

HIGH TEMPERATURE THERMOCOUPLES

- Can stand high temperature applications.
- High grade, 99.4% minimum purity, MgO (magnesium oxide) insulators.
- Can be custom built for maximum temperature and durability.



High Temperature Thermocouples & Exotic Thermocouples

High temperature line of thermocouples are used in applications where standard thermocouples would fail due to excess heat or severe environments. Like our standard thermocouple line, our high temperature thermocouples are available with high grade, 99.4% minimum purity, MgO (magnesium oxide) insulators. In addition, our high temperature line is available with BeO (beryllium oxide), HfO (Hafnium Oxide), and Al₂O₃ (Aluminum Oxide) insulators as well. Typically used, high temperature wire calibrations available include type B, C, D, R, and S. More information on choosing the best sheath, wire, and insulators can be found below.

If you're looking for maximum temperature and durability we can supply our thermocouples with molybdenum, tantalum, tungsten, and platinum-rhodium sheaths. If you require assistance in choosing the product that is right for you, or you would like to request a quote, our knowledgeable sales staff is available to help. As always, we can custom manufacture all of our probes to almost any length or diameter your application requires.

High Temperature Sheath Materials

SHEATH TYPE	Our SYMBOL	MAX. TEMP	MELTING TEMP	ALLOWABLE ENVIRONMENT	STD SHEATH DIA. (inches)	MIN. BEND RADIUS
Inconel 600	B	1175°C	1345°C	Inert, Vacuum, Oxidizing	0.040, 0.062, 0.125 0.188, 0.250	5 X Sheath Diameter
Platinum 10% Rhodium	AH	1550°C	1850°C	Inert, Oxidizing	0.040, 0.062, 0.125	5 X Sheath Diameter
Tantalum	N	2200°C	2995°C	Inert, Vacuum	0.040, 0.062, 0.125	10 X Sheath Diameter
Niobium 1% Zirconium	AV	2200°C	2495°C	Inert, Vacuum	0.062, 0.125	10 X Sheath Diameter
Molybdenum	O	2000°C	2620°C	Inert, Vacuum, Reducing	0.062, 0.125 0.188, 0.250	Do Not Bend
Coated Molybdenum	OCR	1600°C	2000°C	Inert, Oxidizing	0.125 0.250	Do Not Bend

High Temperature Wire Types

THERMOCOUPLE COMBINATIONS	Calibration Type	Our SYMBOL	STANDARD LIMITS OF ERROR*	RECOMMENDED TEMPERATURE RANGE
Platinum 30% Rhodium (+) Vs. Platinum 6% Rhodium (-)	B	B	±0.5%	870-1700°C
Tungsten 5% Rhenium (+) Vs Tungsten 26% Rhenium (-)	C	AE	±4.4°C (0-426°C)* ±1% (426-2315°C)*	0-2200°C
Tungsten 3% Rhenium (+) Vs. Tungsten 25% Rhenium (-)	D	AO	±4.4°C (0-426°C)* ±1% (426-2315°C)*	0-2200°C
Platinum 13% Rhodium (+) Vs. Platinum (-)	R	R	±1.5°C or .25% **	0-1450°C
Platinum 10% Rhodium (+) Vs. Platinum (-)	S	S	±1.5°C or .25% **	0-1450°C

High Temperature Insulators

INSULATION TYPE	Our SYMBOL	MAX. OPERATING TEMP	APPROX MELTING TEMP.	COMMENTS
Magnesia (MgO)	N	1700°C	2800°C	Very hygroscopic. Used mostly in compacted sheaths.
Alumina Oxide (Al ₂ O ₃)	A	1550°C	2040°C	Excellent with Platinum alloys.
Hafnium Oxide (HfO ₂)	H	2200°C	2790°C	Comparable to Beryllium Oxide and safe to handle
Beryllium Oxide (BeO)***	B	2200°C	2650°C	Excellent High Temperature thermal conductivity and resistivity.

