

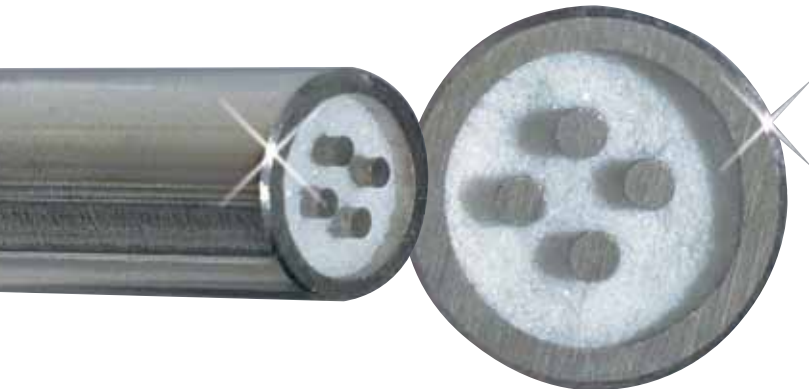
Applications and Benefits of MI Cable in Critical Processes

WHAT IS AN MI CABLE?

MI cable is a specialized type of cable used in high temperatures or harsh environmental conditions because it has low flammability, even when operating at high temperatures. It resists oxidation and enables precise measurement.

Mineral insulated cable consists of copper wires inside a copper, stainless steel, or Inconel® sheath, insulated by packed minerals such as magnesium oxide (MgO). Magnesium oxide makes an excellent electrical insulation material because it resists oxidation and ionizing radiation, and it is both chemically and physically stable at high temperatures. After the cable has been packed with MgO insulation, it may be rolled under pressure to achieve the desired diameter. The outer sheath protects the internal thermocouple wire from heat, chemical or other environmental damage. The metal sheath may be covered with an additional colored plastic sheath to add in identification and to add an additional layer of protection from corrosion.

An MI cable may contain any number of wires, but the most common configurations include 1, 2 or 3 pairs of conductors. Specialized MI cables may include additional thermocouples in customized configurations. MI cable is available in a variety of diameters and lengths, depending on the specific requirements. Many MI cables are calibrated using sensitive, fast and highly accurate dry block probe calibrators.



Dual OMEGACLAD® Thermocouple Cable

RTD and thermocouple sensors manufactured from MI cable are used extensively in heat treating metals, solid waste incinerators, sintering powdered metals, firing ceramic materials, gas or oil fired furnaces, fuel fired heat exchangers, box furnaces and nuclear or hydrocarbon based energy plants.

ADVANTAGES OF MI CABLE

The metal sheath that clads MI cable helps to protect the thermocouple wires from oxidation when used in chemically active or wet environments. Corrosion resistance makes MI cable ideal for use in areas where failure and replacement could be dangerous or even impossible. For example, MI cable is used in nuclear plants to monitor core temperatures. It would be extremely dangerous if the temperature controllers were not receiving accurate readings, and it would be difficult to repair or replace cables in that environment.



Molten Metal

The mineral fillings in MI cables provide excellent non-reactive insulation, preventing the thermocouple wires from contact with each other or with caustic substances such as oils, solvents or water. This helps to ensure that the thermocouple probes remain accurate, critical in applications such as heat treating or sintering where the quality of the product could be adversely affected by temperature fluctuations.

The insulation in MI cables does not burn, which makes it ideal for applications where fire could be catastrophic. Medical devices, power plants and oil rigs are examples of places where installation of MI cables makes operations safer.



Oil Rig

Since the thermocouple probes are protected from contact with other electrically active wires by the insulation, they are not readily subject to malfunction or inaccurate temperature measurements. Carefully calibrated to meet international standards, MI cables provide accurate and precise temperature measurement over long duty cycles with little or no loss of accuracy.

Because of the mineral insulation, MI cables can operate in high temperature conditions with no loss of accuracy. This makes them ideal in kilns, firing ceramics or heat treating metals or in any high temperature process. MI cables retain their accuracy even during and after exposure to high temperatures, so they are ideal as a thermocouple probe in these operations. In addition, for industries such as medical devices or aerospace where safety standards are strictly enforced, process deviations could result in life threatening quality issues. MI cables are carefully calibrated, and verified using NIST standards at OMEGA Engineering against known temperatures or certified thermometers. NIST traceable calibration ensures temperature accuracy under actual operating conditions and provides documentation of their original accuracy. To remain NIST certified, the chain of verification must be intact and the thermocouples must be recalibrated as part of a well-documented and executed quality management system.

MARKET NEEDS AND BENEFITS

MI cables are used as thermocouples in testing, monitoring and controlling temperatures in critical processes such as in furnaces, kilns, heat treating, power stations oil & gas processing nuclear plants automotive, aerospace, testing or medical devices.

In these industries, many processes must be performed at specific stable temperatures to achieve the desired results. Heat treated and sintered metals, for example, must be exposed to precise temperatures for a defined duration to ensure that the correct metallurgical changes take place. If temperatures fall outside the required zone, the necessary attributes will not develop. This could result in unexpected failures and hazardous conditions in aerospace, automotive, medical or other applications.

Nuclear power stations must operate within a specific temperature range to control reactions at the core. MI cable is an ideal thermocouple probe in this environment because of its accuracy and reliability in conditions where changes in temperature could be disastrous.

WHY CHOOSE OMEGA?

OMEGA was founded in 1962 and since then has become a global leader in technical materials, offering more than 10,000 measurement and control products. OMEGA is dedicated to customer service, and has generated numerous handbooks over the years to help its customers understand the principles and applications for its line-up of technical products.

A pioneer in direct marketing, OMEGA has a full staff of friendly, knowledgeable people who are eager to share their expertise to ensure our customers' success.

OMEGA products carry warranties which in most cases exceed the "industry standard" offered by our competitors. We have dedicated R&D teams to keep us at the forefront of technology, and our ISO 9001 certified, world class state of the art manufacturing facilities help ensure quality in everything we make. We assist customers with advice and custom designs. Well known for our superior technical support, OMEGA works hard to exceed customers' expectations with every interaction.

Source

https://en.wikipedia.org/wiki/Mineral-insulated_copper-clad_cable

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