

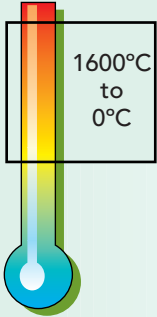
# Thermocouples in the Primary Laboratory

Thermocouples are no longer a part of the ITS-90 scale. However they are so important to industry that every Primary Laboratory should consider having a thermocouple calibration system.

Isotech offers a selection of fine thermocouples designed specifically for the Primary Laboratory.

## Standard Thermocouple

### Model 1600



The Isothermal range of Thermocouple Standards are the result of 5 years development. The type R and S standards will cover the range from 0°C to 1600°C.

The thermocouples are complete as follows:

The measuring assembly comprises a 7mm x 300mm or 600mm gas tight 99.7% recrystallized alumina sheath inside which is a 2.5mm diameter twin bore tube holding the thermocouple.

The inner 2.5mm assembly is removable since some calibration laboratories will only accept fine bore tubed thermocouples and some applications require fine bore tubing.

1.7 metres of covered noble metal thermocouple wire connect the measuring sheath to the reference sheath which is a 4.5mm x 250mm stainless steel sheath suitable for referencing in a Zeref 0°C reference system (see data book 4 page 14). Two thermo electrically free multistrand copper wires (teflon coated) connect the thermocouple to the voltage measuring device.

The thermocouple material is continuous from the hot or measuring junction to the cold, or referencing junction. The thermocouple is complete with an attractive carrying case.

#### CALIBRATION

The 1600 is supplied with a certificate giving the error between the ideal value and the actual emf of the thermocouple at the gold point. For types R and S thermocouples, manufacturing tolerances are small and, therefore, the use of a standard reference table is particularly apt. A few calibration points, only, are required to determine the (small) differences between the characteristics of an individual thermocouple and the standard reference table. As an example of consistency, 48 thermocouples calibrated at NPL, had a standard deviation of the differences from the reference table value at the gold point (11, 364µV) of only 7µV, equivalent to about 0.5°C.

Thermocouple characteristics are sufficiently smooth to allow interpolation of deviations from the reference table to be carried out over fairly wide temperature spans without introducing unacceptable errors. Isotech can offer a 4-point UKAS calibration for temperatures up to 1100°C (supplied as standard), a 6 point UKAS calibration up to 1300°C with the option of a table of millivolts to degrees Celsius in 10°C steps or, alternatively, arrange for an NPL calibration for temperatures up to 1600°C.

Please contact Isotech to obtain current prices for calibration.

Model No	1600
Hot Sheath Temperature Range	0°C to 1600°C (R or S)
Emf Vs Temperature	According to relevant document
Response Time	5 mintues
Hot Junction Dimensions	see diagram
Connecting Cable	see diagram
Cold Junction	250mm long x 4.5 diameter
Copper Extension Wires	2000mm
Immersion	100mm min.
Case Dimensions	Height 65mm Width 710mm Depth 165mm
Gross Weight	900g
Feature	Removeable inner assembly

The standard thermocouple described can be supplied in the following noble metal combinations

**TYPE R:** Platinum vs Platinum 13% Rhodium

**TYPE S:** Platinum vs Platinum 10% Rhodium

#### How to order

Model 1600 R/300

Model 1600 R/600

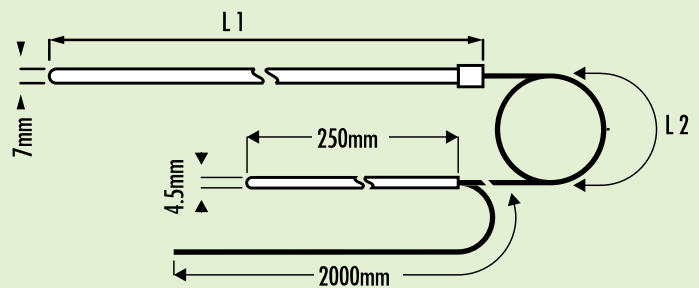
Model 1600 S/300

Model 1600 R/600

Specify either Type R or S.

UKAS calibration is included - see Databook 5

*Type R & S Standard Thermocouple, Model 1600, Premium grade wire, gas tight assembly, No intermediate junctions, Reference junctions fit into Zeref*



TYPE R & S STANDARD THERMOCOUPLE	CODE	L 1	L 2
	/600	600	1150mm
	/300	300	1450mm