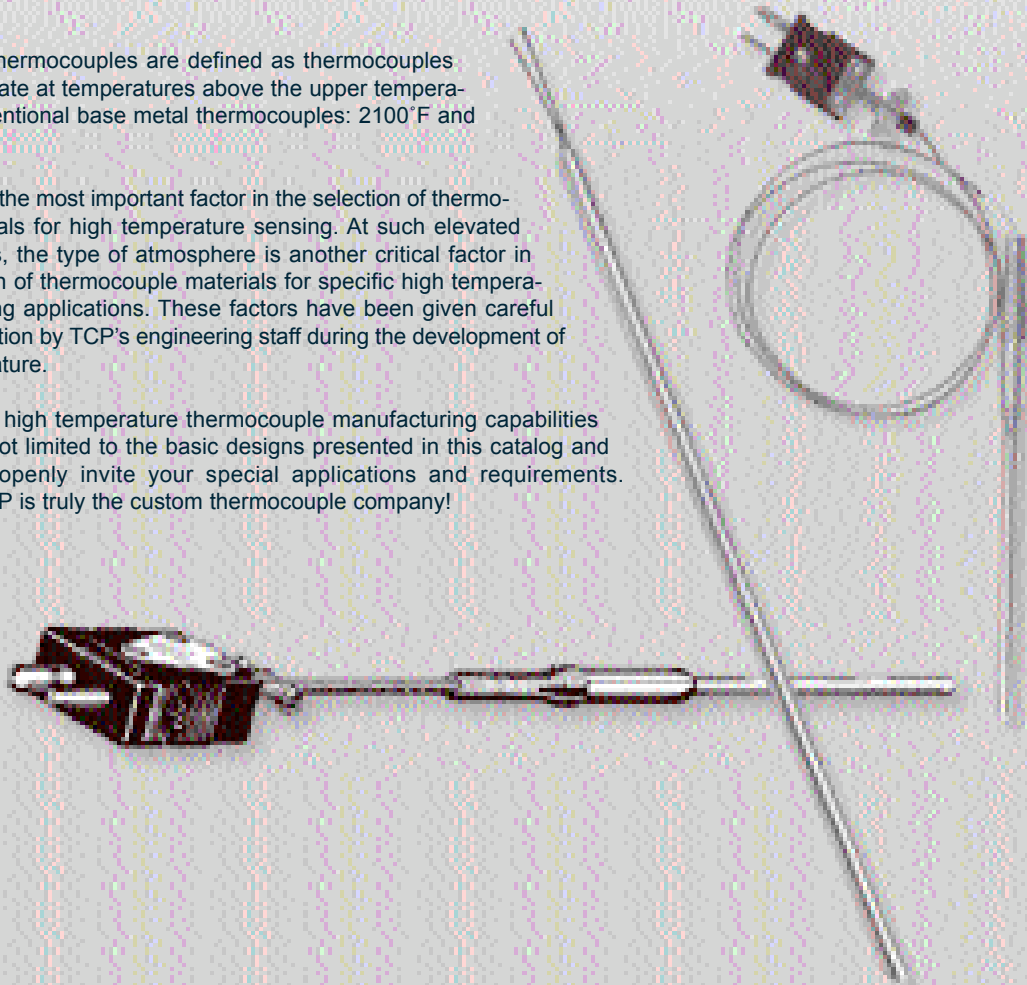


High Temperature Thermocouples

High Temperature Thermocouples are defined as thermocouples which typically operate at temperatures above the upper temperature limits of conventional base metal thermocouples: 2100°F and greater.

Temperature is the most important factor in the selection of thermocouple materials for high temperature sensing. At such elevated temperatures, the type of atmosphere is another critical factor in the selection of thermocouple materials for specific high temperature sensing applications. These factors have been given careful consideration by TCP's engineering staff during the development of this literature.

TCP's high temperature thermocouple manufacturing capabilities are not limited to the basic designs presented in this catalog and we openly invite your special applications and requirements. TCP is truly the custom thermocouple company!



Use the table below to help construct part numbers for assemblies shown on the following pages.

