



HSQ

Ex Mineral insulated (MI) stainless steel sheathed heating cable

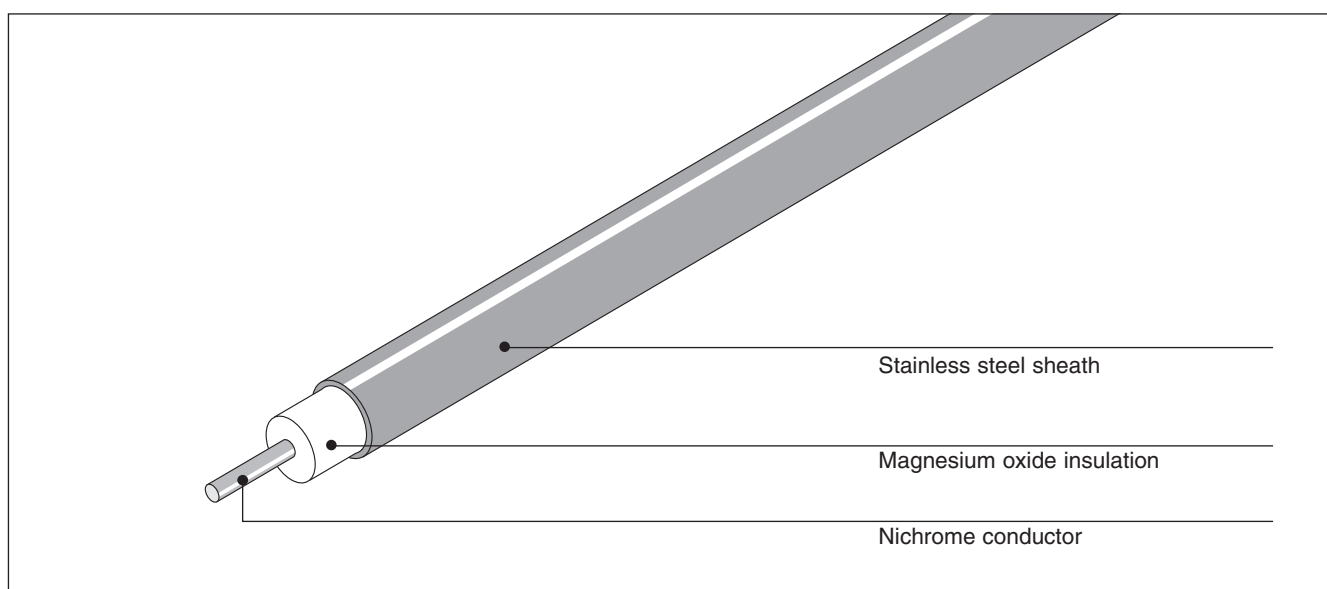
Mineral insulated (MI) stainless steel sheathed cables can operate to a maximum sheath temperature of 600°C. MI stainless steel cables offer the industrial heat-tracing market excellent corrosive properties against a range of harsh environments with a high temperature capability.

HSQ cables are typically used in bitumen plants, gas plants, oil refineries, reactors and vessels, sodium loops and a variety of other heat-tracing applications where temperature, efficiency, durability and cable safety is paramount.

MI cable features:

- Corrosion resistance
- High performance output
- High resistance to mechanical abuse
- Safety and fire resistance

Heating cable construction



Stainless Steel Sheathed Heating Cable

| | |
|--------------------------------------|--|
| Cable sheath material | 321 stainless steel |
| Cable insulation material | Magnesium oxide (MgO) |
| Cable conductor material | Nichrome |
| Supply voltage | Up to 300/500 V AC |
| Withstand voltage | 2.0 kV rms AC |
| Insulation resistance | 1000 MΩ/1000 m (factory pass level) |
| Maximum allowable sheath temperature | 600°C (for higher temperatures please contact Tyco Thermal Controls) |
| Earth leakage | 3mA/100 m (nominal at 20°C) |
| Minimum installation temperature | -60°C |
| Minimum bending radius | 6 x O.D. (cable outside diameter) at -60°C |
| Approvals | System (heating units) Baseefa02ATEX0046X Ex II 2 G EEx e II T6 to T1 Actual T class temperature determined by design Bulk cable Baseefa02ATEX0045U Ex II 2 G EEx e II |
| Area classification | Hazardous area, Zone 1 or Zone 2, Ordinary |
| Minimum cable spacing | 25 mm for hazardous areas |

