

## PRECAUTIONS & INSTALLATION

- Cartridge units are made with special tubing which is a few thousandth under-size to ensure a free fit for easy installation. To install cartridge heaters, drill and ream holes to proper length and the nominal diameter  $\pm 0.001$  inches maximum of the Cartridge Heater (3/8 Inch, 1/2 Inch, 5/8 Inch etc.). A hole should be drilled & reamed to 1/? Inch diameter  $\pm 0.001$  Inch to insure a proper fit. Always finish ream, drilled or cast holes to ensure a smooth, uniform metal contact for efficient heat transfer. A knockout hole should be provided if possible to facilitate cartridge removal. For watt density over 150W/in<sup>2</sup> we recommend press fit split bores. Elements that fit too loosely will have poor heat transfer and shorten life due to excessively high sheath temperature. They should be tight fit with minimum tolerance in reamed holes.
- Prior to installation, the holes must be cleaned & should be free of all contamination that might liquefy under heat and penetrate into the heater thereby carbonize & become conductive. The smallest amount of contamination can cause electrical shorts and result in heater failure. Raw materials (polymers) spillage on the terminals & contamination (oil/grease) penetrating into the heaters results in failure of heaters. Combustible gases & vapours also lead to deposits of carbon on the terminals resulting in failure of heaters.
- Physical or mechanical damage can also result in failure of the heater as it can damage the element in the heater.
- Due to hygroscopic in nature moisture absorption can occur when element is exposed or stored in damp or wet climate. If kept unused for longer period, there is moisture deposition on the terminals which results in heater failure. It is recommended to de-moisturize the heaters prior to installation by heating them at 100 - 120 degree centigrade in an oven for approximately 1 to 2 hours or use controllers with soft start function. This will help evaporate any moisture present inside.

- Overheating that leads the heater to operate beyond the maximum capacity can be a cause for destroying an entire heating zone. The wattage should be calculated as close as possible to operating wattage to minimize on-off cycle resulting to power saving. In case of heaters without In-Built thermocouple ensure that the tips of the sensors (External Thermocouples) are clean and free from any contamination and should be checked for good response to temperature changes. Defective temperature sensors and controllers also lead to heater failures,6. Lead ends (Non Heating) once bent should not be re-bent. This could lead to breakage. Sharp edges along the lead wire path should be avoided, Connection lead areas should be protected from combustable gases & liquid to avoid short-circuits. 7. Stabilized Voltage supply increases the life of the heater as well as increases the wattage