HD3D-1000 | NS | 520348 | 60 |
| 12.5 | 277 | 1 | 45.1 | 277 | 1 | 1/15 | 1,050 | 1,180 | 800 | 36 | 40 | 7 | HD3D-1250 | NS | 520356 | 60 |
| 12.5 | 480 | 1 | 26.0 | 480 | 1 | 1/15 | 1,050 | 1,180 | 800 | 36 | 40 | 7 | HD3D-1250 | NS | 520364 | 60 |
| 12.5 | 208 | 3 | 34.7 | 208 | 1 | 1/15 | 1,050 | 1,180 | 800 | 36 | 40 | 7 | HD3D-1250 | NS | 520372 | 60 |
| 12.5 | 240 | 3 | 30.1 | 240 | 1 | 1/15 | 1,050 | 1,180 | 800 | 36 | 40 | 7 | HD3D-1250 | NS | 520380 | 60 |
| 12.5 | 480 | 3 | 15.1 | 480 | 1 | 1/15 | 1,050 | 1,180 | 800 | 36 | 40 | 7 | HD3D-1250 | NS | 520399 | 60 |
| 12.5 | 575 | 3 | 12.6 | 575 | 1 | 1/15 | 1,050 | 1,180 | 800 | 36 | 40 | 7 | HD3D-1250 | NS | 520401 | 60 |
| 15 | 480 | 1 | 31.3 | 480 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 7 | HD3D-1500 | NS | 520410 | 60 |
| 15 | 208 | 3 | 41.7 | 208 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 7 | HD3D-1500 | NS | 520428 | 60 |
| 15 | 240 | 3 | 36.1 | 240 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 7 | HD3D-1500 | NS | 520436 | 60 |
| 15 | 480 | 3 | 18.1 | 480 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 7 | **HD3D-1500†** | **S** | **520444** | 60 |
| 15 | 480 | 3 | 18.1 | 480 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 7 | **HD3D-1500 TSP*†** | **S** | **520452** | 61 |
| 15 | 575 | 3 | 15.1 | 575 | 1 | 1/15 | 1,050 | 1,330 | 900 | 32 | 45 | 7 | HD3D-1500 | NS | 520460 | 60 |
| 19.5 | 240 | 3 | 47.0 | 240 | 1 | 1/15 | 1,050 | 1,330 | 900 | 42 | 45 | 7 | HD3D-2000 | NS | 520479 | 60 |
| 20 | 480 | 1 | 41.7 | 480 | 1 | 1/15 | 1,050 | 1,330 | 900 | 42 | 45 | 7 | HD3D-2000 | NS | 520487 | 60 |
| 20 | 480 | 3 | 24.1 | 480 | 1 | 1/15 | 1,050 | 1,330 | 900 | 42 | 45 | 7 | **HD3D-2000†** | **S** | **520495** | 60 |
| 20 | 480 | 3 | 24.1 | 480 | 1 | 1/15 | 1,050 | 1,330 | 900 | 42 | 45 | 7 | **HD3D-2000 TSP*†** | **S** | **520508** | 61 |
| 20 | 575 | 3 | 20.1 | 575 | 1 | 1/15 | 1,050 | 1,330 | 900 | 42 | 45 | 7 | HD3D-2000 | NS | 520516 | 60 |
| 25 | 480 | 3 | 30.1 | 480 | 3 | 1/3 | 1,725 | 2,700 | 1110 | 31 | 48 | 7 | **HD3D-2500** | **S** | **520524** | 80 |
| 25 | 575 | 3 | 25.1 | 575 | 3 | 1/3 | 1,550 | 1,800 | 740 | 42 | 48 | 7 | HD3D-2500 | NS | 520532 | 80 |
| 30 | 480 | 3 | 36.1 | 480 | 3 | 1/3 | 1,725 | 2,700 | 1110 | 37 | 48 | 7 | **HD3D-3000** | **S** | **520540** | 80 |
| 30 | 575 | 3 | 30.2 | 575 | 3 | 1/3 | 1,550 | 1,800 | 740 | 50 | 48 | 7 | HD3D-3000 | NS | 520559 | 80 |
| 35 | 480 | 3 | 42.1 | 480 | 3 | 1/3 | 1,725 | 2,700 | 1110 | 43 | 48 | 7 | HD3D-3500 | NS | 520567 | 80 |
| 35 | 575 | 3 | 35.2 | 575 | 3 | 1/3 | 1,550 | 1,800 | 740 | 57 | 48 | 7 | HD3D-3500 | NS | 520575 | 80 |
| 39 | 480 | 3 | 47.0 | 480 | 3 | 1/3 | 1,725 | 2,700 | 1110 | 50 | 48 | 7 | **HD3D-4000** | **S** | **520583** | 80 |
| 39 | 575 | 3 | 39.2 | 575 | 3 | 1/3 | 1,550 | 1,800 | 740 | 65 | 48 | 7 | HD3D-4000 | NS | 520591 | 80 |

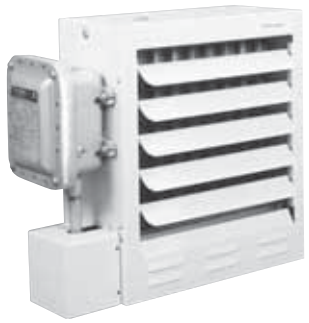
**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, PCN, kW, volts, phase and quantity.

***HD3D Series heaters with TSP suffix includes thermostat, selector switch and pilot light.**
**†Models can be field re-wired for use on single phase**
****Mounting height if mounted for horizontal airflow. For vertical mounting, minimum height is 10'.**

# CXH-A

## Explosion Proof Blower Heater for Hazardous Locations

- **3 - 35 kW**
- **10,200 - 119,420 Btuh**
- **208 to 600 Volts**
- **1 or 3 Phase**
- **Meets NEC, OSHA and UL Requirements**
- **CE Approved Models Available**



### *Description*

Type CXH-A is designed to heat areas classified as hazardous locations to provide primary or supplementary heating for comfort or freeze protection.

### *Applications*

- Sewage Treatment Plants
- Petrochemical Facilities, Oil Rigs
- Unattended Pumping Stations
- Chemical Storage and Handling Facilities
- Paint Storage Areas
- Grain Elevators
- Coal Preparation Plants
- Aircraft Servicing Areas
- Oil Refineries
- Areas Containing Metal Dusts

### *Construction*

**Cabinet —** 14 gauge steel construction with polyester powder coat paint finish.

**Adjustable Louvers —** Control the direction of airflow as needed.

**Rugged, Seamless, Copper Heating Elements —** are immersed in the sealed liquid-to-air heat exchanger.

**Factory Sealed Heat Exchanger —** Features steel tubes with integral aluminum fins and filled with glycol-water heat transfer fluid.

**Safety Pressure Relief Device** on the heat exchanger is factory helium leak tested to assure a leak-proof design.

**Explosion Proof Ball Bearing Motor —** Permanently lubricated and equipped with built-in thermal overload protection.

**Epoxy Coated Aluminum Fan —** Prevents sparking.

### *Features*

**Pre-Wired Explosion Proof Control Center** with magnetic contactor and control circuit transformer.

**Quick-Acting Auto Reset Cutout**

**Pole, Wall and Ceiling Mounting Kits —** Optional. Recessed threaded fasteners on top of heater for mounting with threaded rods.

**Warranty —** Limited Three Year

### *Optional Features*

- Built-in Thermostat 50°F to 90°F
- Built-in Manual Disconnect Switch
- Pilot Light
- Fan Selector Switch

### *Designed for Areas Classified*

Low operating temperature for atmospheres having an ignition temperature higher than 165˚C (329˚F) code T3B.

- Class I, Group C, D - Divisions 1 & 2
- Class II, Groups E, F, G - Divisions 1 & 2

### *Optional Classifications*

- Temperature Code T3C 160°C (320°F)
  Class I, Groups C, D - Divisions 1 & 2
  Class II, Groups F, G - Divisions 1 & 2
  Ex II2G Ex d IIB T3
- Arctic Duty Construction

### *Advantages*

- Easy Installation
- Safe, Propylene Glycol Heat Transfer Fluid
- Low Surface Temperature
- Wall, Pole or Ceiling Mounting
- Built-in Controls
- Virtually Maintenance Free
- Corrosion Resistant
- 120V Control (24V optional)
- Rugged and Versatile

*Refer to WR-80EP in the Controls section.*

# CXH-A

## Explosion Proof Blower Heater for Hazardous Locations *(cont'd.)*

### *Mounting Kits*

**Pole (PMB)[1]**

Particularly useful in buildings with insufficient strength to use other types of mounts. Requires 3-1/2" schedule 40 pipe (4" O.D.) - not supplied.

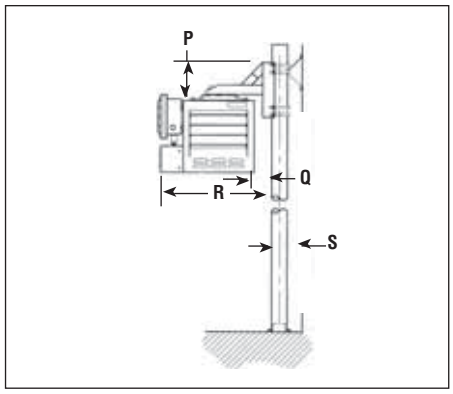
**Wall (WMB)[1]**

Ideal for use in buildings that have substantial walls. Arm only can also be bolted directly to structural steel.

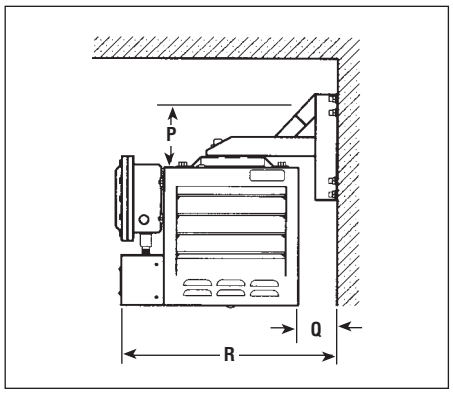
**Ceiling (HMK)**

Simple and economical if adequate overhead structure exists. Requires 5/8" rod, cut and threaded (not supplied).

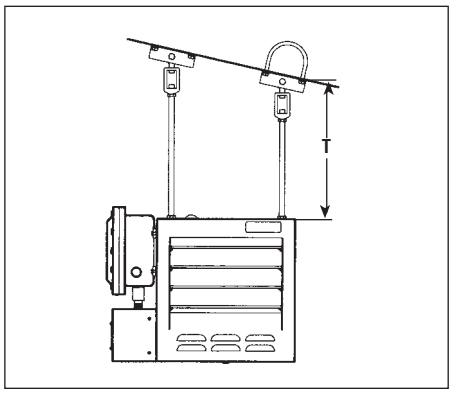
*Pole Mounting Bracket*




*Wall Mounting Bracket*



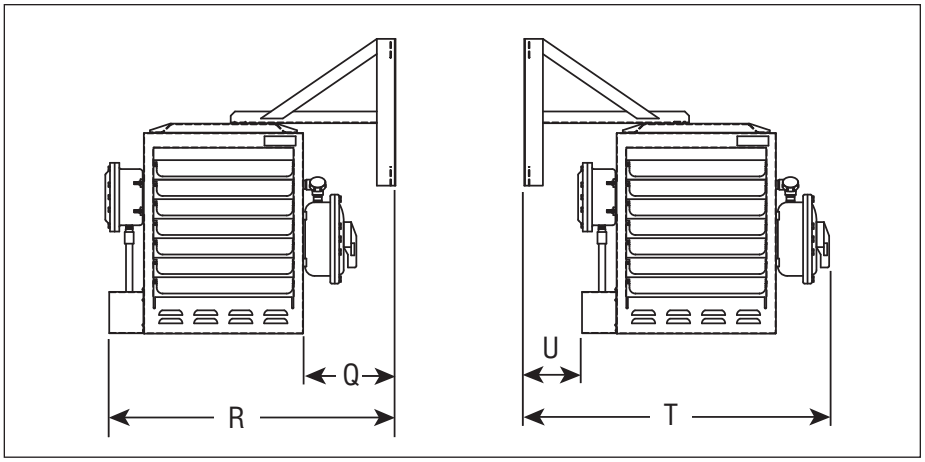

*Ceiling Mounting Bracket*




### *Mounting Kits*

| Heater | Pole | | Wall | | Ceiling | | Dimensions (In.) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Model | PCN | Model | PCN | Model | PCN | P | Q | R | S | T (Min.) |
| CXH-A-03 to -10 | PMB-12 | 025179 | WMB-12 | 025152 | HMK-00 | 025195 | 10 | 5-1/2 | 29-1/2 | 6 | 7 |
| CXH-A-15 to -20 | PMB-16 | 025187 | WMB-16 | 025160 | HMK-00 | 025195 | 11-1/2 | 5-1/8 | 33 | 6 | 7 |
| CXH-A-25 to -35 | PMB-20 | 029073 | WMB-20 | 029065 | HMK-00 | 025195 | 14-1/2 | 6-3/8 | 38-1/4 | 6 | 7 |

### *Wall Mounting Kits (for models supplied with disconnect switch)*



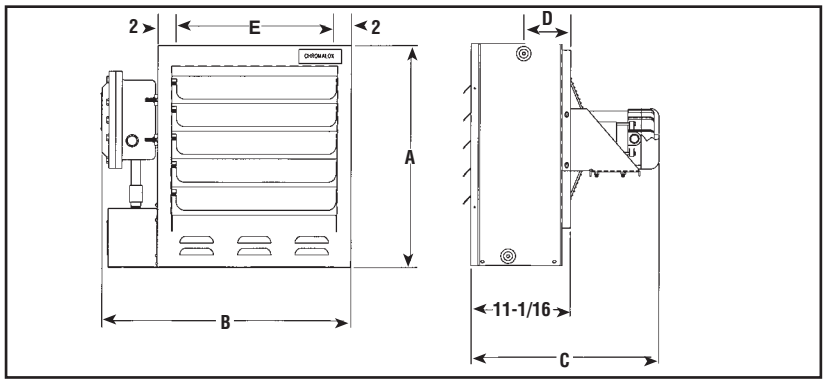

### *Wall Mounting Kits (for models supplied with disconnect switch)*

| Heater | Model | PCN | Dimensions | | | | Wt. Lbs |
|---|---|---|---|---|---|---|---|
| | | | Q | R | T | U | |
| CXH-A-03 to -10 | WMBD-12 | 028880 | 7-7/8 | 31-1/16 | 30-1/8 | 6-15/16 | 26 |
| CHX-A-15 to -20 | WMBD-16 | 028898 | 13-3/4 | 40-15/16 | 35-3/8 | 8-3/16 | 28 |
| CHX-A-25 to -35 | WMDD-20 | 028900 | 14-7/8 | 46-1/16 | 40-1/2 | 9-5/16 | 30 |

# CXH-A

## Explosion Proof Blower Heater for Hazardous Locations *(cont'd.)*

### *Dimensions (Inches)*




### *Dimensions (Inches)*

| Heater | Dimensions (In.) | | | | |
|---|---|---|---|---|---|
| | A | B | C | D | E (Mtg. Holes) |
| CXH-A-03 to -10 | 19-1/8 | 23-7/8 | 21 | 3-1/2 | 13-5/8 |
| CXH-A-15 to -20 | 25 | 27-7/8 | 21 | 4-13/32 | 17-5/8 |
| CXH-A-25 to -35 | 32-1/8 | 31-7/8 | 21-3/4 | 5-1/2 | 21-5/8 |

**Notes —**
A. E dimension mounting hole center to center.
B. Disconnect switch option increases B dimension by 7 inches.

# CXH-A

## Explosion Proof Blower Heater for Hazardous Locations *(cont'd.)*

### *Optional Controls & Disconnects*

**Built-in Adjustable Thermostat**

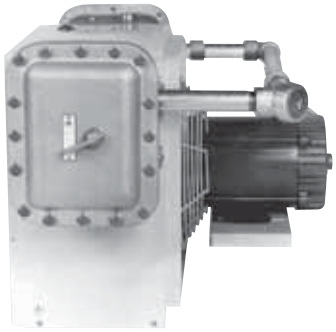
- Temperature range 50°F to 90°F
- Adjustable control knob on exterior of explosion-proof enclosure
- Mounted and wired to heater control center
- Eliminates installation of wall thermostats and associated explosion-proof conduit.
- Factory Installed

**Built-in Disconnect Switch**

- 15, 30 or 60 Amp as required by application
- Factory installed, eliminating field labor
- Meets National Electric Code (NEC)

**Built-in Fan Switch**

- Allows fan only operation for cooling



### *Specifications and Ordering Information*

| Electrical (60 Hz) | | | | | Motor | | | | Air Delivery | | | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | Amps | Control Volts | Phase | HP | RPM | CFM | FPM | Temp. Rise (°F) | Horiz. Throw (Ft.) | Mtg. Height (Ft.) | Model | Stock | PCN | Wt. (Lbs.) |
| **Standard Models** | | | | | | | | | | | | | | | | |
| 3 | 208 | 1 | 16.7 | 120 | 1 | 1/4 | 1,725 | 700 | 900 | 13 | 28 | 8 | CXH-A-03-81-32-00-20EP | NS | 026008 | 135 |
| 3 | 208 | 3 | 9.7 | 120 | 3 | 1/4 | 1,725 | 700 | 900 | 13 | 28 | 8 | CXH-A-03-83-32-00-20EP | NS | 026016 | 135 |
| 3 | 240 | 1 | 14.8 | 120 | 1 | 1/4 | 1,725 | 700 | 900 | 13 | 28 | 8 | CXH-A-03-21-32-00-20EP | AS | 026024 | 135 |
| 3 | 240 | 3 | 8.6 | 120 | 3 | 1/4 | 1,725 | 700 | 900 | 13 | 28 | 8 | CXH-A-03-23-32-00-20EP | NS | 026032 | 135 |
| 3 | 480 | 3 | 4.3 | 120 | 3 | 1/4 | 1,725 | 700 | 900 | 13 | 28 | 8 | **CXH-A-03-43-32-00-20EP** | **S** | **026040** | 135 |
| 3 | 575 | 3 | 3.6 | 120 | 3 | 1/4 | 1,725 | 700 | 900 | 13 | 28 | 8 | CXH-A-03-63-32-00-20EP | NS | 026059 | 135 |
| 3 | 208 | 1 | 16.7 | 24 | 1 | 1/4 | 1,725 | 700 | 900 | 13 | 28 | 8 | CXH-A-03-81-30-00-20EP | NS | 026067 | 135 |
| 3 | 208 | 3 | 9.7 | 24 | 3 | 1/4 | 1,725 | 700 | 900 | 13 | 28 | 8 | CXH-A-03-83-30-00-20EP | NS | 026075 | 135 |
| 3 | 240 | 1 | 14.8 | 24 | 1 | 1/4 | 1,725 | 700 | 900 | 13 | 28 | 8 | CXH-A-03-21-30-00-20EP | NS | 026083 | 135 |
| 3 | 240 | 3 | 8.6 | 24 | 3 | 1/4 | 1,725 | 700 | 900 | 13 | 28 | 8 | CXH-A-03-23-30-00-20EP | NS | 026091 | 135 |
| 3 | 480 | 3 | 4.3 | 24 | 3 | 1/4 | 1,725 | 700 | 900 | 13 | 28 | 8 | CXH-A-03-43-30-00-20EP | NS | 026104 | 135 |
| 3 | 575 | 3 | 3.6 | 24 | 3 | 1/4 | 1,725 | 700 | 900 | 13 | 28 | 8 | CXH-A-03-63-30-00-20EP | NS | 026112 | 135 |
| 5 | 208 | 1 | 26.3 | 120 | 1 | 1/4 | 1,725 | 700 | 900 | 22 | 28 | 8 | CXH-A-05-81-32-00-20EP | NS | 026120 | 135 |
| 5 | 208 | 3 | 15.3 | 120 | 3 | 1/4 | 1,725 | 700 | 900 | 22 | 28 | 8 | **CXH-A-05-83-32-00-20EP** | **S** | **026139** | 135 |
| 5 | 240 | 1 | 23.1 | 120 | 1 | 1/4 | 1,725 | 700 | 900 | 22 | 28 | 8 | CXH-A-05-21-32-00-20EP | NS | 026147 | 135 |
| 5 | 240 | 3 | 13.4 | 120 | 3 | 1/4 | 1,725 | 700 | 900 | 22 | 28 | 8 | **CXH-A-05-23-32-00-20EP** | **S** | **026155** | 135 |
| 5 | 480 | 3 | 6.7 | 120 | 3 | 1/4 | 1,725 | 700 | 900 | 22 | 28 | 8 | **CXH-A-05-43-32-00-20EP** | **S** | **026163** | 135 |
| 5 | 575 | 3 | 5.6 | 120 | 3 | 1/4 | 1,725 | 700 | 900 | 22 | 28 | 8 | CXH-A-05-63-32-00-20EP | NS | 026171 | 135 |
| 5 | 208 | 1 | 26.3 | 24 | 1 | 1/4 | 1,725 | 700 | 900 | 22 | 28 | 8 | CXH-A-05-81-30-00-20EP | NS | 026180 | 135 |
| 5 | 208 | 3 | 15.3 | 24 | 3 | 1/4 | 1,725 | 700 | 900 | 22 | 28 | 8 | CXH-A-05-83-30-00-20EP | NS | 026198 | 135 |
| 5 | 240 | 1 | 23.1 | 24 | 1 | 1/4 | 1,725 | 700 | 900 | 22 | 28 | 8 | CXH-A-05-21-30-00-20EP | NS | 026200 | 135 |
| 5 | 240 | 3 | 13.4 | 24 | 3 | 1/4 | 1,725 | 700 | 900 | 22 | 28 | 8 | CXH-A-05-23-30-00-20EP | NS | 026219 | 135 |
| 5 | 480 | 3 | 6.7 | 24 | 3 | 1/4 | 1,725 | 700 | 900 | 22 | 28 | 8 | CXH-A-05-43-30-00-20EP | NS | 026227 | 135 |
| 5 | 575 | 3 | 5.6 | 24 | 3 | 1/4 | 1,725 | 700 | 900 | 22 | 28 | 8 | CXH-A-05-63-30-00-20EP | NS | 026235 | 135 |
| 7.5 | 208 | 1 | 38.4 | 120 | 1 | 1/4 | 1,725 | 840 | 1,070 | 27 | 32 | 10 | CXH-A-07-81-32-00-20EP | NS | 026243 | 135 |
| 7.5 | 208 | 3 | 22.2 | 120 | 3 | 1/4 | 1,725 | 840 | 1,070 | 27 | 32 | 10 | **CXH-A-07-83-32-00-20EP** | **S** | **026251** | 135 |
| 7.5 | 240 | 1 | 33.6 | 120 | 1 | 1/4 | 1,725 | 840 | 1,070 | 27 | 32 | 10 | CXH-A-07-21-32-00-20EP | NS | 026260 | 135 |
| 7.5 | 240 | 3 | 19.4 | 120 | 3 | 1/4 | 1,725 | 840 | 1,070 | 27 | 32 | 10 | CXH-A-07-23-32-00-20EP | NS | 026278 | 135 |
| 7.5 | 480 | 3 | 9.7 | 120 | 3 | 1/4 | 1,725 | 840 | 1,070 | 27 | 32 | 10 | **CXH-A-07-43-32-00-20EP** | **S** | **026286** | 135 |
| 7.5 | 575 | 3 | 8.1 | 120 | 3 | 1/4 | 1,725 | 840 | 1,070 | 27 | 32 | 10 | CXH-A-07-63-32-00-20EP | NS | 026294 | 135 |
| 7.5 | 208 | 1 | 38.4 | 24 | 1 | 1/4 | 1,725 | 840 | 1,070 | 27 | 32 | 10 | CXH-A-07-81-30-00-20EP | NS | 026307 | 135 |
| 7.5 | 208 | 3 | 22.2 | 24 | 3 | 1/4 | 1,725 | 840 | 1,070 | 27 | 32 | 10 | CXH-A-07-83-30-00-20EP | NS | 026315 | 135 |
| 7.5 | 240 | 1 | 33.6 | 24 | 1 | 1/4 | 1,725 | 840 | 1,070 | 27 | 32 | 10 | CXH-A-07-21-30-00-20EP | NS | 026323 | 135 |
| 7.5 | 240 | 3 | 19.4 | 24 | 3 | 1/4 | 1,725 | 840 | 1,070 | 27 | 32 | 10 | CXH-A-07-23-30-00-20EP | NS | 026331 | 135 |
| 7.5 | 480 | 3 | 9.7 | 24 | 3 | 1/4 | 1,725 | 840 | 1,070 | 27 | 32 | 10 | CXH-A-07-43-30-00-20EP | NS | 026340 | 135 |
| 7.5 | 575 | 3 | 8.1 | 24 | 3 | 1/4 | 1,725 | 840 | 1,070 | 27 | 32 | 10 | CXH-A-07-63-30-00-20EP | NS | 026358 | 135 |

# CXH-A

## Explosion Proof Blower Heater for Hazardous Locations *(cont'd.)*

### *Specifications and Ordering Information*

| Electrical (60 Hz) | | | | | Motor | | | | Air Delivery | | | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | Amps | Con-trol Volts | Phase | HP | RPM | CFM | FPM | Temp. Rise (°F) | Horiz. Throw (Ft.) | Mtg. Height (Ft.) | Model | Stock | PCN | Wt. (Lbs.) |
| 10 | 208 | 3 | 29.2 | 120 | 3 | 1/4 | 1,725 | 840 | 1,070 | 36 | 32 | 10 | CXH-A-10-83-32-00-20EP | NS | 026366 | 140 |
| 10 | 240 | 1 | 44 | 120 | 1 | 1/4 | 1,725 | 840 | 1,070 | 36 | 32 | 10 | CXH-A-10-21-32-00-20EP | NS | 026374 | 140 |
| 10 | 240 | 3 | 25.5 | 120 | 3 | 1/4 | 1,725 | 840 | 1,070 | 36 | 32 | 10 | CXH-A-10-23-32-00-20EP | NS | 026382 | 140 |
| 10 | 480 | 3 | 12.7 | 120 | 3 | 1/4 | 1,725 | 840 | 1,070 | 36 | 32 | 10 | **CXH-A-10-43-32-00-20EP** | **S** | **025101** | 140 |
| 10 | 575 | 3 | 10.6 | 120 | 3 | 1/4 | 1,725 | 840 | 1,070 | 36 | 32 | 10 | CXH-A-10-63-32-00-20EP | NS | 026390 | 140 |
| 10 | 208 | 3 | 29.2 | 24 | 3 | 1/4 | 1,725 | 840 | 1,070 | 36 | 32 | 10 | CXH-A-10-83-30-00-20EP | NS | 026403 | 140 |
| 10 | 240 | 1 | 44 | 24 | 1 | 1/4 | 1,725 | 840 | 1,070 | 36 | 32 | 10 | CXH-A-10-21-30-00-20EP | NS | 026411 | 140 |
| 10 | 240 | 3 | 25.5 | 24 | 3 | 1/4 | 1,725 | 840 | 1,070 | 36 | 32 | 10 | CXH-A-10-23-30-00-20EP | NS | 026420 | 140 |
| 10 | 480 | 3 | 12.7 | 24 | 3 | 1/4 | 1,725 | 840 | 1,070 | 36 | 32 | 10 | CXH-A-10-43-30-00-20EP | NS | 026438 | 140 |
| 10 | 575 | 3 | 10.6 | 24 | 3 | 1/4 | 1,725 | 840 | 1,070 | 36 | 32 | 10 | CXH-A-10-63-30-00-20EP | NS | 026446 | 140 |
| 15 | 208 | 3 | 43 | 120 | 3 | 1/4 | 1,725 | 1,450 | 1,040 | 31 | 47 | 10 | CXH-A-15-83-32-00-20EP | NS | 026454 | 160 |
| 15 | 240 | 3 | 37.5 | 120 | 3 | 1/4 | 1,725 | 1,450 | 1,040 | 31 | 47 | 10 | CXH-A-15-23-32-00-20EP | NS | 026462 | 160 |
| 15 | 480 | 3 | 18.7 | 120 | 3 | 1/4 | 1,725 | 1,450 | 1,040 | 31 | 47 | 10 | **CXH-A-15-43-32-00-20EP** | **S** | **026470** | 160 |
| 15 | 575 | 3 | 15.7 | 120 | 3 | 1/4 | 1,725 | 1,450 | 1,040 | 31 | 47 | 10 | CXH-A-15-63-32-00-20EP | NS | 026489 | 160 |
| 15 | 208 | 3 | 43 | 24 | 3 | 1/4 | 1,725 | 1,450 | 1,040 | 31 | 47 | 10 | CXH-A-15-83-30-00-20EP | NS | 026497 | 160 |
| 15 | 240 | 3 | 37.5 | 24 | 3 | 1/4 | 1,725 | 1,450 | 1,040 | 31 | 47 | 10 | CXH-A-15-23-30-00-20EP | NS | 026500 | 160 |
| 15 | 480 | 3 | 18.7 | 24 | 3 | 1/4 | 1,725 | 1,450 | 1,040 | 31 | 47 | 10 | CXH-A-15-43-30-00-20EP | NS | 026518 | 160 |
| 15 | 575 | 3 | 15.7 | 24 | 3 | 1/4 | 1,725 | 1,450 | 1,040 | 31 | 47 | 10 | CXH-A-15-63-30-00-20EP | NS | 026526 | 160 |
| 18 | 240 | 3 | 44.7 | 120 | 3 | 1/4 | 1,725 | 1,400 | 1,000 | 39 | 43 | 10 | CXH-A-18-23-32-00-20EP | NS | 026534 | 171 |
| 18 | 240 | 3 | 44.7 | 24 | 3 | 1/4 | 1,725 | 1,400 | 1,000 | 39 | 43 | 10 | CXH-A-18-23-30-00-20EP | NS | 026542 | 171 |
| 20 | 480 | 3 | 24.8 | 120 | 3 | 1/4 | 1,725 | 1,400 | 1,000 | 43 | 43 | 10 | **CXH-A-20-43-32-00-20EP** | **S** | **025110** | 171 |
| 20 | 575 | 3 | 20.7 | 120 | 3 | 1/4 | 1,725 | 1,400 | 1,000 | 43 | 43 | 10 | CXH-A-20-63-32-00-20EP | NS | 026550 | 171 |
| 20 | 480 | 3 | 24.8 | 24 | 3 | 1/4 | 1,725 | 1,400 | 1,000 | 43 | 43 | 10 | CXH-A-20-43-30-00-20EP | NS | 026569 | 171 |
| 20 | 575 | 3 | 20.7 | 24 | 3 | 1/4 | 1,725 | 1,400 | 1,000 | 43 | 43 | 10 | CXH-A-20-63-30-00-20EP | NS | 026577 | 171 |
| 25 | 480 | 3 | 31.1 | 120 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 32 | 54 | 10 | **CXH-A-25-43-32-00-20EP** | **S** | **028556** | 216 |
| 25 | 575 | 3 | 25.8 | 120 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 32 | 54 | 10 | CXH-A-25-63-32-00-20EP | NS | 028589 | 216 |
| 25 | 480 | 3 | 31.1 | 24 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 32 | 54 | 10 | CXH-A-25-43-30-00-20EP | NS | 028602 | 216 |
| 25 | 575 | 3 | 25.8 | 24 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 32 | 54 | 10 | CXH-A-25-63-30-00-20EP | NS | 028609 | 216 |
| 30 | 480 | 3 | 37.1 | 120 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 39 | 54 | 10 | **CXH-A-30-43-32-00-20EP** | **S** | **028564** | 216 |
| 30 | 575 | 3 | 30.2 | 120 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 39 | 54 | 10 | CXH-A-30-63-32-00-20EP | NS | 028615 | 216 |
| 30 | 480 | 3 | 37.1 | 24 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 39 | 54 | 10 | CXH-A-30-43-30-00-20EP | NS | 028620 | 216 |
| 30 | 575 | 3 | 30.2 | 24 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 39 | 54 | 10 | CXH-A-30-63-30-00-20EP | NS | 028625 | 216 |
| 35 | 480 | 3 | 43.1 | 120 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 45 | 54 | 10 | **CXH-A-35-43-32-00-20EP** | **S** | **028572** | 216 |
| 35 | 575 | 3 | 36 | 120 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 45 | 54 | 10 | CXH-A-35-63-32-00-20EP | NS | 028605 | 216 |
| 35 | 480 | 3 | 43.1 | 24 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 45 | 54 | 10 | CXH-A-35-43-30-00-20EP | NS | 028612 | 216 |
| 35 | 575 | 3 | 36 | 24 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 45 | 54 | 10 | CXH-A-35-63-30-00-20EP | NS | 028617 | 216 |
| **Models with Built-In Thermostats** | | | | | | | | | | | | | | | | |
| 10 | 480 | 3 | 12.7 | 120 | 3 | 1/4 | 1,725 | 840 | 1,070 | 36 | 32 | 10 | **CXH-A-10-43-32-40-20EP** | **S** | **028580** | 150 |
| 20 | 480 | 3 | 24.8 | 120 | 3 | 1/4 | 1,725 | 1,400 | 1,070 | 43 | 43 | 10 | **CXH-A-20-43-32-40-20EP** | **S** | **028599** | 181 |
| 25 | 480 | 3 | 31.1 | 120 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 32 | 54 | 10 | **CXH-A-25-43-32-40-20EP** | **S** | **028601** | 226 |
| 30 | 480 | 3 | 37.1 | 120 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 39 | 54 | 10 | **CXH-A-30-43-32-40-20EP** | **S** | **028610** | 226 |
| 35 | 480 | 3 | 43.1 | 120 | 3 | 1/2 | 1,725 | 2,330 | 1,070 | 45 | 54 | 10 | **CXH-A-35-43-32-40-20EP** | **S** | **028628** | 226 |

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

# CXH-A

## Explosion Proof Blower Heater for Hazardous Locations *(cont'd.)*

### *Ordering Information*

**To Order —** Complete the Model Number using the Matrix Provided.

### *Model Numbers*

When ordering CXH-A heaters, specify the model number and corresponding PCN (Product Code Number, found in the Ordering Information Table). If thermostat, or disconnect switch options are required, designate these options in addition to the model number when ordering. Use PCN Numbers only on standard models. On made to order CXH heaters, complete catalog number from matrix provided. Always specify voltage, phase and kW by listing them on the purchase order product specifications.

**Model** — **Explosion Proof Blower Heater**

**CXH-A**

| Code | Heating Element Rating (kW) |
|---|---|
| **03** | 3 |
| **05** | 5 |
| **07** | 7.5 |
| **10** | 10 |
| **15** | 15 |
| **18** | 18 |
| **20** | 20 |
| **25** | 25 |
| **30** | 30 |
| **35** | 35 |

| Code | Heater Volts |
|---|---|
| **2** | 240 |
| **3** | 380 (3 phase only) |
| **4** | 480 (3 phase only) |
| **5** | 415 (3 phase only) |
| **6** | 575 (3 phase only) |
| **8** | 208 |
| **9** | 600 (3 phase only) |

| Code | Phase |
|---|---|
| **1** | 1 |
| **3** | 3 |

| Code | Control Volts |
|---|---|
| **30** | 24 |
| **32** | 120 (Std.) |

| Code | Thermostat Option |
|---|---|
| **00** | Without Thermostat |
| **40** | Thermostat |

| Code | Heat Exchanger | |
|---|---|---|
| **1** | Ethylene Groups C, D, E, F, G | T3B |
| **2** | Propylene Groups C, D, E, F, G (Std.) | T3B |
| **3** | Ethylene Groups C, D, F, G | T3C |
| **4** | Propylene Groups C, D, F, G | T3C |

| Code | Options |
|---|---|
| **0** | Without Disconnect |
| **1** | Disconnect: 15 Amp 3-phase, 30 Amp 1-phase or 3-phase, specify as requried |
| **2** | 60 Amp Disconnect |
| **3** | Pilot Light No Disconnect |
| **4** | Pilot Light and 30 Amp Disconnect |
| **5** | Pilot Light and 60 Amp Disconnect |
| **6** | Summer Fan Switch |
| **7** | Summer with Pilot Light |
| **8** | Disconnect with Fan Switch |
| **9** | Disconnect Pilot Light and Fan Switch |

| Code | |
|---|---|
| **EP** | Explosion Proof |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **CXH-A** | **10** | **4** | **3** | **30** | **40** | **1** | **1** | **EP** | **Typical Model Number** |

# CXH-A

## Explosion Proof Blower Heater for Hazardous Locations *(cont'd.)*

### Heater Rating and Operating Data

(3 to 35 kW)

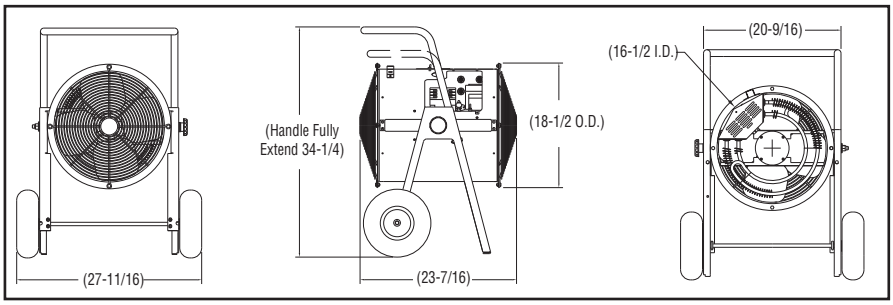
| | | |
|---|---|---|
| | Hazardous Location Classifications | 3 to 35 kW Models - Class I, Group C & D; Class II, Groups E, F & G, Divisions 1 & 2 |
| | Temperature Codes | This temperature shall not exceed the ignition temperature of the gas or vapor to be encountered. All standard models 165˚C (329˚F) T3B |
| **INSTALLATION** | Maximum Mounting Height From Floor to Bottom of Heater | 8' to 10' (2.4 to 3 meters) normal, when heat is required at floor level. |
| | Ambient Temperature | -49˚F/-45˚C (Min.) 104˚F/40˚C (Max.) |
| | Operating Limits Maximum Operational Altitude Above Sea level | 7500' (2286 meters). Check with local Chromalox sales office for recommendations for higher elevations. |
| **PROTECTION** | High-Limit | Auto reset quick acting linear type thermal cutout. |
| | Pressure Relief | Pressure relief device. |
| **HEAT EXCHANGER** | General Description | Steel tubes, with integral rolled-aluminum fins |
| | Core Material | Steel. |
| | Heat Transfer Fluid | Propylene Glycol (Ethylene Glycol available for arctic duty - check with local Chromalox sales office.) |
| | Heating Element Assembly | Immersion heater assembly with seamless copper sheathed heating elements. |
| **CABINET** | Cabinet | 14 gauge steel, polyester powder-coated. Individually adjustable louvers with minimum position stops. |
| | Fan Guard | Heavy duty polyester powder-coated steel. |
| | Fasteners | Nickel plated steel for corrosion resistance. |
| | Conduit Material | Plated steel for corrosion resistance. |
| | Control Enclosure | Cast aluminum (non-copper Alloy) NEMA 7 and 9 enclosure. |
| | Hanger Connections | 2 (two) 5/8" UNC tapped holes. |
| **CONTROLS** | Control Circuit | Built in 120V control. Optional 24V control available. |
| | Power Contactor | 50 Amp/600V. |
| | Transformer | Primary voltage same as heater voltage - secondary voltage, 24V or 120V. |

# DRA

## Portable Spot Industrial Salamander Blower Heater

- 7.5 to 30 kW
- 25,590 to 102,360 BTUH
- 208, 240, 480 and 600 Volts
- Single and Three Phase
- No Assembly Required
- Built-in Controls

### *Dimensions (Inches)*




### *Description*

The Chromalox DRA Dragon is a rugged industrial grade, self contained, highly mobile, electric blower heater. The DRA can be left unattended without the threat of poisoning from combustion by-products associated with fuel fired heaters. The built in safety features include an adjustable thermostat to control the outlet air temperature, auto-reset cutouts for the fan motor and heating elements. The thermostat provides settings for full off, fan only and temperature control in the heating setting. Dragon heaters feature a large, easily accessible control and wiring compartment containing a magnetic contactor; additional safety is provided by a 120 volt control voltage transformer and motor starter on 480 and 600 volt units. The bright red polyester powder coated heating cylinder is highly visible and can be rotated to direct heat or fan driven air movement where it is needed. For assured safety, all standard units meet the requirements of UL (File No. E7061) and CSA (File No. LR40859).

### *Construction*

#### Heating Cylinder

A structural frame consisting of 2 spun steel rings and 2 formed steel channels support a 20 gauge steel cylinder phosphate coated for corrosion resistance, and finished in red polyester powder coat paint. The heating cylinder pivots vertically to direct air flow.

#### Leg Assembly

Each side consists of a one piece, 12 gauge, formed steel member, which accepts a steel tubular handle, held in place with a 1 1/2" long x 1/4" bolt on each side. The handle can be raised from the shipping position if desired. The rubber, pneumatic wheels are 10" diameter and 3 1/2" wide to provide ease of transporting the heater on irregular and gravel surfaces. The large wheels make it easy to roll up stairways without damage to decorative step surfaces.

#### Fan Assembly

The self-centering fan assembly consists of a totally enclosed, permanently lubricated motor and a dynamically balanced aluminum fan blade for smooth, quiet operation.

#### Controls

A thermostat, with a temperature range of 40°F to 100°F is included, with a full off position, a fan only position and an adjustable range of temperature settings in the heating mode position. Each unit includes a 3 pole magnetic contactor and auto-reset thermal cutout. 480 volt and 600 volt units also include a motor relay and 120 volt control voltage transformer for personnel safety.

#### Safety Guards

Front and rear grills are 10 gauge, finished in black polyester powder coat and are designed to meet OSHA safety requirements.

#### Heating Assembly

The patented metal sheath Fintube® heating elements consist of steel fins furnace brazed on industrial grade .475 diameter steel sheath tubular heaters for maximum heat transfer. The elements are held in place with steel bulkhead fittings for durability. The elements feature a high temperature finish for corrosive protection.

### *Applications*

- For Best Results Use in Enclosed Area with Ceiling Heights Below 15'
- Any Commercial or Industrial Application Needing Instant Fan Forced Heat
- Building Construction
- Curing Plaster and Concrete
- Warming Workers
- Thawing Frozen Pipes
- Thawing Railroad Cars
- Heating Large Tents
- Non-Hazardous Areas

# DRA

## Portable Spot Industrial Salamander Blower Heater *(cont'd.)*

### *Specifications And Ordering Information*

| kW | Volts | Phase | Amps[1] | BTU/H | HP | CFM | Temp. Rise °F[2] | Model | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7.5 | 208 | 1 and 3 | 36.3/21.0 | 25,590 | 0.06 | 1070 | 23 | DRA-07-83 | NS | 295523 | 65 |
| 7.5/5.6 | 240/208 | 1 and 3 | 31.5/18.3[3] | 25,590 | 0.06 | 1070 | 23 | **DRA-07-23** | **S** | **295531** | 65 |
| 9.75 | 208 | 1 and 3 | 47.1/27.3 | 33,267 | 0.06 | 1070 | 31 | **DRA-10-83** | **S** | **295540** | 65 |
| 10/7.5 | 240/208 | 1 and 3 | 40.8/23.7[3] | 33,267 | 0.06 | 1070 | 31 | **DRA-10-23** | **S** | **295558** | 65 |
| 15 | 208 | 3 | 41.8 | 51,180 | 0.06 | 1070 | 46 | DRA-15-83 | NS | 295566 | 65 |
| 15/11.2 | 240/208 | 3 | 36.3[3] | 51,180 | 0.06 | 1070 | 46 | **DRA-15-23** | **S** | **295574** | 65 |
| 15 | 480 | 1 and 3 | 31.4/18.2 | 51,180 | 0.06 | 1070 | 46 | **DRA-15-43** | **S** | **295582** | 65 |
| 15 | 600 | 1 and 3 | 25.2/14.6 | 51,180 | 0.06 | 1070 | 46 | DRA-15-93 | NS | 295596 | 65 |
| 19.5/15 | 240/208 | 3 | 47.1[3] | 66,534 | 0.06 | 1070 | 61 | DRA-20-23 | NS | 295603 | 75 |
| 20 | 480 | 1 and 3 | 42.0/24.4 | 68,240 | 0.06 | 1070 | 62 | **DRA-20-43** | **S** | **295611** | 75 |
| 20 | 600 | 1 and 3 | 33.5/19.4 | 68,240 | 0.06 | 1070 | 62 | DRA-20-93 | NS | 295620 | 75 |
| 30 | 480 | 3 | 36.3 | 102,360 | 0.06 | 1070 | 92 | **DRA-30-43** | **S** | **295638** | 75 |
| 30 | 600 | 3 | 29.1 | 102,360 | 0.06 | 1070 | 92 | DRA-30-93 | NS | 295646 | 75 |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order—**Specify model, PCN, kW, volts, phase and quantity.
1. Includes motor amps
2. Temperature rise at 240V operation
3. 208V amperage is 86% of 240V value

See back page for control, thermostat and fan options.
All units are factory wired for 3 phase operation.
Models designated 1 and 3 phase can be field wired for single phase operation.

### *Cable Kits for Chromalox DRA Series Portable Blower Heaters*

| Model No. | Used on Heater | Cable Specifications | | | Cord Connector | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|
| | | Size/Type | Max. Amp | Temp. Ratings | NPT | | | |
| PLC-2514-4 | 15kW 600V 3PH | 14/4 SO | 15 | 90°C | 3/4" | **S** | **295427** | 7 |
| PLC-2512-4 | 7.5kW 240V 3PH<br>15kW 480V 3PH<br>20kW 600V 3PH | 12/4 SO | 20 | 90°C | 1" | **S** | **295435** | 9 |
| PLC-2510-3 | 15kW 600V 1PH | 10/3 SO | 30 | 90°C | 1" | NS | 295443 | 9 |
| PLC-2510-4 | 7.5kW 208V 3PH<br>9.75kW 240V 3PH<br>20kW 480V 3PH | 10/4 SO | 25 | 90°C | 1" | **S** | **295451** | 11 |
| PLC-2508-3 | 7.5kW 208V 1PH<br>7.5kW 240V 1PH<br>15kW 480V 1PH<br>20kW 600V 1PH | 8/3 SO | 40 | 90°C | 1" | **S** | **295460** | 12 |
| PLC-2508-4 | 9.75kW 208V 3PH<br>30kW 600V 3PH | 8/4 SO | 35 | 90°C | 1" | NS | 295478 | 15 |
| PLC-2506-3 | 9.75kW 208V 1PH<br>9.75kW 240V 1PH<br>20kW 480V 1PH | 6/3 SO | 55 | 90°C | 1" | **S** | **295486** | 16 |
| PLC-2506-4 | 15kW 240V 3PH<br>30kW 480V 3PH | 6/4 SO | 45 | 90°C | 1" | **S** | **295494** | 17 |
| PLC-2504-4 | 19.5kW 240V 3PH | 4/4 SO | 60 | 90°C | 1 1/4" | **S** | **295515** | 25 |

SO = Hard Service Cord, 600V. Length = 25 Feet

Cable packages include 25 feet Type SO cable, with either 3-conductors or 4-conductors, depending on the heater requirements. Each cable assembly includes the proper cord (connector). Plugs are not included. All models are factory wired for 3-phase, but can be field wired for single phase, select plug and cord accordingly.

# DRA

## Portable Spot Industrial Salamander Blower Heater *(cont'd.)*

### *Plug Kits*

| Plug Type | Catalog Number | Description | Volts | Amps | Configuration | NEMA# | ANSI# | Fits Cable Dia. | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LOCKING | PGL-15-20 | 3 Pole, 4 Wire | 250 | 20 |  | L15-20 | C73.85 | .385"-.780 | NS | 338845 | 0.5 |
| LOCKING | PGL-15-30 | 3 Pole, 4 Wire | 250 | 30 |  | L15-30 | C73.86 | .385"-.780 | NS | 338853 | 0.5 |
| LOCKING | PGL-16-30 | 3 Pole, 4 Wire | 480 | 30 |  | L16-30 | C73.88 | .595"-1.150 | **S** | **338861** | 0.5 |
| LOCKING | PGL-17-30 | 3 Pole, 4 Wire | 600 | 30 |  | L17-30 | C73.89 | .595"-1.150 | NS | 338870 | 0.5 |
| LOCKING | PGL-3763C | 2 Pole, 3 Wire | 600 | 50 |  | — | — | .750"-1.125" | NS | 338917 | 0.5 |
| LOCKING | PGL-3765C | 3 Pole, 4 Wire | 600 | 50 |  | — | — | .750"-1.125" | **S** | **338925** | 0.5 |
| NON LOCKING | PGN-6-50 | 2 Pole, 3 Wire | 250 | 50 |  | 6-50 | C73.53 | .625"-1.187" | **S** | **338888** | 0.5 |
| NON LOCKING | PGN-15-20 | 3 Pole, 4 Wire | 250 | 20 |  | 15-20 | C73.59 | .390"-.775" | NS | 338896 | 0.5 |
| NON LOCKING | PGN-15-50 | 3 Pole, 4 Wire | 250 | 50 |  | 15-50 | C73.61 | .750"-1.250" | NS | 338909 | 0.5 |

# HF
## Portable Blower Heater

- **1.9 - 4 kW**
- **6,483 - 13,648 Btuh**
- **120 and 240 Volt**
- **Single Phase**
- **AC and DC Rated Models**

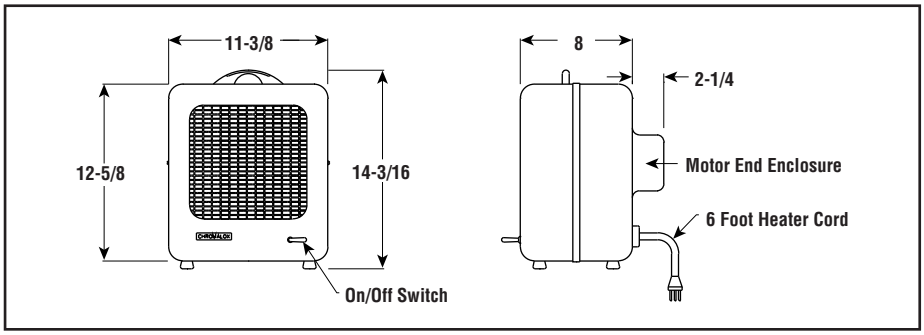
### *Description*

Heavy duty HF portable blower heaters are ideal for heating small areas in industrial environments and are available in DC ratings for use in crane cabs.

### *Applications*

- Construction Sites
- Garages
- Work Stations
- Warehouses
- Crane Cabs
- Storage Buildings

### *Dimensions (Inches)*




### *Construction*

**Cabinet —** Heavy 20 gauge steel, phosphate undercoated for corrosion resistance and finished in almond powder coat providing a good, clean appearance. Includes carrying handle.

**Heating Elements —** Shock-resistant metal sheath heating elements, designed for long life.

**AC Rated Models** include a quiet, completely enclosed, vibration-free AC motor, overheat cutout, on/off toggle switch and 6 ft. cord and ground plug (except HF-303AC, which does not include a plug).

**DC Rated Models** equipped with DC motors and DC rated magnetic contactors wired in series with the overheat cutout. Like the AC models, DC rated units also include on/off toggle switch, 6 ft. cord and plugs except on HF-303H and HF-303E which includes the cord only and HF-403E which includes neither the cord nor the plug.

### *Advantages*

- Clean and Reliable
- Easy to Move
- Built-in Thermal Cutout
- DC Ratings

### *Specifications and Ordering Information*

| Electrical (60 Hz) | | | | Motor | | | | | Air Delivery[1] | | | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | Amps | Volts | Phase | HP | RPM | CFM | FPM[1] | Temp. Rise (°F)[1] | Horiz. Throw (Ft.) | Mtg. Height (Ft.) | Model[1] | Stock | PCN | Wt. (Lbs.) |
| 1.9 | 120 | 1 | 15.8 | 115 | 1 | 1/30 | 1,550 | 170 | 410 | 35 | 6 | 13-3/16 | **HF-203G AC** | **S** | **261307** | 16.5 |
| 1.9 | 120 | 1 | 15.8 | 125 | 1 | 1/60 | 1,725 | 200 | 480 | 30 | 6 | 13-3/16 | **HF-203EG DC** | **S** | **261323** | 16.5 |
| 2 | 240 | 1 | 8.3 | 240 | 1 | 1/30 | 1,550 | 170 | 410 | 37 | 6 | 13-3/16 | HF-203G AC | AS | 261315 | 16.5 |
| 2 | 240 | 1 | 8.3 | 125 | 1 | 1/60 | 1,725 | 200 | 480 | 32 | 6 | 13-3/16 | **HF-203DG DC** | **S** | **261331** | 16.5 |
| 3 | 120 | 1 | 25 | 115 | 1 | 1/30 | 1,550 | 170 | 410 | 56 | 6 | 13-3/16 | **HF-303H AC[3]** | **S** | **261340** | 19 |
| 3 | 240 | 1 | 12.5 | 240 | 1 | 1/30 | 1,550 | 170 | 410 | 56 | 6 | 13-3/16 | HF-303G AC | NS | 261358 | 19 |
| 3 | 120 | 1 | 25 | 125 | 1 | 1/60 | 1,725 | 200 | 480 | 48 | 6 | 13-3/16 | HF-303E DC[3] | NS | 261366 | 19 |
| 3 | 240 | 1 | 12.5 | 125 | 1 | 1/60 | 1,725 | 200 | 480 | 48 | 6 | 13-3/16 | **HF-303DG DC** | **S** | **261374** | 19 |
| 4 | 240 | 1 | 16.7 | 240 | 1 | 1/30 | 1,550 | 170 | 410 | 75 | 6 | 13-3/16 | **HF-403G AC** | **S** | **261382** | 19 |
| 4 | 240 | 1 | 16.7 | 125 | 1 | 1/60 | 1,725 | 200 | 480 | 63 | 6 | 13-3/16 | **HF-403E DC[2]** | **S** | **261390** | 19 |

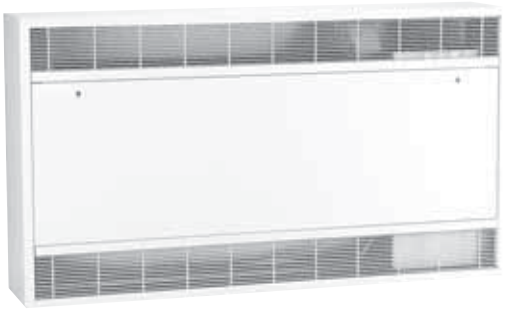
**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, PCN, kW, volts, phase and quantity.

1. Approximate value.
2. Without cord and plug.
3. Cord only, no plug.

**Other Notes —**
A. Alternating current (AC) 60 Hz (supplied with on/off switch).
B. Direct current (DC).

# CCH
## Cabinet Console Blower Heater

- **2 - 18 kW**
- **6,824 - 61,416 Btuh**
- **208, 240, 277 and 480 Volt**
- **1 or 3 Phase**
- **32, 45 and 65" Lengths**



### *Applications*

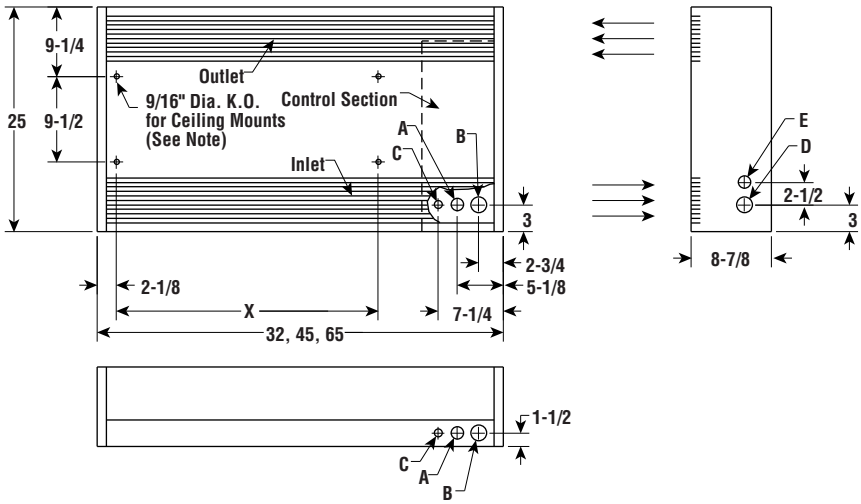
- Lobbies
- Corridors
- Entryways
- Offices
- Waiting Rooms
- Stairways
- Passenger Terminals

### *Construction*

- 16 Gauge Steel Cabinet Construction
- Architectural Bar Grills
- Flexible Discharge and Intake Grille Configurations
- Stainless Steel Heating Elements with Corrosion Resistant Fins
- Direct-Drive Motor and Blower Fans
- Two-speed Motor (except for ceiling mount) with Built-in Time Delay on Motor Switch

*Refer to WT-121, WT-122, WTL-121, WR-80, WR-90 in the Controls section.*

### *Dimensions (Inches)*




**Note** — Ceiling Mounting Holes are shown as viewed from front of heater.

**Unit "X"**

**32" = 16"**
**45" = 29"**
**65" = 49"**

### *Knockout Schedule*

| Item Size | Qty. |
|---|---|
| A. 1-3/8"/2" Dia. | 2 |
| B. 1-3/4" | 2 |
| C. 7/8" | 2 |
| D. 1-3/4"/2" | 1 |
| E. 1-3/8" | 1 |

### *Features*

- Almond Wear-resistant Finish of Powder Coat Polyester
- Thermal Limit Switch with Automatic Reset
- Multiple Knockouts
- Floor, Wall or Ceiling Mountable - Semi or Fully Recessed or Surface Mounted.
- Built in controls are located in tamper resistant control enclosure

### *Optional Controls (Select One)*

- Built-in Thermostat 45°F - 90°F
- Provisions for External 24V Room Thermostat
- Built-in Relay for Use with Remote Thermostat Control (208V)

### *Optional Accessories*

- Duct Transition Collar
- Disconnect Swich
- Trim Frame

### *Advantages*

- Safer Operation
- Easy to Clean
- Easy Field Installation
- Quiet and Vibration Free Operation
- Versatile
- Attractive Cabinetry to Compliment Decor

# CCH
## Cabinet Console Blower Heater *(cont'd.)*

### *Specifications and Ordering Information*

| Electrical | | | | Dimensions (In.) | | | Ordering | | |
|---|---|---|---|---|---|---|---|---|---|
| kW HI/LO | Voltage Option Codes | Btuh | CFM HI/LO | Width | Height | Depth | Model | Stock | Wt. (Lbs.) |
| 2 | A,B,C,D,E,F,G,J | 6,824 | 250/200 | 32 | 25 | 8-7/8 | CCH-3D-02 | NS | 105 |
| 3 | A,B,C,D,E,F,G,J | 10,236 | 250/200 | 32 | 25 | 8-7/8 | CCH-3D-03 | NS | 105 |
| 4 | A,B,C,D,E,F,G,J | 13,648 | 250/200 | 32 | 25 | 8-7/8 | CCH-3D-04 | NS | 105 |
| 5 | A,B,C,D,E,F,G,J | 17,060 | 250/200 | 32 | 25 | 8-7/8 | CCH-3D-05 | NS | 105 |
| 6 | A,B,C,D,E,F,G,J | 20,472 | 250/200 | 32 | 25 | 8-7/8 | CCH-3D-06 | NS | 105 |
| 4 | A,B,C,D,E,F,G,J | 13,648 | 500/400 | 45 | 25 | 8-7/8 | CCH-4D-04 | NS | 145 |
| 6 | A,B,C,D,E,F,G,J | 20,472 | 500/400 | 45 | 25 | 8-7/8 | CCH-4D-06 | NS | 145 |
| 8 | A,B,C,D,E,F,G,J | 27,296 | 500/400 | 45 | 25 | 8-7/8 | CCH-4D-08 | NS | 145 |
| 10 | A,B,C,D,E,F,G,J | 34,120 | 500/400 | 45 | 25 | 8-7/8 | CCH-4D-10 | NS | 145 |
| 12 | A,B,C,D,E,F,G,J | 40,944 | 500/400 | 45 | 25 | 8-7/8 | CCH-4D-12 | NS | 145 |
| 15 | D,E,F,J | 51,180 | 750/600 | 65 | 25 | 8-7/8 | CCH-6D-15 | NS | 240 |
| 18 | D,E,F,J | 61,416 | 750/600 | 65 | 25 | 8-7/8 | CCH-6D-18 | NS | 240 |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order—** Specify model, inlet and outlet arrangement, kW, volts, phase, control or fuse options and quantity.

**Voltage Selection**

| Code | Voltage/Phase | Code | Voltage/Phase |
|---|---|---|---|
| **A** | 208/1 | **E** | 240/3 |
| **B** | 240/1 | **F** | 480/3 |
| **C** | 277/1 | **G** | 480/1 |
| **D** | 208/3 | **J** | 600/3 |

**Notes —**

A. 208 to 600V units are available in both 1 and 3 phase, all others are single phase only.

B. All heaters rated over 48 Amps require two circuits.

C. All heaters equipped with fusing where necessary to meet NEC and UL requirements.

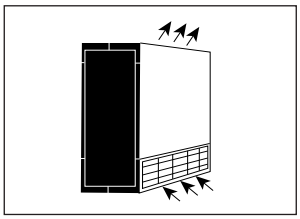
D. Fan Motor - Permanent split capacitor type, built-in overload protection, lifetime lubricated, resiliently mounted, totally enclosed, 2 speed, direct drive, 1/20 HP.

E. Motor volts same as heater for 208, 240, 277 volt units. 480 and 600 volt units use 240V motors.

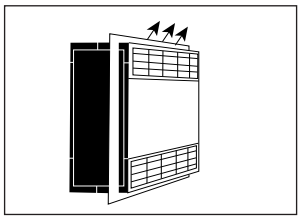
### *Mounting Configurations*

Floor, wall or ceiling mount. Each arrangement can be recessed, semi-recessed or surface mounted as shown. A variety of inlet, outlet grille positions provides complete flexibility of use.

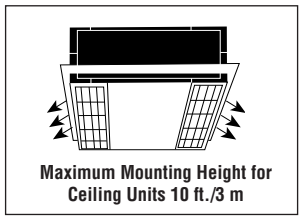
*Surface*



*Semi-Recessed*



*Fully Recessed*

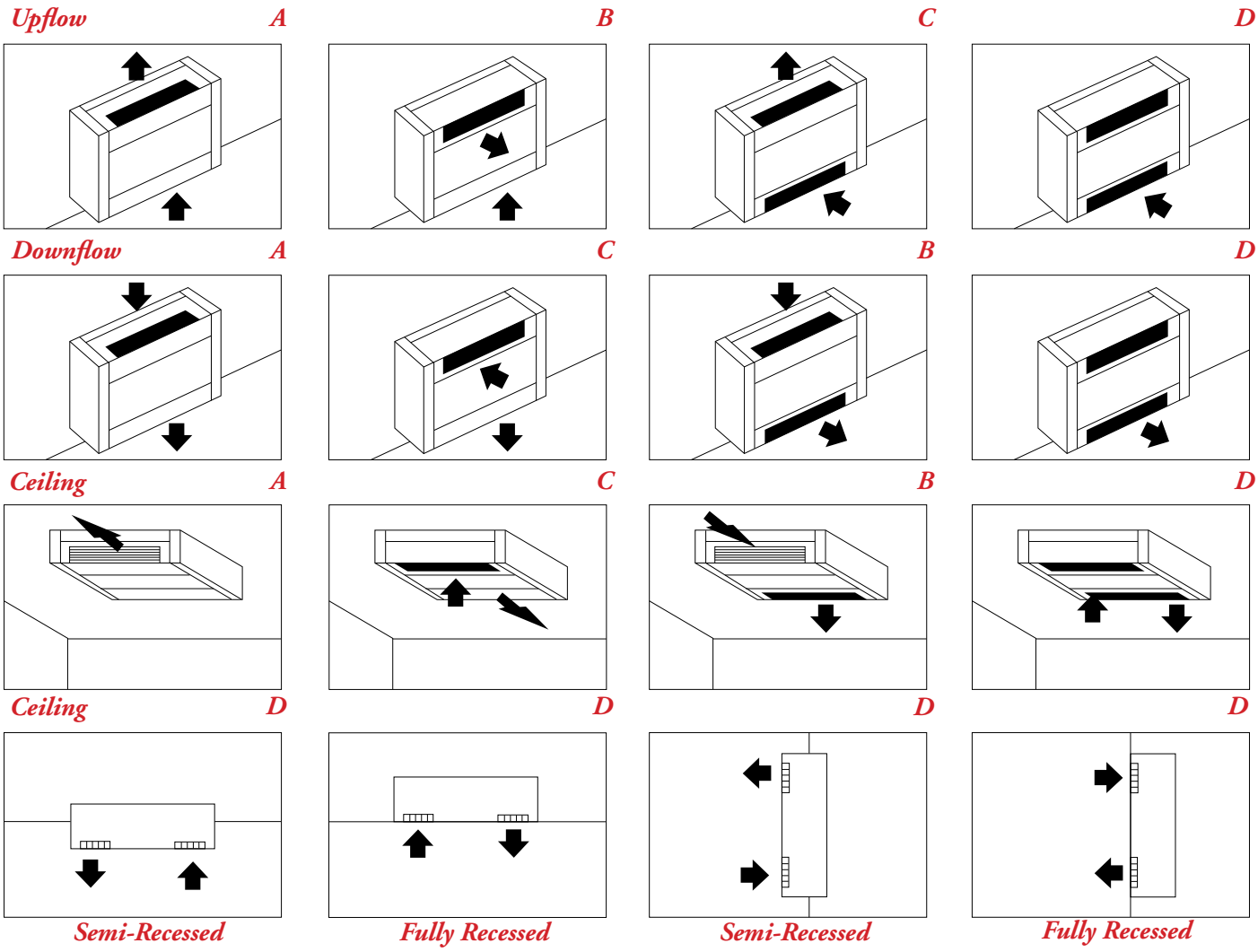


**Maximum Mounting Height for Ceiling Units 10 ft./3 m**

# CCH
## Cabinet Console Blower Heater *(cont'd.)*

### *Inlet & Outlet Configurations*

Architectural style bar grilles can be field reconfigured for top/bottom inlet/outlet arrangements as shown below.



# CCH
## Cabinet Console Blower Heater *(cont'd.)*

### *Ordering Information*

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

**Model** **Cabinet Console Blower Heater**

**CCH**

| Code | Cabinet Length (In.) & Ratings (kW) |
|---|---|
| **3D** | 32 — 2 - 6 kW |
| **4D** | 45 — 4 - 12 kW |
| **6D** | 65 — 15 - 18 kW |

| Code | Heating Element Rating (kW) | Code | Heating Element Rating (kW) |
|---|---|---|---|
| **02** | 2 kW | **08** | 8 kW |
| **03** | 3 kW | **10** | 10 kW |
| **04** | 4 kW | **12** | 12 kW |
| **05** | 5 kW | **15** | 15 kW |
| **06** | 6 kW | **18** | 18 kW |

| Code | Volts/Phase | Code | Volts/Phase |
|---|---|---|---|
| **A** | 208/1 | **E** | 240/3 |
| **B** | 240/1 | **F** | 480/3 |
| **C** | 277/1 | **G** | 480/1 |
| **D** | 208/3 | **J** | 600/3 |

| Code | Control Option |
|---|---|
| **3** | Built-in single pole thermostat control<br>High/low control switch for heat/fan, on/off control switch |
| **T** | Built-in low voltage relay kit for remote 24V thermostat (not included) |
| **R** | Provision for remote wire control (not included)<br>High/low control switch for heat/fan |
| **C** | Duct transition collar for connecting to ducting |
| **S** | Disconnect switch for positive power interruption |

| Code | Color |
|---|---|
| **68** | Almond (Std.) |
| **W** | White |

| CCH | 4D | 04 | A | 3 | W | Typical Model Number |
|---|---|---|---|---|---|---|

### *Accessories (Field Installed)*

**TF32 —** Trim frame for recess mounting of 32 inch cabinets

**TF45 —** Trim frame for recess mounting of 45 inch cabinets

**TF65 —** Trim frame for recess mounting of 65 inch cabinets

**PWF35 —** Permanent washable filter for 32 inch cabinets

**PWF45 —** Permanent washable filter for 45 inch cabinets

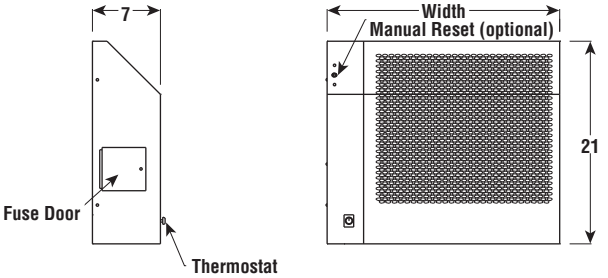
**PWF65 —** Permanent washable filter for 65 inch cabinets

For throw away filters, contact your Local Chromalox Sales office.

# HCH
## Wall Mounted Convection Heater

- 500 - 5,000 Watts
- 1,706 - 17,060 Btuh
- 120, 208, 240, 277, 480, 575 and 600 Volt
- 1 & 3 Phase
- Built-in Controls
- 24, 36 or 48" Widths

### *Dimensions (Inches)*




### *Description*

Type HCH convection heaters are designed for easy installation in hard-use areas. The patented metal sheath Fintube® radiating heating elements with furnace brazed steel fins assures long life and superior heat transfer. Each unit is self-contained, complete with thermostat, automatic reset (standard) and manual reset (optional) cutout.

### *Applications*

- Entryways
- Stairwells
- Guard Shacks
- Isolated Buildings
- Cold Spots in Offices or Plants

### *Construction*

**Cabinet —** Heavy 18 gauge steel, zinc chromate primer and almond polyester powder coat finish.

**Heating Elements —** Rugged, shock-proof 0.475" diameter steel with furnace brazed steel fins.

### *Features*

**Power Terminal Block —** Provided to facilitate field installation.

**Built-in Contactors and Fused Control Voltage Transformers —** Typical on all models rated over 277V and all three-phase heaters.

**Thermostat and Overtemperature Cutout —** All models include a thermostat (55 - 105°F) and automatic reset overtemperature cutout. Models with suffix M in the model number include an additional manual reset cutout.

### *Advantages*

- Minimum Maintenance
- Attractive Design
- Self Contained
- Safer to Operate in Unattended Areas

**CAUTION** — Not intended for use where flammable vapors, gases, liquids or other combustible atmospheres are present.

# HCH
## Wall Mounted Convection Heater *(cont'd.)*

### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (In.) | | | w/o Manual Reset | | | w/ Manual Reset | | | Wt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | Amps | Btuh | Height | Width | Depth | Model | Stock | PCN | Model | Stock | PCN | (Lbs.) |
| 0.5 | 120 | 1 | 4.2 | 1,706 | 21 | 24 | 7 | HCH-051 | NS | 330376 | HCH-051M | NS | 331459 | 41 |
| 0.5 | 208 | 1 | 2.4 | 1,706 | 21 | 24 | 7 | HCH-051 | NS | 330384 | HCH-051M | NS | 331467 | 41 |
| 0.5 | 240 | 1 | 2.1 | 1,706 | 21 | 24 | 7 | HCH-051 | NS | 330392 | HCH-051M | NS | 331475 | 41 |
| 0.5 | 277 | 1 | 1.8 | 1,706 | 21 | 24 | 7 | HCH-051 | NS | 330405 | HCH-051M | NS | 331483 | 41 |
| 0.75 | 120 | 1 | 6.25 | 2,559 | 21 | 24 | 7 | HCH-071 | NS | 330413 | HCH-071M | NS | 331491 | 41 |
| 0.75 | 208 | 1 | 3.6 | 2,559 | 21 | 24 | 7 | HCH-071 | NS | 330421 | HCH-071M | NS | 331504 | 41 |
| 0.75 | 240 | 1 | 3.1 | 2,559 | 21 | 24 | 7 | HCH-071 | NS | 330430 | HCH-071M | NS | 331512 | 41 |
| 0.75 | 277 | 1 | 2.7 | 2,559 | 21 | 24 | 7 | HCH-071 | NS | 330448 | HCH-071M | NS | 331520 | 41 |
| 1 | 120 | 1 | 8.3 | 3,412 | 21 | 24 | 7 | HCH-101 | NS | 330456 | HCH-101M | NS | 331539 | 41 |
| 1 | 208 | 1 | 4.8 | 3,412 | 21 | 24 | 7 | HCH-101 | NS | 330464 | HCH-101M | NS | 331547 | 41 |
| 1 | 208 | 3 | 2.8 | 3,412 | 21 | 24 | 7 | HCH-101 | NS | 330501 | HCH-101M | NS | 331580 | 41 |
| 1 | 240 | 1 | 4.2 | 3,412 | 21 | 24 | 7 | HCH-101 | NS | 330472 | HCH-101M | NS | 331555 | 41 |
| 1 | 240 | 3 | 2.4 | 3,412 | 21 | 24 | 7 | HCH-101 | NS | 330510 | HCH-101M | NS | 331598 | 41 |
| 1 | 277 | 1 | 3.6 | 3,412 | 21 | 24 | 7 | HCH-101 | NS | 330480 | HCH-101M | NS | 331563 | 41 |
| 1 | 480 | 1 | 2.1 | 3,412 | 21 | 24 | 7 | HCH-101 | NS | 330499 | HCH-101M | NS | 331571 | 41 |
| 1 | 480 | 3 | 1.2 | 3,412 | 21 | 24 | 7 | HCH-101 | NS | 330528 | HCH-101M | NS | 331600 | 41 |
| 1 | 480 | 3 | 1.2 | 3,412 | 21 | 24 | 7 | HCH-101 (4W) | NS | 330536 | HCH-101M (4W) | NS | 331619 | 41 |
| 1.5 | 120 | 1 | 12.5 | 5,118 | 21 | 24 | 7 | HCH-151 | NS | 330544 | HCH-151M | NS | 331627 | 41 |
| 1.5 | 208 | 1 | 7.2 | 5,118 | 21 | 24 | 7 | HCH-151 | NS | 330552 | HCH-151M | NS | 331635 | 41 |
| 1.5 | 208 | 3 | 4.2 | 5,118 | 21 | 24 | 7 | HCH-151 | NS | 330595 | HCH-151M | NS | 331678 | 41 |
| 1.5 | 240 | 1 | 6.3 | 5,118 | 21 | 24 | 7 | HCH-151 | NS | 330560 | HCH-151M | NS | 331643 | 41 |
| 1.5 | 240 | 3 | 3.6 | 5,118 | 21 | 24 | 7 | HCH-151 | NS | 330608 | HCH-151M | NS | 331686 | 41 |
| 1.5 | 277 | 1 | 3.1 | 5,118 | 21 | 24 | 7 | HCH-151 | NS | 330579 | HCH-151M | NS | 331651 | 41 |
| 1.5 | 480 | 1 | 3.1 | 5,118 | 21 | 24 | 7 | HCH-151 | NS | 330587 | HCH-151M | NS | 331661 | 41 |
| 1.5 | 480 | 3 | 1.8 | 5,118 | 21 | 24 | 7 | HCH-151 | NS | 330616 | HCH-151M | NS | 331694 | 41 |
| 1.5 | 480 | 3 | 1.8 | 5,118 | 21 | 24 | 7 | HCH-151 (4W) | NS | 330659 | HCH-151M (4W) | NS | 331731 | 41 |
| 1.5 | 550 | 3 | 1.6 | 5,118 | 21 | 24 | 7 | HCH-151 | NS | 330624 | HCH-151M | NS | 331707 | 41 |
| 1.5 | 575 | 3 | 1.5 | 5,118 | 21 | 24 | 7 | HCH-151 | NS | 330632 | HCH-151M | NS | 331715 | 41 |
| 1.5 | 600 | 3 | 1.4 | 5,118 | 21 | 24 | 7 | HCH-151 | NS | 330640 | HCH-151M | NS | 331723 | 41 |
| 2 | 120 | 1 | 16.7 | 6,824 | 21 | 24 | 7 | HCH-201 | NS | 330667 | HCH-201M | NS | 331740 | 41 |
| 2 | 208 | 1 | 9.6 | 6,824 | 21 | 24 | 7 | HCH-201 | NS | 330675 | HCH-201M | NS | 331758 | 41 |
| 2 | 208 | 3 | 5.6 | 6,824 | 21 | 24 | 7 | HCH-201 | NS | 330712 | HCH-201M | NS | 331790 | 41 |
| 2 | 240 | 1 | 8.3 | 6,824 | 21 | 24 | 7 | HCH-201 | NS | 330683 | HCH-201M | NS | 331766 | 41 |
| 2 | 240 | 3 | 4.8 | 6,824 | 21 | 24 | 7 | HCH-201 | NS | 330720 | HCH-201M | NS | 331803 | 41 |
| 2 | 277 | 1 | 7.2 | 6,824 | 21 | 24 | 7 | HCH-201 | NS | 330691 | HCH-201M | NS | 331774 | 41 |
| 2 | 480 | 1 | 4.2 | 6,824 | 21 | 24 | 7 | **HCH-201** | **S** | **330704** | HCH-201M | NS | 331782 | 41 |
| 2 | 480 | 3 | 2.4 | 6,824 | 21 | 24 | 7 | HCH-201 | NS | 330739 | HCH-201M | NS | 331811 | 41 |
| 2 | 480 | 3 | 2.4 | 6,824 | 21 | 24 | 7 | HCH-201 (4W) | NS | 330771 | HCH-201M (4W) | NS | 331854 | 41 |
| 2 | 550 | 3 | 2.1 | 6,824 | 21 | 24 | 7 | HCH-201 | NS | 330747 | HCH-201M | NS | 331820 | 41 |
| 2 | 575 | 3 | 2 | 6,824 | 21 | 24 | 7 | HCH-201 | NS | 330755 | HCH-201M | NS | 331838 | 41 |
| 2 | 600 | 3 | 1.9 | 6,824 | 21 | 24 | 7 | HCH-201 | NS | 330763 | HCH-201M | NS | 331846 | 41 |
| 2.5 | 120 | 1 | 20.8 | 8,530 | 21 | 36 | 7 | HCH-251 | NS | 330780 | HCH-251M | NS | 331862 | 57 |
| 2.5 | 208 | 1 | 12 | 8,530 | 21 | 36 | 7 | HCH-251 | NS | 330798 | HCH-251M | NS | 331870 | 57 |
| 2.5 | 240 | 1 | 10.4 | 8,530 | 21 | 36 | 7 | HCH-251 | NS | 330800 | HCH-251M | NS | 331889 | 57 |
| 2.5 | 277 | 1 | 9 | 8,530 | 21 | 36 | 7 | HCH-251 | NS | 330819 | HCH-251M | NS | 331897 | 57 |
| 2.5 | 480 | 1 | 5.2 | 8,530 | 21 | 36 | 7 | HCH-251 | NS | 330827 | HCH-251M | NS | 331900 | 57 |
| 2.5 | 208 | 3 | 6.9 | 8,530 | 21 | 36 | 7 | HCH-251 | NS | 330835 | HCH-251M | NS | 331918 | 57 |
| 2.5 | 240 | 3 | 6 | 8,530 | 21 | 36 | 7 | HCH-251 | NS | 330843 | HCH-251M | NS | 331926 | 57 |
| 2.5 | 480 | 3 | 3 | 8,530 | 21 | 36 | 7 | HCH-251 | NS | 330851 | HCH-251M | NS | 331934 | 57 |
| 2.5 | 480 | 3 | 3 | 8,530 | 21 | 36 | 7 | HCH-251 (4W) | NS | 330894 | HCH-251M (4W) | NS | 331977 | 57 |
| 2.5 | 550 | 3 | 2.6 | 8,530 | 21 | 36 | 7 | HCH-251 | NS | 330860 | HCH-251M | NS | 331942 | 57 |
| 2.5 | 575 | 3 | 2.5 | 8,530 | 21 | 36 | 7 | HCH-251 | NS | 330878 | HCH-251M | NS | 331950 | 57 |
| 2.5 | 600 | 3 | 2.4 | 8,530 | 21 | 36 | 7 | HCH-251 | NS | 330886 | HCH-251M | NS | 331969 | 57 |
| 3 | 208 | 1 | 14.4 | 10,236 | 21 | 36 | 7 | HCH-301 | NS | 330907 | HCH-301M | NS | 331985 | 57 |
| 3 | 208 | 3 | 8.3 | 10,236 | 21 | 36 | 7 | HCH-301 | NS | 330940 | HCH-301M | NS | 332021 | 57 |
| 3 | 240 | 1 | 12.5 | 10,236 | 21 | 36 | 7 | HCH-301 | NS | 330915 | HCH-301M | NS | 331993 | 57 |
| 3 | 240 | 3 | 7.2 | 10,236 | 21 | 36 | 7 | HCH-301 | NS | 330958 | HCH-301M | NS | 332030 | 57 |
| 3 | 277 | 1 | 10.8 | 10,236 | 21 | 36 | 7 | HCH-301 | NS | 330923 | HCH-301M | NS | 332005 | 57 |
| 3 | 480 | 1 | 6.3 | 10,236 | 21 | 36 | 7 | HCH-301 | NS | 330931 | HCH-301M | NS | 332013 | 57 |
| 3 | 480 | 3 | 3.6 | 10,236 | 21 | 36 | 7 | HCH-301 | NS | 330966 | HCH-301M | NS | 332048 | 57 |
| 3 | 550 | 3 | 3.2 | 10,236 | 21 | 36 | 7 | HCH-301 | NS | 330974 | HCH-301M | NS | 332056 | 57 |
| 3 | 575 | 3 | 3 | 10,236 | 21 | 36 | 7 | HCH-301 | NS | 330982 | HCH-301M | NS | 332064 | 57 |
| 3 | 600 | 3 | 2.9 | 10,236 | 21 | 36 | 7 | HCH-301 | NS | 330990 | HCH-301M | NS | 332072 | 57 |
| 3 | 480 | 3 | 3.6 | 10,236 | 21 | 36 | 7 | HCH-301 (4W) | NS | 331002 | HCH-301M (4W) | NS | 332080 | 57 |

# HCH
## Wall Mounted Convection Heater *(cont'd.)*

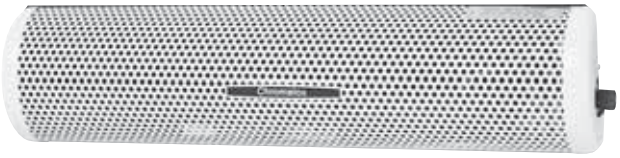
### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (In.) | | | w/o Manual Reset | | | w/ Manual Reset | | | Wt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | Amps | Btuh | Height | Width | Depth | Model | Stock | PCN | Model | Stock | PCN | (Lbs.) |
| 3.5 | 208 | 1 | 16.8 | 11,942 | 21 | 36 | 7 | HCH-351 | NS | 331010 | HCH-351M | NS | 332099 | 57 |
| 3.5 | 240 | 1 | 14.6 | 11,942 | 21 | 36 | 7 | HCH-351 | NS | 331029 | HCH-351M | NS | 332101 | 57 |
| 3.5 | 277 | 1 | 12.6 | 11,942 | 21 | 36 | 7 | HCH-351 | NS | 331037 | HCH-351M | NS | 332110 | 57 |
| 3.5 | 480 | 1 | 7.3 | 11,942 | 21 | 36 | 7 | HCH-351 | NS | 331045 | HCH-351M | NS | 332128 | 57 |
| 3.5 | 208 | 3 | 9.7 | 11,942 | 21 | 36 | 7 | HCH-351 | NS | 331053 | HCH-351M | NS | 332136 | 57 |
| 3.5 | 240 | 3 | 8.4 | 11,942 | 21 | 36 | 7 | HCH-351 | NS | 331061 | HCH-351M | NS | 332144 | 57 |
| 3.5 | 480 | 3 | 4.2 | 11,942 | 21 | 36 | 7 | HCH-351 | NS | 331070 | HCH-351M | NS | 332152 | 57 |
| 3.5 | 550 | 3 | 3.7 | 11,942 | 21 | 36 | 7 | HCH-351 | NS | 331088 | HCH-351M | NS | 332160 | 57 |
| 3.5 | 575 | 3 | 3.5 | 11,942 | 21 | 36 | 7 | HCH-351 | NS | 331096 | HCH-351M | NS | 332179 | 57 |
| 3.5 | 600 | 3 | 3.4 | 11,942 | 21 | 36 | 7 | HCH-351 | NS | 331109 | HCH-351M | NS | 332187 | 57 |
| 3.5 | 480 | 3 | 4.2 | 11,942 | 21 | 36 | 7 | HCH-351 (4W) | NS | 331117 | HCH-351M (4W) | NS | 332195 | 57 |
| 4 | 208 | 1 | 19.2 | 13,648 | 21 | 48 | 7 | HCH-401 | NS | 331125 | HCH-401M | NS | 332208 | 70 |
| 4 | 208 | 3 | 11.1 | 13,648 | 21 | 48 | 7 | HCH-401 | NS | 331168 | HCH-401M | NS | 332240 | 70 |
| 4 | 240 | 1 | 16.7 | 13,648 | 21 | 48 | 7 | **HCH-401** | **S** | **331133** | HCH-401M | NS | 332216 | 70 |
| 4 | 240 | 3 | 9.6 | 13,648 | 21 | 48 | 7 | HCH-401 | NS | 331176 | HCH-401M | NS | 332259 | 70 |
| 4 | 277 | 1 | 14.4 | 13,648 | 21 | 48 | 7 | HCH-401 | NS | 331141 | HCH-401M | NS | 332224 | 70 |
| 4 | 480 | 1 | 8.3 | 13,648 | 21 | 48 | 7 | HCH-401 | NS | 331150 | HCH-401M | NS | 332232 | 70 |
| 4 | 480 | 3 | 4.8 | 13,648 | 21 | 48 | 7 | HCH-401 | NS | 331184 | HCH-401M | NS | 332267 | 70 |
| 4 | 550 | 3 | 4.2 | 13,648 | 21 | 48 | 7 | HCH-401 | NS | 331192 | HCH-401M | NS | 332275 | 70 |
| 4 | 575 | 3 | 4.0 | 13,648 | 21 | 48 | 7 | HCH-401 | NS | 331205 | HCH-401M | NS | 332283 | 70 |
| 4 | 600 | 3 | 3.9 | 13,648 | 21 | 48 | 7 | HCH-401 | NS | 331213 | HCH-401M | NS | 332291 | 70 |
| 4 | 480 | 3 | 4.8 | 13,648 | 21 | 48 | 7 | HCH-401 (4W) | NS | 331221 | HCH-401M (4W) | NS | 332304 | 70 |
| 4.5 | 208 | 1 | 21.6 | 15,354 | 21 | 48 | 7 | HCH-451 | NS | 331230 | HCH-451M | NS | 332355 | 70 |
| 4.5 | 240 | 1 | 18.8 | 15,354 | 21 | 48 | 7 | HCH-451 | NS | 331248 | HCH-451M | NS | 332320 | 70 |
| 4.5 | 277 | 1 | 16.2 | 15,354 | 21 | 48 | 7 | HCH-451 | NS | 331256 | HCH-451M | NS | 332339 | 70 |
| 4.5 | 480 | 1 | 9.4 | 15,354 | 21 | 48 | 7 | HCH-451 | NS | 331264 | HCH-451M | NS | 332347 | 70 |
| 4.5 | 208 | 3 | 12.5 | 15,354 | 21 | 48 | 7 | HCH-451 | NS | 331272 | HCH-451M | NS | 332355 | 70 |
| 4.5 | 240 | 3 | 10.8 | 15,354 | 21 | 48 | 7 | HCH-451 | NS | 331280 | HCH-451M | NS | 332363 | 70 |
| 4.5 | 480 | 3 | 5.4 | 15,354 | 21 | 48 | 7 | HCH-451 | NS | 331299 | HCH-451M | NS | 332371 | 70 |
| 4.5 | 480 | 3 | 5.4 | 15,354 | 21 | 48 | 7 | HCH-451 (4W) | NS | 331336 | HCH-451M (4W) | NS | 332419 | 70 |
| 4.5 | 550 | 3 | 4.7 | 15,354 | 21 | 48 | 7 | HCH-451 | NS | 331301 | HCH-451M | NS | 332380 | 70 |
| 4.5 | 575 | 3 | 4.5 | 15,354 | 21 | 48 | 7 | HCH-451 | NS | 331310 | HCH-451M | NS | 332398 | 70 |
| 4.5 | 600 | 3 | 4.3 | 15,354 | 21 | 48 | 7 | HCH-451 | NS | 331328 | HCH-451M | NS | 332400 | 70 |
| 5 | 208 | 1 | 24 | 17,060 | 21 | 48 | 7 | HCH-501 | NS | 331344 | HCH-501M | NS | 332427 | 70 |
| 5 | 208 | 3 | 13.9 | 17,060 | 21 | 48 | 7 | HCH-501 | NS | 331387 | HCH-501M | NS | 332460 | 70 |
| 5 | 240 | 1 | 20.1 | 17,060 | 21 | 48 | 7 | HCH-501 | NS | 331352 | HCH-501M | NS | 332435 | 70 |
| 5 | 240 | 3 | 12 | 17,060 | 21 | 48 | 7 | HCH-501 | NS | 331395 | HCH-501M | NS | 332478 | 70 |
| 5 | 277 | 1 | 18.1 | 17,060 | 21 | 48 | 7 | HCH-501 | NS | 331360 | HCH-501M | NS | 332443 | 70 |
| 5 | 480 | 1 | 10.4 | 17,060 | 21 | 48 | 7 | **HCH-501** | **S** | **331379** | HCH-501M | NS | 332451 | 70 |
| 5 | 480 | 3 | 6 | 17,060 | 21 | 48 | 7 | HCH-501 | NS | 331408 | HCH-501M | NS | 332486 | 70 |
| 5 | 480 | 3 | 6 | 17,060 | 21 | 48 | 7 | HCH-501 (4W) | NS | 331440 | HCH-501M (4W) | NS | 332523 | 70 |
| 5 | 550 | 3 | 5.3 | 17,060 | 21 | 48 | 7 | HCH-501 | NS | 331416 | HCH-501M | NS | 332494 | 70 |
| 5 | 575 | 3 | 5 | 17,060 | 21 | 48 | 7 | HCH-501 | NS | 331424 | HCH-501M | NS | 332507 | 70 |
| 5 | 600 | 3 | 4.8 | 17,060 | 21 | 48 | 7 | HCH-501 | NS | 331432 | HCH-501M | NS | 332515 | 70 |

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

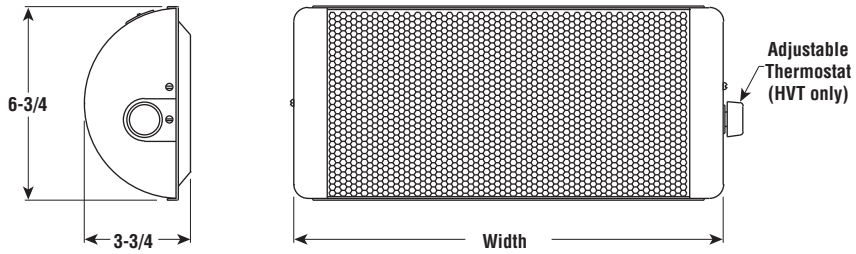
**Note —** (4W) represents 4 wire.

# EH & HVT
## Industrial Convection Heaters



- **Without Thermostat (type EH)**
- **With Thermostat (type HVT)**
- **250 - 1,000 Watts**
- **853 - 3,412 Btuh**
- **120 and 240 Volt**
- **Single Phase**

### *Dimensions (Inches)*




### *Description*

EH and HVT industrial convection heaters are designed for the highest dependability for rough plant areas and small manned or unattended areas.

### *Applications*

- Crane Cabs
- Shop Offices
- Small Plant Areas
- Non-Hazardous Pump Sheds

### *Construction*

**Cabinet —** Heavy gauge perforated steel case finished in corrosion resistant almond polyester powder coat paint.

**Heating Elements** are strip type construction and are the most rugged, durable, long-lasting elements available to industry.

**Built-in Thermostat —** (HVT only). Furnished standard to provide temperatures from 50°F - 110°F.

### *Advantages*

- Long Life
- Rugged for High Traffic Areas
- Easy Installation
- Corrosion Resistant

**CAUTION** — Not intended for use where flammable vapors, gases, liquids or other combustible atmospheres are present.

### *Specifications and Ordering Information*

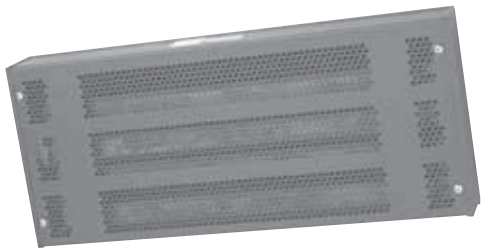
| kW | Volts | Phase | Amps | Btuh | Dimensions (In.) Height | Width | Depth | Model | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **EH — Without Thermostat** | | | | | | | | | | | |
| 0.25 | 120 | 1 | 2.1 | 853 | 6-3/4 | 14-5/8 | 3-3/4 | **EH-1221** | **S** | **261833** | 7 |
| 0.25 | 240 | 1 | 1 | 853 | 6-3/4 | 14-5/8 | 3-3/4 | EH-1221 | NS | 261841 | 7 |
| 0.5 | 120 | 1 | 4.2 | 1,706 | 6-3/4 | 14-5/8 | 3-3/4 | **EH-1251** | **S** | **261850** | 7 |
| 0.5 | 240 | 1 | 2.1 | 1,706 | 6-3/4 | 14-5/8 | 3-3/4 | **EH-1251** | **S** | **261868** | 7 |
| **HVT — With Thermostat** | | | | | | | | | | | |
| 0.5 | 120 | 1 | 4.2 | 1,706 | 6-3/4 | 28-5/8 | 3-3/4 | **HVT-1251** | **S** | **240055** | 13 |
| 1 | 120 | 1 | 8.3 | 3,412 | 6-3/4 | 28-5/8 | 3-3/4 | **HVT-2411** | **S** | **240071** | 15 |

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

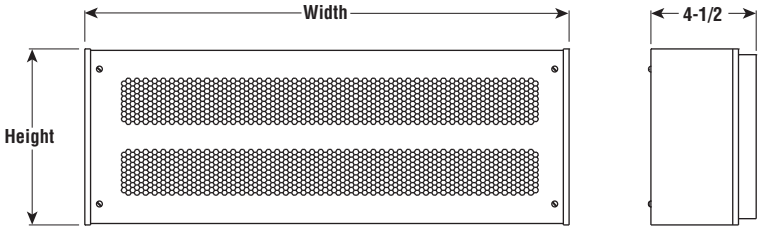
*Refer to WR-80, WR-90 in the Controls section.*

# H
## Horizontal Convection Heater

- 1 - 3 kW
- 3,412 - 10,236 Btuh
- 120, 240 and 480 Volt
- Single Phase



### *Dimensions (Inches)*




### *Description*

Type H horizontal convection heaters are designed for the highest dependability for rugged plant areas and small manned or unattended areas.

### *Applications*

- Crane Cabs
- Shop Offices
- Small Plant Areas
- Non-Hazardous Pump Sheds

### *Construction*

**Cabinet —** Heavy gauge perforated steel case finished in corrosion resistant black polyester powder coat paint.

**Heating Elements** are strip type construction and are the most rugged, durable, long-lasting elements available to industry.

**CAUTION** — Not intended for use where flammable vapors, gases, liquids or other combustible atmospheres are present.

### *Advantages*

- Long Life
- Durable for High Traffic Areas
- Easy Installation
- Corrosion Resistant

### *Specifications and Ordering Information*

| kW | Volts | No. Elem. | Amps | Btuh | Dimensions (In.) Height | Width | Depth | Model | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 120 | 2 | 8.3 | 3,412 | 7-1/2 | 20-3/4 | 4-1/2 | **H-1801** | **S** | **261948** | 28 |
| 1 | 240 | 2 | 4.2 | 3,412 | 7-1/2 | 20-3/4 | 4-1/2 | H-1801 | NS | 261956 | 28 |
| 1.5 | 120 | 2 | 12.5 | 5,118 | 7-1/2 | 26-1/2 | 4-1/2 | H-2405 | NS | 262000 | 30 |
| 1.5 | 240 | 2 | 6.3 | 5,118 | 7-1/2 | 26-1/2 | 4-1/2 | **H-2405** | **S** | **262019** | 30 |
| 1.5 | 480 | 2 | 3.1 | 5,118 | 7-1/2 | 26-1/2 | 4-1/2 | H-2405 | NS | 262027 | 30 |
| 2 | 120 | 4 | 16.7 | 6,824 | 11-1/4 | 26-1/2 | 4-1/2 | **H-2406** | **S** | **262060** | 32 |
| 2 | 240 | 4 | 8.3 | 6,824 | 11-1/4 | 26-1/2 | 4-1/2 | **H-2406** | **S** | **262078** | 32 |
| 2 | 480 | 4 | 4.2 | 6,824 | 11-1/4 | 26-1/2 | 4-1/2 | **H-2406** | **S** | **262086** | 32 |
| 3 | 240 | 4 | 12.5 | 10,236 | 11-1/4 | 26-1/2 | 4-1/2 | **H-2407** | **S** | **262131** | 32 |
| 3 | 480 | 4 | 6.3 | 10,236 | 11-1/4 | 26-1/2 | 4-1/2 | **H-2407** | **S** | **262140** | 32 |

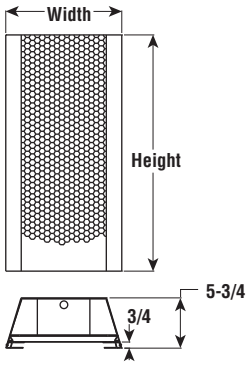
**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, PCN, kW, volts, phase and quantity.

*Refer to WR-80, WR-90 in the Controls section.*

# V
# Vertical Convection Heater

- **2 - 4.5 kW**
- **6,824 - 15,354 Btuh**
- **120, 240 and 480 Volt**
- **Single Phase**

## *Dimensions (Inches)*




## *Description*

Type V vertical convection heaters are designed for the highest dependability for rugged plant areas and small manned or unattended areas.

