

Cartridge Heaters **GP, GPT, GPN, GPF**

Specification

Characteristic

Cartridge heaters are modern, highly proficient heating elements with a special construction enabling significant heat emission from a small surface. Relatively small size and single-sided connection enable the heater installation within a small space. The cartridge heaters are primarily used for warming solid bodies. Most frequently, the heaters are inserted within metal elements, however they are equally suitable for warming fluids (water, oil, emulsion) or even gases.

Application

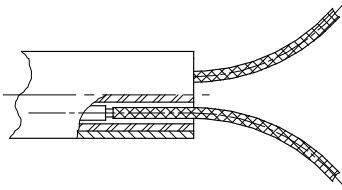
- plastics industry - hot-runner systems; injection moulding nozzles; cupping punches; stamps for packing machines
- footwear industry – vulcanizing presses; mould heaters; extruding presses.
- foundry – heaters for core boxes and metal moulds; vacuum furnaces
- medical and laboratory technology – distillation units; oil heaters; soldering dippers, inhalation and sterilization equipment
- wood industry – punches for burning, lacquer and paint atomizers
- machine-building industry – printing and casing-in machines, coil winders
- automotive industry



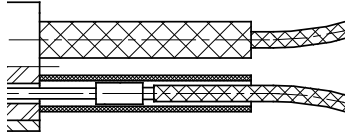
| Parameters | GP/GPT | GPN | GPF |
|--------------------------------------|---|--------------------|---|
| Heater diameter | Standard [mm]: $\varnothing 6.5, \varnothing 8.0, \varnothing 10, \varnothing 12.5, \varnothing 16, \varnothing 20$ Inch: 1/4" 3/8" 1/2" 5/8" 3/4" Custom [mm]: for $\varnothing 6$ to $\varnothing 50$ | | Metric: [mm] $\varnothing 6.5, \varnothing 8.0, \varnothing 10, \varnothing 12.5, \varnothing 16, \varnothing 20$ Inch: 1/4" 3/8" 1/2" 5/8" 3/4" 1" |
| Diameter tolerance | -0.02 [mm] -0.08 [mm] | +0.2 [mm] | -0.02 [mm] -0.08 [mm] |
| Range of length | 20-1000 [mm] | | do 2300[mm] |
| Length tolerance | $\pm 1,5\%$ | | $\pm 2\%$ (minimum 2,4mm) |
| Voltage | 12-380 [V] | | 12-480 [V] |
| Surface loading | 35W/cm ² | 5W/cm ² | do 62W/cm ² |
| Maximum operating temperature | 500°C (on the sheath) | | 870°C (on the sheath) |
| Power | 50-3000W | | 5000W |
| Power tolerance | +5[%] -10 | | +5[%] -10 |
| Tube material | Stal Cr-Ni 1H18N9T | | Incoloy 800 |
| Minimum lengths of dead zones | – from the bottom: 4 [mm] – from the insulator: 6 [mm] | | – from the bottom: 6[mm] – from the insulator: 6 [mm] |

Non-standard constructions with mounting sleeves or special power distribution on request.