*Per ASTM E-988

**Per ASTM E-230

***Beryllium is considered a toxic material and can cause health problems if particles are inhaled.

Material Specifications and Ordering Information

THERMOCOUPLE COMBINATIONS	Calibration Type	Our SYMBOL	STANDARD LIMITS OF ERROR	RECOMMENDED TEMPERATURE RANGE
Platinum 10% Rhodium (+) Vs. Platinum (-)	S	S	±1.5°C or .25% Per ASTM E-230	0-1450°C
Platinum 13% Rhodium (+) Vs. Platinum (-)	R	R	±1.5°C or .25% Per ASTM E-230	0-1450°C
Platinum 30% Rhodium (+) Vs. Platinum (-)	B	B	±0.5%	870-1700°C

6% Rhodium (-)				
Tungsten 5% Rhenium (+) Vs Tungsten 26% Rhenium (-)	C	AE	±4.4°C (0-426°C) ±1% (426-2315°C) Per ASTM E-988	0-2200°C
Tungsten 3% Rhenium (+) Vs. Tungsten 25% Rhenium (-)	D	AO	±4.4°C (0-426°C) ±1% (426-2315°C) Per ASTM E-988	0-2200°C

TABLE 2 SHEATH MATERIALS

SHEATH TYPE	Our SYMBOL	RECOMMENDED MAX. TEMP	MELTING TEMP.	ALLOWABLE ENVIRONMENT	STD SHEATH DIAMETERS (inches)	MIN. BEND RADIUS
Inconel 600	B	1175°C.	1345°C.	Inert, Vacuum, Oxidizing	0.040, 0.062, 0.125, 0.188, 0.250	5 X Sheath Diameter
Platinum 10% Rhodium	AH	1550°C.	1850°C.	Inert, Oxidizing	0.040, 0.062, 0.125	5 X Sheath Diameter
Tantalum	N	2200°C.	2995°C.	Inert, Vacuum	0.040, 0.062, 0.125	10 X Sheath Diameter
Molybdenum	O	2000°C.	2620°C.	Inert, Vacuum, Reducing	0.062, 0.125, 0.188, 0.250	Do Not Bend
Niobium 1% Zirconium	AV	2200°C.	2495°C.	Inert, Vacuum	0.062, 0.125	10 X Sheath Diameter
Coated Molybdenum	OCR	1600°C.	2000°C.	Inert, Oxidizing	0.125, 0.250	Do Not Bend

TABLE 3 INSULATION MATERIALS

INSULATION TYPE	Our SYMBOL	RECOMMENDED MAX. OPERATING TEMPERATURE	APPROXIMATE MELTING TEMP.	COMMENTS
Magnesia (MgO)	N	1700°C.	2800°C.	Very hygroscopic. Used mostly in compacted sheaths.
Alumina Oxide (Al ₂ O ₃)	A	1550°C.	2040°C.	Excellent with Platinum alloys.
Hafnia Oxide (HfO ₂)	H	2200°C.	2790°C.	Comparable to Beryllia Oxide and safe to handle
Beryllia Oxide* (BeO)	B	2200°C.	2650°C.	Excellent High Temperature thermal conductivity and resistivity.

*Beryllia is considered a toxic material and can cause health problems if particles are inhaled.