## *Applications*

- Crane Cabs
- Shop Offices
- Small Plant Areas
- Non-Hazardous Pump Sheds

## *Construction*

**Cabinet —** Heavy gauge perforated steel case finished in corrosion resistant black polyester powder coat paint.

**Heating Elements** are strip type construction and are the most rugged, durable, long-lasting elements available to industry.

**CAUTION** — Not intended for use where flammable vapors, gases, liquids or other combustible atmospheres are present.

## *Advantages*

- Long Life
- Durable for High Traffic Areas
- Easy Installation
- Corrosion Resistant
- Low Maintenance

## *Specifications and Ordering Information*

| kW | Volts | No. Elem. | Amps | Btuh | Dimensions (In.) Height | Width | Depth | Model | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 240 | 4 | 8.3 | 6,824 | 27 | 12-3/4 | 5-3/4 | V-2020 | NS | 262254 | 34 |
| 3 | 240 | 4 | 12.5 | 10,236 | 27 | 12-3/4 | 5-3/4 | **V-2030** | **S** | **262318** | 34 |
| 3 | 480 | 4 | 6.3 | 10,236 | 27 | 12-3/4 | 5-3/4 | V-2030 | NS | 262326 | 34 |
| 4.5 | 120 | 6 | 25 | 10,236 | 27 | 17-3/4 | 5-3/4 | V-2040 | NS | 262369 | 44 |
| 4.5 | 240 | 6 | 18.8 | 15,354 | 27 | 17-3/4 | 5-3/4 | V-2040 | NS | 262377 | 44 |
| 4.5 | 480 | 6 | 9.4 | 15,354 | 27 | 17-3/4 | 5-3/4 | **V-2040** | **S** | **262385** | 44 |

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

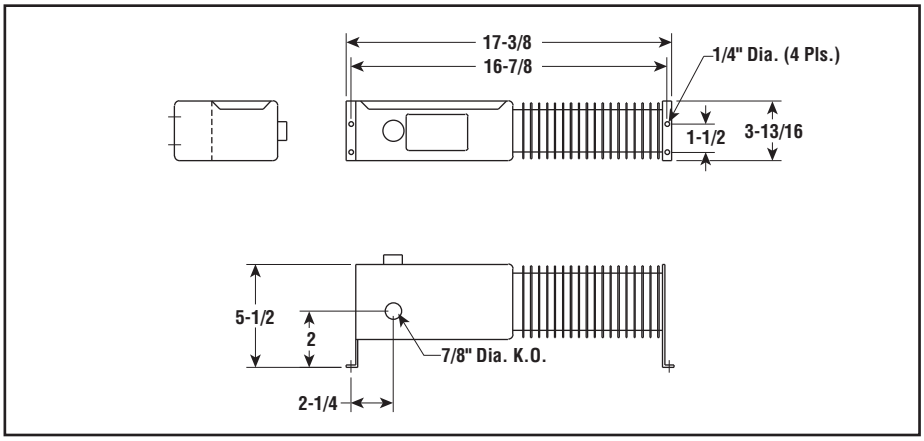
*Refer to WR-80, WR-90 in the Controls section.*

# CPHH

## Pump House Convection Heater

- **500 Watts**
- **1,706 Btuh**
- **120 and 240 Volt**
- **Single Phase**

### *Dimensions (Inches)*




### *Description*

CPHH pump house heaters provide around the clock freeze protection or heat anywhere it's needed. The heater features a built-in thermostat and can be left unattended all winter long. The rugged cast grid heating element can withstand most any environment.

### *Applications*

- Boiler Rooms
- Water Pump Sheds (golf course)
- Garage Grease Pits
- Equipment Buildings
- Control Panels

### *Construction*

**Control Enclosure —** Heavy gauge formed steel corrosion treated and painted with a hybrid polyester epoxy coating.

**Heating Element —** Cast aluminum heating grid.

**Control —** Built-in bimetallic adjustable thermostat with 40 to 80°F range.

**CAUTION** — Not intended for use where flammable vapors, gases, liquids or other combustible atmospheres are present.

### *Advantages*

- Long Life
- Self Contained
- For Unattended Locations
- Corrosion Resistant

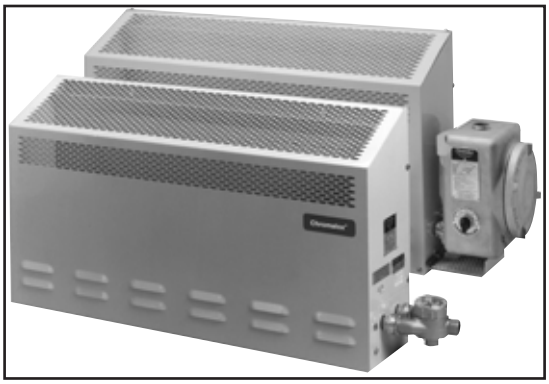
### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (In.) | | | Ordering | | | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | No. Elem. | Amps | Btuh | Height | Width | Depth | Model | Stock | PCN | |
| 0.5 | 120 | 1 | 4.2 | 1,707 | 2-1/2 | 18-7/8 | 6-1/8 | **CPHH-50011** | **S** | **350190** | 5 |
| 0.5 | 240 | 1 | 2.1 | 1,707 | 2-1/2 | 18-7/8 | 6-1/8 | CPHH-50031 | NS | 350203 | 5 |

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

# CVEP
## Explosion Proof Convection Heater

- **1.6 - 9 kW**
- **5,459 - 30,708 Btuh**
- **120, 208, 240, 277, 480 and 575 Volt**
- **1 & 3 Phase**
- **Built-in & Prewired Control Options**
- **UL Listed and CSA Certified for Class 1, Division 1 or 2, Group B, C & D Environments**
- **CE Approved Models Available**



### *Description*

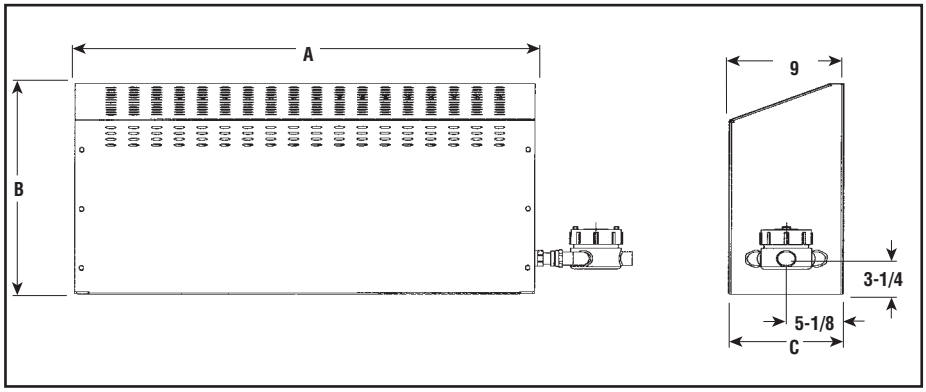
Type CVEP explosion proof convection heater is designed to provide a rugged, corrosion-resistant heat source for areas where volatile flammable liquids, gases or vapors are present. All basic models without controls are UL listed and CSA certified for use in areas designated as Class 1, Division 1 or 2 Group B, C or D locations.

### *Applications*

- Petroleum Refineries, Gasoline Storage and Dispensing Areas
- Industrial Areas Using Flammable Liquids in Dip Tanks
- Petroleum Refineries
- Dry Cleaning Plants
- Utility and Natural Gas Plants
- Aircraft Hangers/Fueling Areas
- Solvent Extraction Plants
- Storage Areas for Flammable Products or Batteries
- Sewage Treatment Plants
- Hydrogen Atmospheres

*Refer to WR-80EP in the Controls section.*

### *Dimensions (Inches)*




### *Dimensions (Inches)*

| kW | A | B | C |
|---|---|---|---|
| 1.6, 1.8 and 3.6 | 34 | 20 | 9 |
| 3.2 and 7.6 | 58 | 20 | 9 |
| 4.0, 4.5 and 9.0 | 70 | 20 | 9 |

### *Construction*

**Cabinet —** Sloped top, constructed of heavy 16 gauge steel, polyester powder coated for maximum corrosion resistance.

**Explosion Proof Junction Box —** For conduit entry and ease of power wiring.

**Heating Elements —** Sealed, metal sheath, heavy-duty, low watt density, enclosed high grade resistance wire embedded in MgO refractory core. Elements are inserted in a copper tube with aluminum fins.

### *Features*

Integral Mounting Brackets allow for easy wall installation.

Sloped Top Cabinet ensures maximum ventilation by preventing objects from being placed on the top which would restrict air flow.

### *Designed for Areas Classified*

- Class I, Division 1 or 2, Groups B, C, D
- Temperature Code T3A 180°C (356°F) or T2A 280°C (536°F)
  Ex II2G Ex d IIB T2-T3

### *Optional Features (Factory Installed)*

- Thermostat
- Magnetic Contactor
- Control Voltage Transformer

### *Advantages*

- Easy Installation
- Clean, Safer Heat Source
- Pre-Wired Control Options
- Long Life

# CVEP
## Convection Heater For Hazardous Locations

*Specifications and Ordering Information*

| Electrical | | | | | Model | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | Amps | Btuh | | | | |
| **Temperature Code T3A (356°F, 180°C) Group B, C, and D** | | | | | | | | |
| 1.6 | 208 | 1 | 7.7 | 5,500 | CVEP-16-81-00-00 | NS | 088336 | 58 |
| 1.6 | 208 | 3 | 4.5 | 5,500 | CVEP-16-83-00-00 | NS | 086844 | 58 |
| 1.6 | 240 | 1 | 6.7 | 5,500 | CVEP-16-21-00-00 | NS | 086852 | 58 |
| 1.6 | 240 | 3 | 3.8 | 5,500 | CVEP-16-23-00-00 | NS | 086860 | 58 |
| 1.6 | 277 | 1 | 5.8 | 5,500 | CVEP-16-71-00-00 | NS | 086879 | 58 |
| 1.6 | 480 | 1 | 3.3 | 5,500 | CVEP-16-41-00-00 | NS | 086887 | 58 |
| 1.6 | 480 | 3 | 1.9 | 5,500 | CVEP-16-43-00-00 | NS | 086895 | 58 |
| 1.6 | 575 | 1 | 2.8 | 5,500 | CVEP-16-61-00-00 | NS | 086908 | 58 |
| 3.2 | 208 | 1 | 15.4 | 11,000 | CVEP-32-81-00-00 | NS | 086916 | 94 |
| 3.2 | 208 | 3 | 9.0 | 11,000 | CVEP-32-83-00-00 | NS | 086924 | 94 |
| 3.2 | 240 | 1 | 13.3 | 11,000 | CVEP-32-21-00-00 | NS | 086932 | 94 |
| 3.2 | 240 | 3 | 7.7 | 11,000 | CVEP-32-23-00-00 | NS | 086940 | 94 |
| 3.2 | 277 | 1 | 11.6 | 11,000 | CVEP-32-71-00-00 | NS | 086959 | 94 |
| 3.2 | 480 | 1 | 6.7 | 11,000 | CVEP-32-41-00-00 | NS | 086967 | 94 |
| 3.2 | 480 | 3 | 3.8 | 11,000 | CVEP-32-43-00-00 | NS | 086975 | 94 |
| 3.2 | 575 | 1 | 5.6 | 11,000 | CVEP-32-61-00-00 | NS | 086983 | 94 |
| 4 | 208 | 1 | 19.2 | 13,600 | CVEP-40-81-00-00 | NS | 086991 | 112 |
| 4 | 208 | 3 | 11.1 | 13,600 | CVEP-40-83-00-00 | NS | 087003 | 112 |
| 4 | 240 | 1 | 16.7 | 13,600 | CVEP-40-21-00-00 | NS | 087011 | 112 |
| 4 | 240 | 3 | 9.6 | 13,600 | CVEP-40-23-00-00 | NS | 087020 | 112 |
| 4 | 277 | 1 | 14.4 | 13,600 | CVEP-40-71-00-00 | NS | 087038 | 112 |
| 4 | 480 | 1 | 8.3 | 13,600 | CVEP-40-41-00-00 | NS | 087046 | 112 |
| 4 | 480 | 3 | 4.8 | 13,600 | CVEP-40-43-00-00 | NS | 087054 | 112 |
| 4 | 575 | 1 | 7 | 13,600 | CVEP-40-61-00-00 | NS | 087062 | 112 |
| **Temperature Code T2A (536°F, 280°C) Group B, C, and D** | | | | | | | | |
| 1.8 | 120 | 1 | 15 | 6,140 | CVEP-18-11-00-00 | NS | 028759 | 46 |
| 1.8 | 208 | 1 | 8.7 | 6,140 | **CVEP-18-81-00-00** | **S** | **028767** | 46 |
| 1.8 | 208 | 3 | 5 | 6,140 | CVEP-18-83-00-00 | NS | 028775 | 46 |
| 1.8 | 240 | 1 | 7.5 | 6,140 | **CVEP-18-21-00-00** | **S** | **028783** | 46 |
| 1.8 | 240 | 3 | 4.4 | 6,140 | CVEP-18-23-00-00 | NS | 028791 | 46 |
| 1.8 | 277 | 1 | 6.5 | 6,140 | CVEP-18-71-00-00 | NS | 028804 | 46 |
| 1.8 | 480 | 1 | 3.7 | 6,140 | CVEP-18-41-00-00 | NS | 028812 | 46 |
| 1.8 | 480 | 3 | 2.2 | 6,140 | CVEP-18-43-00-00 | NS | 028820 | 46 |
| 3.6 | 208 | 1 | 17.3 | 12,300 | **CVEP-36-81-00-00** | **S** | **087070** | 58 |
| 3.6 | 208 | 3 | 10 | 12,300 | CVEP-36-83-00-00 | NS | 087089 | 58 |
| 3.6 | 240 | 1 | 15 | 12,300 | **CVEP-36-21-00-00** | **S** | **087097** | 58 |
| 3.6 | 240 | 3 | 8.7 | 12,300 | CVEP-36-23-00-00 | NS | 087100 | 58 |
| 3.6 | 277 | 1 | 13 | 12,300 | CVEP-36-71-00-00 | NS | 087118 | 58 |
| 3.6 | 480 | 1 | 7.5 | 12,300 | **CVEP-36-41-00-00** | **S** | **087126** | 58 |
| 3.6 | 480 | 3 | 4.3 | 12,300 | CVEP-36-43-00-00 | NS | 087134 | 58 |
| 3.6 | 575 | 1 | 6.3 | 12,300 | CVEP-36-61-00-00 | NS | 087142 | 58 |
| 7.6 | 208 | 1 | 36.5 | 24,000 | CVEP-76-81-00-00 | NS | 085913 | 94 |
| 7.6 | 208 | 3 | 21.1 | 24,000 | CVEP-76-83-00-00 | NS | 085921 | 94 |
| 7.6 | 240 | 1 | 31.7 | 24,000 | CVEP-76-21-00-00 | NS | 085930 | 94 |
| 7.6 | 240 | 3 | 18.3 | 24,000 | CVEP-76-23-00-00 | NS | 085948 | 94 |
| 7.6 | 277 | 1 | 27.4 | 24,000 | CVEP-76-71-00-00 | NS | 085956 | 94 |
| 7.6 | 480 | 1 | 15.8 | 24,000 | CVEP-76-41-00-00 | NS | 085964 | 94 |
| 7.6 | 480 | 3 | 9.2 | 24,000 | CVEP-76-43-00-00 | NS | 085972 | 94 |
| 7.6 | 575 | 1 | 13.2 | 24,000 | CVEP-76-61-00-00 | NS | 085980 | 94 |
| 9 | 208 | 1 | 43.3 | 30,700 | CVEP-90-81-00-00 | NS | 087230 | 112 |
| 9 | 208 | 3 | 25 | 30,700 | CVEP-90-83-00-00 | NS | 087249 | 112 |
| 9 | 240 | 1 | 37.5 | 30,700 | CVEP-90-21-00-00 | NS | 087257 | 112 |
| 9 | 240 | 3 | 21.7 | 30,700 | CVEP-90-23-00-00 | NS | 087265 | 112 |
| 9 | 277 | 1 | 32.5 | 30,700 | CVEP-90-71-00-00 | NS | 087273 | 112 |
| 9 | 480 | 1 | 18.8 | 30,700 | CVEP-90-41-00-00 | NS | 087281 | 112 |
| 9 | 480 | 3 | 10.8 | 30,700 | CVEP-90-43-00-00 | NS | 087290 | 112 |
| 9 | 575 | 1 | 15.7 | 30,700 | CVEP-90-61-00-00 | NS | 087302 | 112 |
| **Stock CVEP with Built-in Thermostat** | | | | | | | | |
| 1.8 | 120 | 1 | 15 | 6,140 | **CVEP-18-11-00-42** | **S** | **028839** | 59 |
| 1.8 | 208 | 1 | 8.7 | 6,140 | **CVEP-18-81-00-42** | **S** | **028847** | 59 |
| 1.8 | 240 | 1 | 7.5 | 6,140 | CVEP-18-21-00-42 | NS | 028855 | 59 |
| 1.8 | 277 | 1 | 6.5 | 6,140 | CVEP-18-71-00-42 | NS | 028863 | 59 |
| 1.8 | 480 | 1 | 3.7 | 6,140 | CVEP-18-41-32-42[1] | NS | 028871 | 69 |
| 3.6 | 208 | 1 | 17.3 | 12,300 | **CVEP-36-81-00-42** | **S** | **028644** | 60 |
| 3.6 | 240 | 1 | 15 | 12,300 | **CVEP-36-21-00-42** | **S** | **028660** | 60 |
| 3.6 | 480 | 1 | 7.5 | 12,300 | CVEP-36-41-32-42[1] | NS | 028652 | 70 |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order—**Specify model, PCN, kW, volts, phase and quantity.
CE approved models available. Contact your Chromalox representative.

**Note —**
1. Includes control transformer and contactor
2. Other sizes and configurations available, contact your Local Chromalox Sales office.

# CVEP

## Explosion Proof Convection Heater *(cont'd.)*

### *Ordering Information*

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

### *Power & Temp. Control Options*

| Power Control Combination | Thermostat Option | Figure Number |
|---|---|---|
| 00 | 00 | 1 |
| 00 | 40[1] | 5 |
| 00 | 42[2] | 2 |
| 30 - 35 | 00 | 4 |
| 30 - 35 | 40 | 5 |
| 30 - 35 | 42 | 3 |

[1] **Thermostat option: 40**
**Temperature range: 40˚ - 90˚F**
**Electrical Rating: 25 Amp 24V, 120V, 240V AC 22 Amp 277 VAC Higher Voltage or 3 phase requires magnetic contactor option and transformer**

[2] **Thermostat option: 42**
**Temperature range: 50˚ - 90˚F**
**Electrical Rating: 22 Amps 125/277 VAC Higher Voltage or 3 phase requires magnetic contactor option and transformer**

| Model | Explosion Proof Convection Heater | | | | | |
|---|---|---|---|---|---|---|
| CVEP | | | | | | |
| Code | Watts | | | | | |
| **16** | 1600 | | **40** | 4000 | | |
| **18** | 1800 | | **45** | 4500 | | |
| **32** | 3200 | | **76** | 7600 | | |
| **36** | 3600 | | **90** | 9000 | | |
| | Code | Voltage | | | | |
| | **1** | 120 | **6** | 575 | | |
| | **2** | 240 | **7** | 277 | | |
| | **3** | 380 | **8** | 208 | | |
| | **4** | 480 | **9** | 600 | | |
| | **5** | 415 | | | | |
| | | Code | Phase | | | |
| | | **1** | Single | | | |
| | | **3** | Three | | | |
| | | | Code | Power Control Options (See Options Table) | | |
| | | | **00** | no transformer no contactor | | |
| | | | **30** | (24V) transformer and contactor | | |
| | | | **31** | no transformer with contactor(24V) | | |
| | | | **32** | (120V) transformer and contactor | | |
| | | | **33** | no transformer with contactor(120V) | | |
| | | | **34** | no transformer with contactor(208/240V) | | |
| | | | **35** | no transformer with contactor(277V) | | |
| | | | | Code | Thermo/Class Options (See Options Table) | |
| | | | | **00** | no thermo B, C & D | |
| | | | | **40** | thermo in box B, C & D | |
| | | | | **42** | thermo C & D | |
| **CVEP** | **16** | **1** | **1** | **30** | **42** | **Typical Model Number** |

CE approved models available. Contact your Chromalox representative.

### *Dimensions (Inches)*

*Figure 1*

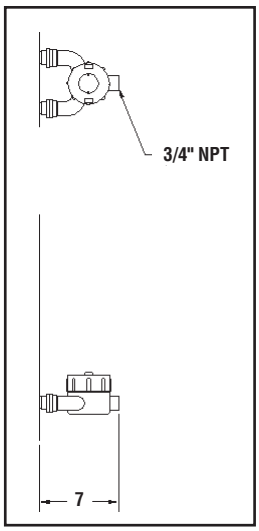



*Figure 2*

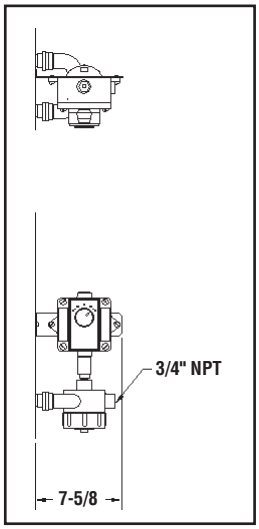



*Figure 3*

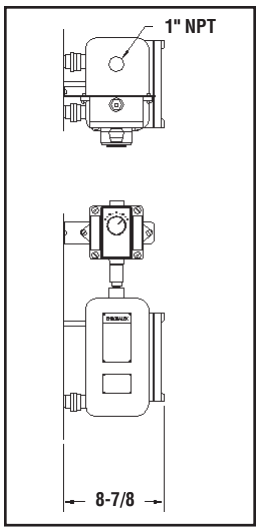



*Figure 4*

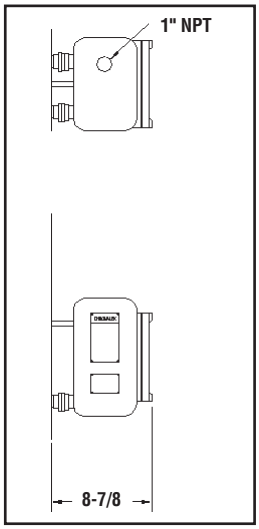
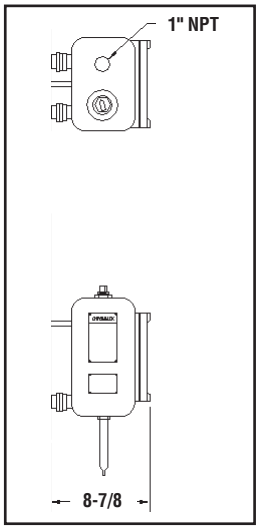



*Figure 5*



# CVEP Convection Heater For Hazardous Locations

## Sample Specifications – U.S. approved models

### 1. General

1.1 The Explosion-Proof Convection Air Heater Catalog Number _____ Rated _____ Volts, _____ Phase, _____ Watts, shall be designed and constructed for use in hazardous locations.

1.2 ☐ For Groups B, C and D Check This Block
The Heater shall be Underwriters Laboratories Inc. Listed and Canadian Standards Association Certified for constant use in Class I, Groups B, C and D Division 1 or 2 hazardous locations, and National Electric Code minimum gas ignition temperature identification number ☐ T2A, 280°C (536° F) or ☐ T3A, 180°C (356°F).

1.3 ☐ For Groups C and D Check This Block
The Heater shall be Underwriters Laboratories Inc. Listed and Canadian Standards Association Certified for constant use in Class I, Groups C and D Division 1 or 2 hazardous locations, and National Electric Code minimum gas ignition temperature identification number ☐ T2A, 280°C (536°F) or ☐ T3A, 180°C (356°F).

1.4 ☐ For Group D Check This Block
The heater shall be Underwriters Laboratories Inc. Listed and Canadian Standards Association Certified for constant use in Class 1, Group D Division 1 or 2 hazardous locations, and National Electric Code minimum gas ignition temperature identification number ☐ T2A, 280°C (536°F) or ☐T3A, 180°C (356°F).

1.5 The Heater shall be the natural convection type intended for wall mounting.

### 2. Construction

2.1 The back panel shall be designed to be easily mounted to the wall using keyhole slots.

2.2 The back panel shall be fabricated for 16 gauge steel, 9" deep by 20" high, finished with corrosion resistant polyester powder coating.

2.3 The back panel shall include perforations and a baffle to direct outside air between the panel and the mounting surface.

2.4 The front cabinet shall be easily removable by unthreading 4 bolts from threaded inserts.

2.5 The front cabinet shall be fabricated from 16 gauge steel. 9" deep by 20" high, and coated with corrosion resistant polyester powder coating.

2.6 The front cabinet shall be sloped to prevent objects from being placed on top causing restricted air flow.

### 3. Elements

3.1 The elements shall be constructed of heavy duty resistance wire insulated by magnesium oxide refractory, which has been highly compacted to transmit heat and act as an electrical insulator.

3.2 The elements are to be contained in a tube assembly, which is then swaged to an O.D. of 1.25".

3.3 The element assembly is inserted into a copper tube with 3" x 3.25" aluminum fins spaced at 48 fins per linear foot.

3.4 The finned assembly is to be mounted to the rear panel by polyester powder-coated brackets.

### 4. Controls (Optional)

4.1 The CVEP shall include the following built in control features:
☐ operating temperature control
☐ magnetic contactor
☐ control transformer with ☐ 120V ☐ 24V secondary

4.2 The control components shall be factory installed, wired and tested.

### 5. Terminal Box (For units without transformer or contactor options)

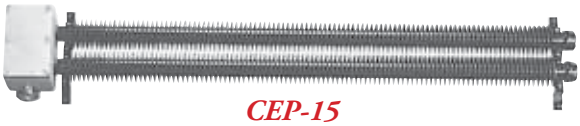
The terminal box shall be constructed of copper free aluminum, to include a grounding lug and to be U.L. listed for Class I hazardous locations (as indicated in 1. General Specifications above.)

# FPEP & CEP-15

## Explosion Proof Convection Heaters

- **200 to 1,500 Watts**
- **682 - 5,118 Btuh**
- **120, 208, 240, 277, 480 and 600 Volt**
- **Single Phase**

*FPEP*



*CEP-15*

### *Description*

The FPEP and CEP heaters have been especially engineered and constructed for supplying heat in areas containing hazardous vapors, gases and dusts.

### *Applications*

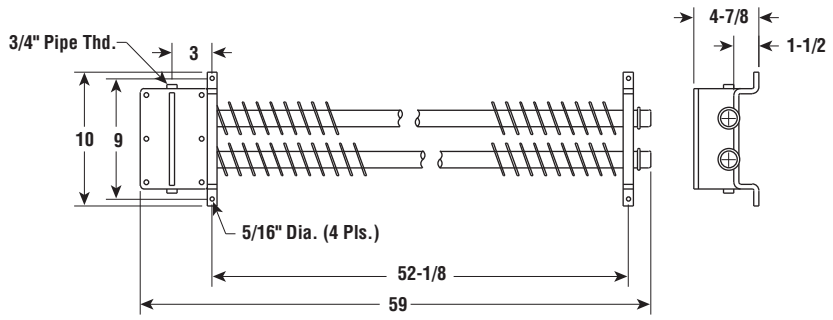
- Refineries
- Gas Generator Rooms
- Grain Handling Areas
- Mines
- Sewage Pumping Stations

### *Construction*

- Heating Surface Constructed of Schedule 40 Finned Pipe
- Cast Alloy® Explosion Proof Terminal Enclosure
- Elements Consist of 4 INCOLOY® Sheath Tubular Heaters

*Refer to WR-80EP in the Controls section.*

### *Dimensions (Inches)*




### *Designed for Areas Classified*

- Class I, Groups C, D
  Temperature Code T3C 160°C (320°F)
- Class II, Groups E, F, G
  Temperature Code T3B 165°C (329°F)
- Class III

### *Advantages*

- Long Life
- Safe for Dusty Environments
- Easy Installation
- Corrosion Resistant

### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (In.) | | | Ordering | | | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Watts | Volts | No. Elem. | Amps | Btuh | Height | Width | Depth | Model | Stock | PCN | |
| **FPEP — One Finned Element** | | | | | | | | | | | |
| 200 | 120 | 1 | 1.7 | 682 | 5 | 21-5/8 | 5-3/4 | FPEP-200211 | NS | 350000 | 14 |
| 400 | 120 | 1 | 3.3 | 1,365 | 5 | 34-1/2 | 5-3/4 | FPEP-400211 | NS | 350019 | 19 |
| 400 | 208 | 1 | 1.9 | 1,365 | 5 | 34-1/2 | 5-3/4 | FPEP-400221 | NS | 350027 | 19 |
| 400 | 240 | 1 | 1.7 | 1,365 | 5 | 34-1/2 | 5-3/4 | FPEP-400231 | NS | 350035 | 19 |
| 500 | 120 | 1 | 4.2 | 1,706 | 5 | 40-1/8 | 5-3/4 | FPEP-500211 | NS | 350043 | 24 |
| 500 | 208 | 1 | 2.4 | 1,706 | 5 | 40-1/8 | 5-3/4 | FPEP-500221 | NS | 350051 | 24 |
| 500 | 240 | 1 | 2.1 | 1,706 | 5 | 40-1/8 | 5-3/4 | FPEP-500231 | NS | 350060 | 24 |
| 750 | 120 | 1 | 6.3 | 2,559 | 5 | 57-7/8 | 5-3/4 | FPEP-750211 | NS | 350078 | 34 |
| 750 | 208 | 1 | 3.6 | 2,559 | 5 | 57-7/8 | 5-3/4 | FPEP-750221 | NS | 350086 | 34 |
| 750 | 240 | 1 | 3.1 | 2,559 | 5 | 57-7/8 | 5-3/4 | FPEP-750231 | NS | 350094 | 34 |
| 1,000 | 120 | 1 | 8.3 | 3,412 | 5 | 78-7/8 | 5-3/4 | FPEP-1000211 | NS | 350107 | 41 |
| 1,000 | 208 | 1 | 4.8 | 3,412 | 5 | 78-7/8 | 5-3/4 | FPEP-1000221 | NS | 350115 | 41 |
| 1,000 | 240 | 1 | 4.2 | 3,412 | 5 | 78-7/8 | 5-3/4 | FPEP-1000231 | NS | 350123 | 41 |
| **CEP-15 — Two Finned Elements** | | | | | | | | | | | |
| 1,500 | 120 | 1 | 12.5 | 5,118 | 10 | 59 | 4-7/8 | **CEP-15C11** | **S** | **350131** | 66 |
| 1,500 | 208 | 1 | 7.2 | 5,118 | 10 | 59 | 4-7/8 | **CEP-15C21** | **S** | **350140** | 66 |
| 1,500 | 240 | 1 | 6.3 | 5,118 | 10 | 59 | 4-7/8 | **CEP-15C31** | **S** | **350158** | 66 |
| 1,500 | 277 | 1 | 5.4 | 5,118 | 10 | 59 | 4-7/8 | CEP-15C41 | NS | 350166 | 66 |
| 1,500 | 480 | 1 | 3.1 | 5,118 | 10 | 59 | 4-7/8 | CEP-15C71 | NS | 350174 | 66 |
| 1,500 | 600 | 1 | 2.5 | 5,118 | 10 | 59 | 4-7/8 | CEP-15C81 | NS | 350182 | 66 |

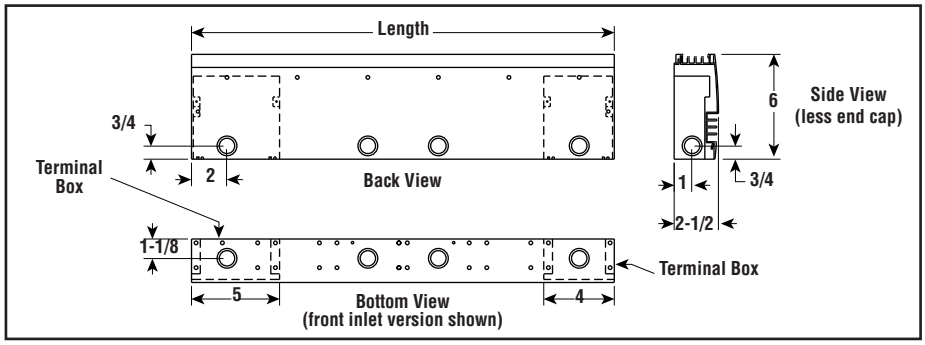
**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order—**Specify model, PCN, watts, volts, phase and quantity.

# CAF-6

## Architectural Draft Barrier Convection Heater

- 500 - 2,500 Watts
- 1,706 - 8,530 Btuh
- 120, 208, 240 and 277 Volt
- Single Phase
- 24.3 - 120.3" Lengths
- 250 W/Ft.

### Dimensions (Inches)




### Applications

Ideal for commercial buildings under large windows or walls constructed of glass. For total or supplemental heat in:

- Lobbies
- Vestibules
- Hallways
- Corridors
- Banks
- Hospitals
- Condominiums
- Offices and Other Areas.

### Construction

Painted Finish is hybrid polyester epoxy powder coat process. Clear and Bronze 40 are anodized aluminum finishes.

Standard — White, Almond, Clear Aluminum or Bronze 40 Aluminum.

Front and Top Surface is constructed of 14 gauge extruded aluminum with punched air intake and exhaust vents. Cabinet back and bottom are fabricated from satin coat steel with multiple knockouts for convenient power connection. Endcaps are field removable for continuous heater installation.

Stainless Steel Sheath encloses a nickel chromium element compacted in a mineral insulation. Aluminum fins are positively staked to the surface and provide superior heat transfer.

Choice of Cold Air Intake, front or bottom.

Custom — Contact your Local Chromalox Sales office.

### Features

Full Length Thermal Protection.

Floating Element Suspension Minimizes Expansion Noise.

Built-in Wireway for Continuous Installation

Optional Built-in Tamperproof Thermostat or Adjustable Thermostat Controls may be mounted in either the left or right hand terminal box. Built-in low voltage controls, if specified, are located in the right hand terminal box. Power connection can be made at either end of the heater.

### Advantages

- Easy Mounting and Wiring
- Advanced Architectural Low Profile Styling
- Attractive Appearance

### Specifications and Ordering Information

| Electrical | | | | | Dimensions (In.) | | | Ordering | | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|
| Volts | Phase | Watts | Amps | Btuh | Height | Length | Depth | Model | Stock | |
| 120 | 1 | 500 | 4.2 | 1,706 | 6 | 24.3 | 2.5 | CAF-6F205 | NS | 18.7 |
| 208 | 1 | 500 | 2.4 | 1,706 | 6 | 24.3 | 2.5 | CAF-6F205 | NS | 18.7 |
| 240 | 1 | 500 | 2.1 | 1,706 | 6 | 24.3 | 2.5 | CAF-6F205 | NS | 18.7 |
| 277 | 1 | 500 | 1.8 | 1,706 | 6 | 24.3 | 2.5 | CAF-6F205 | NS | 18.7 |
| 120 | 1 | 750 | 6.3 | 2,259 | 6 | 36.3 | 2.5 | CAF-6F307 | NS | 25.4 |
| 208 | 1 | 750 | 3.6 | 2,259 | 6 | 36.3 | 2.5 | CAF-6F307 | NS | 25.4 |
| 240 | 1 | 750 | 3.1 | 2,259 | 6 | 36.3 | 2.5 | CAF-6F307 | NS | 25.4 |
| 277 | 1 | 750 | 2.7 | 2,259 | 6 | 36.3 | 2.5 | CAF-6F307 | NS | 25.4 |
| 120 | 1 | 1,000 | 8.3 | 3,412 | 6 | 48.3 | 2.5 | CAF-6F410 | NS | 32.1 |
| 208 | 1 | 1,000 | 4.8 | 3,412 | 6 | 48.3 | 2.5 | CAF-6F410 | NS | 32.1 |
| 240 | 1 | 1,000 | 4.2 | 3,412 | 6 | 48.3 | 2.5 | CAF-6F410 | NS | 32.1 |
| 277 | 1 | 1,000 | 3.6 | 3,412 | 6 | 48.3 | 2.5 | CAF-6F410 | NS | 32.1 |
| 120 | 1 | 1,250 | 10.4 | 4,265 | 6 | 60.3 | 2.5 | CAF-6F512 | NS | 40.2 |
| 208 | 1 | 1,250 | 6 | 4,265 | 6 | 60.3 | 2.5 | CAF-6F512 | NS | 40.2 |
| 240 | 1 | 1,250 | 5.2 | 4,265 | 6 | 60.3 | 2.5 | CAF-6F512 | NS | 40.2 |
| 277 | 1 | 1,250 | 4.5 | 4,265 | 6 | 60.3 | 2.5 | CAF-6F512 | NS | 40.2 |
| 120 | 1 | 1,500 | 12.5 | 5,118 | 6 | 72.3 | 2.5 | CAF-6F615 | NS | 48.2 |
| 208 | 1 | 1,500 | 7.2 | 5,118 | 6 | 72.3 | 2.5 | CAF-6F615 | NS | 48.2 |
| 240 | 1 | 1,500 | 6.3 | 5,118 | 6 | 72.3 | 2.5 | CAF-6F615 | NS | 48.2 |
| 277 | 1 | 1,500 | 5.4 | 5,118 | 6 | 72.3 | 2.5 | CAF-6F615 | NS | 48.2 |
| 208 | 1 | 1,750 | 8.4 | 5,971 | 6 | 84.3 | 2.5 | CAF-6F717 | NS | 57.6 |
| 240 | 1 | 1,750 | 7.3 | 5,971 | 6 | 84.3 | 2.5 | CAF-6F717 | NS | 57.6 |
| 277 | 1 | 1,750 | 6.3 | 5,971 | 6 | 84.3 | 2.5 | CAF-6F717 | NS | 57.6 |
| 208 | 1 | 2,000 | 9.6 | 6,824 | 6 | 96.3 | 2.5 | CAF-6F820 | NS | 67.0 |
| 240 | 1 | 2,000 | 8.3 | 6,824 | 6 | 96.3 | 2.5 | CAF-6F820 | NS | 67.0 |
| 277 | 1 | 2,000 | 7.2 | 6,824 | 6 | 96.3 | 2.5 | CAF-6F820 | NS | 67.0 |
| 208 | 1 | 2,250 | 10.8 | 7,677 | 6 | 108.3 | 2.5 | CAF-6F922 | NS | 77.7 |
| 240 | 1 | 2,250 | 9.4 | 7,677 | 6 | 108.3 | 2.5 | CAF-6F922 | NS | 77.7 |
| 277 | 1 | 2,250 | 8.1 | 7,677 | 6 | 108.3 | 2.5 | CAF-6F922 | NS | 77.7 |
| 208 | 1 | 2,500 | 12 | 8,530 | 6 | 120.3 | 2.5 | CAF-6F025 | NS | 88.4 |
| 240 | 1 | 2,500 | 10.4 | 8,530 | 6 | 120.3 | 2.5 | CAF-6F025 | NS | 88.4 |
| 277 | 1 | 2,500 | 9 | 8,530 | 6 | 120.3 | 2.5 | CAF-6F025 | NS | 88.4 |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, watts, volts, phase and quantity.

# CAF-6

## Architectural Draft Barrier Convection Heater *(cont'd.)*

### *Ordering Information*

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

**Model — Architectural Draft Barrier Convection Heater**

**CAF-6**

**Code — Inlet**

| Code | Inlet |
|---|---|
| **F** | Front |
| **B** | Bottom |

**Code — Length (Ft.)**

| Code | Length (Ft.) | Code | Length (Ft.) |
|---|---|---|---|
| **2** | 2 | **7** | 7 |
| **3** | 3 | **8** | 8 |
| **4** | 4 | **9** | 9 |
| **5** | 5 | **10** | 10 |
| **6** | 6 | | |

**Code — Wattage (see table)**

**Code — Voltage/Phase**

| Code | Voltage/Phase | Code | Voltage/Phase |
|---|---|---|---|
| **11** | 120/1 | **31** | 240/1 |
| **21** | 208/1 | **41** | 277/1 |

**Code — Finish**

| Painted | | Anodized | |
|---|---|---|---|
| **68** | Almond | **07** | Bronze |
| **02** | White | **10** | Clear |

**Code — Control Options (factory installed)**

| Code | Control Options (factory installed) |
|---|---|
| **A1** | Built-in SP tamperproof thermostat 120 - 277V |
| **A2** | Built-in DP tamperproof thermostat 120 - 277V |
| **F1** | Built-in SP adjustable thermostat 120 - 277V |
| **F2** | Built-in DP adjustable thermostat 120 - 277V |
| **A4** | Built-in 24V low voltage relay 120 - 277V |
| **A5** | Built-in 24V low voltage relay and transformer 120 - 277V |
| **A8** | Built-in disconnect switch, rated 277V @ 20A |
| **B1** | Built-in SP tamperproof thermostat and disconnect |
| **B2** | Built-in DP tamperproof thermostat and disconnect |
| **F3** | Built-in SP adjustable thermostat and disconnect |
| **F4** | Built-in DP adjustable thermostat and disconnect |
| **D1** | Built-in low voltage relay and disconnect |
| **D2** | Built-in low voltage relay and transformer and disconnect |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CAF-6** | **B** | **3** | **07** | **11** | **68** | **A1** | **Typical Model Number** |

### *Accessories (Field Installed)*

ALPKS2 — Pedestal kit for units up to 4 feet in length (2 pedestals included)

ALPKS3 — Pedestal kit for units above 4 feet in length (3 pedestals included)

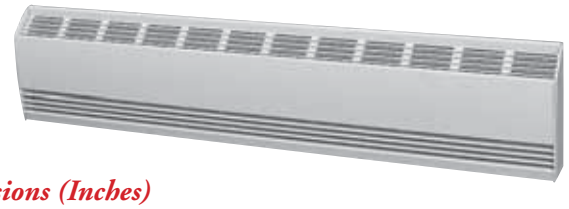
ALF6IC90 — Inside 90 degree corner

ALF6OC90 — Outside 90 degree corner

Filler Sections — Contact your Local Chromalox Sales office for available sizes.

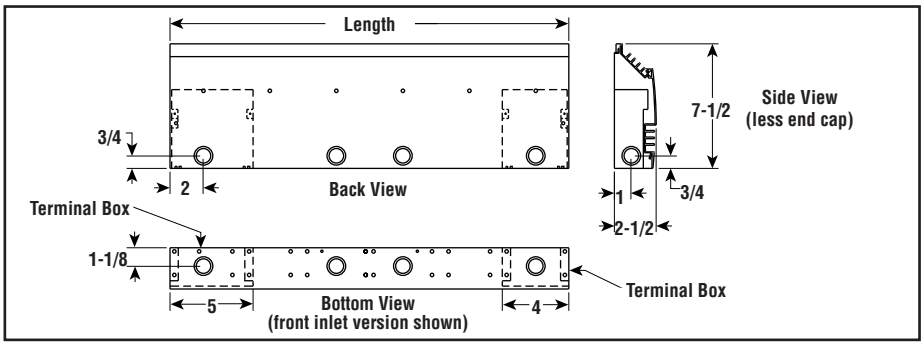
# CCAS-8

## Architectural Slope Top Convection Heater



- **500 - 2,500 Watts**
- **1,706 - 8,530 Btuh**
- **120, 208, 240 and 277 Volt**
- **Single Phase**
- **24.3 - 120.3" Lengths**
- **250 W/Ft.**

### *Dimensions (Inches)*




### *Applications*

Ideally suited for heavily traveled areas such as:

- Factory Offices
- Assembly Areas
- Schools
- Laboratories
- Corridors
- Public Areas (hotels, etc.)
- Stairwell Landings.

### *Construction*

**Standard Finishes —** White or Almond painted finish is hybrid polyester epoxy powder coat. Clear and Bronze 40 are anodized aluminum finishes.

**Front and Slope Surface** is constructed of 14 gauge extruded aluminum with punched air intake and exhaust vents. Cabinet back and bottom are fabricated from satin coat steel with multiple knockouts for convenient power connection. Endcaps are field removable for continuous heater installation.

**Stainless Steel Sheath** encloses a nickel chromium element compacted in a mineral insulation. Aluminum fins are positively staked to the surface and provide superior heat transfer.

**Choice** of Cold Air Intake, front or bottom.

**Custom —** Contact your Local Chromalox Sales office.

### *Features*

**Full Length** Thermal Protection.

**Floating Element Suspension** Minimizes Expansion Noise.

**Built-in Wireway** for Continuous Installation.

**Optional Built-in Tamperproof Thermostat or Adjustable Thermostat Controls** may be mounted in either the left or right hand terminal box. Built-in low voltage relays, if specified, are located in the right hand terminal box. Power connection can be made at either end of the heater.

### *Advantages*

- Sloped Top Prevents Storage Shelf Usage
- Easy Mounting and Wiring
- Low Noise
- Safer Operations Under Most Conditions
- Advanced Architectural Low Profile Styling
- Slope Top Prevents Blockage to Heat Flow

### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (In.) | | | Ordering | | Wt. |
|---|---|---|---|---|---|---|---|---|---|---|
| Volts | Phase | Watts | Amps | Btuh | Height | Length | Depth | Model | Stock | (Lbs.) |
| 120 | 1 | 500 | 4.2 | 1,706 | 7.5 | 24.3 | 2.5 | CCAS-8F205 | NS | 18.7 |
| 208 | 1 | 500 | 2.4 | 1,706 | 7.5 | 24.3 | 2.5 | CCAS-8F205 | NS | 18.7 |
| 240 | 1 | 500 | 2.1 | 1,706 | 7.5 | 24.3 | 2.5 | CCAS-8F205 | NS | 18.7 |
| 277 | 1 | 500 | 1.8 | 1,706 | 7.5 | 24.3 | 2.5 | CCAS-8F205 | NS | 18.7 |
| 120 | 1 | 750 | 6.3 | 2,559 | 7.5 | 36.3 | 2.5 | CCAS-8F307 | NS | 25.4 |
| 208 | 1 | 750 | 3.6 | 2,559 | 7.5 | 36.3 | 2.5 | CCAS-8F307 | NS | 25.4 |
| 240 | 1 | 750 | 3.1 | 2,559 | 7.5 | 36.3 | 2.5 | CCAS-8F307 | NS | 25.4 |
| 277 | 1 | 750 | 2.7 | 2,559 | 7.5 | 36.3 | 2.5 | CCAS-8F307 | NS | 25.4 |
| 120 | 1 | 1,000 | 8.3 | 3,412 | 7.5 | 48.3 | 2.5 | CCAS-8F410 | NS | 32.1 |
| 208 | 1 | 1,000 | 4.8 | 3,412 | 7.5 | 48.3 | 2.5 | CCAS-8F410 | NS | 32.1 |
| 240 | 1 | 1,000 | 4.2 | 3,412 | 7.5 | 48.3 | 2.5 | CCAS-8F410 | NS | 32.1 |
| 277 | 1 | 1,000 | 3.6 | 3,412 | 7.5 | 48.3 | 2.5 | CCAS-8F410 | NS | 32.1 |
| 120 | 1 | 1,250 | 10.4 | 4,265 | 7.5 | 60.3 | 2.5 | CCAS-8F512 | NS | 40.2 |
| 208 | 1 | 1,250 | 6 | 4,265 | 7.5 | 60.3 | 2.5 | CCAS-8F512 | NS | 40.2 |
| 240 | 1 | 1,250 | 5.2 | 4,265 | 7.5 | 60.3 | 2.5 | CCAS-8F512 | NS | 40.2 |
| 277 | 1 | 1,250 | 4.5 | 4,265 | 7.5 | 60.3 | 2.5 | CCAS-8F512 | NS | 40.2 |
| 120 | 1 | 1,500 | 12.5 | 5,118 | 7.5 | 72.3 | 2.5 | CCAS-8F615 | NS | 48.2 |
| 208 | 1 | 1,500 | 7.2 | 5,118 | 7.5 | 72.3 | 2.5 | CCAS-8F615 | NS | 48.2 |
| 240 | 1 | 1,500 | 6.3 | 5,118 | 7.5 | 72.3 | 2.5 | CCAS-8F615 | NS | 48.2 |
| 277 | 1 | 1,500 | 5.4 | 5,118 | 7.5 | 72.3 | 2.5 | CCAS-8F615 | NS | 48.2 |
| 208 | 1 | 1,750 | 8.4 | 5,971 | 7.5 | 84.3 | 2.5 | CCAS-8F717 | NS | 57.6 |
| 240 | 1 | 1,750 | 7.3 | 5,971 | 7.5 | 84.3 | 2.5 | CCAS-8F717 | NS | 57.6 |
| 277 | 1 | 1,750 | 6.3 | 5,971 | 7.5 | 84.3 | 2.5 | CCAS-8F717 | NS | 57.6 |
| 208 | 1 | 2,000 | 9.6 | 6,824 | 7.5 | 96.3 | 2.5 | CCAS-8F820 | NS | 67.0 |
| 240 | 1 | 2,000 | 8.3 | 6,824 | 7.5 | 96.3 | 2.5 | CCAS-8F820 | NS | 67.0 |
| 277 | 1 | 2,000 | 7.2 | 6,824 | 7.5 | 96.3 | 2.5 | CCAS-8F820 | NS | 67.0 |
| 208 | 1 | 2,250 | 10.8 | 7,677 | 7.5 | 108.3 | 2.5 | CCAS-8F922 | NS | 77.0 |
| 240 | 1 | 2,250 | 9.4 | 7,677 | 7.5 | 108.3 | 2.5 | CCAS-8F922 | NS | 77.0 |
| 277 | 1 | 2,250 | 8.1 | 7,677 | 7.5 | 108.3 | 2.5 | CCAS-8F922 | NS | 77.0 |
| 208 | 1 | 2,500 | 12 | 8,530 | 7.5 | 120.3 | 2.5 | CCAS-8F025 | NS | 88.4 |
| 240 | 1 | 2,500 | 10.4 | 8,530 | 7.5 | 120.3 | 2.5 | CCAS-8F025 | NS | 88.4 |
| 277 | 1 | 2,500 | 9 | 8,530 | 7.5 | 120.3 | 2.5 | CCAS-8F025 | NS | 88.4 |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, watts, volts, phase and quantity.

# CCAS-8

## Architectural Slope Top Convection Heater *(cont'd.)*

### *Ordering Information*

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

**Model — Architectural Slope Top Convection Heater**

**CCAS-8**

| Code | Inlet |
|---|---|
| **F** | Front |
| **B** | Bottom |

| Code | Length (Ft.) | Code | Length (Ft.) |
|---|---|---|---|
| **2** | 2 | **7** | 7 |
| **3** | 3 | **8** | 8 |
| **4** | 4 | **9** | 9 |
| **5** | 5 | **10** | 10 |
| **6** | 6 | | |

**Code — Wattage (see table)**

| Code | Voltage/Phase | Code | Voltage/Phase |
|---|---|---|---|
| **11** | 120/1 | **31** | 240/1 |
| **21** | 208/1 | **41** | 277/1 |

| Code | Finish | Code | Finish |
|---|---|---|---|
| **Painted** | | **Anodized** | |
| **68** | Almond | **07** | Bronze |
| **02** | White | **10** | Clear |

| Code | Control Options (factory installed) |
|---|---|
| **A1** | Built-in SP tamperproof thermostat 120 - 277V |
| **A2** | Built-in DP tamperproof thermostat 120 - 277V |
| **F1** | Built-in SP adjustable thermostat 120 - 277V |
| **F2** | Built-in DP adjustable thermostat 120 - 277V |
| **A4** | Built-in 24V low voltage relay 120 - 277V |
| **A5** | Built-in 24V low voltage relay and transformer 120 - 277V |
| **A8** | Built-in disconnect switch, rated 277V @ 20A |
| **B1** | Built-in SP tamperproof thermostat and disconnect |
| **B2** | Built-in DP tamperproof thermostat and disconnect |
| **F3** | Built-in SP adjustable thermostat and disconnect |
| **F4** | Built-in DP adjustable thermostat and disconnect |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CCAS-8** | **B** | **2** | **05** | **11** | **68** | **A1** | **Typical Model Number** |

### *Accessories (Field Installed)*

**ALPKS2 —** Pedestal kit for units up to 4 feet in length (2 pedestals included)

**ALPKS3 —** Pedestal kit for units above 4 feet in length (3 pedestals included)

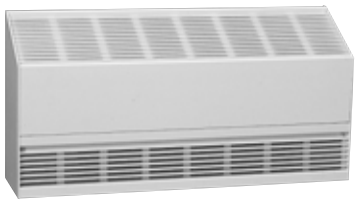
**ALS8IC90 —** Inside 90 degree corner

**ALS8OC90 —** Outside 90 degree corner

**Filler Sections —** Contact your Local Chromalox Sales office for available sizes.

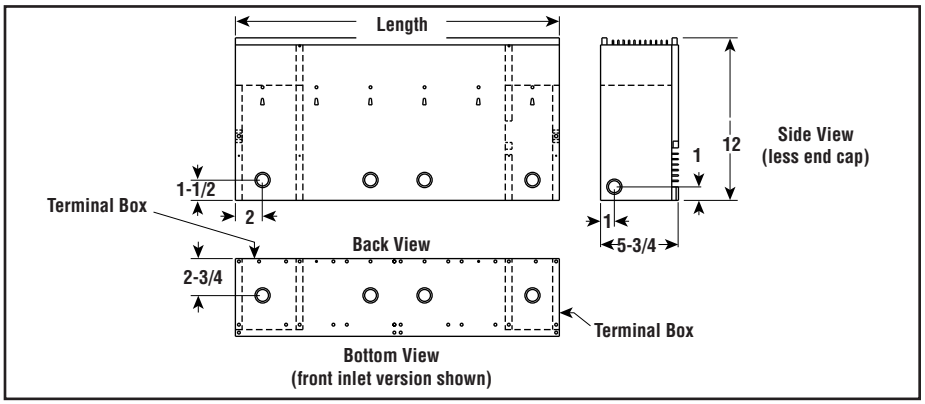
# CCAS-12

## Architectural Slope Top Convection Heater



- **1,125 - 6,000 Watts**
- **3,838 - 20,472 Btuh**
- **208, 240, 277 and 480 Volt**
- **1 & 3 Phase**
- **24.3 - 96.3" Lengths**
- **562 or 750 W/Ft.**

### *Dimensions (Inches)*




### *Applications*

Ideally suited for heavily traveled areas such as:

- Factory Offices
- Assembly Areas
- Schools
- Laboratories
- Corridors
- Public Areas (hotels, etc.)
- Stairwell Landings

### *Construction*

**Standard Finishes —** White or Almond painted finish is hybrid polyester epoxy powder coat. Clear and Bronze 40 are anodized aluminum finishes.

**Front and Slope Surface** is constructed of 14 gauge extruded aluminum with punched air intake and exhaust vents. Cabinet back and bottom are fabricated from satin coat steel with multiple knockouts for convenient power connection. Endcaps are field removable for continuous heater installation.

**Stainless Steel Sheath** encloses a nickel chromium element compacted in a mineral insulation. Aluminum fins are positively staked to the surface and provide superior heat transfer.

**Choice** of Cold Air Intake, front or bottom.

**Custom —** Contact your Local Chromalox Sales office.

### *Features*

**Full Length** Thermal Protection.

**Floating Element Suspension** Minimizes Expansion Noise.

**Built-in Wireway** for Continuous Installation.

**Optional Built-in Tamperproof Thermostat Controls** may be mounted in either the left or right hand terminal box. Built-in low voltage relays or contactors, if specified, are located in the right hand terminal box. Power connection can be made at either end of the heater.

### *Advantages*

- Advanced Architectural Styling
- Sloped Top Prevents Storage Shelf Usage
- Easy Mounting and Wiring
- Low Noise
- Safer Operation Under Most Conditions

### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (In.) | | | Ordering | | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|
| Volts | Phase | Watts | Amps | Btuh | Height | Length | Depth | Model | Stock | |
| 208 | 1 | 1,125 | 5.4 | 3,838 | 12 | 24.3 | 5.75 | CCAS-12F211 | NS | 50.9 |
| 208 | 3 | 1,125 | 3.1 | 3,838 | 12 | 24.3 | 5.75 | CCAS-12F211 | NS | 50.9 |
| 240 | 1 | 1,125 | 4.7 | 3,838 | 12 | 24.3 | 5.75 | CCAS-12F211 | NS | 50.9 |
| 277 | 1 | 1,125 | 4.1 | 3,838 | 12 | 24.3 | 5.75 | CCAS-12F211 | NS | 50.9 |
| 208 | 1 | 1,500 | 7.2 | 5,118 | 12 | 24.3 | 5.75 | CCAS-12F215 | NS | 50.9 |
| 208 | 3 | 1,500 | 4.2 | 5,118 | 12 | 24.3 | 5.75 | CCAS-12F215 | NS | 50.9 |
| 240 | 1 | 1,500 | 6.3 | 5,118 | 12 | 24.3 | 5.75 | CCAS-12F215 | NS | 50.9 |
| 277 | 1 | 1,500 | 5.4 | 5,118 | 12 | 24.3 | 5.75 | CCAS-12F215 | NS | 50.9 |
| 480 | 3 | 1,500 | 1.8 | 5,118 | 12 | 24.3 | 5.75 | CCAS-12F215 | NS | 50.9 |
| 208 | 1 | 1,687 | 8.1 | 5,756 | 12 | 36.3 | 5.75 | CCAS-12F316 | NS | 64.3 |
| 208 | 3 | 1,687 | 4.7 | 5,756 | 12 | 36.3 | 5.75 | CCAS-12F316 | NS | 64.3 |
| 240 | 1 | 1,687 | 7 | 5,756 | 12 | 36.3 | 5.75 | CCAS-12F316 | NS | 64.3 |
| 277 | 1 | 1,687 | 6.1 | 5,756 | 12 | 36.3 | 5.75 | CCAS-12F316 | NS | 64.3 |
| 480 | 3 | 1,687 | 2 | 5,756 | 12 | 36.3 | 5.75 | CCAS-12F316 | NS | 64.3 |
| 208 | 1 | 2,250 | 10.8 | 7,677 | 12 | 48.3 | 5.75 | CCAS-12F422 | NS | 77.7 |
| 208 | 3 | 2,250 | 6.3 | 7,677 | 12 | 48.3 | 5.75 | CCAS-12F422 | NS | 77.7 |
| 240 | 1 | 2,250 | 9.3 | 7,677 | 12 | 48.3 | 5.75 | CCAS-12F422 | NS | 77.7 |
| 277 | 1 | 2,250 | 8.1 | 7,677 | 12 | 48.3 | 5.75 | CCAS-12F422 | NS | 77.7 |
| 480 | 3 | 2,250 | 2.7 | 7,677 | 12 | 48.3 | 5.75 | CCAS-12F422 | NS | 77.7 |
| 208 | 1 | 3,000 | 14.4 | 10,236 | 12 | 48.3 | 5.75 | CCAS-12F430 | NS | 77.7 |
| 208 | 3 | 3,000 | 8.3 | 10,236 | 12 | 48.3 | 5.75 | CCAS-12F430 | NS | 77.7 |
| 240 | 1 | 3,000 | 12.5 | 10,236 | 12 | 48.3 | 5.75 | CCAS-12F430 | NS | 77.7 |
| 277 | 1 | 3,000 | 10.8 | 10,236 | 12 | 48.3 | 5.75 | CCAS-12F430 | NS | 77.7 |
| 480 | 3 | 3,000 | 3.6 | 10,236 | 12 | 48.3 | 5.75 | CCAS-12F430 | NS | 77.7 |
| 208 | 1 | 3,375 | 16.2 | 11,515 | 12 | 72.3 | 5.75 | CCAS-12F633 | NS | 104.5 |
| 208 | 3 | 3,375 | 9.4 | 11,515 | 12 | 72.3 | 5.75 | CCAS-12F633 | NS | 104.5 |
| 240 | 1 | 3,375 | 14.1 | 11,515 | 12 | 72.3 | 5.75 | CCAS-12F633 | NS | 104.5 |
| 277 | 1 | 3,375 | 12.2 | 11,515 | 12 | 72.3 | 5.75 | CCAS-12F633 | NS | 104.5 |
| 480 | 3 | 3,375 | 4.1 | 11,515 | 12 | 72.3 | 5.75 | CCAS-12F633 | NS | 104.5 |
| 208 | 1 | 4,500 | 21.6 | 15,354 | 12 | 72.3 | 5.75 | CCAS-12F645 | NS | 104.5 |
| 208 | 3 | 4,500 | 12.5 | 15,354 | 12 | 72.3 | 5.75 | CCAS-12F645 | NS | 104.5 |
| 240 | 1 | 4,500 | 18.8 | 15,354 | 12 | 72.3 | 5.75 | CCAS-12F645 | NS | 104.5 |
| 277 | 1 | 4,500 | 16.2 | 15,354 | 12 | 72.3 | 5.75 | CCAS-12F645 | NS | 104.5 |
| 480 | 3 | 4,500 | 5.4 | 15,354 | 12 | 72.3 | 5.75 | CCAS-12F645 | NS | 104.5 |

# CCAS-12

## Architectural Slope Top Convection Heater *(cont'd.)*

### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (In.) | | | Ordering | | Wt. |
|---|---|---|---|---|---|---|---|---|---|---|
| Volts | Phase | Watts | Amps | Btuh | Height | Length | Depth | Model | Stock | (Lbs.) |
| 208 | 1 | 4,500 | 21.6 | 15,354 | 12 | 96.3 | 5.75 | CCAS-12F845 | NS | 131.3 |
| 208 | 3 | 4,500 | 12.5 | 15,354 | 12 | 96.3 | 5.75 | CCAS-12F845 | NS | 131.3 |
| 240 | 1 | 4,500 | 18.8 | 15,354 | 12 | 96.3 | 5.75 | CCAS-12F845 | NS | 131.3 |
| 277 | 1 | 4,500 | 16.2 | 15,354 | 12 | 96.3 | 5.75 | CCAS-12F845 | NS | 131.3 |
| 480 | 3 | 4,500 | 5.4 | 15,354 | 12 | 96.3 | 5.75 | CCAS-12F845 | NS | 131.3 |
| 208 | 1 | 6,000 | 28.8 | 20,472 | 12 | 96.3 | 5.75 | CCAS-12F860 | NS | 131.3 |
| 208 | 3 | 6,000 | 16.7 | 20,472 | 12 | 96.3 | 5.75 | CCAS-12F860 | NS | 131.3 |
| 240 | 1 | 6,000 | 25 | 20,472 | 12 | 96.3 | 5.75 | CCAS-12F860 | NS | 131.3 |
| 277 | 1 | 6,000 | 21.7 | 20,472 | 12 | 96.3 | 5.75 | CCAS-12F860 | NS | 131.3 |
| 480 | 3 | 6,000 | 7.2 | 20,472 | 12 | 96.3 | 5.75 | CCAS-12F860 | NS | 131.3 |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, watts, volts, phase and quantity.

### *Ordering Information*

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

**Model** — **Architectural Slope Top Convection Heater**

**CCAS-12**

**Code Inlet**

| | |
|---|---|
| **F** | Front |
| **B** | Bottom |

**Code Length (Ft.)**

| | |
|---|---|
| **2** | 2 |
| **3** | 3 |
| **4** | 4 |
| **6** | 6 |
| **8** | 8 |

**Code Wattage (see table)**

**Code Voltage/Phase**

| | | | |
|---|---|---|---|
| **21** | 208/1 | **33** | 240/3 |
| **23** | 208/3 | **41** | 277/1 |
| **31** | 240/1 | **73** | 480/3 |

**Code Finish**

| **Painted** | | **Anodized** | |
|---|---|---|---|
| **68** | Almond | **07** | Bronze |
| **02** | White | **10** | Clear |

**Code Control Options (factory installed)**

| | |
|---|---|
| **A9** | Built-in DP tamperproof hydraulic thermostat 208 - 277V |
| **A3** | Built-in 3P tamperproof hydraulic thermostat for 3P voltages 208 - 480V |
| **A4** | Built-in 24V low voltage relay for 1P voltages 208 - 277V |
| **A5** | Built-in 24V low voltage relay and transformer for 1P voltages 208 - 277V |
| **A6** | Built-in 24V contactor for 3P voltages 208 - 480V |
| **A7** | Built-in 24V contactor and transformer for 3P voltages 208 - 480V |
| **A8** | Built-in disconnect switch, rated 277V @ 20A |
| **B9** | Built-in DP tamperproof thermostat and disconnect |
| **B3** | Built-in 3P tamperproof thermostat and disconnect |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CCAS-12** | **B** | **2** | **15** | **21** | **68** | **A9** | **Typical Model Number** |

### *Accessories (Field Installed)*

**ALPKM2 —** Pedestal kit for units up to 4 feet in length (2 pedestals included)

**ALPKM3 —** Pedestal kit for units above 4 feet in length (3 pedestals included)

**ALS12IC90 —** Inside 90 degree corner

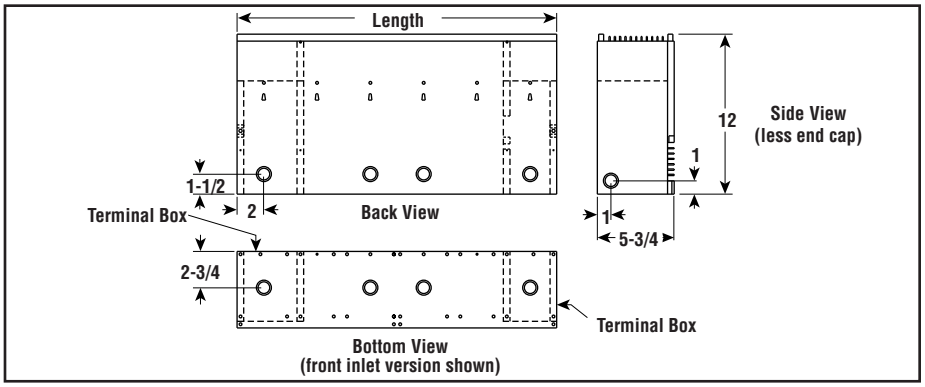
**ALS12OC90 —** Outside 90 degree corner

**Filler Sections —** Contact your Local Chromalox Sales office for available sizes.

# CAF-12
## Architectural Convection Heater

- 1,125 - 6,000 Watts
- 3,839 - 20,472 Btuh
- 208, 240, 277 and 480 Volt
- 1 & 3 Phase
- 24.3 - 72.3" Lengths
- 562 or 750 W/Ft.

### *Dimensions (Inches)*




### *Applications*

Provide ideal solutions to a wide variety of institutional, commercial and industrial space heating applications such as:

- Entryways
- Stairwells
- Corridors, Meeting Rooms
- Factory Offices
- Auditoriums
- Areas where Cabinet Strength and Contemporary Styling are Required

### *Construction*

**Standard Finishes —** White or Almond painted finish is hybrid polyester epoxy powder coat. Clear and Bronze 40 are anodized aluminum finishes.

**Front and Top Surface** is constructed of 14 gauge extruded aluminum with punched air intake and exhaust vents. Cabinet back and bottom are fabricated from satin coat steel with multiple knockouts for convenient power connection. Endcaps are field removable for continuous heater installation.

**Stainless Steel Sheath** encloses a nickel chromium element compacted in a mineral insulation. Aluminum fins are positively staked to the surface and provide superior heat transfer.

**Choice** of Cold Air Intake, front or bottom.

**Custom —** Contact your Local Chromalox Sales office.

### *Features*

**Full Length** Thermal Protection.

**Floating Element Suspension** Minimizes Expansion Noise.

**Built-in Wireway** for Continuous Installation.

**Optional Built-in, Tamperproof Thermostat Controls** may be mounted in either the left or right hand terminal box. Built-in low voltage relays or contactors, if specified, are located in the right hand terminal box. Power connection can be made at either end of the heater.

### *Advantages*

- Easy Mounting and Wiring
- Advanced Architectural Styling

### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (In.) | | | Ordering | | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|
| Volts | Phase | Watts | Amps | Btuh | Height | Length | Depth | Model | Stock | |
| 208 | 1 | 1,125 | 5.4 | 3,838 | 12 | 24.3 | 5.75 | CAF-12F211 | NS | 50.9 |
| 208 | 3 | 1,125 | 3.1 | 3,838 | 12 | 24.3 | 5.75 | CAF-12F211 | NS | 50.9 |
| 240 | 1 | 1,125 | 4.7 | 3,838 | 12 | 24.3 | 5.75 | CAF-12F211 | NS | 50.9 |
| 277 | 1 | 1,125 | 4.1 | 3,838 | 12 | 24.3 | 5.75 | CAF-12F211 | NS | 50.9 |
| 208 | 1 | 1,500 | 7.2 | 5,118 | 12 | 24.3 | 5.75 | CAF-12F215 | NS | 50.9 |
| 208 | 3 | 1,500 | 4.2 | 5,118 | 12 | 24.3 | 5.75 | CAF-12F215 | NS | 50.9 |
| 240 | 1 | 1,500 | 6.3 | 5,118 | 12 | 24.3 | 5.75 | CAF-12F215 | NS | 50.9 |
| 277 | 1 | 1,500 | 5.4 | 5,118 | 12 | 24.3 | 5.75 | CAF-12F215 | NS | 50.9 |
| 480 | 3 | 1,500 | 1.8 | 5,118 | 12 | 24.3 | 5.75 | CAF-12F215 | NS | 50.9 |
| 208 | 1 | 1,687 | 8.1 | 5,756 | 12 | 36.3 | 5.75 | CAF-12F316 | NS | 64.3 |
| 208 | 3 | 1,687 | 4.7 | 5,756 | 12 | 36.3 | 5.75 | CAF-12F316 | NS | 64.3 |
| 240 | 1 | 1,687 | 7 | 5,756 | 12 | 36.3 | 5.75 | CAF-12F316 | NS | 64.3 |
| 277 | 1 | 1,687 | 6.1 | 5,756 | 12 | 36.3 | 5.75 | CAF-12F316 | NS | 64.3 |
| 480 | 3 | 1,687 | 2 | 5,756 | 12 | 36.3 | 5.75 | CAF-12F316 | NS | 64.3 |
| 208 | 1 | 2,250 | 10.8 | 7,677 | 12 | 48.3 | 5.75 | CAF-12F422 | NS | 77.7 |
| 208 | 3 | 2,250 | 6.3 | 7,677 | 12 | 48.3 | 5.75 | CAF-12F422 | NS | 77.7 |
| 240 | 1 | 2,250 | 9.3 | 7,677 | 12 | 48.3 | 5.75 | CAF-12F422 | NS | 77.7 |
| 277 | 1 | 2,250 | 8.1 | 7,677 | 12 | 48.3 | 5.75 | CAF-12F422 | NS | 77.7 |
| 480 | 3 | 2,250 | 2.7 | 7,677 | 12 | 48.3 | 5.75 | CAF-12F422 | NS | 77.7 |
| 208 | 1 | 3,000 | 14.4 | 10,236 | 12 | 48.3 | 5.75 | CAF-12F430 | NS | 77.7 |
| 208 | 3 | 3,000 | 8.3 | 10,236 | 12 | 48.3 | 5.75 | CAF-12F430 | NS | 77.7 |
| 240 | 1 | 3,000 | 12.5 | 10,236 | 12 | 48.3 | 5.75 | CAF-12F430 | NS | 77.7 |
| 277 | 1 | 3,000 | 10.8 | 10,236 | 12 | 48.3 | 5.75 | CAF-12F430 | NS | 77.7 |
| 480 | 3 | 3,000 | 3.6 | 10,236 | 12 | 48.3 | 5.75 | CAF-12F430 | NS | 77.7 |
| 208 | 1 | 3,375 | 16.2 | 11,515 | 12 | 72.3 | 5.75 | CAF-12F633 | NS | 104.5 |
| 208 | 3 | 3,375 | 9.4 | 11,515 | 12 | 72.3 | 5.75 | CAF-12F633 | NS | 104.5 |
| 240 | 1 | 3,375 | 14.1 | 11,515 | 12 | 72.3 | 5.75 | CAF-12F633 | NS | 104.5 |
| 277 | 1 | 3,375 | 12.2 | 11,515 | 12 | 72.3 | 5.75 | CAF-12F633 | NS | 104.5 |
| 480 | 3 | 3,375 | 4.1 | 11,515 | 12 | 72.3 | 5.75 | CAF-12F633 | NS | 104.5 |

# CAF-12
## Architectural Convection Heater *(cont'd.)*

### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (In.) | | | Ordering | | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|
| Volts | Phase | Watts | Amps | Btuh | Height | Length | Depth | Model | Stock | |
| 208 | 1 | 4,500 | 21.6 | 15,354 | 12 | 72.3 | 5.75 | CAF-12F645 | NS | 104.5 |
| 208 | 3 | 4,500 | 12.5 | 15,354 | 12 | 72.3 | 5.75 | CAF-12F645 | NS | 104.5 |
| 240 | 1 | 4,500 | 18.8 | 15,354 | 12 | 72.3 | 5.75 | CAF-12F645 | NS | 104.5 |
| 277 | 1 | 4,500 | 16.2 | 15,354 | 12 | 72.3 | 5.75 | CAF-12F645 | NS | 104.5 |
| 480 | 3 | 4,500 | 5.4 | 15,354 | 12 | 72.3 | 5.75 | CAF-12F645 | NS | 104.5 |
| 208 | 1 | 4,500 | 21.6 | 15,354 | 12 | 96.3 | 5.75 | CAF-12F845 | NS | 131.3 |
| 208 | 3 | 4,500 | 12.5 | 15,354 | 12 | 96.3 | 5.75 | CAF-12F845 | NS | 131.3 |
| 240 | 1 | 4,500 | 18.8 | 15,354 | 12 | 96.3 | 5.75 | CAF-12F845 | NS | 131.3 |
| 277 | 1 | 4,500 | 16.2 | 15,354 | 12 | 96.3 | 5.75 | CAF-12F845 | NS | 131.3 |
| 480 | 3 | 4,500 | 5.4 | 15,354 | 12 | 96.3 | 5.75 | CAF-12F845 | NS | 131.3 |
| 208 | 1 | 6,000 | 28.8 | 20,472 | 12 | 96.3 | 5.75 | CAF-12F860 | NS | 131.3 |
| 208 | 3 | 6,000 | 16.7 | 20,472 | 12 | 96.3 | 5.75 | CAF-12F860 | NS | 131.3 |
| 240 | 1 | 6,000 | 25 | 20,472 | 12 | 96.3 | 5.75 | CAF-12F860 | NS | 131.3 |
| 277 | 1 | 6,000 | 21.7 | 20,472 | 12 | 96.3 | 5.75 | CAF-12F860 | NS | 131.3 |
| 480 | 3 | 6,000 | 7.2 | 20,472 | 12 | 96.3 | 5.75 | CAF-12F860 | NS | 131.3 |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, watts, volts, phase and quantity.

### *Ordering Information*

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

**Model** **Architectural Convection Heater**

**CAF-12**

**Code** **Inlet**

**F** Front
**B** Bottom

**Code** **Length (Ft.)**

**2** 2
**3** 3
**4** 4
**6** 6
**8** 8

**Code** **Wattage (see table)**

**Code** **Voltage/Phase**

**21** 208/1 **41** 277/1
**23** 208/3 **73** 480/3
**31** 240/1

**Code** **Finish**

**Painted** **Anodized**

**68** Almond **07** Bronze
**02** White **10** Clear

**Code** **Control Options (factory installed)**

**A9** Built-in DP tamperproof hydraulic thermostat 208 - 277V
**A3** Built-in 3P tamperproof hydraulic thermostat for 3P voltages 208 - 480V
**A4** Built-in 24V low voltage relay for 1P voltages 208 - 277V
**A5** Built-in 24V low voltage relay and transformer for 1P voltages 208 - 277V
**A6** Built-in 24V contactor for 3P voltages 208 - 480V
**A7** Built-in 24V contactor and transformer for 3P voltages 208 - 480V
**A8** Built-in disconnect switch, rated 277V @ 20A
**B9** Built-in DP tamperproof thermostat and disconnect
**B3** Built-in 3P tamperproof thermostat and disconnect

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CAF-12** | **B** | **2** | **15** | **21** | **68** | **A9** | **Typical Model Number** |

### *Accessories (Field Installed)*

**ALPKM2 —** Pedestal kit for units up to 4 feet in length (2 pedestals included)

**ALPKM3 —** Pedestal kit for units above 4 feet in length (3 pedestals included)

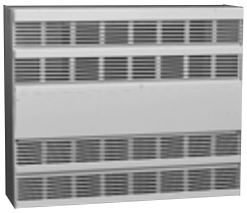
**ALF12IC90 —** Inside 90 degree corner

**ALF12OC90 —** Outside 90 degree corner

**Filler Sections —** Contact your Local Chromalox Sales office for available sizes.

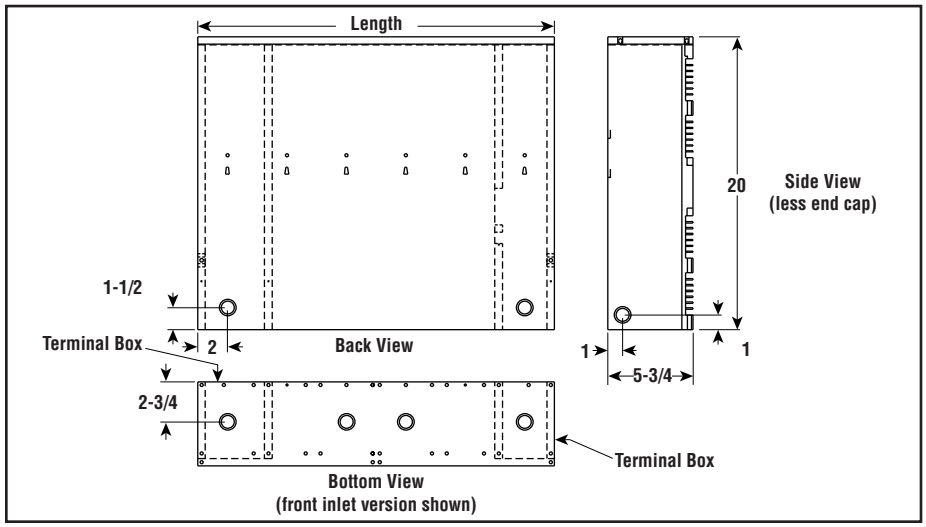
# CAF-20

## Architectural Cabinet Convection Heater



- 1,500 - 6,000 Watts
- 5,118 - 20,472 Btuh
- 208, 240, 277 and 480 Volt
- 1 & 3 Phase
- 24.3 - 72.3" Lengths
- 750 or 1,000 W/Ft.

### *Dimensions (Inches)*




### *Applications*

Provide ideal solutions to a wide variety of institutional, commercial and industrial space heating applications such as:

- Entryways
- Stairwells
- Corridors
- Meeting Rooms
- Factory Offices
- Auditorium areas where Cabinet Strength and Contemporary Styling are required.

### *Construction*

**Standard Finishes —** White or Almond painted finish is hybrid polyester epoxy powder coat. Clear and Bronze 40 are anodized aluminum finishes.

**Front and Top Surface** is constructed of 14 gauge extruded aluminum with punched air intake and exhaust vents. Cabinet back and bottom are fabricated from satin coat steel and with multiple knockouts for convenient power connection. Endcaps are field removable for continuous heater installation.

**Front** Air Intake, Front Air Exhaust.

**May Be** Partially or Fully Recessed.

**Stainless Steel Sheath** encloses a nickel chromium element compacted in a mineral insulation. Aluminum fins are positively staked to the surface and provide superior heat transfer.

**Custom —** Contact your Local Chromalox Sales office.

### *Features*

**Optional Built-in Tamperproof Thermostat Controls** may be mounted in either the left or right hand terminal box. Built-in low voltage relays or contactors, if specified, are located in the right hand terminal box. Power connection can be made at either end of the heater.

**Full Length** Thermal Protection.

**Floating Element Suspension** Minimizes Expansion Noise.

### *Advantages*

- Easy Mounting and Wiring
- Advanced Architectural Styling

### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (In.) | | | Ordering | | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|
| Volts | Phase | Watts | Amps | Btuh | Height | Length | Depth | Model | Stock | |
| 208 | 1 | 1,500 | 7.2 | 5,118 | 20 | 24.3 | 5.75 | CAF-20215 | NS | 32 |
| 208 | 3 | 1,500 | 4.2 | 5,118 | 20 | 24.3 | 5.75 | CAF-20215 | NS | 32 |
| 240 | 1 | 1,500 | 6.3 | 5,118 | 20 | 24.3 | 5.75 | CAF-20215 | NS | 32 |
| 240 | 3 | 1,500 | 3.6 | 5,118 | 20 | 24.3 | 5.75 | CAF-20215 | NS | 32 |
| 277 | 1 | 1,500 | 5.4 | 5,118 | 20 | 24.3 | 5.75 | CAF-20215 | NS | 32 |
| 480 | 1 | 1,500 | 3.1 | 5,118 | 20 | 24.3 | 5.75 | CAF-20215 | NS | 32 |
| 480 | 3 | 1,500 | 1.8 | 5,118 | 20 | 24.3 | 5.75 | CAF-20215 | NS | 32 |
| 208 | 1 | 2,000 | 9.6 | 6,824 | 20 | 24.3 | 5.75 | CAF-20220 | NS | 32 |
| 208 | 3 | 2,000 | 5.6 | 6,824 | 20 | 24.3 | 5.75 | CAF-20220 | NS | 32 |
| 240 | 1 | 2,000 | 8.3 | 6,824 | 20 | 24.3 | 5.75 | CAF-20220 | NS | 32 |
| 240 | 3 | 2,000 | 4.8 | 6,824 | 20 | 24.3 | 5.75 | CAF-20220 | NS | 32 |
| 277 | 1 | 2,000 | 7.2 | 6,824 | 20 | 24.3 | 5.75 | CAF-20220 | NS | 32 |
| 480 | 1 | 2,000 | 4.2 | 6,824 | 20 | 24.3 | 5.75 | CAF-20220 | NS | 32 |
| 480 | 3 | 2,000 | 2.4 | 6,824 | 20 | 24.3 | 5.75 | CAF-20220 | NS | 32 |
| 208 | 1 | 3,000 | 14.4 | 10,236 | 20 | 36.3 | 5.75 | CAF-20330 | NS | 43.5 |
| 208 | 3 | 3,000 | 8.3 | 10,236 | 20 | 36.3 | 5.75 | CAF-20330 | NS | 43.5 |
| 240 | 1 | 3,000 | 12.5 | 10,236 | 20 | 36.3 | 5.75 | CAF-20330 | NS | 43.5 |
| 240 | 3 | 3,000 | 7.2 | 10,236 | 20 | 36.3 | 5.75 | CAF-20330 | NS | 43.5 |
| 277 | 1 | 3,000 | 10.8 | 10,236 | 20 | 36.3 | 5.75 | CAF-20330 | NS | 43.5 |
| 480 | 1 | 3,000 | 6.3 | 10,236 | 20 | 36.3 | 5.75 | CAF-20330 | NS | 43.5 |
| 480 | 3 | 3,000 | 3.6 | 10,236 | 20 | 36.3 | 5.75 | CAF-20330 | NS | 43.5 |
| 208 | 1 | 3,000 | 14.4 | 10,236 | 20 | 48.3 | 5.75 | CAF-20430 | NS | 141.9 |
| 208 | 3 | 3,000 | 8.3 | 10,236 | 20 | 48.3 | 5.75 | CAF-20430 | NS | 141.9 |
| 240 | 1 | 3,000 | 12.5 | 10,236 | 20 | 48.3 | 5.75 | CAF-20430 | NS | 141.9 |
| 240 | 3 | 3,000 | 7.2 | 10,236 | 20 | 48.3 | 5.75 | CAF-20430 | NS | 141.9 |
| 277 | 1 | 3,000 | 10.8 | 10,236 | 20 | 48.3 | 5.75 | CAF-20430 | NS | 141.9 |
| 480 | 1 | 3,000 | 6.3 | 10,236 | 20 | 48.3 | 5.75 | CAF-20430 | NS | 141.9 |
| 480 | 3 | 3,000 | 3.6 | 10,236 | 20 | 48.3 | 5.75 | CAF-20430 | NS | 141.9 |

# CAF-20

## Architectural Cabinet Convection Heater *(cont'd.)*

### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (In.) | | | Ordering | | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|
| Volts | Phase | Watts | Amps | Btuh | Height | Length | Depth | Model | Stock | |
| 208 | 1 | 4,000 | 19.2 | 13,648 | 20 | 48.3 | 5.75 | CAF-20440 | NS | 141.9 |
| 208 | 3 | 4,000 | 11.1 | 13,648 | 20 | 48.3 | 5.75 | CAF-20440 | NS | 141.9 |
| 240 | 1 | 4,000 | 16.7 | 13,648 | 20 | 48.3 | 5.75 | CAF-20440 | NS | 141.9 |
| 240 | 3 | 4,000 | 9.6 | 13,648 | 20 | 48.3 | 5.75 | CAF-20440 | NS | 141.9 |
| 277 | 1 | 4,000 | 14.4 | 13,648 | 20 | 48.3 | 5.75 | CAF-20440 | NS | 141.9 |
| 480 | 1 | 4,000 | 8.3 | 13,648 | 20 | 48.3 | 5.75 | CAF-20440 | NS | 141.9 |
| 480 | 3 | 4,000 | 4.8 | 13,648 | 20 | 48.3 | 5.75 | CAF-20440 | NS | 141.9 |
| 208 | 1 | 4,500 | 21.6 | 15,354 | 20 | 72.3 | 5.75 | CAF-20645 | NS | 198.2 |
| 208 | 3 | 4,500 | 12.5 | 15,354 | 20 | 72.3 | 5.75 | CAF-20645 | NS | 198.2 |
| 240 | 1 | 4,500 | 18.8 | 15,354 | 20 | 72.3 | 5.75 | CAF-20645 | NS | 198.2 |
| 240 | 3 | 4,500 | 10.8 | 15,354 | 20 | 72.3 | 5.75 | CAF-20645 | NS | 198.2 |
| 277 | 1 | 4,500 | 16.2 | 15,354 | 20 | 72.3 | 5.75 | CAF-20645 | NS | 198.2 |
| 480 | 1 | 4,500 | 9.4 | 15,354 | 20 | 72.3 | 5.75 | CAF-20645 | NS | 198.2 |
| 480 | 3 | 4,500 | 5.4 | 15,354 | 20 | 72.3 | 5.75 | CAF-20645 | NS | 198.2 |
| 208 | 1 | 5,000 | 24 | 17,060 | 20 | 60.3 | 5.75 | CAF-20550 | NS | 170.1 |
| 208 | 3 | 5,000 | 13.9 | 17,060 | 20 | 60.3 | 5.75 | CAF-20550 | NS | 170.1 |
| 240 | 1 | 5,000 | 20.8 | 17,060 | 20 | 60.3 | 5.75 | CAF-20550 | NS | 170.1 |
| 240 | 3 | 5,000 | 12 | 17,060 | 20 | 60.3 | 5.75 | CAF-20550 | NS | 170.1 |
| 277 | 1 | 5,000 | 18.1 | 17,060 | 20 | 60.3 | 5.75 | CAF-20550 | NS | 170.1 |
| 480 | 1 | 5,000 | 10.4 | 17,060 | 20 | 60.3 | 5.75 | CAF-20550 | NS | 170.1 |
| 480 | 3 | 5,000 | 6 | 17,060 | 20 | 60.3 | 5.75 | CAF-20550 | NS | 170.1 |
| 208 | 1 | 6,000 | 28.8 | 20,472 | 20 | 72.3 | 5.75 | CAF-20660 | NS | 198.2 |
| 208 | 3 | 6,000 | 16.7 | 20,472 | 20 | 72.3 | 5.75 | CAF-20660 | NS | 198.2 |
| 240 | 1 | 6,000 | 25 | 20,472 | 20 | 72.3 | 5.75 | CAF-20660 | NS | 198.2 |
| 240 | 3 | 6,000 | 14.5 | 20,472 | 20 | 72.3 | 5.75 | CAF-20660 | NS | 198.2 |
| 277 | 1 | 6,000 | 21.7 | 20,472 | 20 | 72.3 | 5.75 | CAF-20660 | NS | 198.2 |
| 480 | 1 | 6,000 | 12.5 | 20,472 | 20 | 72.3 | 5.75 | CAF-20660 | NS | 198.2 |
| 480 | 3 | 6,000 | 7.2 | 20,472 | 20 | 72.3 | 5.75 | CAF-20660 | NS | 198.2 |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, watts, volts, phase and quantity.

### *Ordering Information*

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

**Model** — **Architectural Cabinet Convection Heater**

**CAF-20**

**Code** — **Length (Ft.)**

| | |
|---|---|
| **2** | 2 |
| **3** | 3 |
| **4** | 4 |
| **5** | 5 |
| **6** | 6 |

**Code** — **Wattage (see table)**

**Code** — **Voltage/Phase**

| | | | |
|---|---|---|---|
| **21** | 208/1 | **33** | 240/3 |
| **23** | 208/3 | **41** | 277/1 |
| **31** | 240/1 | **73** | 480/3 |

**Code** — **Finish**

| **Painted** | | **Anodized** | |
|---|---|---|---|
| **68** | Almond | **07** | Bronze |
| **02** | White | **10** | Clear |

**Code** — **Control Options (factory installed)**

| | |
|---|---|
| **A9** | Built-in DP tamperproof hydraulic thermostat 208 - 480V |
| **A3** | Built-in 3P tamperproof hydraulic thermostat for 3P voltages 208 - 480V |
| **A4** | Built-in 24V low voltage relay for 1P voltages 208 - 480V |
| **A5** | Built-in 24V low voltage relay and transformer for 1P voltages 208 - 480V |
| **A6** | Built-in 24V contactor for 3P voltages 208 - 480V |
| **A7** | Built-in 24V contactor and transformer for 3P voltages 208 - 480V |
| **A8** | Built-in 30 amp disconnect |

| | | | | | | |
|---|---|---|---|---|---|---|
| **CAF-20** | **2** | **20** | **21** | **68** | **A9** | **Typical Model Number** |

### *Accessories (Field Installed)*

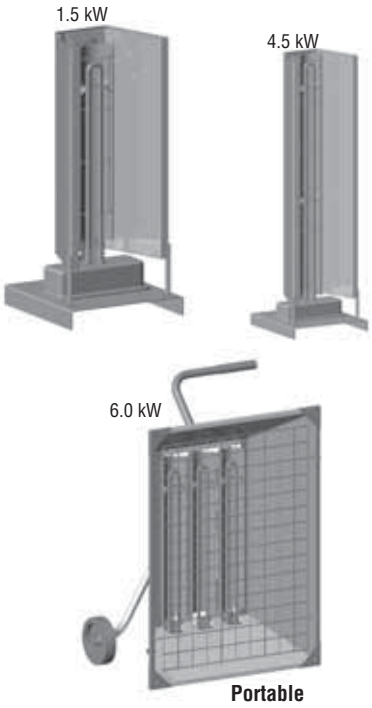
**ALTB —** Trim Bar. Consult your Local Chromalox Sales office for details.

# ChromaStar™
## Infra-Red Radiant Heaters

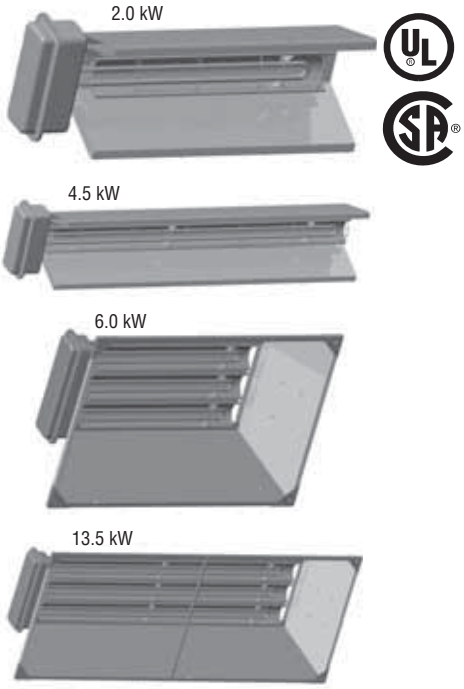
- **1.5 to 13.5 kW**
- **5,118 to 46,062 BTU/Hr**
- **120, 208, 240, 277, 480, and 600 Volts**
- **Single or 3 Phase - Most Models Field Convertible**
- **Fixed Overhead - Convertible to Portable**
- **Portable/Factory Assembled**
- **Optional Accessories**
  **- Ground Fault**
  **- Disconnect**
  **- Tip Over Shut Down**
- **UL Listed, CSA Registered (Fixed Overhead Models Only)**

### *Applications*

- Localized heating in large plants
- Loading Docks
- Narrow warehouse aisle heating
- Garages
- Dry paint
- Prevent freezing of pipes, valves
- Heat hoppers



**Portable**



**Fixed**

### *Description*

The Chromalox ChromaStar™ infra-red comfort heaters are designed to provide a rugged source of heat for use in areas where dependence on air movement is impractical. The heaters are versatile, designed to provide warmth directly where it is needed for primary or spot heating applications. Each unit is constructed for long life and requires minimal maintenance. There are no moving parts or motors to wear out, no air filters or lubrication required.

All Chromalox ChromaStar™ radiant heaters feature the exclusive “Arctic End” Patent Pending heating element terminal construction. This feature lowers the terminal box temperatures resulting in extended element and wiring life.

Extruded aluminum housings are rigid to provide added protection to the heating elements located at the focal point of a built-in mirrored aluminum reflector(s).

The heater(s) consist of hairpin bent .430” diameter alloy sheath tubular element(s) constructed of high quality resistance wire embedded in carefully selected MgO refractory insulation. The element feature “Arctic end” terminal construction for longer life and cooler terminal enclosure temperatures. The element(s) also feature terminal construction using a waged-in silicone bushings that produce unequalled resistance to moisture absorption. The heating element(s) connect to a gasketed, moisture resistance terminal enclosure with liquid-tight bulkhead threaded fittings. An extension reflector constructed of 0.050” mirrored aluminum extends over the assembly to provide a more uniform heating pattern.

### *Portable*

All portable heaters are supplied fully assembled to a rugged, chrome-nickel plated tubular steel cart and handle (1.5 and 2.0 kW heater has a fixed pedestal). The cart features large wheels for easy portability. All portable heaters include safety grills to protect personnel from contacting hot elements.

Field wiring is accomplished through a 3/4” conduit opening in terminal enclosure. The 1.5 kW u nit comes complete with a factory installed 6 foot cord and 2 prong grounding type plug. Other models can be field wired using accessory cable and plug kits shown.

### *Fixed Overhead*

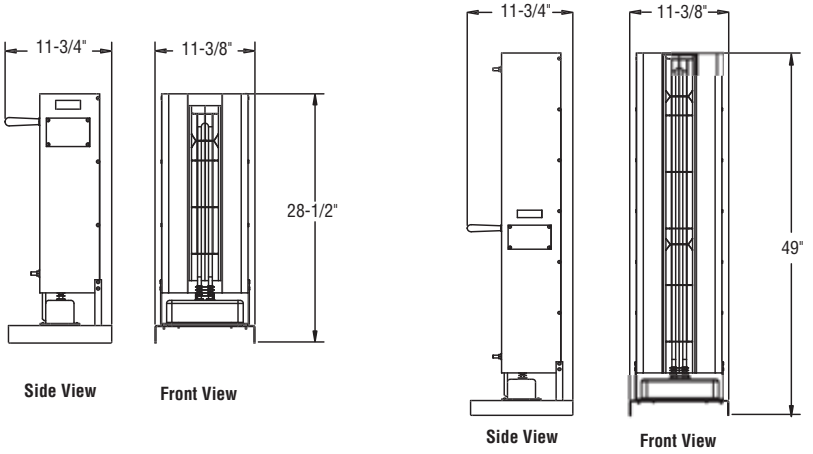
The Chromalox ChromaStar™ radiant heater is shipped fully assembled and can be hung from thee ceiling with 2 chains or rigid angle brackets attached to the heater brackets located on the back of the heater.

Field wiring is accomplished through the liquid tight terminal enclosure. No secondary splice box required.

Protective screens, disconnect switches and portable carts are available for these heaters as shown.

# ChromaStar™ Infra-Red Radiant Heaters *(cont'd.)*

## *Portable Radiant Heaters 1.5 to 4.5 kW Dimensions*

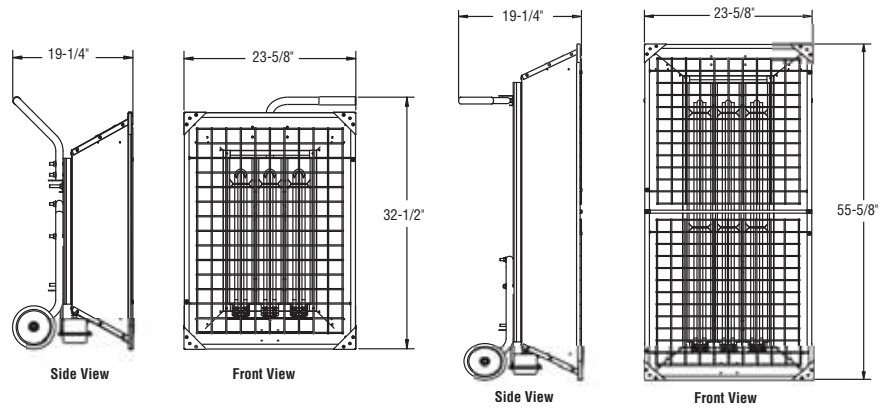



## *Specifications and Ordering Information*

| Electrical | | | | | | Dimensions (in.) | | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | No. Elem. | Amps | Btuh | Height | Base Width | Base Depth | Model | Stock | PCN | Wt. (Lbs.) |
| 1.5 | 120 | 1 | 1 | 12.5 | 5,118 | 28-1/2 | 11-3/8 | 11-3/4 | **STAR-02A-11-PC*** | **S** | **340486** | 15 |
| 2 | 208 | 1 | 1 | 9.6 | 6,824 | 28-1/2 | 11-3/8 | 11-3/4 | STAR-02A-81-P | AS | 340494 | 15 |
| 2 | 240 | 1 | 1 | 8.3 | 6,824 | 28-1/2 | 11-3/8 | 11-3/4 | STAR-02A-21-P | AS | 340507 | 15 |
| 2 | 277 | 1 | 1 | 7.2 | 6,824 | 28-1/2 | 11-3/8 | 11-3/4 | STAR-02A-71-P | AS | 340515 | 15 |
| 2 | 480 | 1 | 1 | 4.2 | 6,824 | 28-1/2 | 11-3/8 | 11-3/4 | **STAR-02A-41-P** | **S** | **340523** | 15 |
| 2 | 600 | 1 | 1 | 3.2 | 6,824 | 28-1/2 | 11-3/8 | 11-3/4 | STAR-02A-61-P | AS | 340531 | 15 |
| 4.5 | 208 | 1 | 1 | 21.6 | 15,354 | 49 | 11-3/8 | 11-3/4 | STAR-05A-81-P | AS | 340380 | 25 |
| 4.5 | 240 | 1 | 1 | 18.8 | 15,354 | 49 | 11-3/8 | 11-3/4 | STAR-05A-21-P | AS | 340398 | 25 |
| 4.5 | 277 | 1 | 1 | 16.2 | 15,354 | 49 | 11-3/8 | 11-3/4 | STAR-05A-71-P | AS | 340400 | 25 |
| 4.5 | 480 | 1 | 1 | 9.4 | 15,354 | 49 | 11-3/8 | 11-3/4 | **STAR-05A-41-P** | **S** | **340419** | 25 |
| 4.5 | 600 | 1 | 1 | 7.5 | 15, 354 | 49 | 11-3/8 | 11-3/4 | STAR-05A-61-P | AS | 340427 | 25 |

**Stock Status: S** = stock AS = assembly stock NS = non-stock *Incl 6 foot cord and 2-prong grounding type plug.
**To Order** — Specify model, PCN, kW, volts, phase and quantity.