Thermocouple Material Combinations and Their Applications

Thermocouple Material Combinations				Maximum Temperatures Per Atmosphere			
Sheath Material	Sheath Diameter	Insulation Material	Wire Calibration.	Vacuum	Inert	Oxidizing	Reducing
Inconel 600	.062" or .125"	MgO	B, R, S	2200°F (1204°C)	2200°F (1204°C)	2200°F (1204°C)	2200°F (1204°C)
Molybdenum	.125" or .250"	MgO, AL ₂ O ₃	R, S	2700°F (1482°C)	2700°F (1482°C)	800°F (427°C)	2700°F (1482°C)
Molybdenum	.125" or .250"	MgO	B	3100°F (1705°C)	3100°F (1705°C)	800°F (427°C)	3100°F (1705°C)
Molybdenum	.125" or .250"	AL ₂ O ₃	B	2900°F (1593°C)	2900°F (1593°C)	800°F (427°C)	2900°F (1593°C)
Molybdenum	.125" or .250"	MgO	C, D	3200°F (1760°C)	3200°F (1760°C)	800°F (427°C)	3200°F (1760°C)
Molybdenum	.125" or .250"	BeO	C, D	3600°F (1982°C)	3600°F (1982°C)	800°F (427°C)	3600°F (1982°C)
Molybdenum	.125" or .250"	HfO ₂	C, D	2700°F (1482°C)	2700°F (1482°C)	800°F (427°C)	3300°F (1815°C)
Tantalum	.062" or .125"	MgO	R, S	3100°F (1705°C)	3100°F (1705°C)	800°F (427°C)	600°F (315°C)
Tantalum	.062" or .125"	MgO	B	3800°F (2093°C)	3800°F (2093°C)	800°F (427°C)	600°F (315°C)
Tantalum	.062" or .125"	BeO	C, D	3300°F (1815°C)	3300°F (1815°C)	800°F (427°C)	600°F (315°C)
Tantalum	.062" or .125"	HfO ₂	C, D	2700°F (1482°C)	2700°F (1482°C)	2700°F (1482°C)	600°F (315°C)
Aluminum Oxide	.250" or .375"	AL ₂ O ₃	R, S	2900°F (1593°C)	2900°F (1593°C)	2700°F (1482°C)	2700°F (1482°C)
Aluminum Oxide	.250" or .375"	AL ₂ O ₃	B	2900°F (1593°C)	2900°F (1593°C)	2900°F (1593°C)	2900°F (1593°C)
Aluminum Oxide	.250" or .375"	AL ₂ O ₃	C, D	2900°F (1593°C)	2900°F (1593°C)	2900°F (1593°C)	2900°F (1593°C)
Plat. 10% Rhod.	.062" or .125"	MgO	R, S	2500°F (1317°C)	2900°F (1593°C)	2900°F (1593°C)	600°F (315°C)
Plat. 10% Rhod.	.062" or .125"	MgO	B	2500°F (1317°C)	2900°F (1593°C)	2900°F (1593°C)	600°F (315°C)

NOTE:

Molybdenum and Tantalum sheaths are not recommended for use in oxidizing atmospheres.

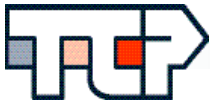
Tantalum and Plat. 10% rhodium sheaths are not recommended for use in reducing atmospheres.

Molybdenum and Aluminum Oxide sheaths are not bendable.

All Thermocouples with Type C or D wires are backfilled with inert Argon Gas to prevent oxidation.

Calibration services traceable to N.I.S.T. are available; consult factory.

Grounded junctions (W2) are not available with Aluminum oxide sheaths.



STANDARD THERMOCOUPLE

Series 300HT

- For High temperature (2100°F and Greater) Applications
- Industry Standard Color-Coded Quick Disconnect
- Very Popular and Versatile Design
- Argon Chamber Available
- Commonly Installed with Compression Fittings (Adapter) See pgs. 118 & 119



Enter a selection for each item, please fax your inquiry to TCP.