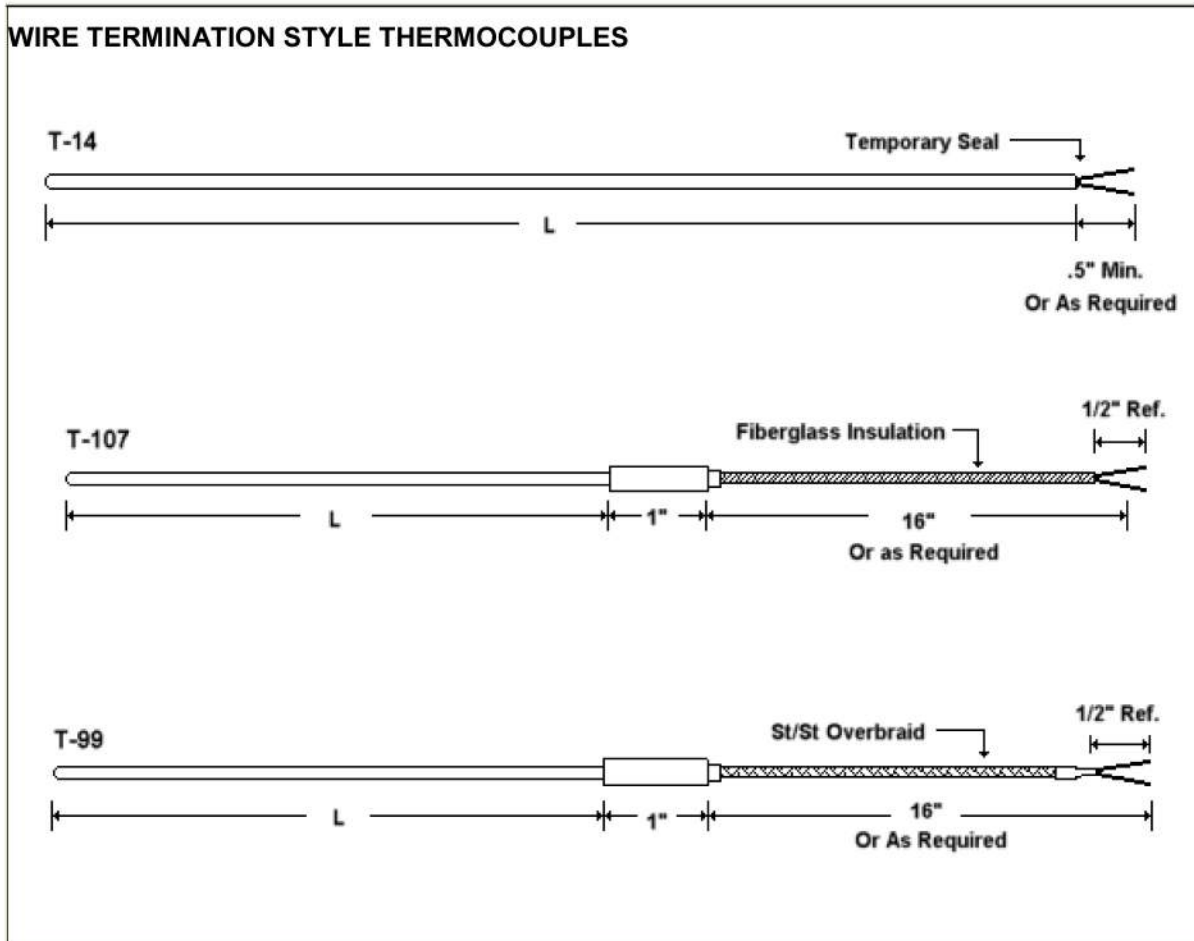
TABLE 4 SHEATH DIAMETER CODES

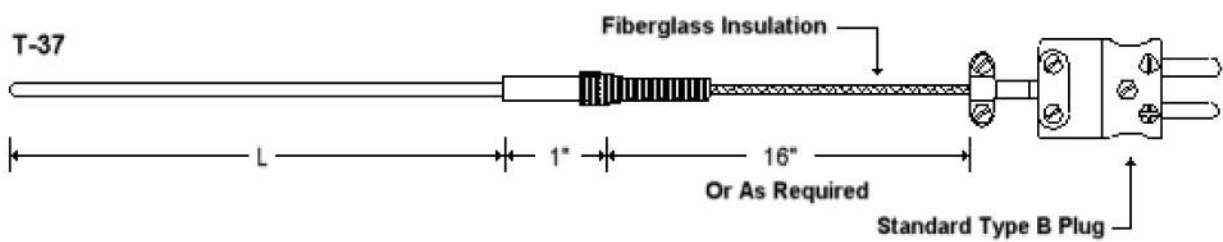
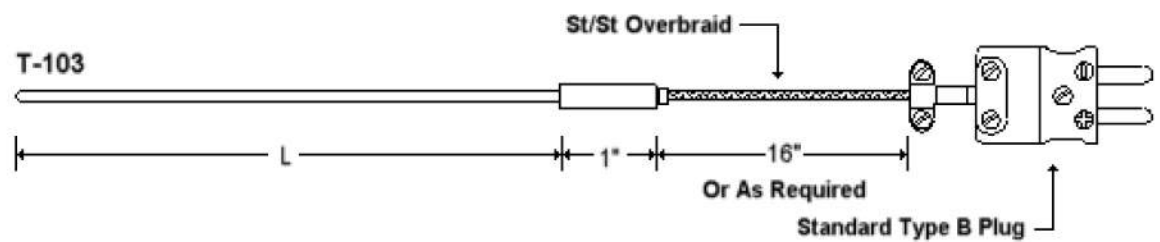