## *Portable Radiant Heaters 6 to 13.5 kW Dimensions*



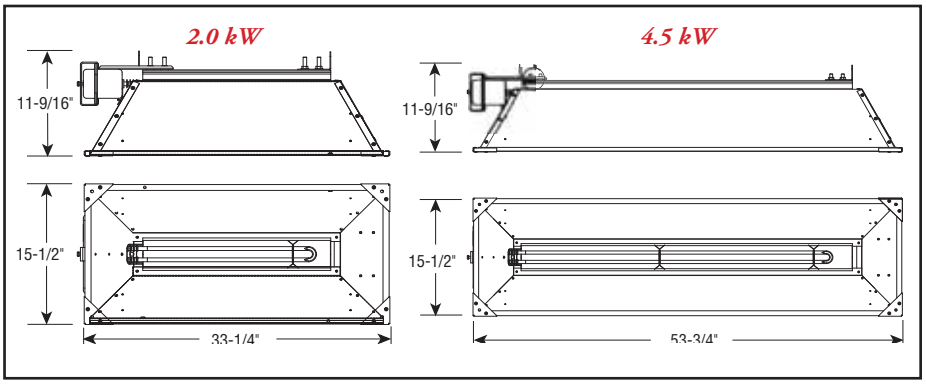

## *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (in.) | | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | Amps | Btuh | Height | Base Width | Base Depth | Model | Stock | PCN | Wt. (Lbs.) |
| 6 | 208 | 3 | 16.7 | 20,472 | 32-1/2 | 23-5/8 | 11-1/2 | **STAR-06A-83-P** | **S** | **341163** | 26 |
| 6 | 240 | 3 | 14.4 | 20,472 | 32-1/2 | 23-5/8 | 11-1/2 | **STAR-06A-23-P** | **S** | **341171** | 26 |
| 6 | 277 | 1 | 21.7 | 20,472 | 32-1/2 | 23-5/8 | 11-1/2 | STAR-06A-71-P | AS | 341180 | 26 |
| 6 | 480 | 3 | 7.2 | 20,472 | 32-1/2 | 23-5/8 | 11-1/2 | **STAR-06A-43-P** | **S** | **341198** | 26 |
| 6 | 600 | 3 | 5.8 | 20,472 | 32-1/2 | 23-5/8 | 11-1/2 | STAR-06A-63-P | AS | 341200 | 26 |
| 13.5 | 208 | 3 | 37.5 | 46,062 | 55-5/8 | 23-5/8 | 11-1/2 | **STAR-14A-83-P** | **S** | **341219** | 44 |
| 13.5 | 240 | 3 | 32.5 | 46,062 | 55-5/8 | 23-5/8 | 11-1/2 | **STAR-14A-23-P** | **S** | **341227** | 44 |
| 13.2 | 277 | 1 | 47.7 | 46,062 | 55-5/8 | 23-5/8 | 11-1/2 | STAR-14A-71-P | NS | 341235 | 44 |
| 13.5 | 480 | 3 | 16.3 | 46,062 | 55-5/8 | 23-5/8 | 11-1/2 | **STAR-14A-43-P** | **S** | **341243** | 44 |
| 13.5 | 600 | 3 | 3 | 46,062 | 55-5/8 | 23-5/8 | 11-1/2 | **STAR-14A-63-P** | **S** | **341251** | 44 |

**Stock Status: S** = stock AS = assembly stock NS = non-stock *Includes 6 foot cord and 2-prong grounding type plug.
**To Order** — Specify model, PCN, kW, volts, phase and quantity. Assembly Stock shipped in one week. For Stock shipment, order fixed overhead heaters on following page and appropriate cart kit on page 80.

# ChromaStar™
## Infra-Red Radiant Heaters *(cont'd.)*

### *Fixed Overhead Radiant Heaters 2.0 to 4.5 kW Dimensions*
**U.L Listed & CSA Certified for Fixed Installations**

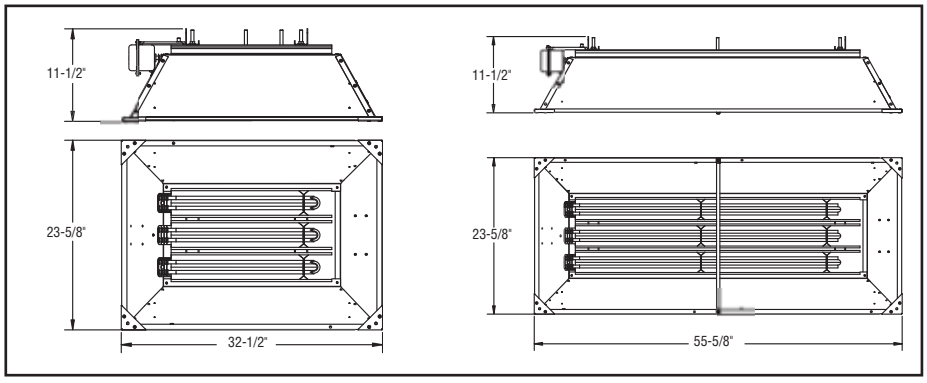



### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (in.) | | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | Amps | Btuh | Height | Base Width | Base Depth | Model | Stock | PCN | Wt. (Lbs.) |
| 2 | 208 | 1 | 9.6 | 6,824 | 27-11/16 | 9-7/8 | 6-13/16 | **STAR-02A-81-F** | **S** | **340558** | 14 |
| 2 | 240 | 1 | 8.3 | 6,824 | 27-11/16 | 9-7/8 | 6-13/16 | **STAR-02A-21-F** | **S** | **340566** | 14 |
| 2 | 277 | 1 | 7.2 | 6,824 | 27-11/16 | 9-7/8 | 6-13/16 | STAR-02A-71-F | AS | 340574 | 14 |
| 2 | 480 | 1 | 4.2 | 6,824 | 27-11/16 | 9-7/8 | 6-13/16 | **STAR-02A-41-F** | **S** | **340582** | 14 |
| 2 | 600 | 1 | 3.3 | 6,824 | 27-11/16 | 9-7/8 | 6-13/16 | **STAR-02A-61-F** | **AS** | **340590** | 14 |
| 4.5 | 208 | 1 | 21.6 | 15,354 | 48-3/16 | 9-7/8 | 6-13/16 | STAR-05A-81-F | AS | 340435 | 23 |
| 4.5 | 240 | 1 | 18.8 | 15,354 | 48-3/16 | 9-7/8 | 6-13/16 | STAR-05A-21-F | NS | 340443 | 23 |
| 4.2 | 277 | 1 | 16.2 | 15,354 | 48-3/16 | 9-7/8 | 6-13/16 | STAR-05A-71-F | NS | 340451 | 23 |
| 4.5 | 480 | 1 | 9.4 | 15,354 | 48-3/16 | 9-7/8 | 6-13/16 | **STAR-05A-41-F** | **S** | **340460** | 23 |
| 4.5 | 600 | 1 | 7.5 | 15,354 | 48-3/16 | 9-7/8 | 6-13/16 | STAR-05A-61-F | NS | 340478 | 23 |

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

### *Fixed Overhead Radiant Heaters 6.0 to 13.5 kW Dimensions*




### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (in.) | | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | Amps | Btuh | Height | Base Width | Base Depth | Model | Stock | PCN | Wt. (Lbs.) |
| 6 | 208 | 3 | 16.7 | 20,472 | 32-1/2 | 23-5/8 | 11-1/2 | **STAR-06A-83-F** | **S** | **340339** | 26 |
| 6 | 240 | 3 | 14.4 | 20,472 | 32-1/2 | 23-5/8 | 11-1/2 | **STAR-06A-23-F** | **S** | **340347** | 26 |
| 6 | 277 | 1 | 21.7 | 20,472 | 32-1/2 | 23-5/8 | 11-1/2 | STAR-06A-71-F | AS | 340355 | 26 |
| 6 | 480 | 3 | 7.2 | 20,472 | 32-1/2 | 23-5/8 | 11-1/2 | **STAR-06A-43-F** | **S** | **340363** | 26 |
| 6 | 600 | 3 | 5.8 | 20,472 | 32-1/2 | 23-5/8 | 11-1/2 | STAR-06A-63-F | AS | 340371 | 26 |
| 13.5 | 208 | 3 | 37.5 | 46,062 | 55-5/8 | 23-5/8 | 11-1/2 | **STAR-14A-83-F** | **S** | **340232** | 44 |
| 13.5 | 240 | 3 | 32.5 | 46,062 | 55-5/8 | 23-5/8 | 11-1/2 | **STAR-14A-23-F** | **S** | **340240** | 44 |
| 13.5 | 277 | 1 | 48.7 | 46,062 | 55-5/8 | 23-5/8 | 11-1/2 | STAR-14A-71-F | NS | 340259 | 44 |
| 13.5 | 480 | 3 | 16.3 | 46,062 | 55-5/8 | 23-5/8 | 11-1/2 | **STAR-14A-43-F** | **S** | **340267** | 44 |
| 13.5 | 600 | 3 | 13 | 46,062 | 55-5/8 | 23-5/8 | 11-1/2 | STAR-14A-63-F | AS | 340275 | 44 |

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

# ChromaStar™ Infra-Red Radiant Heaters *(cont'd.)*

## *Accessories*

**For use with both Fixed Overhead and Portable Heaters**

### *Disconnect Kits*

The disconnect kit consists of a complete liquid tight assembly including a 3 pole 48 Amp switch, power terminal block and all hardware to mount either the fixed overhead or portable radiant heater.

*Specifications and Ordering Information*

| Model No. | kW | Status | PCN | Wt. (Lbs.) |
|---|---|---|---|---|
| DS-50600 | All | AS | 340662 | 3 |

## *Portable Kits*

### *Tip Over Switch Kits*

Chromalox STARTIP tip-over switch kits can be easily added to all Chromalox STAR 06 or 14 series factory assembled portable heaters or fixed overhead heaters which have been modified by use of a portable STAR-CART kit. This kit is designed to de-energize the heating elements of unattended units in event the heater is accidentally knocked over. The kit includes a control circuit transformer, magnetic contactor, tip-over switch assembly and on-off toggle switch with rubber boot, completely prewired in a NEMA 4 enclosure. The kit also includes a 1" coupling, wiring between the contactor and heater, mounting bracket, hardware and instructions to complete the installation to the heater.

*Specifications and Ordering Information*

| Model No. | kW | Status | PCN | Wt. (Lbs.) |
|---|---|---|---|---|
| **STARTP-8** | 208 | **S** | **340670** | 14 |
| **STARTP-2** | 240 | **S** | **340689** | 14 |
| STARTP-7 | 277 | NS | 340697 | 14 |
| **STARTP-4** | 480 | **S** | **340700** | 14 |
| STARTP-6 | 600 | NS | 340718 | 14 |

### *Tip-Over Switch and Ground Fault Detector Kits*

**(for Portable STAR-06 and STAR-14 Heaters)**

The Chromalox STAR-TG series kits include the components and features of the STARTIP tip-over kits with the additional protection provides by a ground fault detector. The ground fault detector will monitor for any gradual changes in the insulation level due to humidity or mechanical damage as they develop and will de-energize the contactor to prevent arcing type faults, preventing premature element failure and potential fire damage.

*Specifications and Ordering Information*

| Model No. | kW | Status | PCN | Wt. (Lbs.) |
|---|---|---|---|---|
| STAR-TG-8 | 208 | AS | 340726 | 16 |
| STAR-TG-2 | 240 | AS | 340734 | 16 |
| STAR-TG-7 | 277 | NS | 340742 | 16 |
| STAR-TG-4 | 480 | NS | 340750 | 16 |
| STAR-TG-6 | 600 | NS | 340769 | 16 |

# ChromaStar™ Accessories *(cont'd.)*

## *Plug Kits for Portable Heaters*

| Plug Type | Model Number | Description | Volts | Amps | Config. | NEMA# | ANSI# | Fits Cable Dia. | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Locking | PGL-15-20 | 3 Pole 4 Wire | 250 | 20 |  | L15-20 | C73.85 | .385"-.780 | NS | 338845 | 0.5 |
| Locking | PGL-15-30 | 3 Pole 4 Wire | 250 | 30 |  | L15-30 | C73.86 | .385"-.780 | NS | 338853 | 0.5 |
| Locking | PGL-16-30 | 3 Pole 4 Wire | 480 | 30 |  | L16-30 | C73.88 | .595"- 1.150 | **S** | **338861** | 0.5 |
| Locking | PGL-17-30 | 3 Pole 4 Wire | 600 | 30 |  | L17-30 | C73.89 | .595"- 1.150 | NS | 338870 | 0.5 |
| Locking | PGL-3763C | 2 Pole 3 Wire | 600 | 50 |  | - | - | .750"-1.125 | NS | 338917 | 0.5 |
| Locking | PGL-3765C | 3 Pole 4 Wire | 600 | 50 |  | - | - | .750"-1.125 | **S** | **338925** | 0.5 |
| Non Locking | PGN-6-50 | 2 Pole 3 Wire | 250 | 50 |  | 6-50 | C73.53 | .625"-1.187 | **S** | **338888** | 0.5 |
| Non Locking | PGN-15-20 | 3 Pole 4 Wire | 250 | 20 |  | 15-20 | C73.59 | .390"-.775 | NS | 338896 | 0.5 |
| Non Locking | PGN-15-50 | 3 Pole 4 Wire | 250 | 50 |  | 15-50 | C73.61 | .750"-1.250 | NS | 338909 | 0.5 |

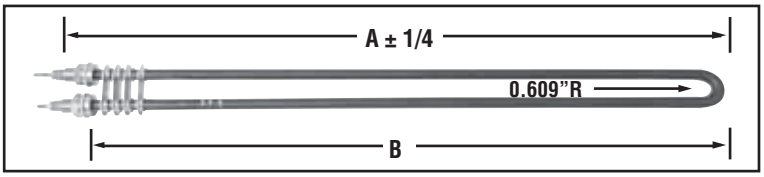
## *Cable Kits for ChromaStar™ Series Portable Radiant Heaters*

Cable packages include 25 feet Type SO cable, with either 3-conductors or 4-conductors, depending on the heater requirements. Each cable assembly includes the proper cord (connector). Plugs are not included. All models are factory wired for 3-phase, but can be field wired for single phase, select plug and cord accordingly.

| | Cable Specifications | | | Cord Connector | | | Wt. |
|---|---|---|---|---|---|---|---|
| Model No. | Size/Type | Max. Amp | Temperature Ratings | NPT | Stock | PCN | (Lbs.) |
| **PLC-2514-4** | 14/4SO | 15 | 90 Deg. C | 3/4" | **S** | **295427** | 7 |
| **PLC-2514-3** | 14/3SO | 18 | 90 Deg. C | 3/4" | **S** | **295670** | 23 |
| **PLC-2512-4** | 12/4SO | 20 | 90 Deg. C | 1" | **S** | **295435** | 9 |
| **PLC-2512-3** | 12/3SO | 25 | 90 Deg. C | 3/4" | **S** | **295662** | 6 |
| PLC-2510-3 | 10/3SO | 30 | 90 Deg. C | 1" | NS | 295443 | 9 |
| **PLC-2508-3** | 8/4SO | 35 | 90 Deg. C | 1" | **S** | **295460** | 15 |
| **PLC-2506-4** | 6/4SO | 45 | 90 Deg. C | 1" | **S** | **295494** | 17 |
| **PLC-2506-3** | 6/3SO | 55 | 90 Deg. C | 1" | **S** | **295486** | 16 |
| SO = hard Service Cord, 600V | | | Length = 25 Feet | | | | |

## *Replacement Elements*

| Model No. | kW | Volts | Win2 | Dimensions - inches A | Dimensions - inches B | Status | PCN | Wt. Lbs. |
|---|---|---|---|---|---|---|---|---|
| UTU-STAR 21 | 1.5 | 120 | 32 | 21-1/2 | 20-1/2 | AS | 106059 | 2 |
| UTU-STAR 28 | 2 | 208 | 42 | 21-1/2 | 20-1/2 | AS | 106067 | 3 |
| UTU-STAR 22 | 2 | 240 | 42 | 21-1/2 | 20-1/2 | AS | 106075 | 3 |
| UTU-STAR 27 | 2 | 277 | 42 | 21-1/2 | 20-1/2 | AS | 106083 | 3 |
| UTU-STAR 24 | 2 | 480 | 42 | 21-1/2 | 20-1/2 | AS | 106091 | 3 |
| UTU-STAR 26 | 2 | 600 | 42 | 21-1/2 | 20-1/2 | AS | 106104 | 3 |
| UTU-STAR 48 | 4.5 | 208 | 42 | 43-3/8 | 42-3/8 | AS | 106403 | 4 |
| UTU-STAR 42 | 4.5 | 240 | 42 | 43-3/8 | 42-3/8 | AS | 106411 | 4 |
| UTU-STAR 47 | 4.5 | 277 | 42 | 43-3/8 | 42-3/8 | AS | 106796 | 4 |
| UTU-STAR 44 | 4.5 | 480 | 42 | 43-3/8 | 42-3/8 | AS | 106964 | 4 |
| UTU-STAR 46 | 4.5 | 600 | 42 | 43-3/8 | 42-3/8 | AS | 106972 | 4 |




**UTU-STAR**

# ChromaStar™ Accessories *(cont'd.)*

## *Accessories for Fixed Overhead Heaters*

### *Hanger Kit*

Hanger kits include 24 feet of chain, 4 "S" hooks to mount units in a fixed overhead position using the universal mounting brackets included on the back of fixed overhead radiant models. The chain is long enough to allow all heaters to be mounted up to 6 feet from the ceiling.

#### *Specifications and Ordering Information*

| Model No. | kW | Status | PCN | Wt. (Lbs.) |
|---|---|---|---|---|
| **STAR-HK** | All | **S** | **340654** | 2 |

### *Portable Cart Kits*

Chromalox series ChromaStar™ fixed overhead radiant heaters can be field converted to portable spot heaters with the use of the cart kits. Each kit includes wheels, legs, handle, grill(s), baffle (if required) and all of the necessary hardware to complete the modification. These kits are easy to install with standard tools.

#### *Specifications and Ordering Information*

| Model No. | kW | Status | PCN | Wt. (Lbs.) |
|---|---|---|---|---|
| STAR-06A CART | 6 | AS | 340830 | 8 |
| **STAR-14A CART** | 13.5 | **S** | **340849** | 8 |

### *Floor Protection Baffle Kit*

The Chromalox safety baffle kit includes a refletor baffle which can be field installed on the lower reflective panel on portable STAR radiant heaters. The baffle will protect temperature sensitive flooring materials such as vinyl tile from being damaged due to radiant heat.

#### *Specifications and Ordering Information*

| Model No. | kW | Status | PCN | Wt. (Lbs.) |
|---|---|---|---|---|
| **FP-614** | 6 or 13.5 | **S** | **340865** | 2 |

### *Safety Grill Kits*

The safety grill kits contain one (2kW, 4.5kW and 6kW) or two grills (13.5kw) to protect personnel from coming in contact with hot heating elements. The grills are constructed of heavy gauge plated steel and are simple to install.

#### *Specifications and Ordering Information*

| Model No. | kW | Status | PCN | Wt. (Lbs.) |
|---|---|---|---|---|
| **GR-2** | 2 | **S** | **111878** | 5 |
| **GR-4** | 4.5 | **S** | **111894** | 5 |
| GR-6KW | 6 | NS | 340638 | 6 |
| GR-14AKW | 13.5 | NS | 340857 | 12 |

### *Ground Fault Detection*

The Chromalox STAR-GF series wall mounted ground fault detectors are designed to monitor for any gradual changes in the insulation level due to humidity or mechanical damage as they develop and will de-energize the load to prevent arcing type faults, preventing premature element failure and potential fire damage. The detector consists of a ground fault sensor, control circuit transformer, magnetic contactor and an on off toggle switch with rubber boot, completely prewired ina NEMA 4 enclosure.

#### *Specifications and Ordering Information*

| Model No. | Heater Volts | Status | PCN | Wt. Lbs. |
|---|---|---|---|---|
| STAR-GF-8 | 208 | NS | 340777 | 16 |
| STAR-GF-2 | 240 | NS | 340785 | 16 |
| STAR-GF-7 | 277 | NS | 340793 | 16 |
| STAR-GF-4 | 480 | AS | 340806 | 16 |
| STAR-GF-6 | 600 | NS | 340814 | 16 |

# RBC-1

## Overhead Radiant Space Heater

- **1 - 2.5 kW**
- **3,412 - 8,530 Btuh**
- **120, 208, 240, 277 and 347 Volt Single Phase**
- **Heater Can be Washed Down After Being Disconnected**
- **Optional Screen Available**

### *Description*

RBC-1 Infrared radiant heaters are ideal for providing supplemental heat in damp locations or under-heated areas. The heaters can be suspended just like flourescent lighting fixtures to focus heat where desired. The heater assembly can be hosed down to remove dust and dirt accumulation found in heavy industrial locations.

### *Applications*

- Garages
- Laundry Areas
- Work Shops
- Factories
- Assembly Areas
- Maintenance Areas

### *Construction*

**Reflector —** 0.050" polished aluminum for high radiant efficiency .

**Heating Elements —** Single ended 0.475" diameter alloy sheathed tubular heater with liquid-tight brass threaded fittings connected to the gasketed enclosure.

**Field Wiring —** Includes moisture resistant terminal enclosure allowing the unit to be hosed down.

**Mounting —** 4 mounting holes to accept S-hooks supplied with STAR-HK hanger kit.

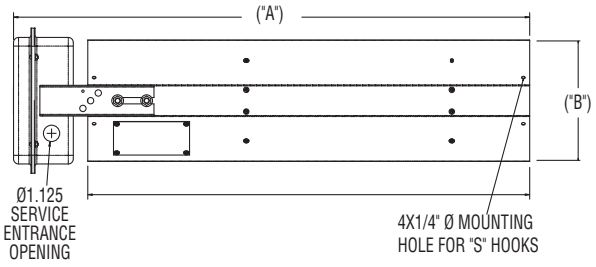
**CAUTION — Hazard of Fire.** Minimum spacing from front of heater case to combustible material is 4 ft. Do not operate any radiant heater where flammable vapors, gases or liquids are present.

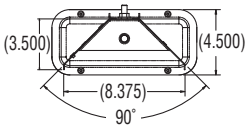
### *Advantages*

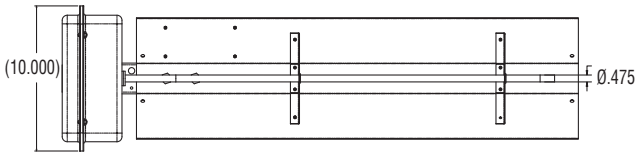
- Minimum Maintenance
- Easy Installation
- No Toxic Byproducts of Combustion
- No Fuel Lines to Break
- Safer, No Open Flames

*Refer to WR-80, WR-90, VCF, VCS, VCR, HCP in the Controls section.*

# RBC-1
## Overhead Radiant Space Heater *(cont'd.)*




### *Specification and Ordering Information*

| Model | Volts | kW | Amperage | BTU | Dimensions A Length | Dimensions B Width | Dimensions D Depth | Stock Status | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|
| RBC-1101 | 120 | 1000 | 8.3 | 3412 | | | | AS | 345826 | |
| RBC-1108 | 208 | 1000 | 4.8 | 3412 | | | | S | **345834** | |
| RBC-1102 | 240 | 1000 | 4.2 | 3412 | 27.125" (689 mm) | 8.375" (212 mm) | 3.5" (88.9) | S | **345842** | 18 |
| RBC-1107 | 277 | 1000 | 3.6 | 3412 | | | | NS | 345850 | |
| RBC-11034 | 347 | 1000 | 2.9 | 3412 | | | | NS | 345869 | |
| RBC-1151 | 120 | 1500 | 12.5 | 5118 | | | | S | **345877** | |
| RBC-1158 | 208 | 1500 | 7.2 | 5118 | | | | AS | 345885 | |
| RBC-1152 | 240 | 1500 | 6.3 | 5118 | 35.625" (905 mm) | 8.375" (212 mm) | 3.5" (88.9) | S | **345893** | 22 |
| RBC-1157 | 277 | 1500 | 5.4 | 5118 | | | | NS | 345906 | |
| RBC-11534 | 347 | 1500 | 4.3 | 5118 | | | | NS | 345914 | |
| RBC-1208 | 208 | 2000 | 9.6 | 6824 | | | | S | **345922** | |
| RBC-1202 | 240 | 2000 | 8.3 | 6824 | 46.625" (1184 mm) | 8.375" (212 mm) | 3.5" (88.9) | S | **345930** | 24 |
| RBC-1207 | 277 | 2000 | 7.2 | 6824 | | | | NS | 345949 | |
| RBC-12034 | 347 | 2000 | 5.8 | 6824 | | | | NS | 345957 | |
| RBC-1258 | 208 | 2500 | 12.0 | 8530 | | | | AS | 345965 | |
| RBC-1252 | 240 | 2500 | 10.4 | 8530 | 53.375" (1356 mm) | 8.375" (212 mm) | 3.5" (88.9) | AS | 345973 | 26 |
| RBC-1257 | 277 | 2500 | 9.0 | 8530 | | | | NS | 345981 | |
| RBC-12534 | 347 | 2500 | 7.2 | 8530 | | | | NS | 345990 | |

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

### *RBC-1 Optional Accessories*

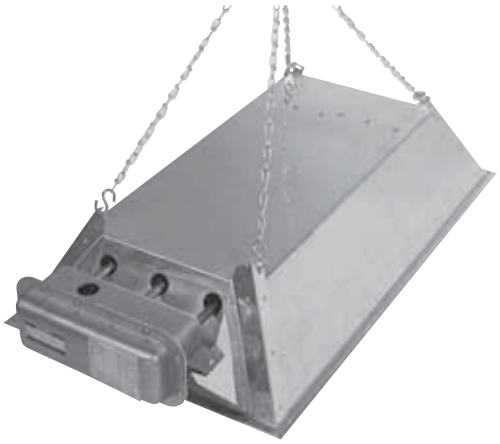
| Model | Description | Wt (Lbs.) | Stock Status | PCN |
|---|---|---|---|---|
| STAR-HK | Hanger Kit | 2 | S | **340654** |
| G-110 | Grill 1 kW | 1 | S | **341120** |
| G-115 | Grill 1.5 kW | 1 | S | **341139** |
| G-120 | Grill 2 kW | 1 | S | **341147** |
| G-125 | Grill 2.5 kW | 1 | S | **341155** |

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

# RBC-3

## Fixed Overhead Radiant Space Heater

- **1.2 - 3.6 kW**
- **4,094 - 12,283 Btuh**
- **208, 240 and 480 Volt**
- **1 or 3 Phase**
- **Moisture Resistant**



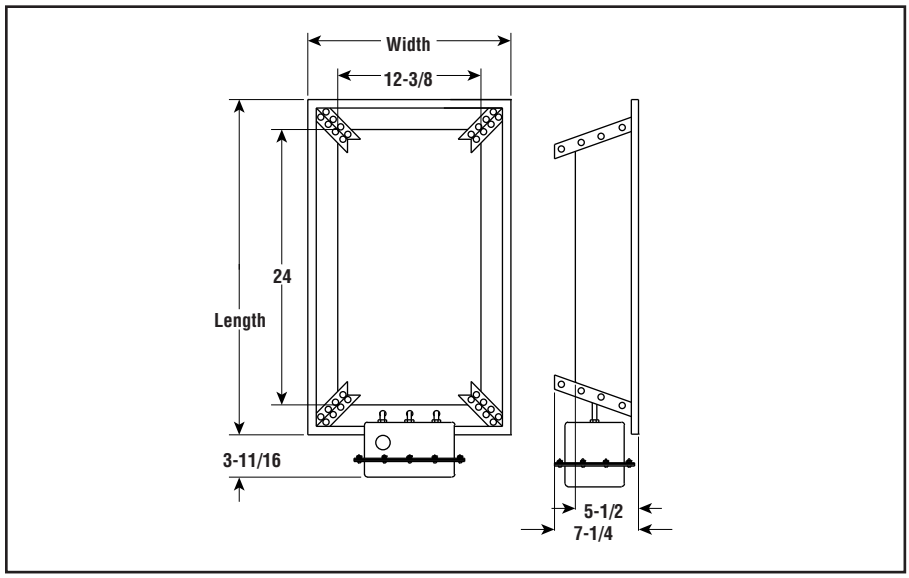
### *Description*

RBC-3 Infrared radiant heaters are ideal for providing supplemental heat in damp locations or under-heated areas. The heater assembly can be hosed down to remove dust and dirt accumulations found in many heavy industrial locations.

### *Applications*

- Garages
- Machine Shops
- Store Rooms
- Warehouses
- Factories
- Work Stations
- Parts Counters
- Maintenance Areas
- Shipping and Receiving Areas, Loading Docks

### *Dimensions (Inches)*




### *Construction*

**Housing —** 0.050" polished aluminum for high efficiency radiant reflectivity, re-enforced at the corners for added strength.

**Heating Elements —** One, two or three single ended 0.475" diameter alloy sheathed tubular heaters with liquid-tight brass threaded fittings connected to the terminal enclosure.

**Field Wiring —** Includes a gasketed, moisture resistant terminal enclosure allowing the heater to be hosed down to remove dust and dirt.

**Mounting —** No. 2 size chain and S hooks supplied for suspension.

**CAUTION — Hazard of Fire**. Minimum spacing from front of heater case to combustible material is 4 ft. Do not operate any radiant heater where flammable vapors, gases or liquids are present.

### *Advantages*

- Minimum Maintenance
- Easy Installation
- No Toxic Byproducts of Combustion
- No Fuel Lines to Break
- Safer, No Open Flames

*Refer to WR-80, WR-90, VCF, VCS, VCR, HCP in the Controls section.*

# RBC-3

## Fixed Overhead Radiant Space Heater *(cont'd.)*

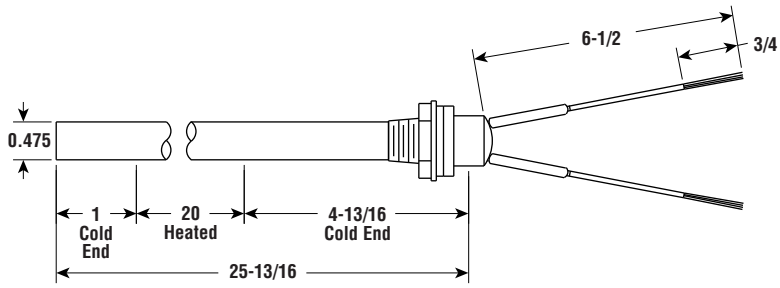
### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (In.) | | | Ordering | | | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | No. Elem. | Btuh | Height | Width | Length | Model | Stock | PCN | |
| 1.2 | 208 | 1 | 1[1] | 4,094 | 5-1/2 | 17-9/16 | 32-3/4 | RBC-31280 | AS | 115043 | 30 |
| 1.2 | 240 | 1 | 1[1] | 4,094 | 5-1/2 | 17-9/16 | 32-3/4 | RBC-31220 | AS | 115051 | 30 |
| 1.2 | 480 | 1 | 1[1] | 4,094 | 5-1/2 | 17-9/16 | 32-3/4 | RBC-31240 | AS | 115060 | 30 |
| 2.4 | 208 | 2 | 2[2] | 8,188 | 5-1/2 | 17-9/16 | 32-3/4 | RBC-32480 | AS | 115078 | 30 |
| 2.4 | 240 | 2 | 2[2] | 8,188 | 5-1/2 | 17-9/16 | 32-3/4 | RBC-32420 | AS | 115086 | 30 |
| 2.4 | 480 | 2 | 2[2] | 8,188 | 5-1/2 | 17-9/16 | 32-3/4 | **RBC-32440** | **S** | **115094** | 30 |
| 3.6 | 208 | 3 | 3[2] | 12,283 | 5-1/2 | 17-9/16 | 32-3/4 | **RBC-33680** | **S** | **115107** | 30 |
| 3.6 | 240 | 3 | 3[2] | 12,283 | 5-1/2 | 17-9/16 | 32-3/4 | **RBC-33620** | **S** | **115115** | 30 |
| 3.6 | 480 | 3 | 3[2] | 12,283 | 5-1/2 | 17-9/16 | 32-3/4 | **RBC-33640** | **S** | **115123** | 30 |

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

1. For supply connections use 75°C wire minimum.
2. For supply connections use 90°C wire minimum.

### *Replacement Elements — Dimensions (Inches)*




### *RBC-3 Replacement Elements — Specifications and Ordering Information*

| kW | Volts | W/In² | Part No. | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|
| 1.2 | 208 | 40 | 322-874016-003 | NS | 114796 | 2 |
| 1.2 | 240 | 40 | 322-874016-001 | AS | 114761 | 2 |
| 1.2 | 480 | 40 | 322-874016-002 | AS | 114753 | 2 |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify Part Number, PCN, volts, kW and quantity.

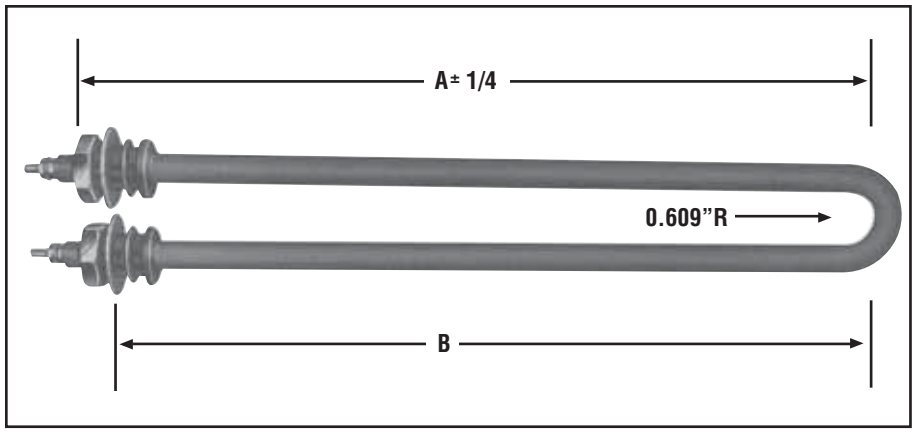
**Note —** These elements are not to be used for direct immersion in liquids.

# UTUA-LT

## 430" Dia.
## Round Cross- Section

- **INCOLOY Sheath**
- **2000 and 4500 Watts 240 and 480 Volt**
- **9/16 - 18 Bulkhead Fittings**
- **Replacement Element for Aitken* OH, SH, PPH and PHX Radiant Heaters**

### *Replacement Elements - Dimensions (Inches)*




### *Applications*

Replaces heating elements in radiant comfort heaters manufactured by Aitken Products, Inc. It can also be used in other heating applications where threaded liquid-tight fittings permit mounting for high-velocity air or immersion heating of liquids which are not corrosive to INCOLOY. When used for immersion heating, heated section of element must be immersed at all times.

### *Advantages*

Specially constructed to provide excellent service life in radiant heating applications.

### *Features*

**Liquid-Tight Fittings** - 9/16-18 Brass for mounting. Nuts, washers and gaskets included.

**10-32 Terminals** - Stainless steel, complete with nuts and washers.

**Work Temperatures** - See Tubular Heater overview section for element rated 40 W/In$^2$

**Bending** - Lengthwise only. See Tubular Heater Overview Section.

### *Specifications and Ordering Information*

| 40 W/In$^2$ Watts | Volts | Dimensions (In) A | Dimensions (In) B | Model | Aitken* Part No. | Stock | PCN | Wt. (Lbs) |
|---|---|---|---|---|---|---|---|---|
| 2000 | 240 | 21.5 | 20.5 | **UTUA-224LT** | HE20240 | **S** | **106016** | 2 |
| 2000 | 480 | 21.5 | 20.5 | **UTUA-248LT** | HE20480 | **S** | **106024** | 2 |
| 4500 | 240 | 43 | 42 | **UTUA-424LT** | HE45240 | **S** | **106032** | 3 |
| 4500 | 480 | 43 | 42 | **UTUA-448LT** | HE45480 | **S** | **106040** | 3 |

**Stock Status:** S = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, watts, volts, phase and quantity.
*Aitken is a registered trademark of Aitken Products, Inc.

# SKR
## Single Fixed Element Radiant Heater

- **0.8 - 3.6 kW**
- **2,730 - 12,283 Btuh**
- **120, 208, 240, 275 and 480 Volt**
- **Single Phase**
- **Protective Grille**

### *Description*

SKR metal sheath infrared radiant heaters provide comfort heat in indoor and protected outdoor locations. The radiant heaters are not dependent upon air movement and offer zone control flexibility. They can be used for supplemental heat in problem spots or as a complete heating system.

### *Applications*

- Indoor Tennis Courts and Racquetball
- Warehouses
- Factories
- Indoor Swimming Pools
- Parts Counters
- Shipping and Receiving Areas

### *Construction*

**Extruded Aluminum Housing —** Rugged design provides added protection to heating element and reflector.

**Protective Grille —** Helps protect personnel from direct contact with hot element.

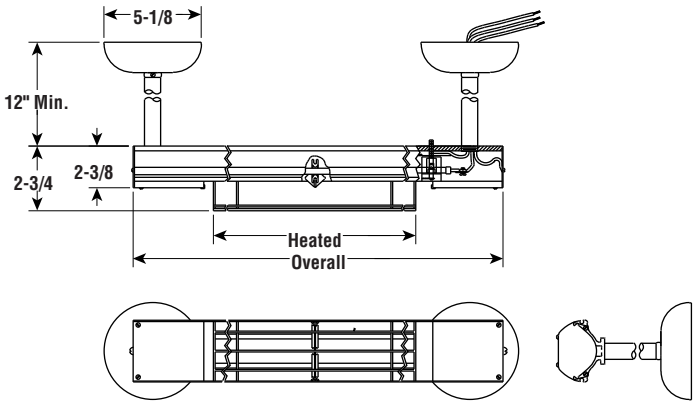
**Heating Elements —** Triangular cross section 3/8" diameter alloy sheath element located at the focal point of a built-in optically designed, polished aluminum parabolic reflector.

**Mounting and Wiring** with Hanger Kit consisting of 2 ea. canopies, 12" long 3/8" conduits and hanger brackets.

**For Ceiling Mounting to 12 Feet Heights —** While stems can be bent to direct radiation, UL listing applies to type SKR installed with a minimum spacing: 12" from ceiling as provided by fixture stems, 6' from floor and 24" from walls.

*Refer to WR-80, WR-90, VCF, VCS, VCR, HCP in the Controls section.*

### *Dimensions (Inches)*




### *Advantages*

- Minimum Maintenance
- Easy Installation
- No Toxic Byproducts of Combustion
- Fast Response
- Easy to Control

**CAUTION** — Not intended for use where flammable vapors, gases, liquids or other combustible atmospheres are present.

### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (In.) | | Ordering | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | No. Elem. | Btuh | Heated Length | Overall Length | Model | Stock | PCN | Wt. (Lbs.) |
| 0.8 | 120 | 1 | 1 | 2,730 | 16-3/4 | 24-3/8 | SKR-2083 | NS | 120184 | 9 |
| 0.8 | 208 | 1 | 1 | 2,730 | 16-3/4 | 24-3/8 | SKR-2083 | AS | 120192 | 9 |
| 0.8 | 240 | 1 | 1 | 2,730 | 16-3/4 | 24-3/8 | SKR-2083 | NS | 120205 | 9 |
| 1.1 | 120 | 1 | 1 | 3,753 | 22-5/8 | 30-5/8 | **SKR-3113** | **S** | **120213** | 11 |
| 1.1 | 208 | 1 | 1 | 3,753 | 22-5/8 | 30-5/8 | SKR-3113 | NS | 120221 | 11 |
| 1.1 | 240 | 1 | 1 | 3,753 | 22-5/8 | 30-5/8 | **SKR-3113** | **S** | **120230** | 11 |
| 1.8 | 208 | 1 | 1 | 6,142 | 38-5/8 | 46-5/8 | SKR-4183 | AS | 120248 | 13 |
| 1.8 | 240 | 1 | 1 | 6,142 | 38-5/8 | 46-5/8 | **SKR-4183** | **S** | **120256** | 13 |
| 1.8 | 275 | 1 | 1 | 6,142 | 38-5/8 | 46-5/8 | **SKR-4183** | **S** | **120803** | 13 |
| 2.5 | 208 | 1 | 1 | 8,530 | 53-3/8 | 61-3/8 | SKR-5253 | AS | 120264 | 17 |
| 2.5 | 240 | 1 | 1 | 8,530 | 53-3/8 | 61-3/8 | **SKR-5253** | **S** | **120272** | 17 |
| 2.5 | 275 | 1 | 1 | 8,530 | 53-3/8 | 61-3/8 | SKR-5253 | AS | 120838 | 17 |
| 2.5 | 480 | 1 | 1 | 8,530 | 53-3/8 | 61-3/8 | SKR-5253 | NS | 120280 | 17 |
| 3 | 208 | 1 | 1 | 10,236 | 65-3/4 | 73-3/4 | SKR-6303 | AS | 120299 | 19 |
| 3 | 240 | 1 | 1 | 10,236 | 65-3/4 | 73-3/4 | SKR-6303 | AS | 120301 | 19 |
| 3 | 275 | 1 | 1 | 10,236 | 65-3/4 | 73-3/4 | SKR-6303 | AS | 120846 | 19 |
| 3 | 480 | 1 | 1 | 10,236 | 65-3/4 | 73-3/4 | SKR-6303 | AS | 120310 | 19 |
| 3.6 | 208 | 1 | 1 | 12,283 | 77-3/4 | 85-3/4 | **SKR-7363** | **S** | **120820** | 21 |
| 3.6 | 240 | 1 | 1 | 12,283 | 77-3/4 | 85-3/4 | **SKR-7363** | **S** | **120328** | 21 |
| 3.6 | 275 | 1 | 1 | 12,283 | 77-3/4 | 85-3/4 | SKR-7363 | NS | 120811 | 21 |
| 3.6 | 480 | 1 | 1 | 12,283 | 77-3/4 | 85-3/4 | SKR-7363 | AS | 120336 | 21 |

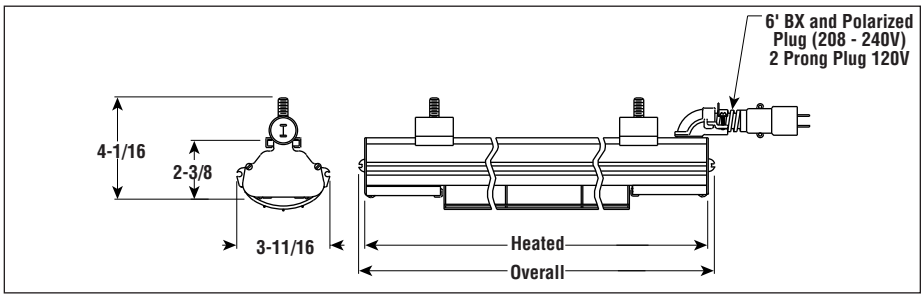
**Stock Status: S** = stock AS = assembly stock NS = non-stock
**To Order—Specify model, PCN, kW, volts, phase and quantity.**

**Note —** Center-to-center distance between canopies is 1-1/2" less than overall length. Canopy diameter is 5-1/4 inches.

# KR
## Single Fixed Element Radiant Heater

- **0.8 - 1.8 kW**
- **2,730 - 6,142 Btuh**
- **120, 208 and 240 Volt**
- **Single Phase**
- **Protective Grille**

### *Dimensions (Inches)*




### *Description*

KR metal sheath infrared radiant heaters provide comfort heat in indoor and protected outdoor locations. They may be ceiling mounted by chains, steel strap or other means and can be mounted elsewhere at any angle. Use also for supplemental heat in problem spots or as a complete heating system.

### *Applications*

- Spot Heating
- Aisleways
- Entryways
- Farm Buildings
- Parts Counters
- Loading Docks

### *Construction*

**Extruded Aluminum Housing —** Rugged design provides added protection to heating element and reflector.

**Highly Polished Aluminum Reflectors** give good reflectivity and heat transfer, and are easily cleaned to maintain energy efficiency.

**Protective Grille —** Helps protect personnel from direct contact with hot element.

**Heating Elements —** Triangular cross section 3/8" diameter alloy sheath element located at the focal point of a built-in optically designed, polished aluminum parabolic reflector.

**Mounting Clamps —** Two sliding clamps are shipped with the heater for attachment to supports.

**Field Wiring** is accomplished with a 6" long 1/2" flexible metallic conduit with male plug. All 208 to 240V heaters have a polarized plug, while 120V heaters have a 3-prong grounded plug.

**For Horizontal, Vertical or Angled Mounting** on your supporting framework. Type KR is provided with 6" of flexible metallic conduit connected to a standard male plug.

### *Advantages*

- Minimum Maintenance
- Easy Installation
- No Toxic Byproducts of Combustion
- Fast Response
- Easy to Control

**Ceiling Mounting —** Mounting chains, steel strap or other means and can be conveniently mounted at virtually any angle.

**CAUTION** — Not intended for use where flammable vapors, gases, liquids or other combustible atmospheres are present.

### *Specifications and Ordering Information*

| Electrical | | | | | Dimensions (In.) | | Ordering | | | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|
| kW | Volts | Phase | No. Elem. | Btuh | Heated Length | Overall Length | Model | Stock | PCN | |
| 0.8 | 120 | 1 | 1 | 2,730 | 16-3/4 | 24-3/8 | | | | 9 |
| 0.8 | 240 | 1 | 1 | 2,730 | 16-3/4 | 24-3/8 | KR-2083B | AS | 120352 | 9 |
| 1.1 | 120 | 1 | 1 | 3,753 | 22-5/8 | 30-5/8 | KR-3113B | AS | 120360 | 11 |
| 1.1 | 208 | 1 | 1 | 3,753 | 22-5/8 | 30-5/8 | | | | 11 |
| 1.1 | 240 | 1 | 1 | 3,753 | 22-5/8 | 30-5/8 | KR-3113B | AS | 120387 | 11 |
| 1.8 | 208 | 1 | 1 | 6,142 | 38-5/8 | 46-5/8 | KR-4183BV | AS | 120395 | 13 |
| 1.8 | 240 | 1 | 1 | 6,142 | 38-5/8 | 46-5/8 | | | | 13 |

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

*Refer to WR-80, WR-90, VCF, VCS, VCR, HCP in the Controls section.*

# WR
## Wall Mounted Room Thermostats

- **Heavy Duty**
  **25 Amps, 120 Vac**
  **22 Amps, 240 Vac**
  **18 Amps, 277 Vac**
- **Positive Snap-Action Switch**
- **3 Degree Control Differential**
- **UL Listed, CSA Certified**

*WR-80*

*WR-90*

### *Description*

**WR-80**
Range 40-80°F Internal Sensing Element Indicating Thermometer

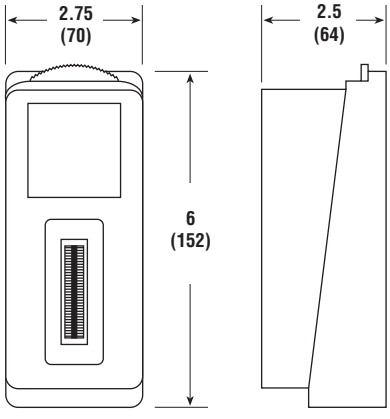
**WR-90**
External Sensing Bulb Range 20-90°F

The WR Series Room Thermostats are designed to directly control individual heaters or, by using an external contactor, can control several heaters. The WR-90 is particularly useful for maintaining lower temperatures (in garages, warehouses, etc.) and avoiding unnecessary heating costs.

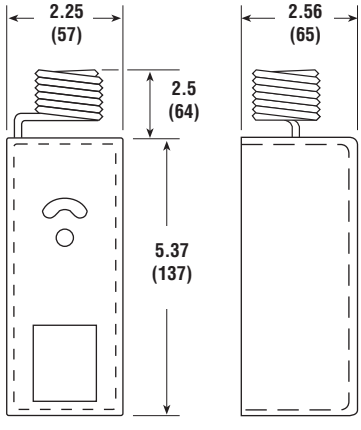
Each design has accuracy and provides long reliable service with a 3 degree control differential. Both units are heavy duty, single stage, with a SPST line voltage snap-action switch and are finished with tough, metallic gray enamel housings.

**WARNING: Hazard of Fire.** The WR thermostats are designed for temperature control service only. Because they do not fail-safe, they should not be used for temperature limiting duty.

### *Dimensions*




*WR-80*




*WR-90*

All Dimensions in Inches (mm )

### *Specifications and Ordering Information*

| Model | Temp. Range (˚F) | Voltage/Current | | | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|
| | | 120V | 240V | 277V | | | |
| **WR-80** | 40 - 80 | 25A | 22A | 18A | **S** | **263177** | 1 |
| **WR-90** | 20 - 90 | 25A | 22A | 18A | **S** | **263185** | 1 |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**Note —** 1. Pilot Duty rating, 125 VA for 120 - 277 Vac.

# WR80-EP

## Explosion Proof Room Thermostat

- **Heavy Duty**
  **25 Amps, 120 Vac**
  **22 Amps, 240 Vac**
  **18 Amps, 277 Vac**
- **Positive Snap-Action Switch**
- **3 Degree Control Differential**
- **Temperature Range 40 - 90°F**

### *Description*

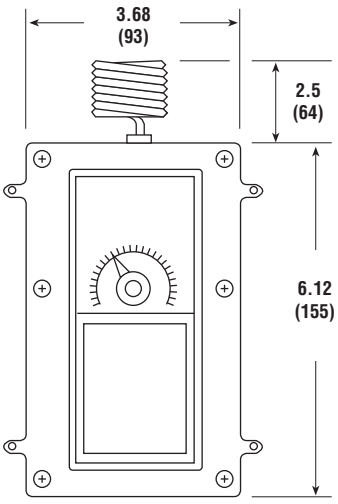
The WR80-EP Room Thermostat is designed to control individual heaters directly or by using an external contactor can control several heaters. It is suitable for Class I, Division I, Group D and Class II, Division I, Groups E, F and G locations.

The WR80-EP provides accuracy, long and reliable service, with a 3 degree differential.

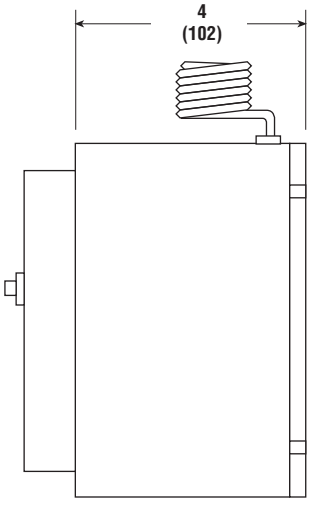
The control is a heavy duty, single stage, SPST line voltage snap-action switch. It features an external, coiled sensing element and adjustable setpoint knob.

**WARNING: Hazard of Fire.** The WR80-EP thermostat is designed for temperature control service only. Because it is not fail-safe, it should not be used for temperature limiting duty.

### *Dimensions*




Front View




Side View

All Dimensions in Inches (mm )

### *Specifications and Ordering Information*

| Model | Temp. Range (˚F) | Voltage/Current | | | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|
| | | 120V | 240V | 277V | | | |
| **WR80-EP** | 40-90 | 25A | 22A | 18A | **S** | **266124** | 1 |

**Stock Status: S** = stock AS = assembly stock NS = non-stock

**Note —** 1. Pilot Duty rating, 125 VA for 120 - 277 Vac.

# WT

## Wall Mounted Residential & Commercial Room Thermostat

- **22 Amps, 120 Vac - 240 Vac 18 Amps, 277 Vac**
- **45 - 75°F Temperature Range**
- **Ivory Color**
- **Mounts in Standard Electrical Box**

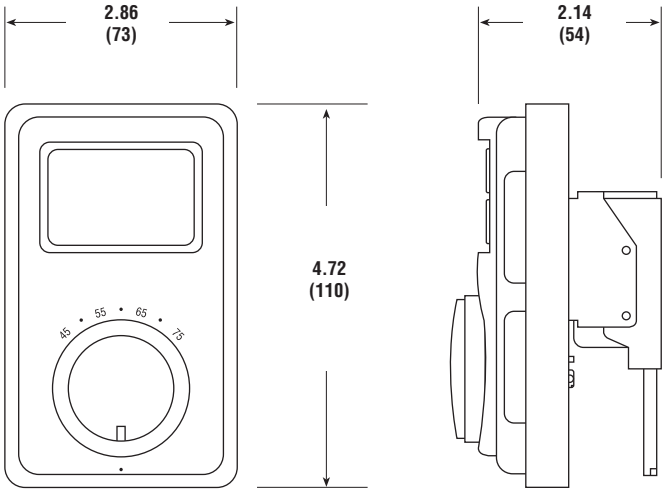

### *Description*

The WT-121 and WT-122 Room Thermostats are designed to control individual heaters or may be used with an external contactor. The WT-121 provides heat control with a SPST snap action switch (open on rise) for breaking one line of the power source. The WT-122 also is a heat control but uses a DPST snap action switch and will break both lines of the power source.

Both models include heat anticipators—assuring closer and more even temperature regulation.

**WARNING: Hazard of Fire.** The WT thermostats are designed for temperature control service only. Because they are not fail-safe, they should not be used for temperature limiting duty.

### *Dimensions*




Front View  Side View

All Dimensions in Inches (mm )

### *Specifications and Ordering Information*

| Model | Type | Temp. Range (˚F) | Voltage/Current 120V | 208V | 240V | 277V | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|
| **WT-121** | SPST | 45-75 | 22A | 22A | 22A | 18A | **S** | **309999** | 1 |
| **WT-122** | DPST | 45-75 | 22A | 22A | 22A | 18A | **S** | **310009** | 1 |

**Stock Status:** **S** = stock  AS = assembly stock  NS = non-stock

# WTL

## Wall Mounted Residential & Commercial Room Thermostat

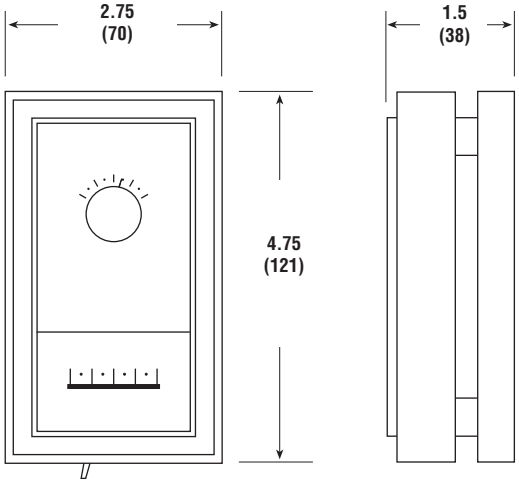
- 24 - 30 Vac, 1A Maximum
- 40 - 80°F Temperature Range
- Beige Color
- Mounts in Standard Electrical Box
- Screw Terminals for Signal Wiring


### *Description*

The WTL-121 Room Thermostat is designed for space heaters with low voltage control circuits. Its operation is from a sealed mercury cell providing long life and protection from environmental dirt and moisture. The heating anticipator provides a narrow differential control of room temperature, 1°F.

**WARNING: Hazard of Fire.** The WTL thermostat is designed for temperature control service only. Because it is not fail-safe, it should not be used for temperature limiting duty.

### *Dimensions*




All Dimensions in Inches (mm )

### *Specifications and Ordering Information*

| Model | Type | Temp. Range (˚F) | Voltage Current 24-30 Vac | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|
| **WTL-121** | SPST Low Volt (opens on rise) | 40 - 80 | 1A Max. | **S** | **308005** | 1 |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock

# WCRT

## Corrosion Resistant Wall Mounted Industrial Room Thermostat

- **25-Amps, 120 - 240 Vac 22 - Amps, 277 Vac**
- **Positive Snap-Action Switch**
- **Heating or Cooling Control, SPDT Contacts**
- **NEMA 4X Weatherproof Enclosure**
- **40 - 100°F Temperature Range**
- **2.5°F Differential**


### *Description*

The WCRT Room Thermostat is designed to directly control an individual heater. Using an external contactor, it can control several heaters. The WCRT provides high level accuracy and sensitivity with 2.5°F differential. The control has a SPDT output and can be used for heating or cooling.

**WARNING: Hazard of Fire.** The WCRT thermostat is designed for temperature control service only. Because it is not fail-safe, it should not be used for temperature limiting duty.

### *Applications*

- Can be used to control room temperature in harsh environments regardless of whether heating or cooling is required.
- Tolerates continuous spraying with water, high humidity, airborne contamination and moderately corrosive conditions.

### *Ratings for Other Electrical Applications*

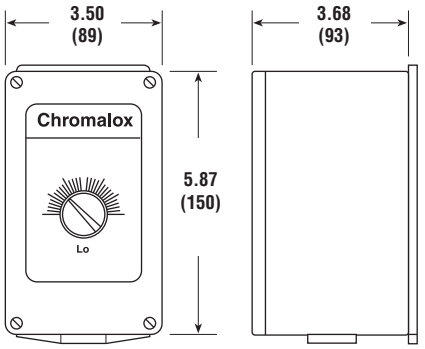
| Type of Service | Maximum Rating (Amps AC) | | |
|---|---|---|---|
| | 120V | 240V | 277V |
| Locked Rotor | 80 | 60 | 50 |
| Inductive | 16 | 12 | 10 |
| Pilot Duty | 125VA | 125VA | 125VA |

Suitable for 24 Vac Operation @ 100mA Minimum

### *Features*

- Shielded sensing bulb is nickel-plated and attached directly to bottom of enclosure where it is shielded from damage and accumulation of insulating particles.
- Sealed Noryl case with neoprene gasket to seal out dust and moisture. Knob opening is closed with lubricated "O" ring.
- Adjustable Knob setting is accurate to ± 2.5°F with large easily-read numerical dial.
- Positive OFF for heating is provided by setting unit to LO position. (At LO Position, heat circuit is open and cool circuit is closed at any temperature.)

### *Dimensions*




All Dimensions in Inches (mm )

### *Specifications and Ordering Information*

| Model | Type | Temp. Range (˚F) | Voltage/Current, Resistive | | | Voltage/Current, Inductive | | | Stock | PCN | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 120V | 240V | 277V | 120V | 240V | 277V | | | |
| **WCRT-100** | SPDT | 40-100 | 22A | 22A | 18A | 16A | 12A | 10A | **S** | **223589** | 1 |

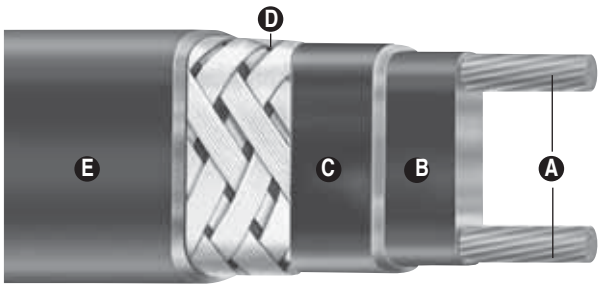
**Stock Status:** **S** = stock AS = assembly stock NS = non-stock

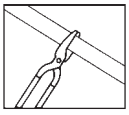
# SRL
## Self-Regulating Low Temperature

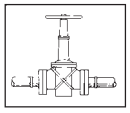
- **Self-Regulating, Energy Efficient**
- **16 AWG Buss Wire**
- **Circuit Lengths to 660 Feet**
- **Process Temperature Maintenance to 150°F (65°C)**
- **Maximum Continuous Exposure Temperature, Power Off, 185°F (85°C)**
- **Industrial Freeze Protection Applications**
- **Freeze Protection of Fire Protection System Piping**
- **Field Splicing Without Disrupting Heat Output**
- **3, 5, 8 and 10 W/Ft.**
- **120 and 208 - 277 Volt From Stock**
- **Approximate Size 3/8"W x 1/8"H**
- **Min. Bend Radius 1-1/8"**
- **For Use on Metal and Plastic Pipes**

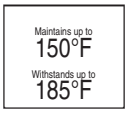
### *Description*

Chromalox SRL self-regulating heating cable provides safe, reliable heat tracing for freeze protection of pipes, valves, tanks and similar applications. Constructed of industrial grade 16 AWG buss wire with a tinned copper braid and optional overjacketing, SRL ensures operating integrity in Div. 2 hazardous environments as well as certain corrosive industrial environments. SRL heating cable has a maximum maintenance temperature rating of 150°F (65°C).

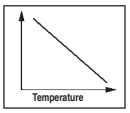




Cut to Length in Field


Can be Single Overlapped



Low Temperature



Self Regulating Output

### *Features*

- Energy efficient, self-regulating SRL uses less energy when less heat is required.
- Easy to install, SRL can be cut to any length (up to max. circuit length) in the field.
- Field splices can be performed easily in minutes with no scrap or wasted cold sections.
- SRL features lower installed cost than steam tracing, less maintenance expense and less downtime.
- SRL can be overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Because SRL is self-regulating, over-temperature conditions are minimized.
- Chromalox termination, splice, tee and end seal kits reduce installation time.

### *Construction*

**A** **Twin 16 AWG Copper Buss Wires —** Provide reliable electrical current capability.

**B** **Semiconductive Polymer Core Matrix —** "Self-Regulating" component of the cable, its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; as process temperature rises, the heat output decreases.

**C** **Polyolefin Jacket —** Flame retardant, electrically insulates the matrix and buss wires and provides resistance to water and some inorganic chemical solutions.

**D** **Tinned Copper Braid —** Provides additional mechanical protection in any environment and a positive ground path.

**E** **High Temperature Fluoropolymer or TPR Overjacket (optional) —** Corrosion resistant, flame retardant overjacket is highly effective in many environments. TPR coatings protect against certain inorganic chemical solutions. Fluoropolymer coatings are used for exposure to organic or corrosive solutions. These coatings also protect against abrasion and impact damage.

### *Approvals*

ATEX and IECEX Exe IIGb, Factory Mutual (FM) Approved for ordinary areas. UL Listed, CSA Certified for ordinary areas. UL listed for freeze protection of fire protection system piping. FM Approved for hazardous (classified) areas when used with U Series, DL and EL accessories:

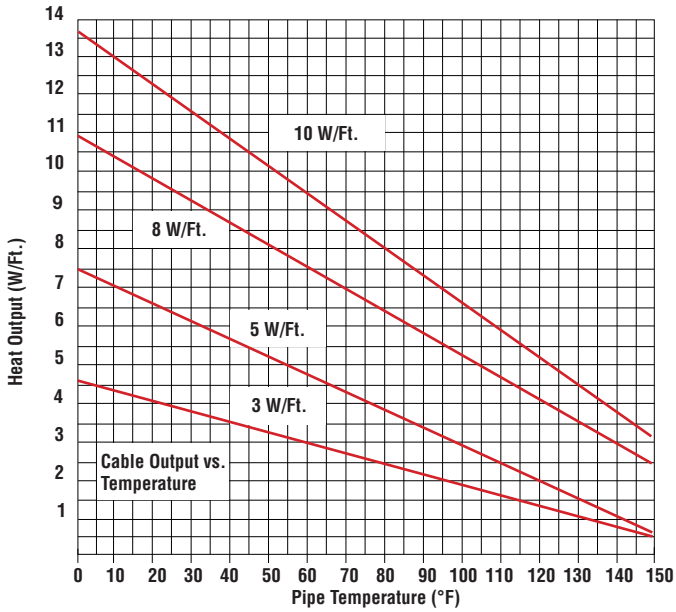
- Class I, Div. 2, Groups B, C, D (gases, vapors)
- Class II, Div. 2, Groups F, G (combustible dust)
- Class III, Div. 2 (easily ignitable fibers and fillings)
- 3 Watt Rated T6 Temperature Class
- 5 and 8 Watt Rated T5 Temperature Class
- 10 Watt Rated T4A Temperature Class.

**CSA** Certified for hazardous areas when used with DL or EL accessories:

- Class I, Div. 2, Groups A, B, C, D
- Class II, Div. 2, Groups F, G.
- ATEX and IECEX Exe IIGb
- Ex IIG Exe II

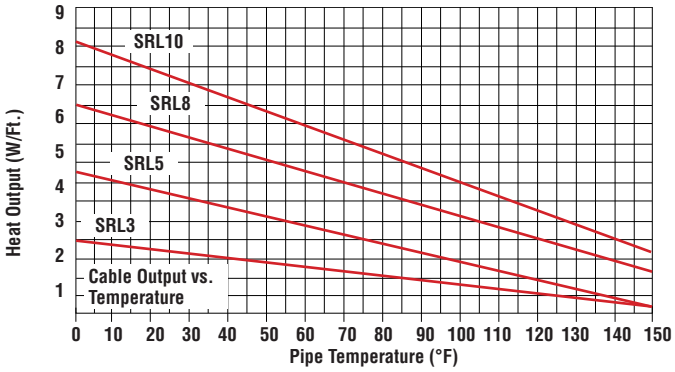
# SRL
## Self-Regulating Low Temperature *(cont'd.)*

### *Thermal Output Ratings on Insulated Metal Pipe[1]*




**Note 1** — Thermal output is determined per IEEE 515-2004 Standard for testing, design installation, and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

### *Thermal Output Ratings on Plastic Pipe with Aluminum Tape*




### *Output Wattage at Alternate Voltages (W/Ft.)*

| Model | 208V | % Change In Output | 220V | % Change In Output | 277V | % Change In Output |
|---|---|---|---|---|---|---|
| SRL 3 | 2.4 | -20 | 2.6 | -13 | 3.4 | +15 |
| SRL 5 | 4.1 | -18 | 4.5 | -10 | 5.6 | +13 |
| SRL 8 | 6.88 | -14 | 7.28 | -9 | 8.96 | +12 |
| SRL 10 | 8.7 | -13 | 9.2 | -8 | 11.1 | +10 |

### *Circuit Breaker Selection (Max. Circuit Lengths in Ft.)*

| Cable Rating | 50°F Start-Up (Ft.) | | | | | | 0°F Start-Up (Ft.) | | | | | | -20°F Start-Up (Ft.) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10A | 15A | 20A | 25A | 30A | 40A | 10A | 15A | 20A | 25A | 30A | 40A | 10A | 15A | 20A | 25A | 30A | 40A |
| SRL3-1C | 205 | 305 | 360 | NR | NR | NR | 135 | 200 | 270 | 330 | 360 | NR | 120 | 185 | 245 | 300 | 360 | NR |
| SRL3-2C | 400 | 600 | 660 | NR | NR | NR | 275 | 415 | 555 | 660 | NR | NR | 245 | 370 | 495 | 600 | 660 | NR |
| SRL5-1C | 125 | 185 | 250 | 270 | NR | NR | 90 | 135 | 180 | 225 | 270 | NR | 80 | 120 | 160 | 205 | 245 | 270 |
| SRL5-2C | 250 | 375 | 505 | 540 | NR | NR | 180 | 270 | 360 | 450 | 540 | NR | 160 | 245 | 325 | 405 | 490 | 540 |
| SRL8-1C | 100 | 150 | 200 | 215 | NR | NR | 70 | 110 | 145 | 180 | 215 | NR | 65 | 100 | 130 | 165 | 200 | 210 |
| SRL8-2C | 185 | 285 | 375 | 420 | NR | NR | 135 | 200 | 265 | 335 | 395 | 420 | 120 | 175 | 235 | 300 | 350 | 420 |
| SRL10-1C | 60 | 95 | 130 | 160 | 180 | NR | 50 | 80 | 105 | 130 | 155 | 180 | 45 | 70 | 95 | 120 | 140 | 180 |
| SRL10-2C | 100 | 160 | 210 | 260 | 315 | 360 | 80 | 125 | 170 | 210 | 255 | 340 | 75 | 120 | 160 | 195 | 240 | 320 |

**NR =** Not Required. Maximum circuit length has been reached in a smaller breaker size.

**Note —** Thermal magnetic circuit breakers are recommended since magnetic circuit breakers could "nuisance trip" at low temperature.

# SRL
## Self-Regulating Low Temperature *(cont'd.)*

### *Ordering Information*

| Output (W/Ft.) | Volts | Model | Stock | PCN | Wt./1000' (Lbs.) |
|---|---|---|---|---|---|
| 3 @ 50°F | 120 | SRL 3-1C | S | 382678 | 53 |
| | | SRL 3-1CT | S | 383400 | 66 |
| | | SRL 3-1CR | S | 382731 | 64 |
| | 208 - 277 | SRL 3-2C | S | 382686 | 53 |
| | | SRL 3-2CT | S | 383419 | 66 |
| | | SRL 3-2CR | S | 382740 | 64 |
| 5 @ 50°F | 120 | SRL 5-1C | S | 382694 | 53 |
| | | SRL 5-1CT | S | 383443 | 66 |
| | | SRL 5-1CR | S | 382758 | 64 |
| | 208 - 277 | SRL 5-2C | S | 382707 | 53 |
| | | SRL 5-2CT | S | 383451 | 66 |
| | | SRL 5-2CR | S | 382766 | 64 |
| 8 @ 50°F | 120 | SRL 8-1C | S | 382555 | 53 |
| | | SRL 8-1CT | S | 383460 | 66 |
| | | SRL 8-1CR | S | 382598 | 64 |
| | 208 - 277 | SRL 8-2C | S | 382563 | 53 |
| | | SRL 8-2CT | S | 383478 | 66 |
| | | SRL 8-2CR | S | 382600 | 64 |
| 10 @ 50°F | 120 | SRL 10-1C | S | 382820 | 53 |
| | | SRL 10-1CT | S | 383486 | 66 |
| | | SRL 10-1CR | S | 382846 | 64 |
| | 208 - 277 | SRL 10-2C | S | 382838 | 53 |
| | | SRL 10-2CT | S | 383494 | 66 |
| | | SRL 10-2CR | S | 382854 | 64 |

**To Order —** Specify length, model, PCN and installation accessories.

### *Accessories*

| Accessories | | U Series | DL | EL |
|---|---|---|---|---|
| Power Connection | Heat trace to electrical service connection | UPC | RTPC | SSK |
| Splice & Tee | | UMC | RTST | RT-RST |
| End Seal | For terminating cable | UES | RTES | RT-RES |
| Lighted End Seal | | USL | RTST-SL | N/A |
| Thermostat | Ambient air sensing thermostat | UAS | RTAS | THL/TXL |
| | Line sensing mechanical thermostat | UBC | RTBC | THR/TXR |

**To Order —** General Application & Installation Accessories such as tape, pipe straps, warning labels, etc., refer to the U Series, DL & EL General Application Accessories page at the end of this section.

### *Ordering Information*

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

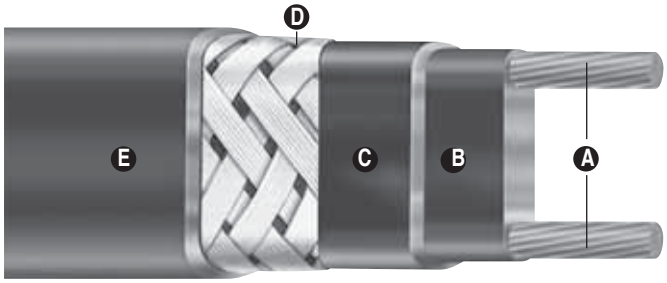
Contact your Local Chromalox Sales office for monitor wire option.

| Model | Self-Regulating Low Temperature | | | |
|---|---|---|---|---|
| SRL | Self-Regulating, Low Temperatue Heating Cable | | | |
| | Code | Output (W/Ft.) | | |
| | 3 | Three | | |
| | 5 | Five | | |
| | 8 | Eight | | |
| | 10 | Ten | | |
| | | Code | Voltage | |
| | | 1 | 120 | |
| | | 2 | 208 - 277 | |
| | | | Code | Braid and Overcoat Options |
| | | | C | Tin-Plated copper metallic braid for additional protection and ground path |
| | | | CT | Fluoropolymer corrosion resistant overjacket over braid for hostile/corrosive environments |
| | | | CR | TPR overjacket over braid for protection against certain inorganic chemical solutions |
| SRL | 5 | 1 | C | Typical Model Number |

*More Information is Available Online on Heat Trace.*

*Bookmark Your Browser to* ***www.chromalox.com*** *and Select* ***Manuals****.*

# SRP
## Self-Regulating Process Temperatures




NEW!



- **Self- Regulating, Energy Efficient**
- **16 AWG Buss Wire**
- **Circuit Lengths to 750 ft.**
- **Process Temperature Maintenance to 225°F (110°F)**
- **Maximum Continuous Exposure Temperature, Power Off, 275°F (135°F)**
- **Available in 5, 10, and 15 Watts per Foot**
- **120 and 208-277 Volts Available From Stock**
- **Industrial Process Maintenance Applications**

### *Description*

Chromalox SRP self-regulating heating cable provides safe, reliable heat tracing for process maintenance applications to 225°F (110°C) or freeze protection of pipes / tank with high heat losses. Constructed of industrial grade 16 AWG buss wire with a tinned copper braid and optional overjacketing, SRP ensures operating integrity most hostile industrial environments.

### *Features*

- Energy efficient, self-regulating SRP uses less energy when less heat is required.
- Easy to install, SRP can be cut to any length (up to max circuit length) in the field.
- SRP features lower installed cost than steam tracing, less maintenance expense and less down time.
- SRP can be single overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Because SRP is self-regulating, overtemperature conditions are minimized.
- Chromalox U-Series Connection Kits reduce installation time.

### *Construction*

**A** **Twin 16 AWG Copper Buss Wires –** Provide reliable electric current capability.

**B** **Semiconductive Polymer Core Matrix** "Self-Regulating" component of the cable its electrical resistance varies with temperature. As process temperature drops,the core's heat output increases; as process temperature rises, the heat output decreases.

**C** **Fluoropolymer Jacket –** Flame retardant, electrically insulates the matrix and buss wires and provides corrosion resistance.

**D** **Tinned Copper Braid –** Provides additional mechanical protection in any environment and a positive ground path.

**E** **High Temperature Fluoropolymer Overjacket –** Corrosion resistant, flame retardant overjacket is highly effective in many environments. Protects against exposure to organic or corrosive solutions. The overjacket also protects against abrasion and impact damage.

### *Approvals*

CSA Certified

Class I, Division 2, Groups B, C, D
Class II, Division 2, Groups F, G
Class III

FM Approved

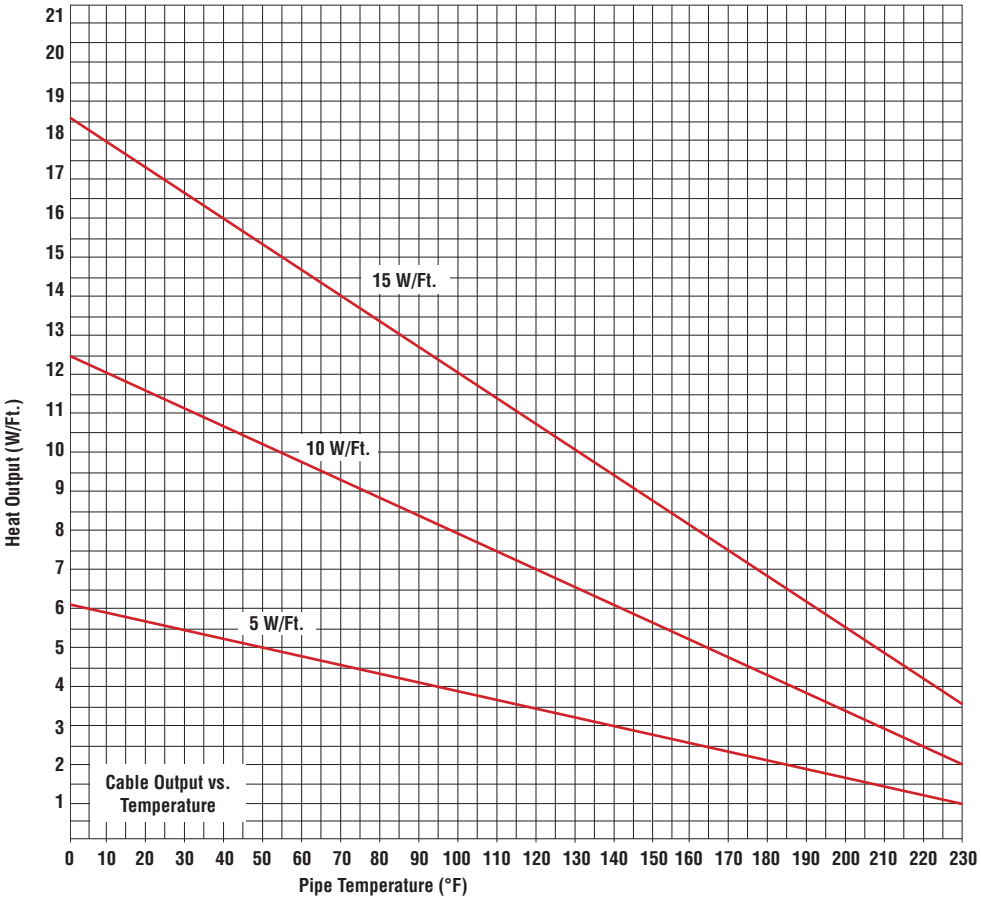
Class I, Division 2, Groups B, C, D
Class II, Division 2, Groups F, G
Class III

UL Recognized Component
AWM Style 20565

Rated T4

# SRP
## Self-Regulating Process Temperatures *(cont'd.)*

### *Thermal Output Ratings on Insulated Metal Pipes*




**Note 1** — Thermal output is determined per IEEE 515-1997 Standard for testing, design, installation and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

### *Output Wattage at Alternate Voltages (W/Ft.)*

| Model | 208V | % Change In Output | 220V | % Change In Output | 277V | % Change In Output |
|---|---|---|---|---|---|---|
| SRP 5 | 3.85 | -20 | 4.25 | -13 | 6.45 | +15 |
| SRP 10 | 8.3 | -18 | 8.80 | -10 | 12.50 | +13 |
| SRP 15 | 12.75 | -14 | 13.50 | -9 | 18.45 | +12 |

### *Circuit Breaker Selection (Max. Circuit Lengths in Ft.)*

| Cable Rating | 50°F Start-Up (Ft.) | | | | | 0°F Start-Up (Ft.) | | | | | -20°F Start-Up (Ft.) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15A | 20A | 30A | 40A | 50A | 15A | 20A | 30A | 40A | 50A | 15A | 20A | 30A | 40A | 50A |
| SRP5-1CT | 145 | 195 | 295 | 390 | 490 | 110 | 145 | 215 | 295 | 360 | 70 | 90 | 135 | 180 | 225 |
| SRP5-2CT | 295 | 385 | 580 | 750 | 750 | 220 | 290 | 430 | 580 | 720 | 135 | 180 | 270 | 360 | 450 |
| SRP10-1CT | 100 | 135 | 200 | 270 | 330 | 70 | 95 | 145 | 190 | 240 | 65 | 85 | 130 | 175 | 215 |
| SRP10-2CT | 200 | 270 | 400 | 530 | 665 | 145 | 190 | 290 | 380 | 480 | 130 | 175 | 260 | 350 | 440 |
| SRP15-1CT | 75 | 100 | 150 | 200 | 250 | 60 | 80 | 120 | 160 | 200 | 55 | 70 | 110 | 145 | 180 |
| SRP15-2CT | 150 | 195 | 295 | 390 | 500 | 120 | 160 | 235 | 320 | 400 | 110 | 145 | 220 | 290 | 360 |

**NR =** Not Required. Maximum circuit length has been reached in a smaller breaker size.

# SRP
## Self-Regulating Process Temperatures *(cont'd.)*



### *Ordering Information*

| Output (W/Ft.) | Volts | Model | Stock | PCN | Wt./1000' (Lbs.) |
|---|---|---|---|---|---|
| **Output at Rated Voltage** | | | | | |
| 5 @ 50°F | 120 | **SRP 5-1C** | **S** | **387161** | 68 |
| | | **SRP 5-1CT** | **S** | **387188** | 80 |
| | 208 - 277 | **SRP 5-2 C** | **S** | **387217** | 68 |
| | | **SRP 5-2CT** | **S** | **387225** | 80 |
| 10 @ 50°F | 120 | **SRP 10-1C** | **S** | **387102** | 68 |
| | | **SRP 10-1CT** | **S** | **387129** | 80 |
| | 208 - 277 | **SRP 10-2C** | **S** | **387170** | 68 |
| | | **SRP 10-2CT** | **S** | **387196** | 80 |
| 15 @ 50°F | 120 | **SRP 15-1C** | **S** | **387065** | 68 |
| | | **SRP 15-1CT** | **S** | **387073** | 80 |
| | 208 - 277 | **SRP 15-2C** | **S** | **387110** | 68 |
| | | **SRP 15-2CT** | **S** | **387137** | 80 |

**To Order** – Specify length, model, PCN and installation accessories.

### *Accessories*

| Accessories | | DL Series | U Series |
|---|---|---|---|
| Power Connection | Heat trace to electrical sevice connection | RTPC | UPC |
| T- Splice | Electrical connection for 3 segments | RTST | UMC |
| In-Line Splice | Electrical connection for 2 segments | RTST | UMC |
| End Seal | For terminating cable | RTES | UES |
| Thermostat | Ambient air sensing thermostat | RTAS | UAS |
| | Line sensing mechanical thermostat | RTBC | UBC |

**To Order –** For general application & installation accessories such as tape, pipe straps, warning labels, etc. refer the to the DL & EL General Application Accessories page at the end of this section.

### *Ordering Information*

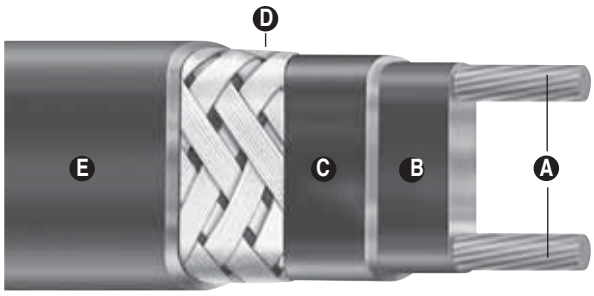
***To Order —*** *Complete the Model Number using the Matrix provided.*

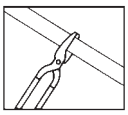
| Model | Hazardous Location Self-Regulating Process Temperature | | | |
|---|---|---|---|---|
| **SRP** | | | | |
| | **Code** | **Output (W/Ft.)** | | |
| | **5** | Five | | |
| | **10** | Ten | | |
| | **15** | Fifteen | | |
| | | **Code** | **Voltage** | |
| | | **1** | 120 | |
| | | **2** | 240 | |
| | | | **Code** | **Construction** |
| | | | **C** | Braid Only |
| | | | **CT** | Standard braid and overjacket |
| **SRP** | **5** | **1** | **CT** | **Typical Model Number** |

# SRM/E

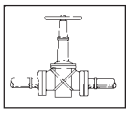
## Self-Regulating Medium Temperature

- **Self-Regulating, Energy Efficient**
- **14 AWG Buss Wire**
- **Circuit Lengths to 780 Feet**
- **Process Temperature Maintenance to 302°F (150°C)**
- **Maximum Continuous Exposure Temperature, Power Off, 420°F (215°C)**
- **Industrial Process Maintenance Applications**
- **Industrial Freeze Protection Applications**
- **Freeze Protection of Fire Protection System Piping**
- **Steam Cleanable on Process Equipment Up to 300 PSIG**
- **3, 5, 8, 10, 15 and 20 W/Ft.**
- **120 and 208 - 277 Volt From Stock**
- **Approximate Size 1/2"W x 1/4"H**
- **Minimum Bend Radius 1-1/2"**
- **For Use on Metallic Pipes Only**



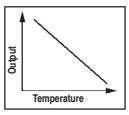



Cut to Length in Field



Can be Overlapped


Medium Temperature




Self Regulating Output

### *Description*

Chromalox SRM/E self-regulating heating cable provides safe, reliable heat tracing for process temperature maintenance and freeze protection of pipes, valves, tanks and similar applications. Constructed of industrial grade 14 AWG buss wire with metal braid and optional overjacketing, SRM/E ensures operating integrity in most hostile industrial environments. The 420°F (215°C) maximum exposure temperature rating allows steam cleaning of process equipment with up to 300 psig steam.

### *Enhanced Features*

- Industrial Grade, 14 gauge buss wire has higher current capacity, allowing longer circuit lengths up to 780 feet.
- Superior matrix to buss wire bonding ensures overall operating integrity and performance.
- High output, 20 W/Ft. heating cable.
- All ratings are available from stock.

### *Features*

- Energy efficient, self-regulating SRM/E uses less energy when less heat is required.
- Easy to install, SRM/E can be cut to any length (up to max. circuit length) in the field.
- Field splices can be performed easily in minutes with no scrap or wasted cold sections.
- With lower installed cost than steam tracing, SRM/E features less maintenance expense and downtime.
- SRM/E can be overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Because SRM/E is self-regulating, overtemperature conditions are minimized.
- Chromalox termination, splice, tee and end seal kits reduce installation time.

### *Construction*

**A** **Twin 14 AWG Copper Buss Wires —** Provide reliable electrical current capability.

**B** **Semiconductive Polymer Core Matrix —** "Self-Regulating" component of the cable, its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; as process temperature rises, the heat output decreases.

**C** **High Temperature Fluoropolymer Jacket —** Flame retardant, electrically insulates the matrix and provides corrosion resistance.

**D** **Metallic Braid —** Provides additional mechanical protection in any environment and a positive ground path.

**E** **High Temperature Fluoropolymer Overjacket (optional) —** Corrosion resistant, flame retardant overjacket is highly effective in hostile, aqueous and chemically active environments. It also protects against abrasion and impact damage.

### *Approvals*

ATEX and IECEX Exe IIGb, Factory Mutual (FM) Approved for ordinary areas. UL Listed, CSA Certified for ordinary areas. UL listed for freeze protection of fire protection system piping. FM Approved for hazardous (classified) areas when used with U Series, DL and EL accessories:

- Class I, Div. 2, Groups B, C, D (gases, vapors)
- Class II, Div. 2, Groups F, G (combustible dust)
- Class III, Div. 2 (easily ignitable fibers and filings)
- 3, 5 and 8 Watt Rated T3 Temperature Class
- 10, 15 and 20 Watt Rated T2D Temperature Class

**CSA** Certified for hazardous (classified) areas when used with DL accessories:

- Class I, Div. 2, Groups A, B, C, D
- Class II, Div. 2, Groups F, G
- Rated T3[1] Temperature Class.
- ATEX and IECEX Exe IIGb
- Ex IIG Exe II

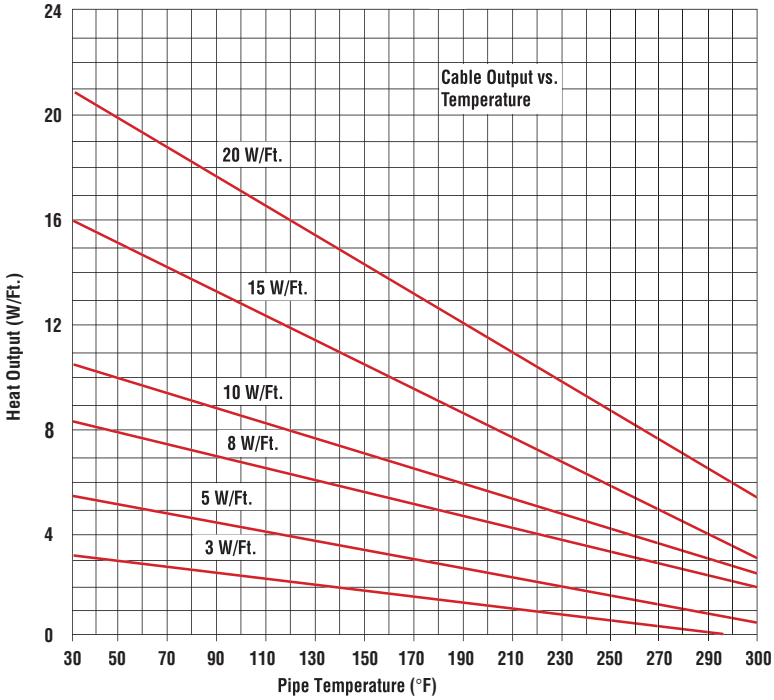
**Note 1 Exception** — Cable Surface Temperature shall not exceed 190°C in Class II, Div. 2, Group F; 165°C in Class II, Div. 2, Group G.

# SRM/E

## Self-Regulating Medium Temperature *(cont'd.)*



### *Thermal Output Ratings on Insulated Metal Pipe[1]*




**Note 1** — Thermal output is determined per IEEE 515-2004 Standard for testing, design installation, and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

### *Output Wattage at Alternate Voltages (W/Ft.)*

| Model | 208V | % Change In Output | 220V | % Change In Output | 277V | % Change In Output |
|---|---|---|---|---|---|---|
| SRM/E 3 | 2.31 | -23 | 2.55 | -15 | 3.90 | +23 |
| SRM/E 5 | 3.85 | -23 | 4.25 | -15 | 6.45 | +23 |
| SRM/E 8 | 6.4 | -20 | 6.88 | -14 | 10.24 | +22 |
| SRM/E 10 | 8.3 | -17 | 8.80 | -12 | 12.50 | +20 |
| SRM/E 15 | 12.75 | -15 | 13.50 | -10 | 18.45 | +19 |
| SRM/E 20 | 17.6 | -12 | 18.40 | -8 | 24.40 | +19 |

### *Circuit Breaker Selection (Max. Circuit Lengths in Ft.)*

| Cable Rating | 50°F Start-Up (Ft.) | | | | | 0°F Start-Up (Ft.) | | | | | -20°F Start-Up (Ft.) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15A | 20A | 30A | 40A | 50A | 15A | 20A | 30A | 40A | 50A | 15A | 20A | 30A | 40A | 50A |
| SRM/E 3-1 | 285 | 385 | NR | NR | NR | 275 | 375 | 385 | NR | NR | 265 | 365 | 385 | NR | NR |
| SRM/E 3-2 | 575 | 770 | 780 | NR | NR | 540 | 750 | 780 | NR | NR | 525 | 740 | 780 | NR | NR |
| SRM/E 5-1 | 180 | 240 | 360 | 375 | NR | 165 | 220 | 330 | 375 | NR | 155 | 210 | 310 | 375 | NR |
| SRM/E 5-2 | 360 | 480 | 720 | 750 | NR | 325 | 430 | 645 | 750 | NR | 310 | 415 | 620 | 750 | NR |
| SRM/E 8-1 | 145 | 190 | 285 | 325 | NR | 135 | 175 | 265 | 325 | NR | 130 | 165 | 250 | 325 | NR |
| SRM/E 8-2 | 285 | 380 | 575 | 650 | NR | 255 | 345 | 520 | 650 | NR | 245 | 335 | 490 | 650 | NR |
| SRM/E 10-1 | 95 | 125 | 190 | 250 | NR | 90 | 110 | 175 | 250 | NR | 85 | 100 | 170 | 245 | 250 |
| SRM/E 10-2 | 190 | 255 | 385 | 490 | NR | 165 | 225 | 345 | 490 | NR | 155 | 215 | 330 | 470 | 490 |
| SRM/E 15-1 | 70 | 95 | 145 | 190 | 210 | 65 | 85 | 125 | 165 | 210 | 60 | 80 | 120 | 150 | 210 |
| SRM/E 15-2 | 145 | 190 | 290 | 385 | 420 | 120 | 175 | 270 | 360 | 420 | 115 | 165 | 260 | 340 | 420 |
| SRM/E 20-1 | 60 | 75 | 115 | 155 | 160 | 50 | 65 | 105 | 140 | 160 | 45 | 65 | 100 | 135 | 160 |
| SRM/E 20-2 | 115 | 155 | 230 | 305 | 350 | 100 | 135 | 200 | 270 | 350 | 90 | 130 | 195 | 255 | 335 |

**NR =** Not Required. Maximum circuit length has been reached in a smaller breaker size.

**Note —** Thermal magnetic circuit breakers are recommended since magnetic circuit breakers could "nuisance trip" at low temperature.

# SRM/E
## Self-Regulating Medium Temperature *(cont'd.)*

### *Ordering Information*

| Output (W/Ft.) | Volts | Model | Stock | PCN | Wt./1000' (Lbs.) |
|---|---|---|---|---|---|
| 3 @ 50°F | 120 | SRM/E 3-1C<br>SRM/E 3-1CT | S<br>S | 388025<br>385561 | 80<br>100 |
| | 208 - 277 | SRM/E 3-2C<br>SRM/E 3-2CT | S<br>S | 385490<br>385570 | 80<br>100 |
| 5 @ 50°F | 120 | SRM/E 5-1C<br>SRM/E 5-1CT | S<br>S | 388084<br>388092 | 80<br>100 |
| | 208 - 277 | SRM/E 5-2C<br>SRM/E 5-2CT | S<br>S | 388113<br>388121 | 80<br>100 |
| 8 @ 50°F | 120 | SRM/E 8-1C<br>SRM/E 8-1CT | S<br>S | 388148<br>388156 | 80<br>100 |
| | 208 - 277 | SRM/E 8-2C<br>SRM/E 8-2CT | S<br>S | 388172<br>388180 | 80<br>100 |
| 10 @ 50°F | 120 | SRM/E 10-1C<br>SRM/E 10-1CT | S<br>S | 388201<br>388210 | 80<br>100 |
| | 208 - 277 | SRM/E 10-2C<br>SRM/E 10-2CT | S<br>S | 388236<br>388244 | 80<br>100 |
| 15 @ 50°F | 120 | SRM/E 15-1C<br>SRM/E 15-1CT | S<br>S | 388260<br>388279 | 80<br>100 |
| | 208 - 277 | SRM/E 15-2C<br>SRM/E 15-2CT | S<br>S | 388308<br>388316 | 80<br>100 |
| 20 @ 50°F | 120 | SRM/E 20-1C<br>SRM/E 20-1CT | S<br>S | 388332<br>388340 | 80<br>100 |
| | 208 - 277 | SRM/E 20-2C<br>SRM/E 20-2CT | S<br>S | 388367<br>388375 | 80<br>100 |

**To Order —** Specify length, model, PCN and installation accessories.

### *Accessories*

| Accessories | | U Series | DL | EL |
|---|---|---|---|---|
| Power Connection | Heat trace to electrical service connection | UPC | RTPC | SSK |
| Splice & Tee | | UMC | RTST | RT-RST |
| End Seal | For terminating cable | UES | RTES | RT-RES |
| Lighted End Seal | | USL | RTST-SL | N/A |
| Thermostat | Ambient air sensing thermostat | UAS | RTAS | THL/TXL |
| | Line sensing mechanical thermostat | UBC | RTBC | THR/TXR |

**To Order —** General Application & Installation Accessories such as tape, pipe straps, warning labels, etc., refer to the U Series, DL & EL General Application Accessories page at the end of this section.

### *Ordering Information*

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

| Model | Self-Regulating Medium Temperature | | | |
|---|---|---|---|---|
| SRM/E | Self-Regulating, Medium Temperatue Enhanced Heating Cable | | | |
| | Code | Output (W/Ft.) | | |
| | 3 | Three | | |
| | 5 | Five | | |
| | 8 | Eight | | |
| | 10 | Ten | | |
| | 15 | Fifteen | | |
| | 20 | Twenty | | |
| | | Code | Voltage | |
| | | 1 | 120 | |
| | | 2 | 208 - 277 | |
| | | | Code | Braid and Overcoat Options |
| | | | C | Tin-Plated copper metallic braid for additional protection and ground path |
| | | | CT | Fluoropolymer corrosion resistant overjacket over braid for hostile/ corrosive environments |
| SRM/E | 8 | 8 | CT | Typical Model Number |

*More Information is Available Online on Heat Trace.*

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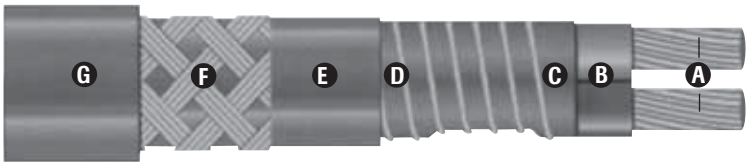
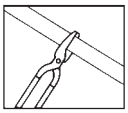
# CWM
## Constant Wattage Medium Temperature

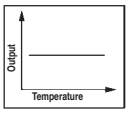
- **Uniform Thermal Output**
- **Accurate, Easy to Control and Monitor**
- **Low Energy Cost**
- **No Inrush at Any Ambient**
- **Industrial/Process and Commercial/Construction Applications**
- **Flexible to Most Any Configuration**
- **Fluoropolymer Jacket**
- **Maximum Exposure Temperature, Power Off, 392°F (200°C)**
- **Steam Cleanable on Process Equipment Up to 190 PSIG (Power Off)**
- **4, 8 and 12 W/Ft.**
- **120, 208 - 277 and 480 Volt From Stock**
- **Approximate Size 1/4"W x 1/8"H**
- **Minimum Bend Radius 1-1/4"**
- **For Use on Metallic Pipes Only**
- **Consult Factory for Use on Plastic Pipes**



Cut to Length in Field


Medium Temperature




Constant Wattage Output

**Note —** Consult maximum maintenance temperature chart on page G-15 for allowable watt densities.

### *Description*

Chromalox CWM constant wattage heating cable is a proven, reliable solution for industrial process temperature maintenance and freeze protection. CWM features a parallel heating core that produces uniform thermal output over its entire length. Using a single power point, you can easily configure and install a heat tracing system as short as several feet or as long as 780 feet right in the field. System design only requires that you match the CWM cable thermal output to the heat loss of your piping system.