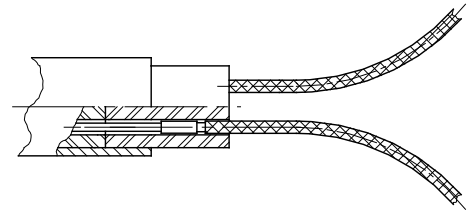
Type A



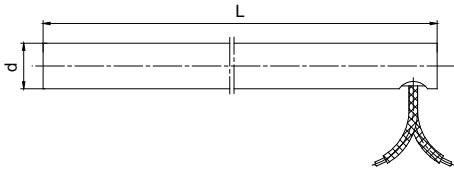
Type B



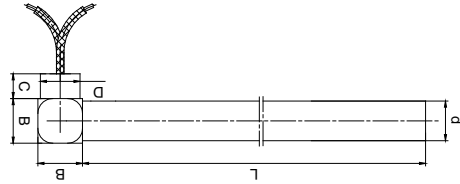
Type C



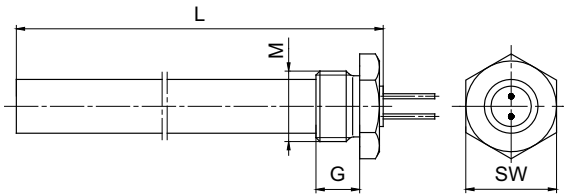
Type D



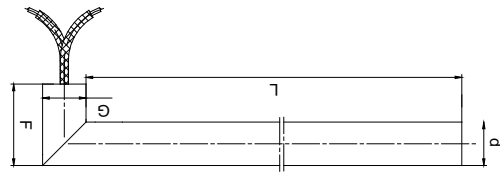
Type E



Type G



Type F



Ordering code

Cartridge heater



Type: **GP/GPT/GPN/GPF** _____

Diameter [mm] _____

Length [mm] _____

Power [W] _____

Voltage [V] _____

Termination type: _____

A: straight, inner contact _____

B: straight, outer contact _____

C: straight, contact in ceramic block _____

D: angular, directly form the heater _____

E: angular, with steel block _____

F: angular, with sleeve _____

G: with threaded sleeve (x-thread) _____

Lead wire protection _____

0: none _____

P: corrugated pipe _____

Ws: insulated wire, up to 400°C _____

Lead wire length _____

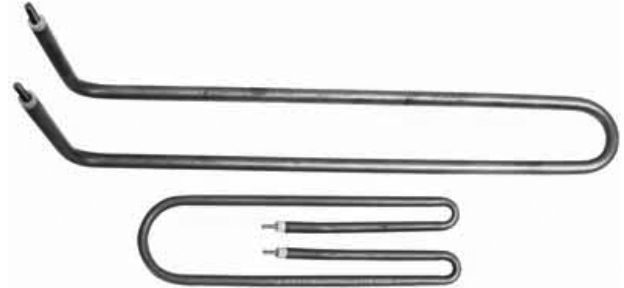
U

Tubular Heaters **GR, ZGR**

Specification

Characteristic

- high and stable quality of electric parameters resulting from the central position of the heating coil;
- long life and stability of heater operating resulting from the use of homogeneous and dense insulation consisting of the highest quality magnesium oxide (MgO) as well as the use of the highest quality resistance wires;
- high surface loading and high allowable surface temperature of the tube resulting from the application of the highest quality stainless steel tubes.



Diameter tolerance

±0,1mm

Standard diameters

| ø[mm] | Tube material | | | length [mm] |
|-------|---------------|------------------|---|-------------|
| | copper | steel (C10,IF25) | stainless steel (AISI 321, AISI 316, Incoloy 800) | |
| 6,4 | + | + | + | 200 – 3300 |
| 6,9 | – | – | + | 200 – 3300 |
| 8,0 | + | – | – | 200 – 3100 |
| 8,5 | + | + | + | 200 – 3400 |
| 10 | – | – | + | 200 – 3400 |
| 10,2 | – | – | + | 200 – 3400 |
| 13,0 | – | – | + | 200 – 3600 |

Allowable operating temperature

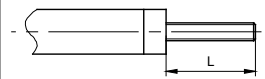
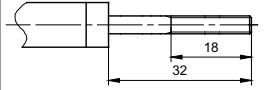
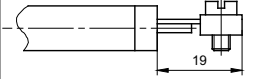
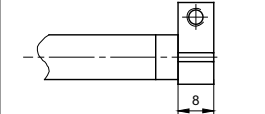
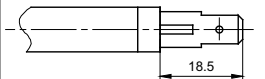
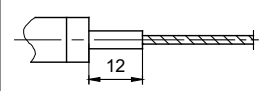
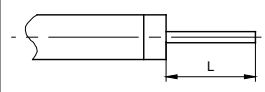
| Sheath material | Allowable operating temperature |
|---|---------------------------------|
| A– alloy steel 20%Cr30%Ni (e.g Incoloy 800) | max. 800°C |
| B– alloy steel 18%Cr, 9%Ni (e.g AISI-321) | max. 650°C |
| C– chromium steel | max. 600°C |
| D– carbon steel | max. 350°C |
| E– aluminium | max. 300°C |
| F– copper, brass | max. 250°C |