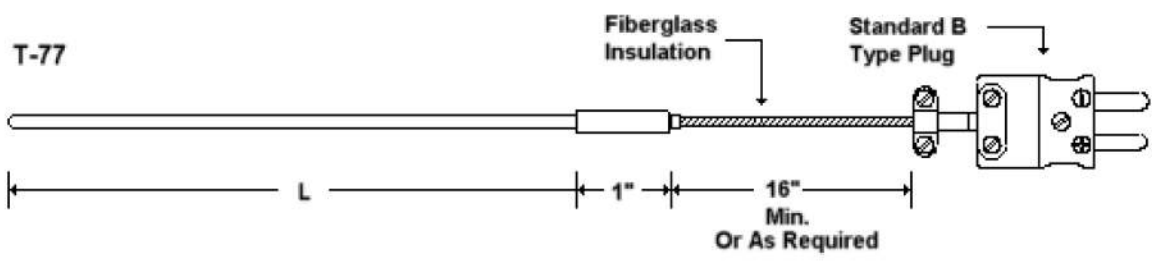
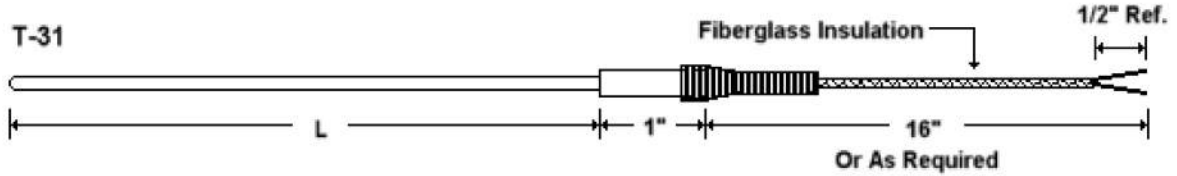
SHEATH DIAMETER (inches)	Our Letter Code
0.040	A
0.062	B
0.125	D
0.188	E
0.250	F