CWM is flexible at most ambient temperatures and can be wrapped around piping and complex fittings. It is rugged, easy to monitor and maintain temperature, and has zero inrush at start-up. With 392°F (200°C) fluoropolymer electrical insulation overjacketing, CWM has outstanding electrical and thermal properties, and is well suited for most chemically hostile environments. An extensive range of wattages and voltages are available immediately from Chromalox stock.

### *Features*

- Durable, non-aging fluoropolymer jacket ensures long service life and can be used in some hostile environments.
- Flexible, easy to install on most equipment and delivers long-term reliable performance.
- Eliminates the need for oversized wiring or switchgear.
- Accurate temperature, reliable electric heat that can be consistently controlled and easily monitored.
- Safe and rugged.
- Parallel circuitry allows cut-to-length.
- High performance, rated to withstand up to 392°F saturated steam (190 psig) temperature (power off).
- Low profile, uses standard size thermal insulation on piping and process equipment.

### *Construction*

**A** **Twin 12 AWG Copper Buss Wires —** Provide reliable, consistent electrical current.

**B** **FEP Insulation Jacket —** Electrically insulates buss wires.

**C** **Pairing Jacket —** Secures two buss wires together and provides wrapping surface for Nichrome wire.

**D** **Nickel Chromium Wire —** Heating component of the cable.

**E** **FEP Insulation —** Rugged outer sheath protects heating cable, assures longer service life, and provides protection against environmental application hazards.

**F** **Tinned Copper Braid —** Plated copper braid increases robust construction, provides ground path and provides additional protection in any location. Suffix "C" in model number.

**G** **FEP Overjacket (optional) —** Fluoropolymer overjacket, over the braid, provides protection from most aqueous and chemically corrosive solutions. Suffix "T" in model number.

### *Approvals*[1]

**UL** Listed for ordinary areas.

**CSA** Certified for ordinary and:

- Class I, Div. 2, Groups A, B, C, D
- Class II, Div. 2, Groups F, G. Rated T3 Temperature Class[2].

**Notes —**

1. Depends on specific model.
2. Exception: Cable surface temperature shall not exceed 190°C in Class II, Div. 2, Group F; 165°C in Class II, Div. 2, Group G.

# CWM

## Constant Wattage Medium Temperature *(cont'd.)*

### *Specifications*

| Model | Output (W/Ft.) | Nominal Voltage (Vac) | Circuit Load (Amps/Ft.) | Max. Circuit Length (Ft.) |
|---|---|---|---|---|
| CWM 4-1CT | 4 | 120 | 0.033 | 350 |
| CWM 8-1CT | 8 | 120 | 0.067 | 240 |
| CWM 12-1CT | 12 | 120 | 0.100 | 200 |
| CWM 4-2CT | 4 | 240 | 0.017 | 700 |
| CWM 8-2CT | 8 | 240 | 0.033 | 480 |
| CWM 12-2CT | 12 | 240 | 0.050 | 400 |
| CWM 12-4CT | 12 | 480 | 0.025 | 780 |

### *Output Wattage at Various Operating Voltages (Ft.)*

| Model | 120V | 208V | 220V | 240V | 277V | 480V |
|---|---|---|---|---|---|---|
| CWM 12-1 | 12 | — | — | — | — | — |
| CWM 8-1 | 8 | — | — | — | — | — |
| CWM 4-1 | 4 | — | — | — | — | — |
| CWM 12-2 | 3 | 9 | 10.1 | 12 | — | — |
| CWM 8-2 | 2 | 6 | 6.7 | 8 | — | — |
| CWM 4-2 | — | 3 | 3.4 | 4 | — | — |
| CWM 12-4 | — | 2.3 | 2.5 | 3 | 4 | 12 |

### *Maximum Allowable Pipe Maintenance Temperature with Power On*

| Output (W/Ft.) | Temperatures (°F) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 3 | 4 | 6 | 6.7 | 8 | 9 | 10.1 | 10.6 | 12 |
| w/o AT-1 Tape | 340 | 325 | 293 | 282 | 262 | 246 | 229 | 222 | 200 |
| w/ AT-1 Tape | 350 | 344 | 332 | 328 | 320 | 314 | 307 | 304 | 296 |

# CWM

## Constant Wattage Medium Temperature *(cont'd.)*



### *Ordering Information*

| Output (W/Ft.) | Nominal Voltage (Vac) | Model | Stock | PCN | Wt./1000' (Lbs.) |
|---|---|---|---|---|---|
| 4 | 120 | **CWM 4-1C**<br>**CWM 4-1CT** | **S**<br>**S** | **392040**<br>**392075** | 96<br>110 |
| | 240 | **CWM 4-2C**<br>**CWM 4-2CT** | **S**<br>**S** | **392059**<br>**392083** | 96<br>110 |
| 8 | 120 | **CWM 8-1C**<br>**CWM 8-1CT** | **S**<br>**S** | **392139**<br>**392163** | 96<br>110 |
| | 240 | **CWM 8-2C**<br>**CWM 8-2CT** | **S**<br>**S** | **392147**<br>**392171** | 96<br>110 |
| 12 | 120 | **CWM 12-1C**<br>**CWM 12-1CT** | **S**<br>**S** | **392227**<br>**392251** | 96<br>110 |
| | 240 | **CWM 12-2C**<br>**CWM 12-2CT** | **S**<br>**S** | **392235**<br>**392260** | 96<br>110 |
| | 480 | **CWM 12-4C**<br>**CWM 12-4CT** | **S**<br>**S** | **392243**<br>**392278** | 96<br>110 |

### *Accessories*

| Accessories | | U Series | DL | EL |
|---|---|---|---|---|
| Power Connection | Heat trace to electrical service connection | UPC | RTPC | SSK |
| Splice & Tee | | UMC | RTST | RT-RST |
| End Seal | For terminating cable | UES | RTES | RT-RES |
| Lighted End Seal | | USL | RTST-SL | N/A |
| Thermostat | Ambient air sensing thermostat | UAS | RTAS | THL/TXL |
| | Line sensing mechanical thermostat | UBC | RTBC | THR/TXR |

**To Order —** General Application & Installation Accessories such as tape, pipe straps, warning labels, etc., refer to the U Series, DL & EL General Application Accessories page at the end of this section.

### *Ordering Information*

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

| Model | Constant Wattage Medium Temperature | | | |
|---|---|---|---|---|
| **CWM** | Constant Wattage, Medium Temperature Heating Cable | | | |
| | **Code** | **Output (W/Ft.)** | | |
| | **4** | Four | | |
| | **8** | Eight | | |
| | **12** | Twelve | | |
| | | **Code** | **Nominal Voltage (Vac)** | |
| | | **1** | 120 | |
| | | **2** | 240 | |
| | | **4** | 480 | |
| | | | **Code** | **Braid and Overcoat Options** |
| | | | **C** | Standard tinned-copper metallic braid for additional protection and ground path |
| | | | **CT** | Fluoropolymer corrosion resistant overjacket over braid for hostile/ corrosive environments |
| **CWM** | **5** | **1** | **C** | **Typical Model Number** |

*More Information is Available Online on Heat Trace.*

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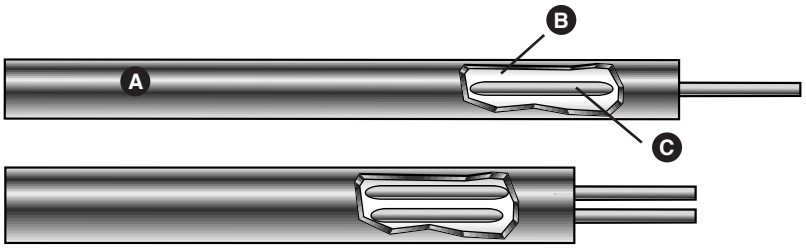
# MI
## Mineral Insulated High Temperature




- **Constant Wattage Series Resistance Heating Cable Sets**
- **Process Temperature Maintenance to 1100°F**
- **Maximum Exposure Temperature 1400°F (Power Off)**
- **Corrosion Resistant Alloy 825 Sheath**
- **Factory Assembled Cable Sets—Ready for Installation**
- **Fully Annealed Sheath allows Field Bending**
- **For Use on Metallic Pipes Only**

### *Description*

Chromalox MI mineral insulated heating cables provide rugged and reliable heat tracing for a variety of demanding applications. The high nickel alloy sheath, magnesium oxide dielectric insulation and resistance wire construction allow the tracing of equipment up to 1100°F maintenance temperatures and excellent resistance to many corrosive environments. At lower temperatures, watt densities of up to 50 W/Ft can be designed. Please contact factory for cable maintenance temperature above 400˚F.

### *Construction*

**A** Metal Sheath: High nickel content Alloy 825 is used for all heating cables and cold leads. Alloy 825 is recognized for its use in high temperature applications, and use in many corrosive environments. This alloy has excellent resistance to pitting, chloride-stress, acid and alkali corrosion.

**B** MgO: Highly compacted Magnesium Oxide provides insulation of the resistance wire for voltages up to 600V. Completely sealed sheath protects the MgO from moisture & contamination.

**C** Resistance Wire: A large number of available resistances enables the design of a large range of lengths and wattages. Double and single conductor available

**D** Cold-Lead (Shown Below): Non-heating Alloy 825 sheathed MI cable extends the leads away from the high temperature equipment. 4 ft. long is standard.

**E** Gland Fitting (Shown Below): Every set includes one or two 1/2" NPT fittings for connection to a junction box. The number of fittings depends on the configuration of the cable set.

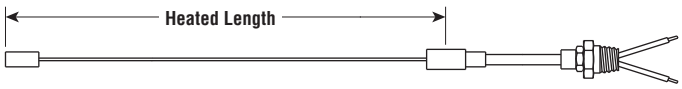
### *Approvals*

**FM** Approved
Class I, Division 2, Groups A, B, C, D
Class I, Zone 2, Group IIC

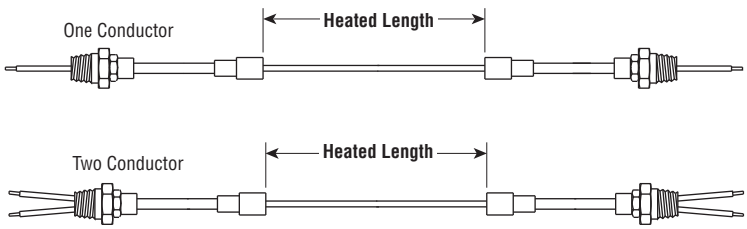
**CSA** Approved
Class I, Division 2, Groups A, B, C, D
Class II, Division 2, Groups F, G
Class III, Division
Class I, Zone 1 and Zone 2, Group IIC

### *Available Designs*

**Form "A"** (one cold section w/ 14 AWG - 12 in. pigtails and termination w/ end cap, 0.50" brass pressure fittings)
Available in two conductor only




**Form "E"** (two cold sections w/ 14 AWG - 12 in. pigtails, 0.50" brass pressure fittings)
Available in one conductor or two conductor



# MI
## Mineral Insulated High Temperature *(cont'd.)*



### *Heating Cable System Design*

1. **Heater Design**
   Determine heater design to use.

2. **Calculate Heat Loss**
   Using the Technical Section of this catalog (Determining Heat Energy Requirements), calculate the heat energy requirements of the pipe or tank to be heated. In addition, Chromalox® offers ChromaTrace, a heat trace design program to facilitate heat tracing system design.

3. **Determine Total Cable Length**
   In addition to the system piping, in-line equipment such as valves, flanges and pipe supports require additional heat tracing to maintain the system operating temperature. Refer to Technical Section of this catalog (Pipe Component Allowance Table) to determine the proper component cable allowances for your system. Add the heated pipe length and the component cable allowance lengths to calculate the total cable length.

   Guidelines for tracing tanks and vessels are also given in the Technical Section of this catalog

4. **Determine Available Voltage (V)**
   Determine what Voltage is available. At a given voltage, not every cable length and power output is available. For example, shorter lengths may require 120V supply. Trying several voltages may result in a more efficient design.

5. **Calculate Resistance per Foot (R/ft) using the desired Watts per Foot (W/ft) and cable length (L)**
   $R/ft_{desired} = V^2/(W/ft_{desired} \times L^2)$

6. **Select the Proper Resistance per Foot (R/ft) Rating**
   Choose a cable having equal or the next lower resistance per foot value from the Ordering Information Table

7. **Calculate Actual W/Ft. and Total Wattage ($W_{TOTAL}$)**
   $W/ft_{actual} = V^2/(R/ft_{actual} \times L^2)$
   $W_{TOTAL} = W/ft_{actual} \times L$

8. **Determine Current Draw (I)**
   $I = V/(R/ft_{actual} \times L)$

9. **Select Heater Single or Double Conductor Length**
   The cold lead is determined by the customer or by using a standard 7 ft. Standard cold lead is #14 awg.

10. **Convert Design to a Model Number**.

**Note:**
Some cable resistances must be modified according to the resistance curves in the Order Information Table. Modify your resistance according to the following procedure:

a. Based on the desired power output in Watts/ft, use Graph-1 to determine the Sheath Temperature Rise for the particular cable diameter you select.

b. Add the sheath temperature rise to the desired maintenance temperature to determine the cable resistance at operating conditions.

c. From Graph-2, determine the cable resistance multiplier for your application. Multiply the resistance value given in the resistance tables by this multiplier to determine the cable resistance at operating conditions.

d. Determine the electrical and thermal conditions. Once the cable resistance has been selected, verify the performance of the cable you have selected from Graph-3 and 4.

### *Optional Construction Adders*

| Prefix | Suffix | Description |
|---|---|---|
| P | | Pulling Eye for "A" form only |
| X | | Oversized cold section current >25 Amps and <40 Amps |
| | EM | Mounting of hot-cold junction outside thermal insulation (freeze protection of lines over 600ºF) |
| | QT | QHT-3 High temperature adapter |
| | UG | UL listing tag** |
| | UH | UL hazardous area listing tag** |
| | PH | FM hazardous area listing tag** |
| | CH | CSA hazardous area listing tag** |
| | CHB | CSA group B hazardous area listing tag** |

**Required volts, amps and watts with each cable order

# MI

## Mineral Insulated
## High Temperature *(cont'd.)*

### *Available Resistances*
### *Two Conductor, 3/16" Dia. O.D., Alloy 825, 300 Volts, 0.20 lbs/ft*

| Cable Number | Ohms/ft | Maximum Exposure Temperature Rating °F | Resistance Curve |
|---|---|---|---|
| 556K | 0.043 | 600 | 1 |
| 658K | 0.0581 | | 1 |
| 674K | 0.0742 | | 1 |
| 693K | 0.0926 | | 1 |
| 712K | 0.1170 | | 1 |
| 715K | 0.1470 | | 1 |
| 721K | 0.213 | | 3 |
| 732K | 0.319 | 1100 | N/A |
| 742K | 0.416 | | |
| 752K | 0.520 | | |
| 766K | 0.660 | | |
| 774K | 0.740 | | |
| 783K | 0.830 | | |
| 810K | 1.00 | | |
| 813K | 1.30 | | |
| 818K | 1.80 | | |
| 824K | 2.34 | | |
| 830K | 2.96 | | |
| 838K | 3.70 | | |
| 846K | 4.72 | | |
| 860K | 5.60 | | |
| 866K | 6.60 | | |
| 894K | 9.00 | | |
| 919K | 18.00 | | |

### *Two Conductor, 5/16" Dia. O.D., Alloy 825, 600 Volts, 0.27 lbs/ft*

| Cable Number | Ohms/ft | Maximum Exposure Temperature Rating °F | Resistance Curve |
|---|---|---|---|
| 588B | 0.0071 | 600 | 1 |
| 614B | 0.0149 | | 1 |
| 627B | 0.027 | | 2 |
| 640B | 0.040 | | 3 |
| 670B | 0.065 | 1100 | N/A |
| 710B | 0.104 | | |
| 715B | 0.162 | | |
| 720B | 0.205 | | |
| 732B | 0.325 | | |
| 750B | 0.500 | | |
| 774B | 0.735 | | |
| 810B | 1.62 | | |
| 819B | 1.87 | | |
| 830B | 2.97 | | |
| 840B | 4.30 | | |
| 859B | 5.98 | | |

### *One Conductor, 3/16" Dia. O.D., Alloy 825, 600 Volts, 0.18 lbs/ft*

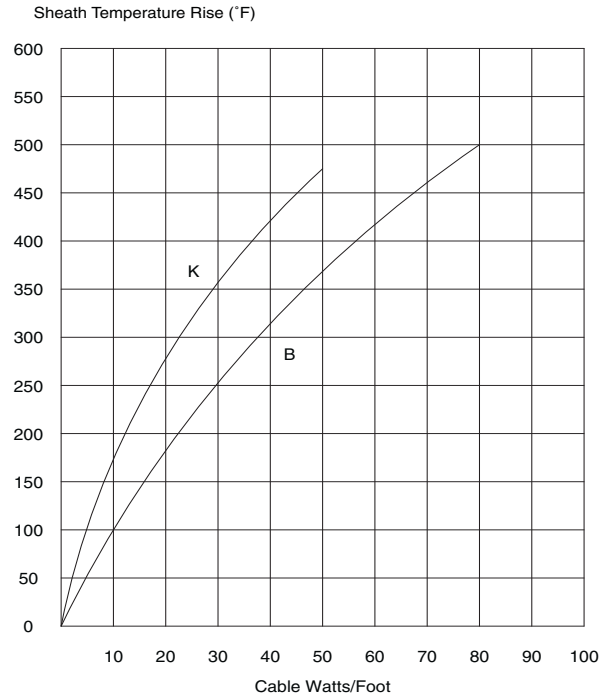
| Cable Number | Ohms/ft | Maximum Exposure Temperature Rating °F | Resistance Curve |
|---|---|---|---|
| 145K | 0.0046 | 600 | 1 |
| 189K | 0.0090 | | 2 |
| 216K | 0.0165 | | 3 |
| 239K | 0.069 | 1100 | N/A |
| 250K | 0.050 | | |
| 279K | 0.079 | | |
| 310K | 0.095 | | |
| 316K | 0.157 | | |
| 326K | 0.260 | | |
| 333K | 0.330 | | |
| 346K | 0.457 | | |
| 372K | 0.730 | | |
| 412K | 1.17 | | |
| 415K | 1.48 | | |
| 423K | 2.36 | | |
| 430K | 2.80 | | |
| 447K | 4.50 | | |

# MI

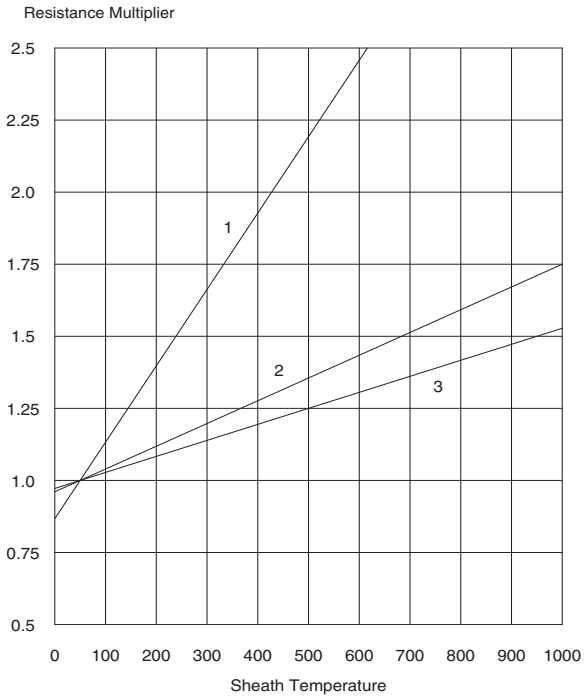
## Mineral Insulated High Temperature *(cont'd.)*

### *Specification / Application Information*

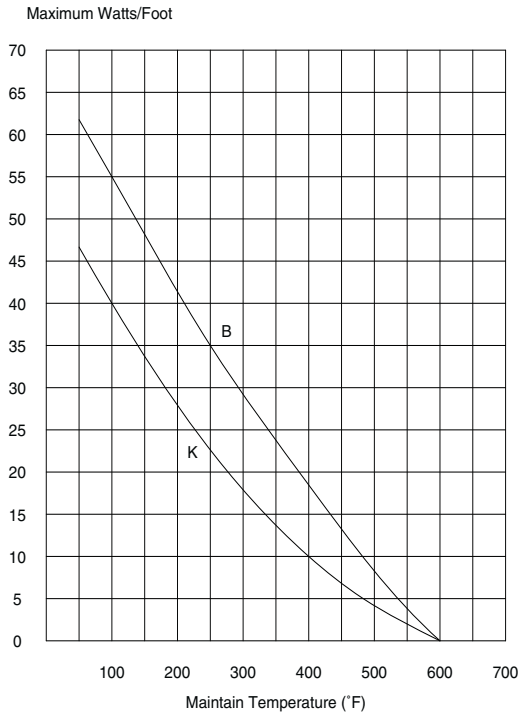
*Graph-1*
*Cable Sheath Temperature Rise*



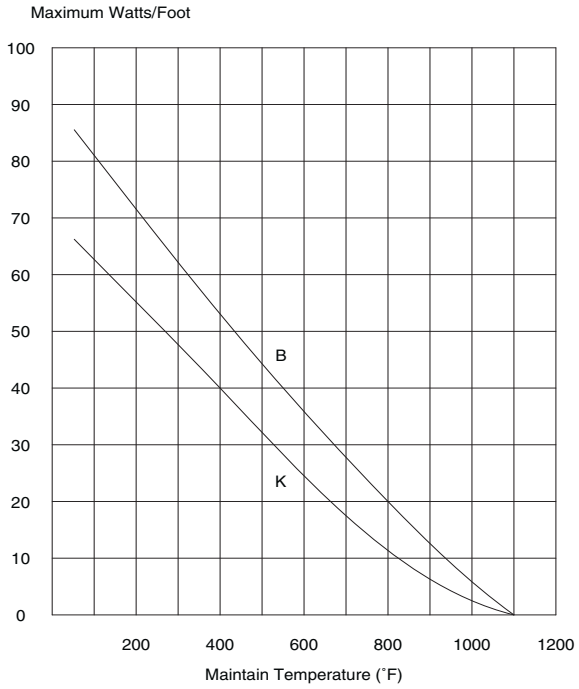

*Graph-2*
*Cable Resistance Temperature Multiplier*




*Graph-3*
*Maximum Wattages - All Cables*
*With Hot/Cold Junction Under Insulation*




*Graph-4*
*Maximum Wattages - All 1100˚F Maximum Temperature*
*Cables With Hot/Cold Junction Under Insulation*



# MI

## Mineral Insulated High Temperature *(cont'd.)*

### *Accessories*

***HTC-30-1 (392286)***

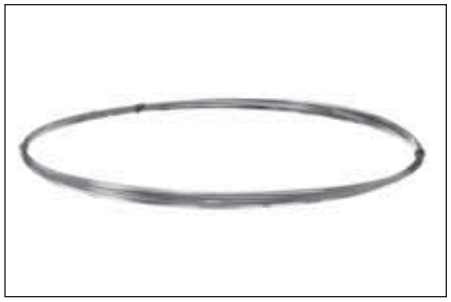
Heat Transfer Cement, 1 Gallon Pail

***HTC-30-5 (392294)***

Heat Transfer Cement, 5 Gallon Pail

***SSW-100 (392315)***

Stainless Steel Tie Wire, 100ft Roll



***JB-7-4 (392307)***

Four Hub, NEMA 7 Cast Aluminum Junction Box

***SSP-1 (392323)***

Stainless Steel Spacer Strip with 1" spaced tabs, 50ft roll

***CL-1 (382424) Caution Labels***

(5) electric heat tracing caution labels, weather resistant


### *Ordering Information*

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

| Model | Heater Set Design "A" or "E" | Cable Number (determined by resistance value required for needed wattage output) | Cable Heated Section Length in Feet | Cable Cold Section Length in Feet | Heater Set Total Wattage ($W_{TOTAL}$) | Operating Voltage (V) | |
|---|---|---|---|---|---|---|---|
| MICI | A | 670B | 150 | 07 | 1477W | 120V | Typical Model Number |

(120V, 9.9 w/ft cable, 150 ft heated section, 7ft cold lead section)

# HSRL
## Self-Regulating Low Temperature

- **Self- Regulating, Energy Efficient**
- **16 AWG Buss Wire**
- **Circuit Lengths to 660 Feet**
- **Process Temperature Maintenance to 150°F (65°F)**
- **Maximum Continuous Exposure Temperature, Power Off, 185°F (85°F)**
- **Freeze Protection of Fire Protection System Piping**
- **Available in 3, 5, 8, and 10 Watts per Foot**
- **120 and 208-277 Volts Available**
- **Division 1 Hazardous Locations**
- **Approximate Size 3/8"W x 1/8"H**
- **Minimum Bend Radius 1-1/8"**
- **For Use on Metal & Plastic Pipes**

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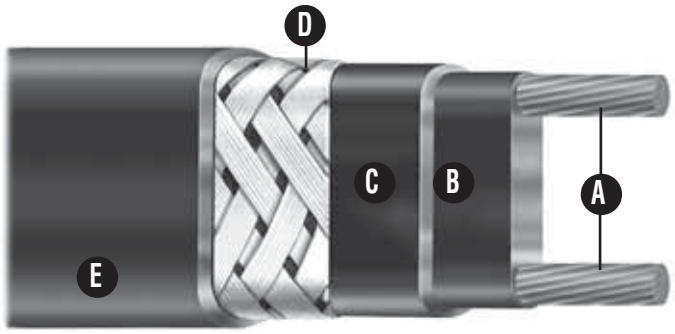



### *Description*

Chromalox HSRL self-regulating heating cable provides safe, reliable heat tracing for freeze protection of pipes, valves, tanks and similar applications. Constructed of industrial grade 16 AWG buss wire with a tinned copper braid and fluoropolymer overjacket, HSRL ensures operating integrity in Div. 1 hazardous environments. HSRL heating cable has a maximum maintenance temperature rating of 150°F (65°F) and a maximum exposure temperature of 185˚F (85˚C)

**Note:** Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

### *Features*

- Energy efficient, self-regulating HSRL uses less energy when less heat is required.
- Easy to install, HSRL can be cut to any length (up to max circuit length) in the field.
- HSRL features lower installed cost than steam tracing, less maintenance expense and less down time.
- HSRL can be overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Chromalox HL Connection Kits reduce installation time.

### *Construction*

**A** **Twin 16 AWG Copper Buss Wires—** Provide reliable electric current capability.

**B** **Semiconductive Polymer Core Matrix—** "Self-Regulating" component of the cable its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; as process temperature rises, the heat output decreases.

**C** **Polyolefin Jacket—** Flame retardant, electrically insulates the matrix and buss wires and provides resistance to water and some inorganic chemical solutions.

**D** **Tinned Copper Braid—** Provides additional mechanical protection in any environment and a positive ground path.

**E** **High Temperature Fluoropolymer Overjacket—** Corrosion resistant, flame retardant overjacket is highly effective in many environments. Protects against exposure to organic or corrosive solutions. The overjacket also protects against abrasion and impact damage.

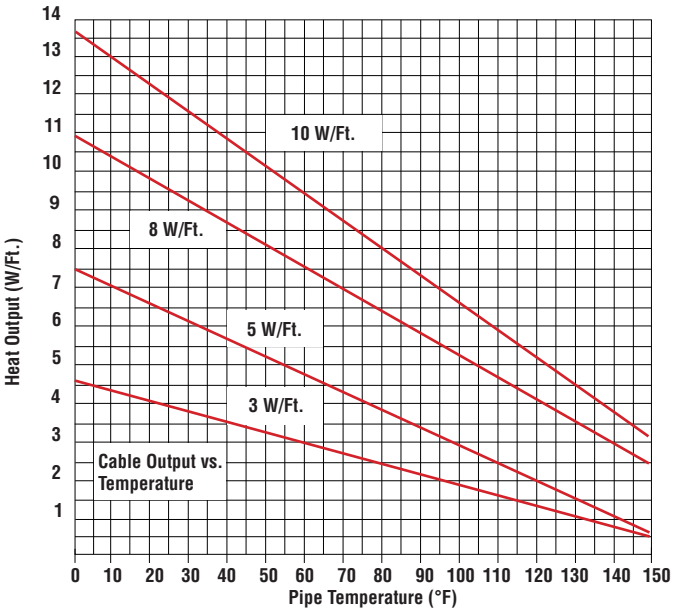
### *Approvals*

**FM** Approved
- Class I, Division 1, Groups B, C, D
- Class II, Division 1, Groups E, F, G
- Class III, Division 1
- 3 Watt rated T6 temperature class
- 5 and 8 Watt rated T5 temperature class
- 10 Watt rated T4A temperature class

**CSA** Approved
- Class I, Division 1, Groups B, C, D
- Class II, Division 1, Groups E, F, G
- 3 Watt rated T6 temperature class
- 5 and 8 Watt rated T5 temperature class
- 10 Watt rated T4A temperature class

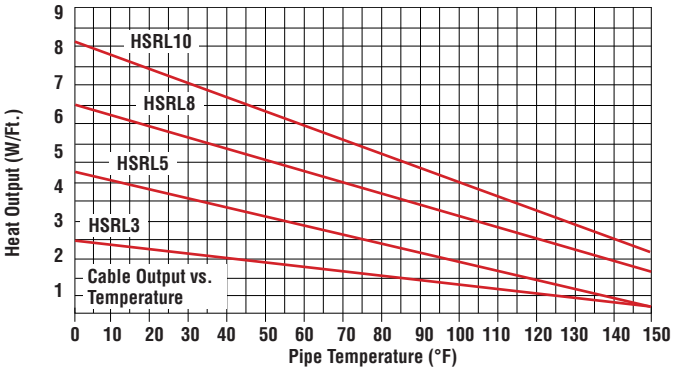
# HSRL
## Self-Regulating Low Temperature *(cont'd.)*

### *Thermal Output Ratings on Insulated Metal Pipe[1]*




**Note 1** — Thermal output is determined per IEEE 515-2004 Standard for testing, design installation, and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

### *Thermal Output Ratings on Plastic Pipe with Aluminum Tape*




### *Output Wattage at Alternate Voltages (W/Ft.)*

| Model | 208V | % Change In Output | 220V | % Change In Output | 277V | % Change In Output |
|---|---|---|---|---|---|---|
| HSRL 3 | 2.4 | -20 | 2.6 | -13 | 3.4 | +15 |
| HSRL 5 | 4.1 | -18 | 4.5 | -10 | 5.6 | +13 |
| HSRL 8 | 6.88 | -14 | 7.28 | -9 | 8.96 | +12 |
| HSRL 10 | 8.7 | -13 | 9.2 | -8 | 11.1 | +10 |

### *Circuit Breaker Selection (Max. Circuit Lengths in Ft.)*

| Cable Rating | 50°F Start-Up (Ft.) | | | | | | 0°F Start-Up (Ft.) | | | | | | -20°F Start-Up (Ft.) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10A | 15A | 20A | 25A | 30A | 40A | 10A | 15A | 20A | 25A | 30A | 40A | 10A | 15A | 20A | 25A | 30A | 40A |
| HSRL3-1CT | 205 | 305 | 360 | NR | NR | NR | 135 | 200 | 270 | 330 | 360 | NR | 120 | 185 | 245 | 300 | 360 | NR |
| HSRL3-2CT | 400 | 600 | 660 | NR | NR | NR | 275 | 415 | 555 | 660 | NR | NR | 245 | 370 | 495 | 600 | 660 | NR |
| HSRL5-1CT | 125 | 185 | 250 | 270 | NR | NR | 90 | 135 | 180 | 225 | 270 | NR | 80 | 120 | 160 | 205 | 245 | 270 |
| HSRL5-2CT | 250 | 375 | 505 | 540 | NR | NR | 180 | 270 | 360 | 450 | 540 | NR | 160 | 245 | 325 | 405 | 490 | 540 |
| HSRL8-1CT | 100 | 150 | 200 | 215 | NR | NR | 70 | 110 | 145 | 180 | 215 | NR | 65 | 100 | 130 | 165 | 200 | 210 |
| HSRL8-2CT | 185 | 285 | 375 | 420 | NR | NR | 135 | 200 | 265 | 335 | 395 | 420 | 120 | 175 | 235 | 300 | 350 | 420 |
| HSRL10-1CT | 60 | 95 | 130 | 160 | 180 | NR | 50 | 80 | 105 | 130 | 155 | 180 | 45 | 70 | 95 | 120 | 140 | 180 |
| HSRL10-2CT | 100 | 160 | 210 | 260 | 315 | 360 | 80 | 125 | 170 | 210 | 255 | 340 | 75 | 120 | 160 | 195 | 240 | 320 |

**NR =** Not Required. Maximum circuit length has been reached in a smaller breaker size.

# HSRL
## Self-Regulating Low Temperature *(cont'd.)*



### *Ordering Information*

| Output (W/Ft.) | Volts | Model | Stock | PCN | Wt./1000' (Lbs.) |
|---|---|---|---|---|---|
| 3 @ 50°F | 120 | **HSRL 3-1CT** | **S** | **382070** | 66 |
| | 208 - 277 | **HSRL 3-2CT** | **S** | **382061** | 66 |
| 5 @ 50°F | 120 | **HSRL 5-1CT** | **S** | **382053** | 66 |
| | 208 - 277 | **HSRL 5-2CT** | **S** | **382045** | 66 |
| 8 @ 50°F | 120 | **HSRL 8-1CT** | **S** | **382037** | 66 |
| | 208 - 277 | **HSRL 8-2CT** | **S** | **382029** | 66 |
| 10 @ 50°F | 120 | **HSRL 10-1CT** | **S** | **382010** | 66 |
| | 208 - 277 | **HSRL 10-2CT** | **S** | **382022** | 66 |

**To Order —** Specify length, model, PCN and installation accessories.

### *Accessories*

| Description | | Model |
|---|---|---|
| Power Connection | Heat trace to electrical service connection | HL-PC |
| T- Splice | Electrical connection for 3 cables | HL-T |
| In-Line Splice | Electrical connection for 2 cables | HL-S |
| End Seal | For terminating cable | HL-ES |
| Thermostat | Ambient air sensing thermostat | TXL |
| | Line sensing mechanical thermostat | TXR |
| | | E-122 |
| | | E-122P |

— Please refer to HL Connection Accessories page

### *Ordering Information*

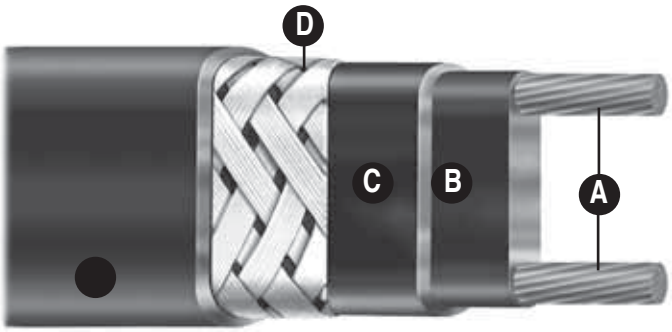
***To Order —*** *Complete the Model Number using the Matrix provided.*

| Model | Hazardous Location Self-Regulating Low Temperature | | | |
|---|---|---|---|---|
| **HSRL** | Self-Regulating, Low Temperature Heating Cable | | | |
| | **Code** | **Output (W/Ft.)** | | |
| | **3** | Three | | |
| | **5** | Five | | |
| | **8** | Eight | | |
| | **10** | Ten | | |
| | | **Code** | **Voltage** | |
| | | **1** | 120 | |
| | | **2** | 240 | |
| | | | **Code** | **Standard Braid & Overjacket** |
| | | | **CT** | Tinned copper metallic braid for ground path fluoropolymer corrosion resistant overjacket. Specifically tested for Division I environments. |
| **HSRL** | **3** | **1** | **CT** | **Typical Model Number** |

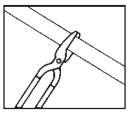
**Note 1** — Note: Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

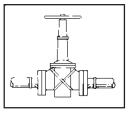
# HSRM
## Self-Regulating Medium Temperature

- **Self- Regulating, Energy Efficient**
- **14 AWG Buss Wire**
- **Circuit Lengths to 780 Feet**
- **Process Temperature Maintenance to 302°F (150°C)**
- **Maximum Continuous Exposure Temperature, Power Off, 420°F (215°C)**
- **Freeze Protection of Fire Protection System Piping**
- **Available in 5, 8, 10, 15 and 20 Watts per Foot**
- **120 and 208-277 Volts Available**
- **Division 1 Hazardous Locations**
- **Approximate Size 1/2"W x 1/4"H**
- **Minimum Bend Radius 1-1/2"**
- **For Use on Metallic Pipes Only**

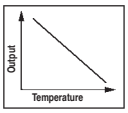



FM APPROVED


Cut to Length in Field


Can be Overlapped

Medium Temperature



Self Regulating Output

## *Description*

Chromalox HSRM self-regulating heating cable provides safe, reliable heat tracing for freeze protection of pipes, valves, tanks and similar applications. Constructed of industrial grade 14 AWG buss wire with a tinned copper braid and fluoropolymer overjacket, HSRM ensures operating integrity in Div. 1 hazardous environments. HSRM heating cable has a maximum maintenance temperature rating of 302°F (150°C) and a maximum exposure temperature of 420˚F (215˚C).

**Note:** Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

## *Features*

- Energy efficient, self-regulating HSRM uses less energy when less heat is required.
- Easy to install, HSRM can be cut to any length (up to max circuit length) in the field.
- HSRM features lower installed cost than steam tracing, less maintenance expense and less down time.
- HSRM can be overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Chromalox HL Connection Kits reduce installation time.

## *Construction*

Ⓐ **Twin 14 AWG Copper Buss Wires—** Provide reliable electric current capability.

Ⓑ **Semiconductive Polymer Core Matrix—** "Self-Regulating" component of the cable its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; as process temperature rises, the heat output decreases.

Ⓒ **Fluoropolymer Jacket—** Flame retardant electrically insulates the matrix and provides corrosion resistance.

Ⓓ **Tinned Copper Braid—** Provides additional mechanical protection in any environment and a positive ground path.

Ⓔ **High Temperature Fluoropolymer Overjacket—** Corrosion resistant, flame retardant overjacket is highly effective in many environments. Protects against exposure to organic or corrosive solutions. The overjacket also protects against abrasion and impact damage.

## *Approvals*

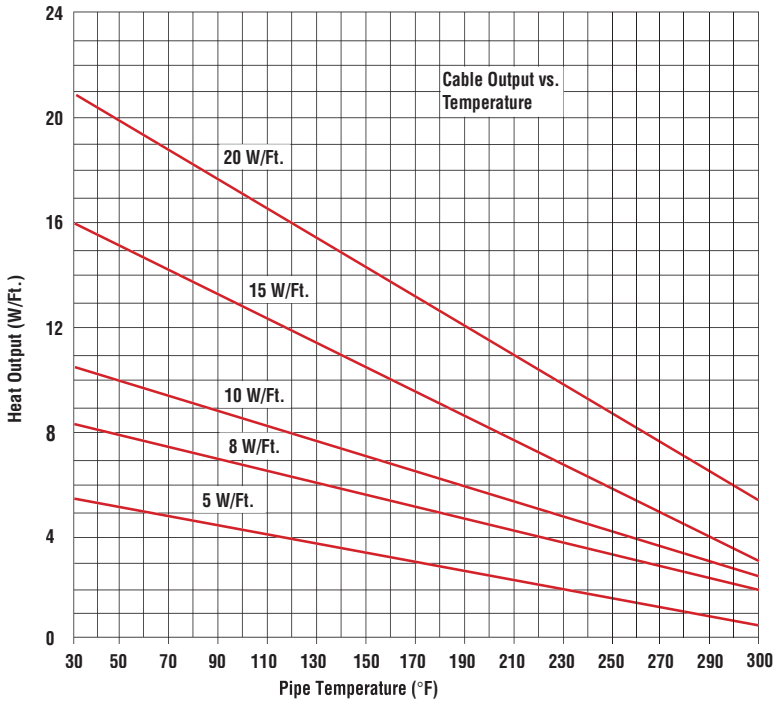
**FM** Approved
- Class I, Division 1, Groups B, C, D
- Class II, Division 1, Groups E, F, G
- Class III, Division 1
- 5 and 8 Watt rated T3C Temperature Class
- 10 Watt rated T3A Temperature Class
- 15 and 20 Watt rated T2C Temperature Class

**CSA** Approved
- Class I, Division 1, Groups B, C, D
- Class II, Division 1, Groups E, F, G
- 5 and 8 Watt rated T3C Temperature Class
- 10 Watt rated T3A Temperature Class
- 15 and 20 Watt rated T2C Temperature Class

# HSRM
## Self-Regulating Medium Temperature *(cont'd.)*



### *Thermal Output Ratings on Insulated Metal Pipe[1]*




**Note 1** — Thermal output is determined per IEEE 515-2004 Standard for testing, design, installation, and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

### *Output Wattage at Alternate Voltages (W/Ft.)*

| Model | 208V | % Change In Output | 220V | % Change In Output | 277V | % Change In Output |
|---|---|---|---|---|---|---|
| HSRM 5 | 3.85 | -23 | 4.25 | -15 | 6.45 | +23 |
| HSRM 8 | 6.4 | -20 | 6.88 | -14 | 10.24 | +22 |
| HSRM 10 | 8.3 | -17 | 8.80 | -12 | 12.50 | +20 |
| HSRM 15 | 12.75 | -15 | 13.50 | -10 | 18.45 | +19 |
| HSRM 20 | 17.6 | -12 | 18.40 | -8 | 24.40 | +19 |

### *Circuit Breaker Selection (Max. Circuit Lengths in Ft.)*

| Cable Rating | 50°F Start-Up (Ft.) | | | | | 0°F Start-Up (Ft.) | | | | | -20°F Start-Up (Ft.) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15A | 20A | 30A | 40A | 50A | 15A | 20A | 30A | 40A | 50A | 15A | 20A | 30A | 40A | 50A |
| HSRM 5-1 | 180 | 240 | 360 | 375 | NA | 165 | 220 | 330 | 375 | NA | 155 | 210 | 310 | 375 | NA |
| HSRM 5-2 | 360 | 480 | 720 | 750 | NA | 325 | 430 | 645 | 750 | NA | 310 | 415 | 620 | 750 | NA |
| HSRM 8-1 | 145 | 190 | 285 | 325 | NA | 135 | 175 | 265 | 325 | NA | 130 | 165 | 250 | 325 | NA |
| HSRM 8-2 | 285 | 380 | 575 | 650 | NA | 255 | 345 | 520 | 650 | NA | 245 | 335 | 490 | 650 | NA |
| HSRM 10-1 | 95 | 125 | 190 | 250 | NA | 90 | 110 | 175 | 250 | NA | 85 | 100 | 170 | 245 | 250 |
| HSRM 10-2 | 190 | 255 | 385 | 490 | NA | 165 | 225 | 345 | 490 | NA | 155 | 215 | 330 | 470 | 490 |
| HSRM 15-1 | 70 | 95 | 145 | 190 | 210 | 65 | 85 | 125 | 165 | 210 | 60 | 80 | 120 | 150 | 210 |
| HSRM 15-2 | 145 | 190 | 290 | 385 | 420 | 120 | 175 | 270 | 360 | 420 | 115 | 165 | 260 | 340 | 420 |
| HSRM 20-1 | 60 | 75 | 115 | 155 | 160 | 50 | 65 | 105 | 140 | 160 | 45 | 65 | 100 | 135 | 160 |
| HSRM 20-1 | 115 | 155 | 230 | 305 | 350 | 100 | 135 | 200 | 270 | 350 | 90 | 130 | 195 | 255 | 335 |

NR = Not Required. Maximum circuit length has been reached in a smaller breaker size.

# HSRM
## Self-Regulating Medium Temperature *(cont'd.)*

### *Ordering Information*

| Output (W/Ft.) | Volts | Model | Stock | PCN | Wt./1000' (Lbs.) |
|---|---|---|---|---|---|
| 5 @ 50°F | 120 | **HSRM5-1CT** | **S** | **382176** | 80 |
| | 208 - 277 | **HSRM5-2CT** | **S** | **382168** | 80 |
| 8 @ 50°F | 120 | **HSRM8-1CT** | **S** | **382150** | 80 |
| | 208 - 277 | **HSRM8-2CT** | **S** | **382141** | 80 |
| 10 @ 50°F | 120 | **HSRM10-1CT** | **S** | **382133** | 80 |
| | 208 - 277 | **HSRM10-2CT** | **S** | **382125** | 80 |
| 15 @ 50°F | 120 | **HSRM15-1CT** | **S** | **382117** | 80 |
| | 208 - 277 | **HSRM15-2CT** | **S** | **382109** | 80 |
| 20 @ 50°F | 120 | **HSRM20-1CT** | **S** | **382096** | 80 |
| | 208 - 277 | **HSRM20-2CT** | **S** | **382088** | 80 |

**To Order —** Specify length, model, PCN and installation accessories.

### *Accessories*

| Description | | Model |
|---|---|---|
| Power Connection | Heat trace to electrical service connection | HL-PC |
| T- Splice | Electrical connection for 3 circuits | HL-T |
| In-Line Splice | Electrical connection for 2 circuits | HL-S |
| End Seal | For terminating cable | HL-ES |
| Thermostat | Ambient air sensing thermostat | TXL |
| | Line sensing mechanical thermostat | TXR<br>E-122<br>E-122P |

**To Order** — Please refer to HL Connection Accessories page.

### *Ordering Information*

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

**Note —** Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

| Model | Hazardous Location Self-Regulating Medium Temperature |
|---|---|
| **HSRM** | Self-Regulating, Medium Temperature Heating Cable |

| Code | Output (W/Ft.) |
|---|---|
| **5** | Five |
| **8** | Eight |
| **10** | Ten |
| **15** | Fifteen |
| **20** | Twenty |

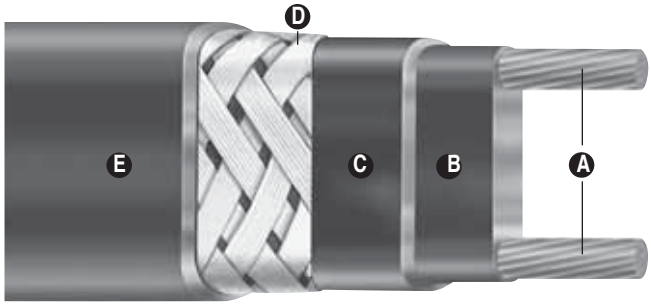
| Code | Voltage |
|---|---|
| **1** | 120 |
| **2** | 240 |

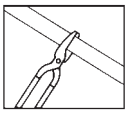
| Code | Standard Braid & Overcoat Options |
|---|---|
| **CT** | Tinned copper braid for ground path fluoropolymer overjacket specifically tested for Division I environments |

| | | | | |
|---|---|---|---|---|
| **HSRM** | **8** | **1** | **CT** | **Typical Model Number** |

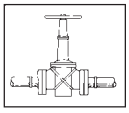
# SRF
## Self-Regulating Freeze Protection

- **Self-Regulating, Energy Efficient**
- **Designed for Freeze Protection**
- **Max. Exposure Temp. 185°F (Power Off)**
- **Cost Effective for Commercial Construction Freeze Protection Applications**
- **Freeze Protection of Fire Protection System Piping**
- **Industrial Grade, 16 AWG Buss Wire**
- **Standard Braid and Optional Overjacket**
- **Circuit Lengths, Up to 660 Ft.**
- **3, 5 and 8 W/Ft.**
- **120, 208 - 277 Volt From Stock**
- **Approximate Size 3/8"W x 1/8"H**
- **Minimum Bend Radius 1-1/8"**
- **For Use on Metal and Plastic Pipes**

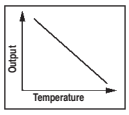


Cut to Length in Field



Can be Single Overlapped




Self Regulating Output

UL
CSA
FM APPROVED

SELF-REGULATING

### *Description*

Chromalox SRF cable is ideal for keeping metal and plastic pipes warm in commercial construction, institutional buildings and some industrial freeze protection applications. SRF cable is constructed of a self-regulating polymer core that varies its output along its entire length, saving energy and eliminating hot spots along the pipe. Parallel construction makes it easier to install than zone or series types of cable since it can be cut-to-length at any point on the pipe. It can be single overlapped without overheating the cable.

### *Features*

- Energy efficient, self-regulating SRF uses less energy when less heat is required.
- Easy to install, SRF can be cut to any length (up to max. circuit length) in the field.
- Field splices can be performed easily in minutes with no scrap or wasted cold sections.
- SRF can be overlapped without burnout, which simplifies heat tracing of in-line process equipment such as valves, elbows and pumps.
- Because SRF is self-regulating, over-temperature conditions are minimized.
- Chromalox termination, splice, tee and end seal kits reduce installation time.

### *Construction*

**A** **Twin 16 AWG Copper Buss Wires —** Provide high electrical current capability.

**B** **Semiconductive Polymer Core Matrix —** its electrical resistance varies with temperature. As process temperature drops, the core's heat output increases; conversely, as process temperature rises, the heat output decreases.

**C** **Polyolefin Jacket —** Flame retardant, electrically insulates the matrix and buss wires. Also provides resistance to water and some inorganic chemical solutions.

**D** **Tinned Copper Braid —** The braid covering the jacket provides additional mechanical protection in any environment and a positive ground path.

**E** **High Temperature TPR Overjacket (optional) —** The TPR overcoat protects the braid and provides resistance to certain inorganic chemical solutions.

### *Approvals*

**UL** Listed for ordinary areas.

**UL** Listed for fire protection system piping

**CSA** Certified for ordinary areas.

**FM** Approved for ordinary areas.

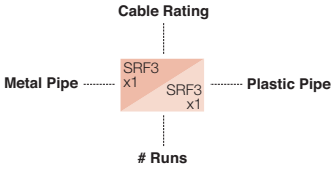
# SRF

## Application & Selection Guidelines

### *Commercial Freeze Protection SRF Cable Selection Charts*

These charts are designed to speed selection of the appropriate wattage of cable when used for freeze protection. Find the diameter of pipe below and cross reference with the expected minimum ambient temperature for the recommended cable.

- Selections suitable for 120 and 208 to 277V applications.
- Design based on straight runs of cable or pipe. Spiralling is not required.
- Heat loss is based on 40°F maintenance temperature and Fiberglas® insulation k = 0.25 at 50°F.
- Non-metallic pipe heat losses are based on using Chromalox AT-1 aluminum tape for improving heat transfer.
- Only 3 W/Ft. rating is UL Listed for non-metallic pipe applications, however, 5W/Ft. and 8 W/Ft. can be used.




Each block specifies cable rating and # of runs for metal pipe (dark) and plastic pipe (light).

For larger pipe sizes, refer to the Technical section in the back of this catalog or contact your Local Chromalox Sales office.

**Note** – AT-1 Aluminum tape must be used on plastic pipe installation

### 0.50" Pipe

Min. Ambient Temp.

| Insulation Thickness (In.) | 0° | -10° | -20° | -30° | -40° |
|---|---|---|---|---|---|
| 0.5 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF5 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 |
| 1.0 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 |
| 1.5 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 |
| 2.0 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 |
| 3.0 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 |

### 1.00" Pipe

Min. Ambient Temp.

| Insulation Thickness (In.) | 0° | -10° | -20° | -30° | -40° |
|---|---|---|---|---|---|
| 0.5 | SRF3 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 | SRF5 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 |
| 1.0 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF5 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 |
| 1.5 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF5 x1 |
| 2.0 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 |
| 3.0 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 |

### 2.00" Pipe

Min. Ambient Temp.

| Insulation Thickness (In.) | 0° | -10° | -20° | -30° | -40° |
|---|---|---|---|---|---|
| 0.5 | SRF5 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 | SRF8 x1 / SRF5 x2 | SRF5 x2 / SRF8 x2 |
| 1.0 | SRF3 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 | SRF3 x1 / SRF5 x1 | SRF5 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 |
| 1.5 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 |
| 2.0 | SRF3 x1 / SRF3 x1 | SRF5 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 |
| 3.0 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF5 x1 |

### 3.00" Pipe

Min. Ambient Temp.

| Insulation Thickness (In.) | 0° | -10° | -20° | -30° | -40° |
|---|---|---|---|---|---|
| 0.5 | SRF8 x1 / SRF8 x1 | SRF8 x1 / SRF5 x2 | SRF5 x2 / SRF8 x2 | SRF5 x2 / SRF8 x2 | SRF5 x2 / SRF8 x2 |
| 1.0 | SRF5 x1 / SRF5 x1 | SRF5 x1 / SRF8 x1 | SRF5 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 |
| 1.5 | SRF3 x1 / SRF5 x1 | SRF3 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 | SRF5 x1 / SRF8 x1 | SRF5 x1 / SRF8 x1 |
| 2.0 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF5 x1 | SRF3 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 |
| 3.0 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 |

### 4.00" Pipe

Min. Ambient Temp.

| Insulation Thickness (In.) | 0° | -10° | -20° | -30° | -40° |
|---|---|---|---|---|---|
| 0.5 | SRF8 x1 / SRF5 x2 | SRF5 x2 / SRF8 x2 | SRF8 x2 / SRF8 x2 | SRF8 x2 / SRF8 x2 | SRF5 x3 / SRF8 x3 |
| 1.0 | SRF5 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 | SRF8 x1 / SRF5 x2 | SRF5 x2 / SRF8 x2 |
| 1.5 | SRF3 x1 / SRF5 x1 | SRF3 x1 / SRF5 x1 | SRF5 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 |
| 2.0 | SRF3 x1 / SRF5 x1 | SRF3 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 | SRF5 x1 / SRF8 x1 | SRF5 x1 / SRF8 x1 |
| 3.0 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 |

### 5.00" Pipe

Min. Ambient Temp.

| Insulation Thickness (In.) | 0° | -10° | -20° | -30° | -40° |
|---|---|---|---|---|---|
| 0.5 | SRF5 x2 / SRF8 x2 | SRF8 x2 / SRF8 x2 | SRF8 x2 / SRF8 x3 | SRF8 x3 / SRF8 x3 | SRF8 x3 / SRF8 x3 |
| 1.0 | SRF8 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 | SRF8 x1 / SRF5 x2 | SRF5 x2 / SRF8 x2 | SRF5 x2 / SRF8 x2 |
| 1.5 | SRF5 x1 / SRF5 x1 | SRF5 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 | SRF8 x1 / SRF5 x2 |
| 2.0 | SRF3 x1 / SRF5 x1 | SRF3 x1 / SRF5 x1 | SRF5 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 | SRF8 x1 / SRF8 x1 |
| 3.0 | SRF3 x1 / SRF3 x1 | SRF3 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 | SRF5 x1 / SRF5 x1 | SRF5 x1 / SRF8 x1 |

# SRF

## Application & Selection Guidelines *(cont'd.)*



### 6.00" Pipe

Min. Ambient Temp.

| Insulation Thickness (In.) | 0° | -10° | -20° | -30° | -40° |
|---|---|---|---|---|---|
| 0.5 | SRF8 x2 SRF8 x2 | SRF8 x2 SRF8 x3 | SRF8 x3 SRF8 x3 | SRF8 x3 SRF8 x3 | SRF8 x3 SRF8 x4 |
| 1.0 | SRF8 x1 SRF8 x1 | SRF8 x1 SRF5 x2 | SRF5 x2 SRF8 x2 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x2 |
| 1.5 | SRF5 x1 SRF8 x1 | SRF5 x1 SRF8 x1 | SRF8 x1 SRF8 x1 | SRF8 x1 SRF5 x2 | SRF5 x2 SRF8 x2 |
| 2.0 | SRF5 x1 SRF5 x1 | SRF5 x1 SRF8 x1 | SRF5 x1 SRF8 x1 | SRF8 x1 SRF8 x1 | SRF8 x1 SRF8 x1 |
| 3.0 | SRF3 x1 SRF5 x1 | SRF3 x1 SRF5 x1 | SRF5 x1 SRF5 x1 | SRF5 x1 SRF8 x1 | SRF8 x1 SRF8 x1 |

### 8.00" Pipe

Min. Ambient Temp.

| Insulation Thickness (In.) | 0° | -10° | -20° | -30° | -40° |
|---|---|---|---|---|---|
| 1.0 | SRF8 x1 SRF5 x2 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x2 | SRF8 x2 SRF8 x2 | SRF8 x2 SRF8 x3 |
| 1.5 | SRF5 x1 SRF8 x1 | SRF8 x1 SRF8 x1 | SRF8 x1 SRF5 x2 | SRF5 x2 SRF8 x2 | SRF5 x2 SRF8 x2 |
| 2.0 | SRF5 x1 SRF8 x1 | SRF5 x1 SRF8 x1 | SRF8 x1 SRF8 x1 | SRF8 x1 SRF5 x2 | SRF8 x2 SRF8 x2 |
| 3.0 | SRF5 x1 SRF5 x1 | SRF5 x1 SRF5 x1 | SRF5 x1 SRF8 x1 | SRF5 x1 SRF8 x1 | SRF8 x1 SRF8 x1 |

### 10.00" Pipe

Min. Ambient Temp.

| Insulation Thickness (In.) | 0° | -10° | -20° | -30° | -40° |
|---|---|---|---|---|---|
| 1.0 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x2 | SRF8 x2 SRF8 x3 | SRF8 x2 SRF8 x3 | SRF8 x3 SRF8 x3 |
| 1.5 | SRF8 x1 SRF8 x1 | SRF8 x1 SRF5 x2 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x2 | SRF8 x2 SRF8 x2 |
| 2.0 | SRF5 x1 SRF8 x1 | SRF8 x1 SRF8 x1 | SRF8 x1 SRF5 x2 | SRF5 x2 SRF8 x2 | SRF5 x2 SRF8 x2 |
| 3.0 | SRF5 x1 SRF5 x1 | SRF5 x1 SRF8 x1 | SRF5 x1 SRF8 x1 | SRF8 x1 SRF8 x1 | SRF8 x1 SRF5 x2 |

### 12.00" Pipe

Min. Ambient Temp.

| Insulation Thickness (In.) | 0° | -10° | -20° | -30° | -40° |
|---|---|---|---|---|---|
| 1.0 | SRF8 x2 SRF8 x2 | SRF8 x2 SRF8 x3 | SRF8 x2 SRF8 x3 | SRF8 x3 SRF8 x3 | SRF8 x3 SRF8 x4 |
| 1.5 | SRF8 x1 SRF5 x2 | SRF5 x2 SRF8 x2 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x2 | SRF8 x2 SRF8 x3 |
| 2.0 | SRF8 x1 SRF8 x1 | SRF8 x1 SRF5 x2 | SRF5 x2 SRF8 x2 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x2 |
| 3.0 | SRF5 x1 SRF8 x1 | SRF5 x1 SRF8 x1 | SRF8 x1 SRF8 x1 | SRF8 x1 SRF5 x2 | SRF8 x1 SRF8 x2 |

### 14.00" Pipe

Min. Ambient Temp.

| Insulation Thickness (In.) | 0° | -10° | -20° | -30° | -40° |
|---|---|---|---|---|---|
| 1.0 | SRF8 x2 SRF8 x2 | SRF8 x2 SRF8 x3 | SRF8 x3 SRF8 x3 | SRF8 x3 SRF8 x4 | SRF8 x3 SRF8 x4 |
| 1.5 | SRF8 x1 SRF8 x2 | SRF5 x2 SRF8 x2 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x3 | SRF8 x2 SRF8 x3 |
| 2.0 | SRF8 x1 SRF5 x2 | SRF8 x1 SRF8 x2 | SRF5 x2 SRF8 x2 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x3 |
| 3.0 | SRF5 x1 SRF8 x1 | SRF8 x1 SRF8 x1 | SRF8 x1 SRF5 x2 | SRF8 x1 SRF8 x2 | SRF5 x2 SRF8 x2 |

### 16.00" Pipe

Min. Ambient Temp.

| Insulation Thickness (In.) | 0° | -10° | -20° | -30° | -40° |
|---|---|---|---|---|---|
| 1.0 | SRF8 x2 SRF8 x3 | SRF8 x3 SRF8 x3 | SRF8 x3 SRF8 x4 | SRF8 x4 SRF8 x4 | SRF8 x4 |
| 1.5 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x2 | SRF8 x2 SRF8 x3 | SRF8 x2 SRF8 x3 | SRF8 x3 SRF8 x3 |
| 2.0 | SRF8 x2 SRF5 x2 | SRF5 x2 SRF8 x2 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x2 | SRF8 x2 SRF8 x3 |
| 3.0 | SRF5 x1 SRF8 x1 | SRF8 x1 SRF8 x1 | SRF8 x1 SRF5 x2 | SRF5 x2 SRF8 x2 | SRF5 x2 SRF8 x2 |

### 18.00" Pipe

Min. Ambient Temp.

| Insulation Thickness (In.) | 0° | -10° | -20° | -30° | -40° |
|---|---|---|---|---|---|
| 1.0 | SRF8 x2 SRF8 x3 | SRF8 x3 SRF8 x4 | SRF8 x3 SRF8 x4 | SRF8 x4 | SRF8 x4 |
| 1.5 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x3 | SRF8 x2 SRF8 x3 | SRF8 x3 SRF8 x3 | SRF8 x3 SRF8 x4 |
| 2.0 | SRF8 x1 SRF8 x2 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x2 | SRF8 x2 SRF8 x3 | SRF8 x3 SRF8 x3 |
| 3.0 | SRF8 x1 SRF8 x1 | SRF8 x2 SRF5 x2 | SRF8 x1 SRF8 x2 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x2 |

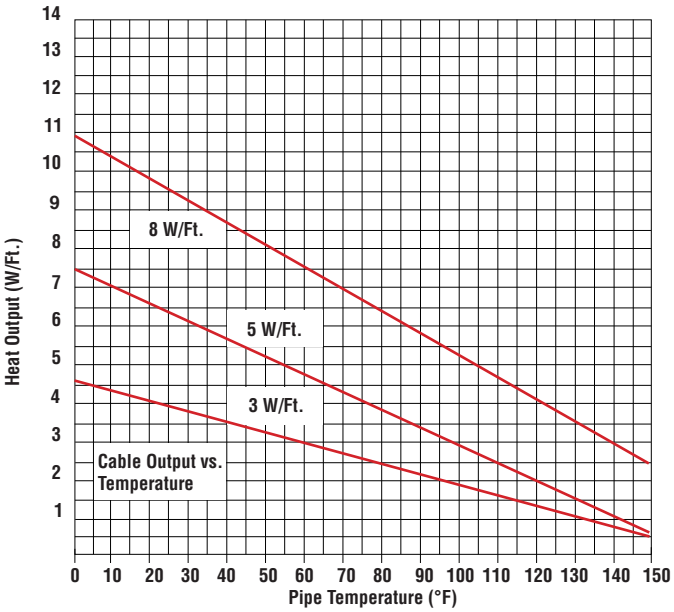
### 20.00" Pipe

Min. Ambient Temp.

| Insulation Thickness (In.) | 0° | -10° | -20° | -30° | -40° |
|---|---|---|---|---|---|
| 1.0 | SRF8 x3 SRF8 x3 | SRF8 x4 SRF8 x4 | SRF8 x4 | | |
| 1.5 | SRF8 x2 SRF8 x2 | SRF8 x2 SRF8 x3 | SRF8 x3 SRF8 x3 | SRF8 x3 SRF8 x4 | SRF8 x3 SRF8 x4 |
| 2.0 | SRF5 x2 SRF8 x2 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x3 | SRF8 x2 SRF8 x3 | SRF8 x3 SRF8 x3 |
| 3.0 | SRF8 x1 SRF8 x1 | SRF8 x1 SRF5 x2 | SRF5 x2 SRF8 x2 | SRF8 x2 SRF8 x2 | SRF8 x2 SRF8 x2 |

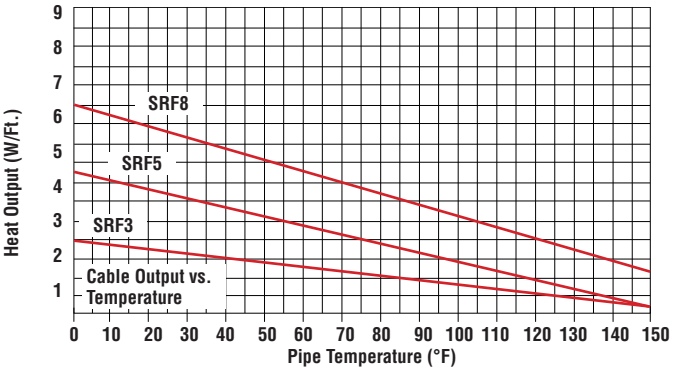
# SRF
## Self-Regulating Freeze Protection *(cont'd.)*

### *Thermal Output Ratings on Insulated Metal Pipe[1]*




**Note 1** — Thermal output is determined per IEEE 515-2004 Standard for testing, design installation, and maintenance of electrical resistance heat tracing section 4.1.11 Method C.

### *Thermal Output Ratings on Plastic Pipe with Aluminum Tape*




### *Output Wattage at Alternate Voltages (W/Ft.)*

| Model | 208V | % Change In Output | 220V | % Change In Output | 277V | % Change In Output |
|---|---|---|---|---|---|---|
| SRF 3 | 2.4 | -20 | 2.6 | -13 | 3.4 | +15 |
| SRF 5 | 4.1 | -18 | 4.5 | -10 | 5.6 | +13 |
| SRF 8 | 6.88 | -14 | 7.28 | -9 | 8.96 | +12 |

### *Circuit Breaker Selection (Max. Circuit Lengths in Ft.)*

| Cable Rating | 40°F Start-Up (Ft.) | | | 0°F Start-Up (Ft.) | | |
|---|---|---|---|---|---|---|
| | 20A | 30A | 40A | 20A | 30A | 40A |
| SRF 3-1C | 350 | 360 | NR | 270 | 360 | NR |
| SRF 3-2C | 660 | NR | NR | 555 | 660 | NR |
| SRF 5-1C | 230 | 270 | NR | 180 | 270 | NR |
| SRF 5-2C | 450 | 540 | NR | 360 | 540 | NR |
| SRF 8-1C | 180 | 215 | NR | 145 | 215 | NR |
| SRF 8-2C | 330 | 420 | 420 | 265 | 395 | 420 |

**NR =** Not Required. Maximum circuit length has been reached in a smaller breaker size.

**Note —** Thermal magnetic circuit breakers are recommended since magnetic circuit breakers could "nuisance trip" at low temperature.

# SRF

## Self-Regulating Freeze Protection *(cont'd.)*



### *Ordering Information*

| Output (W/Ft.) | Volts | Model | Stock | PCN | Wt./1000' (Lbs.) |
|---|---|---|---|---|---|
| **Output at Rated Voltage** | | | | | |
| 3 @ 50°F | 120<br>208 - 277 | **SRF 3-1C**<br>**SRF 3-2C** | **S**<br>**S** | **386943**<br>**386951** | 53<br>53 |
| 5 @ 50°F | 120<br>208 - 277 | **SRF 5-1C**<br>**SRF 5-2C** | **S**<br>**S** | **386960**<br>**386978** | 53<br>53 |
| 8 @ 50°F | 120<br>208 - 277 | **SRF 8-1C**<br>**SRF 8-2C** | **S**<br>**S** | **386986**<br>**386994** | 53<br>53 |
| **With Optional Overcoat (CR)** | | | | | |
| 3 @ 50°F | 120<br>208 - 277 | **SRF 3-1CR**<br>**SRF 3-2CR** | **S**<br>**S** | **386100**<br>**386118** | 64<br>64 |
| 5 @ 50°F | 120<br>208 - 277 | **SRF 5-1CR**<br>**SRF 5-2CR** | **S**<br>**S** | **386142**<br>**386150** | 64<br>64 |
| 8 @ 50°F | 120<br>208 - 277 | **SRF 8-1CR**<br>**SRF 8-2CR** | **S**<br>**S** | **386062**<br>**386070** | 64<br>64 |

### *Accessories*

| Accessories | | U Series | DL | EL |
|---|---|---|---|---|
| Power Connection | Heat trace to electrical service connection | UPC | RTPC | SSK |
| Splice & Tee | | UMC | RTST | RT-RST |
| End Seal | For terminating cable | UES | RTES | RT-RES |
| Thermostat | Ambient air sensing thermostat | UAS | RTAS | THL/TXL |
| | Line sensing mechanical thermostat | UBC | RTBC | THR/TXR |

General Application & Installation Accessories such as tape, pipe straps, warning labels, etc., refer to the U Series and DL & EL General Application Accessories page at the end of this section.

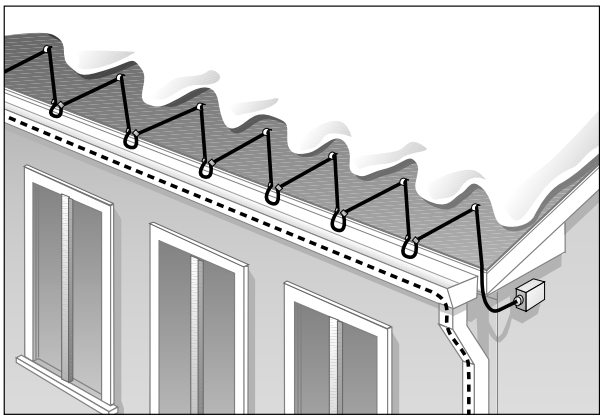
### *Ordering Information*

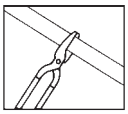
***To Order —*** *Complete the Model Number using the Matrix provided.*

| Model | Self-Regulating Medium Temperature | | | |
|---|---|---|---|---|
| **SRF** | Self-Regulating, Freeze Protection Heating Cable | | | |
| | **Code** | **Output (W/Ft.)** | | |
| | **3** | Three | | |
| | **5** | Five | | |
| | **8** | Eight | | |
| | | **Code** | **Voltage** | |
| | | **1** | 120 | |
| | | **2** | 208 - 277 | |
| | | | **Code** | **Braid and Overcoat Options** |
| | | | **C** | Standard tinned-copper metallic braid for additional protection and ground path |
| | | | **CR** | TPR overjacket over braid for protection against certain inorganic chemical solutions |
| **SRF** | **5** | **1** | **C** | **Typical Model Number** |

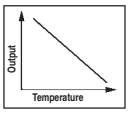
# SRF-RG
## Self-Regulating Roof & Gutter

- **Roof and Gutter De-Icing**
- **Fast, Easy Installation**
- **Cut to Length**
- **UL Listed**
- **CSA Certified**
- **Approximate Size 3/8"W x 1/8"H**
- **Minimum Bend Radius 1-1/8"**





Cut to Length in Field




Self Regulating Output

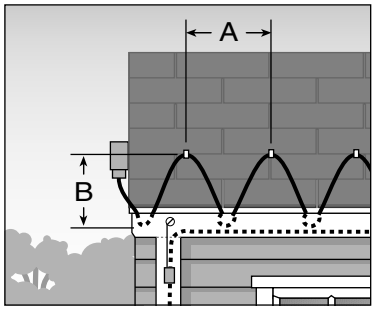
## *Description*

Chromalox SRF-RG self-regulating heating cable provides reliable freeze protection of roofs and gutters. Because SRF-RG is self-regulating, it automatically adjusts to the appropriate heat output as ambient conditions change, making it both energy efficient and cost effective. The protective waterproof outer jacket is suitable for wet applications in downspouts and roof drains.

Likewise, it is easy to apply SRF-RG following the provided instruction sheets and utilizing the required accessory kits. It can be cut-to-length and overlapped. Simply trace the gutter or roof and energize the cable when precipitation is expected. From that point on, SRF-RG will rapidly increase its output when in contact with snow or ice, providing maximum melting power. When the roof and gutters are clear of snow and ice, the SRF-RG cable will regulate its output and save energy.

## *Applications*

1. To calculate the amount of cable needed, multiply roof edge length to be heat traced by the spacing factor. The spacing factor (feet of cable required per foot of roof edge) is determined by the roof overhang, heating width (A) and heating height (B):




2. Add the total gutter length and the total downspout length to the figure calculated in step 1 to get the total length of cable required.
3. Determine how many circuits are required. Divide the total length of cable by the maximum circuit length (see specifications, next page). Round that number up (for example, 2.1 to 3) to get the total number of circuits.

**WARNING** — A ground fault protection device is required by NEC to minimize the danger of fire if the heating cable is damaged or improperly installed. A minimum trip level of 30mA is recommended to minimize nuisance tripping.

| Roof Overhang (In.) | Heating Width A (Ft.) | Heating Height B (In.) | Spacing Factor |
|---|---|---|---|
| 12 | 2 | 18 | 2 |
| 24 | 2 | 30 | 3 |
| 36 | 2 | 42 | 4 |

For larger roof overhang, determine cable required by using equasion below:

Spacing factor = $\sqrt{B^2 + A^2}$

# SRF-RG
## Self-Regulating Roof & Gutter *(cont'd.)*



### *Specifications*

| | | |
|---|---|---|
| **Buss Wire** | | 16 AWG, Nickel-Coated Copper |
| **Ground Braid** | | Tinned Copper Braid Under Jacket |
| **Outer Jacket** | | RG = UV Stabilized Polyolefin Weatherproof Jacket<br>RGT = Teflon |
| **Environmental Use** | | Use only in Ordinary Areas, 150°F Max. Exposure Temperature |
| **Output Wattage** | | 12 W/Ft. in Snow or Ice @ 32°F |
| **Service Voltage** | SRF 5-1RG<br>SRF 5-2RG<br>SRF 5-1RGT<br>SRF 5-2RGT | 120 Vac<br>208 - 277 Vac<br>120 Vac<br>208 - 277 Vac |

### *Maximum Circuit Length (Ft.)*

| | 120 Vac | | | 208 - 277 Vac | | |
|---|---|---|---|---|---|---|
| Start Up | 15A | 20A | 30A | 15A | 20A | 30A |
| 40°F | 185 | 230 | 270 | 375 | 450 | 540 |
| 0°F | 135 | 180 | 270 | 270 | 360 | 540 |

### *Ordering Information*

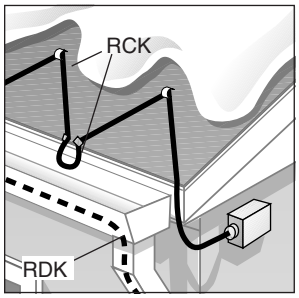
| Product | Use | Model | Stock | PCN | Wt./1000' (Lbs.) |
|---|---|---|---|---|---|
| **Cable** | | | | | |
| 120V | Cable with braid and UV stabilized polyolefin jacket | **SRF 5-1RG** | **S** | **386329** | 64 |
| 208 - 277V | Cable with braid and UV stabilized polyolefin jacket | **SRF 5-2RG** | **S** | **386337** | 64 |
| 120V | Cable with braid and Teflon stabilized polyolefin jacket | **SRF 5-1RGT** | **S** | **392331** | 66 |
| 208 - 277V | Cable with braid and Teflon stabilized polyolefin jacket | **SRF 5-2RGT** | **S** | **392340** | 66 |
| **Accessories** | | | | | |
| Power Connection Kit | Power termination into junction box with 1 end seal and 2 "Warning-Electric Traced" adhesive labels | **RG-PK-1** | **S** | **386206** | 1 |
| Splice Kit | Materials for 1 splice of cable | **RG-SK-1** | **S** | **386214** | 1 |
| End Seal Kit | Materials for 1 cable end termination | **RG-EK-1** | **S** | **386257** | 1 |
| Roof Clips | To attach cable to standard roofing material, 10 per kit | **RCK-1** | **S** | **340179** | 1 |
| Downspout Hangers | To support cable in gutter downspout, 1 pack per carton | **RDK-1** | **S** | **340160** | 1 |
| Aluminum Tape | Aluminum foil installation tape with pressure sensitive adhesive, 180 ft. roll. Used to secure cable placement in gutters. | **AT-1** | **S** | **383355** | 1 |

**Note —** Cables are UL Listed for Snow Melting and De-Icing Equipment.
See ETI Catalog pages for control options GIT-4, GIT 3-A and APS 4C

### *Roof & Gutter Accessories*


#### *RG-PK-1 (386206) Power Connection Kit*

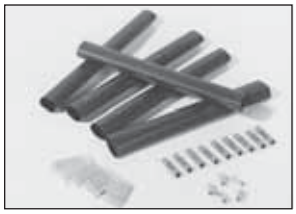
Power termination into junction box with one end seal and two "Warning-Electric Traced" labels




#### *RCK-1 & RDK-1 Mounting Kits*

**RCK-1 (340179)**
Roof clips (10) to attach cable

**RDK-1 (340160)**
Downspout hangers (1) to suspend cable in downspout



#### *RG-SK-1 (386214) Splice Kit*

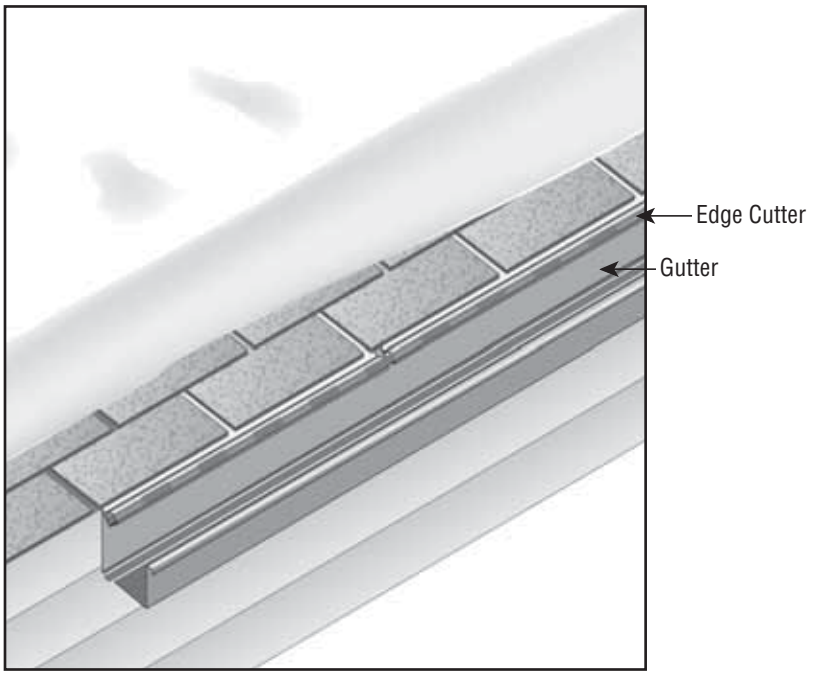
Materials to make one splice connection. Special weatherproof sleeving to insure trouble-free operation

#### *RG-EK-1 (386257) End Seal Kit*

Seals cable at end termination

# Edge-Cutter®
## Roof De-Icing System

- **Aluminium Construction**
- **Angled or Flat Surface Designs**
- **Corrosion Resistant Coating Available**




### *Description*

Edge-Cutter® is an aluminum flashing designed to be used as a heat conductive plate to aid in keeping snow and ice from roof edges. The system is for use only with self-regulating heating cables certified for use in roof and gutter applications.

Edge-Cutter is designed to be applied between the roofing and the roof substrate. It can be used with various roofing products such as asphalt shingles, aluminum, steel* and even slate.

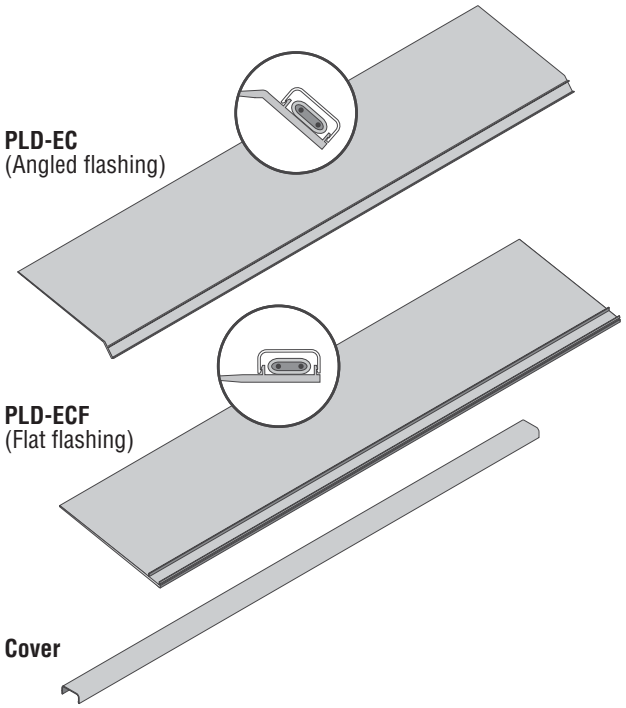
Valleys on a roof may also be heat traced with Edge-Cutter PLD-ECF (Flat Flashing).

Edge-Cutter can be fastened using various methods including screws or adhesives depending on application and building materials.

*Edge-Cutter can be ordered with a 6 mil urethane membrane applied to help prevent galvanic oxidation or corrosion when in contact with dissimilar metals.

### *Available Items*

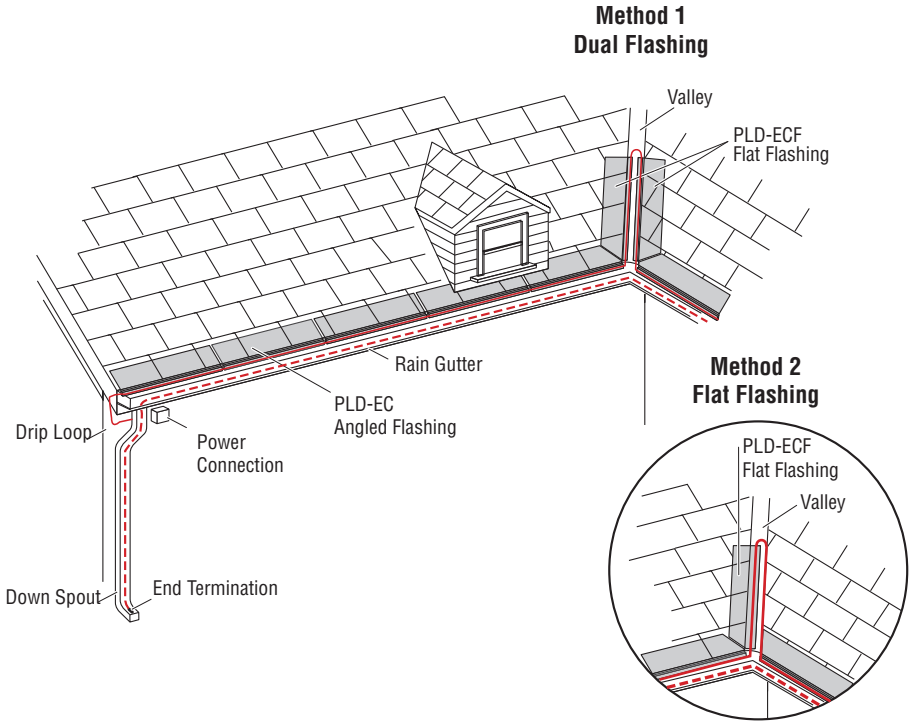
| Model | PCN | Stock | Length | Wt (Lbs.) |
|---|---|---|---|---|
| PLD-EC | 393967 | S | 4' | 1 |
| PLD-ECF | 393975 | S | 4' | 1 |
| Cover-EC | 393983 | S | 4' | 1 |

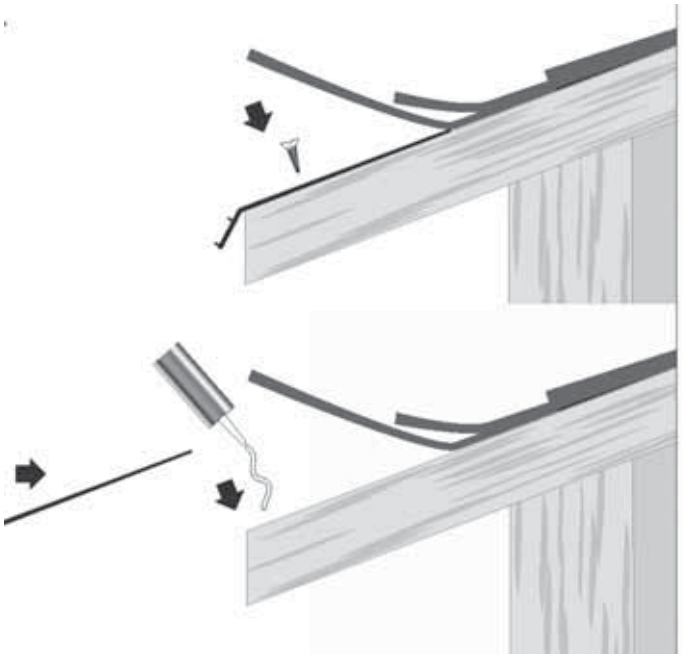


# Edge-Cutter®
## Roof De-Icing System
*(cont'd.)*



Valleys can also be heat traced using Edge-Cutter PLD-ECF flat flashing. Dual or single flashing can be used in the valleys



Edge-Cutter flashing can be cut to fit your specific roofing layout. Screws or adhesive can be used to easily attach the Edge-Cutter system to your roof.

# APS-4C

## Automatic Snow/Ice Melting System Controller

- **Multiple Sensor Capability**
- **Remote Control and High Temperature Sensor Included**
- **Controls Up to 10 Satellite Contactors**
- **Timed Heater Cycle Capability**
- **UL Listed, CSA Certified**
- **Single and Three-Phase Power Control**
- **Supply Options: 208, 240, 277 and 480 Volts**
- **Grount Fault Equipment Protection with Adjustable Trip Levels: 30mA, 60mA or 120mA**
- **Contactor Rating of 50 Amps Per Pole**
- **Simple Installation**

### *Description*

The patented APS-4C provides effective, economical automatic control of snow melting systems including those for gutter and down spouts. The ability to use multiple sensors ensures optimum control of large systems. Supply voltage options include 277 volt single-phase, 208-240 volts 3 phase, or 277/480 volt 3 phase, with a contactor rating of 50 amps per pole. The integral ground fault circuit interrupter with a test/reset facility ensures safety along with NEC and local code compliance. The APS-4C operates up to ten SC-40C Satellite Contactors for larger loads.

The adjustable 10 hour hold-on timer keeps heaters operating after snow stops to ensure complete melting. A cycle switch can be used to operate heaters for the hold-on timer setting. This useful feature melts tracked or blowing snow or ice. LED indicators permit monitoring snow melting system operation. The APS-4C provides a relay closure interface for use with energy management computers (EMC).

The optional patented RCU-4 Remote Control provides monitoring and control of the snow melting system at a convenient location. For installation simplicity and low cost, sensors, the RCU-4, and satellite contactor control wiring is NEC Class 2. The APS-4C's nonmetallic enclosure is rated for protected NEMA 3R locations in the temperature range of -40˚ to 160˚F (-40˚ to 60˚C).

### *Specifications and Ordering Information*

| Model Number | PCN | Stock |
|---|---|---|
| APS-4C Control Panel (277 Volt Single Phase) | **389845** | **S** |
| APS-4C Control Panel (208-240 Volt 3-Phase) | **389853** | **S** |
| APS-4C Control Panel (277/480 Volt 3-Phase) | **389861** | **S** |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, PCN and quantity.

# APS-3C

## Automatic Snow/Ice Melting System Controller

- **Automatic Snow/Ice Melting Control**
- **Minimum Energy Costs**
- **Controls Mechanically-Held Contactors**
- **Remote Control and High Temperature Sensor Included**
- **NEMA 3R Enclosure**
- **UL Listed**
- **Adjustable Heater Hold-On Timer**
- **Heater Cycle Push Button**
- **Multiple Sensor Capability**

### *Description*

In conjunction with up to six sensors residing in target zones, the microprocessor-based APS-3C provides effective, economical automatic control of snow melting applications for walkways, ramps, driveways, gutters and downspouts. Operating at either 120 volt or 208-240 volt, 50/60 Hz, the APS-3C's DPDT output relay switches 24 Amp heater loads or directly operates both mechanically and electrically held remote contactors.

The adjustable hold-on timer provides up to 10 hours of heater operation after snowfall ceases, to complete snow/ice melting. Independent of weather conditions, a manual heater cycle control operates heaters for the hold-on period to clear tracked slush and drifted snow. LEDs provide indication of power, sensor status and heater operation. Remote heater cycle and system indication is provided by the optional RCU-3 remote control unit. APS-3C provides a relay closure interface for use with energy management computers (EMC).

The APS-3C nonmetallic enclosure is suitable for NEMA 1 through 3R, 12 and 13 applications over an ambient temperature range of -40˚ to 136˚F (-40˚ to 58˚C).

For installation simplicity and low cost the sensor RCU-3 wiring is NEC Class 2.

### *Specifications and Ordering Information*

| Model Number | PCN | Stock |
|---|---|---|
| APS-3C Control Panel (208-240V) | 389829 | ST |
| APS-3C Control Panel (120V) | 389837 | NS |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order—**Specify model, PCN and quantity.

# SC-40C
## Satellite Contactor

- **Low Cost Control of Larger Snow Melting Systems**
- **Contactor Rating of 50 Amps Per Pole**
- **Supply Options: 208, 240, 277 and 480 volts**
- **Single and Three-Phase Power Control**
- **Grount Fault Equipment Protection with Adjustable Trip Levels: 30mA, 60mA or 120mA**
- **UL Listed, CSA Certified**
- **Self-Test Feature**
- **Simple Installation**
- **Low Cost**

### *Description*

The patented SC-40C Satellite Contactor is a power control peripheral for a APS-4C Snow Switch and similar Environmental Technology, Inc. products. The APS-4C Snow Switch operates the SC-40Cs whenever its contactor operates. That is, during snow and for the hold-on time thereafter.

The integral ground fault circuit interrupter (GFCI) along with a test/reset facility ensure safety along with NEC and local code compliance. Partitioning heater loads for multiple SC-40Cs prevents the nuisance GFCI tripping that is often unavoidable when controlling a large system with a single contactor. The self-test facility operates heaters for one minute with a duty cycle limited to 33% for safer heater testing during the summer months.

An APS-4C operates up to ten SC-40Cs. The size and location of the heaters determines the number of SC-40Cs required. The APS-4C and its SC-40Cs can be separated by up to 1,000ft (305m).

Supply voltage options include 277 volt single-phase, 208-240 volts 3 phase, or 277/480 volt 3 phase, with a contactor rating of 50 amps per pole. For installation simplicity, SC–40C control wiring is NEC Class 2.

The SC-40C's non-metallic enclosure is rated for protected NEMA 3R locations in the temperature range of -40˚ to 160˚F (-40˚ to 60˚C).

### *Specifications and Ordering Information*

| Model Number | PCN | Stock |
|---|---|---|
| SC-40C Satellite Contactor (277 Volt Single Phase) | 389870 | NS |
| SC-40C Satellite Contactor (208-240 Volt 3-Phase) | **389888** | **S** |
| SC-40C Satellite Contactor (277/480 Volt 3-Phase) | **389896** | **S** |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, PCN and quantity.

# GIT-4

## Gutter Ice Melting Control


- **Automatic Gutter Ice Melting Control**
- **Energy Efficient**
- **Minimum Operating Costs**
- **Maintains Ice Melting Heater Efficiency**
- **Built-in Ground Fault Equipment Protection (GFEP) for Safety**
- **UL and CUL Listed to Standard 873**
- **Remote Monitor and Control Included**
- **Low Cost**
- **Simple Installation**

### *Description*

Snow and ice on a roof cause a variety of expensive problems including gutter and down spout breakage and interior water damage. In addition, falling ice can endanger pedestrians. Using heating cables for ice melting can eliminate these problems, however uncontrolled heating is expensive and not energy efficient.

The computerized patented and patent pending GIT-4 Automatic Gutter Ice Melting Control operates ice melting heaters only while required thus insuring energy efficiency and low operating costs. A GIT-4 consists of a gutter-mounted computerized sensor and a control enclosure connected by a 12' 6" (3.8 meter) cable. If the distance between the sensor and control needs to be changed, please contact Customer Service. A GIT-4 includes an RCU-2 Remote Control Unit. It can be located up to 150 feet (45.7 meters) from the control enclosure. It mounts in a single-gang switch box.

The GIT-4 senses both moisture and temperature conditions in the gutter or down spout thus assuring optimum control. Ice melting heaters operate at temperatures below 38˚F (3.3˚C) while moisture is present. Operation continues a period of time thereafter to insure complete melting. While operating, the heaters are maintained at a nominal temperature of 38˚F (3.3˚C). The RCU-2 provides remote monitoring of the ice melting system operation. It also controls GFEP operation and can override automatic heater operation.

Line voltage and ice melting heater connections are located in the control enclosure. The GIT-4 operates from single-phase 120, 208/240 or 277 volt supply selected by a internal jumper connection that is set during installation. It controls single-phase ice melting heater loads of up to 26 amps. The GIT-4 meets the new NEC Class 2 low voltage requirement for wet locations. It is both UL and CUL Listed while the RCU-2 is a NEC Class 2 device. Safety testing was done to UL Standard 873.

### *Specifications and Ordering Information*

| Model Number | PCN | Stock |
|---|---|---|
| **GIT-4 Gutter De-Icing/Sensor Control** | **389810** | **S** |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, PCN and quantity.

# GIT-3A
## Gutter Ice Melting Control

- **Automatic Gutter Ice Melting Control**
- **Energy Efficient**
- **Minimum Operating Costs**
- **Maintains Ice Melting Heater Efficiency**
- **Field Proven Reliability**
- **UL and CUL Listed to Standard 873**
- **Low Cost**
- **Simple Installation**

### *Description*

Snow and ice on a roof cause a variety of expensive problems including gutter and down spout breakage and interior water damage. In addition, falling ice can endanger pedestrians. Using heating cables for ice melting can eliminate these problems, however uncontrolled heating is expensive and not energy efficient.

The computerized patent pending GIT-3A Automatic Gutter Ice Melting Control operates ice melting heaters only while required thus insuring energy efficiency and low operating costs. A GIT-3A consists of a gutter-mounted sensor and a control enclosure connected by a 12' 6" (3.8 meter) cable. If the distance between the sensor and control needs to be changed, please contact Customer Service.

The GIT-3A senses both moisture and temperature conditions in the gutter or down spout thus assuring optimum control. Ice melting heaters operate at temperatures at or below 38˚F (3.3˚C) while moisture is present. Operation continues a period of time thereafter to insure complete melting. While operating, the heaters are maintained at a nominal temperature of 38˚F (3.3˚C).

Line voltage and ice melting heater connections are located in the control enclosure. The GIT-3A operates from single-phase 120, 208/240 or 277 volt supply selected by an internal jumper connection that is set during installation. It controls single-phase ice melting heater loads of up to 26 amps. The GIT-3A meets the new NEC Class 2 low voltage requirement for wet locations. It is both UL and CUL Listed. Safety testing was done to UL Standard 873.

### *Specifications and Ordering Information*

| Model Number | PCN | Stock |
|---|---|---|
| GIT-3A Gutter De-Icing/Sensor Control | 389802 | NS |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, PCN and quantity.

# LCD-1
## Snow Switch

- **Minimum Snow Melting Costs**
- **No Supervision Required**
- **Low Cost**
- **Reliable Automatic Control**
- **UL Listed/CSA Certified**
- **Simple Installation**
- **Field Proven in Thousands of Installations**
- **Integral Precipitation Sensor**
- **16 Amp 120/240 Volt Relay**

### *Description*

The LCD-1 Snow Switches are an energy saving alternative to thermostat, manual or timer controls. Their low price ideally suits them for cost-sensitive residential and commercial snow melting applications. Unlike thermostats, the LCD-1 and Snow Switches operate heaters when precipitation and temperature conditions indicate snow fall. This saves substantial energy compared to other control techniques.

The LCD-1 Snow Switches and integral sensor initiate snow melting at temperatures below 38˚F (3.3˚C) during precipitation and continue heater operation for five hours after snow stops. This ensures complete snow melting.

The LCD-1 Snow Switches operate from 120 volts AC 50/60 Hz. An integral relay rated for 120/240 volt AC 16 Amp loads permits direct heater control for small applications such as wheelchair ramps and stairways or may operate external contactors in larger installations.

Extensive quality control, high grade components and microprocessor technology contribute to trouble-free operation. These innovative, field-proven products provide reliable automatic control in thousands of installations.

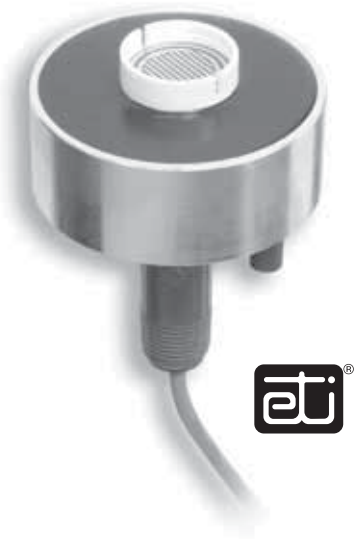
### *Specifications and Ordering Information*

| Model Number | PCN | Stock |
|---|---|---|
| **LCD-1 (UL) Snow Switch** | **389781** | **S** |
| LCD-1 (CSA) Snow Switch | 389790 | NS |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, PCN and quantity.

# CIT-1
## Snow Sensor

- **Reliable Snow Sensing**
- **Senses Both Temperature and Precipitation**
- **Application Flexibility**
- **Simple Installation**
- **Field Proven in Thousands of Installations**



### *Description*

The CIT-1 Snow Sensor detects falling or blowing snow as precipitation at temperatures below 38˚F(3.3˚C). The CIT-1 provides the industry's most versatile and cost effective automatic snow melting control when used with the EUR-5, APS-3C or APS-4C Control Panel. Reliability and sensitivity are key CIT-1 features. The solid state design combined with a rugged aluminum housing and epoxy potting ensure many years of trouble free service. Precision precipitation and temperature sensors ensure snow detection accuracy.

Typical applications include controlling snow melting systems for sidewalks, doorways, stairs, loading docks, ramps for the physically challenged and parking garages. Easy installation is another key CIT-1 feature. Low voltage operation, up to 2000' (609.6m) separation from the control panel, mast or roof mounting, and non-critical extension wiring are just a few of the features making this possible.