Example: 300HT- S - C - 12 - MO - W4 - INC - 10 - 0

300HT - [] - [] - [] - [] - [] - [] - [] - []

CODE	WIRE CALIBRATION
R	Plat. 13% Rhod./Plat.
S	Plat. 10% Rhod./Plat.
B	Plat. 30% Rhod./Plat. 6% Rhod.
C	Tungsten 5% Rhenium/ Tungsten 26% Rhenium
D	Tungsten 3% Rhenium/ Tungsten 25% Rhenium

Consult page 40 for available wires with respect to sheath material.

CODE	SHEATH DIAMETER
C	.062"
D	.125"
F	.250"
M	.375" (<i>AL₂O₃ only</i>)

Consult page 40 for available diameters with respect to sheath material.

IMMERSION LENGTH "L"
Specify in inches 01 to 24. For lengths over 24 inches consult factory.

CODE	INSULATION MATERIAL
AO	Aluminum Oxide (<i>AL₂O₃</i>)
BO	Beryllium Oxide (<i>BeO</i>)
HO	Hafnium Oxide (<i>HfO₂</i>)
MO	Magnesium Oxide (<i>MgO</i>)

Consult page 40 for available insulation with respect to sheath material.

CODE	OTHER PERTINENT DATA
0	NONE
999	Special Request Consult Factory

CODE	TERMINATION STYLE
10	111 Standard Plug
20	131 Mini Plug
30	109 High Temp Plugs

Code 10 - 111 Plug is standard
Code 20 - 131 Mini Plug is available in .062" and .125" sheath diameter
Consult factory for other options.

CODE	SHEATH MATERIAL
INC	Inconel 600
MOL	Molybdenum
TAL	Tantalum
ALO	Aluminum Oxide
PLT	Platinum 10% Rhodium

Consult page 40 for available sheath material with respect to calibration, diameter and insulation.

CODE	JUNCTION STYLE
W2	Grounded Rounded Tip
W4	Ungrounded Rounded Tip
W5	Exposed

Code W4 is standard

Metric Orders Welcome

Place an **mm** in the appropriate selection box:

100 mm

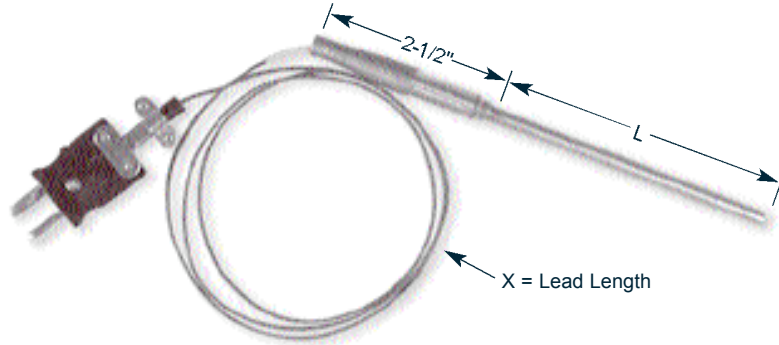
Important:

Consult page 40 for available thermocouple material combinations

TRANSITION JOINT THERMOCOUPLE

Series 400HT

- Ideal for Limited Space Applications
- For High temperature (2100°F and Greater) Applications
- Industry Standard Color-Coded Quick Disconnect or Bare Wires
- Has a Rugged, Sealed Transition
- Argon Chamber Available
- Commonly Installed with Compression Fittings (Adapter) See pgs. 118 & 119



Enter a selection for each item, please fax your inquiry to TCP.

Example:

400HT- **S** - **D** - **18** - **6** - **AO** - **W4** - **MOL** - **10** - **40** - **0**

400HT- - - - - - - - - -

CODE	WIRE CALIBRATION
R	Plat. 13% Rhod./Plat.
S	Plat. 10% Rhod./Plat.
B	Plat. 30% Rhod./Plat. 6% Rhod.
C	Tungsten 5% Rhenium/ Tungsten 26% Rhenium
D	Tungsten 3% Rhenium/ Tungsten 25% Rhenium

Consult page 40 for available wires with respect to sheath material.

