



Flexible | Heat-resistant | Heavy-duty

Heavy-duty cables for temperature measurement

Sensy**MIC**

Pioneer in temperature measurement for over 60 years

SensyMIC is one of the world's most experienced suppliers of mineral-insulated cables for temperature measurement. SensyMIC represents a long tradition in the production of sheathed cables. Founded by Degussa in the 1960s, the division was part of the ABB Group for 18 years and has been part of the WIKA Group since the beginning of 2017. SensyMIC is synonymous with outstanding quality of products and modern manufacturing processes.

On the basis of this know-how, we continuously promote the further development and improvement of our product range for reliable temperature measurement. Thus we are also able to offer suitable solutions for individual applications.

Globally present

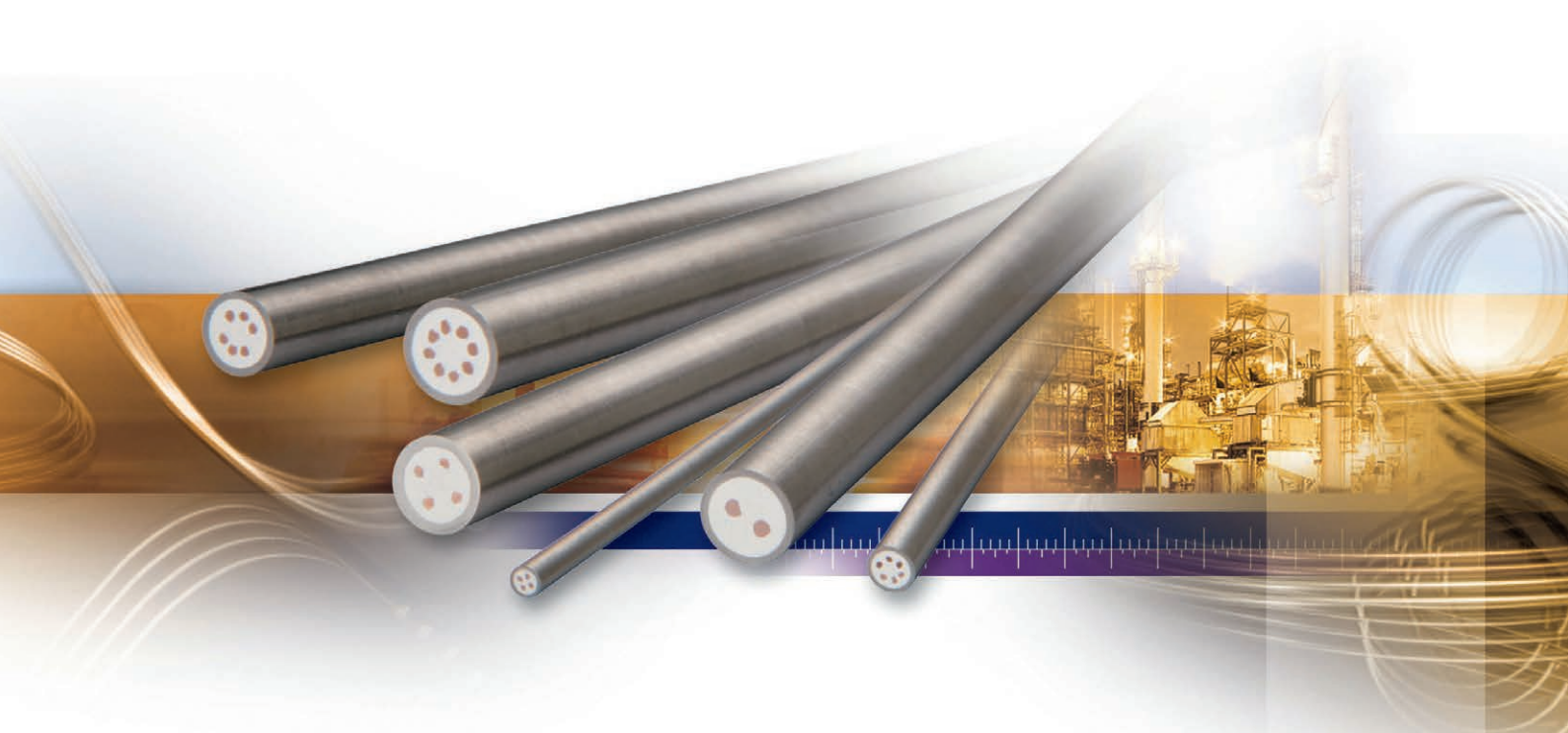
Our focus is on establishing close co-operation in partnership with our customers from the widest range of industries and with the widest range of applications. We do not just offer high-quality technical solutions, but also comprehensive support, with which we contribute to the continuous improvement of our customers' business processes.