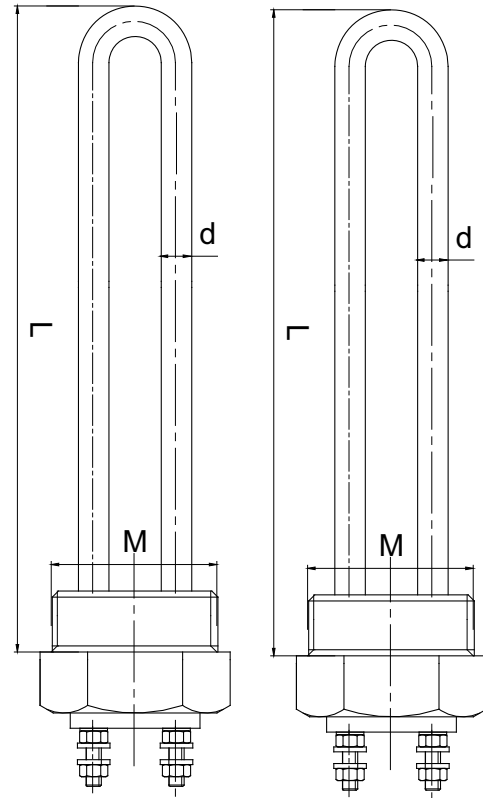
Recommended surface loading

| Application | Tube material | | | |
|-------------------------------|---------------|-------|---------------------------------|---------------------------|
| | copper | steel | alloy steel (AISI 321,AISI 316) | alloy steel (Incoloy 800) |
| Standing water | | – | 10 | – |
| Moving water | | – | 14 | – |
| Flowing water (flow heater) | | – | 25 | – |
| Water (steam generator) | | – | 6 | – |
| Thin oil | – | 3,5 | 3,5 | – |
| Thick oil | – | 1,2 | 1,2 | – |
| Special heating oil (heaters) | – | 12 | 12 | – |
| Still air | – | 1,7 | 5 | 6 |
| Moving air v=2m/s | – | 2 | 5,5 | 6,5 |
| Moving air v=10m/s | – | 5 | 10 | 10 |

Termination types (GR)

Tubular heating unit (ZGR)

| Designation | Figure | Description |
|-------------|---|--|
| A |  | Threaded mandrel |
| B |  | Threaded terminal M4 |
| C |  | Threaded terminal M4 |
| D |  | Threaded terminal M4 |
| E |  | Straight termination 6.3 |
| F |  | Sleeve and steel or copper stranded wire |
| G |  | Mandrels (sealed heating elements) |



Ordering code

Tubular heater



Type: tubular **GR/ZGR**

Diameter [mm]

Length [mm]

Power [W]

Voltage [V]

Termination type:

A: Threaded mandrel

B: Threaded terminal M4

C: Threaded terminal M4

D: Threaded terminal M4

E: Straight termination 6.3

F: Sleeve and steel or copper stranded wire

G: Mandrels (sealed heating elements)

U

Band heating elements **GM, GC**

Specification

Characteristic

Band heaters are designed with micanite or ceramic insulation sheathed with brass or stainless steel plate. Ceramic band heaters are characterised by the excellent insulation properties and the long-lasting period of operation.

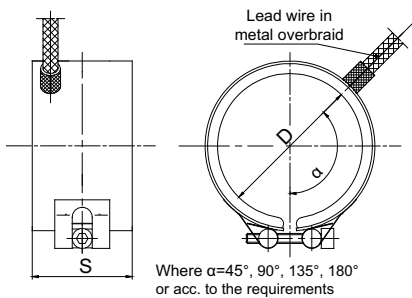
Application

– for heating: industrial pipes; nozzles; film blowing machines, packing machines; injection moulding machine; extruders.

