CHARACTERISTICS OF SANTO MI CABLES

Due to their particular construction, based on a resistive heating element and metallic sheath material, the design of an application and selection of a relevant heating cable follows some specific rules:

- Evaluation of corrosive agents potentially existing in the environment in order to check compatibility of heating cable outer sheath (see table 1).
- Estimation of maximum sheath temperature and maximum output based on cable family and methodology of fabricating elements, brazing or laser welding (see table 2).
- Determination of the actual output power based on applied voltage, length and resistance of heating elements.

The cables are terminated at the extremities with a non-heating section and seal, a so called 'cold lead'. The connections and seals are critical factors for safe and reliable operation. Although on-site terminations are possible, they can only be executed by personnel experienced and trained in brazing techniques. SANTO MI heating systems can be supplied as factory-terminated and tested units to guarantee a consistently high level of quality. (see Figure 1).

Stainless Steel, Inconel 600 and Alloy 825 MI heating cables can be laser-welded. This creates connections of the highest reliability and enables them to be used at higher temperatures and/or loadings.

Heating cables with Alloy 825 sheath are also available in a dual conductor version, which offers a significant technical advantage when space is limited or when high resistances are required, such as for high temperature instrumentation lines or short branches. They also significantly reduce installation times, as only half of the length of the heating cable is required (see Figure 2).

MI heating unit type B (single conductor)

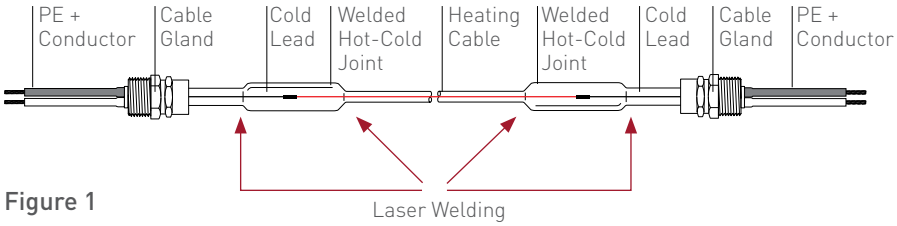

Figure 1

MI heating unit type D (dual conductor)

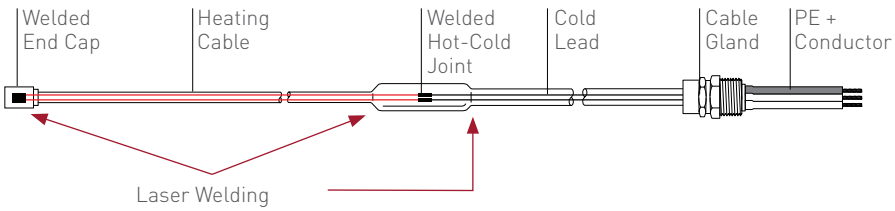

Figure 2

This table gives an indication of the corrosion resistance of the available sheath materials against different corrosive agents.

Table 1

MI HEATING CABLE TYPE	SULPHURIC ACID	HYDROCHLORIC ACID	HYDROFLUORIC ACID	PHOSPHORIC ACID	NITRIC ACID	ORGANIC ACIDS	ALKALIS	SALTS	SEA WATER	CHLORIDES
HCC	NR	NR	A	A	NR	A	A	X	NR	X
HCCH	GE	GE	A	A	A	NR	A	A	A	A
HDC/HDF	NR	X	X	X	X	X	X	X	GE	GE
HSQ	NR	NR	NR	NR	X	GE	A	A	NR	NR
HIQ	X	X	A	X	X	GE	GE	GE	A	GE
HAx	GE	GE	GE	GE	GE	GE	GE	GE	GE	GE

GE Good to excellent **A** Acceptable **X** Check for specific data **NR** Not recommended

Table 2

MI HEATING CABLE REFERENCE	SHEATH MATERIAL	MAX. SHEATH TEMPERATURE	MAX. TYPICAL [1] POWER OUTPUT
HCC (*)	Copper (*optional additional sheath "H" for HDEP)	200°C (limited to 80°C with HDPE)	50 W/m
HDC/HDF	Cupro-Nickel (70/30)	400°C	70 W/m
HSQ	Stainless Steel 321	450°C (750°C with laser welded joints)	150 W/m
HIQ	Inconel 600	450°C (750°C with laser welded joints)	300 W/m
HAx	Alloy 825	450°C (750°C with laser welded joints)	270 W/m

(*)Corrosion resistance data is dependent on temperature and concentration
(1) Typical value, allowed max. power output dependent on the application. Consult Santo for more information.