

# HEATING ELEMENTS

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## Cartridge Heaters



# Cartridge Heaters

## Installation & Operating Instructions

UCI cartridge heaters provide excellent heat transfer and long life. Cartridge heaters are designed for push fit into holes of nominal diameters and are manufactured from the highest quality materials. Cartridge heaters are used for heating solids such as Dies, Molds, Platens and various other applications demanding localized heating and are suitable for temperatures up to 800 deg C. They are generally not suitable for liquids, but the nipple design can be used which provides a water-tight seal, low wattage should be selected.

Cartridge heaters are available in metric and imperial sizes 6.5mm (1/4") to 40mm (1.5") diameters and up to 2m in length.

They are supplied with high watt densities as standard for the most demanding of applications, medium and low are also offered on request.

Below you can see a few selections of terminations we offer; others also can also be easily made.

## Material Specification

- Welded watertight base (Tig) to withstand pressure up to 60 kg/cm<sup>2</sup>.
- Calibrated stainless steel AISI 304/316/321/ INCOLOY.
- Disc ceramic insulator.
- Pure granulometric magnesium oxide.
- Nickel-chromium 80/20 heater wire. Melting point 1400° C.
- Ceramic core.
- Hard ceramic head.
- Conductor lead.
- Hard refracting paste.

### Conductor without connections

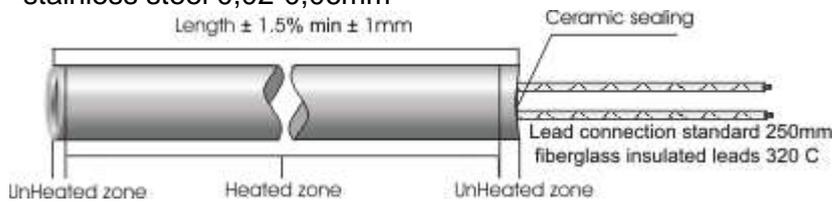
Cartridge heaters provide excellent heat transfer and are sheathed in Stainless Steel tubes. Cartridge heaters are designed for push fit into holes of nominal diameters. Cartridge heaters are used for heating Dies, Molds, Platens and various other applications demanding localized heating. Cartridge heaters are available in metric and imperial sizes 6.5mm (1/4") to 40mm (1.5") diameters, Low, Medium, and High watt density.

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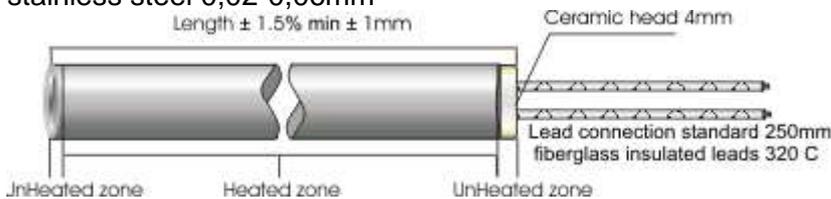
### TYP 1 standard