TABLE 5 JUNCTION NUMBER CODES

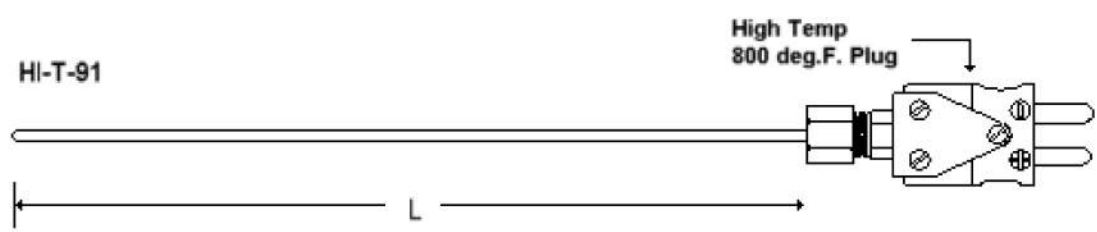
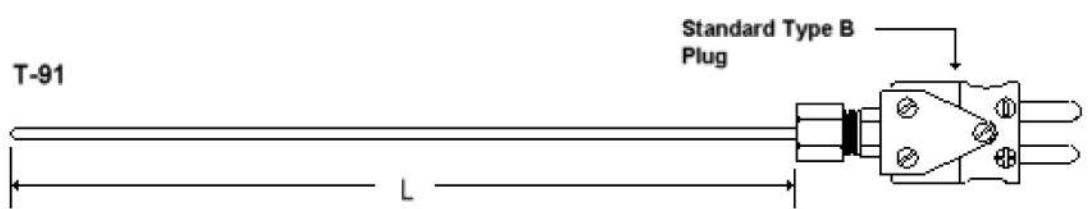
SHEATH TYPE	WIRE TYPE LETTER TYPE	JUNCTION CODE GROUNDED	JUNCTION CODE UNGROUNDED
Inconel 600	R, S, & B	(8.1)	(9.5)
Platinum 10% Rhodium	R, S, & B	8	9
Coated Molybdenum	AE & AO	N/A	(9.3)
Tantalum	R, S, B, AE, & AO	(8.1)	(9.5)
Molybdenum	R, S, & B	N/A	(9.4)
Molybdenum	AE & AO	N/A	(9.3)
Niobium 1% Zirconium	AE & AO	(8.1)	(9.5)

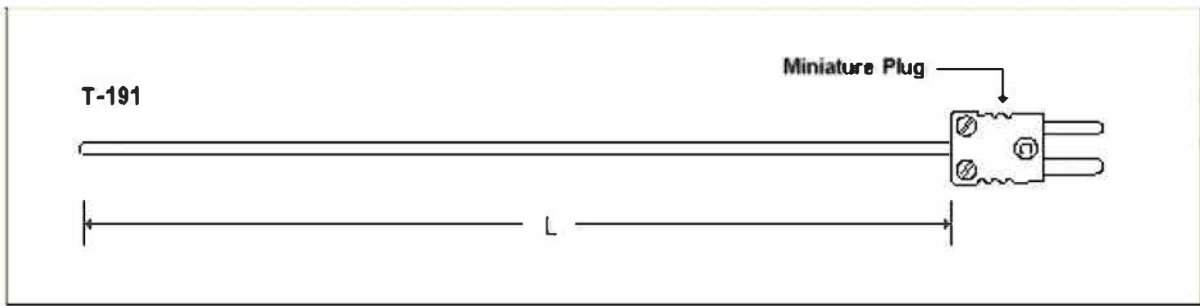
WIRE TERMINATION STYLE THERMOCOUPLES



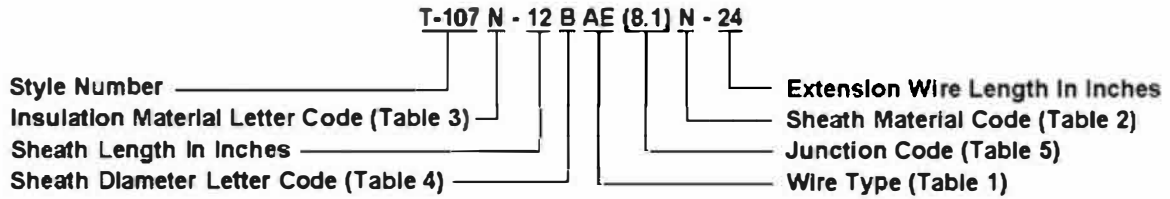


PLUG TERMINATION STYLE THERMOCOUPLES





PART NUMBER EXAMPLE



METRIC SIZES

We maintain a wide variety of mineral insulated cable and tubing in our inventory to manufacture thermocouples with metric sheath diameter requirements. Metric sizes are subject to availability.

To specify this option, insert the decimal equivalent in place of the sheath diameter letter code of the part number.

Example: For 3.0 mm (0.118" Sheath Diameter): T-91N-12(.118)AE(9.3)O

DUE TO CONTINUOUS PRODUCT IMPROVEMENT, THE DESIGN AND TECHNICAL SPECIFICATIONS
ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

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