### *Specifications and Ordering Information*

| Model Number | PCN | Stock |
|---|---|---|
| CIT-1 Snow Sensor | 389749 | S |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, PCN and quantity.

# GIT-1

## Gutter Ice Sensor

- **Reduces Operating Costs**
- **Reliable Automatic De-icing Control**
- **Sense Both Moisture and Temperature**
- **Gutter-Mounted for Accuracy**
- **Avoids Ice Bridging**
- **Ruggedized Housing**
- **Locate Up to 2,000' (609.6m) From the Control Panel**
- **Simple, Low Cost Installation**
- **Field Proven Reliability**

### *Description*

An automatic control system for gutters and downspouts, employs one or more GIT-1 Gutter Ice Sensors and an EUR-5, APS-3C or APS-4C Control Panel. Heaters operate only while required thus saving energy and ensuring reliable ice melting. Since the GIT-1 mounts in gutters and downspouts it senses actual environmental conditions. This improves sensing accuracy. Solid state moisture and temperature sensors provide the sensitivity required for effective automatic control.

Ice bridging occurs if incomplete melting occurs near the heater or sensor leaving an air space. The air insulates thus preventing effective heater and sensor operation. The GIT-1's unique microcontroller design frees its moisture sensor from ice bridging. Additional features prevent heater operation under conditions favorable to heater ice tunneling. Low voltage operation simplifies installation. Sensors can be located up to 2,000' (609.6m) away from the control panel.

### *Specifications and Ordering Information*

| Model Number | PCN | Stock |
|---|---|---|
| **GIT-1 Gutter Sensor** | **389757** | **S** |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, PCN and quantity.

# SIT-6E
## Pavement Sensor

- **Reliable Snow Sensing**
- **Control Based on Pavement Conditions**
- **Rugged Construction**
- **Simple Installation**
- **Low Voltage Construction**

### *Description*

The SIT-6E, which replaces the SIT-5E, reliably detects snow and ice conditions on pavement surfaces. This ensures that deicing heaters operate only while needed which minimizes energy costs without sacrificing snow melting effectiveness. A built-in hold-on timer keeps heaters operating for an hour after snow stops to help ensure complete snow melting.

The SIT-6E senses snow as moisture detected between the limits of -30 and 38˚F. Operation in the 32 to 38 degree temperature range eliminates unnecessary heater operation.

The SIT-6E accurately measures pavement temperature by compensating for its internal heating. This eliminates the cost and complexity of a separate pavement temperature sensor. For improved efficiency, the SIT-6E mounts closely to the deicing heaters to ensure that pavement and sensor become dry at about the same time.

The new mounting system helps align the SIT-6E with the pavement surface. Six available conduit locations add to installation flexibility and simplicity. The sensor subassembly is field replaceable without disturbing the pavement. The SIT-6E is a NEC Class 2 low voltage device which simplifies installation.

Only brass, epoxy, and stainless steel are exposed to the pavement surface. Precision machining gives the SIT-6E a handsome appearance that will please the building owner, engineer, and architect.

### *Specifications and Ordering Information*

| Model Number | PCN | Stock |
|---|---|---|
| **SIT-6E Pavement Mounted Sensor** | **389765** | **S** |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, PCN and quantity.

# RCU-3
## Remote Control Unit

- **Remote System Status Indication**
- **Convenient Manual Control for Melting Problem Areas**
- **Low Cost**
- **Simple Installation**


### *Description*

The RCU-3 Remote Control Unit is a companion accessory to the EUR-5, APS-3C and the APS-4C Snow/Ice Melting Controllers. The RCU-3 provides a convenient and economical means to both monitor and manually control a snow/ice melting system from a remote location. The integral heater cycle push button operates heaters for the hold-on time setting on the host Control Panel, permitting tracked slush or drifted snow to be cleared independent of prevailing meteorological conditions. LEDs provide indication of system power supply and heater operation.

The RCU-3 Remote Control Unit employs an attractive single gang metallic device plate suitable for both flush and surface installations. The RCU-3 interfaces with its host Control Panel via a NEC Class 2 circuit which may have an installed length as great as 2,000'(609.6m) utilizing 2-conductor #18 AWG jacketed cable.

### *Specifications and Ordering Information*

| Model Number | PCN | Stock |
|---|---|---|
| **RCU-3 Remote Control Unit** | **389773** | **S** |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, PCN and quantity.

# U Series

## Heat Trace Connection System Accessories

**Single Entry Connection Box**
- **NEMA 4X**
- **Entry for 1 Cable**
- **3/4" Conduit Hub Opening**

**Multiple Entry Connection Box**
- **NEMA 4X**
- **Entry for up to 3 Cables**
- **Power or Tee Connection**
- **3/4" Conduit Hub Opening**

**End Seal Fitting**
- **NEMA 4X**
- **Fits All Pipe Sizes**
- **Mounts Above the Insulation for Easy Access**

**Pipe Standoff Kit**
- **Brings Cable Outside Insulation to Customer Supplied Junction Box**

**Under Insulation End Seal Kit**
- **3" Dia. Curved Mounting Surface**
- **Stainless Steel Hardware**
- **1" Wide Strapping Channel for Secure Mounting**

**Small Pipe Adapter for Pipes Under 1-1/2" Diameter**

203312

### *Description*

The U-Series Connection System represents cutting edge design in heat tracing accessories. Each model in this series is designed to satisfy the unique demands of a particular operation. These high-quality models combine a variety of functions in a convenient, easy-to-use and economical package.

### *Applications*

These accessories are designed to connect SRP, SRM/E and CWM heating cables to customer-supplied wiring in any of the following applications:

- Freeze Protection
- Piping Process Temperature Maintenance
- Fluid Flow and Viscosity Maintenance

### *Features*

- Molded of Durable Polyphenylene Sulphide Plastic Material*
- Maximum Pipe Temperature 482˚F (250˚C)
- Corrosion Resistant
- Thermal Stability
- Non-Flammable
- High Strength and Rigidity
- Captive Hardware
- Stainless Steel Hardware to Ensure the Integrity of the System
- Liquid Tight Design Prevents Moisture from Reaching the Electrical Connections
- All Models are Rated NEMA 4X.

### *Approvals*

**UL Listed**
Ordinary Areas

**CSA Certified**
Ordinary Areas
Class I, Div. 2, Groups A, B, C, and D
Class II, Div. 2, Groups F, G
Class I, Div. 2, Zone 1 or 2 AEx e II

**FM Approved**
Ordinary Areas
Class I, Div. 2, Groups B, C, D
Class II, Div. 2, Groups E, F, G
Class III
Class I, Div. 2, Zone 1 or 2 AEx e II

**ATEX Certified (SRL & SRM/E Cables Only)**
IIG Exe II
IECEx Certified
Exe 11 Gb

* This crystalline, high-performance engineering TP is characterized by outstanding high-temperature stability, inherent flame resistance and a broad range of chemical resistance. PPS plastics and compounds provide various combinations of high mechanical strength, impact resistance and electrical insulation, with its high arc resistance and low arc tracking.

# U Series
## Heat Trace Connection System Accessories *(cont'd.)*



### *Accessories*

### *UPC Power Connection Box*
### *PCN 393553*

NEMA 4X rated junction box designed to connect SRL, SRP, SRM/E and CWM cables to customer supplied power wiring. This kit provides water-resistant cable entry for one cable, enclosure support, terminal block, and a water-resistant corrosion-resistant wiring enclosure with a 3/4" opening to accept a conduit hub (CCH-2 or equal). A pipe strap (PS Series) is required to attach this model to a pipe. Small pipe adapter is available for pipe size less than 1-1/2".

**Kit Includes:**
1 Junction box with DIN rail & terminal block
1 Compression fitting
1 Locknut
1 Silicone termination boot
1 Pipe standoff
1 O-ring
1 Self-regulating cable grommet
1 Constant wattage cable grommet

### *UMC Multiple Entry Connection Box*
### *PCN 393561*

NEMA 4X rated junction box designed to connect two or three SRL, SRP, SRM/E and CWM cables to customer supplied power wiring. This kit provides water-resistant cable entry, enclosure support, terminal block and a water-resistant, corrosion-resistant wiring enclosure. In addition to splicing or teeing cables, this model can be used to provide power connection to up to three cables from one connection kit. A pipe strap (PS series) is required to attach this model to a pipe. Small pipe adapter is available for pipe size less than 1-1/2".

**Kit Includes:**
1 Junction box with din rail and terminal block
1 Compression fitting
1 Locknut
3 Silicone termination boots
1 Pipe standoff
1 O-ring
1 Self-regulating cable grommet
1 Constant wattage cable grommet
1 Self-regulating cable grommet insert
1 Constant wattage cable grommet insert

### *SPA Small Pipe Adapter*
### *PCN 393609*

**Kit Includes:**
1 Small pipe adapter

# U Series
## Heat Trace Connection System Accessories *(cont'd.)*

### *UES Above Insulation End Seal Kit*
### *PCN 393570*

NEMA 4X rated end seal designed of to terminate SRL, SRP, SRM/E and CWM cables. This kit provides water-resistant cable entry for one cable, water-resistant and corrosion-resistant pipe support to bring the cable end outside the insulation for easy access. A pipe strap (PS Series) is required to attach this model to a pipe. Small pipe adapter is available for pipe size less than 1-1/2".

**Kit Includes:**
1 End cap
1 Pipe standoff
1 Self-regulating cable grommet
1 Constant wattage cable grommet

### *RTES Under Insulation End Seal Kit*
### *PCN 389570*

NEMA 4X rated enclosure is designed to terminate SRL, SRP, SRM/E and CWM cables. This kit provides water-resistant cable entry for one cable, enclosure support and a water-resistant corrosion-resistant enclosure. The fitting has two different curved mounting surfaces. One side has a 1-1/2" radius curved surface that provides stable support on pipes with a diameter of 3" or more. The other side has a 1/2" radius curved surface which permits a better fit on smaller pipes. A pipe strap (PS Series) is required to attach this model to a pipe. In addition, this side also has four "feet" for installation on flat surfaces.

**Kit Includes:**
1 End Cap
1 Pressure Plate
1 GRSR Self-Regulating Cable Sealing Grommet
1 GRCW Constant Wattage Cable Sealing Grommet

### *SSK Single Entry Sealing Kit**
### *PCN 393617*

This kit provides water resistant cable entry for one cable, water-resistant and corrosion-resistant pipe support to bring the cable outside the insulation for easy connection to power. A pipe strap (PS Series) is required to attach this model to a pipe. A small pipe adapter is available for pipe sizes less than 1-1/2". Customer supplied junction box required.

**Kit Includes:**
1 Compression fitting
1 Locknut
3 Silicone termination boots
1 Pipe standoff
1 O-ring
1 Self-regulating cable grommet
1 Constant wattage cable grommet
2 Insulated butt splice 10-12 AWG
2 Insulated butt splice 14-16 AWG

# U Series
## Heat Trace Connection System Accessories *(cont'd.)*



### *USL Signal Light Kit*
### *PCN 393588*

NEMA 4X rated end seal designed to power or seal one cable and indicate power on with universal voltage 120-277 LED indicator light kit designed for use with SRL, SRP, SRM/E and CWM cables. This model provides water-resistant cable entry, enclosure support, terminal block, and corrosion-resistant wiring enclosure. A pipe strap (PS Series) is required to attach this model to a pipe. Small pipe adapter is available for pipe size less than 1-1/2".

**Kit Includes:**
1 Junction box with DIN rail & terminal block
1 Compression fitting
1 Locknut
1 Silicone termination boot
1 Pipe standoff
1 O-ring
1 Self-regulating cable grommet
1 Constant wattage cable grommet
1 Universal voltage 120-277V LED light assembly

### *UAS Ambient-Sensing Thermostat*
### *PCN 3394038*

NEMA 4X rated junction box designed to connect a single SRL, SRP, SRM/E or CWM cable run to power and control cable output via ambient air temperature in non-hazardous areas. This kit provides water-resistant cable entry for one cable, enclosure support, terminal block and a water resistant corrosion resistant wiring enclosure with a 3/4" opening to accept a conduit hub (CCH-2 or equal). Stainless steel sheath probe is 9/16" diameter x 3" long. Switch rated for 22 amps SPDT 120-480 volts. Operating temperature range is -40°F to 160°F (-40°C to 71°C). Temperature set point 0° to 225°F (-81°C to 107°C) with 10°F scale divisions.

**Kit Includes:**
1 Junction box with DIN rail & terminal block
1 Compression fitting
1 Locknut
1 Silicone termination boot
1 Pipe standoff
1 O-ring
1 Self-regulating cable grommet
1 Constant wattage cable grommet

# U Series
## Heat Trace Connection System Accessories *(cont'd.)*

### *UBC Line-Sensing Thermostat*
### *PCN394011*

NEMA 4X rated junction box designed to connect a single SRL, SRP, SRM/E or CWM cable run to power and control cable output via ambient air temperature in non-hazardous areas. This kit provides water-resistant cable entry for one cable, enclosure support, terminal block and a water resistant corrosion resistant wiring enclosure with a 3/4" opening to accept a conduit hub (CCH-2 or equal). Stainless steel bulb is 1/4" diameter x 7-1/4" long with 3ft capillary. Switch rated for 22 amps SPDT 120-480 volts. Operating temperature range is -40°F to 160°F (-40°C to 71°C). Temperature set point 0° to 400°F (-81°C to 200°C) with 10°F.

**Kit Includes:**
1 Junction box with DIN rail &terminal block
1 Compression fitting
1 Locknut
1 Silicone termination boot
1 Pipe standoff
1 O-ring
1 Self-regulating cable grommet
1 Constant wattage cable grommet
1 Line-sensing thermostat assembly

### *AT-1 Aluminum Tape Cable Attachments*
### *PCN 383355*

180' roll aluminum foil installation tape with pressure sensitive acrylic adhesive. 2-mil thickness with high tensile strength; 2-½" wide. 200°F (93°C) rating. Minimum application temperatures 40°F (5°C).

# U Series

## Heat Trace Connection System Accessories *(cont'd.)*



### *FT-3 Fiberglass Tape Cable Attachments*
### *PCN 389941*

66' roll glass cloth installation tape with pressure sensitive thermosetting adhesive. 3/8" wide. 310°F (155°C) rating. Strap at one foot intervals. Minimum application temperature 40°F (5°C).

### *PS-1, PS-3, PS-10 Pipe Straps*
### *PCN 382352, 382360, 382379*

Used for attaching UPC and UMC kits to pipe.

| | |
|---|---|
| PS-1 | 1/2" to 3/4" pipes (PCN 382352) |
| PS-3 | 1" to 3-1/2" pipes (PCN 382360) |
| PS-10 | 2-1/2" to 9" pipes (PCN 382379) |

### *Stripping Tool*
### *PCN 393510*

For SR Cables, Blades for HSRL and SRL Cables included


### *Replacement Blades*

### *PCN 393529*

Blade Set for Stripping HSRM and SRM/E Cables

### *PCN 393537*

Blade Set for Stripping HSRL and SRL Cables

# DL & EL Series
## Connection Accessories

### DL Series

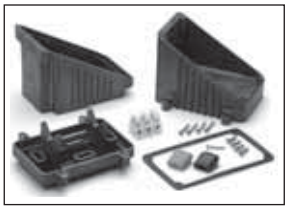
- **Re-usable Components**
- **Through-the-Insulation Mounting Provides High Visibility**
- **Easy Access for Maintenance**

### EL Series

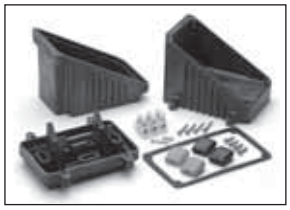
- **Low Profile Provides Easy Installation of Insulation**
- **Contains Standard, Off-the-Shelf Electrical Connection Components**

Chromalox offers cable termination kits in DL for high profile, through-the-insulation styles and EL for low profile, under-the-insulation. Both styles are approved for hazardous area applications.

*RTPC*



*RTST*



*RTES*

## *Ordering Information*

| DL Accessories | | EL Accessories | |
|---|---|---|---|
| **Model** | **Used With** | **Model** | **Used With** |
| **Power Connection Kit** | | | |
| RTPC<br>RTPC-SL | SRL-C<br>SRL-CR, CT<br>SRP-C, SRP-CT<br>CWM-C<br>CWM-CT<br>SRL-MC<br>SRL-MCR, MCT<br>SRM/E-C<br>SRM/E-CT | SSK<br>PJB<br>RG-PK-1 | SRL-C, SRL-CR, SRL-CT,<br>SRF-C, CWM-C, CWM-CT<br>SRF-RG<br>SRP-C, SRP-CT<br>HWM |
| **Splice & Tee Kit** | | | |
| RTST<br>RTST-SL | SRL-C<br>SRL-CR, CT<br>SRP-C, SRP-CT<br>CWM-C<br>CWM-CT<br>SRL-MC<br>SRL-MCR, MCT<br>SRM/E-C<br>SRM/E-CT | RT-RST<br>RT-TST<br>RG-SK-1 | SRL-C, SRL-CR, SRF-C<br>CWM-C, CWM-CT<br>SRF-RG, SRP-C<br>SRP-CT |
| **End Seal Kit** | | | |
| RTES | SRL-C<br>SRL-CR, CT<br>SRP-C, SRP-CT<br>CWM-C<br>CWM-CT<br>SRL-MC<br>SRL-MCR, MCT<br>SRM/E-C<br>SRM/E-CT | RT-RES<br><br>RG-EK-1 | SRL-C, SRL-CR, SRF-C<br><br>SRF-RG |

**To Order —** Refer to the DL & EL General Application Accessories in this section.

## *Attachment Accessories*

| Model | Description |
|---|---|
| FT-3 | Fiberglas® tape to affix cable to pipe |
| AT-1 | Aluminum tape to improve heat transfer to pipe |
| PS-1 | Pipe strap to mount power connection box to pipe, 1/2 - 3/4" pipes |
| PS-3 | Pipe strap to mount power connection box to pipe, 1 - 3-1/2" pipes |
| PS-10 | Pipe strap to mount power connection box to pipe, 2-1/2 - 9" pipes |
| CL-1 | Caution labels, apply every 10 feet to insulation to alert personnel |

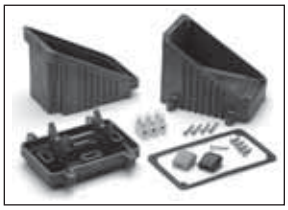
**To Order —** Refer to the DL & EL General Application Accessories in this section.

# DL
## Integrated Connection Accessories



- **Power Connection Box**
  - **NEMA 4X Enclosure**
  - **Cable Entry Up to 3 Cables**
  - **3/4" Conduit Hub Opening**
- **Splice & Tee Box**
  - **NEMA 4X Enclosure**
  - **Cable Entry Up to 3 Cables**
  - **Straight or Tee Connections**
- **End Seal Fitting**
  - **NEMA 4X Enclosure**
  - **Fits All Pipe Sizes**
  - **Mounting Feet for Installing on Flat Surfaces**
- **Stainless Steel Hardware**
- **Corrosion & Weather Resistant Ryton® Construction**

*RTPC*



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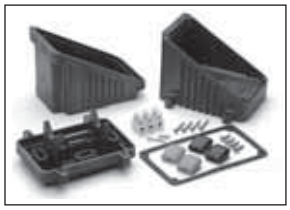


*RTES*

### *Description*

The DL Series Installation Accessories for Chromalox heat tracing products represents the state of the art in heat tracing. Each model in the series is designed to satisfy the demands of a particular operation. These high-quality models combine a variety of functions in a convenient, easy to use and economical package.

### *Applications*

Connection of all Rapid Trace Heating Cables to Customer Supplied Power Wiring in any of the following applications:

- Hydrocarbon and Chemical Product Piping
- Process Temperature Maintenance
- Fluid Flow and Viscosity Maintenance
- Freeze Protection.

### *Features*

- Molded of Durable Plastic Material (Ryton®, PPS)[1]
- High Service Temperature
- Corrosion Resistant
- Integrated Connection Accessories and Controls
- Thermal Stability
- Non-Flammable
- High Strength and Rigidity
- Stainless Steel Hardware to Ensure the Integrity of the System
- Liquid Tight Design prevents moisture from reaching the electrical connections. All models are rated NEMA 4X.

### *Approvals*[2]

**UL, CSA, FM** Approved for most models, consult specific product information.

**UL** Listed for ordinary areas

**CSA** Certified for ordinary and:

- Class I, Div. 2, Groups A, B, C, D
- Class II, Div. 2, Groups F, G.

**FM** Approved for ordinary and:

- Class I, Div. 2, Groups B, C, D
- Class II, Div. 2, Groups F, G
- Class III, Div. 2 Areas.

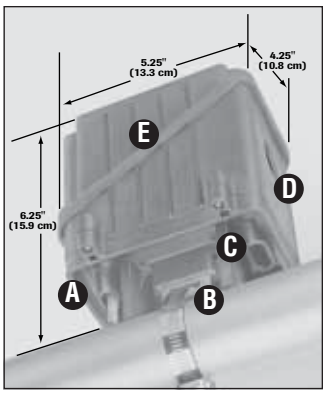
**Notes** —

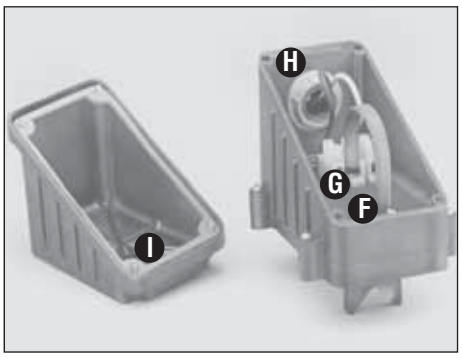
1. Ryton®, is a registered trade name of Phillips Chemical Company.
2. Depends on specific model and cable applied.

# DL
## Integrated Connection Accessories *(cont'd.)*

### *RTPC — Power Connection Kit*

**RTPC** Power Connection Box is a NEMA 4X rated junction box designed to connect all Chromalox Rapid Trace Heating Cables to customer supplied power wiring. This kit provides waterproof cable entry for up to three cables, enclosure support, terminal block and a waterproof, corrosion resistant wiring enclosure with an opening to accept a 3/4" conduit hub (Chromalox CCH-2 or equal). A pipe strap (Chromalox PS or equal) is required to attach this model to a pipe.




### *RTPC — Power Connection Kit*

1 molded junction box consisting of:
- 1 base
- 1 box w/conduit opening
- 1 lid

1 three position terminal block
1 mounting screw for terminal block
1 GRSR self-regulating cable sealing grommet
1 GRCW constant wattage sealing grommet

### *Ordering Information — RTPC*

| Model | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|
| RTPC | 389554 | S | 1 |
| RTPC-SL1 | 389626 | S | 2 |
| RTPC-SL2 | 389634 | S | 2 |
| RTPC-SL3 | 389642 | S | 2 |

### *Construction*

- **A** Three strategically placed cable entries allow maximum flexibility for insulation (Heating cable cut away for clarity).
- **B** Stainless steel tiedown support provides positive attachment to pipes.[1]
- **C** Heavy duty support legs give stable pipe mounting and provide conduit clearance for applications with up to three inches of insulation.
- **D** Opening for 3/4" (20 mm) conduit hub.[1]
- **E** Oblique sided box and cover allow easy access for wiring.
- **F** Cable grommets provide water-tight seal between base, box and cable. Use GRSR with all self-regulating cable. Use GRCW for constant wattage cables. One of each grommet included in kit. See table below for spare grommets.
- **G** Three position terminal block for easy wiring.
- **H** Power wiring entry. Conduit hub not included.[1]
- **I** Gasket provides water-tight seal between box and lid. It is affixed to the lid and holds the mounting hardware during assembly.

**Note 1** — Refer to DL & EL General Application Accessories at the end of this section.

### *RTPC-SL — Power Connection Kit w/Signal Light (Ordinary Area Only)*

1 molded junction box consisting of:
- 1 base
- 1 box w/conduit opening
- 1 lid *w/signal light installed (LED style)*
  Specify: SL1(120V), SL2(208-240V), SL3(277V) operation

1 three position terminal block
1 mounting screw for terminal block
1 GRSR self-regulating cable sealing grommet
1 GRCW constant wattage sealing grommet

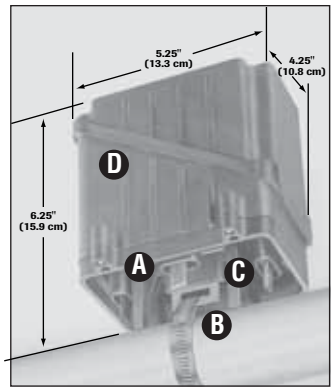
### *Spare Grommets* — *PCN*

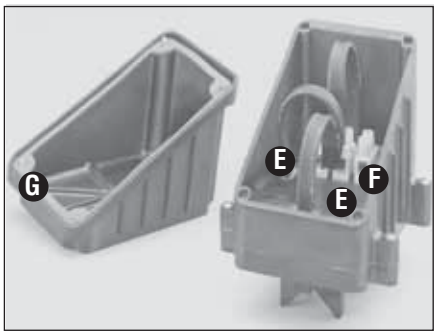
| | | |
|---|---|---|
| **GRS** | RTD/Capillary type | **385000** |
| **GR0** | Blank | **385019** |
| **GRSR** | Self Regulating type | **389714** |
| **GRCW** | Constant Wattage type | **389722** |

# DL
## Integrated Connection Accessories *(cont'd.)*

### *RTST — Splice & Tee Kit*

**RTST** Splice & Tee Box is a NEMA 4X rated junction box designed to make straight or tee splices for all Chromalox Rapid Trace Heating Cables. This model provides waterproof cable entry (for two cables for a splice or three cables for a tee), enclosure support, terminal block and a waterproof, corrosion resistant wiring enclosure. A pipe strap (Chromalox PS or equal) is required to attach this model to a pipe.




### *RTST — Splice & Tee Kit*

1 molded junction box consisting of:
- 1 base
- 1 box
- 1 lid

1 three position terminal block
1 mounting screw for terminal block
3 GRSR Self-regulating cable sealing grommet
3 GRCW Constant wattage sealing grommets

### *Ordering Information — RTPC*

| Model | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|
| RTST | 389562 | S | 1 |
| RTST-SL1 | 389650 | S | 2 |
| RTST-SL2 | 389669 | S | 2 |
| RTST-SL3 | 389677 | S | 2 |

### *Construction*

**A** Three strategically placed cable entries allow maximum flexibility for insulation (heating cable cut away for clarity).

**B** Stainless steel tiedown support provides positive attachment to pipes.[1]

**C** Heavy duty support legs give stable pipe mounting and provide conduit clearance for applications with up to three inches of insulation.

**D** Oblique sided box and cover allow easy access for wiring.

**E** Cable grommets provide water-tight seal between base, box and cable. Use GRSR with all self-regulating cable. Use GRCW for constant wattage cables. Three of each grommet included in kit. See table below for spare grommets.

**F** Three position terminal block for easy wiring.

**G** Gasket provides water-tight seal between box and lid. It is affixed to the lid and holds the mounting hardware during assembly.

**Note 1** — Refer to DL & EL General Application Accessories at the end of this section.

### *RTST-SL — Splice & Tee Kit w/Signal Light (Ordinary Area Only)*

1 molded junction box consisting of:
- 1 base
- 1 box
- 1 lid *w/signal light installed (LED style)*
  Specify: SL1 for 120 Volt, SL2 for 208-240 Volt, SL3 for 277 Volt operation

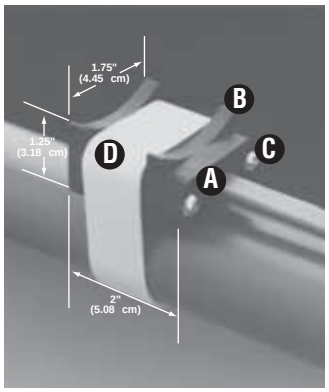
1 three position terminal block
1 mounting screw for terminal block
1 GRSR Self-regulating cable sealing grommet
1 GRCW Constant wattage sealing grommet

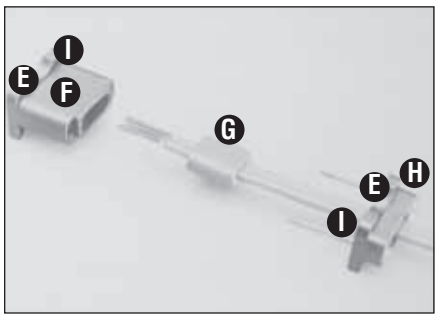
| *Spare* | *Grommets* | *PCN* |
|---|---|---|
| **GRS** | RTD/Capillary type | **385000** |
| **GR0** | Blank | **385019** |
| **GRSR** | Self Regulating type | **389714** |
| **GRCW** | Constant Wattage type | **389722** |

# DL
## Integrated Connection Accessories *(cont'd.)*

### *RTES — End Seal Kit*

**RTES** End Seal Fitting is a NEMA 4X rated enclosure designed to terminate all Chromalox Rapid Trace Heating Cables. This model provides waterproof cable entry for one cable, enclosure support and a waterproof corrosion resistant enclosure. The fitting has two different curved mounting surfaces. One side has a 1-1/2" radius curved surface that provides stable support on pipes with a diameter of 3" or more. The other side has a 1/2" radius curved surface which permits a better fit on smaller pipes. In addition, this side also has four "feet" for installation on flat surfaces.




### *Construction*

- **A** Cable entry.
- **B** Three inch diameter curved mounting surface.
- **C** Captured stainless steel hardware.
- **D** One inch wide strapping channel for secure mounting.
- **E** One-half inch radius curved mounting surface.
- **F** End cap.
- **G** Cable grommet provides water-tight seal between end cap and pressure plate. Use GRSR with all self-regulating cables. Use GRCW with constant wattage cables. One of each grommet included in kit. See table below for spare grommets.
- **H** Pressure plate.
- **I** Mounting feet for installation on flat surfaces.

### *RTES — End Seal Kit*

1 end cap
1 pressure plate
1 GRSR Self-regulating cable sealing grommet
1 GRCW Constant wattage cable sealing grommet

### *Ordering Information — RTES*

| Model | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|
| RTES | 389570 | S | 1 |

### *Spare Grommets* *PCN*

| | | |
|---|---|---|
| **GRS** | RTD/Capillary type | **385000** |
| **GR0** | Blank | **385019** |
| **GRSR** | Self-Regulating type | **389714** |
| **GRCW** | Constant wattage type | **389722** |

### *DL Accessory Components*

### *MP-1 (385780)*

### *Mounting Plate Kit Attachments*

For installing RTPC and RTST kits on flat surfaces. Kit includes:
1 mounting plate
1 lock washer
1 bolt
1 washer
1 nut

**Note** — The complete line of DL & EL Mounting Accessories is located at the end of this section.

# EL
## Standard Connection Accessories

- **Junction Box Connection Kits for SRL, SRF and CWM Applications**
- **Splice & Tee Kits for SRL, SRF and CWM Applications**
- **End Seal Kits for SRL and SRF Applications**



### *Description*

Each model in the EL Series Installation Accessories for Chromalox Rapid Trace Heating Cable products is designed to satisfy the demands of a particular operation. These high-quality models combine a variety of functions in a convenient, easy to use and economical package.

### *Applications*

Connection of selected rapid trace heating cables to customer supplied power wiring in any of the following applications:

- Freeze Protection
- Hydrocarbon and Chemical Product Piping
- Process Temperature Maintenance
- Fluid Flow and Viscosity Maintenance.

### *Approvals*

**UL*** Listed for ordinary areas
**CSA*** Certified for ordinary areas
**FM**** Approved for ordinary areas

* Does not include SSK
** Does not include SSK and PJB

### *Ordering Information*

| Model | Used With |
|---|---|
| **Power Connection Kit** | |
| SSK<br>PJB | SRF-C, SRF-CR, SRL-C, SRL-CR, SRL-CT, CWM-C, CWM-CT, SRP-C, SRP-CT |
| **Splice & Tee Kit** | |
| RT-RST<br>RT-TST | SRL-C, SRL-CR, SRF-C<br>CWM-C, CT, SRP-C, SRP-CT |
| **End Seal Kit** | |
| RT-RES<br>RT-TES | SRL-C, SRL-CR, SRF-C<br>CWM-C, CT, SRP-C, SRP-CT |

**To Order —** Refer to the DL & EL General Application Accessories in this section.

# EL
## Standard Connection Accessories *(cont'd.)*

### *Accessories*

***Junction Box Connection Kit SSK (393617)***

(1) compression fitting
(1) pipe stand off
(1) tube of RTV sealant
(1) O-ring
(1) 1" locknut
(1) self-regulating cable grommet
(1) constant wattage cable grommet
(1) silicone boot
(2) uninsulated barrel connectors
(2) insulated barrel connectors

***Rain Tight Junction Box PJB (393676)***

Polycarbonate watertight enclosure for use with SSK

***End Seal Kit (for SRL cable) RT-RES (383574)***

(5) 1/2" diameter heat shrink caps

***Conduit Hub w/Grounding Lug CCH-2 (385650)***

Corrision resistant hub for 3/4" conduit. Fits opening in RTPC. Includes ground connector


***Caution Labels CL-1 (382424)***

(5) electric heat tracing caution labels, weather resistant

***Splice & Tee Kit (for Constant Wattage cable) RT-TST (383566)***

(5) 7" long large heat shrink tubes
(10) 1-1/2" long small heat shrink tubes
(5) 10" lengths of sealant tape
(15) uninsulated barrel connectors
(1) tube of RTV sealant

***Splice & Tee Kit (for Self-Regulating cable) RT-RST (383558)***

(5) 8" long heat shrink tubes
(5) 1/2" lengths of sealant tape
(10) insulated barrel connectors
(5) uninsulated barrel connectors

# DL & EL Series

## General Application Accessories



### *Accessories*

#### *Conduit Hub Cable Attachments CCH-2 (385650)*

Corrosion resistant for 3/4" conduit. Fits opening in RTPC and PJB. Includes a ground connector.

#### *Metal Pipe Strap Kit Attachments PS-1, 3 and 10*

**PS-1 (382352)** 1/2 to 3/4" pipes
**PS-3 (382360)** 1 to 3-1/2" pipes
**PS-10 (382379)** 2-1/2 to 9" pipes

Interlock Straps for larger diameter pipes

#### *Fiberglas® Tape Cable Attachments FT-3 (389941)*

66 foot roll glass cloth tape with pressure-sensitive thermosetting silicone adhesive 3/8" wide. 310°F (155°C) rating. Strap at one foot intervals at minimum application temperatures of -40°F (-40°C).


#### *Caution Labels CL-1 (382424)*

5 electric heat tracing caution labels, weather resistant.

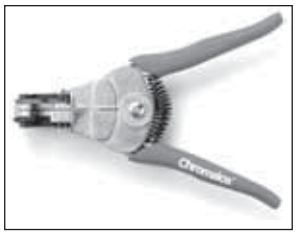

#### *Aluminum Tape Cable Attachments AT-1 (383355)*

180 foot roll aluminum foil installation tape with pressure-sensitive acrylic adhesive. 2-mil thickness with high tensile strength; 2-1/2" wide. 200°F (93°C) rating. Minimum application temperatures 40°F (5°C).

### *Ordering Information — Cable Attachments*

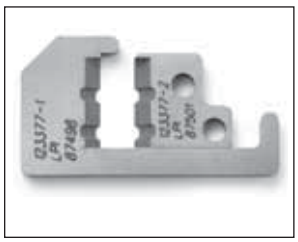
| Description | Model | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|---|
| Fiberglas® Tape | FT-3 | 389941 | S | 1 |
| Aluminum Tape | AT-1 | 383355 | S | 2 |
| Metal Pipe Strap Kit | PS-1 | 382352 | S | 1 |
| | PS-3 | 382360 | S | 1 |
| | PS-10 | 382379 | S | 1 |
| Caution Labels | CL-1 | 382424 | S | 1 |
| Cable Stripping Tool with 16 awg blades | ST-1 | 393510 | S | 1 |
| 14 awg Replacement Blades | BL-1 | 393529 | S | 1 |
| 16 awg Replacement Blades | BL-2 | 393537 | S | 1 |
| 20 awg Replacement Blades | BL-3 | 393545 | S | 1 |

**To Order –** Specify model, PCN and quantity.



#### *Cable Stripping Tool w/16 awg Blades ST-1 (393510)*

#### *Replacement Blades*



#### *BL-1 14 awg (393529)*

Blades for use with the Cable Stripping Tool. 14 awg blades for HSRM and SRM/E products.

#### *BL-2 16 awg (393537)*

Blades for use with the Cable Stripping Tool. 16 awg blades for HSRL and SRL, SRF and Thermwire products.

#### *BL-3 20 awg (393545)*

Blades for use with the Cable Stripping Tool. 20 awg blades for SRR, SRS and STW products.

# HL
## Hazardous Location Connection Kits

- **Power Connection Kit**
- **End Seal Kit**
- **Splice Kit**
- **Tee Kit**
- **Signal Light Kit**

### *Description*

The HL Series Connection System for Chromalox heating cable products is specifically designed to comply with the requirements of Division 1 hazardous areas.

### *Applications*

- Process Temperature Maintenance
- Fluid Flow and Viscosity Maintenance

Due to the nature of Division 1 hazardous location applications consultation with factory representative is required.

### *Features*

- High strength aluminum alloy cast bodies
- Corrosion resistant
- Internally threaded junction box body with externally threaded cover
- Seal fitting applicable for use on vertical or horizontal conduit

The **Model HL-PC** Hazardous Location Power Connection Kit is a Division 1 certified junction box and seal fitting, providing an electrical power connection for 1 cable. Use with D1SL1 or D1SL2 signal light for voltage present indication at power connection or end seal.

The **Model HL-ES** Hazardous Location End Seal Kit is a Division 1 certified junction box and seal fitting. This kit is designed for end-of-run sealing for 1 cable.

The **Models HL-S and HL-T** Hazardous Location Kits consist of a Division 1 certified junction box and seal fittings. These kits are designed for the splicing of two, or three self-regulating cables in Division 1 areas.

- The splice kit provides entry for two cables
- The tee kit provides entry for three cables

### *Approvals*

**FM** Approved
- Class I, Division 1, Groups B, C, D
- Class II, Division 1, Groups E, F, G
- Class III, Division 1

**CSA** Approved
- Class I, Division 1, Groups B, C, D
- Class II, Division 1, Groups E, F, G

### *Ordering Information*

| Kit | Description | Model | Stock | PCN |
|---|---|---|---|---|
| Power Connection | Electrical Service Connection | **HL-PC** | **S** | **382192** |
| End Seal | Terminating 1 Cable | **HL-ES** | **S** | **382221** |
| In-Line Splice | Splice 2 Cables | **HL-S** | **S** | **382205** |
| Tee Splice | Splice 3 Cables | **HL-T** | **S** | **382213** |
| 120V Signal Light Kit | Voltage Indication | **D1SL1** | **S** | **393684** |
| 208-277V Signal Light Kit | Voltage Indication | **DISL2** | **S** | **393692** |

# HL Series
## General Application Accessories



### *Fiberglas® Tape Cable Attachments FT-3 (389941)*

66 foot roll glass cloth tape with pressure-sensitive thermosetting silicone adhesive 3/8" wide. 310°F (155°C) rating. Strap at one foot intervals at minimum application temperatures of -40°F (-40°C).

### *Metal Pipe Strap Kit Attachments*

**PS-1 (382352)** 1/2 to 3/4" pipes

**PS-3 (382360)** 1 to 3-1/2" pipes

**PS-10(382379)** 2-1/2 to 9" pipes

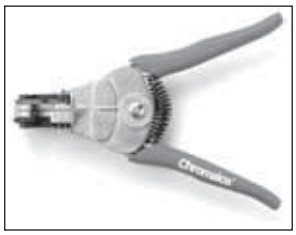
Interlock Straps for larger diameter pipes

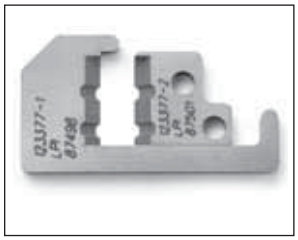

### *Aluminum Tape Cable Attachments AT-1 (383355)*

180 foot roll aluminum foil installation tape with pressure-sensitive acrylic adhesive. 2-mil thickness with high tensile strength; 2-1/2" wide. 200°F (93°C) rating. Minimum application temperatures 40°F (5°C).


### *Caution Labels CL-1 (382424)*

5 electric heat tracing caution labels, weather resistant.





### *Cable Stripping Tool w/16 awg Blades ST-1 (393510)*

### *Replacement Blades*

***BL-1 14 awg (393529)***
Blades for use with the Cable Stripping Tool. 14 awg blades for HSRM and SRM/E products.

***BL-2 16 awg (393537)***
Blades for use with the Cable Stripping Tool. 16 awg blades for HSRL and SRL, SRF and Thermwire products.

***BL-3 20 awg (393545)***
Blades for use with the Cable Stripping Tool. 20 awg blades for SRR, SRS and STW products.

### *Ordering Information — Cable Attachments*

| Description | Model | PCN | Stock | Wt. (Lbs.) |
|---|---|---|---|---|
| Fiberglas® Tape | **FT-3** | **389941** | **S** | 1 |
| Aluminum Tape | **AT-1** | **383355** | **S** | 2 |
| Metal Pipe Strap Kit | **PS-1** | **382352** | **S** | 1 |
| | **PS-3** | **382360** | **S** | 1 |
| | **PS-10** | **382379** | **S** | 1 |
| Caution Labels | **CL-1** | **382424** | **S** | 1 |
| Cable Stripping Tool | **ST-1** | **393510** | **S** | 1 |
| with 16 awg blades | **BL-1** | **393529** | **S** | 1 |
| 14 awg Replacement Blades | **BL-1** | **393529** | **S** | 1 |
| 16 awg Replacement Blades | **BL-2** | **393537** | **S** | 1 |
| 20 awg Replacement Blades | **BL-3** | **393545** | **S** | 1 |

**To Order –** Specify model, PCN and quantity.

# B100 & E100

## Heat Trace/Freeze Protection Thermostats

- **B100 Direct Mount for Freeze Protection (Ambient)**
- **E100 Remote Mount for Heat Trace (Bulb & Capillary)**
- **22 Amp Resistive Switch**
- **Single and Dual Output Models**
- **± 1% Setpoint Repeatability**
- **Fast Response for Protection of Valves and Piping**
- **NEMA 4X, 7 and 9 Enclosures**

*B100 / E100*
*NEMA 4X*

(Models E121/122, B121 only)

*B121 / E121*
*NEMA 7*

### *Applications*

- E100 NEMA 4X Line or Pipe Sensing
- B100 NEMA 4X Ambient Air Sensing
- E121/122/122P NEMA 7 Line or Pipe Sensing
- B121 NEMA 7 Ambient Air Sensing

**WARNING: Hazard of Fire.** These devices function as temperature controls only. Because they do not fail-safe, an approved temperature and/or pressure safety control must be used for safe operation.

### *Description*

Maintaining proper viscosity and flow is critical in heat trace or freeze protection applications. The E100 remote mount thermostats utilize a stainless steel bulb and capillary design to accurately sense temperature at key points along a pipe. The B100 direct mount thermostats feature liquid-filled thermal assemblies and sense air temperatures from 15 to 140˚F. Both models are epoxy coated to seal from moisture and contaminants in compliance with NEMA 4X requirements. NEMA 7 stats E121/122/122P and B121 are designed for Class I, Division I and 2, Groups B, C, D, and Class 2, Division I and 2, Group E, F, G.

### *Specifications*

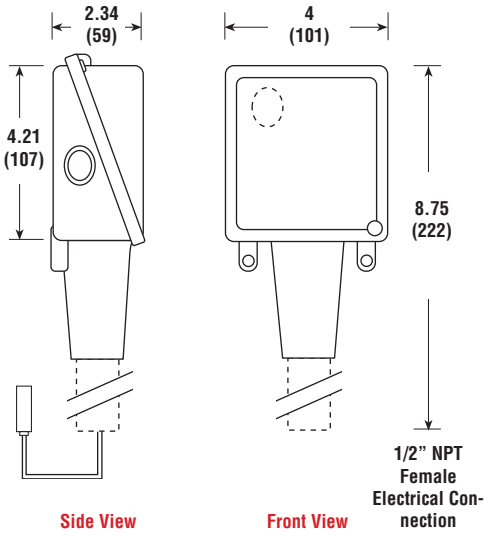
| | |
|---|---|
| **Ambient Temperature Limits** | -40˚ to +160˚F (B100); -58˚F to +160˚F (B121, B122, E122, E121) (-40 to +71˚C); set point typically shifts |
| **Switch Output** | One SPDT (types B100, E100, B121, E121); two SPDT (types E122, E122P) |
| **Electrical Rating** | 22 Amps 125/250/480 Vac resistive |
| **Weight** | Types B100, E100: 1 lb., 8 oz (0,68 kg)<br>Types B121, E121, E122, E122P: 3 lbs., 10 oz (1,6 kg.) |
| **Electrical Connection** | Types E121, E122, E122P, B121: terminal block;<br>Types B100, E100: direct to swtich |
| **Temperature Assembly** | Types E100, E121, E122, E122P: 10 feet stainless steel bulb and capillary<br>Types B100, B121: immersion stem |
| **Fill** | Non-toxic oil filled |
| **Temperature Deadband** | Typically 2% of range |
| **Bulb Dimensions (E100, E121, E122)**<br>**(B100, B121)** | Length 11-5/8", OD 1/8"<br>Length 2-11/16", OD 9/16" |

# B100 & E100

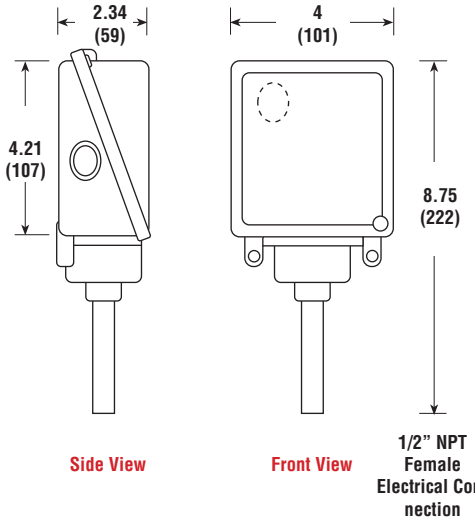
## Heat Trace/Freeze Protection Thermostats *(cont'd.)*

### *Dimensions*

#### *E100 Heat Trace, NEMA 4X Line and Pipe Sensing*

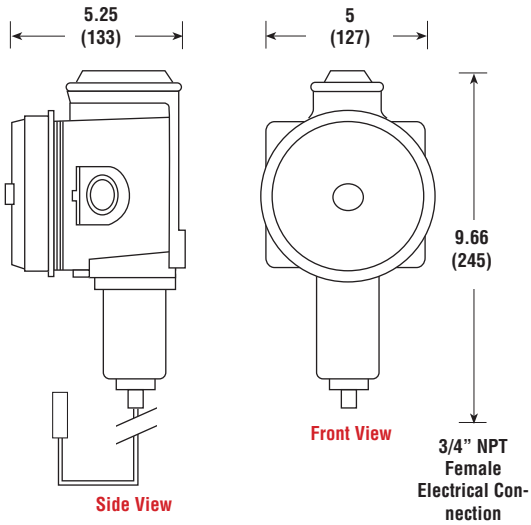



#### *B100 Freeze Protection, NEMA 4X Ambient Sensing*

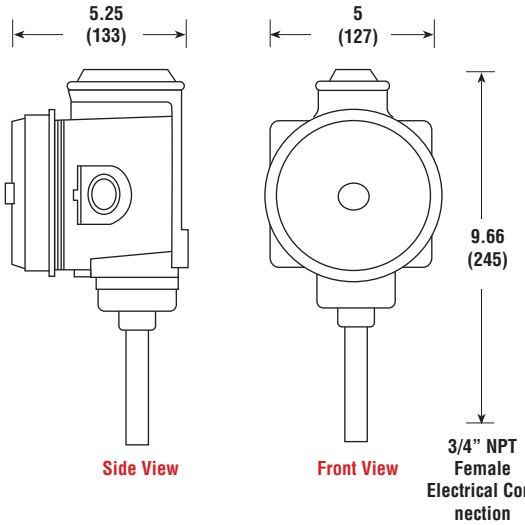



All Dimensions in Inches (mm)

#### *E121/122 Heat Trace, NEMA 7 and 9 Line and Pipe Sensing*




#### *B121 Freeze Protection, NEMA 7 and 9 Ambient Sensing*




### *Ordering Information*

| Thermostat Type | Model | Switch Output | Enclosure NEMA | Stock | PCN |
|---|---|---|---|---|---|
| Heat Trace, Remote Bulb and Capillary 25 - 325˚F (-5 to +163˚C) | E100 | Single Output | 4X | **S** | **305322** |
| | E121 | Single Output | 4X,7,9 | **S** | **384112** |
| | E122 | Dual Output, Dual Setpoint | 4X,7,9 | NS | 305349 |
| | E122P | Dual Output, Common Setpoint | 4X,7,9 | NS | 305357 |
| Freeze Protection Direct Mount 15 - 140˚F (-10 to +60˚C) | B100 | Single Output | 4X | **S** | **305365** |
| | B121 | Single Output | 4X,7,9 | **S** | **384104** |

# RBF

## Heat Trace or Pipe Sensor

- **Heat Trace or Pipe Sensing Applications**
- **316 Stainless Steel Sheath**
- **Moisture Resistant Heads**
- **3/4" or 1/2" NPT Threaded Extension Wire Opening**
- **4" to 8" Cold Leg Standard for Varying Insulation Depths**
- **1" to 3" Pipe Fittings Standard**
- **100 ohm RTD, ± .12% Accuracy**
- **Standard Thermocouple Types J,K,T and E Available**
- **Fiberglass Insulated RTD Probe**
- **Standard Ungrounded Thermocouple Junction**
- **RTD or Universal Transmitter Available (Must Specify Temperature Range)**


### *Description*

For measuring the surface temperature of process piping that is carrying products whose temperatures must be controlled to prevent freeze-up, or to maintain a viscosity level so that the inner medium will flow. The Thermocouple or RTD Sensor Element is made up with a 316SS sheath, and with a stainless steel mounting pad. Cold legs are available in customer specified lengths to accommodate pipe insulation thickness.

### *Approvals*

Explosion Resistant Heads are rated for Class I Groups C, D, Division 1 and 2; Class II Groups E, F, G; Class III for use in hazardous locations as described by the National Electrical Code.

### *Custom Availabilities*

- Connection Head Material (i.e. Polypropylene, Derlin or Cast Iron/Aluminum)
- Mounting Pad for Larger Pipe Sizes
- Hot & Cold Legs (Sheath Length)
- Sheath material (i.e. 304SS or 321SS)
- RTD Sheath Insulation Material (i.e. MGO or Teflon)

### *In Stock:*

| Model | PCN |
|---|---|
| RBF185M-HT-0304-18RC-31SB/C | 317315 |
| RBF185M-HT-0304-18RC-71SB/C | 317340 |

| | | Range (˚F) | |
|---|---|---|---|
| **Model** | **Sensor** | **Min** | **Max** |
| **RBF185M-HT** | RTD | -100 | 900 |
| **J48U-HT** | Type J | 32 | 900 |
| **K48U-HT** | Type K | 900 | 1800 |
| **T48U-HT** | Type T | -300 | 500 |
| **E48U-HT** | Type E | 32 | 1800 |

**Sheath Leg Lengths**

| Code | Hot | Cold |
|---|---|---|
| **0304** | 3" | 4" |
| **0306** | 3" | 6" |
| **0308** | 3" | 8" |

**Mounting Pads**

| Code | Radius | Pipe size |
|---|---|---|
| **18RD** | Fits All Pipe Sizes | |

| Code | Connection Heads |
|---|---|
| **31SB/C** | Aluminum. NEMA 4 |
| **49SB/C** | Flip top aluminum. NEMA 4 |
| **71SB/C** | Explosion resistant cast iron/aluminum NEMA 4 |
| **81SB/C** | Explosion resistant 316L SS. NEMA 4X |
| **91SB/C** | 316L stainless steel. NEMA 4X |

| | | | |
|---|---|---|---|
| **RBF185M-HT** | **0304** | **18RD** | **31SB/C** |

Mounting pads conform to pipe once pipe clamps

# DL
## Integrated Temperature Controls

- **Line or Ambient Sensing Thermostats**
- **ElectroMechanical Control**
- **Rugged, Corrosion Resistant Construction**
- **NEMA 4X Design with Corrosion and Weather Resistant Ryton® Construction**
- **Ambient Sensing**
  - **120 - 480 Vac**
  - **0 - 225°F Temp. Rating**
  - **9/16" OD x 4" SS Probe**
  - **Ordinary & Hazardous Area (Div. 2) Approvals**
- **Bulb & Capillary**
  - **120 - 480 Vac**
  - **0 - 400°F Setpoint Range**
  - **1/4" OD x 7-1/4" SS Bulb and 3 Ft. Capillary**
  - **Ordinary & Hazardous Area (Div. 2) Approvals**



### *Description*

The DL Series Single Point On/Off Temperature Controls from Chromalox represent the state of the art in heat tracing and are available in five models to handle a broad range of applications. Models include two ambient sensing thermostats, two line sensing thermostats and a line sensing solid state controller. These high-quality models combine temperature control and power connection in a convenient, easy to use and economical package.

### *Applications*

- Hydrocarbon and Chemical Product Piping
- Process Temperature Maintenance
- Fluid Flow and Viscosity Maintenance
- Freeze Protection

### *Features*

- Integrated Controls and Power Connections reduce installation hardware
- Molded of Durable Plastic Material (Ryton® PPS)[1]
- High Service Temperature
- Corrosion Resistant
- Thermal Stability
- Non-Flammability
- High Strength and Rigidity
- Stainless Steel Sensor Sheath
- Hermetically Sealed Switches on EP models permit control in Div. 2 hazardous areas
- Stainless Steel Hardware to ensure the integrity of the system
- Cable Terminations inside enclosure reduce installation time and cost
- Liquid Tight Design prevents moisture from reaching the electrical connections. All models are rated NEMA 4X.

### *Approvals*[2]

**UL, CSA, FM** is carried by most models, consult specific product information.

**UL** Listed for ordinary areas

**CSA** Certified for ordinary and:

- Class I, Div. 2, Groups A, B, C, D
- Class II, Div. 2, Groups F, G

**FM** Approved for ordinary and:

- Class I, Div. 2, Groups B, C, D
- Class II, Div. 2, Groups F, G
- Class III, Div. 2 Areas.

**Notes** —
1. Ryton®, is a registered trade name of Phillips Chemical Company.
2. Depends on specific model and cable applied.

# DL
## Integrated Temperature Controls *(cont'd.)*

### *RTAS & RTAS-EP Ambient Sensing*

**RTAS** is an ambient-sensing thermostat which is generally used for freeze protection in ordinary (non-hazardous) areas. The thermostat is mounted through the end of the oblique sided enclosure lid. In fact, because there is so much room in this model, multiple heating cables can be terminated. The stainless steel sheathed, inverted bellows probe provides good sensitivity, resulting in more accurate control.

**RTAS-EP** is a modified version of the RTAS which utilizes a hermetically sealed switch. Since this switch has no arcing contacts, it can be used in Division 2 Hazardous Areas.

### *Specifications*

**Temp. Setpoint Range —** 0 to 225°F (-18 to 107°C) for RTAS/RTAS-EP

**Microswitch® Rating —** 22 Amps SPDT for RTAS; 11 Amps, RTAS-EP

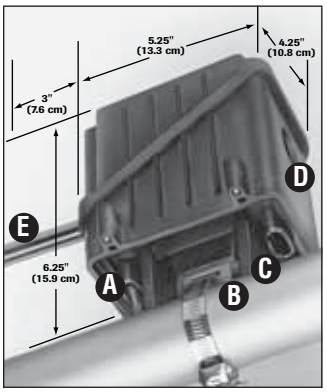
**Scale Division —** 10°F (5.6°C)

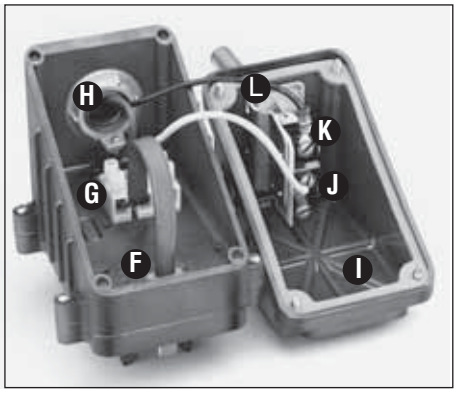
**Max. Sensor Exposure Temp. —** 250°F (121°C)

**Sensor Dimensions —** 9/16" Dia. x 3" Long

**Operating Ambient Temp. Range —** -40°F to 160°F (-40 to 71°C)

**Factory Preset and Calibrated —** 40°F




### *Construction*

- **A** Strategically placed cable entries allow maximum flexibility for insulation (Heating cable cut away for clarity).
- **B** Stainless steel tiedown support provides positive attachment to pipes.[1]
- **C** Heavy duty support legs give stable pipe mounting and provide conduit clearance for applications with up to three inches of insulation.
- **D** Opening for 3/4" (20 mm) conduit hub.[1]
- **E** Stainless steel sheath temperature sensor.
- **F** Cable grommets provide water-tight seal between base, box and cable. Use GRSR with all self-regulating cables. Use GRCW with constant wattage cables. One of each grommet included in kit. See table below for spare grommets.
- **G** Three position terminal block for easy wiring.
- **H** Power wiring entry. Conduit hub not included.
- **I** Gasket provides water-tight seal between box and lid. It is affixed to the lid and holds the mounting hardware during assembly.
- **J** Thermostat switch.
- **K** Setpoint adjustment knob.
- **L** Setpoint indicator.

**Note 1** —Refer to DL & EL General Application Accessories at the end of this section.

| *Spare Grommets* | | *PCN* |
|---|---|---|
| **GRS** | RTD/Capillary type | **385000** |
| **GR0** | Blank | **385019** |
| **GRSR** | Self-regulating cable type | **389714** |
| **GRCW** | Constant wattage cable type | **389722** |

### *Ordering Information*

| Model | PCN | Switch Rating (Amps/Volts) | Max. Continuous Exposure Temp. | | Max. Intermittent Exposure Temp. | | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|
| | | | °F | °C | °F | °C | |
| RTAS | 389589 | 22A @ 120 - 480 | 400 | 200 | 500 | 260 | 2 |
| RTAS-EP | 389597 | 11A @ 120 - 250 | 400 | 200 | 500 | 260 | 2 |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, PCN and quantity.

# DL
## Integrated Temperature Controls *(cont'd.)*

### *RTBC & RTBC-EP Bulb & Capillary*

**RTBC** is a line-sensing thermostat which is generally used for process temperature maintenance applications in ordinary (non-hazardous) areas. The thermostat is mounted within the enclosure and the capillary is brought out through one of the openings in the bottom of the box. This design provides extra protection for the capillary, especially when the control is mounted on a pipe, for heat tracing applications. The three foot long stainless steel capillary provides good flexibility in mounting locations.

**RTBC-EP** is a modified version of the RTBC which utilizes a hermetically sealed switch. Since this switch has no arcing contacts it can be used in Division 2 Hazardous Areas.

### *Specifications*

**Temp. Setpoint Range —** 0 to 400°F (-18 to 200°C) for RTBC, RTBC-EP

**Microswitch® Rating —** 22 Amps SPDT for RTBC; 11 Amps, RTBC-EP

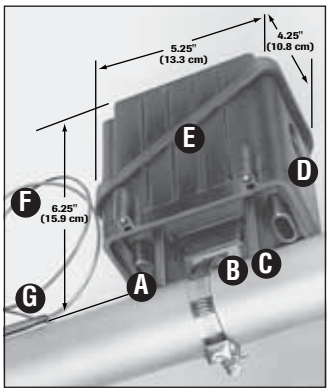
**Minor Scale Division —** 10°F (5.6°C)

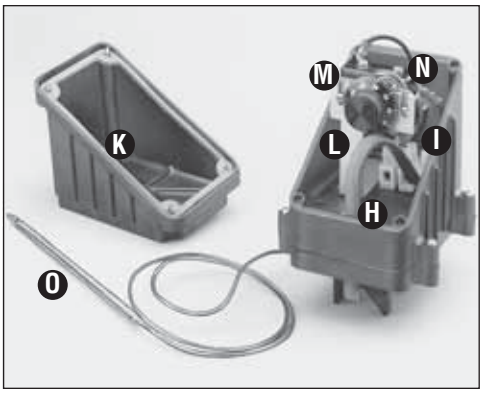
**Max. Sensor Exposure Temp. —** 450°F (230°C)

**Sensor Dimensions —** 1/4" (6.4mm) OD x 7-1/4" (18.4cm) L Bulb, 3' (1m) Capillary

**Operating Ambient Temp. Range —** -40°F to 160°F (-40 to 71°C)

**Factory Preset and Calibrated —** 200°F (93°C) for RTBC, RTBC-EP




### *Construction*

- **A** Strategically placed cable entries allow maximum flexibility for insulation (Heating cable cut away for clarity).
- **B** Stainless steel tiedown support provides positive attachment to pipes.[1]
- **C** Heavy duty support legs give stable pipe mounting and provide conduit clearance for applications with up to three inches of insulation.
- **D** Opening for 3/4" (20 mm) conduit hub.[1]
- **E** Oblique sided box and cover allow easy access for wiring.
- **F** Stainless steel capillary (3 ft/1m long).
- **G** Stainless steel sensing bulb.
- **H** Cable grommets provide water-tight seal between base, box, cable and capillary. Use GRSR with all self-regulating cables. Use GRCW with constant wattage cables. One of each grommet included in kit. See table below for spare grommets.
- **I** Three position terminal block for easy wiring.
- **J** Power wiring entry. Conduit hub not included.[1]
- **K** Gasket provides water-tight seal between box and lid. It is affixed to the lid and captures the mounting hardware.
- **L** Thermostat mounting bracket.
- **M** Setpoint adjustment knob.
- **N** Thermostat switch.
- **O** Stainless steel sensing bulb.

**Note 1** —Refer to DL & EL General Application Accessories at the end of this section.

| *Spare Grommets* | | *PCN* |
|---|---|---|
| **GRS** | RTD/Capillary type | **385000** |
| **GR0** | Blank | **385019** |
| **GRSR** | Self-regulating cable type | **389714** |
| **GRCW** | Constant wattage cable type | **389722** |

### *Ordering Information — RTBC*

| Model | PCN | Switch Rating (Amps/Volts) | Max. Continuous Exposure Temp. | | Max. Intermittent Exposure Temp. | | Wt. (Lbs.) |
|---|---|---|---|---|---|---|---|
| | | | °F | °C | °F | °C | |
| RTBC | 389600 | 22A @ 120 - 480 | 400 | 200 | 500 | 260 | 2 |
| RTBC-EP | 389618 | 11A @ 120 - 250 | 400 | 200 | 500 | 260 | 2 |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order**—Specify model, PCN and quantity.

intelliTRACE®

# HTLS

## Heat Tracing Line Sensing Control Panels


- **Solid State Relay Output Rated 30 Amps or Two-Pole Contactor Control Output**
- **Universal Inputs**
- **NEMA 4/4X Enclosure**
- **Ground Fault Alarm/Trip Monitor or GFI Circuit Breakers**
- **Programmable High or Low Temperature Alarms**
- **Programmable Low Current Alarm**
- **Optional RS-485 MODBUS® Communications**
- **120, 208, 240, and 277 VAC**
- **Optional Heater for Sub-Zero Ambients**

### *Description*

The Chromalox HTLS series panels are microprocessor based temperature control and monitoring units for heat tracing used in freeze protection and process temperature control applications.

This series of panels can be configured for ambient or line sensing control. The HTLS series implement a scaleable design such that they can be configured with or without communications, ground fault monitoring or enclosure heater.

This unique format offers a design that can be tailored both by price and features to meet the most challenging demands in heat trace applications. For example: The HTLS series can be networked together via RS-485 MODBUS and the Chromalox Windows based Chromasoft SpecView software package.

Two options are available for Ground Fault Protection. The Ground Fault Monitoring system has a reset pushbutton on the panel door that illuminates when a ground fault has occured. As an alternative, ground fault circuit breakers are also available. Both Ground Fault systems are rated for Equipment Protection. In the event of sub-zero temperatures, the optional enclosure heater is available.

The HTLS series have programmable inputs (thermocouple, RTD, mA, VDC), On/Off or PID control, Auto-tune function, High/Low temperature alarms, current alarm, and sensor failure indication. The heat tracing circuit is switched by a 30 Amp solid state relay rated at 40˚C ambient or optional 2-pole contactor.

The Chromalox HTLS series panel comes ready to install and includes control and power wiring terminal blocks for field connections.

### *Applications*

- Freeze Protection
- Fuel Gas Preheating and Superheating
- Fuel Oil Preheating
- Hydrocarbon and Chemical Product Piping
- Power Generation Plants

### *Technical Specifications*

| | |
|---|---|
| Supply Voltage: | 120, 208, 240, and 277 Vac |
| Operating Environment: | 32 - 104˚F (0 - 40˚C)<br>-32 - 104˚F (-34 - 40˚C) with enclosure heater option |
| Communications: | RS-485 MODBUS® |
| Input: | Thermocouple J, K, L, N, R, S, RTD, Current, Voltage<br>Field Programmable for ˚C or ˚F |
| Output: | Solid State Relay rated @ 30 amps @ 40˚C or optional 2-pole contactor |
| Current Alarm (Low): | 0 - 30 amps in 1 amp increments |
| Ground Fault Alarm Trip: | 5 - 100mA |
| Temperature Alarms: | Process, Deviation, Band, High/Low, Latching/ Non-Latching (Manual/Automatic Reset) Programmable. |
| Control Modes: | Field Selectable On/Off, PID, Auto Tune |

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# HTLS

## Single-Loop Heat Tracing Line Sensing Control Panel *(cont'd.)*

**Model**

**HTLS** — **IntelliTRACE 10000 Series Line Sensing / Ambient Sensing Heat Trace Panel**

Panel Configuration

cUL and UL Listed Single Loop Line Sensing/ Ambient Sensing Temperature/Monitor Heat Trace Panel. Factory pre-wired for quick installation. Includes: Solid State Relay or Contactor Control, Current Transformer, High-Low Temperature Alarms, Low Current Alarm, On/Off or PID Control, Universal Sensor Inputs, Dual Digital Displays, Terminal Blocks for Field Connections, Loop Enable/Disable, NEMA 4/4X rated Enclosure (12.5"H x 10.5"W x 6"D) for Indoor/Outdoor Applications. Options Include: Ground Fault Monitoring and Selectable Shutdown, GFI Thermal Magnetic Circuit Breakers, Enclosure Heater and RS-485 MODBUS Communications.

| Code | Single Loop of Heat Trace Control |
|---|---|
| **1** | Solid State Relay Control Rated 30 Amps @ 40˚C Ambient (NEMA 4) |
| **1C** | Electromechanical Contactor Control Rated 30Amps @ 40˚C Ambient (NEMA4X) |

| Code | Line Voltage (Single Phase) | Load Voltage (Single Phase) |
|---|---|---|
| **0** | 120 Vac Cable (1-P Breakers) | 120 Vac |
| **1** | 240 Vac Cable (2-P Breakers) | 240 Vac |
| **2** | 277 Vac Cable (1-P Breakers) | 277 Vac (240 Vac Cable) |
| **3** | 208 Vac Cable (2-P Breakers) | 208 Vac (240 Vac Cable) |
| **4** | 480 Vac Cable (2-P Breakers) | 480 Vac |

| Code | Controller Options |
|---|---|
| **0** | IntelliTRACE Controller (Code 1 Solid State Relay) |
| **1** | IntelliTRACE Controller with Communications (Code 1 Solid State Relay) |
| **2** | IntelliTRACE Controller (Code 1C Contactor Control) |
| **3** | IntelliTRACE Controller with Communications (Code 1C Contactor Control) |

| Code | Ground Fault Monitoring Options |
|---|---|
| **0** | None |
| **1** | Ground Fault Monitor 120Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **2** | Ground Fault Monitor 240Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **3** | Ground Fault Monitor 277Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **4** | Ground Fault Monitor 208Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **5** | 15 Amp, 120 Vac, 1-Pole GFI Circuit Breaker |
| **6** | 20 Amp, 120 Vac, 1-Pole GFI Circuit Breaker |
| **7** | 25 Amp, 120 Vac, 1-Pole GFI Circuit Breaker |
| **8** | 30 Amp, 120 Vac, 1-Pole GFI Circuit Breaker |
| **A** | 15 Amp, 277 Vac, 1-Pole GFI Circuit Breaker |
| **B** | 20 Amp, 277 Vac, 1-Pole GFI Circuit Breaker |
| **C** | 30 Amp, 277 Vac, 1-Pole GFI Circuit Breaker |
| **E** | 15 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker |
| **F** | 20 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker |
| **G** | 25 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker |
| **H** | 30 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker |

| Code | Enclosure Heater |
|---|---|
| **0** | None |
| **1** | Thermostat Controlled Enclosure Heater |

| | | | | | | |
|---|---|---|---|---|---|---|
| **HTLS -** | **1** | **1** | **0** | **2** | **1** | **Typical Model Number** |

### *Stock PCN Chart*

| Model | PCN |
|---|---|
| HTLS-10000 | 329666 |
| HTLS-10010 | 329631 |
| HTLS-11020 | 329643 |
| HTLS-12030 | 329658 |

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# HTLS

## Two, Three and Four-Loop Heat Tracing Line Sensing Control Panel

- **Solid State Relay Outputs Rated 30 Amps or Two-Pole Contactor Control Outputs**
- **Universal Inputs**
- **NEMA 4/4X Enclosure**
- **Ground Fault Alarm/Trip Monitors or GFI Circuit Breakers**
- **Programmable High/Low Temperature Alarms**
- **Programmable Low Current Alarm**
- **Optional RS-485 MODBUS® Communications**
- **120, 208, 240, and 277 VAC**
- **Optional Heater for Sub-Zero Ambients**

### *Applications*

- Freeze Protection
- Fuel Gas Preheating and Superheating
- Fuel Oil Preheating
- Hydrocarbon and Chemical Product Piping
- Power Generation Plants

### *Description*

The Chromalox HTLS series panels are microprocessor based temperature control and monitoring units for heat tracing used in freeze protection and process temperature control applications.

This series of panels can be configured for ambient or line sensing control. The HTLS series implement a scaleable design such that they can be configured with or without communications, ground fault monitoring or enclosure heater.

This unique format offers a design that can be tailored both by price and features to meet the most challenging demands in heat trace applications. For example: The HTLS series can be networked together via RS-485 MODBUS and the Chromalox Windows based Chromasoft SpecView software package.

Two options are available for Ground Fault Protection. The Ground Fault Monitoring system has a reset pushbutton on the panel door that illuminates when a ground fault has occured. As an alternative, ground fault circuit breakers are also available. Both Ground Fault systems are rated for Equipment Protection. In the event of sub-zero temperatures, the optional enclosure heater is available.

The HTLS series have programmable inputs (thermocouple, RTD, mA, VDC), On/Off or PID control, Auto-tune function, High/Low temperature alarms, current alarm, and sensor failure indication. The heat tracing circuit is switched by a 30 Amp solid state relays rated at 40˚C ambient or optional 2-pole contactors.

The Chromalox HTLS series panel comes ready to install and includes control and power wiring terminal blocks for field connections.

### *Technical Specifications*

| | |
|---|---|
| Supply Voltage: | 120, 208, 240, and 277 Vac |
| Operating Environment: | 32 to 104˚F (0 to 40˚C)<br>-32 to 104˚F (-34 to 40˚C) with enclosure heater option |
| Communications: | RS-485 MODBUS® |
| Input: | Thermocouple J, K, L, N, R, S, RTD, Current, Voltage<br>Field Programmable for C or F |
| Output: | Solid State Relay rated @ 30 amps @ 40˚C or optional 2-pole contactors |
| Current Alarm (Low): | 0 - 30 amps in 1 amp increments |
| Ground Fault Alarm Trip: | 5 - 100mA |
| Temperature Alarms: | Process, Deviation, Band, High/Low, Latching/ Non-Latching (Manual/Automatic Reset) Programmable. |
| Control Modes: | Field Selectable On/Off, PID, Auto Tune |

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# HTLS

## Dual-Loop Heat Tracing Line Sensing Control Panel *(cont'd.)*

**Model**

**HTLS** **IntelliTRACE 20000 Series Line Sensing Heat Trace Panel**

Panel Configuration

cUL and UL Listed Dual Loop Line Sensing/Ambient Sensing Temperature/Monitor Heat Trace Panel. Factory pre-wired for quick installation. Includes: Solid State Relays or Contactor Control, Current Transformers, High-Low Temperature Alarms, Low Current Alarms, On/Off or PID Control, Universal Sensor Inputs, Dual Digital Displays, Terminal Blocks for Field Connections, Loop Enable/Disable, NEMA 4/4X rated Enclosure (16"H x 14"W x 8"D) for Indoor/Outdoor Applications. Options Include: Ground Fault Monitoring and Selectable Shutdown, GFI Thermal Magnetic Circuit Breakers, Enclosure Heater and RS-485 MODBUS Communications.

| Code | Dual Loop of Heat Trace Control |
|---|---|
| **2** | Solid State Relay Control Per Loop Rated 30 Amps @ 40˚C Ambient (NEMA 4) |
| **2C** | Electromechanical Contactor Control Per Loop Rated 30 Amps Per Loop @ 40˚C Ambient (NEMA 4X) |

| Code | Line Voltage (Single Phase) | Load Voltage (Single Phase) |
|---|---|---|
| **0** | 120 Vac | 120 Vac |
| **1** | 240 Vac | 240 Vac |
| **2** | 277 Vac | 277 Vac (240 Vac Cable) |
| **3** | 208 Vac | 208 Vac (240 Vac Cable) |
| **4** | 480 Vac | 480 Vac |

| Code | Controller Options |
|---|---|
| **0** | IntelliTRACE Controllers (Code 2 Solid State Relay) |
| **1** | IntelliTRACE Controllers with Communications (Code 2 Solid State Relay) |
| **2** | IntelliTRACE Controllers (Code 2C Contactor Control) |
| **3** | IntelliTRACE Controllers with Communications (Code 2C Contactor Control) |

| Code | Ground Fault Monitoring Options |
|---|---|
| **0** | None |
| **1** | Ground Fault Monitor 120 Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **2** | Ground Fault Monitor 240 Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **3** | Ground Fault Monitor 277 Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **4** | Ground Fault Monitor 208 Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **5** | 15 Amp, 120 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **6** | 20 Amp, 120 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **7** | 25 Amp, 120 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **8** | 30 Amp, 120 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **A** | 15 Amp, 277 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **B** | 20 Amp, 277 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **C** | 30 Amp, 277 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **E** | 15 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker (1/Loop) |
| **F** | 20 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker (1/Loop) |
| **G** | 25 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker (1/Loop) |
| **H** | 30 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker (1/Loop) |

| Code | Enclosure Heater |
|---|---|
| **0** | None |
| **1** | Thermostat Controlled Enclosure Heater |

| | | | | | | |
|---|---|---|---|---|---|---|
| **HTLS** | **-** **2** | **0** | **0** | **0** | **0** | **Typical Model Number** |

### *Stock PCN Chart*

| Model | PCN |
|---|---|
| HTLS-20000 | 329674 |

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# HTLS

## Three-Loop Heat Tracing Line Sensing Control Panel *(cont'd.)*

**Model**

**HTLS** **IntelliTRACE 30000 Series Line Sensing Heat Trace Panel**

Panel Configuration

cUL and UL Listed Three Loop Line Sensing Temperature/Monitor Heat Trace Panel. Factory pre-wired for quick installation. Includes: Three-Pole Door-Interlocked Disconnect Switch, Solid State Relay or Contactor Control, High or Low Temperature Alarms, Low Current Alarms, On/Off or PID Control, Universal Sensor Inputs, Dual Digital Display, Terminal Blocks for Field Connections, Loop Standby Mode, NEMA 4 Steel Enclosure (20"H x 20"W x 8"D) for Indoor/Outdoor Applications. Options Include: Ground Fault Monitoring and Selectable Shutdown, GFI Thermal Magnetic Circuit Breakers, Enclosure Heater and RS-485 MODBUS Communications.

| Code | Three Loop Heat Trace Control |
|---|---|
| **3** | Solid State Relay Control Per Loop Rated 30 Amps @ 40˚C Ambient |
| **3C** | Electromechanical Contactor Control Per Loop Rated 30 Amps Inductive Per Loop @ 40˚C Ambient |

| Code | Line Voltage (Three Phase) | Load Voltage |
|---|---|---|
| **0** | 208/120 Vac, 3-Phase, 4 Wire | 120 Vac |
| **1** | 240 Vac, 3-Phase | 240 Vac |
| **2** | 480/277 Vac, 3-Phase, 4 Wire | 277 Vac (240 Vac Cable) |
| **3** | 208/120 Vac, 3-Phase, 4 Wire | 208 Vac (240 Vac Cable) |

| Code | Controller Options |
|---|---|
| **0** | IntelliTRACE Controllers (Code 3 Solid State Relay) |
| **1** | IntelliTRACE Controllers with Communications (Code 3 Solid State Relay) |
| **2** | IntelliTRACE Controllers (Code 3C Contactor Control) |
| **3** | IntelliTRACE Controllers with Communications (Code 3C Contactor Control) |

| Code | Ground Fault Monitoring Options |
|---|---|
| **0** | None |
| **1** | Ground Fault Monitor 120 Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **2** | Ground Fault Monitor 240 Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **3** | Ground Fault Monitor 277 Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **4** | Ground Fault Monitor 208 Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **5** | 15 Amp, 120 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **6** | 20 Amp, 120 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **7** | 25 Amp, 120 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **8** | 30 Amp, 120 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **A** | 15 Amp, 277 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **B** | 20 Amp, 277 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **C** | 30 Amp, 277 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **E** | 15 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker (1/Loop) |
| **F** | 20 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker (1/Loop) |
| **G** | 25 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker (1/Loop) |
| **H** | 30 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker (1/Loop) |

| Code | Enclosure Heater |
|---|---|
| **0** | None |
| **1** | Thermostat Controlled Enclosure Heater |

| | | | | | | |
|---|---|---|---|---|---|---|
| **HTLS -** | **3** | **1** | **0** | **2** | **0** | **Typical Model Number** |

intelliTRACE®

# HTLS

## Four-Loop Heat Tracing Line Sensing Control Panel *(cont'd.)*



**Model**

**HTLS** **IntelliTRACE 40000 Series Line Sensing Heat Trace Panel**

Panel Configuration

cUL and UL Listed Four Loop Line Sensing Temperature/Monitor Heat Trace Panel. Factory pre-wired for quick installation. Includes: Three-Pole Door-Interlocked Disconnect Switch, Solid State Relay or Contactor Control, High or Low Temperature Alarms, Low Current Alarms, On/Off or PID Control, Universal Sensor Inputs, Dual Digital Display, Terminal Blocks for Field Connections, Loop Standby Mode, NEMA 4 Steel Enclosure (30"H x 24"W x 8"D) for Indoor/Outdoor Applications. Options Include: Ground Fault Monitoring and Selectable Shutdown, GFI Thermal Magnetic Circuit Breakers, Enclosure Heater and RS-485 MODBUS Communications.

| Code | Three Loop Heat Trace Control |
|---|---|
| **4** | Solid State Relay Control Per Loop Rated 30 Amps @ 40˚C Ambient |
| **4C** | Electromechanical Contactor Control Per Loop Rated 30 Amps Inductive Per Loop @ 40˚C Ambient |

| Code | Line Voltage (Three Phase) | Load Voltage |
|---|---|---|
| **0** | 208/120 Vac, 3-Phase, 4 Wire | 120 Vac |
| **1** | 240 Vac, 3-Phase | 240 Vac |
| **2** | 480/277 Vac, 3-Phase, 4 Wire | 277 Vac (240 Vac Cable) |
| **3** | 208/120 Vac, 3-Phase, 4 Wire | 208 Vac (240 Vac Cable) |

| Code | Controller Options |
|---|---|
| **0** | IntelliTRACE Controllers (Code 4 Solid State Relay) |
| **1** | IntelliTRACE Controllers with Communications (Code 4 Solid State Relay) |
| **2** | IntelliTRACE Controllers (Code 4C Contactor Control) |
| **3** | IntelliTRACE Controllers with Communications (Code 4C Contactor Control) |

| Code | Ground Fault Monitoring Options |
|---|---|
| **0** | None |
| **1** | Ground Fault Monitor 120 Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **2** | Ground Fault Monitor 240 Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **3** | Ground Fault Monitor 277 Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **4** | Ground Fault Monitor 208 Vac w/Shutdown & Contactor door mounted GFI Illuminated Reset Switch |
| **5** | 15 Amp, 120 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **6** | 20 Amp, 120 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **7** | 25 Amp, 120 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **8** | 30 Amp, 120 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **A** | 15 Amp, 277 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **B** | 20 Amp, 277 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **C** | 30 Amp, 277 Vac, 1-Pole GFI Circuit Breaker (1/Loop) |
| **E** | 15 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker (1/Loop) |
| **F** | 20 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker (1/Loop) |
| **G** | 25 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker (1/Loop) |
| **H** | 30 Amp, 208/240 Vac, 2-Pole GFI Circuit Breaker (1/Loop) |

| Code | Enclosure Heater |
|---|---|
| **0** | None |
| **1** | Thermostat Controlled Enclosure Heater |

| | | | | | | |
|---|---|---|---|---|---|---|
| **HTLS -** | **4** | **1** | **0** | **E** | **0** | **Typical Model Number** |

intelliTRACE®

# HTLSC1D2

## Series C1D2 Heat Trace Line Sensing Control Panel


- **Approved for Class 1, Division 2 Groups B, C and D**
- **Solid State Relay Output Rated 30 Amps 40˚C**
- **Universal Inputs**
- **NEMA 4 Enclosure**
- **Ground Fault Alarm**
- **Programmable High/Low Temperature Alarms**
- **Programmable Current Alarm**

### *Applications*

- Freeze Protection
- Fuel Gas Preheating and Superheating
- Fuel Oil Preheating
- Hydrocarbon and Chemical Product Piping
- Power Generation Plants

### *Description*

The Chromalox HTLSC1D2 series panels are microprocessor based temperature control and monitoring units for heat tracing used in freeze protection and process temperature control applications.

This series of panels can be configured for ambient or line sensing control. The HTLSC1D2 series implement a scaleable design such that they can be configured with or without communications, ground fault monitoring or enclosure heater.

This unique format offers a design that can be tailored both by price and features to meet the most challenging demands in heat trace applications. For example: The HTLSC1D2 series can be networked together via RS-485 MODBUS and the Chromalox Windows based Chromasoft SpecView software package. The optional ground fault monitoring addresses the national electric code requirements and reduces the cost of installing costly ground-fault circuit breakers. In the event of sub-zero temperatures the optional enclosure heater is available. The Chromalox HTLSC1D2 series offers single and dual loop designs and are approved for Class 1 Division 2 Areas.

The HTLSC1D2 series have programmable inputs (thermocouple, RTD, mA, VDC), On/Off or PID control, Auto-tune function, High/Low temperature alarms, current alarm, and sensor failure indication. The heat tracing circuit is switched by a 30 amp solid state relay rated at 40˚C ambient.

The Chromalox HTLSC1D2 series panel comes ready to install and includes control and power wiring terminal blocks for field connections.

### *Technical Specifications*

**Area of Use:** Class 1 Division 2

**Approvals:** UL, cUL, CE

**Supply Voltage:** 120, 208, 240, 277, and 480 Vac.

**Ambient Operating Temperature:** 32 - 104˚F (0 - 40˚C), -32 - 104˚F (-35.5 - 40˚C) with Optional Enclosure Heater.

**Protection:** NEMA 4X Fiberglas®

**Communications:** RS-485 MODBUS

**Temperature Sensor Input:** J, K, T, E, B, R, S, N, L, PT100, mV, mA, V

**Output:** Solid State Relay rated 30 amps @ 40˚C.

**Current Alarm (Low):** 0 - 50 Amps in .1 amp resolution.

**Temperature Alarms:** Field selectable Dev. High/Low, Dev. Band High/Low, Process Low /High, Latching, Non-Latching.

**Control Modes:** Field Selectable On/Off, PID, Auto-tune.

**Ground Fault Alarm:** Adjustable Trip Level 30 - 300mA; Adjustable Trip Delay 0 - 1 Sec.

# HTLSC1D2

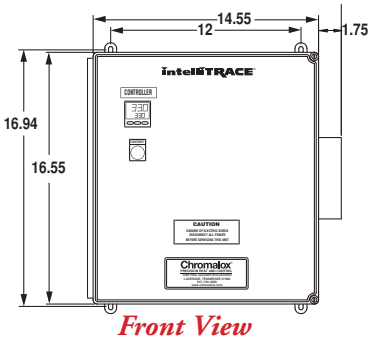
## Series C1D2 Heat Trace Line Sensing Control Panel *(cont'd.)*

### *Ordering Information*

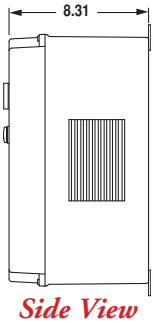
**To Order** — Complete the Model Number using the Matrix provided.

**Note —** Due to the nature of Division 1 hazardous location applications consultation with a factory representative is required.

### *Single Loop Mounting Dimensions*

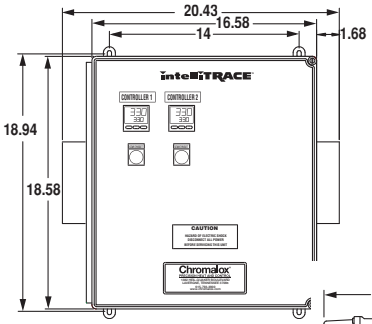



*Front View*

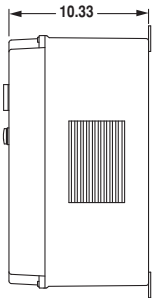



*Side View*

### *Dual Loop Mounting Dimensions*




*Front View*




*Side View*

## *Single Loop*

| Model | IntelliTRACE™ 10000 Series Line Sensing Heat Trace Panel |
|---|---|

**HTLSC1D2 Panel Configuration**

cUL, UL and CE Listed Single Loop Line Sensing Temperature/Monitor Heat Trace Panel. Factory pre-wired for quick installation. Includes: Solid State Relay, Current Transformer, High - Low Temperature Alarms, Low Current Alarm, On/Off or PID Control, Universal Sensor Inputs, Dual Digital Displays, Terminal Blocks for Field Connections, Remote Interlock, NEMA 4 rated Enclosure (16"H x 14"W x 8"D) for Indoor/Outdoor Applications. Options Include: Ground Fault Monitoring, Digital Communications and Enclosure Heater.

| Code | Single Loop Heat Trace Control |
|---|---|
| 1 | 30 Amp Rating |

| Code | Line Voltage (Single Phase) | Load Voltage (Single Phase) |
|---|---|---|
| 0 | 120 Vac | 120 Vac |
| 1 | 208 Vac | 208 Vac (240 Vac Cable) |
| 2 | 240 Vac | 240 Vac |
| 3 | 277 Vac | 277 Vac (240 Vac Cable) |
| 4 | 480 Vac | 480 Vac |

| Code | Controller |
|---|---|
| 0 | IntelliTRACE Controller |
| 1 | IntelliTRACE Controller with Communications |

| Code | Ground Fault Monitoring |
|---|---|
| 0 | None |
| 1 | Ground Fault Module (Includes Illuminated Reset switch) |

| Code | Enclosure Heater |
|---|---|
| 0 | None |
| 1 | Thermostat Controlled Enclosure Heater |

| | | | | | | |
|---|---|---|---|---|---|---|
| HTLSC1D2 | 1 | 0 | 0 | 0 | 0 | Typical Model Number |

## *Dual Loop*

| Model | IntelliTRACE™ 20000 Series Line Dual Loop Sensing Heat Trace Panel |
|---|---|

**HTLSC1D2 Panel Configuration**

cUL, UL and CE Listed Dual Loop Line/Ambient Sensing Temperature/Monitor Heat Trace Panel. Factory pre-wired for quick installation. Includes: Solid State Relay, Current Transformer, High - Low Temperature Alarms, Low Current Alarm, On/Off or PID Control, Universal Sensor Inputs, Dual Digital Displays, Terminal Blocks for Field Connections, Remote Interlock, NEMA 4X rated Enclosure (18"H x 16"W x 10"D) for Indoor/Outdoor Applications. Options Include: Ground Fault Monitoring, Digital Communications and Enclosure Heater.

| Code | Single Loop Heat Trace Control |
|---|---|
| 2 | 30 Amp Rating |

| Code | Line Voltage (Single Phase) | Load Voltage (Single Phase) |
|---|---|---|
| 0 | 120 Vac | 120 Vac |
| 1 | 208 Vac | 208 Vac (240 Vac Cable) |
| 2 | 240 Vac | 240 Vac |
| 3 | 277 Vac | 277 Vac (240 Vac Cable) |
| 4 | 480 Vac | 480 Vac |

| Code | Controller |
|---|---|
| 0 | IntelliTRACE Controller |
| 1 | IntelliTRACE Controller with Communications |

| Code | Ground Fault Monitoring |
|---|---|
| 0 | None |
| 1 | Ground Fault Module (Includes Illuminated Reset switch) |

| Code | Enclosure Heater |
|---|---|
| 0 | None |
| 1 | Thermostat Controlled Enclosure Heater |

| | | | | | | |
|---|---|---|---|---|---|---|
| HTLSC1D2 | 1 | 0 | 0 | 0 | 0 | Typical Model Number |

intelliTRACE®

# HTLS

## Heat Tracing Line Sensing Control Panel Series 8000/12000/24000

- Color Touchscreen Operator Panel
- Eight/Twelve/Twenty-Four Points of Independent On/Off Control
- NEMA 4 Enclosure
- High/Low Temperature Alarms
- Low Current Alarm with Adjustable Setpoint
- Ground Fault Alarming/Trip
- Open Sensor Alarm
- Common Alarm Output (Re-Ring Feature)
- Load Management
- Internal Power Distribution (Includes Circuit Breakers)
- 120, 240, 480, and 277 Vac
- Process Loop Identification
- Global Programming
- Auto-Cycle Feature
- Current Display
- Failed Sensor Output Setting
- Loop Enable/Disable
- Network Communications
- Hand/Off/Auto Selection
- Enclosure Heater Option for Sub-Zero Ambients
- Z-Purge Option for Operation in Class 1, Div. 2 Areas


### *Description*

The IntelliTRACE HTLS Series is a microprocessor based Control/Monitoring and Power Management/Distribution system for Heat Trace Applications.

The IntelliTRACE Multi-Channel Heat Trace System provides Alarms for High/Low temperature, continuity, ground fault leakage, and sensor faults. The Advanced Features include a Color Touchscreen Operator Interface Panel that provides simple programming with no keyboards or cryptic labels. The panel displays loop status, alarm conditions and graphics on process temperature, setpoints, and currents.

With the built-in power distribution, the IntelliTRACE multi-loop provides reduced material, installation, and maintenance costs. The load management feature eliminates the need for expensive ground fault breakers, limits inrush current and systematically interrogates all circuits for continuity, ground fault leakage, sensor faults, and temperature alarms.

### *Technical Specifications*

**Supply Voltage:** 120, 240, 480, and 277Vac, Three-Phase

**Operating Environment:** 32 to 120°F (0 to 40°C) -30 to 104°F (-34 to 40°C) with enclosure heater option

**Communications:** RS-485 MODBUS®

**Input:** RTD 100 Platinum Three-Wire

**Output:** Two-Pole Contactors

**Maximum Current:** 24 Amps/Ckt

**Temperature Alarms:** High/Low 2°F Deadband Non-Latching

**Ground Fault Alarm:** Adjustable 25 – 500mA Factory Set @ 30mA

**Low Current Alarm:** .2 to 24.0 Adjustable

**Load Management:** 15 sec. Non-Overlap to Reduce Inrush

**Auto-Cycle:** Programmable to 720 Hrs (30 days)

**Failed Sensor Output Setting:** 0-100%

**Control Mode:** On/Off with adjustable Deadband

# HTLS

## Heat Tracing Line Sensing Control Panel Series 8000/12000/24000 *(cont'd.)*



### *Ordering Information*

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

| Model | | | | | | |
|---|---|---|---|---|---|---|
| **HTLS** | **IntelliTRACE 8000 Series Line Sensing Heat Trace Panel** | | | | | |
| | Panel Configuration | | | | | |
| | cUL and UL Listed Eight Loop Line Sensing Temperature/Monitor Heat Trace Panel. Factory pre-wired for quick installation. Includes: Two-Pole Contactors, Current Transmitters, High-Low Temperature Alarms, On/Off Control, RTD Sensor Inputs, Ground Fault Indication or Shutdown, Common Alarm Output, Hand/Off/Auto, Loop Enable/Disable, Auto Cycle Feature, Color Touch Screen Programming, Low Current Alarm, Loop Tagging and NEMA 4 rated Enclosure (36"H x 30"W x 8"D) for Indoor/Outdoor Applications. Options Include: Cabinet Heater, Type Z Purge System. | | | | | |
| | **CODE** | **Eight Independent Loops of Heat Trace Control** | | | | |
| | **8** | | | | | |
| | **CODE** | **Line Voltage (Three Phase)** | **Line Voltage** | **Circuit Breakers (1/Loop)** | | |
| | **0** | 208/120 Vac, 3 Phase, 4 Wire | 120 Vac | 1-Pole | | |
| | **1** | 240 Vac, 3 Phase, 4 Wire | 240 Vac | 2-Pole | | |
| | **2** | 480/277 Vac, 3 Phase, 4 Wire | 277 Vac (240 Vac Cable) | 1-Pole | | |
| | **3** | 480 Vac, 3 Phase | 480 Vac | 2-Pole | | |
| | **4** | 208/120 Vac, 3 Phase, 4 Wire | 208 Vac (240 Vac Cable) | 2-Pole | | |
| | | **CODE** | **Circuit Breaker Rating** | | | |
| | | **1** | 15 Amp Thermal Magnetic | | | |
| | | **2** | 20 Amp Thermal Magnetic | | | |
| | | **3** | 30 Amp Thermal Magnetic | | | |
| | | | **CODE** | **Cabinet Heater** | | |
| | | | **0** | None | | |
| | | | **1** | Thermostat Controlled Enclosure Heater | | |
| | | | | **CODE** | **Pressurization Control System** | |
| | | | | **0** | None | |
| | | | | **1** | Type Z for Class I Division II Hazardous Location | |
| **HTLS** | **8** | **0** | **1** | **0** | **0** | **Typical Model Number** |

# HTLS

## Heat Tracing Line Sensing Control Panel Series 8000/12000/24000 *(cont'd.)*

### *Ordering Information*

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

**Model**

**HTLS** — **IntelliTRACE 12000 Series Line Sensing Heat Trace Panel**

**Panel Configuration**

cUL and UL Listed Twelve Loop Line Sensing Temperature/Monitor Heat Trace Panel. Factory pre-wired for quick installation. Includes: Two-Pole Contactors, Current Transmitters, High-Low Temperature Alarms, On/Off Control, RTD Sensor Inputs, Ground Fault Indication or Shutdown, Common Alarm Output, Hand/Off/Auto, Loop Enable/Disable, Auto Cycle Feature, Color Touch Screen Programming, Low Current Alarm, Loop Tagging and NEMA 4 rated Enclosure (48"H x 36"W x 10"D) for Indoor/Outdoor Applications. Options Include: Cabinet Heater, Type Z Purge System.

| CODE | Twelve Independent Loops of Heat Trace Control |
|---|---|
| 12 | |

| CODE | Line Voltage (Three Phase) | Line Voltage | Circuit Breakers (1/Loop) |
|---|---|---|---|
| 0 | 208/120 Vac, 3 Phase, 4 Wire | 120 Vac | 1-Pole |
| 1 | 240 Vac, 3 Phase, 4 Wire | 240 Vac | 2-Pole |
| 2 | 480/277 Vac, 3 Phase, 4 Wire | 277 Vac (240 Vac Cable) | 1-Pole |
| 3 | 480 Vac, 3 Phase | 480 Vac | 2-Pole |
| 4 | 208/120 Vac, 3 Phase, 4 Wire | 208 Vac (240 Vac Cable) | 2-Pole |

| CODE | Circuit Breaker Rating |
|---|---|
| 1 | 15 Amp Thermal Magnetic |
| 2 | 20 Amp Thermal Magnetic |
| 3 | 30 Amp Thermal Magnetic |

| CODE | Cabinet Heater |
|---|---|
| 0 | None |
| 1 | Thermostat Controlled Enclosure Heater |

| CODE | Pressurization Control System |
|---|---|
| 0 | None |
| 1 | Type Z for Class I Division II Hazardous Location |

| | | | | | | |
|---|---|---|---|---|---|---|
| HTLS | 12 | 0 | 1 | 0 | 0 | Typical Model Number |

# HTLS

## Heat Tracing Line Sensing Control Panel Series 8000/12000/24000 *(cont'd.)*



### *Ordering Information*

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

**Model**

**HTLS** **IntelliTRACE 24000 Series Line Sensing Heat Trace Panel**

**Panel Configuration**

cUL and UL Listed Twenty-Four Loop Line Sensing Temperature/Monitor Heat Trace Panel. Factory pre-wired for quick installation. Includes: Two-Pole Contactors, Current Transmitters, High-Low Temperature Alarms, On/Off Control, RTD Sensor Inputs, Ground Fault Indication or Shutdown, Common Alarm Output, Hand/Off/Auto, Loop Enable/Disable, Auto Cycle Feature, Color Touch Screen Programming, Low Current Alarm, Loop Tagging and NEMA 4 rated Enclosure (62"H x 60"W x 12"D) for Indoor/Outdoor Applications. Options Include: Enclosure Heater, Type Z Purge System.

| CODE | Twenty-Four Independent Loops of Heat Trace Control |
|---|---|
| 24 | |

| CODE | Line Voltage (Three Phase) | Line Voltage | Circuit Breakers (1/Loop) |
|---|---|---|---|
| 0 | 208/120 Vac, 3 Phase, 4 Wire | 120 Vac | 1-Pole |
| 1 | 240 Vac, 3 Phase, 4 Wire | 240 Vac | 2-Pole |
| 2 | 480/277 Vac, 3 Phase, 4 Wire | 277 Vac (240 Vac Cable) | 1-Pole |
| 3 | 480 Vac, 3 Phase | 480 Vac | 2-Pole |
| 4 | 208/120 Vac, 3 Phase, 4 Wire | 208 Vac (240 Vac Cable) | 2-Pole |

| CODE | Circuit Breaker Rating |
|---|---|
| 1 | 15 Amp Thermal Magnetic |
| 2 | 20 Amp Thermal Magnetic |
| 3 | 30 Amp Thermal Magnetic |

| CODE | Cabinet Heater |
|---|---|
| 0 | None |
| 1 | Thermostat Controlled Enclosure Heater |

| CODE | Pressurization Control System |
|---|---|
| 0 | None |
| 1 | Type Z for Class I Division II Hazardous Location |

| | | | | | | |
|---|---|---|---|---|---|---|
| **HTLS** | **24** | **0** | **1** | **0** | **0** | **Typical Model Number** |

intelliTRACE®

# HTAS

## Heat Tracing Ambient Sensing Control Panel Series 8000/12000/24000

- **Color Touchscreen Operator Panel**
- **Eight/Twelve/Twenty-Four Points of Power Control**
- **Optional Ambient Sensing Controller**
- **NEMA 4 Enclosure**
- **Low Current Alarm with Adjustable Setpoint**
- **Ground Fault Alarming/Trip**
- **Common Alarm Output (Re-Ring Feature)**
- **Load Management**
- **Process Loop Identification**
- **Internal Power Distribution (Includes Circuit Breakers)**
- **120, 240, 480, and 277 Vac**
- **Auto-Cycle Feature**
- **Current Display**
- **Network Communications**
- **Hand/Off/Auto Selection**
- **Enclosure Heater Option for Sub-Zero Ambients**
- **Z-Purge Option for Operation in Class I, Div. 2 Areas**

### *Description*

The IntelliTRACE HTAS Series is a microprocessor based Monitoring and Power Management/Distribution system for Heat Trace Applications.