CODE	SHEATH DIAMETER
C	.062"
D	.125"
F	.250"
M	.375" (<i>AL₂O₃ only</i>)

Consult page 40 for available diameters with respect to sheath material.

IMMERSION LENGTH "L"
Specify in inches 01 to 24. For lengths over 24 inches consult factory.

LEAD LENGTH "X"
Specify in whole inches. (16 in. increments standard) For length over 99 inches consult factory

CODE	INSULATION MATERIAL
AO	Aluminum Oxide (<i>AL₂O₃</i>)
BO	Beryllium Oxide (<i>BeO</i>)
HO	Hafnium Oxide (<i>HfO₂</i>)
MO	Magnesium Oxide (<i>MgO</i>)

Consult page 40 for available insulation with respect to sheath material.

Important:
Consult page 40 for available thermocouple material combinations

CODE	OTHER PERTINENT DATA
0	NONE
999	Special Request Consult Factory

CODE	TERMINATION STYLE
10	111 Standard Plug
20	131 Mini Plug
30	109 High Temp Plug
40	3" Pig Tail

Code 10 -111 Plug is standard
Consult factory for other options.

CODE	LEAD WIRE
10	Fiberglass
1S	Fiberglass w/SS Overbraid
1F	Fiberglass w/SS Flexhose
20	Teflon/Teflon
2S	Teflon/Teflon w/SS Overbraid
21 ²	Teflon w/SS Flexhose

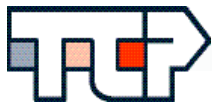
Code 10 - Fiberglass is standard

CODE	SHEATH MATERIAL
INC	Inconel 600
MOL	Molybdenum
TAL	Tantalum
ALO	Aluminum Oxide
PLT	Platinum 10% Rhodium

Consult page 40 for available sheath material with respect to calibration, diameter and insulation.

CODE	JUNCTION STYLE
W2	Grounded Rounded Tip
W4	Ungrounded Rounded Tip
W5	Exposed

Code W4 is standard



BASIC THERMOCOUPLE ELEMENT

Series 800HT

- For High Temperature (2100°F and Greater) Applications
- Bare Leads Provided for Terminations of Your Choice
- A Replacement Thermocouple Element



Enter a selection for each item, please fax your inquiry to TCP.

Example: 800HT C - F - 14 - BO - W4 - MOL - 0

800HT - [] - [] - [] - [] - [] - [] - []

CODE	WIRE CALIBRATION
R	Plat. 13% Rhod./Plat.
S	Plat. 10% Rhod./Plat.
B	Plat. 30% Rhod./Plat. 6% Rhod.
C	Tungsten 5% Rhenium/ Tungsten 26% Rhenium
D	Tungsten 3% Rhenium/ Tungsten 25% Rhenium

Consult page 40 for available wires with respect to sheath material.

CODE	SHEATH DIAMETER
C	.062"
D	.125"
F	.250"
M	.375" (<i>AL₂O₃ only</i>)

Consult page 40 for available diameters with respect to sheath material.

IMMERSION LENGTH "L"
Specify in inches 01 to 24. For lengths over 24 inches consult factory.

CODE	OTHER PERTINENT DATA
0	NONE
999	Special Request Consult Factory

CODE	SHEATH MATERIAL
INC	Inconel 600
MOL	Molybdenum
TAL	Tantalum
ALO	Aluminum Oxide
PLT	Platinum 10% Rhodium

Consult page 40 for available sheath material with respect to calibration, diameter and insulation.

CODE	JUNCTION STYLE
W2	Grounded Rounded Tip
W4	Ungrounded Rounded Tip
W5	Exposed

W4 is standard

CODE	INSULATION MATERIAL
AO	Aluminum Oxide (<i>AL₂O₃</i>)
BO	Beryllium Oxide (<i>BeO</i>)
HO	Hafnium Oxide (<i>HfO₂</i>)
MO	Magnesium Oxide (<i>MgO</i>)

Consult page 40 for available insulation with respect to sheath material.

