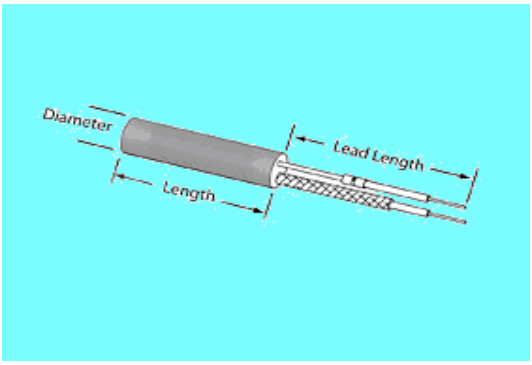
SYNHEAT

Manufacturer of Electric Heating Elements and Controls

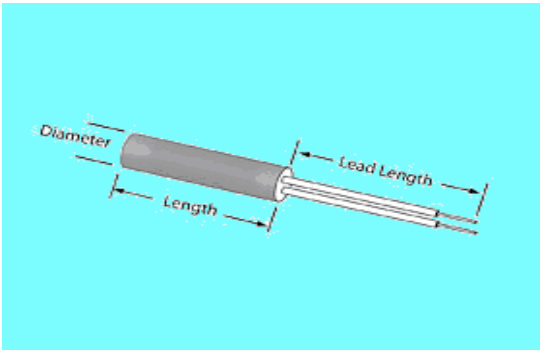
Cartridge Heaters

The construction of high temperature cartridge heaters positions a nickel-chrome resistance wire precision wound around a magnesium oxide core. It is inserted into a stainless or Incoloy tube locating the resistance wire close to the sheath. The core is centrally positioned within the tube and filled with magnesium oxide powder. Nickel pins pass through the centre of the core making contact with the resistance wire at both ends. The whole is assembly is highly compacted by a swaging operation and thus ensuring excellent heat transfer to the external sheath. This allows for operating temperatures to 650ºC and high watt densities. One end of the heater is closed with a welded metal end-disc and wire leads exit at the opposite end which is typically closed with a lava seal. A variety of wire leads and lead protection options are available. Heaters can be supplied with internal thermocouples, mounting fittings and many other options.

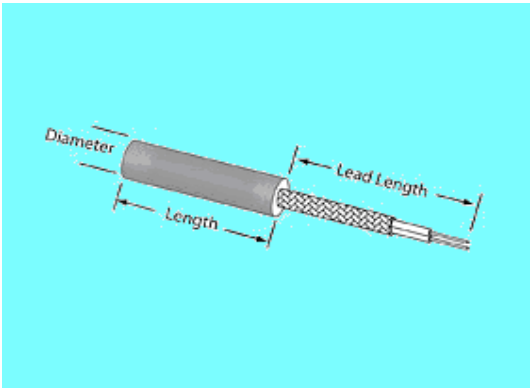
LEAD WIRE OPTIONS



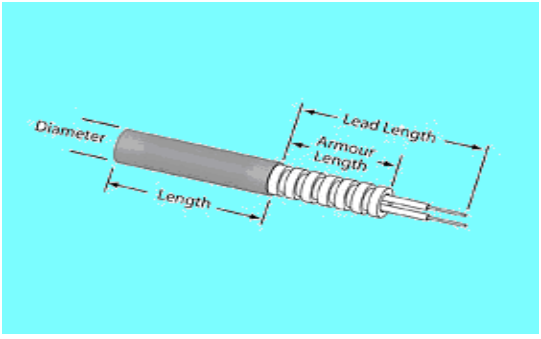
Crimped-On Leads
Double crimp connects 200°C leads to solid nickel pins. This construction is recommended for applications with elevated temperatures. Due to the rigid nickel pins, this construction is not recommended in applications where movement or flexing is encountered, or if sharp bends are required adjacent to the heater exit.



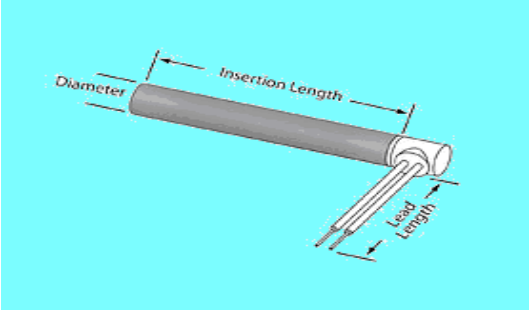
Swaged in Leads
400°C wire is internally connected and swaged in place. This construction is recommended for applications in which the leads must be bent at the exit point from the heater and where mild flexing may be found. For applications with continuous or more severe movement, we would recommend metal braid or armour cable.