Our demand

SensyMIC manufactures products to the highest quality level. Custom-tailored solutions for our OEM partners for these industries:

- Chemical and petrochemical industries
- Energy and steam generation
- Food and beverage
- Oil and gas
- Basic materials industry
- Pharmaceutical industry
- Machine building and automation

Mineral insulated metal sheathed cables for MIMS thermometers in accordance with IEC 61515



Due to rational processing methods, MIMS cables can be used in a wide range of applications, in particular in the field of industrial measurement and control, as an example, in sensor technology for chemical or petrochemical plants, for machine building and also for applications in hazardous areas.

MIMS cables are suitable for use in extreme temperature ranges. They are used wherever particularly high demands exist in relation to mechanical, chemical and electrical stability.

Outstanding quality features of SensyMIC MIMS cables

Reproducible long-term-stable EMF values by aging

Through additional temperature processes, an **aging or stabilisation** of thermoelectric EMF values of the most-frequently used type K is achieved. The EMF values certified in the calibration protocol can be reproduced at any time with proper handling of the MIMS cable.

SensyMIC Premium class

In addition to the standardised tolerance classes of international standards, we supplement our product range with the already-proven **SensyMIC premium class** as the starting material for sensors that meet the requirements of the AMS 2750E or CQI-9 specifications.

Very high insulation resistance

The insulation material from highly compressed magnesium or aluminium oxide (ceramic capillaries) exhibits **very good insulation characteristics**, even at high temperatures. In the 'as-delivered' condition, the insulation resistance of all MIMS cables is >30 GOhm at room temperature.

Ductility test

At SensyMIC, all final MIMS cables undergo a ductility test in which the bending diameter is **three times the outside diameter** of the sheathed cable. Through this even stronger test in comparison to the international DIN EN 61515 standard, the SensyMIC MIMS are particularly suitable for use in cramped installation situations.

Homogenous surface structure

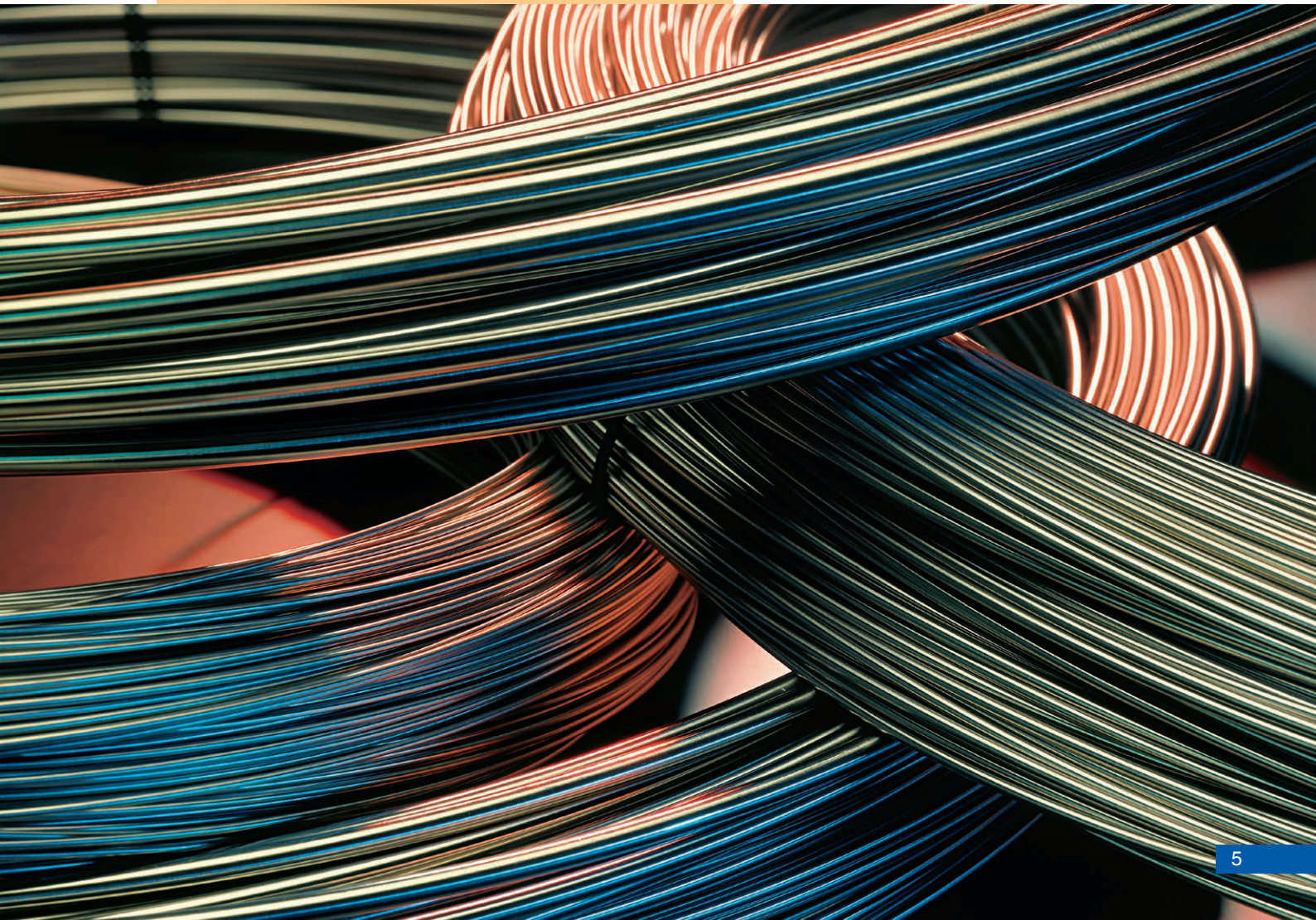
An additional polishing process, as the last production step, ensures a homogeneous surface structure. The **passivation layer** created during this surface treatment **delays the formation of corrosion** and intrusion of pollutants from the end-user process into the MIMS cable and decisively increases the reliability.

