

## Screw Plug Immersion Heaters

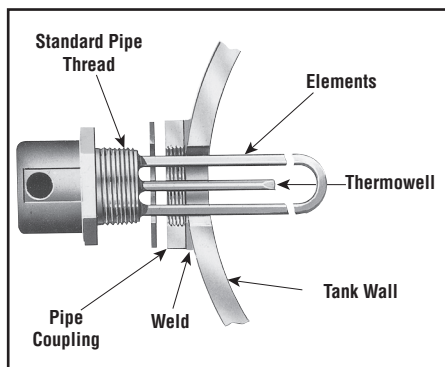
### Technical & Application Data

#### Description

Chromalox heavy duty tubular elements are welded or brazed to a screw plug. Uniform heat distribution and repressed element bends, a Chromalox standard feature, lead to long element life. For all heaters, a thermowell (hollow tube sealed at one end) is welded or brazed to the screw plug allowing thermostat sensing element replacement without draining the tank. A variety of methods of terminating power leads is available for special application heaters.

General purpose screw plug heaters are equipped with a steel terminal enclosure painted with red polyester powder coat. These same heaters are also available with a combination moisture tight/explosion resistant terminal enclosure that may be used in applications where either or both conditions exist.

Screw plug type heaters are screwed directly through a threaded opening in the tank wall. Heavy tank walls may be drilled and tapped if thickness is sufficient to engage 3/4 of the threads. Lighter tank walls should be equipped with a suitable pipe half-coupling welded or brazed to the tank wall.



#### Construction Features — Stock & Assembly Stock Units

##### Element

- **Materials** — copper, steel, INCOLOY®, 304 stainless steel.
- **Number Elements in Screw Plug** — 1, 2 or 3 depending on screw plug size.
- **Element Diameter** — 0.315, 0.375, 0.430 and 0.475".
- **Watt Density** — 6.5, 15, 23, 45 and 75 W/In<sup>2</sup>.

##### Screw Plug

- **Materials** — carbon steel, brass, 304 stainless steel.
- **Size** — 1/2, 3/4, 1, 1-1/4, 2, 2-1/2" NPT nominal.
- **Tolerances** — Tolerance on immersion length (B) dimension is  $\pm 1\%$  ( $\pm 3/8"$  min.).

##### Terminal Enclosures

**Type E1** General purpose, sheet metal, painted with red polyester powder coat. The terminal enclosure rotates 360° to accommodate an electrical conduit run.

**Type E4** Moisture resistant housing.

**Type E2** Combination moisture resistant/explosion resistant.

**Type E2** explosion resistant enclosures are for use in hazardous location conditions:

- Class I Groups B, C & D, Division 1 & 2\*
- Class II, Groups E, F & G, Division 1 & 2
- Class III, Division 1 & 2

Safe operation of heaters equipped with explosion resistant enclosures depends on electrical wiring meeting the National Electrical Code for hazardous locations and on limiting the maximum operating temperatures (including temperatures on outside of vessel, piping, flanges, screw plugs, enclosures and other heat conducting parts) as dictated by flammable liquids, vapors or gases present. Approved pressure and/or temperature limiting controls must be used to assure safe operation in the event of a system malfunction.

The 'C' and 'US' indicators adjacent to the CSA mark signify that the product has been evaluated to the applicable CSA and ANSI/UL standards, for use in Canada and the U.S., respectively. This 'US' indicator includes products eligible to bear the 'NRTL' indicator. NRTL, i.e. National Recognized Testing Laboratory, is a designation granted by the U.S. Occupational Safety and Health Administration (OSHA) to laboratories which have been recognized to perform certification to U.S. standards.

##### Temperature Controls

Many screw plug type heaters are available with built-in thermostatic controls. In some installations where there is more than one heater in a tank, one heater with a built-in control can be used to control the other heaters by wiring the thermostat into the holding coil circuit of a magnetic contactor. If the thermostat is separate from the heater, the thermostat sensing element should be located in the liquid approximately 4 to 6 inches above the heater.

**1 and 1-1/4" Screw Plugs** — Type ARTM, ARTMO and ARTMS. The ARTM, ARTMO or ARTMS automatic thermostat has a temperature range of 60°F - 187°F (T4). Also available with alternate temperature 60°F - 240°F (T5) or 0°F - 127°F (T8). The tamper resistant temperature adjustment screw and scale are inside requiring the removal of the cover to change temperature setting.

**2 and 2-1/2" Screw Plugs** — Type ARMT, ARMTI, AREMTI, ARMTS, AREMTS, AREMTO and ARMTO. The integral thermostat is available with temperature ranges at 60°F - 250°F (T2) or 0°F - 100°F (T1) for ARMT, ARMTI, AREMTI, AREMTS and ARMTS heaters. ARMTO and AREMTO heaters are available with three different temperature ranges: 200°F - 550°F (T3), 60°F - 250°F (T2) and 0°F - 100°F (T1). This control is wired in as a line thermostat for loads up to 3 kW on 120 volts and up to 6 kW on 240 volts. For higher wattage ratings, three phase operation and above 240 volts, this control is used for pilot duty only and should be wired to operate the holding coil of a magnetic contactor.

To set the control temperature of heaters equipped with the standard general purpose enclosure (Type E1), adjust the knob on the outside of the terminal enclosure.

For those heaters equipped with a Type E2 and E4 enclosure, remove the terminal enclosure lid to expose the temperature adjusting knob. For safety reasons, power to heater and pilot duty power must be turned off before removing enclosure lid.

**Note** — The integral thermostat functions as a temperature control only. This is not a fail safe device, so an approved pressure and/or temperature limit control should be used with these heaters to assure safe operation.

**CAUTION** — Explosion Resistant Type E2 construction refers to heater design features which provide explosion resistant containment of electrical wiring according to National Electrical Code. Application or use of heaters which result in abnormal or excessive temperature can create hazardous conditions which can lead to a fire or explosive condition.

##### Corrosion Policy

Chromalox cannot warrant any electric immersion heater against failure by sheath corrosion 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 their knowledge of the chemical composition of the corrosive solution, character of materials entering the solution, and controls which he maintains on the process.

\* For EMT and MT Class I Group B, Div. 1 & 2, consult factory.