



Up to 1700°C

High temperature thermocouples

Type S

Platinum 10 % Rhodium (+) -
Pure Platinum (-)

Normally used in oxidizing atmospheres up to 1600°C. For a long time, they were the basis of the International Practical Temperature Standard for the range 630°C - 1064°C until the introduction of the ITS90.

Type R

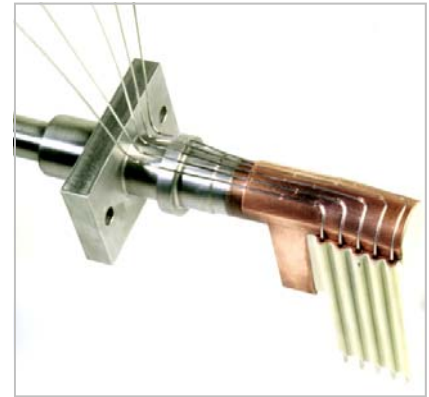
Platinum 13 % Rhodium (+) -
Platinum (-)

Similar version to type S with sensitivity between 6 and 14 µV/°C.

Type B

Platinum 30 % Rhodium (+) -
Platinum 6 % Rhodium (-)

Allows measurements up to 1700°C. Very stable thermocouple but less sensitive especially in lower range which becomes negligible at room temperature.



These noble metal thermocouples are protected by a Platinum 10% rhodium sheath and a high quality mineral power insulant and are frequently used for measuring temperatures ranging from 1000°C to 1700°C.

Type S thermocouple has been used over years as the base of the international practical temperature scale in the interval 630 – 1064°C up to the publication of the ITS90.

Pure platinum and platinum/rhodium alloys develop electromotive forces less important than common metal couples. However, they offer following advantages:

- inertia in oxidizing atmosphere,
- high melting point,
- stability of the electromotive force.

They are the only thermocouples which can be

safely used in oxidizing atmosphere over 1250°C for long periods of time.

When placed in this type of environment, these thermocouples are extremely stable as far as thermoelectricity is concerned; nevertheless, in reducing atmosphere, they are easily contaminated by metals coming from the components dissociation.

This range is standard:

- Other diameters
 - Other sheath materials
 - Other construction
- Please consult us.

Thermocouple					Sheath			
Wire Materials	Type	Mean Sensitivity µV/°C	Working Temperature °C	Code	Material	Diameter in mm		
						1.0	1.5	2.0
Platinum 10 % Rhodium (+) - Pure Platinum (-)	S	12	0 up to 1600°C	2 PRe	Re	●	●	●
Platinum 13 % Rhodium (+) - Pure Platinum (-)	R	14	0 up to 1600°C	2 PRg	Re	●	●	●
Platinum 30 % Rhodium (+) - Platinum 6 % Rhodium (-)	B	10	0 up to 1700°C	2 RdRn	Re	●	●	●

Re = Platinum Rhodium 10 % Rh

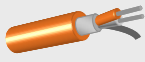



High temperature thermocouples: types S, R and B

Compensation or Extension cables

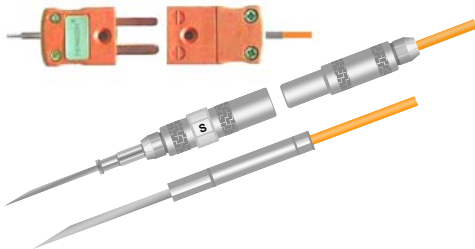
The thermocouple is connected to the measurement device by means of a compensation cable.

This cable has two cores each made of one single wire individually insulated with PVC, and one tinned copper earth wire. All three are totally screened by a flexible aluminum ribbon and again insulated by PVC. Their outer diameter is 2.5 mm.

TC Type	Wire Materials	Sheath Material	Maximum temperature	Outer Diameter 2.5 mm Code	Loop Resistance Ω/m	THERMOCOAX Identification
S R	Compensation Copper (+) Cupro-nickel(-)	PVC	100°C	2PR25	1.8	
S	Extension	Inconel® alloy 600	580°C	2PReI		
B	Prolongation Copper (+) Copper (-)		100°C	2CC25	0.56	

The prolongation cable 2CC25 also has 2 cores each made of 7 wires \varnothing 0.20 mm and it is screened by a flexible finplated copper braiding.

The polyamide sheath has an outer diameter of 2.5 mm.



Connection

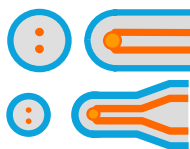
In order to ensure the faultless function of the thermocouples, the end has to be closed by means of an organic sealing compound to avoid any ingress of moisture.

As connection to the plastic

sheathed cable, transferring the measurement signal to the instrument, direct connections are used. Besides this, it is often necessary, especially when being confronted with difficult or complicated measurement problems or specifications, to develop special connections.

Hot junctions

The hot junction is the point where the two cores are joined. This therefore is the sensing part and can take a number of different forms.



TI insulated hot junction
TIS swaged insulated hot junction

Accessories

Any form of brazing or welding of a thermocouple through a wall requires some skill, and to facilitate thermocouple mounting, a range of small seal-glands have been developed and adapted for their standard THERMOCOAX dimensions.



THERMOLOK seal gland



Springloaded adaptor

Quality

Whether they are standard or manufactured to customer specifications, all THERMOCOAX products are developed with the same procedures, the same control principles, the same feed back and the same qualified personnel.

Control and tests:

- X-ray of the hot junction
- Sheath integrity test
- Metallographic test on sample
- Calibration with appropriate thermal treatment...

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