Long-term stability

A longer service life and long-term stability in the field of sensors for aggressive environmental conditions is achieved through **double-sheath technology**. Due to the double grain boundary layers of the two tube materials, processed one above the other, a higher process reliability and delayed corrosion processes in use are achieved.

Homogenous outer diameters

Homogenous outer diameters are achieved through the use of drawing dies made of industrial diamond. This means, for example, **tolerance range 0 in the positive range** of the outside diameter is part of our standard, unless otherwise specified by the customer.



The right metal sheathed cable for each application area

The sheath

Common to all MIMS cables is the metal sheath, which makes it mechanically and chemically resistant to the influences of the medium to be measured. Sheathed cables are produced with a jacket of cold-workable metals, in particular from the entire range of austenitic stainless steels. For the vast majority of applications, nickel-based alloys are used. Special sheath materials are available on request.

The insulation

The standard materials for the ceramic capillaries are high-temperature-resistant magnesium oxide (MgO) and also aluminium oxide (Al₂O₃). For the manufacture of MIMS thermocouple cables, ceramic capillaries with a purity of better than 99 % are used. These insulate the inner leads against electrical short circuits and keep them in the desired geometry.

The conductor materials

MIMS thermocouple cables have inner leads of thermo material in accordance with the international DIN EN, IEC, ASTM, BS, JIS standards. Noble metal thermocouples are ideal for high-temperature applications under oxidising conditions. MIMS cables for resistance thermometers have inner leads of copper, copper-nickel alloy, nickel, nickel-chrome or nickel-plated copper.



The product range



SensyMIC offers a wide programme of MIMS cables for the manufacture of sheathed thermocouples and sheathed resistance thermometers. All standardised thermocouples of the types K, J, L, T, U, E and N, as well as the noble metal thermocouples types R, S and B can be delivered as MIMS thermocouple cables. Also, various sheathed cables with Cu, CuNi, Ni and NiCr inner leads are available from stock.

The MIMS cables can be manufactured in a number of combinations. The selection of the base materials depends on various criteria (operating temperature range, required heat treatment during drawing process, etc.). Sheathed cables are available in outer diameters between 0.25 to 12.7 mm and can be delivered in production lengths between 20 and 2,000 m, depending on the diameter. For reasons of occupational safety and better processability, however, production lengths are divided into manageable stock sizes.

	MIMS thermocouple cables IEC 584, ASTM E230, DIN 43710	MIMS cables for resistance thermometers (RTD)
Temperature *	-200 ... +1,300 °C	-200 ... 1,100 °C
Type ** ***	K, N, J, L, E, N, R, S, B	Cu, Ni-coated Cu, NiCr, Ni, CuNi
Sheath (as well as double-sheath)	Alloy 75, 600, 601, 625, 800, TD, X AISI 304L, 316Ti, 316L, 321, 347, 446, 310S Pt10Rh	Alloy 600, 800 AISI 304L, 316Ti, 316L, 321

* The maximum operating temperature is directly correlated to the outer sheath material and the inner lead material. These are indicated in the order documents.