The IntelliTRACE Multi-Channel Heat Trace System provides Alarms for Continuity, and Ground Fault Leakage. The Advanced Features include a Color Touchscreen Operator Interface Panel that provides simple programming with no keyboards or cryptic labels. The panel displays loop status, alarm conditions and graphics on currents.

With the built-in power distribution, the IntelliTRACE multi-loop provides **reduced material, installation, and maintenance costs.** The load management feature eliminates the need for expensive ground fault breakers, limits inrush current and systematically interrogates all circuits for continuity and ground fault leakage.

### *Technical Specifications*

**Supply Voltage:** 120, 240, 480, and 277Vac, Three-Phase

**Operating Environment:** 32 to 120°F (0 to 40°C) -30 to 104°F (-34 to 40°C) with enclosure heater option

**Communications:** RS-485 MODBUS®

**Output:** Two-Pole Contactors

**Maximum Current:** 24 Amps/Ckt

**Ground Fault Alarm:** Adjustable 25 – 500mA Factory Set @ 30mA

**Low Current Alarm:** .2 - 24.0 Adjustable

**Load Management:** 15 sec. Non-Overlap to Reduce Inrush.

**Auto-Cycle:** Programmable to 720 Hrs (30 days)

**Control Mode:** Optional Ambient Sensing Controller.

# HTAS

## Heat Tracing Ambient Sensing Control Panel Series 8000/12000/24000 *(cont'd.)*



### *Ordering Information*

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

**Model**

**HTAS** **IntelliTRACE 8000 Series Ambient Sensing Heat Trace Panel**

Panel Configuration

cUL and UL Listed Eight Loop Ambient Sensing Temperature/Monitor Heat Trace Panel. Factory pre-wired for quick installation. Includes: Two-Pole Contactors, Current Transmitters, Ground Fault Indication or Shutdown, Continuity Alarms, Common Alarm Output, Loop Enable/Disable, Hand/Off/Auto, Auto Cycle Feature, Thermal Magnetic Circuit Breakers, Color Touch Screen Programming, Low Current Alarm,Loop Tagging NEMA 4 rated Enclosure (36" x 30"W x 8"D) for Indoor/Outdoor Applications. Options Include: Cabinet Heater, Type Z Purge System and Optional Ambient Temperature Sensing Controllers.

| CODE | Eight Zones of Monitored Power Control |
|---|---|
| 8 | |

| CODE | Line Voltage (Three Phase) | Load Voltage | Circuit Breakers (1/Loop) |
|---|---|---|---|
| 0 | 208/120 Vac 3-Phase, 4-Wire | 120 Vac | 1-Pole |
| 1 | 2240 Vac 3-Phase | 240 Vac | 2-Pole |
| 2 | 480/277 Vac 3-Phase, 4-Wire | 277 Vac (240 Vac Cable) | 1-Pole |
| 3 | 480 Vac 3-Phase | 480 Vac | 2-Pole |
| 4 | 208/120 Vac 3-Phase, 4-Wire | 208 Vac (240 Vac Cable) | 2-Pole |

| CODE | Circuit Breaker Selection |
|---|---|
| 1 | 15 Amp Thermal Magnetic |
| 2 | 20 Amp Thermal Magnetic |
| 3 | 30 Amp Thermal Magnetic |

| CODE | Cabinet Heater |
|---|---|
| 0 | None |
| 1 | Thermostat Controlled Cabinet Heater |

| CODE | Ambient Sensing Controller |
|---|---|
| 0 | None (Remote Mounted). |
| 1 | 1601E-11030 |
| 2 | 1603E-11030 |

| CODE | Pressurization Control System |
|---|---|
| 0 | None |
| 1 | Type Z for Class I Division II Hazardous Location |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **HTAS** | **8** | **0** | **1** | **0** | **0** | **0** | **Typical Model Number** |

# HTAS

## Heat Tracing Ambient Sensing Control Panel Series 8000/12000/24000 *(cont'd.)*

### *Ordering Information*

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

**Model**

**HTAS** **IntelliTRACE 12000 Ambient Sensing Heat Trace Panel**

Panel Configuration

cUL and UL Listed Twelve Loop Ambient Sensing Temperature/Monitor Heat Trace Panel. Factory pre-wired for quick installation. Includes: Two-Pole Contactors, Current Transmitters, Ground Fault Indication or Shutdown, Continuity Alarms, Common Alarm Output, Loop Enable/Disable, Hand/Off/Auto, Auto Cycle Feature, Thermal Magnetic Circuit Breakers, Color Touch Screen Programming, Low Current Alarm, Loop Tagging, NEMA 4 rated Enclosure (48" x 36"W x 10"D) for Indoor/Outdoor Applications. Options Include: Cabinet Heater, Type Z Purge System and Optional AmbientTemperature Sensing Controllers.

| CODE | Twelve Zones of Monitored Power Control |
|---|---|
| 12 | |

| CODE | Line Voltage (Three Phase) | Load Voltage | Circuit Breakers (1/Loop) |
|---|---|---|---|
| 0 | 208/120 Vac 3-Phase, 4-Wire | 120 Vac | 1-Pole |
| 1 | 2240 Vac 3-Phase | 240 Vac | 2-Pole |
| 2 | 480/277 Vac 3-Phase, 4-Wire | 277 Vac (240 Vac Cable) | 1-Pole |
| 3 | 480 Vac 3-Phase | 480 Vac | 2-Pole |
| 4 | 208/120 Vac 3-Phase, 4-Wire | 208 Vac (240 Vac Cable) | 2-Pole |

| CODE | Circuit Breaker Rating |
|---|---|
| 1 | 15 Amp Thermal Magnetic |
| 2 | 20 Amp Thermal Magnetic |
| 3 | 30 Amp Thermal Magnetic |

| CODE | Cabinet Heater |
|---|---|
| 0 | None |
| 1 | Thermostat Controlled Cabinet Heater |

| CODE | Ambient Sensing Controller |
|---|---|
| 0 | None (Remote Mounted) |
| 1 | 1601E-11030 |
| 2 | 1603E-11030 |

| CODE | Pressurization Control System |
|---|---|
| 0 | None |
| 1 | Type Z for Class I Division II Hazardous Location |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **HTAS** | **12** | **0** | **1** | **0** | **0** | **0** | **Typical Model Number** |

# HTAS

## Heat Tracing Ambient Sensing Control Panel Series 8000/12000/24000 *(cont'd.)*



### *Ordering Information*

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

**Model**

**HTAS** **IntelliTRACE 24000 Series Ambient Sensing Heat Trace Panel**

Panel Configuration

cUL and UL Listed Twenty-Four Loop Ambient Sensing Temperature/Monitor Heat Trace Panel. Factory pre-wired for quick installation. Includes: Two-Pole Contactors, Current Transmitters, Ground Fault Indication or Shutdown, Continuity Alarms, Common Alarm Output, Loop Enable/Disable, Hand/Off/Auto, Auto Cycle Feature, Thermal Magnetic Circuit Breakers, Color Touch Screen Programming, Low Current Alarm, Loop Tagging, NEMA 4 rated Enclosure (62"x 60"W x 12"D) for Indoor/Outdoor Applications. Options Include: Cabinet Heater, Type Z Purge System and Optional Ambient Temperature Sensing Controllers.

| CODE | Twenty-Four Zones of Monitored Power Control |
|---|---|
| 24 | |

| CODE | Line Voltage (Three Phase) | Load Voltage | Circuit Breakers (1/Loop) |
|---|---|---|---|
| 0 | 208/120 Vac 3-Phase, 4-Wire | 120 Vac | 1-Pole |
| 1 | 2240 Vac 3-Phase | 240 Vac | 2-Pole |
| 2 | 480/277 Vac 3-Phase, 4-Wire | 277 Vac (240 Vac Cable) | 1-Pole |
| 3 | 480 Vac 3-Phase | 480 Vac | 2-Pole |
| 4 | 208/120 Vac 3-Phase, 4-Wire | 208 Vac (240 Vac Cable) | 2-Pole |

| CODE | Circuit Breaker Rating |
|---|---|
| 1 | 15 Amp Thermal Magnetic |
| 2 | 20 Amp Thermal Magnetic |
| 3 | 30 Amp Thermal Magnetic |

| CODE | Cabinet Heater |
|---|---|
| 0 | None |
| 1 | Thermostat Controlled Cabinet Heater |

| CODE | Ambient Sensing Controller |
|---|---|
| 0 | None (Remote Mounted) |
| 1 | 1601E-11030 |
| 2 | 1603E-11030 |

| CODE | Pressurization Control System |
|---|---|
| 0 | None |
| 1 | Type Z for Class I Division II Hazardous Location |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **HTAS** | **24** | **0** | **1** | **0** | **0** | **0** | **Typical Model Number** |

# weatherTRACE™

## Freeze Protection Heat Trace Panels

- **Standard NEMA 4 Enclosures**
- **NEMA 4X Stainless Steel Enclosure Option**
- **Hand/Off/Auto Selector Switch**
- **12, 18, 20, 30, and 42 Position Panelboards**
- **15, 25, 30, and 40 Amp Single-pole and Double-pole 30 mA Ground Fault Thermal-Magnetic Circuit Breakers**
- **100 and 225 Amp Main Bus**
- **Single-phase 120/240 Vac**
- **Three-phase 120/208 Vac 4-Wire**
- **Three-phase 277 Vac 4-Wire**
- **100 and 250 Amp Main Disconnect Switch Option**
- **Ambient and Line Sensing Control**
- **WeatherTrace Sentinel Monitoring with Common Alarm and Re-Ring Feature***
- **Z-Purge Pressurization System for Class 1, Division 2 Option**
- **Enclosure Heater Option for Subzero Ambients**
- **UL and cUL Third Party Approvals**

* The re-ring feature allows the WeatherTrace panel to communicate additional alarm condidtions in the system by momentarily clearing and resetting the alarm output contact. The customer's monitoring device such as a PLC or DCS would interpret this condition to alert the operators of an additional alarm occurring.

*FPASM Model Shown*

### *Description*

The Chromalox FPAS, FPLS, FPASM, and FPLSM series freeze protection heat trace panels offer power-distribution, ground-fault protection, individual circuit alarming, line and ambient sensing control.

The panels are housed in NEMA 4 enclosures for indoor/outdoor applications. NEMA 4X 304 stainless steel enclosures may be selected as an option for more harsh environments.

The standard models are available in 12, 18, 20, 30, and 42 position panelboards with 100 and 225 amp bus ratings in Single and Three-Phase configurations.

Branch circuit breakers are available in 20, 25, 30, and 40 amp single-pole and two-pole configurations with 30 mA ground-fault equipment protection.

**FPAS – Freeze Protection Ambient Sensing Series**
The FPAS series controls multiple heat trace circuits via an ambient sensing external thermostat, external electronic controller or via an ambient sensing, door mounted 1601E controller. Chromalox recommended controllers include: RTAS, RTAS-EP, B100, E100 or the 1601E microprocessor controller.

The FPAS may be operated in two modes; automatically with the external controller, or in manual override via the Hand/Off/Auto selector switch.

**FPLS – Freeze Protection Line Sensing Monitor Series**
The FPLS series controls each heat trace line with individual Chromalox RTBC, RTBC-EP, E-100 or E121 pipe line sensing controls. Each circuit should be controlled by an individual sensor/controller. Depending on the application, controllers can switch more that one circuit.

**FPASM – Freeze Protection Ambient Sensing Monitor Series**

The FPASM WeatherTrace with the Sentinel System, continually monitors the supply voltage to each individual heat trace circuit. Loss of voltage or a ground fault condition will trigger an automatic alarm condition, alerting plant personnel of critical process problems and reducing downtime. An annunciator panel then identifies the faulted zone and a Common Alarm is activated with the re-ring feature.*

The FPASM series controls multiple heat trace circuits via an ambient sensing external thermostat, external electronic controller or via an ambient sensing, door mounted 1601E controller. Chromalox recommended controllers include: RTAS, RTAS-EP, B100, E100 or the 1601E microprocessor controller.

The FPASM may be operated in two modes; automatically with the external controller or in manual override via the Hand/Off/Auto selector switch.

**FPLSM – Freeze Protection Line Sensing Monitor Series**
The FPLSM series controls heat trace lines with individual Chromalox RTBC, RTBC-EP, E100 or E121 pipe line sensing controls. Each circuit should be controlled by and individual sensor/controller. Depending on the application, controllers can switch more that one circuit.

The FPLSM is identical to the FPLS Plug. It features the WeatherTrace Sentinel which continually monitors the supply voltage to each individual heat trace circuit without the need for additional staff. Loss of voltage or a ground fault condition triggers an automatic alarm condition, alerting plant personnel of critical process problems and reducing downtime. An annunciator panel then identifies the faulted zone and a Common Alarm is activated with the re-ring feature.*

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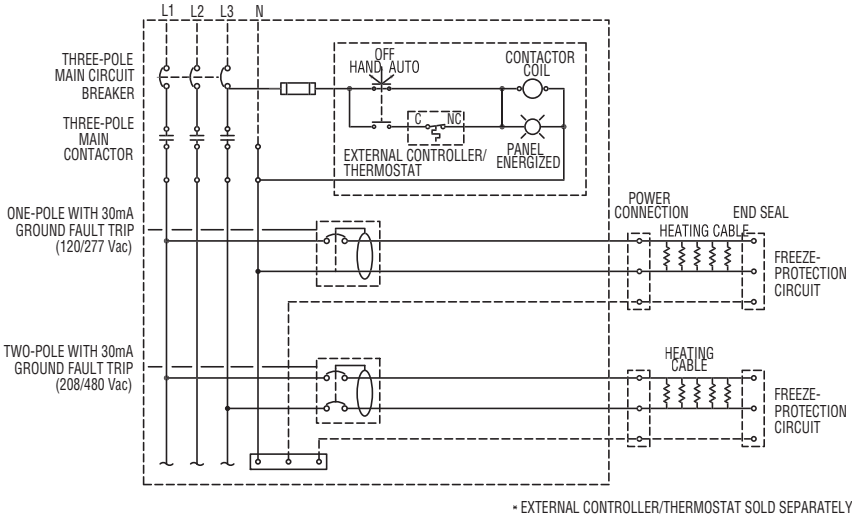
# Freeze Protection Heat Trace Panels *(cont'd.)*



## *Specifications*

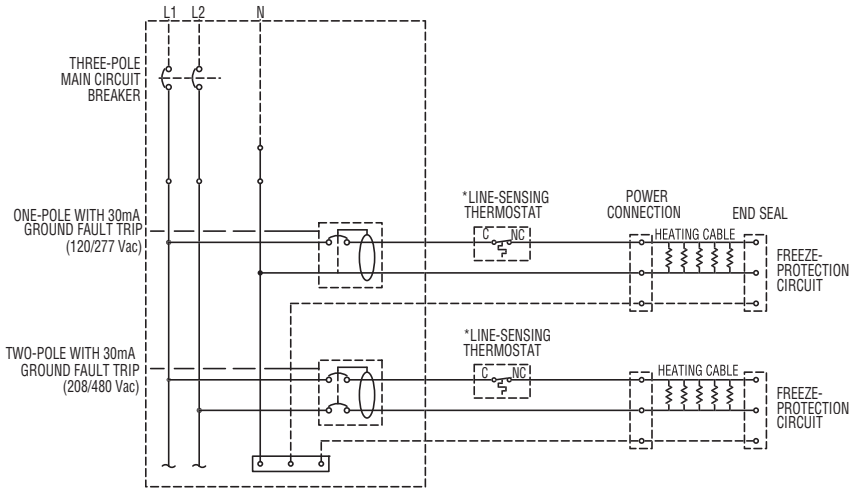
| | |
|---|---|
| **Power Source** | 120/240 Vac Single Phase<br>120/208 Vac Three-Phase 4-Wire<br>277/480 Vac Three-Phase 4-Wire |
| **Ambient Operating Temperature** | -32˚F to 122˚F (With Enclosure Heater) |
| **Field Wire Size** | 14 - 18 AWG (15 - 30 Amp C.B), 8 - 4 AWG (40 Amp C.B) |
| **Ground Fault Breaker Type** | 30mA Ground Fault Equipment Protection |
| **Enclosure** | NEMA 4 or NEMA 4X 304 Stainles Steel (option) |
| **Main Bus Size** | 100 Amp and 225 Amp |
| **Main Breaker Size** | 100 Amp Two-Pole Main Disconnect Switch with through Door Rotary Handle<br>250 Amp Three-Pole Main Disconnect Switch with through Door Rotary Handle |
| **Pressurization System** | Type Z Purge Pressurization System for Class 1 Division 2 Area |
| **Approvals** | UL and cUL |




* EXTERNAL CONTROLLER/THERMOSTAT SOLD SEPARATELY

*Ambient Sensing*
*Three Phase*
*208/120 4-Wire or 480/277 4-Wire*

*Line Sensing*
*Single Phase*
*240/120*




*EXTERNAL CONTROLLER/THERMOSTAT SOLD SEPARATELY

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# Freeze Protection Heat Trace Panels *(cont'd.)*

## *Ordering Information*

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

**Model** **240/120 Vac Single-Phase, 208/120 Vac Three-Phase 4-Wire**

**FPAS** FPAS series Ambient Sensing Heat Trace Panels are designed for use in industrial Freeze Protection and Snow Melt applications. The Chromalox FPAS series offers the following standard features: NEMA 4 enclosure, Hand/Off/Auto Selector Switch, Load Energized Indicator Lamp, Main Power On Lamp, Main Contactor, and Thermal Magnetic Branch Circuit Breakers with 30mA Ground Fault Equipment Protection. Options include: NEMA 4X 304 Stainless Steel Enclosures, Main Disconnect Switch, Remote or Local Ambient Temperature Controller, Enclosure Heater, and Type Z Pressurization System. The FPAS series panels have UL and cUL Third Party Approvals.

| Code | Panelboard | Available Breaker Poles |
|---|---|---|
| 12 | 12 Positions (100 Amp Main Rating) | (12) 1-pole breakers or (6) 2-pole Breakers |
| 20 | 20 Positions (100 Amp Main Rating) | (20) 1-pole breakers or (10) 2-pole Breakers |
| 30 | 30 Positions (225 Amp Main Rating) | (30) 1-pole breakers or (14) 2-pole Breakers |
| 42 | 42 Positions (225 Amp Main Rating) | (42) 1-pole breakers or (20) 2-pole Breakers |

| Code | Line Voltage | Heater Load | Breaker Poles |
|---|---|---|---|
| 1 | 120 Vac | 120 Vac | 1 |
| 2 | 208/120 Vac 3-Phase, 4-Wire | 120 Vac | 1 |
| 3 | 208/120 Vac 3-Phase, 4-Wire | 208 Vac (240 Vac Cable) | 2 |
| 4 | 240-120 Vac 3-Phase | 240 Vac | 2 |

| Code | Enclosure 48"H x 36"W x 10"D (Codes 12 & 20), 60"H x 36"W x 10"D (Codes 30 & 42) |
|---|---|
| 1 | NEMA 4 Single Door, Steel Wall-Mount Enclosure |
| 2 | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 12 & 20) |
| 3 | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 30 & 42) |

| Code | Ground Fault Branch Circuit Breaker (see table for maximum number of circuit breakers allowed) |
|---|---|
| 1(*) | 15 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| 2(*) | 20 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| 3(*) | 25 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| 4(*) | 30 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| 5(*) | 15 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |
| 6(*) | 20 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |
| 7(*) | 25 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |
| 8(*) | 30 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |
| 9(*) | 40 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |

| Code | Main Disconnect Switch Selection |
|---|---|
| 0 | None |
| 1 | 100 Amp with 65k Fault Protection (Code 12 & 20 Only) |
| 2 | 250 Amp with 65k Fault Protection (Code 30 & 42 Only) |

| Code | Ambient Controller |
|---|---|
| 0 | None (See Accessories) |
| 5 | 1601E-11030 1/16 DIN Controller (Panel Door Mounted) |

| Code | Enclosure Heater |
|---|---|
| 0 | None |
| 1 | Thermostat Controlled Enclosure Heater |

| Code | Pressurization Control System |
|---|---|
| 0 | None |
| 1 | Type Z Class 1, Division 2 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **FPAS** | **42** | **2** | **1** | **1(20)** | **2** | **5** | **0** | **0** | **Typical Model Number (FPAS-42211(20)2500)** |

**Technical Notes:**
(*) Enter number of circuit breakers in parenthesis

**Note:** Maximum number of circuit breakers is dependent on the panelboard size (see panelboard selection) and the current capacity of the panelboard (see table below)

| Remote Mounted Control Accessories | PCN |
|---|---|
| RTAS Thermostat | 389589 |
| RTAS-EP Division 2 Thermostat | 389597 |
| B-100 NEMA 4X Thermostat | 305365 |
| E-100 NEMA Division 1 Thermostat | 305322 |
| LCD-1 Snow Switch | 389781 |

| 100 Amp Panel Board | Breaker Rating | | | | | 225 Panel Board | Breaker Rating | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum Number of Breakers | | | | | | Maximum Number of Breakers | | | | |
| Line Voltage | 15 Amp | 20 Amp | 25 Amp | 30 Amp | 40 Amp | Line Voltage | 15 Amp | 20 Amp | 25 Amp | 30 Amp | 40 Amp |
| Code 1 (1 Pole CB) | 16 | 12 | 10 | 8 | | Code 1 (1 Pole CB) | 37 | 28 | 22 | 18 | |
| Code 2 (1 Pole CB) | 20 | 18 | 15 | 12 | | Code 2 (1 Pole CB) | 42 | 42 | 33 | 28 | |
| Code 3 (2 Pole CB) | 10 | 10 | 8 | 7 | 5 | Code 3 (2 Pole CB) | 20 | 20 | 19 | 16 | 14 |
| Code 4 (2 Pole CB) | 8 | 6 | 5 | 4 | 3 | Code 4 (2 Pole CB) | 18 | 14 | 11 | 9 | 7 |

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# Freeze Protection Heat Trace Panels *(cont'd.)*



## *Ordering Information*

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

| Model | 240/120 Vac Single-Phase, 208/120 Vac Three-Phase 4-Wire |
|---|---|
| **FPLS** | FPLS series Line Sensing Heat Trace Panels are designed for use in industrial Freeze Protection and Snow Melt applications. The Chromalox FPLS series offers the following standard features: NEMA 4 enclosure, Main Power On Lamp and Thermal Magnetic Branch Circuit Breakers with 30mA Ground Fault Equipment Protection. Options include: NEMA 4X 304 Stainless Steel Enclosures, Main Disconnect Switch, Enclosure Heater, and Type Z Pressurization System. The FPLS series panels have UL and cUL Third Party Approvals. |

| Code | Panelboard | Available Breaker Poles |
|---|---|---|
| **12** | 12 Positions (100 Amp Main Rating) | (12) 1-pole breakers or (6) 2-pole Breakers |
| **20** | 20 Positions (100 Amp Main Rating) | (20) 1-pole breakers or (10) 2-pole Breakers |
| **30** | 30 Positions (225 Amp Main Rating) | (30) 1-pole breakers or (14) 2-pole Breakers |
| **42** | 42 Positions (225 Amp Main Rating) | (42) 1-pole breakers or (20) 2-pole Breakers |

| Code | Line Voltage | Heater Load | Breaker Poles |
|---|---|---|---|
| **1** | 120 Vac | 120 Vac | 1 |
| **2** | 208/120 Vac 3-Phase, 4-Wire | 120 Vac | 1 |
| **3** | 208/120 Vac 3-Phase, 4-Wire | 208 Vac (240 Vac Cable) | 2 |
| **4** | 240-120 Vac 3-Phase | 240 Vac | 2 |

| Code | Enclosure 48"H x 36"W x 10"D (Codes 12 & 20), 60"H x 36"W x 10"D (Codes 30 & 42) |
|---|---|
| **1** | NEMA 4 Single Door, Steel Wall-Mount Enclosure |
| **2** | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 12 & 20) |
| **3** | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 30 & 42) |

| Code | Ground Fault Branch Circuit Breaker (see table for maximum number of circuit breakers allowed) |
|---|---|
| **1(*)** | 15 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| **2(*)** | 20 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| **3(*)** | 25 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| **4(*)** | 30 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| **5(*)** | 15 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |
| **6(*)** | 20 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |
| **7(*)** | 25 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |
| **8(*)** | 30 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |

| Code | Main Disconnect Switch Selection |
|---|---|
| **0** | None |
| **1** | 100 Amp with 65k Fault Protection (Code 12 & 20 Only) |
| **2** | 250 Amp with 65k Fault Protection (Code 30 & 42 Only) |

| Code | Enclosure Heater |
|---|---|
| **0** | None |
| **1** | Thermostat Controlled Enclosure Heater |

| Code | Pressurization Control System |
|---|---|
| **0** | None |
| **1** | Type Z Class 1, Division 2 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **FPLS** | **20** | **1** | **1** | **1(4)** | **1** | **0** | **0** | **Typical Model Number (FPLS-20111(4)100)** |

**Technical Notes:**
(*) Enter number of circuit breakers in parenthesis

**Note:** Maximum number of circuit breakers is dependent on the panelboard size (see panelboard selection) and the current capacity of the panelboard (see table below)

| 100 Amp Panel Board | Breaker Rating | | | | 225 Panel Board | Breaker Rating | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Maximum Number of Breakers | | | | | Maximum Number of Breakers | | | |
| Line Voltage | 15 Amp | 20 Amp | 25 Amp | 30 Amp | Line Voltage | 15 Amp | 20 Amp | 25 Amp | 30 Amp |
| Code 1 (1 Pole CB) | 16 | 12 | 10 | 8 | Code 1 (1 Pole CB) | 37 | 28 | 22 | 18 |
| Code 2 (1 Pole CB) | 20 | 18 | 15 | 12 | Code 2 (1 Pole CB) | 42 | 42 | 33 | 28 |
| Code 3 (2 Pole CB) | 10 | 10 | 8 | 7 | Code 3 (2 Pole CB) | 20 | 20 | 19 | 16 |
| Code 4 (2 Pole CB) | 8 | 6 | 5 | 4 | Code 4 (2 Pole CB) | 18 | 14 | 11 | 9 |

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## Freeze Protection Heat Trace Panels *(cont'd.)*

**Model** **FPASM Featuring WeatherTrace Sentinel (120, 208, 240 Vac)**

**FPASM** FPASM Series Ambient Sensing Heat Trace Panels are designed for use in industrial Freeze Protection and Snow Melt applications. The Chromalox FPASM series offers the following standard features: NEMA 4 enclosure, Hand/Off/Auto Selector Switch, Load Energized Indicator Lamp, Main Power On Lamp, Main Contactor, and Thermal Magnetic Branch Circuit Breakers with 30mA Ground Fault Equipment Protection. The FPASM WeatherTrace Sentinel continually monitors the supply voltage to each individual heat trace circuit. Loss of voltage or a ground fault condition triggers an automatic alarm condition to an annunciator panel which identifies the faulted zone and a Common Alarm is activated with the Re-Ring feature. Options include: NEMA 4X 304 Stainless Steel Enclosures, Main Disconnect Switch, Remote or Local Ambient Temperature Controller, Enclosure Heater, and Type Z Pressurization System. The FPASM series panels have UL and cUL Third Party Approvals.

### *Ordering Information*

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

| Code | Panelboard | Available Breaker Poles |
|---|---|---|
| **12** | 12 Positions (100 Amp Main Rating) | (12) 1-pole breakers or (6) 2-pole Breakers |
| **20** | 20 Positions (100 Amp Main Rating) | (20) 1-pole breakers or (10) 2-pole Breakers |
| **30** | 30 Positions (225 Amp Main Rating) | (30) 1-pole breakers or (14) 2-pole Breakers |
| **42** | 42 Positions (225 Amp Main Rating) | (42) 1-pole breakers or (20) 2-pole Breakers |

| Code | Line Voltage | Heater Load | Breaker Poles |
|---|---|---|---|
| **1** | 120 Vac | 120 Vac | 1 |
| **2** | 208/120 Vac 3-Phase, 4-Wire | 120 Vac | 1 |
| **3** | 208/120 Vac 3-Phase, 4-Wire | 208 Vac (240 Vac Cable) | 2 |
| **4** | 240-120 Vac 3-Phase | 240 Vac | 2 |

| Code | Enclosure 48"H x 36"W x 10"D (Codes 12 & 20), 60"H x 36"W x 10"D (Codes 30 & 42) |
|---|---|
| **1** | NEMA 4 Single Door, Steel Wall-Mount Enclosure |
| **2** | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 12 & 20) |
| **3** | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 30 & 42) |

| Code | Ground Fault Branch Circuit Breaker (see table for maximum number of circuit breakers allowed) |
|---|---|
| **1(*)** | 15 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| **2(*)** | 20 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| **3(*)** | 25 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| **4(*)** | 30 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| **5(*)** | 15 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |
| **6(*)** | 20 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |
| **7(*)** | 25 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |
| **8(*)** | 30 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |
| **9(*)** | 40 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |

| Code | Main Disconnect Switch Selection |
|---|---|
| **0** | None |
| **1** | 100 Amp with 65k Fault Protection (Code 12 & 20 Only) |
| **2** | 250 Amp with 65k Fault Protection (Code 30 & 42 Only) |

| Code | Ambient Controller |
|---|---|
| **0** | None (See Accessories) |
| **5** | 1601E-11030 1/16 DIN Controller (Panel Door Mounted) |

| Code | Enclosure Heater |
|---|---|
| **0** | None |
| **1** | Thermostat Controlled Enclosure Heater |

| Code | Pressurization Control System |
|---|---|
| **0** | None |
| **1** | Type Z Class 1, Division 2 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **FPASM** | **42** | **2** | **1** | **5(20)** | **2** | **5** | **0** | **0** | **Typical Model Number (FPASM-42215(20)2500)** |

**Technical Notes:**
(*) Enter number of circuit breakers in parenthesis

**Note:** Maximum number of circuit breakers is dependent on the panelboard size (see panelboard selection) and the current capacity of the panelboard (see table below)

| Remote Mounted Control Accessories | PCN |
|---|---|
| RTAS Thermostat | 389589 |
| RTAS-EP Division 2 Thermostat | 389597 |
| B-100 NEMA 4X Thermostat | 305365 |
| E-100 NEMA Division 1 Thermostat | 305322 |
| LCD-1 Snow Switch | 389781 |

| 100 Amp Panel Board | Breaker Rating | | | | | 225 Panel Board | Breaker Rating | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum Number of Breakers | | | | | | Maximum Number of Breakers | | | | |
| Line Voltage | 15 Amp | 20 Amp | 25 Amp | 30 Amp | 40 Amp | Line Voltage | 15 Amp | 20 Amp | 25 Amp | 30 Amp | 40 Amp |
| Code 1 (1 Pole CB) | 16 | 12 | 10 | 8 | | Code 1 (1 Pole CB) | 37 | 28 | 22 | 18 | |
| Code 2 (1 Pole CB) | 20 | 18 | 15 | 12 | | Code 2 (1 Pole CB) | 42 | 42 | 33 | 28 | |
| Code 3 (2 Pole CB) | 10 | 10 | 8 | 7 | 5 | Code 3 (2 Pole CB) | 20 | 20 | 19 | 16 | 14 |
| Code 4 (2 Pole CB) | 8 | 6 | 5 | 4 | 3 | Code 4 (2 Pole CB) | 18 | 14 | 11 | 9 | 7 |

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# Freeze Protection Heat Trace Panels *(cont'd.)*



## *Ordering Information*

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

**Model** **FPLSM featuring WeatherTrace Sentinel (120, 208; 240 Vac)**

**FPLSM** FPLSM Series Line Sensing Heat Trace Panels are designed for use in industrial Freeze Protection and Snow Melt applications. The Chromalox FPLSM series offers the following standard features: NEMA 4 enclosure, Main Power On Lamp, and Thermal Magnetic Branch Circuit Breakers with 30mA Ground Fault Equipment Protection. The FPLSM WeatherTrace Sentinel continually monitors the supply voltage to each individual heat trace circuit. Loss of voltage or a ground fault condition triggers an automatic alarm condition to an annunciator panel which identifies the faulted zone and a Common Alarm is activated with the Re-Ring feature. Options include: NEMA 4X 304 Stainless Steel Enclosures, Main Disconnect Switch, Cabinet Heater, and Type Z Pressurization System. The FPLSM series panels have UL and cUL Third Party Approvals.

| Code | Panelboard | Available Breaker Poles |
|---|---|---|
| **12** | 12 Positions (100 Amp Main Rating) | (12) 1-pole breakers or (6) 2-pole Breakers |
| **20** | 20 Positions (100 Amp Main Rating) | (20) 1-pole breakers or (10) 2-pole Breakers |
| **30** | 30 Positions (225 Amp Main Rating) | (30) 1-pole breakers or (14) 2-pole Breakers |
| **42** | 42 Positions (225 Amp Main Rating) | (42) 1-pole breakers or (20) 2-pole Breakers |

| Code | Line Voltage | Heater Load | Breaker Poles |
|---|---|---|---|
| **1** | 120 Vac | 120 Vac | 1 |
| **2** | 208/120 Vac 3-Phase, 4-Wire | 120 Vac | 1 |
| **3** | 208/120 Vac 3-Phase, 4-Wire | 208 Vac (240 Vac Cable) | 2 |
| **4** | 240-120 Vac 3-Phase | 240 Vac | 2 |

| Code | Enclosure 48"H x 36"W x 10"D (Codes 12 & 20), 60"H x 36"W x 10"D (Codes 30 & 42) |
|---|---|
| **1** | NEMA 4 Single Door, Steel Wall-Mount Enclosure |
| **2** | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 12 & 20) |
| **3** | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 30 & 42) |

| Code | Ground Fault Branch Circuit Breaker (see table for maximum number of circuit breakers allowed) |
|---|---|
| **1(*)** | 15 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| **2(*)** | 20 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| **3(*)** | 25 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| **4(*)** | 30 Amp 1-Pole GFI Circuit Breaker for 120 Vac load |
| **5(*)** | 15 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |
| **6(*)** | 20 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |
| **7(*)** | 25 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |
| **8(*)** | 30 Amp 2-Pole GFI Circuit Breaker for 208/240 Vac load |

| Code | Main Disconnect Switch Selection |
|---|---|
| **0** | None |
| **1** | 100 Amp with 65k Fault Protection (Code 12 & 20 Only) |
| **3** | 250 Amp with 65k Fault Protection (Code 30 & 42 Only) |

| Code | Enclosure Heater |
|---|---|
| **0** | None |
| **1** | Thermostat Controlled Enclosure Heater |

| Code | Pressurization Control System |
|---|---|
| **0** | None |
| **1** | Type Z Class 1, Division 2 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **FPLSM** | **30** | **2** | **1** | **2(30)** | **3** | **0** | **0** | **Typical Model Number (FPLSM-30212(30)300)** |

**Technical Notes:**
(*) Enter number of circuit breakers in parenthesis

**Note:** Maximum number of circuit breakers is dependent on the panelboard size (see panelboard selection) and the current capacity of the panelboard (see table below)

| 100 Amp Panel Board | Breaker Rating | | | | 225 Panel Board | Breaker Rating | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Maximum Number of Breakers | | | | | Maximum Number of Breakers | | | |
| Line Voltage | 15 Amp | 20 Amp | 25 Amp | 30 Amp | Line Voltage | 15 Amp | 20 Amp | 25 Amp | 30 Amp |
| Code 1 (1 Pole CB) | 16 | 12 | 10 | 8 | Code 1 (1 Pole CB) | 37 | 28 | 22 | 18 |
| Code 2 (1 Pole CB) | 25 | 18 | 15 | 12 | Code 2 (1 Pole CB) | 54 | 42 | 33 | 28 |
| Code 3 (2 Pole CB) | 14 | 10 | 8 | 7 | Code 3 (2 Pole CB) | 32 | 24 | 19 | 16 |
| Code 4 (2 Pole CB) | 8 | 6 | 5 | 4 | Code 4 (2 Pole CB) | 18 | 14 | 11 | 9 |

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# Freeze Protection Heat Trace Panels *(cont'd.)*

## *Ordering Information*

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

**Model** **FPLS 277 Vac 4-Wire**

**FPLS** FPLS Series Line Sensing Heat Trace Panels are designed for use in Freeze Protection and Snow Melt applications. The Chromalox FPLS series offers the following standard features: NEMA 4 enclosure, Main Power On Lamp, and Thermal Magnetic Branch Circuit Breakers with 30mA Ground Fault Equipment Protection. Options include: NEMA 4X 304 Stainless Steel Enclosures, Main Disconnect Switch, Enclosure Heater, and Type Z Pressurization System. The FPLS series panels have UL and cUL Third Party Approvals.

| Code | Panelboard | Available Breaker Poles |
|---|---|---|
| **181** | 18 Positions (100 Amp Main Rating) | (8) 1-pole breakers |
| **301** | 30 Positions (100 Amp Main Rating) | (14) 1-pole breakers |
| **421** | 42 Positions (100 Amp Main Rating) | (20) 1-pole breakers |
| **302** | 30 Positions (225 Amp Main Rating) | (14) 1-pole breakers |
| **422** | 42 Positions (225 Amp Main Rating) | (20) 1-pole breakers |

| Code | Power Source | Load Voltage |
|---|---|---|
| **1** | 3 Phase Power, 277/480 Vac 4-Wire | 277 Vac (240 Vac Cable) |

| Code | Enclosure 48"H x 36"W x 10"D (Codes 12 & 20), 60"H x 36"W x 10"D (Codes 30 & 42) |
|---|---|
| **1** | NEMA 4 Single-Door, Steel Wall-Mount Enclosure |
| **2** | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 12 & 20) |
| **3** | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 30 & 42) |

| Code | Ground Fault Branch Circuit Breaker (see table for maximum number of circuit breakers allowed) |
|---|---|
| **1(*)** | 15 Amp 1-Pole GFI Circuit Breaker for 277 Vac load |
| **2(*)** | 20 Amp 1-Pole GFI Circuit Breaker for 277 Vac load |
| **3(*)** | 30 Amp 1-Pole GFI Circuit Breaker for 277 Vac load |

| Code | Main Disconnect Switch Selection |
|---|---|
| **0** | None |
| **1** | 100 Amp with 25k Fault Protection (Code 181, 301 & 421 Only) |
| **2** | 250 Amp with 35k Fault Protection (Code 302 & 422) |

| Code | Enclosure Heater |
|---|---|
| **0** | None |
| **1** | Thermostat Controlled Enclosure Heater |

| Code | Pressurization Control System |
|---|---|
| **0** | None |
| **1** | Type Z Class 1, Division 2 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **FPLS** | **181** | **2** | **1** | **1(4)** | **1** | **1** | **0** | **Typical Model Number (FPLS-181211(4)110)** |

**Technical Notes:**
(*) Enter number of circuit breakers in parenthesis

**Note:** Maximum number of circuit breakers is dependent on the panelboard size (see panelboard selection) and the current capacity of the panelboard (see table below)

| Breaker Rating | | | |
|---|---|---|---|
| | Maximum Number of Breakers | | |
| 277 Vac | 15 Amp | 20 Amp | 30 Amp |
| 100 amp Panel B | 20 | 18 | 12 |
| 225 amp Panel B | 20 | 20 | 20 |

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# Freeze Protection Heat Trace Panels *(cont'd.)*



## *Ordering Information*

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

**Model** **277 Vac 4-Wire**

**FPAS** FPAS Series Ambient Sensing Heat Trace Panels are designed for use in industrial Freeze Protection and Snow Melt applications. The Chromalox FPAS series offers the following standard features: NEMA 4 enclosure, Hand/Off/Auto Selector Switch, Load Energized Indicator Lamp, Main Power On Lamp, Main Contactor, and Thermal Magnetic Branch Circuit Breakers with 30mA Ground Fault Equipment Protection. Options include: NEMA 4X 304 Stainless Steel Enclosures, Main Disconnect Switch, Remote or Local Ambient Temperature Controller, Enclosure Heater, and Type Z Pressurization System. The FPAS series panels have UL and cUL Third Party Approvals.

| Code | Panelboard | Available Breaker Poles |
|---|---|---|
| **181** | 18 Positions (100 Amp Main Rating) | (8) 1-pole breakers |
| **301** | 30 Positions (100 Amp Main Rating) | (14) 1-pole breakers |
| **421** | 42 Positions (100 Amp Main Rating) | (20) 1-pole breakers |
| **302** | 30 Positions (225 Amp Main Rating) | (14) 1-pole breakers |
| **422** | 42 Positions (225 Amp Main Rating) | (20) 1-pole breakers |

| Code | Power Source | Load Voltage |
|---|---|---|
| **1** | 3 Phase Power, 277/480 Vac 4-Wire | 277 Vac (240 Vac Cable) |

| Code | Enclosure 48"H x 36"W x 10"D (Codes 12 & 20), 60"H x 36"W x 10"D (Codes 30 & 42) |
|---|---|
| **1** | NEMA 4 Single-Door, Steel Wall-Mount Enclosure |
| **2** | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 12 & 20) |
| **3** | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 30 & 42) |

| Code | Ground Fault Branch Circuit Breaker (see table for maximum number of circuit breakers allowed) |
|---|---|
| **1(*)** | 15 Amp 1-Pole GFI Circuit Breaker for 277 Vac load |
| **2(*)** | 20 Amp 1-Pole GFI Circuit Breaker for 277 Vac load |
| **3(*)** | 30 Amp 1-Pole GFI Circuit Breaker for 277 Vac load |
| **4(*)** | 40 Amp 1-Pole GFI Circuit Breaker for 277 Vac load |

| Code | Main Disconnect Switch Selection |
|---|---|
| **0** | None |
| **1** | 100 Amp with 25k Fault Protection (Code 181, 301 & 421 Only) |
| **2** | 250 Amp with 35k Fault Protection |

| Code | Ambient Controller |
|---|---|
| **0** | None (See Accessories) |
| **5** | 1601E-11030 1/16 DIN Controller (Panel Door Mounted) |

| Code | Enclosure Heater |
|---|---|
| **0** | None |
| **1** | Thermostat Controlled Enclosure Heater |

| Code | Pressurization Control System |
|---|---|
| **0** | None |
| **1** | Type Z Class 1, Division 2 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **FPAS** | **302** | **1** | **1** | **2(10)** | **2** | **5** | **1** | **0** | **Typical Model Number (FPAS-302112(10)2510)** |

**Technical Notes:**
(*) Enter number of circuit breakers in parenthesis

**Note:** Maximum number of circuit breakers is dependent on the panelboard size (see panelboard selection) and the current capacity of the panelboard (see table below)

| Remote Mounted Control Accessories | PCN |
|---|---|
| RTAS Thermostat | 389589 |
| RTAS-EP Division 2 Thermostat | 389597 |
| B-100 NEMA 4X Thermostat | 305365 |
| E-100 NEMA Division 1 Thermostat | 305322 |
| LCD-1 Snow Switch | 389781 |

| Breaker Rating | | | | |
|---|---|---|---|---|
| | Maximum Number of Breakers | | | |
| 277 Vac | 15 Amp | 20 Amp | 30 Amp | 40 Amp |
| 100 amp Panel Board | 20 | 18 | 12 | 9 |
| 225 amp Panel Board | 20 | 20 | 20 | 20 |

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# Freeze Protection Heat Trace Panels *(cont'd.)*

## *Ordering Information*

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

**Model FPASM featuring the WeatherTrace Sentinel 277 Vac 4-Wire Ambient Rating 40°C (104°F)**

FPASM Series Ambient Sensing Heat Trace Panels are designed for use in industrial Freeze Protection and Snow Melt applications. The Chromalox FPASM series offers the following standard features: NEMA 4 enclosure, Hand/Off/Auto Selector Switch, Load Energized Indicator Lamp, Main Power On Lamp, Main Contactor, and Thermal Magnetic Branch Circuit Breakers with 30 mA Ground Fault Equipment Protection. The FPASM WeatherTrace Sentinel continually monitors the supply voltage to each individual heat trace circuit. Loss of voltage or a ground fault condition triggers an automatic alarm condition to an annunciator panel which identifies the faulted zone and a commom alarm is activated with the re-ring feature. Options include: NEMA 4X 304 Stainless Steel Enclosures, Main Disconnect Switch, Remote or Local Ambient Temperature Controller, Enclosure Heater, and Type Z Pressurization System. The FPASM series panels have UL and cUL Third Party Approvals.

| Code | Panelboard | Available Breaker Poles |
|---|---|---|
| **181** | 18 Positions (100 Amp Main Rating) | (8) 1-pole breakers |
| **301** | 30 Positions (100 Amp Main Rating) | (14) 1-pole breakers |
| **421** | 42 Positions (100 Amp Main Rating) | (20) 1-pole breakers |
| **302** | 30 Positions (225 Amp Main Rating) | (14) 1-pole breakers |
| **422** | 42 Positions (225 Amp Main Rating) | (20) 1-pole breakers |

| Code | Power Source | Heater Load |
|---|---|---|
| **1** | 3 Phase Power, 277/480 Vac 4-Wire | 277 Vac (240 Vac Cable) |

| Code | Enclosure 48"H x 36"W x 10"D (Codes 12 & 20), 60"H x 36"W x 10"D (Codes 30 & 42) |
|---|---|
| **1** | NEMA 4 Single-Door, Steel Wall-Mount Enclosure |
| **2** | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 12 & 20) |
| **3** | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 30 & 42) |

| Code | Ground Fault Branch Circuit Breaker (see table for maximum number of circuit breakers allowed) |
|---|---|
| **1(*)** | 15 Amp 1-Pole GFI Circuit Breaker for 277 Vac load |
| **2(*)** | 20 Amp 1-Pole GFI Circuit Breaker for 277 Vac load |
| **3(*)** | 30 Amp 1-Pole GFI Circuit Breaker for 277 Vac load |
| **4(*)** | 40 Amp 1-Pole GFI Circuit Breaker for 277 Vac load |

| Code | Main Disconnect Switch Selection |
|---|---|
| **0** | None |
| **1** | 100 Amp with 25k Fault Protection (Code 181, 301 & 421 Only) |
| **2** | 250 Amp with 35k Fault Protection |

| Code | Ambient Controller |
|---|---|
| **0** | None (See Accessories) |
| **5** | 1601E-11030 1/16 DIN Controller (Panel Door Mounted) |

| Code | Enclosure Heater |
|---|---|
| **0** | None |
| **1** | Thermostat Controlled Enclosure Heater |

| Code | Pressurization Control System |
|---|---|
| **0** | None |
| **1** | Type Z Class 1, Division 2 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **FPASM** | **422** | **1** | **1** | **1(10)** | **2** | **5** | **0** | **0** | **Typical Model Number (FPASM-422111(10)2500)** |

**Technical Notes:**
(*) Enter number of circuit breakers in parenthesis

**Note:** Maximum number of circuit breakers is dependent on the panelboard size (see panelboard selection) and the current capacity of the panelboard (see table below)

| Remote Mounted Control Accessories | PCN |
|---|---|
| RTAS Thermostat | 389589 |
| RTAS-EP Division 2 Thermostat | 389597 |
| B-100 NEMA 4X Thermostat | 305365 |
| E-100 NEMA Division 1 Thermostat | 305322 |
| LCD-1 Snow Switch | 389781 |

| Breaker Rating | | | | |
|---|---|---|---|---|
| | Maximum Number of Breakers | | | |
| 277 Vac | 15 Amp | 20 Amp | 30 Amp | 40 Amp |
| 100 amp Panel Board | 20 | 18 | 12 | 9 |
| 225 amp Panel Board | 20 | 20 | 20 | 20 |

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# Freeze Protection Heat Trace Panels *(cont'd.)*



## *Ordering Information*

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

**Model** **FPLSM featuring WeatherTrace Sentinel 277 Vac 4-Wire Ambient Rating 40°C (104°F)**

**FPLSM** FPLSM series Line Sensing Heat Trace Panels are designed for use in Freeze Protection and Snow Melt applications. The Chromalox FPLSM series offers the following standard features: NEMA 4 enclosure, Main Power On Lamp, and Thermal Magnetic Branch Circuit Breakers with 30 mA Ground Fault Equipment Protection. The FPLSM WeatherTrace Sentinel continually monitors the supply voltage to each individual heat trace circuit. Loss of voltage of a ground fault condition triggers an automatic alarm to an annunciator panel which identify's the faulted zone and a Common Alarm is activated with the Re-Ring Feature. The FPLSM Options include: NEMA 4X 304 Stainless Steel Enclosures, Main Disconnect Switch, Enclosure Heater, and Type Z Pressurization System. The FPLSM series have UL and cUL Third Party Approvals.

| Code | Panelboard | Available Breaker Poles |
|---|---|---|
| **181** | 18 Positions (100 Amp Main Rating) | (8) 1-pole breakers |
| **301** | 30 Positions (100 Amp Main Rating) | (14) 1-pole breakers |
| **421** | 42 Positions (100 Amp Main Rating) | (20) 1-pole breakers |
| **302** | 30 Positions (225 Amp Main Rating) | (14) 1-pole breakers |
| **422** | 42 Positions (225 Amp Main Rating) | (20) 1-pole breakers |

| Code | Power Source | Heater Load |
|---|---|---|
| **1** | 3 Phase Power, 277/480 Vac 4-Wire | 277 Vac (240 Vac Cable) |

| Code | Enclosure 48"H x 36"W x 10"D (Codes 12 & 20), 60"H x 36"W x 10"D (Codes 30 & 42) |
|---|---|
| **1** | NEMA 4 Single-Door, Steel Wall-Mount Enclosure |
| **2** | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 12 & 20) |
| **3** | NEMA 4X Single-Door, Stainless Steel Wall-Mount Enclosure (Codes 30 & 42) |

| Code | Ground Fault Branch Circuit Breaker (see table for maximum number of circuit breakers allowed) |
|---|---|
| **1(*)** | 15 Amp 1-Pole GFI Circuit Breaker for 277 Vac load |
| **2(*)** | 20 Amp 1-Pole GFI Circuit Breaker for 277 Vac load |
| **3(*)** | 30 Amp 1-Pole GFI Circuit Breaker for 277 Vac load |

| Code | Main Disconnect Switch Selection |
|---|---|
| **0** | None |
| **1** | 100 Amp with 25k Fault Protection (Code 181, 301 & 421 Only) |
| **2** | 250 Amp with 35k Fault Protection (Code 302 & 422) |

| Code | Enclosure Heater |
|---|---|
| **0** | None |
| **1** | Thermostat Controlled Enclosure Heater |

| Code | Pressurization Control System |
|---|---|
| **0** | None |
| **1** | Type Z Class 1, Division 2 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **FPLSM** | **181** | **1** | **1** | **1(5)** | **1** | **0** | **0** | **Typical Model Number (FPLSM-18111(5)100)** |

**Technical Notes:**
(*) Enter number of circuit breakers in parenthesis

**Note:** Maximum number of circuit breakers is dependent on the panelboard size (see panelboard selection) and the current capacity of the panelboard (see table below)

| Breaker Rating | | | |
|---|---|---|---|
| | Maximum Number of Breakers | | |
| 277 Vac | 15 Amp | 20 Amp | 30 Amp |
| 100 amp Panel Board | 20 | 18 | 12 |
| 225 amp Panel Board | 20 | 20 | 20 |

# PHD & PHDT

## Heavy Duty Fiberglas® Woven Drum Heaters

- **Stock Products**
- **5, 15, 30 and 55 Gallon Metal Drums**
- **4" Width**
- **Adjustable Thermostat, 50 - 425°F Optional**
- **120 or 240 Volt, Single Phase**
- **300 - 1,200 Watts**
- **Moisture Resistant**
- **Grounded heating element for Safe Operation**

### *Description*

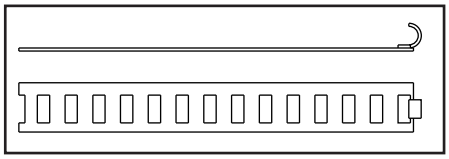
Type PHD Heavy-Duty Fiberglas® Woven Drum Heaters are constructed of Fiberglas® insulated resistance wire woven into a mesh blanket and then encased in layers of silicone rubber. Because of their construction, the Woven Drum Heaters are much stronger and more durable than the standard silicone.

Rubber Drum Heaters and recommended for harsh working environments. All versions use a spring clasp to provide a snug fit around the drums.

### *Features*

- Low watt density electrical resistance heat.
- All 120V units come with a 6 foot power cord and three prong plug. (No plug is included with 240V heaters.)
- An optional built-in adjustable thermostat, 50 - 425°F, is available as a stock option.
- All models come with springs for attachment to your drum.
- Complete, ready to install and use as received.
- All models feature a grounded heating element for electrical protection.
- Girth extension straps are available from stock to use the heaters on non-standard size drums. They can be used to adapt stock heaters to larger drums or other cylindrical containers similar in size. They will permit extending the length of the heater to fit sizes 1/2 - 10" larger in circumference. One step is required per woven drum heater.

### *Girth Extension Straps*



### *Applications*

- Freeze Protection
- Melting of Low Melting Point Solids such as Paraffin, Resins and Chocolate
- Viscosity Control of Fluids such as Paint, Syrups and Honey
- Maintenance of Materials for Roofing, Chimney and Vent Pipe Work

### *Installation*

The Woven Drum Heaters raise/maintain the temperature of the contents of the drum by convection. Heating will occur from the point where the heater is installed to the top of the drum. If the entire drum is to be heated, the drum heater should be installed as near to the bottom of the drum as possible. If only part of the material is to be heated, the drum heater should be installed around the center or top section of the drum. This will provide a faster heat-up and save energy. However, care must be given to ensure that the material level in the drum never falls below the location of the heater.

### *Specifications and Ordering Information*

| Drum | | | | PHD | | | PHDT (50 - 425°F Adjustable Thermostat) | | |
|---|---|---|---|---|---|---|---|---|---|
| Size | Type | Volts | Watts | Model | PCN | Stock | Model | PCN | Stock |
| 55 gallon | Metal | 120 | 1200 | **PHD-55-1-12** | **123027** | **S** | **PHDT-55-1-12** | **123107** | **S** |
| 55 gallon | Metal | 240 | 1200 | **PHD-55-2-12** | **123035** | **S** | **PHDT-55-2-12** | **123115** | **S** |
| 30 gallon | Metal | 120 | 1000 | **PHD-30-1-10** | **122980** | **S** | **PHDT-30-1-10** | **123060** | **S** |
| 30 gallon | Metal | 240 | 1000 | **PHD-30-2-10** | **122999** | **S** | **PHDT-30-2-10** | **123078** | **S** |
| 15 gallon | Metal | 120 | 700 | **PHD-15-1-7** | **122964** | **S** | **PHDT-15-1-7** | **123043** | **S** |
| 15 gallon | Metal | 240 | 700 | **PHD-15-2-7** | **122972** | **S** | **PHDT-15-2-7** | **123051** | **S** |
| 5 gallon | Metal | 120 | 550 | **PHD-5-1-5** | **123000** | **S** | **PHDT-5-1-5** | **123086** | **S** |
| 5 gallon | Metal | 240 | 550 | **PHD-5-2-5** | **123019** | **S** | **PHDT-5-2-5** | **123094** | **S** |
| — | — | — | — | **PDES-10 Girth Extension Strap** | **290132** | **S** | **PDES-10 Girth Extension Strap** | **290132** | **S** |

**To Order** — Specify model, PCN and quantity.

# IBG
## Flexible Thermal Drum Insulation Blanket



- **Flexible and Easy to Mount**
- **Chemical and Moisture Resistant**
- **450°F Max. Exposure Temp.**
- **Designed for Integrated Use with Flexible Drum Heaters**

### *Description*

Insulating blankets are energy saving blankets that increase heating efficiency and reduce operating costs. Bulk Fiberglas® insulation is covered with silicone glass cloth. Easy installation is provided with Velcro® fastening device. All blankets are moisture resistant, but not waterproof.

Type IBG are stock insulation blankets designed to use in conjunction with Chromalox stock drum heaters. They are designed to only cover the drum heater; providing thermal protection from the back, heated-surface of the drum heater. Full coverage thermal insulation blankets are available as made-to-order items per customer specifications. All stock products are shipped within 24 hours.

### *Applications*

- Thermal Protection from Heated Surfaces
- Thermal Insulation to Minimize Heat Loss
- Maximize Effectiveness of Heater

### *Ordering Information*

Please refer to the matrix provided on the Flexible Heater Ordering Guidelines page which follows.

### *Specifications and Ordering Information*

| Model | Stock | PCN | Wt. (Lbs.) | Stock |
|---|---|---|---|---|
| **IBG-5** | **S** | **298070** | 2 | NS |
| **IBG-16** | **S** | **299225** | 2 | NS |
| **IBG-30** | **S** | **299233** | 3 | **S** |
| **IBG-55** | **S** | **298089** | 3 | **S** |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order—**Specify model, PCN and quantity.

# SL-B

## Silicone Rubber Insulated Enclosure & Air Heater

- **All Models Stocked**
- **25, 50, 100 and 200 Watts**
- **120 Volts**
- **Vulcanized to Mounting Plate for Easy Installation**
- **Custom Design and Thermostats Available**
- **Air Temperature Sensing Thermostats (40˚F close, 55˚F open) available**

### *Description*

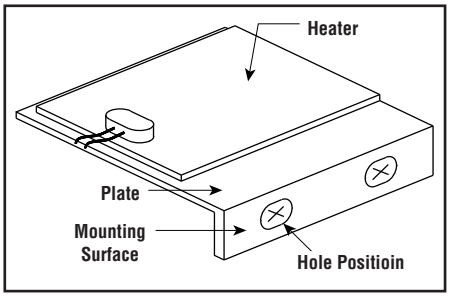
Type SL-B Silicone Rubber Insulated Enclosure Heaters and General Purpose Air Heaters are used for freeze protection and condensate protection in electrical enclosures. They are also installed in equipment to keep mechanical components functioning in applications such as ATM machines and automatic doors. Shipment can be made within 24 hours from receipt of order.

### *Features*

- 10" Lead Length is standard
- 25, 50, 100 and 200 watt heaters available with or without integral air temperature sensing thermostat.
- All stock heaters operate on 120V. Heaters requiring other voltages up to 600V are available as non-stock items however special thermostats with be required.
- Easy installation. Consult Chromalox with Bracket and Mounting Slots
- Integral or remote air temperature sensing thermostats ensure heater operation in condensation forming and other air heating application conditions.

### *Applications*

Freeze or condensation protection in enclosures containing electronic equipment, such as: Temperature Control Panels, Control Valve Housings, ATMs, Traffic Signal Boxes. Also, General Purpose Air Heating applications.




### *Installation*

The SL-B enclosure heaters are factory vulcanized to an aluminum mounting plate that allows for easy installation. The mounting surface is perpendicular to the heater and has two tapped mounting Holes. If using the heater with the integral thermostat, vertical mounting with the sensor towards the base of the enclosure is recommended.

### *Specifications*

| Watts | Dimensions (In.) | | |
|---|---|---|---|
| | Heated Surface | Plate Size | Mounting Surface |
| 25 | 2 x 5 | 2.5 x 5 | 0.5 x 5 |
| 50 | 2 x 5 | 2.5 x 5 | 0.5 x 5 |
| 100 | 2 x 10 | 2.5 x 10 | 0.5 x 10 |
| 200 | 4 x 10 | 4.5 x 10 | 0.5 x 10 |

### *Determining Minimum Recommended Wattage*

| ºF Above Ambient | Total Surface Area (Ft²) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 3 | 4 | 5 | 6 | 7.5 | 9 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |
| **Uninsulated Enclosures** | | | | | | | | | | | | | | |
| 20 | 30 | 40 | 55 | 70 | 80 | 100 | 120 | 135 | 205 | 270 | 335 | 405 | 540 | 670 |
| 40 | 55 | 80 | 110 | 135 | 160 | 200 | 245 | 270 | 405 | 540 | 670 | 805 | 1,075 | 1,340 |
| 60 | 90 | 120 | 160 | 205 | 245 | 300 | 365 | 405 | 605 | 805 | 1,005 | 1,210 | 1,610 | 2,010 |
| 80 | 110 | 160 | 215 | 270 | 325 | 400 | 485 | 540 | 805 | 1,075 | 1,340 | 1,610 | 2,145 | 2,680 |
| 100 | 135 | 200 | 270 | 335 | 405 | 500 | 605 | 670 | 1,005 | 1,340 | 1,675 | 2,010 | 2,680 | 3,350 |
| 120 | 165 | 240 | 320 | 405 | 485 | 600 | 725 | 805 | 1,210 | 1,610 | 2,010 | 2,415 | 3,220 | 4,020 |
| 140 | 190 | 280 | 375 | 470 | 565 | 700 | 845 | 940 | 1,410 | 1,880 | 2,345 | 2,815 | 3,775 | 4,690 |
| **Insulated Enclosures** | | | | | | | | | | | | | | |
| 20 | 10 | 10 | 15 | 20 | 20 | 25 | 30 | 35 | 50 | 65 | 80 | 100 | 130 | 160 |
| 40 | 15 | 20 | 30 | 35 | 40 | 50 | 60 | 65 | 100 | 130 | 160 | 195 | 260 | 320 |
| 60 | 20 | 30 | 55 | 50 | 60 | 75 | 90 | 100 | 145 | 195 | 240 | 290 | 385 | 480 |
| 80 | 30 | 40 | 55 | 65 | 80 | 100 | 115 | 130 | 195 | 260 | 320 | 320 | 515 | 640 |
| 100 | 35 | 50 | 65 | 80 | 100 | 125 | 145 | 160 | 240 | 320 | 400 | 400 | 640 | 800 |
| 120 | 40 | 60 | 80 | 100 | 115 | 150 | 175 | 195 | 290 | 385 | 480 | 480 | 770 | 960 |
| 140 | 45 | 70 | 90 | 115 | 135 | 175 | 205 | 225 | 340 | 450 | 560 | 560 | 900 | 1,120 |

**Notes –** A. °F = (°C x1.8) + 32 B. $Ft^2 = 0.092 \times m^2$

# SLDH
## Silicone Rubber Insulated Drum Heater



- **Stock Products**
- **For 5, 15, 30 and 55 Gallon Metal and Non-Metal Drums**
- **Adjustable Thermostats**
- **Chemical and Moisture Resistant**
- **Rugged and Flexible**
- **Easy to Store**
- **Internally Grounded Standard**

### *Description*

Silicone Rubber Insulated Drum Heaters are constructed of silicone rubber reinforced Fiberglas® cloth laminated around resistance wire to provide flexible, moisture and chemical resistant heat. Drum heaters can withstand flexing without fear of premature failure. Stock drum heaters are shipped within 24 hours of receipt of your order.

### *Features*

- Low watt density electrical resistance heat.
- All stock 120V products come with a 6 foot power cord and three-prong plug. 240V heaters do not include a plug.
- Optional built-in adjustable thermostat, 70 - 425˚F for steel drums or 70 - 140˚F for plastic drums.
- All models come with a heavy-duty spring assembly for attachment to your drum.
- Complete, ready to install and use as received.
- All grounded models feature a wire-mesh screen for ground-fault protection. Should the heater surface be punctured or damaged in any way, the grounding grid will provide electrical protection.
- Girth extension straps are available from stock so you can use Chromalox heavy duty SLDH on non-standard size drums. They can also be used to adapt stock heaters to larger drums or other cylindrical containers similar in size. They will permit extending the length of the heater to fit sizes 1/2 - 10" larger in circumference. One strap is required per heater.

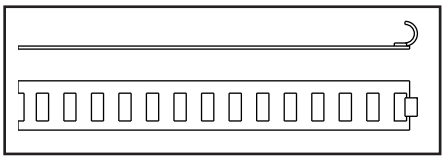
### *Applications*

- Freeze Protection
- Melting of Low Melting Point Solids such as Paraffin, Resins and Chocolate
- Viscosity Control of Fluids such as Paint, Syrups and Honey
- Maintenance of Materials for Roofing, Chimney and Vent Pipe Work

### *Installation*

The SLDH heats the contents of the drum by convection. Heating will occur from the point where the heater is installed to the top of the drum. If the entire drum is to be heated, the SLDH should be installed as near to the bottom of the drum as possible. If only part of the material is to be heated, the drum heater should be installed around the center or top section of the drum. This will provide a faster heat-up and save energy. However, care must be given to ensure that the material level in the drum never falls below the location of the heater.

### *Girth Extension Straps*

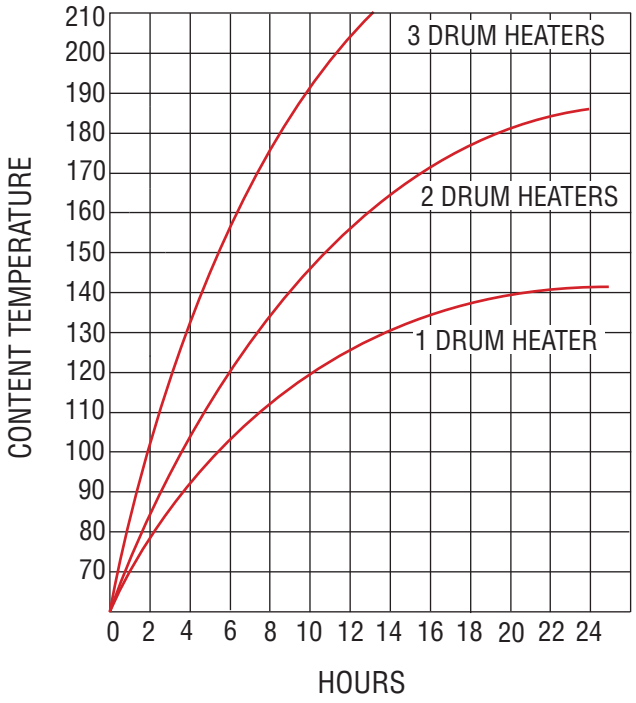


### *Note:*

Not for heating flammable materials or for use in hazardous areas.

# SLDH
## Silicone Rubber Insulated Drum Heater *(cont'd.)*

### *1000 watt, 55 Gallon Drum Heater Performance (Covered Drum Filled with Water at 70°F ambient)*




When a single heater is used, place the heater at the bottom of the drum to minimize stratification.

### *Drum Capacity Cross Reference*

| Drum Size | Diameter (Inches) | Diameter (Millimeters) | Drum Capacity |
|---|---|---|---|
| 55 gal. | 22-1/2 (nom.) | 570 | 210 litres |
| 30 gal. | 18-1/2 (nom.) | 470 | 115 litres |
| 15 gal. | 13-1/2 (nom.) | 343 | 57 litres |
| 5 gal. | 11-1/2 (nom.) | 290 | 20 litres |

### *Specifications and Ordering Information*

| Drum Size | Drum Type | Adjustable Thermostat | Watts | Model Number 120 Volts | PCN | Model Number 240 Volts | PCN | Heater Width (In.) | Stock Status | Weight (Lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5 Gallon | **Metal** | 70 to 425°F | 550 | SLDH-05-A-6CPGM-1-55 | 123123 | - | - | 4 | **S** | 1.4 |
| 15 Gallon | **Metal** | 70 to 425°F | 500 | SLDH-15-A-6CPGM-1-50 | 123131 | SLDH-15-A-6CGM-2-50 | 123211 | 3 | **S** | 1.412 |
| 15 Gallon | **Metal** | 70 to 425°F | 700 | SLDH-15-A-6CPGM-1-70 | 123140 | - | | 4 | **S** | 1.6 |
| 30 Gallon | **Metal** | 70 to 425°F | 750 | SLDH-30-A-6CPGM-1-75 | 123158 | SLDH-30-A-6CGM-2-75 | 123220 | 3 | **S** | 1.7 |
| 30 Gallon | **Metal** | 70 to 425°F | 1000 | SLDH-30-A-6CPGM-1-100 | 123166 | - | - | 4 | **S** | 2 |
| 55 Gallon | **Metal** | 70 to 425°F | 1000 | SLDH-55-A-6CPGM-1-100 | 123174 | SLDH-55-A-6CGM-2-100 | 123238 | 3 | **S** | 1.9 |
| 55 Gallon | **Metal** | 70 to 425°F | 1200 | SLDH-55-A-6CPGM-1-120 | 123182 | SLDH-55-A-6CGM-2-120 | 123246 | 4 | **S** | 2.3 |
| 5 Gallon | **Plastic** | 70 to 140°F | 300 | SLDHP-05-A-6CPGM-1-30 | 123190 | - | - | 9.5 | **S** | 3.4 |
| 55 Gallon | **Plastic** | 70 to 140°F | 750 | SLDHP-55-A-6CPGM-1-75 | 123203 | - | - | 9.5 | **S** | 5.1 |

**Stock Status:** **S** = stock AS = assembly stock NS = non-stock
**To Order—** Specify model, PCN and quantity.

# Technical Information

## Heat Transfer Fundamentals & Thermodynamic Properties

### *Heat Transfer Fundamentals*

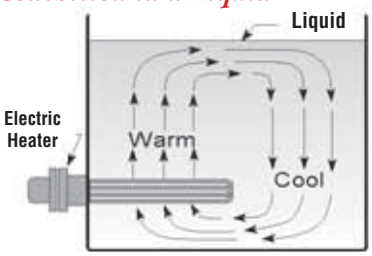
The principles of heat transfer are well understood and are briefly described below. Heat energy is transferred by three basic modes. All heating applications involve each mode to a greater or lesser degree.

- Conduction
- Convection
- Radiation

**Conduction** is the transfer of heat energy through a solid material. Metals such as copper and aluminum are good conductors of heat energy. Glass, ceramics and plastics are relatively poor conductors of heat energy and are frequently used as thermal insulators. All gases are poor conductors of heat energy. A combination of expanded glass or ceramic fiber filled with air is excellent thermal insulation. Typical conduction heating applications include platen heating (cartridge heaters), tank heating (strip and ring heaters), pipe tracing and other applications where the heater is in direct contact with the material being heated.

**Convection** is the transfer of heat energy by circulation and diffusion of the heated media. It is the most common method of heating fluids or gases and also the most frequent application of electric tubular elements and assemblies. Fluid or gas in direct contact with a heat source is heated by conduction causing it to expand. The expanded material is less dense or lighter than its surroundings and tends to rise. As it rises, gravity replaces it with colder, denser material which is then heated, repeating the cycle. This circulation pattern distributes the heat energy throughout the media. Forced convection uses the same principle except that pumps or fans move the liquid or gas instead of gravity.

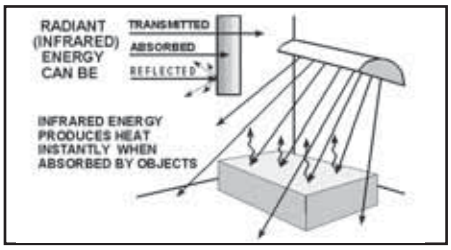
### *Convection in a Liquid*




Typical convection heating applications include water and oil immersion heating, air heating, gas heating and comfort air heating.

**Radiation** is the transfer of heat energy by electromagnetic (infrared) waves and is very different from conduction and convection. Conduction and convection take place when the material being heated is in direct contact with the heat source. In infrared heating, there is no direct contact with the heat source. Infrared energy travels in straight lines through space or vacuum (similar to light) and does not produce heat energy until absorbed. The converted heat energy is then transferred in the material by conduction or convection.

### *Radiant Energy (Infrared) Heating*




All objects above "absolute zero" temperature radiate infrared energy with warmer objects radiating more energy than cooler objects. Infrared energy radiating from a hot object (heating element) strikes the surface of a cooler object (work piece), is absorbed and converted to heat energy. Paint drying by radiant heaters is a typical application of infrared heating. The most important principle in infrared heating is that infrared energy radiates from the source in straight lines and **does not become heat energy until absorbed by the work product.**

### *Thermodynamic Properties*

All materials have basic physical constants and thermodynamic properties. These constants are used in the evaluation of the materials and in heat energy calculations. The constants and properties most often used are:

- Specific Heat ($C_p$)
- Heat of Fusion ($H_{fus}$)
- Heat of Vaporization ($H_{vap}$)
- Thermal Conductivity (k)
- Thermal Resistivity (R)

**Specific Heat (Quantity of Heat Energy) —** All materials contain or absorb heat energy in differing amounts. The quantity of heat energy or thermal capacity of a particular material is called its **specific heat**.

The specific heat of a substance is defined as the amount of heat energy required to raise one pound of the material by one degree Fahrenheit. Specific heat factors are usually defined as British thermal units per pound per degree Fahrenheit **(Btu/lb/°F)**. The specific heat of most materials is constant at only one temperature and usually varies to some degree with temperature. Water has a specific heat of 1.0 and absorbs large quantities of heat energy. Air, with a specific heat of 0.24, absorbs considerably less heat energy per pound.

**Heat of Fusion or Vaporization —** Many materials can change from a solid to a liquid to a gas. For the change of state to occur, heat energy must be added or released. Water is a prime example in that it changes from a solid (ice) to a liquid (water) to a gas (steam or vapor). If the change is from a solid to a liquid to a gas, heat energy is added. If the change is from a gas to a liquid to a solid, heat energy is released. These energy requirements are called the **heat of fusion** and the **heat of vaporization**. They are expressed as Btu per pound **(Btu/lb)**.

- **Heat of Fusion** is the amount of energy required to transform a material from a solid to a liquid (or the reverse) at the same temperature. Water has a heat of fusion of 143 Btu/lb.
- **Heat of Vaporization** is the amount of energy required to transform a material from a liquid to a gas (or the reverse) at the same temperature. Water has a high heat of vaporization, 965 Btu/lb. Water can transfer large amounts of heat energy in the form of condensing steam.

**Thermal Conductivity** is the ability of a material to transmit heat energy by conduction. Thermal conductivity is identified as *"k"* and is usually expressed in British thermal units per linear inch (or foot) per hour per square foot of area per degree Fahrenheit. **(Btu/in/hr/ft²/°F) or (Btu/ft/hr/ft²/°F)**. *"k"* factors are used extensively in comfort heating applications to rate the effectiveness of building construction and other materials as thermal insulation. *"k"* factors are also used in the calculation of heat losses through pipe and tank insulation.

**Thermal Resistivity** or "R" is the inverse of thermal conductivity. Insulating materials are rated by "R" factors. The higher the "R" factor, the more effective the insulation.

# Technical Information

## Determining Heat Energy Requirements

### *General Applications*

The objective of any heating application is to raise or maintain the temperature of a solid, liquid or gas to or at a level suitable for a particular process or application. Most heating applications can be divided into two basic situations; applications which require the maintenance of a constant temperature and applications or processes which require work product to be heated to various temperatures. The principles and calculation procedures are similar for either situation.

### *Constant Temperature Applications*

Most constant temperature applications are special cases where the temperature of a solid, liquid or gas is maintained at a constant value regardless of ambient temperature. Design factors and calculations are based on steady state conditions at a fixed difference in temperature. Heat loss and energy requirements are estimated using "worst case" conditions. For this reason, determining heat energy requirements for a constant temperature application is relatively simple. Comfort heating (constant air temperature) and freeze protection for piping are typical examples of constant temperature applications. The equations and procedures for calculating heat requirements for several applications are discussed later in this section.

### *Variable Temperature Applications*

Variable temperature (process) applications usually involve a start-up sequence and have numerous operating variables. The total heat energy requirements for process applications are determined as the sum of these calculated variables. As a result, the heat energy calculations are usually more complex than for constant temperature applications. The variables are:

**Total Heat Energy Absorbed —** The sum of all the heat energy absorbed during start-up or operation including the work product, the latent heat of fusion (or vaporization), make up materials, containers and equipment.

**Total Heat Energy Lost —** The sum of the heat energy lost by conduction, convection, radiation, ventilation and evaporation during start-up or operation.

**Design Safety Factor —** A factor to compensate for unknowns in the process or application.

### *Process Applications*

The selection and sizing of the installed equipment in a process application is based on the **larger of two calculated heat energy requirements**. In most process applications, the start-up and operating parameters represent two distinctly different conditions in the same process. The heat energy required for start-up is usually considerably different than the energy required for operating conditions. In order to accurately assess the heat requirements for an application, each condition must be evaluated. The comparative values are defined as follows:

- **Calculated heat energy required for process start-up over a specific time period.**
- **Calculated heat energy required to maintain process temperatures and operating conditions over a specific cycle time.**

### *Determining Heat Energy Absorbed*

The first step in determining total heat energy requirements is to determine the heat energy absorbed. If a change of state occurs as a direct or indirect part of the process, the heat energy required for the change of state must be included in the calculations. This rule applies whether the change occurs during start-up or later when the material is at operating temperature. Factors to be considered in the heat absorption calculations are shown below:

**Start-Up Requirements (Initial Heat-Up)**

- Heat absorbed during start-up by:
  - Work product and materials
  - Equipment (tanks, racks, etc.)
- Latent heat absorption at or during start-up:
  - Heat of fusion
  - Heat of vaporization
- Time factor

**Operating Requirements (Process)**

- Heat absorbed during operation by:
  - Work product in process
  - Equipment loading (belts, racks, etc.)
  - Make up materials
- Latent heat absorption during operation:
  - Heat of fusion
  - Heat of vaporization
- Time (or cycle) factor, if applicable

### *Determining Heat Energy Lost*

Objects or materials at temperatures above the surrounding ambient lose heat energy by conduction, convection and radiation. Liquid surfaces exposed to the atmosphere lose heat energy through evaporation. The calculation of total heat energy requirements must take these losses into consideration and provide sufficient energy to offset them. Heat losses are estimated for both start-up and operating conditions and are added into the appropriate calculation.

**Heat Losses at Start-Up —** Initially, heat losses at start-up are zero since the materials and equipment are all at ambient temperature. Heat losses increase to a maximum at operating temperature. Consequently, start-up heat losses are usually based on an average of the loss at start-up and the loss at operating temperature.

**Heat Losses at Operating Temperature —** Heat losses are at a maximum at operating temperature. Heat losses at operating temperature are taken at full value and added to the total energy requirements.

### *Estimating Heat Loss Factors*

The heat losses just discussed can be estimated by using factors from the charts and graphs provided in this section. Total losses include radiation, convection and conduction from various surfaces and are expressed in watts per hour per unit of surface area per degree of temperature **(W/hr/ft²/°F)**.

**Note** — Since the values in the charts are already expressed in watts per hour, they are not influenced by the time factor *"t"* in the heat energy equations.

### *Design Safety Factors*

In many heating applications, the actual operating conditions, heat losses and other factors affecting the process can only be estimated. A safety factor is recommended in most calculations to compensate for unknowns such as ventilation air, thermal insulation, make up materials and voltage fluctuations. As an example, a voltage fluctuation (or drop) of 5% creates a 10% change in the wattage output of a heater.

Safety factors vary from 10 to 25% depending on the level of confidence of the designer in the estimate of the unknowns. The safety factor is applied to the sum of the calculated values for heat energy absorbed and heat energy lost.

# Technical Information

## Determining Heat Energy Requirements *(cont'd.)*

### *Comfort Heating*

For complete building and space heating applications, it is recommended that a detailed analysis of the building construction heat losses (walls, ceilings, floors, windows, etc.) be performed using ASHRAE guidelines. This is the most accurate and cost effective estimating procedure. However, a quick estimate of the kW requirements for room and supplemental heating or freeze protection can be obtained using the chart to the right.

**Problem —** A warehouse extension measures 20 ft long x 13 ft wide x 9 ft high. The building is not insulated. Construction is bare concrete block walls and an open ceiling with a plywood deck and built-up roof. Determine the kW required to maintain the warehouse at 70°F when the outside temperature is 0°F.

**Solution —**

1. **Calculate** the volume of the room.

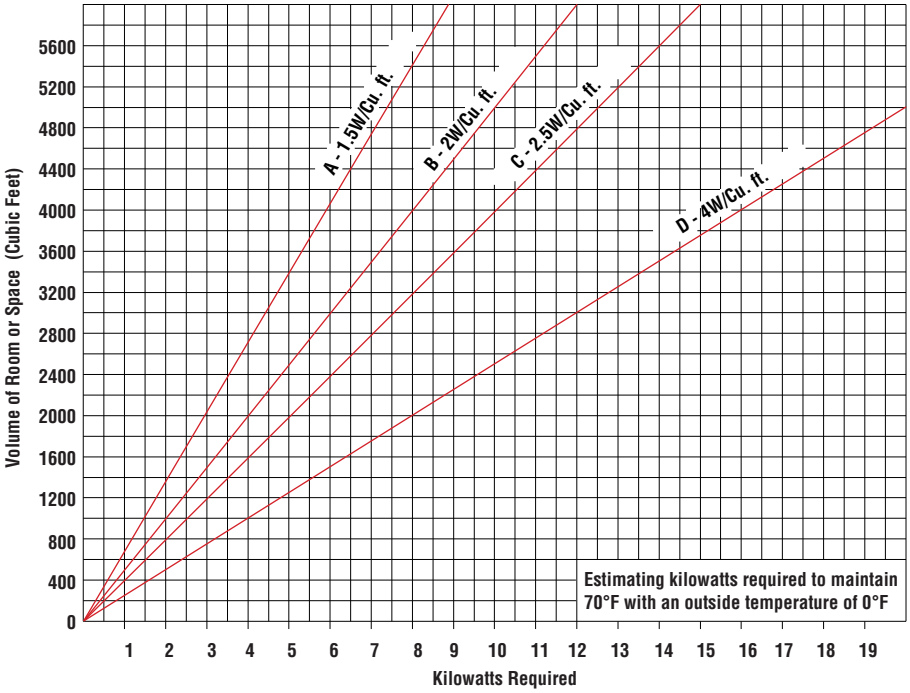
   20 ft x 13 ft x 9 ft = 2,340 $ft^3$

2. **Refer** to the chart, use Curve D which corresponds to the building construction.

3. **Find** the intersection of 2,340 $ft^3$ with curve D. The kilowatts required are 9.3 kW. Suggest using a 10 kW unit blower heater.

**Note** — If the volume of the room is larger than the chart values, divide by 2, 3, 4, etc. until the trial volume fits the curve. Then select heater from this volume. Multiply heaters selected by the number used to select the trial volume.

### *Comfort Heating Chart*




**Curve A —** Rooms with little or no outside exposure. No roof or floor with outside exposure; only 1 wall exposed with not over 15% door and window area.

**Curve B —** Rooms with average exposure. Roof and 2 or 3 walls exposed, up to 30% door and window area. But with roof, walls and floor insulated if exposed to outside temperatures.

**Curve C —** Rooms with roof, walls and floor uninsulated but with inside facing on walls and ceiling.

**Curve D —** Exposed guard houses, pump houses, cabins and poorly constructed rooms with reasonably tight joints but no insulation. Typical construction of corrugated metal or plywood siding, single layer roofs.

# Technical Information

## General Industrial Sizing Guide

### CHROMALOX

**General Industrial Sizing Guide**

Heat Loss Calculation- Indoor

**Job Name:** _____ **Date:** _____

**Location:** _____ **Room:** _____

**Bid Number:** _____ **Reference:** _____

**Voltage:** _____ V **Phase:** _____

**Room Size**

**Length:** _____ ft. **Width:** _____ ft. **Ceiling Height:** _____ ft.

**Total Square Footage:** _____ square feet

**Heater Mounting Height:** _____ ft.

**Design Information**

**Ceiling R-Factor:** _____ **Outside Design Temperature:** _____ F

**Wall R-Factor:** _____ **Desired Inside Temperature:** _____ F

**Temperature Rise:** _____ F

**Air Changes Per Hour:** _____ cubic foot per hour

**Calculation**

| Item | Area | sq-ft | X | U-Factor | = | BTU/Hr/Degree F |
|---|---|---|---|---|---|---|
| Windows | _____ | sq-ft | X | _____ | = | _____ |
| Doors | _____ | sq-ft | X | _____ | = | _____ |
| Net Wall | _____ | sq-ft | X | _____ | = | _____ |
| Roof | _____ | sq-ft | X | _____ | = | _____ |
| Floor Perimeter * | _____ | ft | X | _____ | = | |

Item A **TOTAL =** _____ BTU/Hr/degree F

* For floor perimeter use U-factor of 1.2, 0.7, or 0.6 for exposed, 1" insulation, or 2" insulation respectively

Air Change Loss — Cubic foot per hour X 0.019 BTU/cubic ft. = BTU/hr/degree F

Item B _____ cubic ft./hr X 0.019 BTU/cubic ft. = _____

TOTAL Item A + Item B = _____ BTU/Hr/degree F

Item C Convert to Watts = Total / 3.412 = _____ Watts/Hr/degree F

**TOTAL HEATING REQUIREMENT**

Item C x Temperature Rise = Watts/Hr

_____ Watts/Hr/degree F **X** _____ degree F **=** _____ Total Watts/Hr.

Heat Loss Calculation Form for General Industrial Applications

# Technical Information

## Typical Outside Design Temperatures for the United States

| State | City | Mean Wind Speed: MPH[3] | Heating Degree Days[1] | Yearly Snowfall Mean[4] | Outside Design Temp.[2] |
|---|---|---|---|---|---|
| Arkansas | Ft. Smith | 7.6 | 3336 | 5.7 | 12.0 |
| | Little Rock | 8.1 | 3354 | 5.1 | 15.0 |
| California | Bakersfield | 6.4 | 2185 | 0.0 | 30.0 |
| | Bishop | N/A | 4313 | 8.6 | 10.0 |
| | Fresno | 6.3 | 2650 | 0.1 | 28.0 |
| | Los Angeles | 7.4 | 1819 | 0.0 | 37.0 |
| | Sacramento | 8.3 | 2843 | 0.1 | 30.0 |
| | San Diego | 6.7 | 1507 | 0.0 | 42.0 |
| | San Francisco/Oakland | 8.2 | 3080 | 0.1 | 35.0 |
| Colorado | Colorado Springs | 10.4 | 6473 | 39.3 | -3.0 |
| | Denver | 9.1 | 6016 | 59.0 | -5.0 |
| | Grand Junction | 8.1 | 5605 | 26.3 | 2.0 |
| | Pueblo | 8.7 | 5394 | 30.9 | -7.0 |
| Connecticut | Hartford | 8.9 | 6350 | 53.0 | 3.0 |
| | New Haven | N/A | 6026 | N/A | 3.0 |
| | Bridgeport | 12.0 | 5461 | 26.8 | 6.0 |
| Delaware | Wilmington | 9.1 | 4940 | 19.9 | 10.0 |
| D.C. | Washington DC | 9.3 | 4211 | 16.3 | 14.0 |
| Florida | Daytona Beach | 9.0 | 902 | 0.0 | 32.0 |
| | Jacksonville | 8.5 | 1327 | 0.0 | 29.0 |
| | Miami | 9.1 | 206 | 0.0 | 44.0 |
| | Orlando | 8.7 | 733 | 0.0 | 44.0 |
| | Pensacola | 8.3 | 1578 | 0.3 | 25.0 |
| | Tallahassee | 6.9 | 1563 | 0.0 | 27.0 |
| | Tampa | 8.8 | 718 | 0.0 | 36.0 |
| Georgia | Atlanta | 9.1 | 3095 | 1.5 | 17.0 |
| | Augusta | 6.6 | 2547 | 0.9 | 20.0 |
| | Columbus/Lawson | 6.9 | 2378 | 0.4 | 21.0 |
| | Macon | 7.8 | 2240 | 1.0 | 21.0 |
| | Rome | N/A | 3342 | 2.0 | 17.0 |
| | Savannah/Travis Fld. | 8.1 | 1952 | 0.4 | 24.0 |
| Idaho | Boise | 9.0 | 5833 | 21.5 | 3.0 |
| | Lewiston | N/A | 5464 | 17.9 | -1.0 |
| | Pocatello | 10.3 | 7063 | 40.0 | -8.0 |
| Illinois | Rockford | 9.9 | 6845 | 34.1 | -9.0 |
| | Moline | 9.9 | 6395 | 30.3 | -9.0 |
| | Peoria | 10.3 | 6098 | 24.3 | -8.0 |
| | Springfield | 11.4 | 5558 | 23.1 | -3.0 |
| | Chicago | 10.3 | 6497 | 37.4 | -8.0 |

# Technical Information

## Typical Outside Design Temperatures for the United States *(cont'd.)*

| State | City | Mean Wind Speed: MPH[3] | Heating Degree Days[1] | Yearly Snowfall Mean[4] | Outside Design Temp.[2] |
|---|---|---|---|---|---|
| Indiana | Evansville | 8.2 | 4629 | 13.4 | 4 |
| | Fort Wayne | 10.3 | 6209 | 31.5 | -4 |
| | Indianapolis | 9.7 | 5577 | 21.6 | -2 |
| | South Bend | 10.6 | 6462 | 68.5 | -3 |
| | Terre Haute | N/A | 5366 | N/A | -2 |
| Iowa | Burlington | 10.3 | 6149 | 25.7 | -7 |
| | Des Moines | 11.1 | 6710 | 33.1 | -10 |
| | Dubuque | N/A | 7277 | 42.6 | -12 |
| | Sioux City | 10.9 | 6953 | 30.6 | -11 |
| | Waterloo | 10.7 | 7415 | 31.2 | -15 |
| Kansas | Dodge City | 14.1 | 5046 | 18.2 | 0 |
| | Goodland | 12.7 | 6119 | 33.6 | -5 |
| | Topeka | 10.4 | 5243 | 20.8 | 0 |
| | Wichita | 12.5 | 4687 | 15.1 | 3 |
| Kentucky | Lexington | 9.7 | 4729 | 15.9 | 3 |
| | Louisville | 8.4 | 4645 | 17.6 | 5 |
| Louisiana | Baton Rouge | 7.9 | 1670 | 0.0 | 25 |
| | Lake Charles | 8.8 | 1498 | 0.0 | 27 |
| | New Orleans | 8.3 | 1465 | 0.0 | 29 |
| | Shreveport | 8.8 | 2167 | 0.0 | 20 |
| Maine | Caribou | 11.2 | 9632 | 112.9 | -8 |
| | Portland | 8.8 | 7498 | 74.5 | -6 |
| Maryland | Baltimore | 9.4 | 4729 | 21.2 | 10 |
| Massachusetts | Boston | 12.6 | 5621 | 42.1 | 6 |
| | Worcester | 10.4 | 6848 | 74.2 | 0 |
| Michigan | Alpena | 7.6 | 8518 | 84.9 | -11 |
| | Detroit/Metro. | 10.4 | 6419 | 39.9 | 3 |
| | Flint | 10.4 | 7041 | 45.3 | -4 |
| | Grand Rapids | 10.0 | 6801 | 76.6 | 1 |
| | Lansing | 10.3 | 6904 | 48.7 | -3 |
| | Marquette | 8.3 | 8351 | 107.3 | -12 |
| | Muskegon | 10.9 | 6890 | 95.9 | 2 |
| | Sault Ste. Marie | 9.6 | 9193 | 110.8 | -12 |
| Minnesota | Duluth | 11.4 | 9756 | 77.8 | -21 |
| | International Falls | 9.1 | 10547 | 60.1 | -29 |
| | Mpls./St. Paul | 10.5 | 8159 | 46.1 | -19 |
| | Rochester | 12.7 | 8227 | 44.4 | -17 |
| | St. Cloud | 8 | 8868 | 43.1 | -15 |
| Mississippi | Jackson | 7.6 | 2300 | 0.0 | 21 |
| | Meridian | 6 | 2388 | 0.0 | 19 |
| Missouri | Columbia | 9.9 | 5083 | 22.0 | -1 |
| | Kansas City | 10.3 | 5357 | 20.0 | 2 |
| | St. Joseph | 10 | 5440 | 19.2 | -3 |
| | St. Louis | 9.5 | 4750 | 18.5 2 | |
| | Springfield | 11.1 | 4570 | 15.5 | 3 |

# Technical Information

## Typical Outside Design Temperatures for the United States *(cont'd.)*

| State | City | Mean Wind Speed: MPH[3] | Heating Degree Days[1] | Yearly Snowfall Mean[4] | Outside Design Temp.[2] |
|---|---|---|---|---|---|
| Nebraska | Grand Island | 12.0 | 6425 | 29.0 | -8 |
| | Lincoln | 10.6 | 6218 | 28.4 | -5 |
| | Norfolk | 12.6 | 6981 | 28.8 | -8 |
| | North Platte | 10.3 | 6747 | 29.9 | -8 |
| | Omaha | 10.8 | 6049 | 32.0 | -8 |
| | Scottsbluff | 10.7 | 6774 | 38.0 | -8 |
| Nevada | Elko | 6.0 | 7483 | 38.9 | -8 |
| | Ely | 10.5 | 7814 | 47.6 | -10 |
| | Las Vegas | 9.0 | 2601 | 1.4 | 25 |
| | Reno | 6.4 | 6022 | 26.5 | 5 |
| New Hampshire | Concord | 6.7 | 7360 | 64.8 | -8 |
| New Jersey | Atlantic City | 10.6 | 4940 | 15.8 | 10 |
| | Newark | 10.1 | 5034 | 27.3 | 10 |
| | Trenton | 9.0 | 4952 | 22.7 | 11 |
| New Mexico | Albuquerque | 9.0 | 4292 | 10.5 | 12 |
| New York | Albany | 8.9 | 6962 | 65.7 | -6 |
| | Binghamton | 10.3 | 7285 | 86.9 | -2 |
| | Buffalo | 12.3 | 6927 | 92.9 | 2 |
| | New York/LaGuardia | 12.2 | 4909 | 26.2 | 11 |
| | Rochester | 9.7 | 6719 | 86.9 | 1 |
| | Syracuse | 9.9 | 6678 | 110.7 | -3 |
| North Carolina | Asheville | 7.8 | 4237 | 17.4 | 10 |
| | Charlotte | 7.6 | 3218 | 5.3 | 18 |
| | Greensboro/Winston-Salem | 7.7 | 3825 | 8.7 | 15 |
| | Raleigh/Durham | 7.9 | 3514 | 6.8 | 16 |
| | Wilmington | 9.0 | 2433 | 1.9 | 23 |
| North Dakota | Bismarck | 10.5 | 9044 | 38.7 | -23 |
| | Fargo | 12.7 | 9271 | 35.5 | -22 |
| | Grand Forks | N/A | 9871 | N/A | -26 |
| Ohio | Akron/Canton | 9.9 | 6224 | 47.8 | 1 |
| | Cincinnati | 9.1 | 5070 | 23.9 | 1 |
| | Cleveland | 10.8 | 6154 | 52.2 | 1 |
| | Columbus | 8.7 | 5702 | 27.7 | 0 |
| | Dayton | 10.2 | 5641 | 27.8 | -1 |
| | Mansfield | 11.1 | 5818 | 41.2 | 0 |
| | Toledo | 9.5 | 6381 | 38.9 | -3 |
| | Youngstown | 10.1 | 6426 | 57.6 | -1 |
| Oklahoma | Oklahoma City | 12.8 | 3695 | 8.8 | 9 |
| | Tulsa | 10.6 | 3680 | 9.1 | 8 |
| Oregon | Baker | N/A | 7087 | N/A | -1 |
| | Eugene | 7.6 | 4739 | 7.6 | 17 |
| | Medford | 4.8 | 4930 | 8.7 | 19 |
| | Pendleton | 9.2 | 5240 | 17.7 | -2 |
| | Portland | 7.8 | 4632 | 7.4 | 17 |

# Technical Information

## Typical Outside Design Temperatures for the United States *(cont'd.)*

| State | City | Mean Wind Speed: MPH[3] | Heating Degree Days[1] | Yearly Snowfall Mean[4] | Outside Design Temp.[2] |
|---|---|---|---|---|---|
| Pennsylvania | Allentown | 9.4 | 5827 | 31.5 | 4 |
| | Erie | 11.4 | 6851 | 83.3 | 4 |
| | Harrisburg | 7.7 | 5224 | 34.5 | 7 |
| | Philadelphia | 9.6 | 4865 | 20.2 | 10 |
| | Pittsburgh | 9.4 | 5930 | 45.3 | 1 |
| | Williamsport | 7.9 | 5982 | 43.8 | 2 |
| Rhode Island | Providence | 10.7 | 5972 | 38.0 | 5 |
| South Carolina | Charleston | 8.8 | 2146 | 0.0 | 24 |
| | Columbia | 6.9 | 2598 | 1.7 | 20 |
| | Greenville | 6.8 | 3163 | 5.7 | 18 |
| South Dakota | Aberdeen | 11.2 | 8616 | 36.4 | -19 |
| | Huron | 11.9 | 8054 | 39.5 | -18 |
| | Pierre | N/A | 7283 | N/A | -15 |
| | Rapid City | 11.3 | 7324 | 39.3 | -11 |
| | Sioux Falls | 11.2 | 7838 | 39.1 | -15 |
| Tennessee | Bristol | 5.6 | 4306 | 15.6 | 9 |
| | Chattanooga | 6.3 | 3505 | 4.0 | 13 |
| | Knoxville | 7.3 | 3478 | 12.2 | 13 |
| | Memphis | 9.1 | 3227 | 5.5 | 13 |
| | Nashville | 8.0 | 3696 | 10.9 | 9 |
| Texas | Abilene | 12.2 | 2610 | 4.5 | 15 |
| | Amarillo | 13.7 | 4183 | 14.3 | 6 |
| | Austin | 9.3 | 1737 | 1.0 | 24 |
| | Brownsville | 11.8 | 650 | 0.0 | 35 |
| | Dallas/Ft. Worth | 10.9 | 2382 | 2.9 | 17 |
| | El Paso | 9.5 | 2678 | 4.7 | 20 |
| | Galveston | 11.0 | 1224 | 0.3 | 31 |
| | Houston | 7.6 | 1434 | 0.4 | 27 |
| | San Antonio | 9.4 | 1570 | 0.5 | 18 |
| Utah | Milford | N/A | 6412 | 43.8 | 5 |
| | Salt Lake City | 8.7 | 5983 | 58.3 | 3 |
| Vermont | Burlington | 8.8 | 7876 | 79.3 | -12 |
| Virginia | Lynchburg | 7.9 | 4233 | 18.1 | 12 |
| | Norfolk | 10.6 | 3488 | 7.0 | 20 |
| | Richmond | 7.5 | 3939 | 13.9 | 14 |
| | Roanoke | 8.4 | 4307 | 24.1 | 12 |
| Washington | Olympia | 6.7 | 5530 | 19.2 | 16 |
| | Seattle | 9.2 | 5185 | 14.6 | 21 |
| | Spokane | 8.7 | 6835 | 53.3 | -6 |
| | Walla Walla | 5.3 | 4835 | 20.0 | 0 |
| | Yakima | 7.2 | 6009 | 24.5 | -2 |
| West Virginia | Beckley | 9.5 | 5613 | 55.8 | -2 |
| | Charleston | 6.5 | 4590 | 29.6 | 7 |
| | Huntingdon | 6.4 | 4624 | 24.1 | 5 |

# Technical Information

## Typical Outside Design Temperatures for the United States *(cont'd.)*

| State | City | Mean Wind Speed: MPH[3] | Heating Degree Days[1] | Yearly Snowfall Mean[4] | Outside Design Temp.[2] |
|---|---|---|---|---|---|
| Wisconsin | Green Bay | 10.2 | 8098 | 44.6 | -13 |
| | LaCrosse | 8.8 | 7417 | 42.9 | -13 |
| | Madison | 9.9 | 7730 | 40.2 | -11 |
| | Milwaukee | 11.8 | 7444 | 45.9 | -8 |
| Wyoming | Casper | 13.1 | 7555 | 73.9 | -11 |
| | Cheyenne | 13.3 | 7255 | 51.2 | -9 |

[1]**Heating Degree Days –** A unit based upon temperature difference and time, used in estimating fuel consumption and specifying nominal heating load of a building in winter. For any one-day, when the mean temperature is less than 65˚F, there exist as many degree-days as there are Fahrenheit degrees difference in temperature between the mean temperature for the day and 65˚F. These heating degree-days (as listed in above chart) were compiled during the 1941-1970 period as published by the National Climate Center.