Choice of sheath material:  
stainless steel 0,02-0,06mm



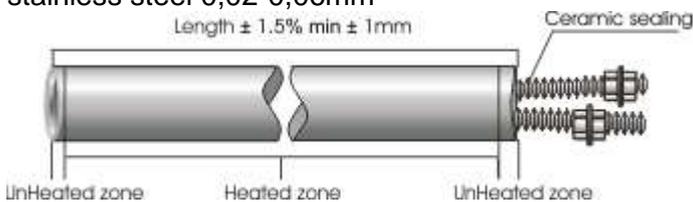
### TYP 2 ceramic

Choice of sheath material:  
stainless steel 0,02-0,06mm



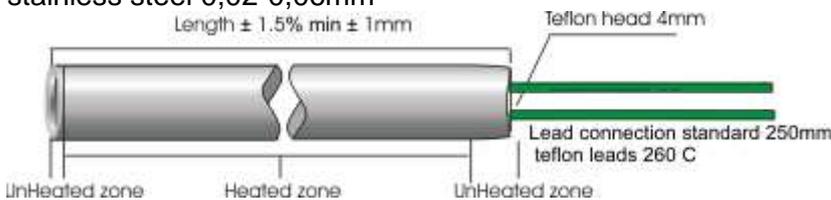
### TYP 3 thread

Choice of sheath material:  
stainless steel 0,02-0,06mm



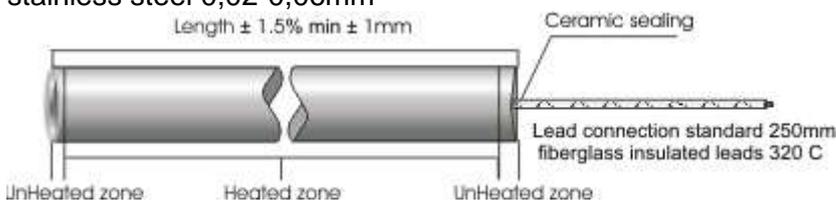
### TYP 4 Teflon

Choice of sheath material:  
stainless steel 0,02-0,06mm



### TYP 5 monopole

Choice of sheath material:  
stainless steel 0,02-0,06mm

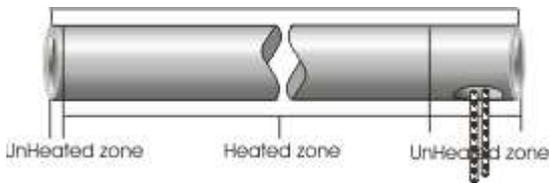


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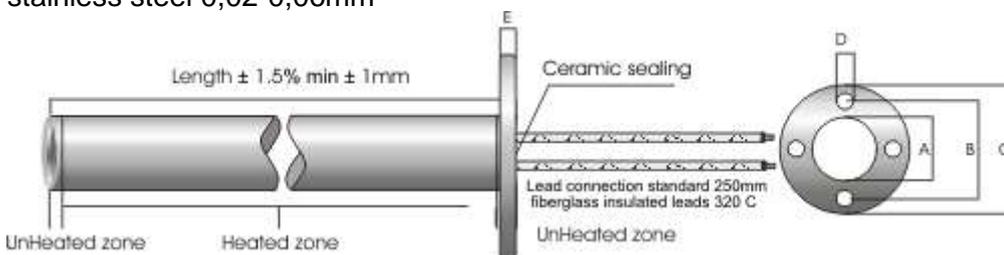
### TYP 6 standard

Choice of sheath material:  
stainless steel 0,02-0,06mm



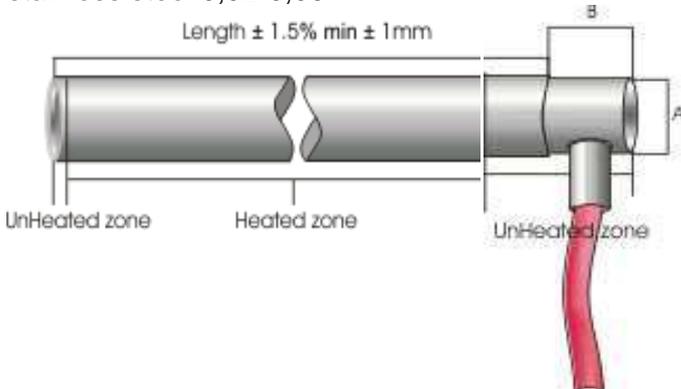
### TYP 7 WASHER

Choice of sheath material:  
stainless steel 0,02-0,06mm



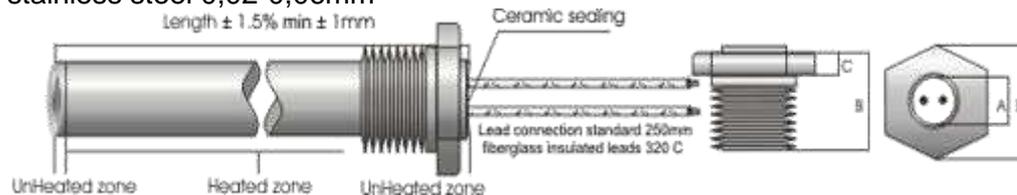
### TYP 8 cylinder

Choice of sheath material:  
stainless steel 0,02-0,06mm



### TYP 9 nipple

Choice of sheath material:  
stainless steel 0,02-0,06mm



# INSTALLATION GUIDE

### Very Important

The cartridges must be adjusted as much as possible. When a hole must be drilled for the housing of the cartridge, the following factors should be noted: The inside of the drilled hole must be uniform, without gratings or un-even diameters. Finishing off with reaming of the hole is recommended. As the heat rises the distribution is less at the ends and the heat is concentrated in the middle.

The connections must never be inside the drilled hole, as there is the risk of shorting and leads burning. The connection must be protected to prevent possible spilling of fluids and the entry of plastic, gases, etc. The temperature of Cartridge heaters should be regulated using an appropriate temperature control device. There must be a minimum space of 3 diameters between the cartridges. Ensure that the drilled hole has an outlet as to make removal easier. Stock heaters have normally watt densities of 8 to 11 w/cm<sup>2</sup>

### Formulae for installation HEATING OF SOLID, FLUIDS OR GASES WITHIN A SPECIFIC TIME

This calculation does not consider the eventual heat loss.

P = Power on installing in Kw

V = Volume to be heated in l. (or dm<sup>3</sup>)

p = weight in kg/dm<sup>3</sup>

Vp = weight on heating in kg

t<sub>1</sub> = Initial temperature in °C

t<sub>2</sub> = final temperature in °C

Cp = specific heat in Kcal/ Kg x °C

T = Time of heating (in hours)

1.2 = Coefficient of seconds, considering tolerance on tension of the sector and on the ohm value of the cartridge

### CALCULATION OF W/cm<sup>2</sup>

W/cm<sup>2</sup> = charge of the surface w/cm<sup>2</sup>

P = power of the cartridge heater (w)

S = surface (cm<sup>2</sup>) = diameter. Length heated (units in cm)

$$W/cm^2 = \frac{P}{S}$$

$$P = \frac{V \times p \times c_p \times (t_2 - t_1) \times 1.2}{860 \times T}$$