** All MIMS type K thermocouples are converted into the "K" state through a defined temperature process, so that a stable, reproducible and reliable temperature measurement is ensured.

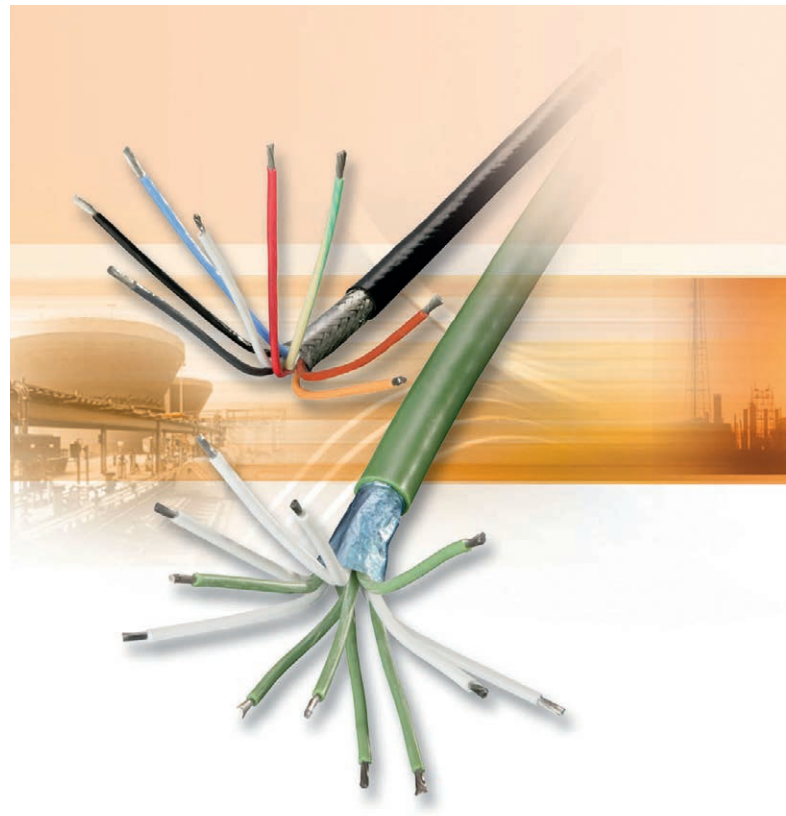
*** Additionally to the standard tolerance class 1 in accordance with DIN EN 60584-2, the K and N thermocouple types are also supplied in SensyMIC premium class which is defined with a positive tolerance deviation of max. 2 °C between 700 and 1,000 °C. The range < 700 °C lies in class 1.

Thermocouple and compensating cables

The connecting cables between the thermocouple and the cold junction must have the same thermoelectrical properties as the thermocouple. This connection can be a compensating, extension or thermocouple cable.

Original or substitute materials

We differentiate between original materials for thermocouple cables and substitute materials for compensating cables. Thermocouple cables from original materials consist of the same material as the thermocouple in application. Compensating cables of substitute materials are made from cheaper alloys which are not identical to the associated thermocouple. However, they have the same thermoelectric properties as the thermocouple in the temperature range permitted for compensating cables.



Insulated thermocouple wires

Insulated thermocouple wires are used for the manufacture of thermocouples which correspond to the recognised standards. The temperature limit values depend on various parameters (ambient atmosphere, installation location, etc.) and should therefore be considered as guideline values. The delivery is made in reels or coils of up to 500 m.

	Thermocouple cables in accordance with DIN 43722 (original material)	Compensating cables in accordance with DIN 43722 (substitute material)	Insulated thermocouple wires in accordance with DIN EN 60584, DIN 43712, IEC 584
Temperature *	-25 ... +200 °C	0 ... 200 °C	- 200 ... +1,200 °C**
Type	KX, EX, JX, NX	KCA, KCB, NC, RCA/SCA, RCB/SCB	K, J, E, N, L
Sheath	PVC, silicone, fibreglass, Teflon-FEP/PFA/PTFE	PVC, silicone, fibreglass, Teflon-FEP	PVC, silicone, Teflon, fibreglass, ceramic fibre
Shield	Braid made of galvanised or stainless steel wires or aluminium foil with drain wire		

* The maximum operating temperature is directly correlated to the outer sheath material and the inner lead material. These are indicated in the order documents.

** Upper temperature limit for short-term use.