[2]**Outside Design Temperature –** This figure represents the temperature which will include 99% of all the winterhour Fahrenheit temperatures. A base of 2160 hours (total hours in Dec., Jan., and Feb.) was used. Therefore, using this figure, as a design temperature will, on an average, cover all but 22 hours of expected winter temperatures. **ASRAE 1976 SYSTEMS HANDBOOK.**

[3]**Mean Wind Speed: MPH –** This figure was arrived at through existing and comparable exposures. This information was obtained from the Local Climatological Data, 1977. (This figure is for reference only – not required in computation)

[4]**Yearly Snowfall: Mean –** This mean value is for the period beginning 1944 through 1977. This information was obtained from the Local Climatological Data, 1977.

# Technical Information

## Radiant Infrared Heating - Comfort Heating

### *Indoor Spot Heating*

Infrared spot heating of work stations and personnel in large unheated structures or areas has proven to be economical and satisfactory. The following guidelines may be used for spot heating applications (areas with length or width less than 50 feet).

1. **Determine** the coldest anticipated inside ambient temperature the system must overcome. If freeze protection is provided by another heating system, this temperature will be 40°F.
2. **Determine** the equivalent ambient temperature desired (normally 70°F is the nominal average).
3. **Subtract** 1 from 2 to determine the theoretical increase in ambient temperature ($\Delta T$) expected from the infrared system. If drafts are present in the occupied area (air movement over 44 feet per minute (0.5 mph) velocity), wind shielding or protection from drafts should be considered.
4. **Determine** the area to be heated in ft². This is termed the "design or work area" ($A_D$) (Fig. 1).
5. **Multiply** the design area by one watt per square foot times the theoretical temperature increase ($\Delta T$) desired as determined in Step 3 (minimum of 12 watts per square foot). The design factor of one watt per square foot density assumes a fixture mounting height of 10 feet. Add 5% for each foot greater than 10 feet in mounting height. Avoid mounting fixtures below 8 feet.
6. **Determine** fixture mounting locations
   **a)** In areas where the width dimension is 25 feet or less, use at least two fixtures mounted opposite each other at the perimeter of the area and tilted at an angle. This provides a greater area of exposure to the infrared energy by personnel in the work area. Tilt the fixtures so that the upper limit of the fixture pattern is at approximately six feet above the center of the work station area (Figure 2).
   **b)** When locating fixtures, be sure to allow adequate height clearance for large moving equipment such as cranes and lift trucks.
   **c)** Avoid directing infrared onto outside walls.
7. **Estimate** (tentatively) the radiated pattern area. Add length of fixture to the fixture pattern width (W) to establish pattern length (L). Pattern Area = L x W (Fig. 3).

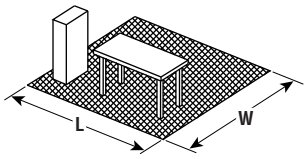



*Figure 1 — Design Area*

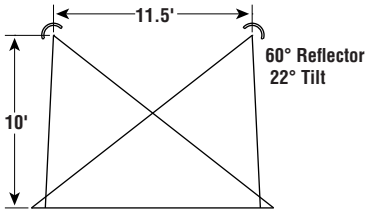
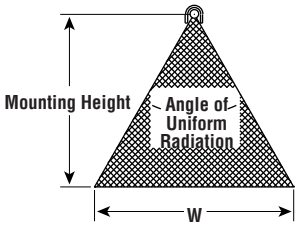



*Figure 2 — Tilted Infrared Fixtures for Spot Heating*



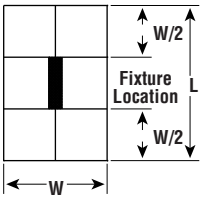




*Figure 3 — Pattern Area*

8. **Divide** the design area (Step 4) into the pattern area (Step 7).

   $$Q = \frac{\text{Pattern Area}}{\text{Design Area}}$$

   If the pattern area is equal to or greater than the design area, quotient (Q) will be equal to or greater than 1 and coverage is adequate. If Q is less than 1, the design area exceeds the pattern area of individual fixtures. Adjust the heater locations and patterns or add additional fixtures with patterns overlapping as necessary, to ensure adequate coverage.
9. **Multiply** quotient (Q in Step 8) by the increase in theoretical temperature ($\Delta T$ of Step 3) by the design area ($A_D$ of Step 4) to determine the amount of radiation to be installed.

   $$\text{Radiation (Watts)} = Q \times \Delta T \times A_D$$
10. **Many Types** of radiant heaters are available for comfort heating applications including ceiling, wall and portable floor standing models. Choose specific fixtures from the product pages. It is preferred that half the wattage requirements be installed on each side of the work station in the design area.

**Controls —** Manual control by percentage timers may be adequate for a small installation. To provide better control of comfort levels in varying ambient temperatures, divide the total heat required into two or three circuits so that each fixture or heating element circuit can be switched on in sequence. Staging can be accomplished by using multistage air thermostats set at different temperatures.

### *Indoor Area Heating*

In many industrial environments, area heating (areas with length or width greater than 50 ft) can be accomplished economically with multiple infrared heaters. For quick estimates, determine the minimum inside temperature and use a factor of 0.5 watts per square foot of design area for each degree of theoretical temperature. If the calculated heat loss of the structure, including infiltration or ventilation air, is less than the quick estimate, select the lower value. Locate heaters uniformly throughout the area with at least a 30% overlap in radiation pattern.

### *Outdoor Spot Heating*

The same guidelines outlined under Indoor Spot Heating should be followed except that watts per square foot for each degree of theoretical ambient temperature increase should be doubled (approximately 2 watts per square foot for each 1°F). This factor applies to outdoor heating applications with little or no wind chill effect on personnel. If wind velocities are a factor in the application, determine the equivalent air temperature from the Wind Chill Chart in NEMA publication HE3-1971 or other information source.

**Note** — Increasing the infrared radiation to massive levels to offset wind chill can create discomfort and thermal stress. In outdoor exposed applications, a wind break or shielding is usually more effective.

# Technical Information

## Watt Density for Typical Applications vs. Temperature Rise

| Application | Condition | Density Watts / Square Foot Desired Comfort Tmperature Rise ˚F | | | | |
|---|---|---|---|---|---|---|
| | | 5°F | 10°F | 15°F | 20°F | 25°F |
| Indoor Supplementry Heat | | 15 to 30 Watts / Square Foot | | | | |
| Indoor Personnel Comfort | No Drafts/No Cold Walls | 5 to 6 | 11 to 13 | 17 to 20 | 22 to 26 | 28 to 33 |
| Indoor Personnel Comfort | Average Conditions | 7 to 9 | 15 to 18 | 23 to 28 | 30 to 36 | 39 to 47 |
| Indoor Personnel Comfort | Drafty Are/Cold Walls | 10 to 12 | 20 to 24 | 30 to 36 | 40 to 48 | 50 to 60 |
| Indoor Personnel Comfort | Large Mall Type Buildings | 40 TO 60 WATTS / SQUARE FOOT | | | | |
| Indoor Moisture | Removal and Control | 15 TO 30 WATTS / SQUARE FOOT | | | | |
| Outdoor Loading Dock | Protected Area W/Wind Shield | 80 TO 120 WATTS / SQUARE FOOT | | | | |
| Outdoor Marquee Heating | Snow & Ice Melting 20 ft. Mounting Hgt. | Use Table B | | | | |
| Outdoor Personnel Comfort | Not Open To Sky Protected Area No Wind | 10 to 12 | 20 to 24 | 30 to 36 | 40 to 48 | 50 to 60 |

Radiant Fixtures for spot heating of individuals should be mounted 10 to 12 feet from the floor with coverage from at least two (2) sides and directed at the individuals waist and never directly overhead. If fixture must be mounted over 12' from the floor, add 25% to the indicated watt density up to a maximum of 15'.

## Snow Control Design Guidelines

| Outside Design Temperature (˚F) | Annual Snowfall Inches | Exposed* w/ sq.ft. | Semi-Protected* w/ sq.ft. | Protected* w/ sq.ft. |
|---|---|---|---|---|
| -20 to -60 | 80 to 115 | 200 | 185 | 160 |
| -20 to -60 | 50 to 79 | 175 | 160 | 145 |
| -20 to -60 | 20 to 49 | 125 | 110 | 100 |
| -20 to -60 | 10 to 19 | 110 | 100 | 90 |
| -20 to -60 | 0 to 9 | 100 | 90 | 85 |
| -10 to -19 | 80 to 115 | 175 | 160 | 145 |
| -10 to -19 | 50 to 79 | 125 | 110 | 100 |
| -10 to -19 | 20 to 49 | 110 | 100 | 90 |
| -10 to -19 | 10 to 19 | 100 | 90 | 85 |
| -10 to -19 | 0 to 9 | 100 | 80 | 75 |
| 0 to -9 | 80 to 115 | 125 | 110 | 100 |
| 0 to -9 | 50 to 79 | 110 | 100 | 90 |
| 0 to -9 | 20 to 49 | 100 | 90 | 85 |
| 0 to -9 | 10 to 19 | 100 | 80 | 75 |
| 0 to -9 | 0 to 9 | 100 | 70 | 65 |
| 19 to 1 | 80 to 115 | 110 | 100 | 90 |
| 19 to 1 | 50 to79 | 100 | 90 | 85 |
| 19 to 1 | 20 to 49 | 100 | 80 | 75 |
| 19 to 1 | 10 to 19 | 100 | 70 | 65 |
| 19 to 1 | 0 to 9 | 100 | 70 | 60 |
| 40 to 18 | 80 to 115 | 100 | 70 | 60 |
| 40 to 18 | 50 to 79 | 100 | 70 | 60 |
| 40 to 18 | 20 to 49 | 100 | 70 | 60 |
| 40 to 18 | 10 to 19 | 100 | 70 | 60 |
| 40 to 18 | 0 to 9 | 100 | 70 | 60 |

* Exposed = Totally open area
* Semi-Protected = One side closed plus roof or overhang
* Protected = Three sides plus roof or overhang

**Heater Selection Guidelines**

1. Always use clear quartz lamps as the correct element selection
2. Use CRDS or CRTS stainless steel enclosures for outdoor locations
3. For best results use 30˚ symmetric units. 60˚ symmetric or assymetric enclosures are generally satisfactory in semi-protected or shielded areas. **Never use 90˚ reflectors.**

# Technical Information

## 90˚ Symmetrical Reflector Table for Single Element RBC-1

| Mounting Height Ft. | Area (WxL) Ft. | Square Ft. | Metal Sheath Element Radiant Efficiency 60% | | | |
|---|---|---|---|---|---|---|
| | | | 1 kW w/sq. ft. | 1.5 kW w/sq. ft. | 2 kW w/sq. ft. | 2.5 kW w/sq. ft. |
| 8 | 16 X 16 | 256 | 2.3 | 3.5 | 4.7 | 5.9 |
| 9 | 18 X 18 | 324 | 1.9 | 2.8 | 3.7 | 4.6 |
| 10 | 20 X 20 | 400 | 1.5 | 2.3 | 3.0 | 3.8 |
| 11 | 22 X 22 | 484 | 1.2 | 1.9 | 2.5 | 3.1 |
| 12 | 24 X 24 | 576 | 1.0 | 1.6 | 2.1 | 2.6 |
| 13 | 26 X 26 | 676 | 0.9 | 1.3 | 1.8 | 2.2 |
| 14 | 28 X 28 | 784 | 0.8 | 1.1 | 1.5 | 1.9 |
| 15 | 30 X 30 | 900 | 0.7 | 1.0 | 1.3 | 1.7 |

## 60˚ Symmetrical Reflector Table for 1 and 3 Element STAR Infrared Heaters

| Mounting Height Ft. | Area (WxL) Ft. | Square Ft. | Metal Sheath Element Radiant Efficiency 60%% | | | | |
|---|---|---|---|---|---|---|---|
| | | | 1.5 kW w/sq. ft. | 2 kW w/sq. ft. | 4.5 kW w/sq. ft. | 6 kW w/sq. ft. | 13.5 kW w/sq. ft. |
| 8 | 9.2 X 9.2 | 85 | 10.6 | 14.2 | 31.9 | 42.5 | 95.7 |
| 9 | 10.35 X 10.35 | 107 | 8.4 | 11.2 | 25.2 | 33.6 | 75.6 |
| 10 | 11.5 X 11.5 | 132 | 6.8 | 9.1 | 20.4 | 27.2 | 61.2 |
| 11 | 12.65 X 12.65 | 160 | 5.6 | 7.5 | 16.9 | 22.5 | 50.6 |
| 12 | 13.8 X 13.8 | 190 | 4.7 | 6.3 | 14.2 | 18.9 | 42.5 |
| 13 | 14.95 X 14.95 | 224 | 4.0 | 5.4 | 12.1 | 16.1 | 36.2 |
| 14 | 16.1 X 16.1 | 259 | 3.5 | 4.6 | 10.4 | 13.9 | 31.2 |
| 15 | 17.25 X 17.25 | 298 | 3.0 | 4.0 | 9.1 | 12.1 | 27.2 |
| 16 | 18.4 X 18.4 | 339 | 2.7 | 3.5 | 8.0 | 10.6 | 23.9 |
| 17 | 19.55 X 19.55 | 382 | 2.4 | 3.1 | 7.1 | 9.4 | 21.2 |
| 18 | 20.7 X 20.7 | 428 | 2.1 | 2.8 | 6.3 | 8.4 | 18.9 |
| 19 | 21.85 X 21.85 | 477 | 1.9 | 2.5 | 5.7 | 7.5 | 17.0 |
| 20 | 23 X 23 | 529 | 1.7 | 2.3 | 5.1 | 6.8 | 15.3 |
| 21 | 24.15 X 24.15 | 583 | 1.5 | 2.1 | 4.6 | 6.2 | 13.9 |
| 22 | 25.3 X 25.3 | 640 | 1.4 | 1.9 | 4.2 | 5.6 | 12.7 |
| 23 | 26.45 X 26.45 | 700 | 1.3 | 1.7 | 3.9 | 5.1 | 11.6 |
| 24 | 27.6 X 27.6 | 762 | 1.2 | 1.6 | 3.5 | 4.7 | 10.6 |

# Technical Information

## 90° Symmetrical Reflectors for 2 & 3 Element High-Intensity Infrared Heaters

| | | | METAL SHEATH ELEMENT RADIANT EFFICIENCY 60% | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 24" Enclosure | | 33" Enclosure | | 46" Enclosure | |
| Mounting Height Ft. | Area (W X L) Ft. | Square Ft. | 2 Element 1.6 KW w/sq.ft. | 3 Element 2.5 KW w/sq.ft. | 2 Element 3 KW w/sq.ft. | 3 Element 4.5 KW w/sq.ft. | 2 Element 4 KW w/sq.ft. | 3 Element 6 KW w/sq.ft. |
| 5 | 10 X 10 | 100 | 9.6 | 15.0 | 18.0 | 27.0 | 24.0 | 36.0 |
| 6 | 12 X 12 | 144 | 6.7 | 10.4 | 12.5 | 18.8 | 16.7 | 25.0 |
| 7 | 14 X 14 | 196 | 4.9 | 7.7 | 9.2 | 13.8 | 12.2 | 18.4 |
| 8 | 16 X 16 | 256 | 3.8 | 5.9 | 7.0 | 10.5 | 9.4 | 14.1 |
| 9 | 18 X 18 | 324 | 3.0 | 4.6 | 5.6 | 8.3 | 7.4 | 11.1 |
| 10 | 20 X 20 | 400 | 2.4 | 3.8 | 4.5 | 6.8 | 6.0 | 9.0 |
| 11 | 22 X 22 | 484 | 2.0 | 3.1 | 3.7 | 5.6 | 5.0 | 7.4 |
| 12 | 24 X 24 | 576 | 1.7 | 2.6 | 3.1 | 4.7 | 4.2 | 6.3 |
| 13 | 26 X 26 | 676 | 1.4 | 2.2 | 2.7 | 4.0 | 3.6 | 5.3 |
| 14 | 28 X 28 | 784 | 1.2 | 1.9 | 2.3 | 3.4 | 3.1 | 4.6 |
| 15 | 30 X 30 | 900 | 1.1 | 1.7 | 2.0 | 3.0 | 2.7 | 4.0 |
| 16 | 32 X 32 | 1024 | | 1.5 | 1.8 | 2.6 | 2.3 | 3.5 |
| 17 | 34 X 34 | 1156 | | 1.3 | 1.6 | 2.3 | 2.1 | 3.1 |
| 18 | 36 X 36 | 1296 | | 1.2 | 1.4 | 2.1 | 1.9 | 2.8 |
| 19 | 38 X 38 | 1444 | | 1.0 | 1.2 | 1.9 | 1.7 | 2.5 |
| 20 | 40 X 40 | 1600 | | | 1.1 | 1.7 | 1.5 | 2.3 |

| | | | QUARTZ TUBE ELEMENT RADIANT EFFICIENCY 80% | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 24" Enclosure | | 33" Enclosure | | 46" Enclosure | |
| Mounting Height Ft. | Area (W X L) Ft. | Square Ft. | 2 Element 2 KW w/sq.ft. | 3 Element 3 KW w/sq.ft. | 2 Element 4 KW w/sq.ft. | 3 Element 6 KW w/sq.ft. | 2 Element 6 KW w/sq.ft. | 3 Element 9 KW w/sq.ft. |
| 5 | 10 X 10 | 100 | 16.0 | 24.0 | 32.0 | 48.0 | 48.0 | 72.0 |
| 6 | 12 X 12 | 144 | 11.1 | 16.7 | 22.2 | 33.3 | 33.3 | 50.0 |
| 7 | 14 X 14 | 196 | 8.2 | 7.7 | 16.3 | 24.5 | 24.5 | 36.7 |
| 8 | 16 X 16 | 256 | 6.3 | 12.2 | 12.5 | 18.8 | 18.8 | 28.1 |
| 9 | 18 X 18 | 324 | 4.9 | 9.4 | 9.9 | 14.8 | 14.8 | 22.2 |
| 10 | 20 X 20 | 400 | 4.0 | 6.0 | 8.0 | 12.0 | 12.0 | 18.0 |
| 11 | 22 X 22 | 484 | 3.3 | 5.0 | 6.6 | 9.9 | 9.9 | 14.9 |
| 12 | 24 X 24 | 576 | 2.8 | 4.2 | 5.6 | 8.3 | 8.3 | 12.5 |
| 13 | 26 X 26 | 676 | 2.4 | 3.6 | 4.7 | 7.1 | 7.1 | 10.7 |
| 14 | 28 X 28 | 784 | 2.0 | 3.1 | 4.1 | 6.1 | 6.1 | 9.2 |
| 15 | 30 X 30 | 900 | 1.8 | 2.7 | 3.6 | 5.3 | 5.3 | 8.0 |
| 16 | 32 X 32 | 1024 | 1.6 | 2.3 | 3.1 | 4.7 | 4.7 | 7.0 |
| 17 | 34 X 34 | 1156 | 1.4 | 2.1 | 2.8 | 4.2 | 4.2 | 6.2 |
| 18 | 36 X 36 | 1296 | 1.2 | 1.9 | 2.5 | 3.7 | 3.7 | 5.6 |
| 19 | 38 X 38 | 1444 | 1.1 | 1.7 | 2.2 | 3.3 | 3.3 | 5.0 |
| 20 | 40 X 40 | 1600 | 1.0 | 1.5 | 2.0 | 3.0 | 3.0 | 4.5 |

| | | | QUARTZ LAMP ELEMENT RADIANT EFFICIENCY 80% | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 24" Enclosure | | 33" Enclosure | | 46" Enclosure | |
| Mounting Height Ft. | Area (W X L) Ft. | Square Ft. | 2 Element 3.2 KW w/sq.ft. | 3 Element 4.8 KW w/sq.ft. | 2 Element 5 KW w/sq.ft. | 3 Element 7.5 KW w/sq.ft. | 2 Element 7.3 KW w/sq.ft. | 3 Element 10.95 KW w/sq.ft. |
| 5 | 10 X 10 | 100 | 25.6 | 38.4 | 40.0 | 60.0 | 58.4 | 87.6 |
| 6 | 12 X 12 | 144 | 17.8 | 26.7 | 27.8 | 41.7 | 40.6 | 60.8 |
| 7 | 14 X 14 | 196 | 13.1 | 19.6 | 20.4 | 30.6 | 29.8 | 44.7 |
| 8 | 16 X 16 | 256 | 10.0 | 15.0 | 15.6 | 23.4 | 22.8 | 34.2 |
| 9 | 18 X 18 | 324 | 7.9 | 11.9 | 12.3 | 18.5 | 18.0 | 27.0 |
| 10 | 20 X 20 | 400 | 6.4 | 9.6 | 10.0 | 15.0 | 14.6 | 21.9 |
| 11 | 22 X 22 | 484 | 5.3 | 7.9 | 8.3 | 12.4 | 12.1 | 18.1 |
| 12 | 24 X 24 | 576 | 4.4 | 6.7 | 6.9 | 10.4 | 10.1 | 15.2 |
| 13 | 26 X 26 | 676 | 3.8 | 5.7 | 5.9 | 8.9 | 8.6 | 13.0 |
| 14 | 28 X 28 | 784 | 3.3 | 4.9 | 5.1 | 7.7 | 7.4 | 11.2 |
| 15 | 30 X 30 | 900 | 2.8 | 4.3 | 4.4 | 6.7 | 6.5 | 9.7 |
| 16 | 32 X 32 | 1024 | 2.5 | 3.8 | 3.9 | 5.9 | 5.7 | 8.6 |
| 17 | 34 X 34 | 1156 | 2.2 | 3.3 | 3.5 | 5.2 | 5.1 | 7.6 |
| 18 | 36 X 36 | 1296 | 2.0 | 3.0 | 3.1 | 4.6 | 4.5 | 6.8 |
| 19 | 38 X 38 | 1444 | 1.8 | 2.7 | 2.8 | 4.2 | 4.0 | 6.1 |
| 20 | 40 X 40 | 1600 | 1.6 | 2.4 | 2.5 | 3.8 | 3.7 | 5.5 |

# Technical Information

## 60° Symmetrical Reflectors for 2 & 3 Element High-Intensity Infrared Heaters

| | | | METAL SHEATH ELEMENT RADIANT EFFICIENCY 60% | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 24" Enclosure | | 33" Enclosure | | 46" Enclosure | |
| Mounting Height Ft. | Area (W X L) Ft. | Square Ft. | 2 Element 1.6 KW w/sq.ft. | 3 Element 2.5 KW w/sq.ft. | 2 Element 3 KW w/sq.ft. | 3 Element 4.5 KW w/sq.ft. | 2 Element 4 KW w/sq.ft. | 3 Element 6 KW w/sq.ft. |
| 5 | 5.8 X 10 | 57.5 | 16.7 | 26.1 | 31.3 | 47.0 | 41.7 | 62.6 |
| 6 | 6.9 X 12 | 82.8 | 11.6 | 18.1 | 21.7 | 32.6 | 29.0 | 43.5 |
| 7 | 8.1 X 14 | 112.7 | 8.5 | 13.3 | 16.0 | 24.0 | 21.3 | 31.9 |
| 8 | 9.2 X 16 | 147.2 | 6.5 | 10.2 | 12.2 | 18.3 | 16.3 | 24.5 |
| 9 | 10.4 X 18 | 186.3 | 5.2 | 8.1 | 9.7 | 14.5 | 12.9 | 19.3 |
| 10 | 11.5 X 20 | 230.0 | 4.2 | 6.5 | 7.8 | 11.7 | 10.4 | 15.7 |
| 11 | 12.7 X 22 | 278.3 | 3.4 | 5.4 | 6.5 | 9.7 | 8.6 | 12.9 |
| 12 | 13.8 X 24 | 331.2 | 2.9 | 4.5 | 5.4 | 8.2 | 7.2 | 10.9 |
| 13 | 15.0 X 26 | 388.7 | 2.5 | 3.9 | 4.6 | 6.9 | 6.2 | 9.3 |
| 14 | 16.1 X 28 | 450.8 | 2.1 | 3.3 | 4.0 | 6.0 | 5.3 | 8.0 |
| 15 | 17.3 X 30 | 517.5 | 1.9 | 2.9 | 3.5 | 5.2 | 4.6 | 7.0 |
| 16 | 18.4 X 32 | 588.8 | 1.6 | 2.5 | 3.1 | 4.6 | 4.1 | 6.1 |
| 17 | 19.6 X 34 | 664.7 | 1.4 | 2.3 | 2.7 | 4.1 | 3.6 | 5.4 |
| 18 | 20.7 X 36 | 745.2 | 1.3 | 2.0 | 2.4 | 3.6 | 3.2 | 4.8 |
| 19 | 21.9 X 38 | 830.3 | 1.2 | 1.8 | 2.2 | 3.3 | 2.9 | 4.3 |
| 20 | 23.0 X 40 | 920.0 | 1.0 | 1.6 | 2.0 | 2.9 | 2.6 | 3.9 |
| | | | QUARTZ TUBE ELEMENT RADIANT EFFICIENCY 80% | | | | | |
| | | | 24" Enclosure | | 33" Enclosure | | 46" Enclosure | |
| Mounting Height Ft. | Area (W X L) Ft. | Square Ft. | 2 Element 2 KW w/sq.ft. | 3 Element 3 KW w/sq.ft. | 2 Element 4 KW w/sq.ft. | 3 Element 6 KW w/sq.ft. | 2 Element 6 KW w/sq.ft. | 3 Element 9 KW w/sq.ft. |
| 5 | 5.8 X 10 | 57.5 | 27.8 | 41.7 | 55.7 | 83.5 | 83.5 | 125.2 |
| 6 | 6.9 X 12 | 82.8 | 19.3 | 29.0 | 38.6 | 58.0 | 58.0 | 87.0 |
| 7 | 8.1 X 14 | 112.7 | 14.2 | 21.3 | 28.4 | 42.6 | 42.6 | 63.9 |
| 8 | 9.2 X 16 | 147.2 | 10.9 | 16.3 | 21.7 | 32.6 | 32.6 | 48.9 |
| 9 | 10.4 X 18 | 186.3 | 8.6 | 12.9 | 17.2 | 25.8 | 25.8 | 38.6 |
| 10 | 11.5 X 20 | 230.0 | 7.0 | 10.4 | 13.9 | 20.9 | 20.9 | 31.3 |
| 11 | 12.7 X 22 | 278.3 | 5.7 | 8.6 | 11.5 | 17.2 | 17.2 | 25.9 |
| 12 | 13.8 X 24 | 331.2 | 4.8 | 7.2 | 9.7 | 14.5 | 14.5 | 21.7 |
| 13 | 15.0 X 26 | 388.7 | 4.1 | 6.2 | 8.2 | 12.3 | 12.3 | 18.5 |
| 14 | 16.1 X 28 | 450.8 | 3.5 | 5.3 | 7.1 | 10.6 | 10.6 | 16.0 |
| 15 | 17.3 X 30 | 517.5 | 3.1 | 4.6 | 6.2 | 9.3 | 9.3 | 13.9 |
| 16 | 18.4 X 32 | 588.8 | 2.7 | 4.1 | 5.4 | 8.2 | 8.2 | 12.2 |
| 17 | 19.6 X 34 | 664.7 | 2.4 | 3.6 | 4.8 | 7.2 | 7.2 | 10.8 |
| 18 | 20.7 X 36 | 745.2 | 2.1 | 3.2 | 4.3 | 6.4 | 6.4 | 9.7 |
| 19 | 21.9 X 38 | 830.3 | 1.9 | 2.9 | 3.9 | 5.8 | 5.8 | 8.7 |
| 20 | 23.0 X 40 | 920.0 | 1.7 | 2.6 | 3.5 | 5.2 | 5.2 | 7.8 |
| | | | QUARTZ LAMP ELEMENT RADIANT EFFICIENCY 80% | | | | | |
| | | | 24" Enclosure | | 33" Enclosure | | 46" Enclosure | |
| Mounting Height Ft. | Area (W X L) Ft. | Square Ft. | 2 Element 3.2 KW w/sq.ft. | 3 Element 4.8 KW w/sq.ft. | 2 Element 5 KW w/sq.ft. | 3 Element 7.5 KW w/sq.ft. | 2 Element 7.3 KW w/sq.ft. | 3 Element 10.95 KW w/sq.ft. |
| 5 | 5.8 X 10 | 57.5 | 44.5 | 66.8 | 69.6 | 104.3 | 101.6 | 152.3 |
| 6 | 6.9 X 12 | 82.8 | 30.9 | 46.4 | 48.3 | 72.5 | 70.5 | 105.8 |
| 7 | 8.1 X 14 | 112.7 | 22.7 | 34.1 | 35.5 | 53.2 | 51.8 | 77.7 |
| 8 | 9.2 X 16 | 147.2 | 17.4 | 26.1 | 27.2 | 40.8 | 39.7 | 59.5 |
| 9 | 10.4 X 18 | 186.3 | 13.7 | 20.6 | 21.5 | 32.2 | 31.3 | 47.0 |
| 10 | 11.5 X 20 | 230.0 | 11.1 | 16.7 | 17.4 | 26.1 | 25.4 | 38.1 |
| 11 | 12.7 X 22 | 278.3 | 9.2 | 13.8 | 14.4 | 21.6 | 21.0 | 31.5 |
| 12 | 13.8 X 24 | 331.2 | 7.7 | 11.6 | 12.1 | 18.1 | 17.6 | 26.4 |
| 13 | 15.0 X 26 | 388.7 | 6.6 | 9.9 | 10.3 | 15.4 | 15.0 | 22.5 |
| 14 | 16.1 X 28 | 450.8 | 5.7 | 8.5 | 8.9 | 13.3 | 13.0 | 19.4 |
| 15 | 17.3 X 30 | 517.5 | 4.9 | 7.4 | 7.7 | 11.6 | 11.3 | 16.9 |
| 16 | 18.4 X 32 | 588.8 | 4.3 | 6.5 | 6.8 | 10.2 | 9.9 | 14.9 |
| 17 | 19.6 X 34 | 664.7 | 3.9 | 5.8 | 6.0 | 9.0 | 8.8 | 13.2 |
| 18 | 20.7 X 36 | 745.2 | 3.4 | 5.2 | 5.4 | 8.1 | 7.8 | 11.8 |
| 19 | 21.9 X 38 | 830.3 | 3.1 | 4.6 | 4.8 | 7.2 | 7.0 | 10.6 |
| 20 | 23.0 X 40 | 920.0 | 2.8 | 4.2 | 4.3 | 6.5 | 6.3 | 9.5 |

# Technical Information

## 30° Symmetrical Reflectors for 2 & 3 Element High-Intensity Infrared Heaters

| | | | METAL SHEATH ELEMENT RADIANT EFFICIENCY 60% | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 24" Enclosure | | 33" Enclosure | | 46" Enclosure | |
| Mounting Height Ft. | Area (W X L) Ft. | Square Ft. | 2 Element 1.6 KW w/sq.ft. | 3 Element 2.5 KW w/sq.ft. | 2 Element 3 KW w/sq.ft. | 3 Element 4.5 KW w/sq.ft. | 2 Element 4 KW w/sq.ft. | 3 Element 6 KW w/sq.ft. |
| 5 | 2.7 X 10 | 27.0 | 35.6 | 55.6 | 66.7 | 100.0 | 88.9 | 133.3 |
| 6 | 3.2 X 12 | 38.9 | 24.7 | 38.6 | 46.3 | 69.4 | 61.7 | 92.6 |
| 7 | 3.8 X 14 | 52.9 | 18.1 | 28.3 | 34.0 | 51.0 | 45.4 | 68.0 |
| 8 | 4.3 X 16 | 69.1 | 13.9 | 21.7 | 26.0 | 39.1 | 34.7 | 52.1 |
| 9 | 4.9 X 18 | 87.5 | 11.0 | 17.1 | 20.6 | 30.9 | 27.4 | 41.2 |
| 10 | 5.4 X 20 | 108.0 | 8.9 | 13.9 | 16.7 | 25.0 | 22.2 | 33.3 |
| 11 | 5.9 X 22 | 130.7 | 7.3 | 11.5 | 13.8 | 20.7 | 18.4 | 27.5 |
| 12 | 6.5 X 24 | 155.5 | 6.2 | 9.6 | 11.6 | 17.4 | 15.4 | 23.1 |
| 13 | 7.0 X 26 | 182.5 | 5.3 | 8.2 | 9.9 | 14.8 | 13.1 | 19.7 |
| 14 | 7.6 X 28 | 211.7 | 4.5 | 7.1 | 8.5 | 12.8 | 11.3 | 17.0 |
| 15 | 8.1 X 30 | 243.0 | 4.0 | 6.2 | 7.4 | 11.1 | 9.9 | 14.8 |
| 16 | 8.6 X 32 | 276.5 | 3.5 | 5.4 | 6.5 | 9.8 | 8.7 | 13.0 |
| 17 | 9.2 X 34 | 312.1 | 3.1 | 4.8 | 5.8 | 8.7 | 7.7 | 11.5 |
| 18 | 9.7 X 36 | 349.9 | 2.7 | 4.3 | 5.1 | 7.7 | 6.9 | 10.3 |
| 19 | 10.3 X 38 | 389.9 | 2.5 | 3.8 | 4.6 | 6.9 | 6.2 | 9.2 |
| 20 | 10.8 X 40 | 432.0 | 2.2 | 3.5 | 4.2 | 6.3 | 5.6 | 8.3 |

| | | | QUARTZ TUBE ELEMENT RADIANT EFFICIENCY 80% | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 24" Enclosure | | 33" Enclosure | | 46" Enclosure | |
| Mounting Height Ft. | Area (W X L) Ft. | Square Ft. | 2 Element 2 KW w/sq.ft. | 3 Element 3 KW w/sq.ft. | 2 Element 4 KW w/sq.ft. | 3 Element 6 KW w/sq.ft. | 2 Element 6 KW w/sq.ft. | 3 Element 9 KW w/sq.ft. |
| 5 | 2.7 X 10 | 27.0 | 59.3 | 88.9 | 118.5 | 177.8 | 177.8 | 266.7 |
| 6 | 3.2 X 12 | 38.9 | 41.2 | 61.7 | 82.3 | 123.5 | 123.5 | 185.2 |
| 7 | 3.8 X 14 | 52.9 | 30.2 | 45.4 | 60.5 | 90.7 | 90.7 | 136.1 |
| 8 | 4.3 X 16 | 69.1 | 23.1 | 34.7 | 46.3 | 69.4 | 69.4 | 104.2 |
| 9 | 4.9 X 18 | 87.5 | 18.3 | 27.4 | 36.6 | 54.9 | 54.9 | 82.3 |
| 10 | 5.4 X 20 | 108.0 | 14.8 | 22.2 | 29.6 | 44.4 | 44.4 | 66.7 |
| 11 | 5.9 X 22 | 130.7 | 12.2 | 18.4 | 24.5 | 36.7 | 36.7 | 55.1 |
| 12 | 6.5 X 24 | 155.5 | 10.3 | 15.4 | 20.6 | 30.9 | 30.9 | 46.3 |
| 13 | 7.0 X 26 | 182.5 | 8.8 | 13.1 | 17.5 | 26.3 | 26.3 | 39.4 |
| 14 | 7.6 X 28 | 211.7 | 7.6 | 11.3 | 15.1 | 22.7 | 22.7 | 34.0 |
| 15 | 8.1 X 30 | 243.0 | 6.6 | 9.9 | 13.2 | 19.8 | 19.8 | 29.6 |
| 16 | 8.6 X 32 | 276.5 | 5.8 | 8.7 | 11.6 | 17.4 | 17.4 | 26.0 |
| 17 | 9.2 X 34 | 312.1 | 5.1 | 7.7 | 10.3 | 15.4 | 15.4 | 23.1 |
| 18 | 9.7 X 36 | 349.9 | 4.6 | 6.9 | 9.1 | 13.7 | 13.7 | 20.6 |
| 19 | 10.3 X 38 | 389.9 | 4.1 | 6.2 | 8.2 | 12.3 | 12.3 | 18.5 |
| 20 | 10.8 X 40 | 432.0 | 3.7 | 5.6 | 7.4 | 11.1 | 11.1 | 16.7 |

| | | | QUARTZ LAMP ELEMENT RADIANT EFFICIENCY 80% | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 24" Enclosure | | 33" Enclosure | | 46" Enclosure | |
| Mounting Height Ft. | Area (W X L) Ft. | Square Ft. | 2 Element 3.2 KW w/sq.ft. | 3 Element 4.8 KW w/sq.ft. | 2 Element 5 KW w/sq.ft. | 3 Element 7.5 KW w/sq.ft. | 2 Element 7.3 KW w/sq.ft. | 3 Element 10.95 KW w/sq.ft. |
| 5 | 2.7 X 10 | 27.0 | 94.8 | 142.2 | 148.1 | 222.2 | 216.3 | 324.4 |
| 6 | 3.2 X 12 | 38.9 | 65.8 | 98.8 | 102.9 | 154.3 | 150.2 | 225.3 |
| 7 | 3.8 X 14 | 52.9 | 48.4 | 72.6 | 75.6 | 113.4 | 110.4 | 165.5 |
| 8 | 4.3 X 16 | 69.1 | 37.0 | 55.6 | 57.9 | 86.8 | 84.5 | 126.7 |
| 9 | 4.9 X 18 | 87.5 | 29.3 | 43.9 | 45.7 | 68.6 | 66.8 | 100.1 |
| 10 | 5.4 X 20 | 108.0 | 23.7 | 35.6 | 37.0 | 55.6 | 54.1 | 81.1 |
| 11 | 5.9 X 22 | 130.7 | 19.6 | 29.4 | 30.6 | 45.9 | 44.7 | 67.0 |
| 12 | 6.5 X 24 | 155.5 | 16.5 | 24.7 | 25.7 | 38.6 | 37.6 | 56.3 |
| 13 | 7.0 X 26 | 182.5 | 14.0 | 21.0 | 21.9 | 32.9 | 32.0 | 48.0 |
| 14 | 7.6 X 28 | 211.7 | 12.1 | 18.1 | 18.9 | 28.3 | 27.6 | 41.4 |
| 15 | 8.1 X 30 | 243.0 | 10.5 | 15.8 | 16.5 | 24.7 | 24.0 | 36.0 |
| 16 | 8.6 X 32 | 276.5 | 9.3 | 13.9 | 14.5 | 21.7 | 21.1 | 31.7 |
| 17 | 9.2 X 34 | 312.1 | 8.2 | 12.3 | 12.8 | 19.2 | 18.7 | 28.1 |
| 18 | 9.7 X 36 | 349.9 | 7.3 | 11.0 | 11.4 | 17.1 | 16.7 | 25.0 |
| 19 | 10.3 X 38 | 389.9 | 6.6 | 9.8 | 10.3 | 15.4 | 15.0 | 22.5 |
| 20 | 10.8 X 40 | 432.0 | 5.9 | 8.9 | 9.3 | 13.9 | 13.5 | 20.3 |

# Technical Information

## 60° Asymmetrical Reflectors for 2 & 3 Element High-Intensity Infrared Heaters

| | | | METAL SHEATH ELEMENT RADIANT EFFICIENCY 60% | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 24" Enclosure | | 33" Enclosure | | 46" Enclosure | |
| Mounting Height Ft. | Area (W X L) Ft. | Square Ft. | 2 Element 1.6 KW w/sq.ft. | 3 Element 2.5 KW w/sq.ft. | 2 Element 3 KW w/sq.ft. | 3 Element 4.5 KW w/sq.ft. | 2 Element 4 KW w/sq.ft. | 3 Element 6 KW w/sq.ft. |
| 5 | 6 X 10 | 63 | 15.4 | 24.0 | 28.8 | 43.2 | 38.4 | 57.6 |
| 6 | 8 X 12 | 90 | 10.7 | 16.7 | 20.0 | 30.0 | 26.7 | 40.0 |
| 7 | 9 X 14 | 123 | 7.8 | 12.2 | 14.7 | 22.0 | 19.6 | 29.4 |
| 8 | 10 X 16 | 160 | 6.0 | 9.4 | 11.3 | 16.9 | 15.0 | 22.5 |
| 9 | 11 X 18 | 203 | 4.7 | 7.4 | 8.9 | 13.3 | 11.9 | 17.8 |
| 10 | 13 X 20 | 250 | 3.8 | 6.0 | 7.2 | 10.8 | 9.6 | 14.4 |
| 11 | 14 X 22 | 303 | 3.2 | 5.0 | 6.0 | 8.9 | 7.9 | 11.9 |
| 12 | 15 X 24 | 360 | 2.7 | 4.2 | 5.0 | 7.5 | 6.7 | 10.0 |
| 13 | 16 X 26 | 423 | 2.3 | 3.6 | 4.3 | 6.4 | 5.7 | 8.5 |
| 14 | 18 X 28 | 490 | 2.0 | 3.1 | 3.7 | 5.5 | 4.9 | 7.3 |
| 15 | 19 X 30 | 563 | 1.7 | 2.7 | 3.2 | 4.8 | 4.3 | 6.4 |
| 16 | 20 X 32 | 640 | 1.5 | 2.3 | 2.8 | 4.2 | 3.8 | 5.6 |
| 17 | 21 X 34 | 723 | 1.3 | 2.1 | 2.5 | 3.7 | 3.3 | 5.0 |
| 18 | 23 X 36 | 810 | 1.2 | 1.9 | 2.2 | 3.3 | 3.0 | 4.4 |
| 19 | 24 X 38 | 903 | 1.1 | 1.7 | 2.0 | 3.0 | 2.7 | 4.0 |
| 20 | 25 X 40 | 1000 | 1.0 | 1.5 | 1.8 | 2.7 | 2.4 | 3.6 |

| | | | QUARTZ TUBE ELEMENT RADIANT EFFICIENCY 80% | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 24" Enclosure | | 33" Enclosure | | 46" Enclosure | |
| Mounting Height Ft. | Area (W X L) Ft. | Square Ft. | 2 Element 2 KW w/sq.ft. | 3 Element 3 KW w/sq.ft. | 2 Element 4 KW w/sq.ft. | 3 Element 6 KW w/sq.ft. | 2 Element 6 KW w/sq.ft. | 3 Element 9 KW w/sq.ft. |
| 5 | 6 X 10 | 63 | 25.6 | 38.4 | 51.2 | 76.8 | 76.8 | 115.2 |
| 6 | 8 X 12 | 90 | 17.8 | 26.7 | 35.6 | 53.3 | 53.3 | 80.0 |
| 7 | 9 X 14 | 123 | 13.1 | 19.6 | 26.1 | 39.2 | 39.2 | 58.8 |
| 8 | 10 X 16 | 160 | 10.0 | 15.0 | 20.0 | 30.0 | 30.0 | 45.0 |
| 9 | 11 X 18 | 203 | 7.9 | 11.9 | 15.8 | 23.7 | 23.7 | 35.6 |
| 10 | 13 X 20 | 250 | 6.4 | 9.6 | 12.8 | 19.2 | 19.2 | 28.8 |
| 11 | 14 X 22 | 303 | 5.3 | 7.9 | 10.6 | 15.9 | 15.9 | 23.8 |
| 12 | 15 X 24 | 360 | 4.4 | 6.7 | 8.9 | 13.3 | 13.3 | 20.0 |
| 13 | 16 X 26 | 423 | 3.8 | 5.7 | 7.6 | 11.4 | 11.4 | 17.0 |
| 14 | 18 X 28 | 490 | 3.3 | 4.9 | 6.5 | 9.8 | 9.8 | 14.7 |
| 15 | 19 X 30 | 563 | 2.8 | 4.3 | 5.7 | 8.5 | 8.5 | 12.8 |
| 16 | 20 X 32 | 640 | 2.5 | 3.8 | 5.0 | 7.5 | 7.5 | 11.3 |
| 17 | 21 X 34 | 723 | 2.2 | 3.3 | 4.4 | 6.6 | 6.6 | 10.0 |
| 18 | 23 X 36 | 810 | 2.0 | 3.0 | 4.0 | 5.9 | 5.9 | 8.9 |
| 19 | 24 X 38 | 903 | 1.8 | 2.7 | 3.5 | 5.3 | 5.3 | 8.0 |
| 20 | 25 X 40 | 1000 | 1.6 | 2.4 | 3.2 | 4.8 | 4.8 | 7.2 |

| | | | QUARTZ LAMP ELEMENT RADIANT EFFICIENCY 80% | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 24" Enclosure | | 33" Enclosure | | 46" Enclosure | |
| Mounting Height Ft. | Area (W X L) Ft. | Square Ft. | 2 Element 3.2 KW w/sq.ft. | 3 Element 4.8 KW w/sq.ft. | 2 Element 5 KW w/sq.ft. | 3 Element 7.5 KW w/sq.ft. | 2 Element 7.3 KW w/sq.ft. | 3 Element 10.95 KW w/sq.ft. |
| 5 | 6 X 10 | 63 | 41.0 | 61.4 | 64.0 | 96.0 | 93.4 | 140.2 |
| 6 | 8 X 12 | 90 | 28.4 | 42.7 | 44.4 | 66.7 | 64.9 | 97.3 |
| 7 | 9 X 14 | 123 | 20.9 | 31.3 | 32.7 | 49.0 | 47.7 | 71.5 |
| 8 | 10 X 16 | 160 | 16.0 | 24.0 | 25.0 | 37.5 | 36.5 | 54.8 |
| 9 | 11 X 18 | 203 | 12.6 | 19.0 | 19.8 | 29.6 | 28.8 | 43.3 |
| 10 | 13 X 20 | 250 | 10.2 | 15.4 | 16.0 | 24.0 | 23.4 | 35.0 |
| 11 | 14 X 22 | 303 | 8.5 | 12.7 | 13.2 | 19.8 | 19.3 | 29.0 |
| 12 | 15 X 24 | 360 | 7.1 | 10.7 | 11.1 | 16.7 | 16.2 | 24.3 |
| 13 | 16 X 26 | 423 | 6.1 | 9.1 | 9.5 | 14.2 | 13.8 | 20.7 |
| 14 | 18 X 28 | 490 | 5.2 | 7.8 | 8.2 | 12.2 | 11.9 | 17.9 |
| 15 | 19 X 30 | 563 | 4.6 | 6.8 | 7.1 | 10.7 | 10.4 | 15.6 |
| 16 | 20 X 32 | 640 | 4.0 | 6.0 | 6.3 | 9.4 | 9.1 | 13.7 |
| 17 | 21 X 34 | 723 | 3.5 | 5.3 | 5.5 | 8.3 | 8.1 | 12.1 |
| 18 | 23 X 36 | 810 | 3.2 | 4.7 | 4.9 | 7.4 | 7.2 | 10.8 |
| 9 | 24 X 38 | 903 | 2.8 | 4.3 | 4.4 | 6.6 | 6.5 | 9.7 |
| 20 | 25 X 40 | 1000 | 2.6 | 3.8 | 4.0 | 6.0 | 5.8 | 8.8 |

# Heat Tracing Products

## Applications

### *Electric Heat Tracing Products*

Chromalox heating cable line includes cables suitable for most process maintenance, pipe and vessel freeze protection and roof and gutter de-icing applications.

Industrial Heating Cables are ideal for process maintenance applications. Maintenance temperatures up to 900°F can be achieved in a variety of hazardous and corrosive environments. Industrial Cables include:

**SRL —** Self-Regulating, Low Temperature

**SRM/E —** Self-Regulating, Medium Temperature Enhanced

**CWM —** Constant Wattage, Medium Temperature

**MI —** Mineral Insulation, High Temperature.

Commercial Application Cables are designed to meet specific needs of winterizing applications such as water line freeze protection and preventing ice damage to building structures. Commercial Cables include:

**SRF —** Self-Regulating Freeze Protection

**SRF-RG —** Self-Regulating Roof and Gutter Freeze Protection

### *Industrial Process Maintenance Applications*

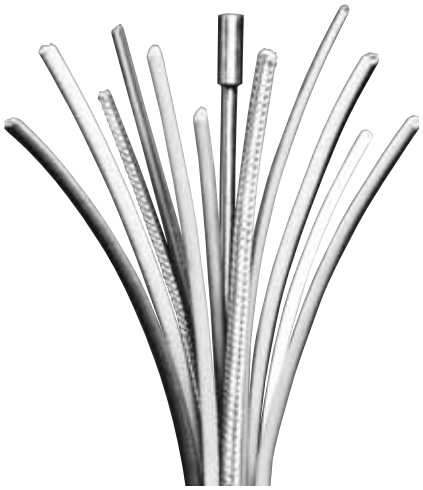
When industrial process piping and vessels must be maintained above the ambient air temperature, Chromalox has the heating cable to fit the application. Cables range in the maximum maintenance temperature from 150°F for SRL to 900°F for MI cables.

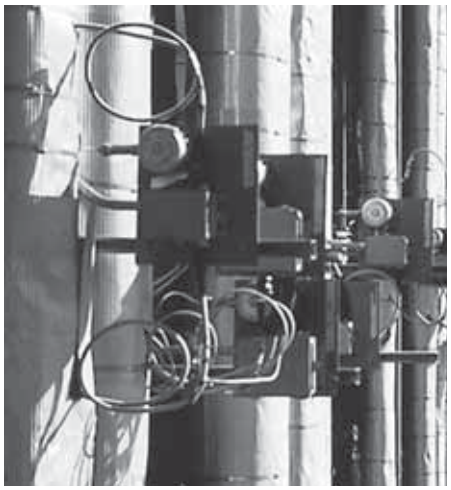
- Petroleum Refineries — Maintain petroleum and by-products at process temperature
- Waste Water Treatment Facilities — Prevent the precipitation of NaOH from solutions
- Food Processing Plants — Maintain viscosity of products in processes such as chocolate, oils and tallow
- Instrument Lines
- Storage Tanks
- Div. 1 and Div. 2 Hazardous Location Applications (Contact your Local Chromalox Sales office for Div. 1 applications)
- Freeze Protection of Steam Cleaned Lines
- Power Generating Plants — Trace steam condensate lines and other chemical additive lines
- Asphalt Lines

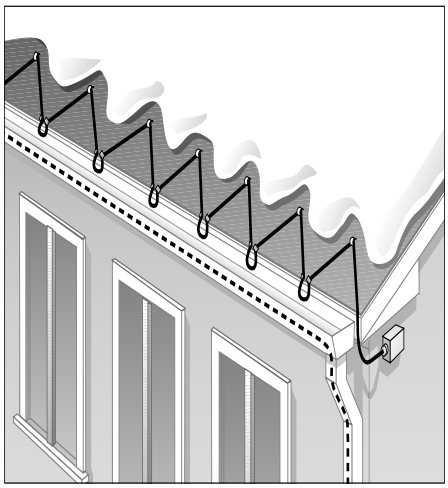
### *Commercial Applications*

In a large number of regions in the world, buildings are susceptible to damage caused by water freezing. Primarily, this damage involves either the bursting of pipes or structural damage due to the weight of ice and snow building up on the roof. Chromalox Commercial Application Cables are intended to prevent this damage.

- Cooling Tower Pipes
- Parking Garage Drain Lines
- Chiller Water Lines
- Exposed Pipe Traps
- Exposed Storm Water Pipes
- Sump Discharge Pipes and Equipment
- Wet Sprinkler Fire Systems, where approved by Local Codes
- Outdoor Sports Facilities and Stadiums
- Roof and Gutter De-icing







# Heat Tracing Products

## Industrial & Commercial Grade Cables

### *Heat Tracing Products — Section Outline*



### *Industrial Cable Applications*

### *Self-Regulating*

Chromalox SRL and SRM/E Self Regulating Heating Cables provide the most versatility in heat trace designs and applications. Constructed of a semiconductive heater matrix extruded between parallel buss wires, a self- regulating cable adjusts its output to independently respond to temperatures all along its length. As temperatures increase, the heater's resistance increases which lowers the output wattage. Conversely, as the temperature decreases, the resistance decreases and the cable produces more heat. The result — an energy efficient heating cable.

Self-regulating cables are flexible, can be cut-to-length in the field and can be single overlapped without fear of burnout in areas where complex piping and equipment require additional heat trace cable.

Chromalox manufactures low (SRL) and medium (SRM/E) temperature self-regulating heating cable for use on 120 and 208 to 277V. Equipped with a ground braid and optional TPR or FEP jacket, Chromalox self-regulating cables are third party tested and approved for use in harsh corrosive and hazardous applications.

### *Constant Wattage*

Chromalox CWM Constant Wattage Heating Cables are ideally suited for applications where a particular watt density is required at all times. The heater element consists of a nichrome wire wrapped around parallel, insulated buss wires. At specific intervals, a short section of insulation is removed from alternating buss wires to create connection nodes for the nichrome wire. The result is a network of parallel resistors along the entire length of constant wattage cable.

Constant wattage cables are flexible, can be cut-to-length in the field, and are manufactured for use on voltages from 120 to 480V. Although not suited for overlapping, its constant output makes it an ideal choice for higher temperature applications where higher watt densities are required. Equipped with a ground braid and optional FEP jacket, Chromalox constant wattage cables are third party tested and approved for use in harsh, corrosive and hazardous areas. Contact your Local Chromalox Sales office for hazardous area designs.

### *Mineral Insulated*

Chromalox MI Mineral Insulated Heating Cables are the most rugged heating cable in Chromalox's product line. Constructed of a solid series resistor element embedded in highly compacted mineral insulation, MI cables are built to handle high temperature, high wattage applications. The series resistor and mineral insulation are encased in a metallic jacket of Alloy 825 for high temperature or corrosive applications.

Mineral insulated cables are factory assembled and tested, ensuring the highest quality product. Since the units consist of a series resistor, virtually any wattage/voltage/length cable configuration can be produced within the cable's physical operating limits. Chromalox mineral insulated cables are available for use up to 600V and are tested and approved for use in corrosive and hazardous areas. Optional accessories include pulling eyes and reverse glands. Other special features are also available.

### *Commercial Cable Applications*

### *Self-Regulating Freeze Protection*

Chromalox SRF Self Regulating Freeze Protection Heating Cable is a self-regulating cable designed for the freeze protection of water lines. The self-regulating matrix allows for overlapping and easy field installation. SRF also lowers its output and energy consumption as the temperature increases thus lowering energy costs. The 16 AWG buss wires provide for long circuits which reduce the number of accessories required.

A braided and braided with overjacket construction is available. Braided cable should be used on dry pipes and dry locations. The overjacket construction is suitable for wet locations where occasional exposure to moisture is expected.

SRF heating cable is not for use in hazardous locations. Consult the Industrial Cable Products in this section for cables suitable for hazardous locations.

### *Self-Regulating Roof & Gutter De-Icing*

SRF-RG Heating Cable is specifically designed for roof and gutter de-icing applications. SRF-RG features a self-regulating matrix that reduces output as snow melt requirements decrease or when warm weather is present.

The braided and overjacketed construction provides reliable moisture protection. The 16 AWG buss wires allow ample circuit lengths and rugged design. Accessories are available for mounting to roofs and gutters.

# Heat Tracing Products

## Application & Selection Guidelines

### *General Product Summary*

This section is designed to assist you in determining the appropriate cable for use in your application.

**Step 1 —** Collect Required Application Data and Determine Heat Loss

**Step 2 —** Choose the cable that best meets your specific application parameters based on the summary. Consideration of application temperature, exposure temperature, application requirements and environmental ratings should be made.

**Step 3 —** Select Heating Cable Wattage Rating

**Step 4 —** Determine Total Cable Required

**Step 5 —** Determine Circuits and Circuit Protection

**Step 6 —** Select Appropriate Accessories

### *Step 1 — Collect Required Application Data & Determine Heat Loss*

Application data required can be split into two categories. The first is the heat loss data. This includes:

- Maintenance Temperature
- Minimum Ambient Temperature
- Pipe Size
- Insulation Type (or K factor)
- Insulation Thickness
- Indoor/Outdoor Installation
- Maximum Expected Wind Speed
- Required Safety Factor.

Refer to the Technical section of this catalog, "Determining Heat Energy Requirements — Pipe & Tank Tracing" for details on performing heat loss calculations. For Commercial Freeze Protection, please see Cable Selection Tables in this section.

The second category of data required is the application and environmental conditions. This includes:

- Maximum Exposure Temperature (Power Off Condition)
- Circuit Length Considerations
- Available Voltage
- Hazardous Area Requirements
- Type of Pipe (Plastic or Metal)
- Chemical Exposure
- Fire Resistance.

### *Step 2 — Select the Cable*

Choose the cable that best fits your specific application parameters and wattage requirements.



### *Heat Tracing Product Features*

| Features | Industrial | | | | Commercial | |
|---|---|---|---|---|---|---|
| | SRL | SRM/E | CWM | Alloy 825 MI | SRF | SRF-RG |
| Max. Maintenance Temp. (°F) | 150 | 302 | 320 | 900 | 100 | 50 |
| Max. Exposure Temp. (°F) Power Off | 185 | 420 | 400 | 1,100 | 185 | 185 |
| Max. W/Ft. | 10 | 20 | 12 | 50 | 8 | 12 |
| Max. Circuit Length (Ft.) | 95 - 660 | 150 - 600 | 225 - 900 | 330 - 1,000+ | 180 - 660 | 135-540 |
| Buss Wire Size | 16 | 14 | 12 | N/A | 16 | 16 |
| Voltages | 120, 208-277 | 120, 208-277 | 120, 208-277, 480 | Up to 600 | 120, 208-277 | 120, 208-277 |
| Hazardous Ratings | Yes | Yes | Yes | Yes | No | No |
| Usable on Plastic Pipe | Yes | No | No | No | Yes | Yes |
| Cut-to-Length in Field | Yes | Yes | Yes | No | Yes | Yes |
| Field Splicable | Yes | Yes | Yes | No | Yes | Yes |
| Can be Overlapped | Yes | Yes | No | No | Yes | Yes |
| Output Varies with Temp. | Yes | Yes | No | No | Yes | Yes |
| Varies Output Along Length | Yes | Yes | No | No | Yes | Yes |
| Design of System | Simple | Simple | Simple | Involved | Simple | Simple |
| Installation of System | Easiest | Easiest | Simple | Involved | Easiest | Easiest |
| Fire Resistance | Fair | Fair | Fair | Excellent | Fair | Fair |
| Chemical Resistance | See Corrosion Guide, next page | | | | | |
| Size (Max. In.) | 0.435 x 0.185 | 0.5 x 0.2 | 0.435 x 0.235 | 0.4 | 0.435 x 0.185 | 0.435 x 0.185 |
| Accessories | DL/EL | DL | DL/EL | | DL/EL | RG Accessories |
| Monitor Wire Available | Yes | Contact Factory | Contact Factory | No | No | No |
| Applications | FL,PL | FL,FH,PL,PH | FL,FH,PL,PH | FL,FH,PL,PH | FL | RG |
| | FL = Freeze Protection<br>FH = Freeze Protection, High Exposure Temperature<br>PL = Process Maintenance, Low Temperature<br>PH = Process Maintenance, High Temperature<br>RG = Roof and Gutter De-icing | | | | | |

# Heat Tracing Products

## Application & Selection Guidelines *(cont'd.)*

### *Agency Approvals*

| Cable | UL | | | | CSA | | | | FM | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ordinary Area | Class I Div. 2 Groups B, C, D | Class II Div. 2 Groups F, G | Class III Div. 2 | Ordinary Area | Class I Div. 2 Groups A, B, C, D | Class II Div. 2 Groups F, G | Class III Div. 2 | Ordinary Area | Class I Div. I Groups B, C, D | Class I Div. 2 Groups B, C, D | Class II Div. I Groups F, G | Class II Div. 2 Groups F, G | Class III Div. 1 | Class III Div. 2 |
| SRL-C<br>SRL-CT<br>SRL-CR | ✓<br>✓<br>✓ | | | | ✓<br>✓<br>✓ | ✓<br>✓<br>✓ | ✓<br>✓<br>✓ | | ✓<br>✓<br>✓ | | ✓<br>✓<br>✓ | | | | ✓<br>✓<br>✓ |
| HSRL | | | | | | | | | | ✓ | | ✓ | ✓ | ✓ | |
| SRM/E-C<br>SRM/E-CT | ✓<br>✓ | | | | ✓<br>✓ | ✓<br>✓ | ✓<br>✓ | | ✓<br>✓ | | ✓<br>✓ | | | | ✓<br>✓ |
| HSRM | | | | | | | | | | ✓ | | ✓ | ✓ | ✓ | |
| CWM-C<br>CWM-CT | ✓<br>✓ | | | | ✓<br>✓ | ✓<br>✓ | ✓<br>✓ | ✓<br>✓ | ✓<br>✓ | | | | | | |
| MI* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | ✓ |
| SRF-C<br>SRF-CR<br>SRF-RG | ✓<br>✓<br>✓ | | | | ✓<br>✓<br>✓ | | | | ✓<br>✓<br>✓ | | | | | | |
| | For T ratings, refer to individual product pages.<br>For more specific information, refer to individual product pages.<br>CF=Contact Factory<br>*Class I, Division I, Groups B,C & D - UL, CSA, FM - Contact your Local Chromalox Sales office for design assistance. | | | | | | | | | | | | | | |

### *Corrosion Guide to Select Proper Cable Construction*

| Exposure To | Industrial | | | | | | Commercial | |
|---|---|---|---|---|---|---|---|---|
| | SRL | SRM/E | HSRL | HSRM | CWM | Alloy 825 MI | SRF | SRF-RG |
| Moisture | C, CR, CT | C, CT | CT | CT | C, CT | Yes | C, CR | Yes |
| Aqueous Solutions of Inorganic Compounds | CR, CT | CT | CT | CT | CT | No | No | No |
| Liquids Organic Chemicals | CT | CT | CT | CT | CT | Yes | No | No |
| Acids or Bases | CT | CT | CT | CT | CT | No | No | No |
| **Note —** This is a recommendation guide. Chromalox cannot warrant any Electric Heat Trace against failure by sheath degradation if such failure is the result of operating conditions beyond the control of the heater manufacturer. It is the responsibility of the purchaser to make the ultimate choice of sheath material based on knowledge of the chemical composition of the corrosive solution, character of materials entering the solution, and controls which maintains the process. | | | | | | | | |

### *Required Jacket Material*

Select the appropriate jacket configuration for the desired level of mechanical and corrosive chemical protection. The CR over-jacket option can be used when additional mechanical protection is desired. The CR over-jacket option is required when the cable can be exposed to aqueous inorganic chemicals. The CT over-jacket option is required when the cable can be exposed to organic chemicals or strong corrosives. Use Corrosion Guide above to determine the correct jacket material option for the cable type selected.

*More Information is Available Online on Heat Trace.*

*Bookmark Your Browser to* ***www.chromalox.com*** *and Select* ***Manuals****.*

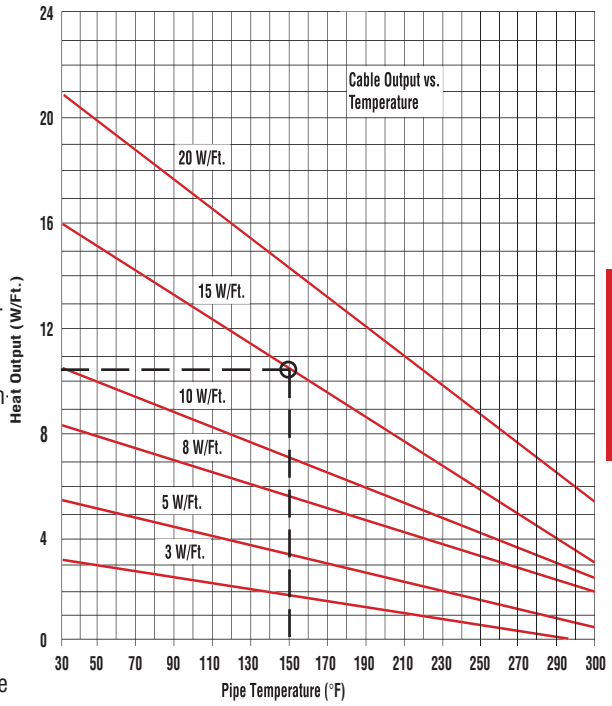
# Heat Tracing Products

## Application & Selection Guidelines *(cont'd.)*

### *Step 3 — Select Heating Cable Wattage Rating*

After calculating the heat loss in the pipe and adjusting for any application deviations, you may determine which cable rating to use. If you have selected a self-regulating cable you must adjust the output based on maintenance temperatures, using the Thermal Output Rating Graphs shown on the individual product pages, select the lowest cable rating that will provide the pipe maintenance temperature. **For Example:** A 15 W/Ft. SRM/E cable @ 150°F will output approximately 10 W/Ft. Multiple passes or runs of cable may be required to provide sufficient output per foot calculated in Step 1. This is accomplished with parallel runs of cable or spiraling. Contact your Local Chromalox Sales office

### *Cable Output vs. Temperature*




### *Step 4 — Determine Total Length of Cable Required*

The total amount of heating cable is determined by adding the total footage of pipe to be traced and adding for allowances for the components such as flanges, valves, pipe supports; then, multiply by the total number of runs or Wrap Factor determined in Step 3.

(Total Feet of Traced Pipe + Cable Allowance for Components) x # of Runs = Total Cable Length)

### *Step 5 — Determine Circuits & Circuit Protection*

Circuit protection depends on the breaker size being used and the start-up temperature. The National Electric Code (NEC 1996) requires the use of ground fault protection breakers for heating cable. Refer to the specific data of the individual heat trace cable to determine maximum circuit lengths. To determine the number of circuits required for each pipe, divide the total cable length found in Step 4 by the maximum circuit length found in the individual cable data charts. Round up to the next higher number.

$$\text{Number of Circuits} = \frac{\text{Cable Length}}{\text{Maximum Circuit Length}}$$

### *Pipe Component Cable Allowance Estimation*

| Component | Cable Allowance Factor (Ft.) | x | # Components | Total Additional Cable |
|---|---|---|---|---|
| Flange Pair | 1.5 | x | | |
| Pipe Support | 2.0 | x | | |
| Butterfly Valve | 2.5 | x | | |
| Ball Valve | 2.7 | x | | |
| Globe Valve | 4.0 | x | | |
| Gate Valve | 5.0 | x | | |

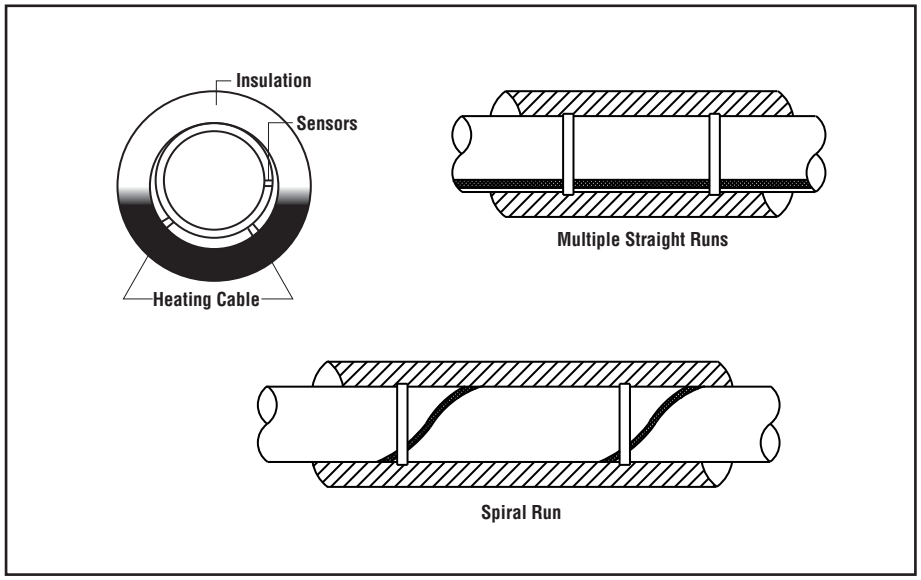
**Example:**

| | |
|---|---|
| Pipe: | 150 feet |
| Valves: | 1 globe valve |
| Pipe Supports: | 2 |
| Flanges: | 2 |
| Total Cable Length | = [150 + (1 x 4) + (2 x 2) + (2 x 1.5)] x 2 runs<br>= 161 feet x 2 runs<br>= 322 feet |

# Heat Tracing Products

## Application & Selection Guidelines *(cont'd.)*

### *Design of Multiple Runs when Heat Requirements Exceed Cable Output Ratings*




### *Step 6 — Select Controls & General Application Accessories*

Chromalox took a long hard look at the hidden costs that occur in a heat trace project. Indeed this is the labor involved in the installation. Being an innovator, we set out to design a product that went above and beyond what the competition offered while reducing overall installation time and number of parts. The Integrated Connection Accessories (DL) are designed to combine power connections and thermostats in one integrated box. Furthermore, the design offers ease of maintenance and expandability for the future. Of course we offer the standard connection accessories, common to the heat trace industry, which offer lower up front purchase pricing.

### *Controls*

**DL —** Duraline Integrated Connection Accessories

- Integrated Design — Allows for quick installation with fewer parts
- Lower Man Hours for Installation and Maintenance
- Ease of Maintenance — No replacement of component when doing routine maintenance checks
- Easy to Troubleshoot — Boxes easily open for access to wiring and for taking diagnostic measurements
- Integrated Power Connection and Thermostat — No separate power connection and thermostat box required, resulting in faster installations
- Allows for Future Expansion of System — Because junction, splice and thermostat boxes have multiple cable exits, future cable runs are easily added.

**EL —** Standard Connection Accessories

- Lower Cost — For use in competitive design and bid installations
- Rugged Cast Junction Box
- Easy to Use Heat Shrink Tubing Kits
- Typical Industry Design — Meets most specifications.

### *General Application Accessories*

For application tape, straps and conduit hubs, refer to the DL & EL General Application Accessories at the end of this section.

For HL kits information, see Product Data Sheet PJ932.

*More Information is Available Online on Heat Trace.*

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# Technical Information

## Determining Heat Energy Requirements

### *Pipe & Tank Tracing*

The following tables can be used to determine the heat losses from insulated pipes and tanks for heat tracing applications. To use these tables, determine the following design factors:

- Temperature differential $\Delta T = T_M - T_A$
  Where:
  $T_M$ = Desired maintenance temperature °F
  $T_A$ = Minimum expected ambient temperature °F
- Type and thickness of insulation
- Diameter of pipe or surface area of tank
- Outdoor or indoor application
- Maximum expected wind velocity (if outdoors).

**Pipe Tracing Example —** Maintain a 1-1/2 inch IPS pipe at 100°F to keep a process fluid flowing. The pipe is located outdoors and is insulated with 2 inch thick Fiberglas® insulation. The minimum expected ambient temperature is 0°F and the maximum expected wind velocity is 35 mph. Determine heat losses per foot of pipe.

1. **Heat Loss Rate —** Using Table 1, determine the heat loss rate in W/ft of pipe per °F temperature differential. Enter table with insulation ID or IPS pipe size (1-1/2 in.) and insulation thickness (2 in.).
   Rate = 0.038 Watts/ft/°F.
2. **Heat Loss per Foot —** Calculated heat loss per foot of pipe equals the maximum temperature differential ($\Delta T$) times heat loss rate in Watts/ft/°F.

   $\Delta T$ = 100°F - 0°F = 100°F
   $Q$ = ($\Delta T$)(heat loss rate per °F)
   $Q$ = (100°F) (0.038 W/ft) = 3.80 W/ft
3. **Insulation Factor —** Table 1 is based on Fiberglas® insulation and a 50°F $\Delta T$. Adjust $Q$ for thermal conductivity ($k$ factor) and temperature as necessary, using adjustment factors from Table 2.

   Adjusted $Q$ = ($Q$)(1.08) = 3.80 W/ft x 1.08
   $Q$ = 4.10 W/ft
4. **Wind Factor —** Table 1 is based on 20 mph wind velocity. Adjust $Q$ for wind velocity as necessary by adding 5% for each 5 mph over 20 mph. Do not add more than 15% regardless of wind speed.

   Adjusted $Q$ = ($Q$)(1.15) = 4.10 W/ft x 1.15
   **Design heat loss per linear foot**
   **$Q$ = 4.72 W/ft**

**Note** — For indoor installations, multiply $Q$ by 0.9.

### *Table 1 — Heat Losses from Insulated Metal Pipes (Watts per foot of pipe per °F temperature differential [1])*

| Pipe Size (IPS) | Insul. I.D. (In.) | Insulation Thickness (In.) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1/2 | 3/4 | 1 | 1-1/2 | 2 | 2-1/2 | 3 | 4 |
| 1/2 | 0.840 | 0.054 | 0.041 | 0.035 | 0.028 | 0.024 | 0.022 | 0.020 | 0.018 |
| 3/4 | 1.050 | 0.063 | 0.048 | 0.040 | 0.031 | 0.027 | 0.024 | 0.022 | 0.020 |
| 1 | 1.315 | 0.075 | 0.055 | 0.046 | 0.036 | 0.030 | 0.027 | 0.025 | 0.022 |
| 1-1/4 | 1.660 | 0.090 | 0.066 | 0.053 | 0.041 | 0.034 | 0.030 | 0.028 | 0.024 |
| 1-1/2 | 1.990 | 0.104 | 0.075 | 0.061 | 0.046 | 0.038 | 0.034 | 0.030 | 0.026 |
| 2 | 2.375 | 0.120 | 0.086 | 0.069 | 0.052 | 0.043 | 0.037 | 0.033 | 0.029 |
| 2-1/2 | 2.875 | 0.141 | 0.101 | 0.080 | 0.059 | 0.048 | 0.042 | 0.037 | 0.032 |
| 3 | 3.500 | 0.168 | 0.118 | 0.093 | 0.068 | 0.055 | 0.048 | 0.042 | 0.035 |
| 3-1/2 | 4.000 | 0.189 | 0.133 | 0.104 | 0.075 | 0.061 | 0.052 | 0.046 | 0.038 |
| 4 | 4.500 | 0.210 | 0.147 | 0.115 | 0.083 | 0.066 | 0.056 | 0.050 | 0.041 |
| — | 5.000 | 0.231 | 0.161 | 0.125 | 0.090 | 0.072 | 0.061 | 0.054 | 0.044 |
| 5 | 5.563 | 0.255 | 0.177 | 0.137 | 0.098 | 0.078 | 0.066 | 0.058 | 0.047 |
| 6 | 6.625 | 0.300 | 0.207 | 0.160 | 0.113 | 0.089 | 0.075 | 0.065 | 0.053 |
| — | 7.625 | 0.342 | 0.235 | 0.181 | 0.127 | 0.100 | 0.084 | 0.073 | 0.059 |
| 8 | 8.625 | 0.385 | 0.263 | 0.202 | 0.141 | 0.111 | 0.092 | 0.080 | 0.064 |
| — | 9.625 | 0.427 | 0.291 | 0.224 | 0.156 | 0.121 | 0.101 | 0.087 | 0.070 |
| 10 | 10.75 | 0.474 | 0.323 | 0.247 | 0.171 | 0.133 | 0.110 | 0.095 | 0.076 |
| 12 | 12.75 | 0.559 | 0.379 | 0.290 | 0.200 | 0.155 | 0.128 | 0.109 | 0.087 |
| 14 | 14.00 | 0.612 | 0.415 | 0.316 | 0.217 | 0.168 | 0.138 | 0.118 | 0.093 |
| 16 | 16.00 | 0.696 | 0.471 | 0.358 | 0.246 | 0.189 | 0.155 | 0.133 | 0.104 |
| 18 | 18.00 | 0.781 | 0.527 | 0.401 | 0.274 | 0.210 | 0.172 | 0.147 | 0.115 |
| 20 | 20.00 | 0.865 | 0.584 | 0.443 | 0.302 | 0.231 | 0.189 | 0.161 | 0.125 |
| 24 | 24.00 | 1.034 | 0.696 | 0.527 | 0.358 | 0.274 | 0.223 | 0.189 | 0.147 |

1. Values in Table 1 are based on a pipe temperature of 50°F, an ambient of 0°F, a wind velocity of 20 mph and a "$k$" factor of 0.25 (Fiberglas®). Values are calculated using the following formula plus a 10% safety margin:
   Watts/ft of pipe = $2\,\varpi\,k\,(\Delta T) \div (Z)\,\ln\,(D_0/D_1)$
   Where: $k$ = Thermal conductivity (Btu/in./hr/ft²/°F); $D_1$ = Inside diameter of insulation (in.); $\Delta T$ = Temperature differential (°F); $Z$ = 40.944 Btu/in/W/hr/ft; $D_0$ = Outside diameter of insulation (in.); ln = Natural Log of $D_0/D_1$ Quotient

### *Table 2 — Thermal Conductivity (k) Factor of Typical Pipe Insulation Materials (Btu/in./hr/ft²/°F)*

| Insulation Type | | Pipe Maintenance Temperature (°F) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 50 | 100 | 150 | 200 | 300 | 400 | 500 |
| Fiberglas® or Mineral Fiber Based on ASTM C-547 | $k$ value | 0.23 | 0.25 | 0.27 | 0.30 | 0.32 | 0.37 | 0.41 | 0.45 |
| | Adjustment factor | (0.92) | (1.00) | (1.08) | (1.20) | (1.28) | (1.48) | (1.64) | (1.80) |
| Calcium Silicate[2] Based on ASTMC-533 | $k$ value | 0.35 | 0.37 | 0.40 | 0.43 | 0.45 | 0.50 | 0.55 | 0.60 |
| | Adjustment factor | (1.52) | (1.48) | (1.60) | (1.72) | (1.80) | (2.00) | (2.20) | (2.40) |
| Foamed Glass[2] Based on ASTMC-552 | $k$ value | 0.38 | 0.40 | 0.43 | 0.47 | 0.51 | 0.60 | 0.70 | 0.81 |
| | Adjustment factor | (1.52) | (1.60) | (1.72) | (1.88) | (2.04) | (2.40) | (2.8) | (3.24) |
| Foamed Urethane Based on ASTMC-591 | $k$ value | 0.18 | 0.17 | 0.18 | 0.21 | 0.25 | Not Recommended | | |
| | Adjustment factor | (0.72) | (0.68) | (0.72) | (0.84) | (1.00) | | | |

2. When using rigid insulation, select an inside diameter one size larger than the pipe on pipe sizes through 9 in. IPS. Over 9 in. IPS, use same size insulation.

### *Table 3 — Heat Losses from Insulated Metal Tanks (W/ft²/°F)[3]*

| Insulation Thickness (In.) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1/2 | 3/4 | 1 | 1-1/2 | 2 | 2-1/2 | 3 | 3-1/2 | 4 | 5 | 6 |
| 0.161 | 0.107 | 0.081 | 0.054 | 0.040 | 0.032 | 0.027 | 0.023 | 0.020 | 0.016 | 0.013 |

3. Values in Table 3 are based on a tank temperature of 50°F, an ambient of 0°F, a wind velocity of 20 mph and a "k" factor of 0.25 (Fiberglas®). Values are calculated using the following formula plus a 10% safety margin:
   Watts/ft² = $Y\,k(\Delta T) \div X$
   Where: Y = 0.293W/hr/btu
   k = Thermal conductivity
   X = Thickness of insulation (in.)
   $\Delta$ = Temperature differential (°F)

**Note** — The above information is presented as a guide for solving typical heat tracing applications. Contact your Local Chromalox Sales office for assistance in heater selection and for pipes made of materials other than metal.

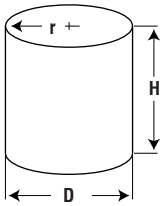
# Technical Information

## Determining Heat Energy Requirements

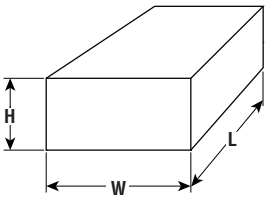
### *Pipe & Tank Tracing (cont'd.)*

Tank tracing requires an additional calculation of the total exposed surface area. To calculate the surface area:

**Cylindrical Tanks —**
Area = $2 \varpi r^2 + \varpi DH$
$A = \varpi D (r + H)$




**Horizontal Tanks —**
Area = 2[(W x L) + (L x H) + (H x W)]




**Tank Tracing Example —** Maintain a metal tank with 2 inch thick Fiberglas® insulation at 50°F. The tank is located outdoors, is 4 feet in diameter, 12 feet long and is exposed at both ends. The minimum ambient temperature is 0°F and the maximum expected wind speed is 15 mph.

1. **Surface Area —** Calculate the surface area of the tank.
   $A = \varpi D (r + H)$
   $A = \varpi 4 (2 + 12)$
   $A = 175.9\ ft^2$

2. **Temperature Differential** ($\Delta T$)

   $\Delta T = T_M - T_A = 50°F - 0°F = 50°F$

3. **Heat Loss Per Foot²** — Obtain the heat loss per square foot per degree from Table 3.

   Heat loss/ft²/°F = 0.04 W/ft²/°F

4. **Insulation Factor —** Table 3 is based on Fiberglas® insulation and a 50°F $\Delta T$. Adjust $Q$ for thermal conductivity ($k$ factor) and temperature as necessary, using factors from Table 2.

5. **Wind Factor —** Table 3 is based on 20 mph wind velocity. Adjust $Q$ for wind velocity as necessary, by adding 5% for each 5 mph over 20 mph. Do not add more than 15% regardless of wind speed. **Note** — For indoor installations, multiply $Q$ by 0.9.

6. **Calculate Total Heat Loss for Tank —** Multiply the adjusted heat loss per square foot per °F figure by the temperature differential. Multiply the loss per square foot by the area.

   $Q = 0.04\ W/ft^2/°F \times 50°F\ \Delta T = 2\ W/ft^2$
   $Q$ = Adjusted W/ft² x tank surface area
   $Q = 2\ W/ft^2 \times 175.9\ ft^2$

   **Heat Loss from Tank = 351.8 Watts**

# Technical Information

## Properties of Steam

### *Saturated Steam*

The thermodynamic properties of saturated steam are shown in the table to the right. Saturated steam is pure steam in direct contact with the liquid water from which it was generated and at the same temperature and pressure as the water. For example, saturated steam at 50 psig has a temperature of 298°F.

Steam pressure is commonly expressed as **psia** or **psig**. Psia is pounds per square inch absolute with reference to a perfect vacuum. Psig is pounds per square inch gauge with reference to atmospheric pressure of 14.7 psi psia = psig + 14.7 psi (1 atmosphere).

The heat content of liquid is the heat energy in Btu/lb required to heat the liquid to the condition indicated starting with water at 32°F.

Latent heat is the heat energy in Btu/lb absorbed when a pound of boiling water is converted to a pound of steam at the same temperature. The same amount of heat is released when the steam condenses back to water at the same temperature. Latent heat varies with temperature.

### *Saturated Steam — Thermodynamic Properties (nearest even digit)*

| Gauge Press. (psig) | (°F) | Btu/lb Liquid Heat | Btu/lb Latent Heat | Btu/lb Steam Total | Sat. Vapor ($ft^3$/lb) | Gauge Press. (psig) | Temp. (°F) | Btu/lb Liquid Heat | Btu/lb Latent Heat | Btu/lb Steam Total | Sat. Vapor ($ft^3$/lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 212 | 180 | 970 | 1150 | 27.0 | 70 | 316 | 286 | 898 | 1184 | 5.2 |
| 1 | 216 | 183 | 968 | 1151 | 25.0 | 75 | 320 | 290 | 895 | 1185 | 4.9 |
| 2 | 219 | 187 | 965 | 1152 | 24.0 | 80 | 324 | 294 | 892 | 1186 | 4.7 |
| 3 | 222 | 190 | 964 | 1154 | 22.5 | 85 | 328 | 298 | 889 | 1187 | 4.4 |
| 4 | 224 | 193 | 962 | 1155 | 21.0 | 90 | 331 | 302 | 886 | 1188 | 4.2 |
| 5 | 227 | 195 | 961 | 1156 | 20.0 | 95 | 335 | 306 | 883 | 1189 | 4.0 |
| 6 | 230 | 198 | 959 | 1157 | 19.5 | 100 | 338 | 309 | 881 | 1190 | 3.9 |
| 7 | 232 | 201 | 957 | 1158 | 18.5 | 110 | 344 | 316 | 876 | 1192 | 3.6 |
| 8 | 235 | 203 | 956 | 1159 | 18.0 | 120 | 350 | 322 | 871 | 1193 | 3.3 |
| 9 | 237 | 206 | 954 | 1160 | 17.0 | 125 | 353 | 325 | 868 | 1193 | 3.2 |
| 10 | 240 | 208 | 952 | 1160 | 16.5 | 130 | 356 | 328 | 866 | 1194 | 3.1 |
| 15 | 250 | 218 | 945 | 1163 | 14.0 | 140 | 361 | 334 | 861 | 1195 | 2.9 |
| 20 | 259 | 227 | 940 | 1167 | 12.0 | 150 | 366 | 339 | 857 | 1196 | 2.7 |
| 25 | 267 | 236 | 934 | 1170 | 10.5 | 160 | 371 | 344 | 853 | 1197 | 2.6 |
| 30 | 274 | 243 | 929 | 1172 | 9.5 | 170 | 375 | 348 | 849 | 1197 | 2.5 |
| 35 | 281 | 250 | 924 | 1174 | 8.5 | 180 | 380 | 353 | 845 | 1198 | 2.3 |
| 40 | 287 | 256 | 920 | 1176 | 8.0 | 190 | 384 | 358 | 841 | 1199 | 2.2 |
| 45 | 292 | 262 | 915 | 1177 | 7.0 | 200 | 388 | 362 | 837 | 1199 | 2.1 |
| 50 | 298 | 267 | 912 | 1179 | 6.7 | 220 | 395 | 370 | 830 | 1200 | 2.0 |
| 55 | 303 | 272 | 908 | 1180 | 6.2 | 240 | 403 | 378 | 823 | 1201 | 1.8 |
| 60 | 307 | 277 | 905 | 1182 | 5.8 | 250 | 406 | 381 | 820 | 1201 | 1.75 |
| 65 | 312 | 282 | 901 | 1183 | 5.5 | 300 | 422 | 399 | 805 | 1204 | 1.48 |

### *Boiler Feed Water Temperature*

The temperature of boiler feed water directly affects the steam output of a boiler. The following table can be used to determine the kilowatt rating of a boiler when the steam load, gauge pressure and boiler feed water temperature are known.

**Example —** A process requires 450 lbs of steam per hour at 75 psig. The available feed water temperature is 50°F. From the chart, read the kW/lb required for 50°F water and a gauge pressure of 75 psig. Multiply the factor by the pounds of steam: 0.3417 x 450 lbs = 153.8 kW.

### *Boiler Feed Water Temperature Vs. kW Required per Pound of Steam*

| Feed Water (°F) | Steam Gauge Pressure (psig) 0 | 2 | 10 | 15 | 25 | 40 | 50 | 75 | 100 | 125 | 150 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | .3347 | .3355 | .3375 | .3388 | .3406 | .3422 | .3431 | .3447 | .3458 | .3464 | .3470 |
| 50 | .3318 | .3326 | .3345 | .3359 | .3376 | .3392 | .3401 | .3417 | .3429 | .3435 | .3441 |
| 60 | .3288 | .3296 | .3316 | .3329 | .3347 | .3363 | .3372 | .3388 | .3400 | .3407 | .3411 |
| 70 | .3259 | .3267 | .3287 | .3300 | .3318 | .3334 | .3343 | .3359 | .3370 | .3376 | .3382 |
| 80 | .3229 | .3238 | .3278 | .3271 | .3288 | .3305 | .3313 | .3329 | .3341 | .3347 | .3353 |
| 90 | .3200 | .3208 | .3238 | .3242 | .3259 | .3275 | .3284 | .3300 | .3312 | .3318 | .3324 |
| 100 | .3171 | .3179 | .3199 | .3212 | .3229 | .3246 | .3255 | .3271 | .3283 | .3288 | .3294 |
| 110 | .3142 | .3150 | .317 | .3183 | .3200 | .3217 | .3225 | .3242 | .3253 | .3259 | .3265 |
| 120 | .3112 | .3210 | .314 | .3154 | .3171 | .3187 | .3196 | .3212 | .3224 | .3230 | .3236 |
| 130 | .3083 | .3091 | .3111 | .3124 | .3142 | .3160 | .3167 | .3183 | .3195 | .3200 | .3206 |
| 140 | .3054 | .3062 | .3082 | .3095 | .3113 | .3129 | .3137 | .3154 | .3165 | .3171 | .3177 |
| 150 | .3025 | .3032 | .3052 | .3066 | .3083 | .3099 | .3108 | .3124 | .3136 | .3142 | .3148 |
| 160 | .2995 | .3003 | .3029 | .3036 | .3054 | .3070 | .3079 | .3095 | .3107 | .3113 | .3118 |
| 170 | .2966 | .2974 | .2994 | .3001 | .3025 | .3041 | .3050 | .3066 | .3077 | .3083 | .3089 |
| 180 | .2937 | .2945 | .2964 | .2978 | .2995 | .3011 | .3020 | .3036 | .3048 | .3054 | .3060 |
| 190 | .2907 | .2915 | .2935 | .2948 | .2966 | .2982 | .2981 | .3007 | .3019 | .3025 | .3030 |
| 200 | .2878 | .2886 | .2906 | .2919 | .2937 | .2953 | .2962 | .2978 | .2989 | .2995 | .3001 |

# Technical Information

## Electrical Fundamentals & Three Phase Calculations

### *Ohm's Law*

The relationship between Wattage (heat) output and the applied Voltage of electric resistance heating elements is determined by a precise physical rule defined as Ohm's Law which states that the current in a resistance heating element is directly proportional to the applied Voltage. Ohm's Law is traditionally expressed as:

$$I = \frac{E}{R}$$

Where: I = Amperes (Current)
E = Voltage
R = Ohms (Resistance)

The same equation using the conventional abbreviation for voltage is:

$$I = \frac{V}{R}$$

Where: I = Amperes (Current)
V = Voltage
R = Ohms (Resistance)

An unknown electrical value can be derived by using any two known values in one of the variations of Ohm's Law shown at the right.

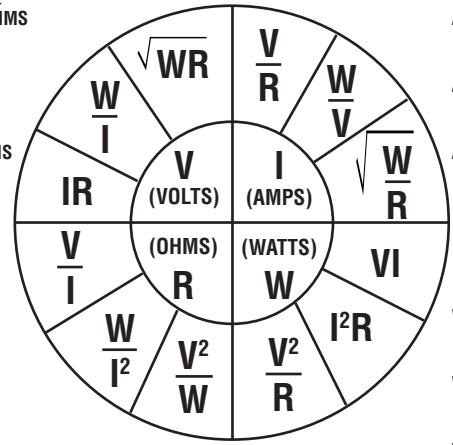
**VOLTS**

VOLTS = $\sqrt{\text{WATTS X OHMS}}$

VOLTS = $\frac{\text{WATTS}}{\text{AMPERES}}$

VOLTS = AMPERES X OHMS

**OHM'S LAW**




**AMPERES**

AMPERES = $\frac{\text{VOLTS}}{\text{OHMS}}$

AMPERES = $\frac{\text{WATTS}}{\text{VOLTS}}$

AMPERES = $\sqrt{\frac{\text{WATTS}}{\text{OHMS}}}$

**OHMS**

OHMS = $\frac{\text{VOLTS}}{\text{AMPERES}}$

OHMS = $\frac{\text{WATTS}}{\text{AMPERES}^2}$

OHMS = $\frac{\text{VOLTS}^2}{\text{WATTS}}$

**WATTS**

WATTS = VOLTS x AMPERES

WATTS = AMPERES² x OHMS

WATTS = $\frac{\text{VOLTS}^2}{\text{OHMS}}$

### *Voltage & Wattage Relationships*

An electric resistance element only produces rated Wattage at rated Voltage. It is common for electric heating elements and assemblies to be connected to a wide range of operating Voltages. Since the Wattage output varies directly with the ratio of the square of the Voltages, the actual Wattage can be calculated for any applied Voltage. The relationship is expressed by the equation below,

$$W_A = W_R \times \left(\frac{V_A^2}{V_R^2}\right)$$

Where: $W_A$ = Actual Wattage
$W_R$ = Rated Wattage
$V_A$ = Applied Voltage
$V_R$ = Rated Voltage

### *Percent of Rated Wattage for Various Applied Voltages*

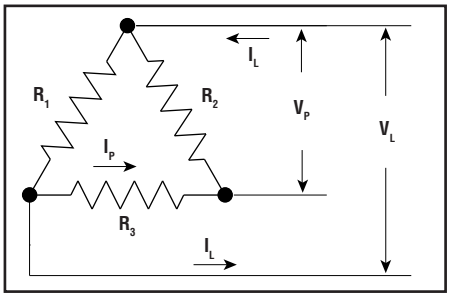
| Applied Voltage | Rated Voltage | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 110 | 115 | 120 | 208 | 220 | 230 | 240 | 277 | 380 | 415 | 440 | 460 | 480 | 575 |
| 110 | 100 | 91 | 84 | 28 | 25 | 23 | 21 | 16 | 8.4 | 7.0 | 6.2 | 5.7 | 5.2 | 3.7 |
| 115 | 109 | 100 | 92 | 31 | 27 | 25 | 23 | 17 | 9.0 | 7.6 | 6.7 | 6.2 | 5.7 | 4.0 |
| 120 | 119 | 109 | 100 | 33 | 30 | 27 | 25 | 19 | 10 | 8.4 | 7.4 | 6.8 | 6.3 | 4.3 |
| 208 | — | — | 300 | 100 | 89 | 82 | 75 | 56 | 30 | 25 | 22 | 20 | 19 | 13 |
| 220 | — | — | — | 112 | 100 | 91 | 84 | 63 | 34 | 28 | 25 | 23 | 21 | 15 |
| 230 | — | — | — | 122 | 109 | 100 | 92 | 69 | 37 | 31 | 27 | 25 | 23 | 16 |
| 240 | — | — | — | 133 | 119 | 109 | 100 | 75 | 40 | 33 | 30 | 27 | 25 | 17 |
| 277 | — | — | — | — | — | — | 133 | 100 | 53 | 45 | 40 | 36 | 33 | 23 |
| 380 | — | — | — | — | — | — | — | 188 | 100 | 84 | 74 | 68 | 63 | 44 |
| 415 | — | — | — | — | — | — | — | — | 119 | 100 | 89 | 81 | 75 | 52 |
| 440 | — | — | — | — | — | — | — | — | — | 112 | 100 | 91 | 84 | 58 |
| 460 | — | — | — | — | — | — | — | — | — | 123 | 109 | 100 | 92 | 64 |
| 480 | — | — | — | — | — | — | — | — | — | — | 119 | 109 | 100 | 70 |
| 550 | — | — | — | — | — | — | — | — | — | — | 156 | 143 | 131 | 91 |
| 575 | — | — | — | — | — | — | — | — | — | — | 171 | 156 | 144 | 100 |
| 600 | — | — | — | — | — | — | — | — | — | — | 186 | 170 | 156 | 109 |

### *Three Phase Equations (Balanced)*

Ohm's Law, as stated above, applies to electrical resistance elements operated on single phase circuits. Ohm's Law can be modifed to calculate three phase values by adding a correction factor for the phase Voltage relationships. The three phase equations shown can be applied to any balanced Delta or Wye circuit. The terms used in the equations are identified below:

$V_L$ = Line Voltage
$V_P$ = Phase Voltage
$I_L$ = Line Current (Amps)
$I_P$ = Phase Current (Amps)
$W_T$ = Total Watts
$R_1 = R_2 = R_3$ = Element Resistance
$W_C$ = Wattage per Circuit (Equal Circuits)
$R_C$ = Circuit Resistance in Ohms Measured Phase to Phase

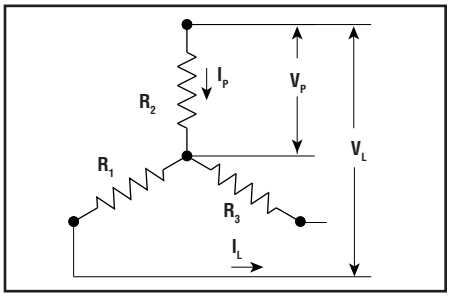
### *3Ø Delta*




$V_P = V_L$ | $V_L = V_P$
$W_T = 1.73\ I_L \times V_L$ | $W_T = 3\ (V_L^2 \div R_1)$
$I_P = I_L \div 1.73$ | $I_L = I_P \times 1.73$
$W_C = 1.73\ I_L \times V_L \div \#$ Circuits
$R_C = (2 \times V_L^2) \div W_C$ | $R_C = V_L^2 \div 0.5 W_C$

**Note** — For Open Delta connections, see next page.

### *3Ø Wye*




$V_P = V_L \div 1.73$ | $V_L = V_P \times 1.73$
$W_T = 1.73\ I_L \times V_L$ | $W_T = V_L^2 \div R_1$
$I_P = I_L$ | $I_L = I_P$
$W_C = 1.73\ I_L \times V_L \div \#$ Circuits
$R_C = (2 \times V_L^2) \div W_C$ | $R_C = V_L^2 \div 0.5\ W_C$

**Note** — For Open Wye connections, see next page.

# Technical Information

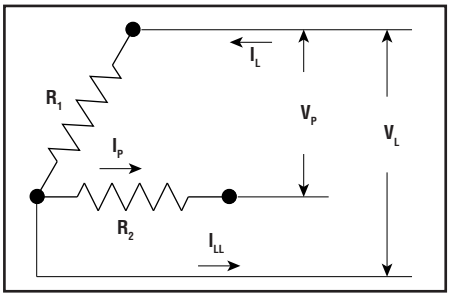
## Three Phase Equations & Heater Wiring Diagrams

### *Open Delta & Wye*

Three phase heating circuits are most efficient when operated under balanced conditions. If it is necessary to operate an unbalanced load, the equations below can be used to calculate the circuit values for open three phase Delta or Wye circuits. The terms used in the equations are identified below:

**$V_L$** = Line Voltage
**$V_P$** = Phase (Element) Voltage
**$I_L$** = Line Current (Amps)
**$I_{LL}$** = Line Current (Unbalanced Phase)
**$I_P$** = Phase Current (Amps)
**$W_T$** = Total Watts
**$R_1$** = $R_2$ = $R_3$ = Element Resistance
**$R_C$** = Circuit Resistance in Ohms Measured from Phase to Phase

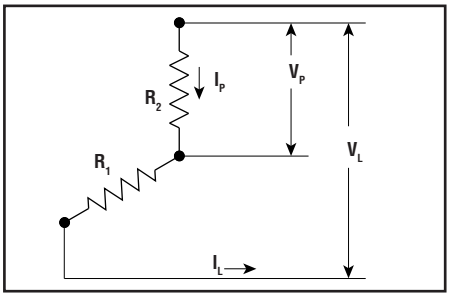
### *3Ø Open Delta*




$V_P = V_L$ | $V_L = V_P$
$W_T = 2V_L \times I_L$ | $W_T = 2 (V_L^2 \div R_1)$
$I_P = I_L$ | $I_L = I_P$
$W_C = 2V_P \times I_P$ | $I_{LL} = 1.73 \times I_P$

The loss of a phase or failure of an element in a three (3) element Delta circuit will reduce the wattage output by 33%.