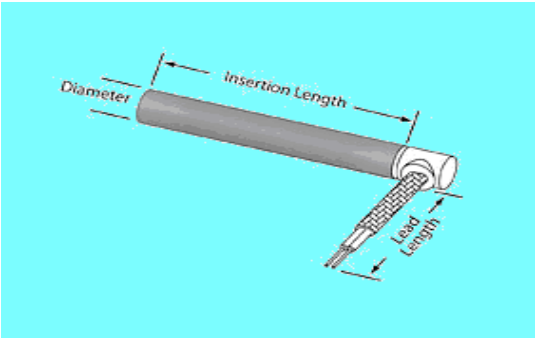
Stainless Steel Screen Braid
200°C wire is internally connected and swaged in place along with stainless steel braid. This construction offers protection against abrasion and sharp edges. This is a very strong construction which offers full length flexibility. This construction is recommended in applications with flexing and where the leads must pass through metal openings or routed along metal components.



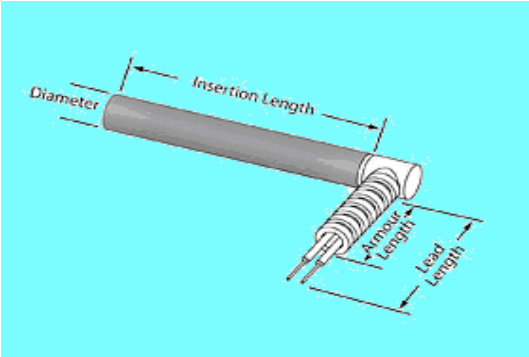
Stainless Steel Conduit Cable (Hose)
200°C wire is internally connected and swaged in place along with stainless steel hose. This construction is recommended for applications in which the leads are subjected to abrasion or run the risk of being pinched. This is the strongest lead protection available and works well in moving or flexing applications.



Right Angle Fibreglass Leads
200°C leads exiting at right angle to the sheath. This construction offers a compact design where space is limited. This construction is not recommended where abrasion or flexing is present.

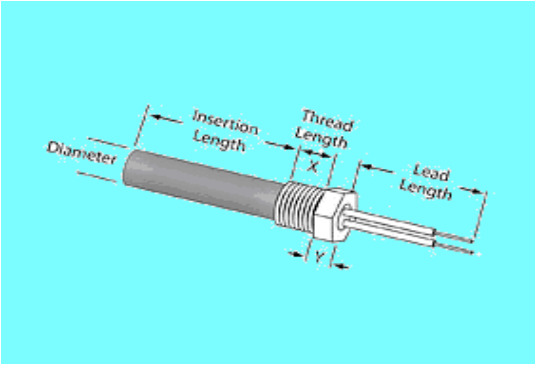


Right Angle Stainless Steel Screen Braided
Stainless steel braid temperature 200°C) wire exiting at right angle to the sheath. This construction is recommended in applications with flexing and where the leads must pass through metal openings or routed along metal components. This construction is desirable when space is limited and it is not feasible to bend standard leads.



Right Angel Stainless Steel Conduit (Hose)
Stainless steel flexible hose 200°C wire exiting at right angle to the sheath. This is the strongest lead protection for use in applications where severe abrasion is present. These leads offer good flexibility and are good for moving or flexing applications.

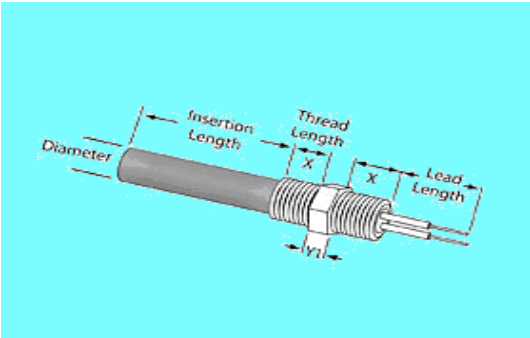
FITTINGS & FLANGES



Single and Double Threaded Fittings
Single or double threaded fittings attached to sheath to allow for installation into threaded holes.

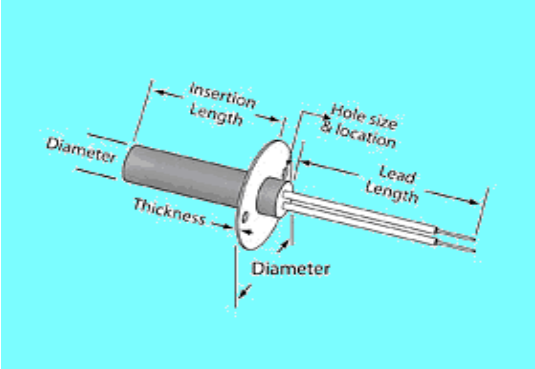
Fitting
- Brass, Steel and Stainless Steel Materials