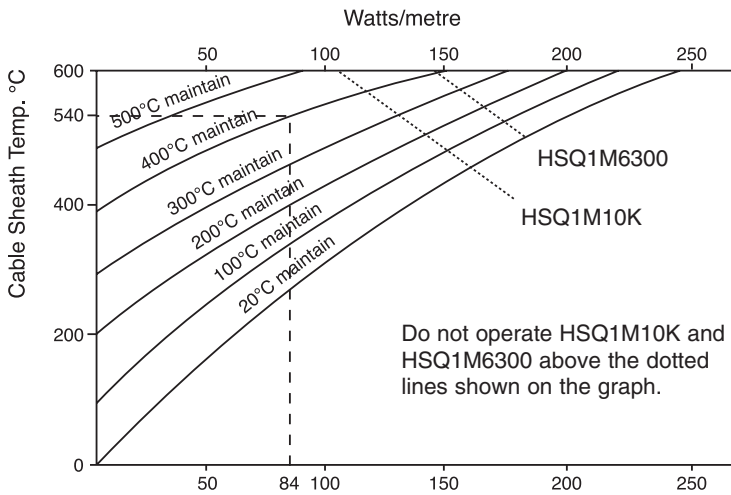
Technical Data

| Cable Reference | Cable Diameter (mm) | Conductor Material | Conductor Diameter (mm) | Nominal Resistance (Ω/km @ 20°C) | Nominal Coil Length (m) | Coil Diameter (mm) | Approx Weight (kg/km) |
|-----------------|---------------------|--------------------|-------------------------|----------------------------------|-------------------------|--------------------|-----------------------|
| HSQ1M10K | 3.2 | Nichrome | 0.37 | 10000 | 717 | 610 | 39 |
| HSQ1M6300 | 3.2 | Nichrome | 0.47 | 6300 | 717 | 610 | 39 |
| HSQ1M4000 | 3.2 | Nichrome | 0.59 | 4000 | 717 | 610 | 39 |
| HSQ1M2500 | 3.4 | Nichrome | 0.74 | 2500 | 639 | 610 | 46 |
| HSQ1M1600 | 3.6 | Nichrome | 0.93 | 1600 | 572 | 610 | 52 |
| HSQ1M1000 | 3.9 | Nichrome | 1.17 | 1000 | 499 | 610 | 62 |
| HSQ1M630 | 4.3 | Nichrome | 1.48 | 630 | 405 | 610 | 78 |
| HSQ1M400 | 4.7 | Nichrome | 1.85 | 400 | 342 | 610 | 96 |
| HSQ1M250 | 5.3 | Nichrome | 2.35 | 250 | 271 | 610 | 127 |
| HSQ1M160 | 6.5 | Nichrome | 2.93 | 160 | 180 | 915 | 191 |

Note: Tyco Thermal Controls requires the use of a 30 mA residual current device to provide maximum safety and protection from fire. Where there is a marked increase in nuisance tripping, a maximum 300 mA residual current device may be used. Also refer to the components section (page 82) for more details on heating units, accessories and nomenclatures.

Maximum operating temperatures

Follow steps below to obtain sheath temperature guidelines from the graph, for ordinary area applications.



Rating factor table

| Cable Ref. | Rating factor |
|------------|---------------|
| HSQ1M10K | 1.000 |
| HSQ1M6300 | 1.000 |
| HSQ1M4000 | 1.000 |
| HSQ1M2500 | 0.952 |
| HSQ1M1600 | 0.901 |
| HSQ1M1000 | 0.840 |
| HSQ1M630 | 0.769 |
| HSQ1M400 | 0.714 |
| HSQ1M250 | 0.645 |
| HSQ1M160 | 0.538 |

- Step 1:** By design, identify cable reference to be used and calculate watts/metre rating of cable/element e.g. HSQ1M1000, 100 W/m.
- Step 2:** Refer to rating factor table and multiply watts/metre rating of cable/element by rating factor to obtain adjusted watts/metre value. (100 W/m x 0.840 = 84 W/m)
- Step 3:** Using adjusted value, enter graph on watts/metre axis and obtain cable sheath temperature for application maintain temperature. Cable sheath temperature = 540°C for 400°C maintain - see graph.

MI Heating cable sheath corrosion resistance and temperature data

| Sheath Material | Maximum Cable Sheath Temp (°C) | Description | Sulphuric Acid | Hydrochloric Acid | Hydrofluoric Acid | Phosphoric Acid | Nitric Acid | Organic Acid | Alkalis | Sea Water | Chloride |
|-----------------------------------|--------------------------------|---|----------------|-------------------|-------------------|-----------------|-------------|--------------|---------|-----------|----------|
| Stainless Steel 321 DIN 1.4541 | 600* | 18/8 austenitic stainless steel with added titanium | NR | NR | NR | NR | X | GE | A | NR | NR |

Note: NR Not recommended, A acceptable, GE Good to excellent, X Check for specific data

* Temperature limitation based on construction of heating element.
Corrosion resistance data is dependent on temperature and concentration.