### *3Ø Open Wye*

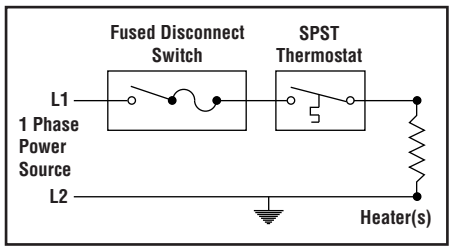



$V_P = V_L \div 2$ | $V_L = V_P \times 2$
$W_T = I_L \times V_L$ | $W_T = V_L^2 \div 2R_1$
$I_P = I_L$ | $I_L = I_P$
$R_C = V_L^2 \div W_C$

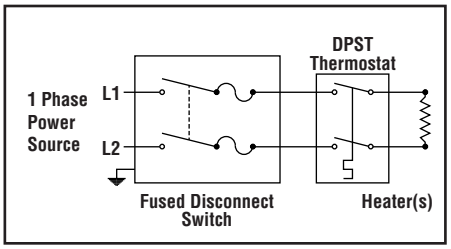
The loss of a phase or failure of an element in a three (3) element Wye circuit will reduce the wattage output by 50%. Heating elements are basically in series on single phase power.

### *Typical Heater Wiring Diagrams*

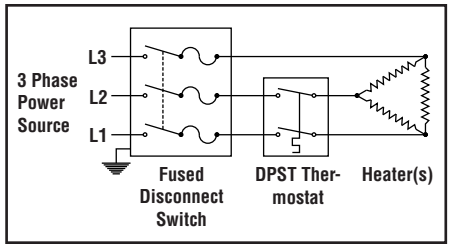
The following diagrams show typical heater wiring schematics.



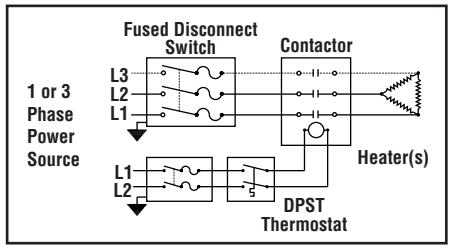

**Single Phase 120 VAC heater circuit where line voltage and current do not exceed thermostat rating.**




**Single Phase AC circuits where line voltage and current do not exceed thermostat rating.**

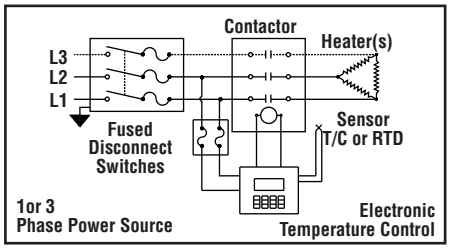



**Three Phase AC heater circuit where line voltage and current do not exceed thermostat rating.** Circuit does not have a "positive" off.

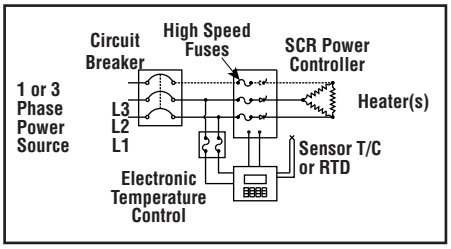



**Single or Three Phase AC heater circuit where line voltage and current exceed thermostat rating.** Separate control circuit can use a single pole or double pole thermostat. Control circuit requires over-current protection.

**WARNING — Hazard of Electric Shock.** Any installation involving electric heaters must be effectively grounded in accordance with the National Electrical Code to eliminate shock hazard.




**Single or Three Phase AC heater circuit using electronic temperature controllers and contactors.** Controller and contactor holding coil must be rated for the same voltage as the heater circuit. Control circuit requires over- current protection.




**Single or Three Phase AC heater circuit using an electronic temperature controller and a SCR (solid state) power controller.** Controller must be rated the same voltage as the heater circuit. Control circuit requires over-current protection. All electrical wiring to electric heaters must be installed in accordance with the National Electrical Code or local electrical codes by a qualified person.

### *Wiring & Ambient Temperatures*

Ambient temperatures must be considered when selecting wiring materials for electric heater circuits. Heating equipment and processes may cause associated wiring to operate well above ambient temperatures. These temperatures may result from heat conducted from the heater terminals, radiation from heated surfaces or simply high ambient air temperatures. Nickel plated copper or nickel alloy conductors with high temperature insulation should always be used in high temperature areas. Outside these areas, conventional wiring materials can usually be used. 60°C building wire is usually not suitable unless otherwise indicated.

### *Wiring in Severe Conditions*

Moist or wet locations require gasketed terminal and junction boxes to protect equipment and wiring. Rigid conduit is recommended. Hazardous Locations require the use of approved explosion-proof terminal and junction boxes. Rigid conduit or mineral insulated (MI) cable is mandatory in Division 1 areas. Some Hazardous Locations may require conduit seals (EYS) adjacent to the equipment.

# Technical Information

## Wiring Practices for Electric Heaters

### *Wire Insulation & Conductors*

The selection of wiring materials to be used in a particular application depends upon the service Voltage and the anticipated operating temperatures. The table below lists some of the more common code wire constructions according to their temperature limitations. Insulated wires should be derated for elevated ambient temperatures and should never be used above their temperature rating. The operating temperature of unplated copper wire should be limited to 200°C (392°F) maximum. A complete listing of wire construction and allowable current carrying capacities is shown in the National Electric Code Article 310.

### *General Purpose Wiring*

| Max. Conductor Temperature °C | Max. Conductor Temperature °F | Wire Type (600V) | Construction (Copper Conductors) |
|---|---|---|---|
| 60 | 140 | TW | Thermoplastic |
| 75 | 167 | RHW<br>THW | Rubber<br>Thermoplastic |
| 90 | 194 | RHH<br>THWN | Heat Resistant Rubber<br>Heat Resistant Thermoplastic |
| | | XHHN | Heat Resistant Cross-link Thermoplastic |
| | | MTW | Heat Resistant Cross-link Thermoplastic |
| 200 | 392 | FEP | Teflon® |

### *High Temperature Wiring Materials*

| Max. Conductor Temperature °C | Max. Conductor Temperature °F | Wire Type (600V) | Construction (Nickel Plated Copper or Nickel Conductors) |
|---|---|---|---|
| 250 | 482 | TGT<br>TGGT | Teflon® - Glass - Teflon® |
| 450 | 842 | MGS<br>MGT | Mica - Glass - Silicone<br>Mica - Glass - Teflon® |
| 594 | 1100 | Bare | Maganese Nickel Wire or Bus Bars with Ceramic Insulators |

**Note** — High temperature wiring materials are available for field application.

### *Contactor Sizing*

Contactors are normally rated for inductive and resistive loads. Most electric resistance heaters have negligible inrush or inductive current. Select contactors based on resistive load ratings. Using the formulas shown in the paragraphs on wire sizing to determine the amp load per pole (phase). Select a contactor with the next highest current rating. Use a two pole contactor for single phase (two-wire) power and a three pole contactor for balanced Delta or Wye three phase loads. For heater loads with high inrush current, refer to product data information for maximum amperage.

### *Thermocouple Wire & Cable*

Thermocouples and extension lead wires are color coded to aid in identification and to avoid inadvertent cross wiring. The following charts indicate the colors used of different alloys.

### *Thermocouple Color Coding*

| Type | Positive Color ( + ) | Alloys |
|---|---|---|
| J | White | Iron/Constantan |
| K | Yellow | Chromel/Alumel |
| T | Blue | Copper/Constantan |
| E | Purple | Chromel/Constantan |
| R | Black | Platinum/Platinum (with 13% Rhodium) |
| S | Black | Platinum/Platinum (with 6% Rhodium) |
| N | Orange | Nicrosil/Nisil |

**Note** — Negative (-) conductor identified with red colored insulation.

### *Thermocouple Extension Wire Colors*

| Type | Positive | Negative | Color Overall | Positive Color ( + ) |
|---|---|---|---|---|
| T | TPX | TNX | Blue | Blue |
| J | JPX | JNX | Black | White |
| E | EPX | ENX | Purple | Purple |
| K | KPX | KNX | Yellow | Yellow |
| R or S | SPX | SNX | Green | Black |
| B | BPX | BNX | Gray | Gray |

**Note** — Negative (-) conductor identified with red colored insulation.

### *Electrical Noise & Controls*

Electrical "noise" refers to extraneous electrical voltages that interfere with legitimate control signals. Most electrical noise is introduced by electromagnetic coupling with fluorescent lights, contactors, power wiring, switches and other arcing devices. Shield control circuit wiring and keep thermocouple wires separate from power wiring. Trace shielded thermocouple lead wires in a separate conduit for maximum protection.

### *Temperature Limits for Controls*

Most mechanical controls and thermostats (control bodies) can withstand a wide range of ambient temperatures ranging from below freezing to over 140°F. Electronic controls, transformers, contactors and other electrical devices are more temperature sensitive and extreme temperatures will usually shorten the life of the component. Most electrical and electronic equipment will function accurately in ambient temperatures ranging from about 30°F to about 130°F. Triacs and SCR controls frequently require special cooling for full load ratings when operated over 120°F. Refer to the installation instructions or contact the device manufacturer for recommendations.

### *Wiring Hints for Electric Heaters*

The following are some general recommendations for wiring electric heating elements and assemblies. These recommendations are only suggestions and are not intended to conflict with the National Electric Code or local codes.

**WARNING — Hazard of Electric Shock.** Any installation involving electric heaters must be effectively grounded in accordance with the National Electrical Code to eliminate shock hazard. All electrical wiring to electric heaters must be installed in accordance with the National Electrical code or local electrical codes by a qualified person.

1. Repetitive heating and cooling can cause wiring connections to loosen over time. High amperage through a loose terminal can cause overheating and terminal failure. All heater terminal connections should be tightened to a maximum torque consistent with terminal strength. Use a second wrench or pliers to prevent twisting heater terminals.
2. Use stranded wire in applications where the power wires to heater terminal connections may be subject to movement. When using solid wire or bus bar on heater terminals, provide expansion loops between points of support to minimize damaging stresses due to expansion and contraction.
3. Solder or silver braze lead connections to heating elements that may be subject to extreme temperatures or vibration. Use a minimum of flux to complete the connection and keep flux from contaminating the heating element. Remove residual flux to prevent corrosion of the electrical joint.
4. Keep thermostat capillary tubing and thermocouple wiring clear of heater terminals to prevent accidental short circuits. Sleeving or insulated tubing is recommended.
5. Use wiring suitable for the anticipated operating temperatures. Unless the heater is specifically marked for use with low temperature copper wiring, high temperature alloy conductors are recommended for connections to the heater terminals.
6. Do not use rubber, wax impregnated or plastic covered wire inside terminal enclosures of heaters in high temperature applications. These insulations will deteriorate and give off fumes which can contaminate the heating elements and cause short circuits.

# Technical Information

## Wiring Practices for Electric Heaters *(cont'd.)*

### *Selecting Wire Size (AWG)*

The size (wire gauge) of the electrical conductor for a particular application will depend upon the Amperage (current) which the heating load will draw from the power source. Current can be calculated by Ohm's Law. To calculate amperage, use the following formulas. On a single phase (two-wire) power supply, the amperage per line is calculated by:

$$\text{1 Ph Amperage} = \frac{\text{Total Circuit Wattage}}{\text{Line Voltage}}$$

On three phase power circuits with balanced Delta or Wye heating loads, line amperage is calculated by:

$$\text{3 Ph Amperage} = \frac{\text{Total Circuit Wattage}}{\text{Line Voltage x 1.73}}$$

Table II lists amperages for common kW ratings.

### *Allowable Ampacities*

Once the load current has been determined, wire size for the calculated amperage may be selected from tables in Article 310 of the National Electrical Code (NEC). As a guide, Table III at the right lists recommended ampacities for the more common insulated wires for high temperature applications. Current ratings for 90°C wire in a 30°C ambient are included for reference.

### *Corrections for Elevated Ambient Temperatures*

The recommended current carrying capacities of 200°C and 250°C wire are valid if conductor temperatures do not exceed 104°F (40°C). Operating temperatures in excess of 104°F (40°C) require the application of a temperature correction factor for the corresponding wire.

**Example —** Size 14 AWG, type TGT wire is capable of handling 39 Amperes at 104°F (40°C) but must be reduced to 0.85 (85%) or 33 Amperes when operated at 212°F (100°C).

### *Multiple Insulated Wires in Conduit*

The wire size selected above may be used in the heating circuit with three (3) wires enclosed in rigid or flexible conduit to protect the wiring. If more than 3 conductors are installed in the same conduit, another current correction factor must be used. For 4 to 6 conductors in a single conduit use 80% of the recommended current-carrying capacity. For 7 to 24 conductors use 70%.

### *Table II — Amperage (Current) for Typical kW Heater Ratings*

| | Single Phase | | | | | Three Phase Balanced Load | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| kW | 120V | 208V | 240V | 440V | 480V | 208V | 240V | 440V | 480V | 575V |
| 1 | 8.4 | 4.8 | 4.2 | 2.3 | 2.1 | 2.8 | 2.5 | 1.4 | 1.3 | 1.0 |
| 2 | 16.7 | 9.7 | 8.4 | 4.6 | 4.2 | 5.6 | 4.9 | 2.7 | 2.5 | 2.0 |
| 3 | 25.0 | 14.5 | 12.5 | 6.9 | 6.3 | 8.4 | 7.3 | 4 | 3.7 | 3.0 |
| 4 | 33.4 | 19.3 | 16.7 | 9.1 | 8.4 | 11.2 | 9.7 | 5.3 | 4.9 | 4.0 |
| 5 | 41.7 | 24.1 | 20.9 | 11.4 | 10.5 | 13.9 | 12.1 | 6.6 | 6.1 | 5.0 |
| 6 | 50.0 | 28.9 | 25.0 | 13.7 | 12.5 | 16.7 | 14.5 | 7.9 | 7.3 | 6.0 |
| 7.5 | 62.5 | 36.1 | 31.3 | 17.1 | 15.7 | 20.9 | 18.1 | 9.9 | 9.1 | 7.5 |
| 10 | 83.4 | 48.1 | 41.7 | 22.8 | 20.9 | 27.8 | 24.1 | 13.2 | 12.1 | 10.0 |
| 12 | 100.0 | 57.7 | 50.0 | 27.3 | 25 | 33.4 | 29 | 15.8 | 14.5 | 12.1 |
| 15 | 125.0 | 72.2 | 62.5 | 34.1 | 31.2 | 41.7 | 36.2 | 19.7 | 18.1 | 45.1 |
| 20 | 167.0 | 96.2 | 83.4 | 45.5 | 41.7 | 55.6 | 48.2 | 26.3 | 24.1 | 20.1 |
| 25 | 209.0 | 121 | 105 | 56.9 | 52.1 | 69.5 | 60.3 | 32.9 | 30.1 | 25.1 |
| 30 | — | 145 | 125 | 68.2 | 62.5 | 83.4 | 72.3 | 39.4 | 36.2 | 30.2 |
| 50 | — | 241 | 209 | 114 | 105 | 139 | 121 | 65.7 | 60.3 | 50.3 |
| 75 | — | — | 313 | 171 | 157 | 209 | 181 | 98.6 | 90.4 | 75.4 |
| 100 | — | — | 417 | 228 | 209 | 278 | 241 | 132 | 121.0 | 100.0 |

### *Table III — Allowable Ampacities*

| Three Insulated Conductors in a Raceway or Conduit | | | | Single Conductor[1,2] in Free Air (200°C Ambient) | | |
|---|---|---|---|---|---|---|
| Conductor Type | Copper | Copper | Nickel or Nickel Coated Copper | Nickel Coated Copper | Nickel | |
| Insulation Type | THHN XHHW MTW | FEP PFA SRG | TGT TGGT TFE | MGT MGS | MGT MGS | |
| Ambient Temp. | 30°C (86°F) | 40°C (104°F) | 40°C (104°F) | 200°C (392°F) | 200°C (392°F) | |
| Maximum Conductor Temperature (Insulation Limits) | | | | | | |
| Size AWG | 90°C (194°F) | 200°C (392°F) | 250°C (482°F) | 450°C (842°F) | 450°C (842°F) | |
| 14 | 25 | 36 | 39 | 44 | 23 | |
| 12 | 30 | 45 | 54 | 58 | 31 | |
| 10 | 40 | 60 | 73 | 77 | 42 | |
| 8 | 55 | 83 | 93 | 100 | 53 | |
| 6 | 75 | 110 | 117 | — | — | |
| **Correction Factors for Elevated Ambient Temperatures** | | | | | | |
| Ambient (°C) | For ambient temperature exceeding the values in the above table, multiply the allowable ampacities by the appropriate factor below. | | | | | Ambient (°F) |
| 36 - 40 | 0.91 | 1.00 | 1.00 | — | — | 96 - 104 |
| 41 - 45 | 0.87 | 0.97 | 0.98 | — | — | 105 - 113 |
| 46 - 50 | 0.82 | 0.96 | 0.97 | — | — | 114 - 122 |
| 51 - 55 | 0.76 | 0.95 | 0.95 | — | — | 123 - 131 |
| 56 - 60 | 0.71 | 0.94 | 0.94 | — | — | 132 - 140 |
| 61 - 70 | 0.58 | 0.9 | 0.93 | — | — | 141 - 158 |
| 71 - 80 | 0.41 | 0.87 | 0.9 | — | — | 159 - 176 |
| 81 - 90 | — | 0.83 | 0.87 | — | — | 177 - 194 |
| 91 - 100 | — | 0.79 | 0.85 | 1.22 | — | 195 - 212 |
| 101 - 120 | — | 0.71 | 0.79 | 1.19 | — | 213 - 248 |
| 121 - 140 | — | 0.61 | 0.72 | 1.16 | 1.16 | 249 - 284 |
| 141 - 160 | — | 0.5 | 0.65 | 1.12 | 1.12 | 285 - 320 |
| 161 - 180 | — | 0.35 | 0.58 | 1.06 | 1.06 | 321 - 356 |
| 181 - 200 | — | — | 0.49 | 1.00 | 1.00 | 357 - 392 |
| 201 - 225 | — | — | 0.35 | 0.92 | 0.92 | 393 - 437 |
| 226 - 250 | — | — | — | 0.87 | 0.87 | 438 - 542 |
| 250 - 300 | — | — | — | 0.70 | 0.70 | 543 - 572 |
| 300 - 350 | — | — | — | 0.49 | 0.49 | 573 - 662 |

1. Data derived or extrapolated from values and criteria set forth in NEC Article 310.
2. MGT & MGS insulated wire is intended to be used for interconnection of strip heaters and elements located in high temperature ambients and is not intended for general purpose wiring. Do not use these Amp ratings for three insulated conductors inside raceways or conduits.

# Reference Data

## Pressure-Temperature Ratings of Common Flange Materials

*Recommended Maximum Pressure-Temperature Ratings[1] for Catalog Flange Immersion & Circulation Heaters[2]*

| Temp. (°F) | Class 150 (Pressures in psig) | | | | | | | Class 300 (Pressures in psig) | | | | | | | Class 600 (Pressures in psig) | | | | | | | Temp (°F) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B-16.5 Material Group Number | | | | | | | | | | | | | | | | | | | | | |
| | 1.1 | 1.9 | 2.1 | 2.2 | 2.3 | 2.4 | 2.5 | 1.1 | 1.9 | 2.1 | 2.2 | 2.3 | 2.4 | 2.5 | 1.1 | 1.9 | 2.1 | 2.2 | 2.3 | 2.4 | 2.5 | |
| | Carbon Steel | Alloy Steel 1-¼ Cr-½ Mo | Austenitic Steels | | | | | Carbon Steel | Alloy Steel 1-¼ Cr-½ Mo | Austenitic Steels | | | | | Carbon Steel | Alloy Steel 1-¼ Cr-½ Mo | Austenitic Steels | | | | | |
| | | | Type 304 | Type 316 | Type 304L 316L | Type 321 | Type 347, 348 | | | Type 304 | Type 316 | Type 304L 316L | Type 321 | Type 347, 348 | | | Type 304 | Type 316 | Type 304L 316L | Type 321 | Type 347, 348 | |
| -20 to 100 | 285 | 290 | 275 | 275 | 230 | 275 | 275 | 740 | 750 | 720 | 720 | 600 | 720 | 720 | 1,480 | 1,500 | 1,440 | 144 | 1,200 | 1,440 | 1,440 | -20 to 100 |
| 200 | 260 | 260 | 235 | 240 | 195 | 235 | 245 | 675 | 710 | 600 | 620 | 505 | 610 | 635 | 1,350 | 1,425 | 1,200 | 124 | 1,015 | 1,220 | 1,270 | 200 |
| 300 | 230 | 230 | 205 | 215 | 175 | 210 | 225 | 655 | 675 | 530 | 560 | 455 | 545 | 590 | 1,315 | 1,345 | 1,055 | 112 | 910 | 1,090 | 1,175 | 300 |
| 400 | 200 | 200 | 180 | 195 | 160 | 190 | 200 | 635 | 660 | 470 | 515 | 415 | 495 | 555 | 1,270 | 1,315 | 940 | 103 | 825 | 990 | 1,110 | 400 |
| 500 | 170 | 170 | 170 | 170 | 145 | 170 | 170 | 600 | 640 | 435 | 480 | 380 | 460 | 520 | 1,200 | 1,285 | 875 | 955 | 765 | 915 | 1,035 | 500 |
| 600 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 550 | 605 | 415 | 450 | 360 | 435 | 490 | 1,095 | 1,210 | 830 | 905 | 720 | 875 | 985 | 600 |
| 650 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 535 | 590 | 410 | 445 | 350 | 430 | 480 | 1,075 | 1,175 | 815 | 890 | 700 | 855 | 960 | 650 |
| 700 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 535 | 570 | 405 | 430 | 345 | 420 | 470 | 1,065 | 1,135 | 805 | 865 | 685 | 840 | 935 | 700 |
| 750 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 505 | 530 | 400 | 425 | 335 | 415 | 460 | 1,010 | 1,065 | 795 | 845 | 670 | 830 | 920 | 750 |
| 800 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 410 | 510 | 395 | 415 | 330 | 415 | 455 | 825 | 1,015 | 790 | 830 | 660 | 825 | 910 | 800 |
| 850 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 270 | 485 | 390 | 405 | 320 | 410 | 445 | 535 | 975 | 780 | 810 | 645 | 815 | 890 | 850 |
| 900 | 50 | 50 | 50 | 50 | — | 50 | 50 | 170 | 450 | 385 | 395 | — | 405 | 430 | 345 | 900 | 770 | 790 | — | 810 | 865 | 900 |
| 950 | 35 | 35 | 35 | 35 | — | 35 | 35 | 105 | 380 | 375 | 385 | — | 385 | 385 | 205 | 755 | 750 | 775 | — | 775 | 775 | 950 |
| 1000 | 20 | 20 | 20 | 20 | — | 20 | 20 | 50 | 225 | 325 | 365 | — | 355 | 365 | 105 | 445 | 645 | 725 | — | 715 | 725 | 1000 |
| 1050 | **Material Groups** | | | | | | | Notes | 140 | 310 | 360 | — | 345 | 360 | — | 275 | 620 | 720 | — | 695 | 720 | 1050 |
| 1100 | 1.1 A-105, A516-70 | | | | | | | A, B | 95 | 260 | 325 | — | 300 | 325 | — | 190 | 515 | 645 | — | 605 | 645 | 1100 |
| 1150 | 1.1 A350-LF2 | | | | | | | C | 50 | 195 | 275 | — | 235 | 275 | — | 105 | 390 | 550 | — | 475 | 550 | 1150 |
| 1200 | 1.9 A182-F11, A182-F12 | | | | | | | D | 35 | 155 | 205 | — | 180 | 170 | — | 70 | 310 | 410 | — | 365 | 345 | 1200 |
| 1250 | 2.1 A182-F304, F304H and A240-304 | | | | | | | — | — | — | — | — | — | 125 | — | — | 220 | 365 | — | 280 | 245 | 1250 |
| 1300 | 2.2 A182-F316, F316H and A240-316 | | | | | | | — | — | 85 | 140 | — | 105 | 95 | — | — | 165 | 275 | — | 210 | 185 | 1300 |
| 1350 | 2.3 A182-F304L, F316L and A240-304L | | | | | | | E, F | — | 60 | 105 | — | 80 | 70 | — | — | 125 | 205 | — | 165 | 135 | 1350 |
| 1400 | 2.4 A182-F321, F321H and A240-321, 321H | | | | | | | G | — | 50 | 75 | — | 60 | 50 | — | — | 90 | 150 | — | 125 | 105 | 1400 |
| 1450 | 2.5 A182-F347, F347H and A240-347, 347H | | | | | | | H | — | 35 | 60 | — | 50 | 40 | — | — | 70 | 115 | — | 95 | 80 | 1450 |
| 1500 | | | | | | | | — | — | 25 | 40 | — | 40 | 35 | — | — | 50 | 85 | — | 75 | 70 | 1500 |

1. The above table is in accordance with ANSI B16.5, 1988 Edition. For other materials, critical applications or for higher pressure-temperature requirements, refer to ANSI Std. B16.5 or contact your Local Chromalox Sales office.
2. Pressure-temperature ratings for ASME pressure vessels and flanges may vary from the values shown in the above table due to Code requirements, re-inforcement and ligament calculations. Contact your Local Chromalox Sales office for further information and specific recommendations for ASME Coded flanges and heaters.

**Other Notes —**

A. Not recommended for prolonged use above 800°F.
B. Do not use A105 flanges above 1000°F or A516-70 plate over 850°F.
C. Do not use A350-LF2 flanges above 650°F.
D. Not recommended for prolonged use above 1100°F.
E. Do not use A182-F304L flanges or A240-304L plate above 800°F.
F. Do not use A182-F316L flanges or A240-316L plate above 850°F.
G. Do not use A182-F321 flanges or A240-321 over 1000°F.
H. Do not use A182-F347 flanges or A240-347 plate above 1000°F.

*Pipe Specifications — Standard (Schedule 40) Steel & Stainless Pipe*

| Nominal Pipe Size | Pipe Schedule | Outside Dia. (In.) | Wall Thickness (In.) | Inside Dia. (In.) | Inside Area ($In^2$) | Weight (Lbs/Ft.) | Volume (Gal/Ft.) | Wt. Water (Lbs/Ft.) | Thds/In. (NPT) |
|---|---|---|---|---|---|---|---|---|---|
| 1/8 | Sch 40 (Std) | 0.405 | 0.068 | 0.269 | 0.0568 | 0.245 | 0.0030 | 0.0246 | 27 |
| 1/4 | Sch 40 (Std) | 0.540 | 0.088 | 0.364 | 0.1041 | 0.425 | 0.0054 | 0.0451 | 18 |
| 3/8 | Sch 40 (Std) | 0.675 | 0.091 | 0.493 | 0.191 | 0.568 | 0.0099 | 0.0827 | 18 |
| 1/2 | Sch 40 (Std) | 0.840 | 0.109 | 0.622 | 0.304 | 0.851 | 0.0157 | 0.1316 | 14 |
| 3/4 | Sch 40 (Std) | 1.050 | 0.113 | 0.824 | 0.533 | 1.131 | 0.0277 | 0.2301 | 14 |
| 1 | Sch 40 (Std) | 1.315 | 0.133 | 1.049 | 0.864 | 1.679 | 0.0449 | 0.374 | 11-1/2 |
| 1-1/4 | Sch 40 (Std) | 1.660 | 0.140 | 1.380 | 1.496 | 2.273 | 0.0779 | 0.648 | 11-1/2 |
| 1/1-2 | Sch 40 (Std) | 1.900 | 0.145 | 1.610 | 2.036 | 2.718 | 0.106 | 0.882 | 11-1/2 |
| 2 | Sch 40 (Std) | 2.375 | 0.154 | 2.067 | 3.360 | 3.653 | 0.174 | 1.455 | 11-1/2 |
| 2-1/2 | Sch 40 (Std) | 2.875 | 0.203 | 2.469 | 4.079 | 5.793 | 0.249 | 2.076 | 8 |
| 3 | Sch 40 (Std) | 3.500 | 0.216 | 3.068 | 7.039 | 7.578 | 0.384 | 3.20 | 8 |
| 3-1/2 | Sch 40 (Std) | 4.000 | 0.226 | 3.548 | 9.89 | 9.11 | 0.514 | 4.28 | 8 |
| 4 | Sch 40 (Std) | 4.500 | 0.237 | 4.026 | 12.73 | 10.79 | 0.661 | 5.51 | 8 |
| 5 | Sch 40 (Std) | 5.563 | 0.258 | 5.047 | 20.01 | 14.62 | 1.04 | 8.66 | 8 |
| 6 | Sch 40 (Std) | 6.625 | 0.280 | 6.065 | 28.89 | 18.97 | 1.50 | 12.51 | 8 |
| 8 | Sch 40 (Std) | 8.625 | 0.322 | 7.981 | 50.00 | 28.55 | 2.66 | 21.69 | 8 |
| 10 | Sch 40 (Std) | 10.75 | 0.365 | 10.02 | 78.90 | 40.48 | 4.19 | 34.10 | 8 |
| 12 | Standard | 12.75 | 0.375 | 12.00 | 113.10 | 49.56 | 5.96 | 49.00 | 8 |
| 14 | Standard | 14.00 | 0.375 | 13.25 | 137.90 | 54.57 | 7.19 | 59.70 | 8 |

# Reference Data

## Physical & Thermodynamic Properties of Common Liquids

| Substance | Density[1] (Lbs/Ft³) | Specific Heat (Btu/lb/°F) | Thermal Conductivity (Btu/in/hr/ft²/°F) | Melting Point (°F) | Latent Heat of Fusion (Btu/lb) | Boiling Point (°F) | Latent Heat of Vaporization (Btu/lb) | Viscosity Centipoise |
|---|---|---|---|---|---|---|---|---|
| Acetic Acid | 65.5 | 0.522 | 1.19 | 62 | 84 | 245 | 174.2 | 1.222 |
| Acetone | 49.42 | 0.514 | 1.22 | -140 | 42.1 | 133 | 224 | 0.31 |
| Allyl Alcohol | 53.31 | 0.665 | 1.25 | -200 | — | 206 | 294.1 | 1.363 |
| Ammonia | 43.5 | 1.099 | 3.48 | 107 | 142.9 | -28 | 583 | — |
| Amyl Alcohol | 51.06 | 0.65 | 1.13 | -110 | — | 280 | 216.3 | — |
| Aniline | 63.77 | 0.512 | 1.2 | 21 | 48.8 | 364 | 186.6 | 4.467 |
| Bromine | 194.7 | 0.107 | — | 19 | 28.5 | 138 | 79.4 | 1.005 |
| Butyl Alcohol | 50.54 | 0.563 | 1.07 | -130 | 54 | 244 | 254 | 2.948 |
| Butyric Acid | 60.2 | 0.515 | 1.13 | 20 | 54.1 | 326 | 217 | 1.54 |
| Carbolic Acid (Phenol) | 66.7 | 0.561 | — | 106 | 52.3 | 360 | — | 12.74 |
| Carbon Disulfide | 78.9 | 0.24 | 1.12 | -169 | — | 115 | 148.8 | 0.376 |
| Carbon Tetrachloride | 99.47 | 0.201 | 0.744 | -9 | 12.8 | 170 | 83.5 | 0.975 |
| Caustic Soda (50% Solution) | 95.4 | 0.78 | — | — | — | — | — | — |
| Decane | 45.6 | 0.5 | 1.03 | -21 | 86.9 | 345 | — | 0.77 |
| Di-ethyl Ether | 44.61 | 0.541 | — | -177 | 42.4 | 94 | 151 | 0.245 |
| Ether | 46 | 0.503 | 0.97 | — | — | 95 | 160 | — |
| Ethyl Acetate | 52.3 | 0.468 | 1.21 | -116 | — | 171 | 183.8 | 0.45 |
| Ethyl Alcohol | 49.27 | 0.68 | 1.26 | -174 | 46.4 | 173 | 367.5 | 1.2 |
| Ethyl Bromide | 90.5 | 0.215 | — | -182 | — | 101 | 107.8 | 0.402 |
| Ethyl Chloride | 56.05 | 0.368 | 2.15 | -214 | — | 54 | 165.9 | — |
| Ethyl Iodide | 120.8 | 0.161 | 2.57 | -163 | — | 162 | 82 | 0.592 |
| Ethylene Glycol | 69.2 | 0.555 | 1 | — | — | 388 | 344 | — |
| Ethylene Bromide | 136.5 | 0.173 | — | 50 | — | 269 | 99.2 | 1.721 |
| Ethylene Chloride | 71.75 | 0.294 | — | -35 | — | 183 | 139.2 | 0.838 |
| Formic Acid | 76.13 | 0.526 | 1.25 | 47 | 118.9 | 213 | 216 | 1.784 |
| Glycerin | 78.69 | 0.576 | 1.36 | 68 | 85.5 | 554 | — | 830 |
| Heat Transfer Fluids | | | | | | | | |
| Dowtherm A | 66.1 | 0.377 | — | 54 | 42.2 | 494 | 127 | — |
| Dowtherm G | 65.4 | 0.377 | — | 40 | 42.2 | 551 | 123 | — |
| Mobiltherm 603 | 53.7 | 0.592 | — | — | — | — | — | — |
| Therminol VP-1 | 65.9 | 0.377 | — | — | — | 495 | 130.6 | — |
| Heptane | 42.68 | 0.532 | 0.89 | -132 | — | 210 | 137.3 | 0.416 |
| Hexane | 41.18 | 0.6 | 0.86 | -40 | — | 155 | 142.5 | 0.326 |
| Linseed Oil | 58.28 | 0.44 | — | -4 | — | 548 | — | 33.1 |
| Methyl Acetate | 57.84 | 0.468 | 1.12 | -144 | — | 134 | 176.6 | 0.388 |
| Methyl Alcohol | 49.42 | 0.601 | 1.49 | -144 | 42.7 | 148 | 473 | 0.596 |
| Methyl Iodide | 142.58 | — | — | -87 | — | 108 | 82.6 | 0.5 |
| Nitric Acid (100%) | 94.41 | 0.42 | 1.92 | -42 | 71.5 | 187 | 270 | — |
| Nitrobenzene | 75.63 | 0.35 | 11.52 | 42 | 40.5 | 412 | 142.4 | 2.1 |
| Octane | 44.12 | 0.51 | 1 | -70 | — | 258 | 131.7 | 0.542 |
| Olive Oil | 57.28 | 0.471 | — | — | — | ~ 572 | — | 84 |
| Pentane | 39.37 | 0.558 | 0.79 | -202 | — | 97 | 153.6 | 0.24 |
| Petroleum Products | | | | | | | | |
| Asphalt | 62.3 | 0.42 | 5.04 | — | — | — | — | — |
| Benzene (Benzol) | 54.85 | 0.412 | 1.02 | 42 | 54.2 | 176 | 169.4 | 0.654 |
| Kerosene | 49.9 | 0.5 | 1.03 | — | — | — | — | — |
| Fuel Oil #6 | 58.5 | 0.41 | 0.85 | — | — | — | — | — |
| Gasoline | 41.2 | 0.5 | 0.936 | — | — | 128 - 164 | — | — |
| Lube Oils | 55.4 | 0.43 | — | — | — | — | — | — |
| Naphthalene | 71.4 | 0.4 | — | 176 | 64 | 411 | 136 | 4 |
| Paraffin (Melted) | 44.3 | 0.71 | 1.68 | — | — | ~ 525 | — | — |
| Toluene | 54.03 | 0.404 | 1.08 | -139 | — | 231 | 155.7 | 0.59 |
| Propionic Acid | 61.77 | 0.473 | 1.2 | -5 | — | 286 | 177.8 | 1.102 |
| Propyl Alcohol | 50.16 | 0.57 | — | -197 | — | 208 | 296 | 2.256 |
| Soy Bean Oil | 57.35 | ~ 0.28 | — | — | — | — | — | 40.6 |
| Sulfur (Melted) | 14.6 | 0.234 | — | — | — | 833 | — | — |
| Sulfuric Acid (100%) | 114.25 | 0.344 | — | 51 | 43.3 | 638 | 219.7 | 50 |
| Tallow (Lard) | 58.66 | 0.64 | — | 50 - 106 | — | — | — | 17.6 |
| Turpentine | 54.48 | 0.42 | 0.876 | 14 | — | 319 | 123.5 | 1.487 |
| **Water** | **62.4** | **1** | **4.17** | **32** | **143.6** | **212** | **972** | **1.005** |
| Xylene (Ortho) | 55 | 0.411 | 1.08 | -13 | — | 291 | 149.2 | 0.881 |

1. Where the temperature is not given, room temperature of 68°F (20°C) is understood.

**Other Notes —**

A. Dowtherm is a trademark of the Dow Chemical Company.
B. Mobiltherm is a trademark of the Mobil Oil Corporation.
C. Therminol is a trademark of the Monsanto Company.

# Reference Data

## Physical & Thermodynamic Properties of Common Solids

### *Properties of Metals (Solid)*

| Substance | Density (Lb/Ft³) | Specific Heat (Btu/ lb/°F) | Thermal Conductivity (Btu/ in/hr/ft²/°F) | Melting Point (°F) | Latent Heat Fusion (Btu/lb) |
|---|---|---|---|---|---|
| Aluminum | 169 | 0.226 | 1536 | 1220 | 167.4 |
| Antimony | 413 | 0.0504 | 127 | 1167 | 70.2 |
| Babbitt - Tin | 462 | 0.071 | 278 | 465 | 279 |
| Barium | 218 | 0.068 | — | 1562 | — |
| Beryllium | 113 | 0.425 | 960 | 2462 | 572.4 |
| Bismuth | 610 | 0.0294 | 62 | 520 | 22.5 |
| Brass (Yellow) | 529 | 0.092 | 768 | ~ 1680 | — |
| Cadmium | 540 | 0.0552 | 644 | 609 | 23 |
| Calcium | 97 | 0.168 | 910 | 1490 | 140 |
| Carbon | 165 | 0.165 | 165 | > 6400 | — |
| Chromium | 432 | 0.111 | 480 | 2940 | 126 |
| Cobalt | 544 | 0.1001 | 336 | 2696 | 115.2 |
| Copper | 555 | 0.0928 | 2784 | 1981 | 88.7 |
| Gold | 1204 | 0.0312 | 2352 | 1945 | 28.6 |
| INCOLOY® 800 | 495 | 0.108 | 80 | 2475 | — |
| INCONEL® 600 | 525 | 0.106 | 103 | 2470 | — |
| Iridium | 1399 | 0.0323 | 448 | 4449 | 47 |
| Iron (99.97%) | 491 | 0.1075 | 498 | 2795 | 117 |
| Lead | 708 | 0.0306 | 243 | 621 | 10.8 |
| Lithium | 33 | 0.79 | 516 | 357 | 217 |
| Magnesium | 108 | 0.246 | 1188 | 1204 | 126 |
| Manganese | 449 | 0.1211 | 81 | 2300 | 116 |
| Mercury | 845 | 0.0333 | 58 | -38 | 4.98 |
| Molybdenum | 636 | 0.065 | 948 | 4748 | 126 |
| MONEL® 400 | 551 | 0.11 | 144 | 2370 | — |
| Nickel | 552 | 0.1032 | 432 | 2624 | 131.4 |
| Platinum | 1333 | 0.0319 | 492 | 3224 | 48.4 |
| Potassium | 54 | 0.177 | 720 | 146 | 26.3 |
| Rhodium | 776 | 0.058 | 666 | 3570 | — |
| Silver | 665 | 0.0557 | 2904 | 1761 | 46.6 |
| Sodium | 60 | 0.283 | 970 | 208 | 48.6 |
| Solder 50%Sn - 50%Pb | 550 | 0.04 | 340 | ~ 440 | 17 |
| Steel, Carbon | 487 | 0.12 | 315 | 2548 | — |
| Steel, SS | 501 | 0.12 | 113 | 2550 | — |
| Tantalum | 1035 | 0.036 | 384 | 5162 | — |
| Tin | 454 | 0.0548 | 432 | 449 | 25.9 |
| Titanium | 281 | 0.1125 | 108 | 3272 | — |
| Type Metal 85%Pb - 15%Sb | 625 | 0.04 | 180 | ~ 479 | 14 |
| Tungsten | 1204 | 0.032 | 1104 | 6119 | 79 |
| Uranium | 397 | 0.028 | 168 | < 3362 | — |
| Vanadium | 349 | 0.1153 | 240 | 3110 | — |
| Zinc | 445 | 0.0931 | 780 | 787 | 47.9 |
| Zirconium | 408 | 0.066 | 132 | 3452 | 108 |

**Note —** Where temperature is not given, 68°F (20°C) temperature is understood.

### *Properties of Metals (Liquid)*

| Metal | Melting Point (°F) | Latent Ht. of Fusion (Btu/lb) | Liquid Temp. (°F) | Density (Lbs/ft³) | Specific Heat (Btu/ Lb/°F) | Thermal Conductivity (Btu/ in/hr/ft²/°F) |
|---|---|---|---|---|---|---|
| Aluminum | 1220 | 173 | 1220 | 148.6 | 0.26 | — |
| | — | — | 1292 | 147.7 | 0.26 | 717 |
| | — | — | 1454 | — | 0.26 | 842 |
| Bismuth | 520 | 21.6 | 600 | 625 | 0.034 | 114 |
| | — | — | 1000 | 608 | 0.037 | 108 |
| | — | — | 1400 | 591 | 0.039 | 108 |
| Cadmium | 609 | 23.8 | 626 | 500 | 0.063 | — |
| | — | — | 660 | 499 | 0.063 | 308 |
| | — | — | 752 | 495 | 0.063 | — |
| Gold | 1945 | 26.9 | 2012 | 1,076 | 0.036 | — |
| Lead | 621 | 10.6 | 700 | 658 | 0.038 | 126 |
| | — | — | 900 | 650 | 0.037 | 137 |
| | — | — | 1300 | 633 | — | — |
| Lithium | 357 | 284 | 392 | 31.7 | 1 | 262 |
| | — | — | 752 | 31 | 1 | — |
| Magnesium | 1204 | 148 | 1204 | 98 | 0.317 | — |
| | — | — | 1328 | 94 | — | — |
| | — | — | 1341 | — | 0.321 | — |
| Mercury | -38 | 5 | 50 | 847 | 0.033 | 56 |
| | — | — | 300 | 826 | 0.033 | 80 |
| | — | — | 600 | 802 | 0.032 | 97 |
| Potassium | 146 | 26.3 | 300 | 50.4 | 0.190 | 312 |
| | — | — | 800 | 46.3 | 0.183 | 274 |
| | — | — | 1300 | 42.1 | 0.180 | 229 |
| Silver | 1761 | 44.8 | 1761 | 581 | 0.069 | — |
| | — | — | 1832 | 578 | 0.069 | — |
| | — | — | 2000 | 574 | 0.069 | — |
| Sodium | 208 | 48.7 | 200 | 58 | 0.33 | 598 |
| | — | — | 400 | 56 | 0.32 | 557 |
| | — | — | 700 | 54 | 0.31 | 502 |
| | — | — | 1300 | 49 | 0.30 | 414 |
| Solder 50%Sn - 50% | 421 | 17 | — | — | 0.056 | — |
| 60%Sn - 40% | 375 | 28 | — | — | 0.058 | — |
| Tin | 449 | 26.1 | 482 | — | 0.058 | — |
| | — | — | 768 | 427 | — | — |
| | — | — | 783 | — | — | 229 |
| Zinc | 787 | 43.9 | 787 | 432 | 0.12 | — |
| | — | — | 932 | — | — | 400 |
| | — | — | 1112 | 425 | 0.117 | 394 |

# Reference Data

## Physical & Thermodynamic Properties of Common Solids *(cont'd.)*

### *Properties of Non-Metallic Solids*

| Substance | Density (Lbs/Ft$^3$) | Specific Heat (Btu/lb/°F 20°C 68°F) | Thermal Conductivity (Btu/in/hr/ft$^2$/°F) | Melting Point (°F) |
|---|---|---|---|---|
| Alumina | 231 | 0.19 | 205 | — |
| Aluminum Silicate (Lava) | 130 | 0.25 | 9 | — |
| Asbestos (Insul.) | 36 | 0.2 | 1.1 | — |
| Asbestos - Cement Board | 120 | 0.24 | 4 | — |
| Asphalt | 81 | 0.4 | 5.2 | 250 |
| Bakelite | 81 | 0.35 | 116 | — |
| Basalt | 184 | 0.2 | — | — |
| Beeswax | 60 | — | — | 144 |
| Boron Nitride (Comp.) | 130 | 0.32 | 150 | — |
| Brick, Building | 123 | 0.22 | 4.8 | — |
| Carbon, Powder | 131 | 0.168 | 2.4 | 6400 |
| Graphite, Solid | 140 | 0.165 | 1044 | — |
| Graphite, Powder | 130 | 0.165 | 1.27 | — |
| Diamond | 219 | 0.16 | 15840 | — |
| Cellulose (Pulp) | 3.4 | 0.35 | 0.32 | — |
| Chalk | 143 | 0.215 | 5.76 | — |
| Charcoal (Oak) | 33 | 0.2 | 0.36 | — |
| Clay | 115 | 0.22 | 9 | — |
| Coal (Anthracite) | 97 | 0.3 | 1.18 | — |
| Coke | 75 | 0.36 | 6.6 | — |
| Concrete, Sand | 144 | 0.22 | 12.6 | — |
| Concrete, Cinder | 97 | 0.21 | 4.92 | — |
| Cordierite | 138 | 0.35 | 23 | — |
| Cork (Granulated) | 5.4 | 0.485 | 0.336 | — |
| Earth (42% $H_2O$) | 108 | 0.9 | 7.44 | — |
| Earth (Dry, Packed) | 95 | 0.42 | 0.9 | — |
| Earth (Dry, Stony) | 127 | 0.44 | 3.6 | — |
| Fiberglas® (Insul.) | 0.75 | — | 0.29 | — |
| Fiberglas® (Insul.) | 3 | — | 0.22 | — |
| Firebrick (Clay) | 112 | 0.198 | 6.96 | — |
| Fosterite | 174 | 0.23 | 26 | — |
| Fused Silica (Quartz) | 137 | 0.31 | 9.96 | — |
| Glass | | | | |
| Normal | 139 | 0.199 | 7.08 | 2200 |
| Crown | 154 | 0.161 | 7.08 | — |
| Flint (Leaded) | 200 | 0.117 | 9.48 | — |
| Pyrex | 139 | 0.20 | 7.08 | — |
| Granite | 159 | 0.192 | 13 - 28 | — |
| Ice -0°C (32°F) | 57.5 | 0.465 | 15.6 | 32 |
| Limestone | 153 | 0.217 | 6.48 | — |

### *Properties of Non-Metallic Solids*

| Substance | Density (Lbs/Ft$^3$) | Specific Heat (Btu/lb/°F 20°C 68°F) | Thermal Conductivity (Btu/in/hr/ft$^2$/°F) | Melting Point (°F) |
|---|---|---|---|---|
| Magnesia 85% (Insul.) | 12 | 0.222 | 4.2 | — |
| Magnesium Oxide | 135 | 0.25 | 17.6 | — |
| Marble | 170 | 0.21 | 18 | — |
| Mica | 165 | 0.206 | 3 | — |
| Paper | 58 | 0.32 | 0.9 | — |
| Plastics | | | | |
| ABS | 62.2 | 0.3 - 0.4 | 1.56 | — |
| Cellulose Acetate | 82.9 | 0.3 - 0.42 | 2.28 | — |
| Epoxy (Resin) | 71.8 | 0.4 - 0.5 | 1.2 - 3.5 | — |
| Fluoroplastic (PTFE) | 133 | 0.25 | 1.68 | — |
| Nylon | 69.1 | 0.4 | 1.2 | — |
| Phenolic | 82.9 | 0.35 | 0.097 - 0.3 | — |
| Polyethylene | 57 | 0.55 | 2.28 | — |
| Polystyrene | 64.8 | 0.32 | 0.7 - 1.08 | — |
| Polystyrene (Exp.) | 1.7 | 0.29 | 0.252 | — |
| Polypropylene | 56.7 | 0.45 | 1.21 - 1.36 | — |
| Polyurethane (Exp.) | 1.5 | 0.38 | 0.228 | — |
| Polyvinyl | 86.4 | 0.2 - 0.3 | 0.84 - 1.20 | — |
| Paraffin | 56 | 0.69 | 1.68 | 133 |
| Porcelain | 145 | 0.26 | 15.6 | — |
| Pyroceram | 163 | 0.233 | 23.4 | — |
| Quartz | 138 | 0.17 | 27.6 | 3150 |
| Rigid Insulation | | | | |
| Fiber Board | 14.8 | | 0.28 | |
| Inorganic Bonded | 10 - 15 | | 0.45 | |
| Rock Salt | 136 | 0.21 | — | 1472 |
| Rubber Soft | 68.6 | 0.48 | 0.96 | — |
| Rubber, Hard | 74.3 | 0.48 | 1.104 | — |
| Sand | 94 | 0.195 | 2.25 | — |
| Silicon | 145 | 0.181 | — | 2577 |
| Sodium Carbonate | 135 | 0.30 | — | 1546 |
| Sodium Chloride | 135 | 0.22 | — | 1440 |
| Sodium Cyanide | 94 | 0.3 | — | 1015 |
| Sodium Nitrate | 141 | 0.29 | — | 555 |
| Sodium Nitrite | 135 | 0.3 | — | 490 |
| Steatite | 158 | 0.2 | 23.2 | — |
| Sugar | 105 | 0.3 | — | 160 |
| Sulfur | 129 | 0.181 | 1.8 | — |
| Woods (Average) | 23 - 70 | 0.45 - 0.67 | 0.78 - 1.78 | — |
| Oak, Red | 42 | 0.57 | 1.188 | — |
| Pine, White | 25 | 0.67 | 0.72 | — |

# Reference Data

## Equivalents & Conversions

### *Temperature Equivalents ( °F and °C)*

| °C | °F | °C | °F | °C | °F | °C | °F | °C | °F | °C | °F | °C | °F | °C | °F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -50 | -58 | 95 | 203 | 240 | 464 | 385 | 725 | 530 | 986 | 675 | 1247 | 820 | 1508 | 965 | 1769 |
| -45 | -49 | 100 | 212 | 245 | 473 | 390 | 734 | 535 | 995 | 680 | 1256 | 825 | 1517 | 970 | 1778 |
| -40 | -40 | 105 | 221 | 250 | 482 | 395 | 743 | 540 | 1004 | 685 | 1265 | 830 | 1526 | 975 | 1787 |
| -35 | -31 | 110 | 230 | 255 | 491 | 400 | 752 | 545 | 1013 | 690 | 1274 | 835 | 1535 | 980 | 1796 |
| -30 | -22 | 115 | 239 | 260 | 500 | 405 | 761 | 550 | 1022 | 695 | 1283 | 840 | 1544 | 985 | 1805 |
| -25 | -13 | 120 | 248 | 265 | 509 | 410 | 770 | 555 | 1031 | 700 | 1292 | 845 | 1553 | 990 | 1814 |
| -20 | -4 | 125 | 257 | 270 | 518 | 415 | 779 | 560 | 1040 | 705 | 1301 | 850 | 1562 | 995 | 1823 |
| -15 | -5 | 130 | 266 | 275 | 527 | 420 | 788 | 565 | 1049 | 710 | 1310 | 855 | 1571 | 1000 | 1832 |
| -10 | 14 | 135 | 275 | 280 | 536 | 425 | 797 | 570 | 1058 | 715 | 1319 | 860 | 1580 | 1005 | 1841 |
| -5 | 23 | 140 | 284 | 285 | 545 | 430 | 806 | 575 | 1067 | 720 | 1328 | 865 | 1589 | 1010 | 1850 |
| 0 | 32 | 145 | 293 | 290 | 554 | 435 | 815 | 580 | 1076 | 725 | 1337 | 870 | 1598 | 1015 | 1859 |
| 5 | 41 | 150 | 302 | 295 | 563 | 440 | 824 | 585 | 1085 | 730 | 1346 | 875 | 1607 | 1020 | 1868 |
| 10 | 50 | 155 | 311 | 300 | 572 | 445 | 833 | 590 | 1094 | 735 | 1355 | 880 | 1616 | 1025 | 1877 |
| 15 | 59 | 160 | 320 | 305 | 581 | 450 | 842 | 595 | 1103 | 740 | 1364 | 885 | 1625 | 1030 | 1886 |
| 20 | 68 | 165 | 329 | 310 | 590 | 455 | 851 | 600 | 1112 | 745 | 1373 | 890 | 1634 | 1035 | 1895 |
| 25 | 77 | 170 | 338 | 315 | 599 | 460 | 860 | 605 | 1121 | 750 | 1382 | 895 | 1643 | 1040 | 1904 |
| 30 | 86 | 175 | 347 | 320 | 608 | 465 | 869 | 610 | 1130 | 755 | 1391 | 900 | 1652 | 1045 | 1913 |
| 35 | 95 | 180 | 356 | 325 | 617 | 470 | 878 | 615 | 1139 | 760 | 1400 | 905 | 1661 | 1050 | 1922 |
| 40 | 104 | 185 | 365 | 330 | 626 | 475 | 887 | 620 | 1148 | 765 | 1409 | 910 | 1670 | 1055 | 1931 |
| 45 | 113 | 190 | 374 | 335 | 635 | 480 | 896 | 625 | 1157 | 770 | 1418 | 915 | 1679 | 1060 | 1940 |
| 50 | 122 | 195 | 383 | 340 | 644 | 485 | 905 | 630 | 1166 | 775 | 1427 | 920 | 1688 | 1065 | 1949 |
| 55 | 131 | 200 | 392 | 345 | 653 | 490 | 914 | 635 | 1175 | 780 | 1436 | 925 | 1697 | 1070 | 1958 |
| 60 | 140 | 205 | 401 | 350 | 662 | 495 | 923 | 640 | 1184 | 785 | 1445 | 930 | 1706 | 1075 | 1967 |
| 65 | 149 | 210 | 410 | 355 | 671 | 500 | 932 | 645 | 1193 | 790 | 1454 | 935 | 1715 | 1080 | 1976 |
| 70 | 158 | 215 | 419 | 360 | 680 | 505 | 941 | 650 | 1202 | 795 | 1463 | 940 | 1724 | 1085 | 1985 |
| 75 | 167 | 220 | 428 | 365 | 689 | 510 | 950 | 655 | 1211 | 800 | 1472 | 945 | 1733 | 1090 | 1994 |
| 80 | 176 | 225 | 437 | 370 | 698 | 515 | 959 | 660 | 1220 | 805 | 1481 | 950 | 1742 | 1095 | 2003 |
| 85 | 185 | 230 | 446 | 375 | 707 | 520 | 968 | 665 | 1229 | 810 | 1490 | 955 | 1751 | 1100 | 2012 |
| 90 | 194 | 235 | 455 | 380 | 716 | 525 | 977 | 670 | 1238 | 815 | 1499 | 960 | 1760 | 1105 | 2021 |

### *Values for Interpolation in Above Table*

| | | | |
|---|---|---|---|
| 1°C = 1.8°F | 6°C = 10.8°F | 1°F = 0.55°C | 6°F = 3.33°C |
| 2°C = 3.6°F | 7°C = 12.6°F | 2°F = 1.11°C | 7°F = 3.88°C |
| 3°C = 5.4°F | 8°C = 14.4°F | 3°F = 1.66°C | 8°F = 4.44°C |
| 4°C = 7.2°F | 9°C = 16.2°F | 4°F = 2.22°C | 9°F = 5°C |
| 5°C = 9°F | | 5°F = 2.77°C | |

### *Formula for Converting Temperature Scales*

| | |
|---|---|
| Fahrenheit to Celsius | °F = 1.8°C + 32 |
| Celsius to Fahrenheit | °C = 5/9 x (°F - 32) |
| Fahrenheit to Rankine (absolute) | °R = °F + 460 |
| Celsius to Kelvin (absolute) | °K = °C + 273 |

**Note** — All decimals are exact. All decimals are repeating decimals.

### *Pressure Equivalents*

| Unit | Lbs/In$^2$ | Kg/cm$^2$ | Atm | Bar | Pascals | mm Hg. (0°C) | In. Hg (32°F) | Ft $H_2O$ (60°F) |
|---|---|---|---|---|---|---|---|---|
| 1 lbs/in$^2$ | 1 | 0.0703 | 0.06804 | 0.06895 | 6,895 | 51.715 | 2.036 | 2.3086 |
| 1 kg/cm.$^2$ | 14.22 | 1 | 0.9678 | 0.98066 | 98,066 | 735.56 | 28.96 | 32.843 |
| 1 Atmosphere (atm) | 14.696 | 1.0333 | 1 | 1.01325 | 101,326 | 760 | 29.921 | 33.925 |
| 1 Bar | 14.504 | 1.019716 | 0.9869 | 1 | $1 \times 10^5$ | 750.06 | 29.53 | 33.49 |
| 1 Pascal (N/m$^2$) | $14.5 \times 10^{-5}$ | $1.03 \times 10^{-5}$ | $1 \times 10^{-5}$ | $1 \times 10^{-5}$ | 1 | $7.5 \times 10^5$ | 0.000295 | 0.000335 |
| 1 mm Hg. (0°C) | 0.01934 | 1.35951 | 0.1316 | 0.1333 | 13,330 | 1 | 0.03937 | 0.04465 |
| 1 in. Hg. (32°F) | 0.4912 | 0.034532 | 0.03342 | 0.03386 | 3,386 | 25.4 | 1 | 1.1342 |
| 1 ft. $H_2O$ (60°F) | 0.4331 | 0.03045 | 0.02947 | 0.02986 | 2,987 | 22.396 | 0.88175 | 1 |
| 100 ft $H_2O$ (60°F) | 43.31 | 3.0448 | 2.9469 | 2.9859 | 298,700 | 2239.6 | 88.175 | 100 |

**Notes —**

A. 1 inch of Hg (Mercury) = 13.6 inches of water.

B. 1 pound per square inch (psi) = 2.31 feet of water.

C. 1 foot of water = 0.4331 pounds per square inch (psi).

# Reference Data

## Engineering Constants & Conversions

### *Common Conversion Factors*

| To Convert | Units | Multiply By | To Obtain | Units |
|---|---|---|---|---|
| Atmospheres | atm | 1.0133 | Bar | |
| Atmospheres | atm | 29.92 | Inches Mercury | in. Hg |
| Bar | | 0.9869 | Atmospheres | atm |
| Bar | | 14.504 | Pounds/square inch | psi |
| British thermal unit | Btu | 1,055 | Joules | J |
| British thermal unit | Btu | 0.0002931 | Kilowatts | kW |
| British thermal unit | Btu | 0.2931 | Watts | W |
| British thermal unit | Btu | 0.252 | Kilocalories | kcal |
| Brit. ther. units/hr | Btuh | 0.2931 | Joules/second | J/s |
| Brit. ther. units/hr | Btuh | 0.2931 | Watt/hours | Wh |
| Brit. ther. units/hr | Btuh | 0.0002931 | Kilowatt/hours | kWh |
| Brit. ther. units/ inch/hour/sqft/°F | Btu/in/h/ ft²/°F | 0.1442 | Watts/meter/°C | W/m/°C |
| Brit. ther. units/hr | Btuh | 0.252 | Kilocalories/hour | kcal/h |
| Calories | cal | 4.187 | Joules | J |
| Centimeter | cm | 0.03281 | Feet | ft |
| Centimeter | cm | 0.3937 | Inches | in. |
| Centimeters/second | cm/s | 1.969 | Feet/minute | fpm |
| Cubic centimeter | $cm^3$ | 0.061 | Cubic inches | $in^3$ |
| Cubic feet | $ft^3$ | 62.43 | Pounds of water | lb |
| Cubic feet | $ft^3$ | 28.32 | Cubic centimeters | $cm^3$ |
| Cubic feet | $ft^3$ | 0.02832 | Cubic meters | $m^3$ |
| Cubic feet | $ft^3$ | 7.481 | Gallons, U.S. | gal |
| Cubic feet | $ft^3$ | 28.32 | Liters | l |
| Cubic feet/minute | cfm | 1.699 | Cubic meters/hour | $m^3/h$ |
| Cubic feet/minute | term | 0.000472 | Cubic meters/sec | $m^3/s$ |
| Cubic feet/minute | cfm | 0.4719 | Liters/second | l/s |
| Cubic inch | $in^3$ | 16.39 | Cubic centimeters | $cm^3$ |
| Cubic meter | $m^3$ | 35.32 | Cubic feet | $ft^3$ |
| Cubic meter | $m^3$ | 264.2 | Gallons, U.S. | gal |
| Cubic meter | $m^3$ | 1,000 | Liters | l |
| Cubic meters/hr | $m^3/h$ | 0.5885 | Cubic feet/min. | cfm |
| Cubic meters/hr | $m^3/h$ | 4.403 | Gallons/min. | gpm |
| Cubic meters/sec | $m^3/s$ | 2,119 | Cubic feet/min. | cfm |
| Feet | ft | 30.48 | Centimeters | cm |
| Feet | ft | 0.3048 | Meters | m |
| Feet/minute | fpm | 0.508 | Centimeters/sec. | cm/s |
| Feet/minute | fpm | 0.00508 | Meters/sec. | m/s |
| Gallon, Imperial | | 1.201 | Gallons, U.S. | gal |
| Gallon, U.S. | gal | 231 | Cubic inches | $in^3$ |
| Gallon, U.S. | gal | 0.1337 | Cubic feet | $ft^3$ |
| Gallon, U.S. | gal | 8.337 | Pounds of water | lb |
| Gallon, U.S. | gal | 0.8327 | Gallon Imperial | |
| Gallon, U.S. | gal | 3.785 | Liters | l |
| Gallon, U.S. | gal | 0.003785 | Cubic meters | $m^3$ |
| Gallons/minute | gpm | 0.2271 | Cubic meters/hr | $m^3/h$ |
| Gallons/minute | gpm | 0.06309 | Liters/sec. | l/s |
| Grams | g | 0.035274 | Ounces | oz |
| Grams | g | 0.002205 | Pounds | lb |
| Grams/cu centimeter | $g/cm^3$ | 1,000 | Kilograms/cu meter | $kg/m^3$ |
| Grams/cu centimeter | $g/cm^3$ | 62.43 | Pounds/cubic foot | $lb/ft^3$ |
| Grams/cu centimeter | $g/cm^3$ | 0.03613 | Pounds/cubic inch | $lb/in^3$ |
| Horsepower | hp | 0.7457 | Kilowatts | kW |
| Horsepower | hp | 2,545 | British thermal units | Btu |
| Horsepower | hp | 33,000 | Foot-lbs/min | ft-lb/min |
| Horsepower, boiler | bhp | 9.803 | Kilowatts | kW |
| Horsepower, boiler | bhp | 3,352 | British ther. units/hr | Btuh |
| Inches | in. | 2.54 | Centimeters | cm |
| Inches | in. | 25.4 | Millimeters | mm |
| Inches Mercury | in. Hg | 0.03342 | Atmospheres | atm |
| Inches Mercury | in. Hg | 0.03937 | Torr | |

### *Common Conversion Factors*

| To Convert | Units | Multiply By | To Obtain | Units |
|---|---|---|---|---|
| Joules | J | 0.000948 | British thermal unit | Btu |
| Joules | J | 0.2388 | Calories | cal |
| Joules | J | 0.0002778 | Watt/hrs | Wh |
| Joules/second | J/s | 1 | Watts | W |
| Kilocalories/hour | kcal/h | 3.969 | British ther. units/hr | Btuh |
| Kilograms | kg | 2.205 | Pounds | lb |
| Kilo./cubic meter | $kg/m^3$ | 0.001 | Grams/cu centimeter | $g/cm^3$ |
| Kilo./cubic meter | $kg/m^3$ | 0.06243 | Pounds/cubic foot | $lb/ft^3$ |
| Kilograms/sq cm | $kg/cm^2$ | 14.22 | Pounds/square inch | psi |
| Kilojoule | kJ | 0.2778 | Watt/hrs | Wh |
| Kilometers/hour | km/h | 0.6315 | Miles/hr | mph |
| Kilopascal | kPa | 0.145 | Pounds/square inch | psi |
| Kilowatt/hours | kWh | 3,412 | British ther. units/hr | Btuh |
| Kilowatt | kW | 3,412 | British thermal units | Btu |
| Liter | l | 0.03532 | Cubic feet | $ft^3$ |
| Liter | l | 0.001 | Cubic meters | $m^3$ |
| Liter | l | 0.2642 | Gallon, U.S. | gal |
| Liters/second | l/s | 2.119 | Cubic feet/min. | cfm |
| Liters/second | l/s | 15.85 | Gallons/min. | gpm |
| Meter | m | 3.281 | Feet | ft |
| Meter | m | 39.37 | Inches | in. |
| Meters/second | m/s | 196.9 | Feet/min. | fpm |
| Miles/hour | mph | 1.609 | Kilometers/hr | km/h |
| Milliliter | ml | 1 | Cubic centimeters | $cm^3$ |
| Millimeter | mm | 0.03937 | Inches | in. |
| Newtons/sq meter | $N/m^2$ | 0.000145 | Pounds/square inch | psi |
| Ounce | oz | 28.35 | Grams | g |
| Pound | lb | 453.6 | Grams | g |
| Pound | lb | 0.4536 | Kilograms | kg |
| Pounds/cubic foot | $lb/ft^3$ | 0.01602 | Grams/cu centimeter | $g/cm^3$ |
| Pounds/cubic foot | $lb/ft^3$ | 16.02 | Kilograms/cu meter | $kg/m^3$ |
| Pounds/cubic inch | $lb/in^3$ | 27.68 | Grams/cu centimeter | $g/cm^3$ |
| Pounds/square inch | psi | 0.06805 | Atmospheres | atm |
| Pounds/square inch | psi | 0.06895 | Bar | |
| Pounds/square inch | psi | 0.07031 | Kilograms/sq cm | $kg/cm^2$ |
| Pounds/square inch | psi | 6.895 | Kilopascals | kPa |
| Pounds/square inch | psi | 6.895 | Newtons/sq meter | $N/m^2$ |
| Pounds/square inch | psi | 51.71 | Torr | |
| Square centimeters | $cm^2$ | 0.001076 | Square feet | $ft^2$ |
| Square centimeters | $cm^2$ | 0.155 | Square inches | $in^2$ |
| Square feet | $ft^2$ | 929 | Square centimeters | $cm^2$ |
| Square feet | $ft^2$ | 0.0929 | Square meters | $m^2$ |
| Square inches | $in^2$ | 6.452 | Square centimeters | $cm^2$ |
| Square meters | $m^2$ | 10.76 | Square feet | $ft^2$ |
| Torr | | 0.001316 | Atmospheres | atm |
| Torr | | 25.4 | Inches Mercury | in. Hg |
| Watt-hours | Wh | 3,600 | Joules | J |
| Watt-hours | Wh | 3.412 | British ther. units/hr | Btuh |
| Watt-hours | Wh | 3.6 | Kilojoules | kJ |
| Watt-hours | Wh | 0.001 | Kilowatt-hours | kWh |
| Watts | W | 1 | Joules/second | J/s |
| Watts | W | 3.412 | British thermal units | Btu |
| Watts | W | 0.001 | Kilowatts | kW |
| Watts/meter/°C | W/m/°C | 6.934 | British ther. units/Btu/in./hr inch/hour/sqft/°F | /ft²/°F |
| Watts/sq centimeter | $W/cm^2$ | 6.452 | Watts/square inch | $W/in^2$ |
| Watts/square inch | $W/in^2$ | 0.155 | Watts/sq centimeter | $W/cm^2$ |
| Yards | yd | 0.944 | Meters | m |

# Technical Information

## NEMA Enclosures & Chromalox Equivalents

### *NEMA Enclosures for Non-Hazardous Areas*

The National Electrical Manufacturer's Association (NEMA) publishes a classification system for electrical enclosures. The NEMA classification or type indicates the exposure or environment for which the enclosure was designed. While Chromalox E1, E2, E3 and E4 enclosures are designed for applications similar to the NEMA types, they are not identical due to modifications required to adapt the housings to heater configurations. Condensed descriptions of the NEMA non- hazardous enclosure types are listed below with the Chromalox equivalents indicated. The condensed descriptions are not intended to be complete representations of the National Electrical Manufacturers Association standards for electrical enclosures. For complete details on NEMA enclosure requirements refer to NEMA Std. No. 250.

**Type 1 Enclosures —** are for indoor use in locations where unusual service conditions do not exist. Intended primarily to provide protection against contact with the enclosed equipment and limited amounts of falling dirt. **(Chromalox E1 or General Purpose enclosures.)**

**Type 2 Enclosures —** are for indoor use providing protection against limited amounts of falling water and dirt.

**Type 3 Enclosures —** are for outdoor use providing protection against windblown dust, rain, and sleet and damage from external ice formation on the enclosure.

**Type 3R Enclosures —** are similar to Type 3 except Type 3R provides protection against falling rain.

**Type 3S Enclosures —** are for outdoor use protecting against windblown dust, rain, and sleet and providing for operation of external mechanisms when ice laden.

**Type 4 Enclosures —** are for indoor or outdoor use providing protection against windblown dust and rain, splashing water, and hose-directed water and remain undamaged by the formation of ice on the enclosure. **(Chromalox E4 Moisture Resistant or E2 Moisture and Explosion Resistant enclosures.)**

**Type 4X Enclosures —** are similar to Type 4 except Type 4X also protects against corrosion.

**Type 5 Enclosures —** are for indoor use and protects against dust and falling dirt.

**Type 6 Enclosures —** are for indoor or outdoor use providing protection against the entry of water during temporary submersion at a limited depth and remain undamaged by ice on the enclosure.

**Type 6P Enclosures —** are similar to Type 6 except Type 6P protects against the entry of water during prolonged submersion at a limited depth.

**Type 12 Enclosures —** are intended for indoor use providing protection against dust, falling dirt and dripping non-corrosive liquids. **(Chromalox E2 and E4 enclosures.)**

**Type 12K Enclosures (knockouts) —** are similar to Type 12 except they are provided with knockouts. Knockouts only permitted in either or both the top or bottom walls.

**Type 13 Enclosures —** are for indoor use providing protection against lint, dust, spraying of water, oil and non-corrosive coolant. **(Chromalox E2 enclosures may be used.)**

The table below lists a comparison of the characteristics of NEMA and Chromalox enclosures for Non-Hazardous areas.

**Note** — For Classified (Hazardous) Location enclosures, refer to NEMA Enclosures and Hazardous Location Heaters elsewhere in this section.

### *Comparison of Specific Applications of Enclosures for Non-Hazardous Locations*

| Provides a Degree of Protection Against the following Environmental Conditions | Type of Enclosure | | | | | | | | | | | | | | Chromalox® | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 3R | 3S | 4 | 4X | 5 | 6 | 6P | 11 | 12 | 12K | 13 | E1 | E2 | E3 | E4 |
| Incidental contact with the enclosed equipment | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Falling dirt | X | X | | | | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Falling liquids and light splashing | | X | | | | X | X | | X | X | X | X | X | X | | X | X | X |
| Dust, lint, fibers and flyings — Not Class III | | | | | | X | X | X | X | X | | X | X | X | | X | X | X |
| Hosedown and splashing water | | | | | | X | X | | X | X | | | | | | X | | X |
| Oil and coolant seepage | | | | | | | | | | | | X | X | X | | X | X | X |
| Oil or coolant spraying and splashing | | | | | | | | | | | | | | X | | X | | |
| Windblown dust | | | X | | X | X | X | | X | X | | | | | | X | X | X |
| Rain, snow and sleet | | | X | X | X | X | X | | X | X | | | | | | X | | |
| Sleet | | | | | X | | | | | | | | | | | | | |
| Corrosive agents | | | | | | | X | | | X | X | | | | | | | |
| Occasional temporary submersion | | | | | | | | | X | X | | | | | | | | |
| Occasional prolonged submersion | | | | | | | | | | X | | | | | | | | |

# Technical Information

## NEMA Enclosures & Hazardous Location Heaters

### *NEMA Enclosures for Classified Locations (Hazardous)*

The following are condensed descriptions of the NEMA enclosure types for Classified (Hazardous) Locations. The Chromalox enclosures equivalent to the NEMA description are indicated. The Chromalox enclosure may not be indentical to the NEMA description due to modifications required to adapt the housing to heater configurations. The NEMA enclosure descriptions are not intended to be complete representations of the National Electrical Manufacturers Association standards for electrical enclosures. For complete details on NEMA enclosure requirements, refer to NEMA Std. No. 250.

**Type 7 Enclosures —** are intended for indoor use in locations classified as Class I, Groups A, B, C and D as defined in the National Electrical Code. **(Chromalox E2, E3 or Explosion Resistant enclosures.)**[2]

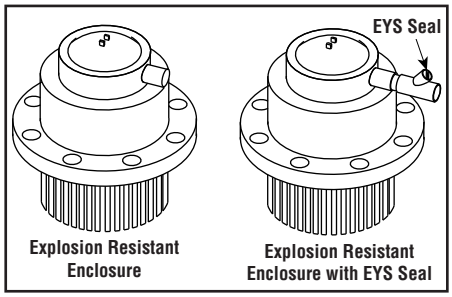
**Type 8 Enclosures —** are intended for indoor or outdoor use in locations classified as Class I, Groups A, B, C and D as defined in the National Electrical Code. **(Chromalox E2 enclosures.)**[2]

**Type 9 Enclosures —** are intended for indoor use in locations classified as Class II, Groups E, F and G as defined in the National Electrical Code. **(Chromalox E2, E3 or Explosion Resistant enclosures.)**

**Type 10 Enclosures** (MSHA) shall be capable of meeting the requirements of the Mine Safety and Health Administration, 30 C.F.R., Part 18.

### *Chromalox Enclosures for Electric Heaters in Classified Locations*

Chromalox has terminal enclosures specifically designed for use on electric heaters installed in Classified (Hazardous) areas. These enclosures are identified as Type E2 and E3. Typical flange heaters with E2 hazardous area terminal enclosures are shown below.




E2 enclosures are supplied with gaskets and are suitable for both indoor and outdoor locations. E2 enclosures meet the moisture and explosion-resistant requirements for NEMA 4, 12, 7, 8 and 9 applications. E3 enclosures are usually not furnished with gaskets and are intended primarily for indoor and dry locations. See table below.

### *Electric Heaters for Hazardous Locations*

Chromalox provides a wide variety of electric immersion and air heaters for use in hazardous locations. These heaters are listed by Underwriters Laboratories (UL) or certified by Canadian Standards Association (CSA). Heaters designed and certified for Class I or II Division I hazardous locations can be used in Division 2 areas in the same class.

**Immersion Heaters —** Screw plug and flanged immersion heaters are available with terminal enclosures CSA or CSA NRTL/C certified for Class I, Groups B, C and D and Class II Groups E, F and G. Supplemental low-liquid level controls are required for maximum safety and equipment protection when immersion heaters are used in hazardous locations.[2]

**Circulation Heaters —** Many water and oil circulation heaters are available with terminal enclosures CSA or CSA NRTL/C certified Class I, Groups B, C and D and Class II, Groups E, F and G. Supplemental controls are required for maximum safety and equipment protection when circulation heaters are used in hazardous locations

**Air Heaters —** Blower type air heaters (CXH-A) are available for Class I, Division I, Groups C and D and Class II, Division I, Groups E, F and G with UL, UL-C, and/or CSA certification. Convection type air heaters (CVEP) are available for use in Class I, Division I, Groups B, C and D hazardous locations. Convection type air heaters (FPEP and CEP) are available for use in Class I, Division I, Groups C and D and Class II, Division I Groups E, F and G.

**Specialty Products & Components —**Chromalox has designed, manufactured and provided certification on a large number of specialty products for hazardous areas and other special applications. These products include UL Recognized Components (finned tubular elements), duct heaters and special aircraft ground support equipment. Contact your Local Chromalox Sales office for assistance in designing equipment or solving any unique electric heating application for hazardous areas.



### *Comparison of Specific Applications of Enclosures for Indoor Hazardous Locations*

| Atmospheres Containing | Class | Group | NEMA | | | | Chromalox® | |
|---|---|---|---|---|---|---|---|---|
| | | | 7 | 8 | 9 | 10 | E2 | E3 |
| Acetylene | I | A | X | X | | | | |
| Hydrogen, Manufactured Gas | I | B | X | X | | | X[1,2] | X[1,2] |
| Diethel Ether, Ethylene, Cyclopropane | I | C | X | X | | | X | X |
| Gasoline, Hexane, Butane, Naptha, Propane, Acetone Toluene or Isoprene | I | D | X | X | | | X | X |
| Metal Dust | II | E | | | X | | X | X |
| Carbon Black, Coal Dust, Coke Dust | II | F | | | X | | X | X |
| Flour, Starch, Grain Dust | II | G | | | X | | X | X |
| Fibers, Flyings | III | G | | | X | | X | X |
| Methane with or without Coal Dust | MSHA | | | | | X | | |

1. Requires seals in the conduit adjacent to the terminal enclosure.
2. For EMT and MT styles, Class 1 Group B; Divisions 1& 2, consult factory.

# Technical Information

## Hazardous Locations & Electric Heater Applications

### *Hazardous Locations (NEC)[5]*

Articles 500 to 504 in the National Electrical Code (NEC) define the requirements for electrical and electronic equipment and wiring in locations where fire or explosion hazards may exist. In Article 500, hazardous locations are categorized by class. Classes are defined as follows:

**Class I —** Groups A, B, C & D - Division 1 or 2 Temperature Rating T1 - T6

**Class II —** Groups E, F & G - Division 1 or 2 Temperature Rating T1 - T6

**Class III —** Division 1 or 2

### *Class I, II & III (NEC 500)*

Hazardous location classes are identified based on the explosive material present. The following information is an interpretation and summary of each class and a discussion of some of the conditions to be considered when using electric heaters in these areas. Refer to the National Electrical Code and local authorities for the proper classification and requirements of a specific hazardous location.

**Class I Locations** (Gases) are areas where flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures (NEC 500-5).

**Class II Locations** (Dust) are areas where the presence of combustible dust presents a fire or explosion hazard (NEC 500-6).

**Class III Locations** (Fibers) are areas made hazardous because of the presence of easily ignitable fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures (NEC 500-7).

### *Group Classification, Class I & II[6]*

Certain chemicals create higher explosive pressures and more heat than others when ignited. In Class I and II hazardous locations, chemical families are further classified by Groups. Group classification involves determination of the maximum explosion pressures, the maximum safe clearance or gap between clamped enclosure joints and the minimum ignition temperature of the atmospheric mixture for a particular chemical.

NEC requires that any electrical equipment approved for use in a hazardous location must be approved for the class and for the specific group (gas or dust) that will be present. Groups are identified as A, B, C, D, E, F and G and are explained as follows:

### *Class I — Gases[6] (NEC 500-3a)*

Combustible and flammable gases and vapors in Class I are sub-divided into four groups A, B, C and D. Group A gases create the most explosive pressure and therefore are the most difficult to contain. Group B is next, then Group C with Group D being the lowest. Third party listings of electrical equipment for Group A or B are more difficult to obtain than Group C or D. Individual gases are further defined by ignition temperature (see Temperature Ratings).

**Group A —**

| Gases include: | Ignition Temperature °C | Ignition Temperature °F |
|---|---|---|
| Acetylene | 305 | 581 |

**Group B —**

| Gases include: | Ignition Temperature °C | Ignition Temperature °F |
|---|---|---|
| Butadiene[1] | 420 | 788 |
| Ethylene oxide[2] | 429 | 804 |
| Hydrogen & mfg gases > 30% hydrogen (by volume) | 400 | 752 |
| Propylene oxide[3] | 449 | 840 |

**Group C —**

| Gases include: | Ignition Temperature °C | Ignition Temperature °F |
|---|---|---|
| Acetaldehyde | 175 | 347 |
| Cyclopropane | 500 | 932 |
| Diethyl ether | 160 | 320 |
| Ethylene | 450 | 842 |
| Dimethyl hydrazine | 249 | 480 |

**Group D —** is the largest group and includes many of the common petroleum products.

| Gases include: | Ignition Temperature °C | Ignition Temperature °F |
|---|---|---|
| Acetone | 465 | 869 |
| Alcohol's | | |
| 1-butanol (butyl) | 365 | 689 |
| Amyl alcohol | 300 | 572 |
| Butyl alcohol (ter) | 480 | 896 |
| Ethanol (ethyl) | 356 | 689 |
| Isobutyl alcohol | 427 | 800 |
| Isopropyl alcohol | 399 | 750 |
| Methanol (methyl) | 385 | 725 |
| Propyl alcohol | 440 | 824 |
| Ammonia[3] | 651 | 1204 |
| Benzene | 560 | 1040 |
| Butane | 405 | 761 |
| Ethane | 515 | 959 |
| Ethyl acetate | 427 | 800 |
| Ethylene dichloride | 413 | 775 |
| Gasoline | | |
| (56 - 60 octane) | 280 | 536 |
| (100 octane) | 456 | 853 |
| Heptanes | 280 | 536 |
| Hexanes | 225 | 437 |
| Isobutyl acetate | 421 | 790 |
| Isoprene | 220 | 428 |
| Methane (Nat. gas) | 482/632 | 900/1170 |
| Methyl ethyl ketone | 516 | 960 |
| Petroleum naphtha[4] | 288 | 550 |
| Octanes | 220 | 428 |
| Pentanes | 260 | 500 |
| Propane | 450 | 842 |
| Vinyl acetate | 427 | 800 |
| Vinyl chloride | 472 | 882 |
| Xylenes | 530 | 986 |

**Notes —**

1. **Group D** equipment may be used for this atmosphere if isolated in accordance with Section 501-5(a) by sealing all conduit(s) 1/2 inch or larger (within 18 inches of the enclosure).
2. **Group C** equipment may be used for this atmosphere if isolated in accordance with Section 501-5(a) by sealing all conduit(s) 1/2 inch or larger (within 18 inches of the enclosure).
3. **For Classification of Ammonia Atmospheres** see Safety Code for Mechanical Refrigeration (ANSI/ASHRAE 15-1992) and Safety Requirements for the Storage and Handling of Anhydrous Ammonia (ANSI/CGA G2.1-1989).
4. **Also Known By** the synonyms benzine, ligroin, petroleum ether or naphtha.
5. **NEC and National Electrical Code** are registered trademarks of the National Fire Protection Association.
6. **For a Complete List** defining properties of flammable liquids, gases, solids or dusts, refer to the latest edition of **NFPA 325, NFPA 497 or NFPA 499.**

# Technical Information

## Hazardous Locations & Electric Heater Applications *(cont'd.)*

### *Class II — Dust[1] (NEC 500-3b)*

**Groups E, F and G (Class II) —** Combustible dusts are divided into Groups E, F and G. Classification involves investigation and testing of the assembled enclosure including the clamped joints, clearances and shaft openings. The blanketing effect of layers of dust, the electrical conductivity and the ignition temperature of the dust are also evaluated.

**Group E Atmospheres** contain metal dust, including aluminum, magnesium, their commercial alloys and other metals of similarly hazardous characteristics having resistivity less than $10^5$ Ohm-cm.

**Group F Atmospheres** contain combustible carbonaceous dusts, charcoal, coal or other atmospheres containing these dusts sensitized by other hazardous materials and having resistivity greater than $10^2$ through $10^8$ Ohm-cm.

**Group G Atmospheres** contain combustible dusts such as flour, grain, wood and chemicals having resistivity of $10^5$ Ohm-cm, or greater.

### *Class III — Fibers (NEC 500-7a)[1]*

Atmospheres containing easily ignitable fibers such as rayon, cotton, flax, jute, hemp, kapok, excelsior and similar materials.

### *Divisions in Hazardous Locations*

The NEC further sub-divides hazardous locations into Divisions (Div. 1 and 2). The requirements for Division 2 are less stringent than for Division 1. The two divisions are discussed in the following paragraphs.

### *Division I Locations*

**Class I, Division 1 —** NEC 500-5(a) is an area where the hazard can exist under normal operating conditions. Included are areas where flammable or combustible liquids are transferred from one container to another, open vats, paint spray booths or any location where ignitable mixtures are used. Also included are locations where a hazard is caused by frequent maintenance, repair or equipment failure.

**Class II, Division 1 —** NEC 500-6(a) is an area where combustible dust is normally in the air in sufficient quantities to produce ignitable mixtures or where mechanical failure or abnormal equipment operation might produce ignitable mixtures. Locations also include operations where hazards exist because of frequent mechanical failure of machinery or equipment and where electrically conductive combustible dusts (all Group E and some Group F) are present in hazardous quantities.

**Class III, Division 1 —** NEC 500-7(a) is an area where easily ignitable fibers or materials producing combustible flyings are handled, manufactured or used.

### *Division 2 Locations*

**Class I, Division 2 —** NEC 500-5(b) is an area where ignitable gases or vapors are handled, processed or used, but which are normally in closed containers or closed systems from which they can only escape through accidental rupture or breakdown of such containers or systems.

**Class II, Division 2 —** NEC 500-6(b) is an area where combustible dust is not normally in the air in sufficient quantities to produce ignitable mixtures or interfere with the operation of electrical equipment, or where dust is present as a result of infrequent malfunctioning of processing or handling equipment. Included are situations where combustible dust accumulations may interfere with the safe dissipation of heat from electrical equipment. No electrically conductive dusts as defined in NEC 502-1, (last sentence) are included in Class II, Div. 2 atmospheres.

**Note** — There is no Division 2 classification for Class II, Group E.

**Class III, Division 2 —** NEC 500-7(b) is an area where easily ignitable fibers are stored or handled.

### *Class I — Adjacent Divisions*

In most indoor areas with adequate partitions, Div. 1 and 2 are self-contained areas. With partitions, a Div. 1 area may exist adjacent to a non-hazardous area. However, outdoors or in large indoor areas with few or no partitions, Class I, Div. 1 and Class 1, Div. 2 areas usually exist adjacent to each other. The Div. 1 location being near the point of vapor release and Division 2 is at a given distance fromthe release point of the flammable liquid. Where the spread of flammable vapors and gases is not contained by adequate partitions, the area designated as Class I, Div. 2 serves as a "transition zone" between the hazardous and non-hazardous area. Div. 1 is the hazardous area where flammable gases or vapors are released from the liquid. Div. 2 is the area further away from the point of release, where the gases or vapors are not normally of sufficient concentration to produce an ignitable mixture.

### *Class I & II — Temperature Ratings*

Originally, equipment in each group had one maximum temperature rating. The maximum for Groups A, B and D was 280°C (536°F) and Group C was 180°C (356°F). Recognizing that chemicals and gases have different ignition temperatures, NEC revised the temperature ratings accordingly. Heat producing equipment must now be identified by Class, Group, Division and "T" rating. The "T" rating shall not exceed the ignition temperature of the specific gas, vapor or dust present. Values for "T" ratings for Class I and II equipment are shown in the table below:

### *T-Ratings for Class I and II*

| Maximum Degrees (°C) | Temperature Degrees (°F) | Identification "T" Number |
|---|---|---|
| 450 | 842 | T1 |
| 300 | 572 | T2 |
| 280 | 536 | T2A |
| 260 | 500 | T2B |
| 230 | 446 | T2C |
| 215 | 419 | T2D |
| 200 | 392 | T3 |
| 180 | 356 | T3A |
| 165 | 329 | T3B |
| 160 | 320 | T3C |
| 135 | 275 | T4 |
| 120 | 248 | T4A |
| 100 | 212 | T5 |
| 85 | 185 | T6 |

**Note 1** — For a complete list defining properties of flammable liquids, gases, solids or dusts, refer to the latest edition of NFPA 325, NFPA 497 or NFPA 499.

# Technical Information

## Hazardous Locations & Electric Heater Applications *(cont'd.)*

**CENELEC (& IEC) Zone Classification System**
Introduced to North America in 1996, the European CENELEC (and IEC) system of classification of hazardous locations is also permitted to apply to installations in the U.S. and Canada as an alternative in Class I Locations, and is now part of the NEC (Article 505) and CE Code (Section 18).

**Class I, Zone 0** - A location in which explosive gas atmospheres are present continuously or for long periods of time.

**Class I, Zone 1** - A location in which explosive gas atmospheres are likely to exist in normal operation or may exist frequently because of repairs, maintenance operations, and leakage or where equipment breakdowns could release gases or vapors and also cause simultaneous failure of electrical equipment in a mode to cause the electrical equipment to become a source of ignition.

**Class I, Zone 2** - A location in which explosive gas atmospheres are not likely to occur in normal operation and, if they do occur, will exist for a short time only; or where volatile flammable liquids, flammable gas, or flammable vapors are handled, processed, or used, but are normally confined within closed containers or systems from which they can escape only as a result of accidental rupture or breakdown of the containers or system, or as a result of abnormal operation of the equipment with which the liquids or gases are handled, processed, or used; or where ignitable concentrations of flammable gases or vapors are normally prevented by adequate ventilation, but which may occur as a result of failure or abnormal operation of the ventilation system.

**Class I Groups**
**Group I -** Atmospheres containing explosive gas in underground coal mines. Electrical apparatus that is intended for use in underground mines.

**Group IIC -** Atmospheres containing acetylene, hydrogen (H2), or gases of equivalent hazard.

**Group IIB -** Atmospheres containing acetaldehyde, ethylene, or gases or vapors of equivalent hazard.

**Group IIA -** Atmospheres containing acetone, ammonia, ethyl alcohol, gasoline, methane, propane, or gases or vapors of equivalent hazard. **Note:** There is potential for confusion between the NEC/CE and IEC gas classification systems since the Group letters are reversed and even combined. Care should also be taken to avoid confusing Group II and Class II, since both use Roman numerals. An unintended result of specifying the IEC gas groups, which combine the traditional Groups A and B into Group IIC, is that equipment approved for hydrogen (H2) would also have to be approved for acetylene. Since very little equipment is designed for acetylene, the wording as originally adopted severely limits the availability of equipment for hydrogen applications. As a result, NEC Section 505-7(d) now allows for equipment to be listed for a specific gas or vapor, specific mixtures of gases or vapors, or any specific combination of gases or vapors. One common example is equipment marked for "IIB + H2". At present, the NEC or CE Code does not recognize any CENELEC or IEC dust classifications.

**Combustion Principles**
Three basic conditions must be satisfied for a fire or explosion to occur. First, a flammable liquid, vapor or combustible dust must be present in sufficient quantity. Second, the flammable liquid, vapor or combustible dust must be mixed with air or oxygen in the proportions required to produce an explosive mixture. Finally, a source of energy must be applied to the explosive mixture.

In applying these principles, the quantity of the flammable liquid or vapor that may be liberated and its physical characteristics must be recognized. Vapors from flammable liquids also have a natural tendency to disperse into the atmosphere, and rapidly become diluted to concentrations below the lower explosion limit, particularly when there is natural or mechanical ventilation. In order to have an explosive gas atmosphere, the concentration of the gas or vapor must be above the Lower Explosive Limit (LEL) but below the Upper Explosive Limit (UEL). The possibility that the gas concentration may be above the upper explosion limit does not afford any degree of safety, as the concentration must first pass through the explosive range to reach the upper explosion limit.

**Equipment Marking Requirements**
Electrical equipment permitted for use in hazardous locations must be marked to show the Class, Division (or Zone under NEC Article 505 and CE Section 18), Group, and maximum surface operating temperature or temperature code referenced to a 40˚C (104˚F) ambient temperature (some exceptions apply). Note that the maximum external temperature of the equipment shall not exceed the minimum ignition temperature of the atmosphere that the equipment is located in.

Electrical equipment approved for operation at ambient temperatures exceeding 40˚C shall be marked with the maximum ambient temperature for which the equipment is approved, and the operating temperature or temperature range at that ambient temperature.

Equipment not marked to indicate a division, or marked "Division 1" or "Div. 1", is suitable for both Division 1 and 2 locations. Equipment marked "Division 2" or "Div. 2" is suitable for Division 2 locations only. Equipment that is listed for a Zone 0 location shall be permitted in a Zone 1 or Zone 2 location of the same gas or vapor. Equipment that is listed for a Zone 1 location shall be permitted in a Zone 2 location of the same gas or vapor.

**Explosion-Proof Enclosures**

**Maximum Surface Temperature Codes**

| Maximum Surface Temperature ˚C (˚F) | Identification Number NEC/CE T-Code | IEC T-Code |
|---|---|---|
| 450˚ C (842˚F) | T1 | T1 |
| 300˚ C (572˚F) | T2 | T2 |
| 280˚ C (536˚F) | T2A | |
| 260˚ C (500˚F) | T2B | |
| 230˚ C (446˚F) | T2C | |
| 215˚ C (419˚F) | T2D | |
| 200˚ C (392˚F) | T3 | T3 |
| 180˚ C (356˚F) | T3A | |
| 165˚ C (329˚F) | T3B | |
| 160˚ C (320˚F) | T3C | |
| 135˚ C (275˚F) | T4 | T4 |
| 120˚ C (248˚F) | T4A | |
| 100˚ C (212˚F) | T5 | T5 |
| 85˚ C (185˚F) | T6 | T6 |

An enclosure which will withstand an internal explosion of a gas or vapor without rupture and without causing the ignition of an external gas or vapor.

Explosion-proof enclosures are not water-proof. They are designed to contain and dissipate explosions but they are not water-proof.

To prevent the ignition of an external explosive atmosphere, the enclosure must not only be strong enough to withstand the internal explosion pressure, but all of the openings (e.g., cover joints, conduit or cable entries, operating shafts, etc.) must be tight enough to cool the hot burning gases before they can come into contact with the external atmosphere.

# General Information

The facts and the recommendations made in this publication are based on our own research and the research of others, and are believed to be accurate.

We cannot anticipate all conditions under which this information and our products, or the products of other manufacturers in combination with our products, may be used. We reserve the right to change materials or methods without prior notice. We accept no responsibility for results obtained by the application of this information or the safety and suitability of our products, either alone or in combination with other products. Users are advised to make their own tests to determine the safety and suitability of each such product or product combination for their own purposes.

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| Hastelloy® | Haynes International, Inc. |
| INCOLOY® | INCO Alloys International, Inc. |
| INCONEL® | INCO Alloys International, Inc. |
| IntelliTherm™ | Chromalox, Inc. |
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| Ryton® | Phillips Petroleum Company |
| Teflon® | El DuPont de Nemours & Company |
| Therminol® | Monsanto Company |
| U-RAD® | Chromalox, Inc. |
| VersaTherm® | Chromalox, Inc. |

# Notes

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