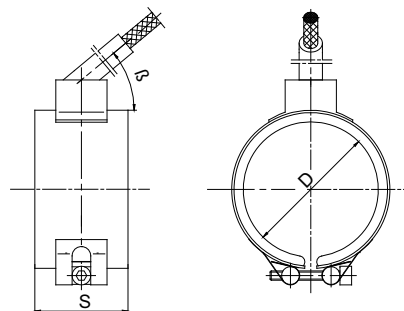


| Parameters | In micanite insulation | In ceramic insulation |
|-----------------------|--|--|
| Heater diameter | ø25÷1000 [mm] | ø50÷1500 [mm] |
| Width | 25÷1000 [mm] | 40÷1000 [mm] |
| Thickness | 3,5÷4 [mm] | 12÷32 [mm] |
| Supply voltage | 220V, 230V, 380V, 3x380V, 400V, 3x400V, or other | |
| Surface loading | 4,5W/cm ² | 7W/cm ² |
| Maximum temperature | 450°C | 550°C |
| Allowable temperature | 500°C during fine heat transfer | 600°C during fine heat transfer |
| Enclosure | steel Cr–Ni (AISI 321), brass | steel Cr–Ni (AISI 321) |
| Additional options | - an adiabatic sheath holding heat radiation outside (of 25%) - possibility for applying thermocouple J, K, T - hermetic termination * Type and way of power supply connections acc. to the figures or requirements | - an adiabatic sheath holding heat radiation outside (of 25%) - possibility for applying thermocouple J, K, T * Type and way of power supply connections acc. to the figures or requirements |