Important:
Consult page 40 for available thermocouple material combinations

Limits of Error for High Temperature Thermocouples Ref ANSI MC96.1, ASTM E-230 AND ASTM E-988*

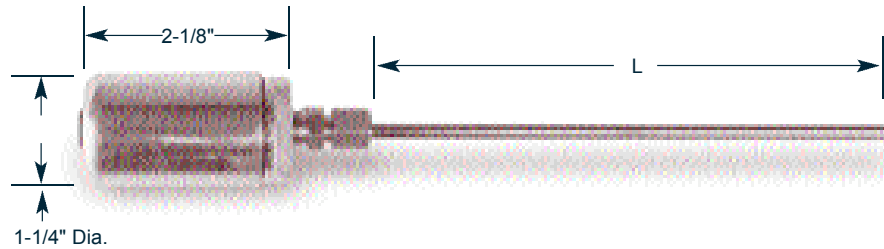
T/C Type	T/C Wires	Temp. Range	Limits of Error	
			Standard	Special
R	Platinum 13% Rhodium - Platinum	32°F to 1100°F 1100°F to 2700°F	± 2.5°F	± 1°F
			± .25%	± .1%
S	Platinum 10% Rhodium - Platinum	32°F to 1100°F 1100°F to 2700°F	± 2.5°F	± 1°F
			± .25%	± .1%
B	Platinum 30% Rhodium - Platinum 6% Rhodium	1500°F to 3100°F	± .5%	N. A.
C*	Tungsten 5% Rhenium- Tungsten 26% Rhenium	32°F to 800°F 800°F to 4200°F	± 8°F	N. A.
			± 1%	
D*	Tungsten 3% Rhenium- Tungsten 25% Rhenium	32°F to 800°F 800°F to 4200°F	± 8°F	N. A.
			± 1%	

High Temperature

MINIATURE HEAD THERMOCOUPLE

Series 900HT

- For High Temperature (2100°F and Greater) Applications
- Supplied with a Lightweight Miniature Screw-Cover Head
- Waterproof Cover Available
- Argon Chamber Available
- Commonly Installed with Compression Fittings (Adapter) See pgs. 118 & 119



Enter a selection for each item, please fax your inquiry to TCP.

Example: 900HT - - - - - - -

900HT - - - - - - - -

CODE	WIRE CALIBRATION
R	Plat. 13% Rhod./Plat.
S	Plat. 10% Rhod./Plat.
B	Plat. 30% Rhod./Plat. 6% Rhod.
C	Tungsten 5% Rhenium/ Tungsten 26% Rhenium
D	Tungsten 3% Rhenium/ Tungsten 25% Rhenium

Consult page 40 for available wires with respect to sheath material.

CODE	SHEATH DIAMETER
C	.062"
D	.125"
F	.250"
M	.375" (<i>AL₂O₃ only</i>)

Consult page 40 for available diameters with respect to sheath material.

IMMERSION LENGTH "L"
Specify in inches 01 to 24. For lengths over 24 inches consult factory.

CODE	INSULATION MATERIAL
AO	Aluminum Oxide (<i>AL₂O₃</i>)
BO	Beryllium Oxide (<i>BeO</i>)
HO	Hafnium Oxide (<i>HfO₂</i>)
MO	Magnesium Oxide (<i>MgO</i>)

Consult page 40 for available insulation with respect to sheath material.

CODE	OTHER PERTINENT DATA
0	NONE
999	Special Request Consult Factory

CODE	TERMINATION STYLE
50	Dust Cover
51	Waterproof Cover
50 Dust Cover is standard	

CODE	SHEATH MATERIAL
INC	Inconel 600
MOL	Molybdenum
TAL	Tantalum
ALO	Aluminum Oxide
PLT	Platinum 10% Rhodium

Consult page 40 for available sheath material with respect to calibration, diameter and insulation.

CODE	JUNCTION STYLE
W2	Grounded Rounded Tip
W4	Ungrounded Rounded Tip
W5	Exposed
W4 is standard	

Metric Orders Welcome

Place an **mm** in the appropriate selection box:

Important:

Consult page 40 for available thermocouple material combinations