



Tempco's Metal Sheathed, Mineral Insulated Thermocouple Cable

Tempco-Pak Thermocouples and cable are manufactured using premium quality materials along with rigid quality control standards to ensure a reliable product that is state of the art. The metal outer sheath protects the thermocouple wires and insulation from contamination and mechanical damage as well as hostile and oxidizing environments while allowing the cable to be moisture proof, formable, weldable, compact and have fast response. The mineral insulation isolates the conductors from the sheath and each other while providing excellent high temperature insulation resistance.

Tempco offers a wide variety of sheath materials to choose from as there is no single sheath material that is suitable for all conditions. The most commonly stocked sheath materials are 304 SS, 316 SS and alloy 600. These are offered in all ANSI recognized thermocouple calibrations.

As a standard, Tempco-Pak Thermocouple cable is made with high purity 94% minimum MgO insulation. Other types and purities are available; however, when selecting a mineral insulation, the environment, temperature rating and cost must be taken into consideration.



Quality Assurance

All Tempco-Pak Thermocouple cable is inspected for appearance, physical and electrical characteristics, as well as conformity to calibration.

Each coil or batch of Tempco-Pak is made from the same production lot of raw materials and processed together. This eliminates the need to calibrate each length cut from the same coil. Samples from each coil are calibrated as shown in the chart.

Tempco-Pak Thermocouple Calibration Temperatures

ANSI Calibration	Standard Calibration Points	Optional Points
T	200°F (93°C), 400°F (204°C)	—
J	200°F (93°C), 500°F (260°C), 1000°F (537°C), 1500°F (815°C)	—
E	300°F (149°C), 500°F (260°C), 1000°F (537°C), 1600°F (871°C)	—
K	300°F (149°C), 500°F (260°C), 1000°F (537°C), 1600°F (871°C), 2000°F (1093°C)*	2200°F (1204°C)*
R	1000°F (537°C), 1600°F (871°C), 2000°F (1093°C)*	2600°F (1426°C)*
S	1000°F (537°C), 1600°F (871°C), 2000°F (1093°C)*	2600°F (1426°C)*
B	1600°F (871°C), 2000°F (1093°C)*, 2600°F (1426°C)*	
N	300°F (149°C), 500°F (260°C), 1000°F (537°C), 1600°F (871°C), 2000°F (1093°C)*	2200°F (1204°C)*

* These calibration points will be checked if the sheath and insulation are rated to this temperature.

Tempco-Pak Thermocouple Data, Care and Handling

Calibration

Tempco-Pak Thermocouple Cable is normally supplied to ANSI standard limits (tolerances) of error as set forth in ANSI circular MC96.1-1982 and duplicated in ASTM E230. Special limits (tolerances) per ANSI MC96.1 are available at extra cost (See Table 1 on page 14-103).

Annealing

Unless otherwise specified all Tempco-Pak will be furnished in a fully annealed condition.

Formability

Because Tempco-Pak is fully annealed it can normally be formed around a mandrel 4 times the sheath diameter without loss of insulation resistance or the sheath's integrity.

Weldability

Tempco-Pak can be brazed, soldered or welded upon its sheath. However, because of the delicate nature of the fabricating of hot junctions, it is recommended they be done at the factory. Brazing or soldering material should not come in contact with the mineral insulation as the flux or resin will contaminate the insulation.

Insulation Resistance

Tempco-Pak should have a minimum insulation resistance wire to wire and wire to sheath at room temperature of 100 megohms at 50 VDC for 0.093" O.D. and smaller and 100 megohms at 100 VDC for .100" O.D. and larger.

Shipping and Packaging

Tempco-Pak is stocked in random lengths with the maximum stock lengths listed in the tables showing the varieties of commonly available material. Tempco reserves the right to supply random lengths of our choice unless specific lengths are specified on your order. Tempco-Pak can be furnished in coil form or in straight lengths. Normally .375" diameter and .312" diameter are shipped in straight lengths. Longer lengths are available on special order.

Handling and Storage

To prevent moisture from being absorbed by the hygroscopic insulation, both ends of the lengths of Tempco-Pak are sealed at the factory with a suitable sealer. Under some conditions, moisture absorption could take place that would lower the insulation resistance and may prove to be troublesome in subsequent assembly and welding, so it is advisable to store Tempco-Pak in a dry place. Slight moisture penetration can be remedied by removing approximately 3 inches from each end. Apply heat (approx. 300°F) 6 to 7 inches from the open end and slowly work heat toward and over the open end. Allow end to cool to approximately 180°F and reseal end. When pieces are cut from stock lengths, the exposed ends should be squared and resealed immediately to prevent contamination or moisture absorption. For deeper moisture penetration, bake entire length of material with both ends open for 24 hours at 250°F to 300°F to remove moisture and bring up insulation resistance. If baking does not bring the insulation resistance to acceptable levels, discard the material. As an option Tempco can provide Tempco-Pak with the ends seal welded.