

Mineral Insulated Cable Part Number System

Mineral insulated cable (MIC) consists of three basic components.

Sheath: The outside covering which shields and protects the conductors and insulation from harm or contamination. This metal sheath is compacted around the inner components and is in direct contact with the insulation. The unique property of MIC, as compared to a simple tube with wires inserted inside, is the great flexibility of this design. The normal MIC can be coiled around a mandrel that is 4 times the diameter of the cable. In some applications, it is possible to coil MIC around a mandrel that is 2 times the diameter of the cable.

Insulation: The most common material furnished is magnesium oxide (MgO). Typical compaction density is between 70% to 75%. ILC furnishes MgO insulation in three purity grades:

- **Low Purity:** Commercial grade having a minimum purity of 96.4%.
- **High Purity:** Used in applications above 1700° F. This insulation has a minimum purity of 99.4%. We also offer this material that meets ASTM E1652 Table 1 requirements.
- **Ultra High Purity:** This insulation has a minimum purity of 99.8%. This grade meets the requirements of ASTM E-235 and ASTM E-2181.

Other ceramic insulating materials such as alumina oxide (Al₂O₃) and hafnia oxide (HfO₂), which has a temperature rating of 2500°C, are also available upon request.

Conductor(s): Thermocouple cable commonly contains 2 wires. There are normally 1 to 8 wires placed in MIC. The most common conductors are nickel alloys used as thermocouples, resistance heating alloys, or conductor alloys.

For a single pair of thermocouple wires, a single letter is used. For multiples, add another letter. Duplex is “KK”, triplex is “KKK”, etc. We offer up to 9 pairs inside a single cable. Our standard construction is parallel.

Duplex Cable Options – Adjacent (Parallel) and Alternating (Diagonal) Cable

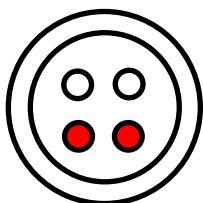


Figure 1: **Parallel construction** of the Duplex (4-wire) Thermocouple Cable. This is the standard configuration made at Idaho Labs.

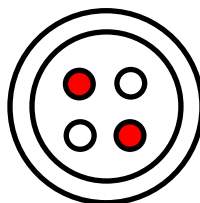


Figure 2: **Diagonal Construction** of Duplex Cable. The red circles denote negative wires. This configuration is available upon request. Known as alternating or “DIAG”.

The red circles show the location of the negative thermocouple wires

Example of MIC part number system:

250-KKS-316-H-HW-DIAG

(a) (b) (c) (d) (e)

- (a) Outside diameter of sheath in thousandths of an inch
- (b) Calibration or type of conductors, quantity of conductors, and limits of error
- (c) Sheath material
- (d) Insulation material
- (e) Special information (multiple requirements separated by dashes)

This part number describes a cable that has a diameter of 1/4", a type "K" calibration, four wire (duplex), special limits of error. The sheath alloy is 316 stainless steel. The insulation is high purity MgO. The next two letters designate a special construction of heavy wall thickness. The final section “DIAG” references the alternating positive and negative wire configuration.