Lead wires
- Fibreglass for high temperature



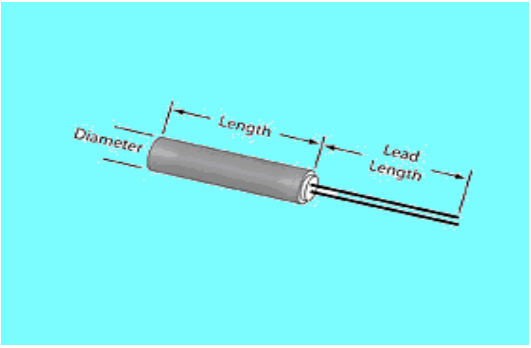
applications
- Teflon for moisture protection
- Stainless Braid or Hose for flexing applications and abrasion protection

Terminal Boxes
- General purpose and moisture resistant housings.



Mounting Flanges
Mounting flanges are recommended for applications where vibration or movement may cause the heater to be dislodged from its hole. Stainless steel flanges are available in a variety of sizes and configurations. The standard flange is round and is supplied with two mounting holes. For heaters 5/8" diameter and under, the flange would be 38mm in diameter. For larger diameter heaters the standard flange would be 25mm in diameter.

OPTIONAL CONSTRUCTIONS

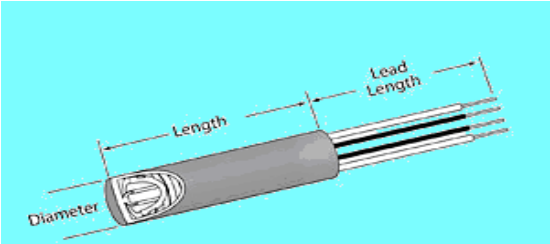


Teflon End Seal
A Teflon plug is swaged in place along with Teflon leads. This construction resists oil and water to 250°C. There is a minimum of a 25mm unheated length at the lead end. Longer cold sections may be required if the watt density or operating temperature is high.

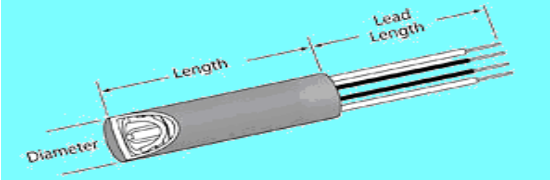
INTERNAL THERMOCOUPLES

Internal thermocouples are built into the heater assembly to monitor the internal or sheath temperatures. These are useful as high limit devices or in applications where space is at a premium. The power and sensor leads exit the sheath together and can be ordered with a variety of lead protections. Not all thermocouple configurations are available on smaller diameter heaters.

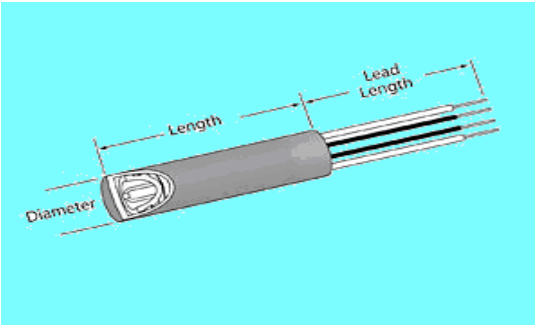
Type J and K calibrations are standard for the shown constructions.



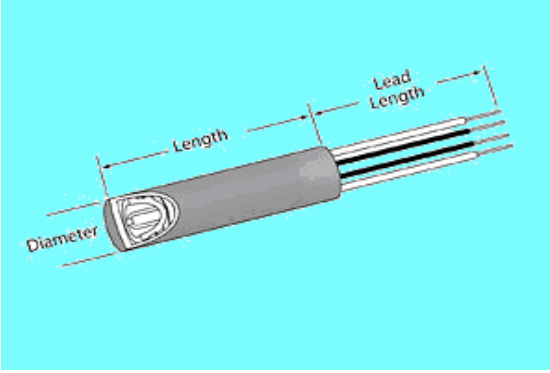
Grounded at Disc End
The thermocouple junction is grounded to the disc end of the heater. This construction is commonly used in hot runner applications. The disc end can be filled with silver solder and ground flat. This will ensure good contact when inserted into a flat end blind hole.



Ungrounded at Disc End
The thermocouple junction is ungrounded and is located just behind the disc end. This will give a reference temperature of the part being heated.



Grounded at Centre
The thermocouple junction is grounded to the sheath along the length of the heater. The standard location is at the centre of the heater, but can be located anywhere along the length of the sheath. This construction will provide a quick response.



Ungrounded at Centre
The thermocouple junction is ungrounded and is centred in the diameter of the sheath. The standard location is at the centre of the heater, but can be located anywhere along the length of the sheath. Typically used as a high limit in air or vacuum applications.