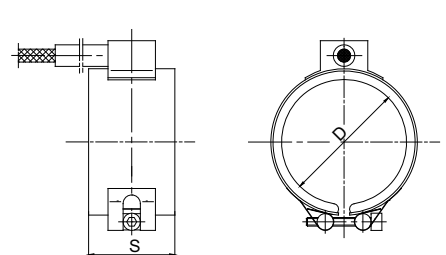
Type A



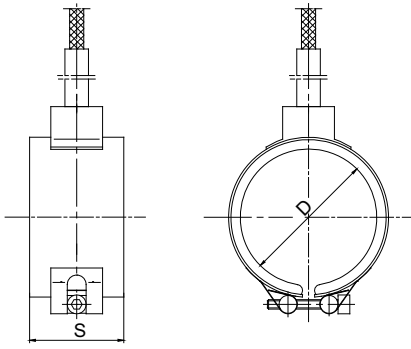
Type B



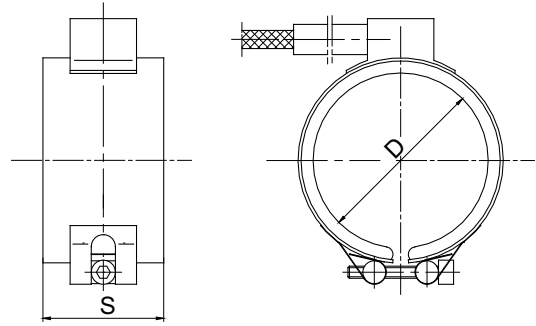
Type C



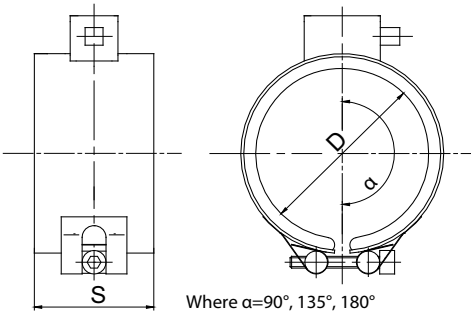
Type D



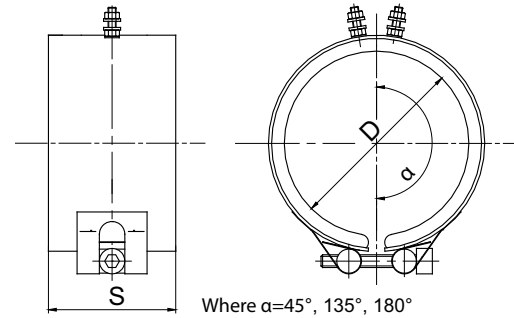
Type E



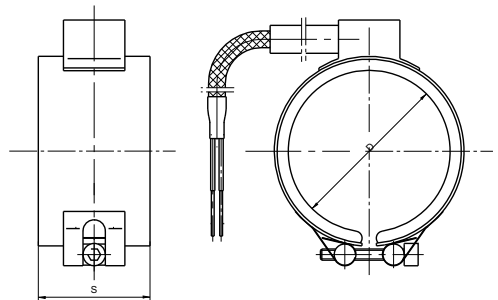
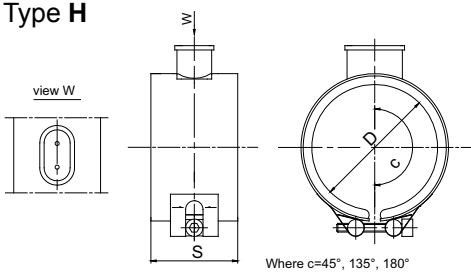
Type F



Type G



Type H



Ordering code

Band heater



Type: micanite: **GM**
 ceramics: **GC**

Diameter [mm] _____

Width [mm] _____

Power [W] _____

Voltage [V] _____

Termination type: _____

A: directly form the heater in overbraid _____

B: axial (angle 3-70°) _____

C: axial flat _____

D: radial _____

E: tangent flat _____

F: with block _____

G: screw: M5 _____

H: plug _____

Additional options

O: without _____

OS: adiabatic sheath _____

Ws: insulated lead wire up to 400°C with steel overbraid _____

Lead wire length _____

Infrared Radiators **FSR, HTS, IOT, EBF, BSH, HTS, SHTS, QP-1/QP-2**

Specification

Characteristic

Ceramic infrared radiators are made of highly flameproof ceramics with ceramic enamel coatings and heating coils from resistance wire inside. Infrared radiators use the electromagnetic radiation phenomena to transfer heat to the objects with lower temperatures. Depending on the heater power, the electromagnetic wave of the heater ranges from 2µm to 10µm length. QP heaters emit electromagnetic radiation with wavelengths ranging from 1,3µm to 3µm. Full emissivity is achieved after 30 seconds. Made of quartz glass tubes with a resistance wire coils inside, the QP heaters are stainless steel sheathed.

Application

Ceramic infrared heaters are suitable for various applications: plastic, food, paper and textile industry, medical technology, surface technology and many others. Their universality is a result of: an excellent corrosion resistance, resistance to aggressive environments, sanitary properties (features essential for medical technology and food industry), possibility of operation control (use of thermocouple), low temperature inertia.



| Type | Power [W] | | | | | | | | |
|------------|-----------|-----|-----|-----|-----|-----|-----|-----|------|
| | 100 | 150 | 200 | 250 | 300 | 400 | 500 | 650 | 1000 |
| QP-1, QP-2 | 100 | 150 | 200 | 250 | 300 | 400 | 500 | 650 | 1000 |
| QP-1/2 | 50 | 75 | 100 | 125 | 150 | 200 | 250 | 325 | 500 |
| QP-1/4 | 25 | 38 | 50 | 63 | 75 | 100 | 125 | 163 | 250 |

Ordering code

Infrared radiator

Type: **FSR** _____
HTS _____
IOT _____
EBF _____
BSH _____
HLS _____
SHTS _____
QP-1/QP-2... _____

Length [mm]: **245** or other _____

Width [mm]: **60** or other _____

