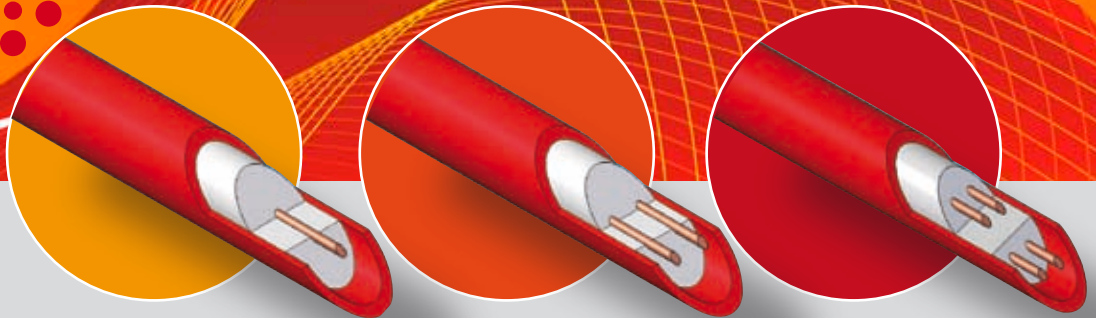


# Mineral Insulated Cable for extreme applications



Mineral insulated heaters

Mineral insulated thermocouples

Mineral insulated cables

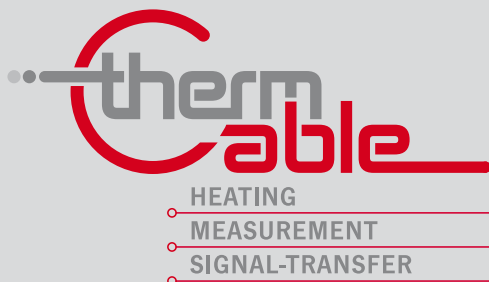
## Mineral insulated heaters

## Mineral insulated thermocouples

## Mineral insulated cables

Mineral insulated thermocouples, measuring elements and heaters are manufactured according to highest quality standard (IEC 584, ASTM E230-93, BS4937/4, NFC 42-321, GOST, KTA 1401). On demand of customer one or more inner leads are insulated by ceramic and covered by sheath material. Special requirements of customer concerning properties of material can be realized.

Our high quality products are suitable for various application fields. Here we give you a few examples:



### *Mineral insulated cables*

*Mechanical stability*

*Low temperatures*

*High temperature range*

*up to 1300°C*

*Acid resistance*

*Malleable and flexible*

### *Temperature instrumentation*

*Plant construction and building*

*Petrochemical industry*

*Avionic industries*

*Car industries*

*Nautical industry*

*and many more*



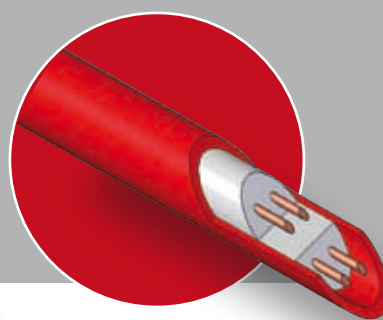
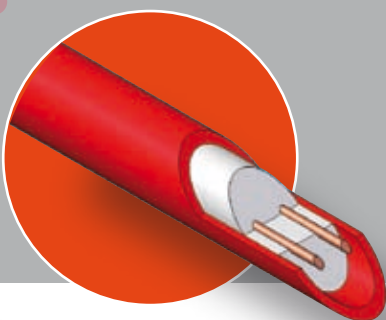
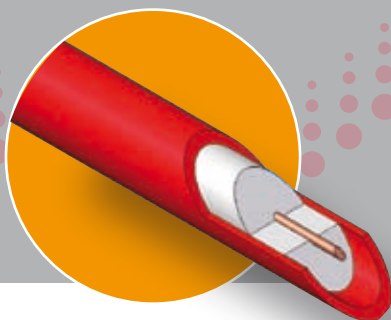
## Mineral insulated heaters

## Mineral insulated thermocouples

## Mineral insulated cables

## Manufacturing process

The corresponding inner leads (thermo legs, copper wire or heating wire) are threaded into isolation rods (mostly made from magnesia or aluminium oxide) and then integrated in the proper sheath. The material is drawn several times to achieve the required diameter.



### MINERAL INSULATED HEATERS

Heating cables are made with an individual electrical resistance, further on with high temperature resistance and used in universal applications. Heating cables are suitable for heating applications up to a maximum sheath temperature of 600°C (stainless steel sheath) or up to 1000°C (nickel alloy sheath material). The environment temperatures has to be considered.

**Diameters 0.5 mm to 14 mm.**

### MINERAL INSULATED THERMOCOUPLES

Mineral insulated (MI) thermocouples according to norm are thermo cables. They are manufactured to customer requirements in different materials depending on type and use. All our thermocouple cables are manufactured according to DIN EN 60584 (type K, N, J, T, S, R, B, E), DIN 43710 (type L). The temperature range starts from -270°C temperatures up to 1300°C.

**Available diameters 0.25 mm to 12 mm.**

### MINERAL INSULATED CABLES

Mineral insulated (MI) cables are comparable with electric wires. The difference to mineral insulated cables for thermocouples are the selected materials of leads and sheath as well as their application for resistance temperature devices. A further application is data transfer or electric supply through strongly stressed zones, such as fire rooms, road construction, vacuum or similar environments where normal cables are not sufficient.

**The temperature range starts from -273°C (0-Kelvin) up to 1300°C. Available diameters 0.5 mm up to 14 mm, various leads 1 to 8 are possible.**

### MI-Cables available programm.

#### MINERAL INSULATED HEATERS

Ø	R/m	Wire material	Sheath material
1,80 mm	3,50	NiCr 8020	AISI 321 or AISI 600
3,20 mm	10,00		
3,20 mm	6,30		
3,20 mm	4,00		
3,40 mm	2,50		
3,90 mm	1,00		
4,70 mm	0,40	Cu Ni 44	AISI 321 or AISI 600
4,30 mm	0,63		
3,40 mm	1,00		
3,70 mm	0,63		
4,00 mm	0,40		

#### MINERAL INSULATED THERMOCOUPLES

Ø	Number of wires	Thermocouple	Sheath material
0,25 – 1,00 mm	2	K N J K N	AISI 321 or AISI 600
1,00 – 3,00 mm	2 / 4		
3,00 – 6,00 mm	2 / 4 / 6		
6,00 – 12,00 mm			

#### MINERAL INSULATED CABLES

Ø	Number of wires	Wire material	Sheath material
0,50 – 1,00 mm	1 / 2	Cu OF Ni AISI 600	AISI 321 or AISI 600
1,00 – 3,00 mm	2 / 4 / 6 / 8		
3,00 – 6,00 mm			

\*Oxygen free

#### SHEATH MATERIAL

For example nickel alloy  
– AISI 600 Stainless steel  
– AISI 321, AISI 316 Ti, AISI 316 L, AISI 304 etc.  
Other sheath materials as well as other thermocouples are available after confirmation of technical details.



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