



Selecting the Correct Tempco-Pak Thermocouple Assembly

Thermocouples must be selected to meet the conditions of each particular application. The environment, operating temperature and atmosphere, response time and length of service must be considered when selecting the sheath, insulation, calibration, junction and termination of the thermocouple assembly.

Refer to the Mineral Insulated Thermocouples and Cable section regarding sheath, insulation and calibration (pages 14-114 through 14-118).

TEMPCO's engineering staff will be happy to assist you with the design and selection of your thermocouple requirements.

Sheath Materials

The most commonly used sheath materials and their maximum continuous operating temperatures in an oxidizing atmosphere are as follows:

| Sheath Material | Max. Operating Temperature |
|---------------------|----------------------------|
| Alloy 600 | 2150°F (1177°C) |
| 304 Stainless Steel | 1650°F (899°C) |
| 316 Stainless Steel | 1650°F (899°C) |
| 310 Stainless Steel | 2100°F (1150°C) |



Note: For temperatures exceeding 2200°F (1204°C), Noble or Refractory metal sheaths are normally used.

Formability

Because Tempco-Pak is fully annealed it can normally be formed around a mandrel 4 times the sheath diameter. Consult TEMPCO if special forming is required.

Weldability

The thermocouple sheath can be brazed, soldered or welded. Welding the thermocouple sheath in the field is not recommended on diameters less than .093 in. All welding should be done in an inert atmosphere.

Calibrations

The table shows the standard temperature ranges for the various ANSI thermocouple calibrations:

| ANSI Letter | Thermocouple Type | Temperature Range | |
|-------------|-------------------------|-------------------|------------|
| | | °F | (°C) |
| J | Iron-Constantan | 32-1400 | (0-760) |
| K | CHROMEL P®-ALUMEL® | 32-2300 | (0-1260) |
| N | Nicrosil-Nisil | 32-2300 | (0-1260) |
| T | Copper-Constantan | 32-660 | (0-350) |
| E | CHROMEL P®-Constantan | 32-1600 | (0-871) |
| R | Pt 13% Rhodium-Platinum | 32-2700 | (0-1482) |
| S | Pt 10% Rhodium-Platinum | 32-2700 | (0-1482) |
| B | Pt 30% Rh-Pt 6% Rh | 1600-3100 | (871-1704) |

Assembly Tolerances: Sheath Length Dimensions

| Sheath O.D. | "L" Tolerance Up to 24" | "L" Tolerance Over 24" |
|-------------------|-------------------------|------------------------|
| Up to .038" | ±½" | ±2% |
| .038" to .065" | ±¾" | ±1½% |
| Larger than .065" | ±¼" | ±1% |

Flexible Lead Dimensions

| Lead Length (ft.) | Tolerance |
|-------------------|-----------|
| Up to 5 | +6", -1" |
| 5 to 10 | +6", -2" |
| over 10 | +5%, -2% |