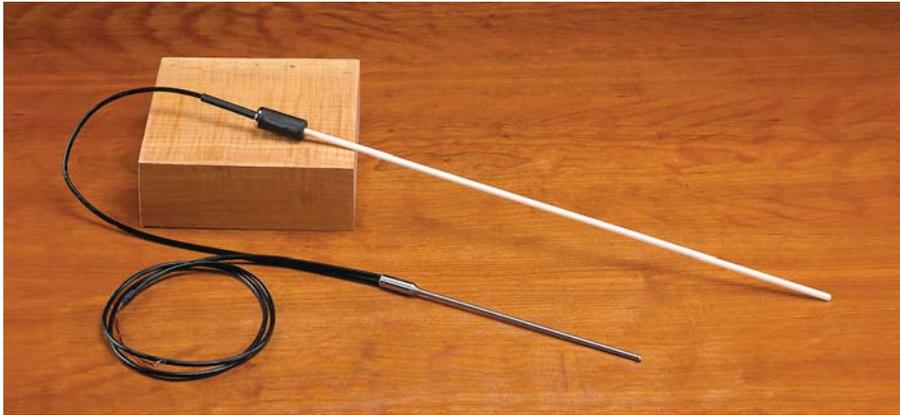


# Type R and S Thermocouple Standards



- Designed by Hart's primary standards design team
- Two sizes available, each with or without reference junction
- Calibration uncertainty of  $\pm 0.5^\circ\text{C}$  to  $1100^\circ\text{C}$ ,  $\pm 3^\circ\text{C}$  to  $1450^\circ\text{C}$

Made from the finest platinum and platinum-rhodium alloy, the Type R and Type S Thermocouples cover a temperature range of  $0^\circ\text{C}$  to  $1450^\circ\text{C}$  with uncertainties as good as  $0.15^\circ\text{C}$  over most of that range. With four different models for each type, we have the thermocouple to fit your application.

The measuring junction of both the 5649 and the 5650 is encased in a 0.25-inch (6.35 mm) alumina sheath that can be ordered in lengths of 20 or 25 inches (50.8 or 63.5 cm) to fit the specific requirements of your application. A reference, or "cold," junction may also be ordered. The reference junction uses a stainless steel sheath and is 8.25 inches long (21 cm) by 0.188 inches in diameter (4.8 mm). The thin diameter minimizes the immersion depth needed, but the extra length ensures you can get all the immersion you like.

Special tin-plated, solid-copper connecting wires with ultra-low EMF properties are used to help retain the integrity of your measurement junction where the probe attaches to your micro voltmeter or Hart *Black Stack*.

Each probe comes from a spool of wire that has been sample tested using fixed-point standards to ensure uncertainties less than  $0.5^\circ\text{C}$  up to  $1100^\circ\text{C}$ . From  $1100^\circ\text{C}$  to  $1450^\circ\text{C}$ , the uncertainty increases linearly to  $3.0^\circ\text{C}$ . If you need greater accuracy, order an individual calibration with fixed-point standards to reduce uncertainties to  $\pm 0.15^\circ\text{C}$  up to  $962^\circ\text{C}$ ,  $\pm 0.25^\circ\text{C}$  up to  $1100^\circ\text{C}$ , and increasing linearly to  $\pm 2.0^\circ\text{C}$  at  $1450^\circ\text{C}$ .

The probe assembly can be easily disassembled for performing your own bare-wire calibrations.



## Specifications

<b>Range</b>	$0^\circ\text{C}$ to $1450^\circ\text{C}$
<b>Type</b>	Platinum/13 %Rhodium vs. platinum (type R) Platinum/10 %Rhodium vs. platinum (type S)
<b>Calibration</b>	Wire spool sampling method by fixed point (optionally available by fixed point for individual thermocouples)
<b>Calibration Uncertainty (k=2)</b>	$\pm 0.5^\circ\text{C}$ to $1100^\circ\text{C}$ $\pm 3.0^\circ\text{C}$ to $1450^\circ\text{C}$
<b>Hot Junction Sheath Dimensions</b>	6.35 mm (0.25 in) diameter; see Ordering Information for lengths
<b>Reference Junction Sheath Dimensions</b>	4.8 mm dia. x 210 mm long (0.188 x 8.25 in)
<b>Long-Term Stability</b>	$\pm 0.5^\circ\text{C}$ to $1100^\circ\text{C}$ $\pm 2.0^\circ\text{C}$ to $1450^\circ\text{C}$ (over one year depending on usage)
<b>Short-Term Stabilities</b>	$\pm 0.2^\circ\text{C}$ to $1100^\circ\text{C}$ $\pm 0.6^\circ\text{C}$ to $1450^\circ\text{C}$
<b>Immersion</b>	At least 152 mm (6 in) recommended
<b>Protective Case</b>	Model 2609 case included
<b>Weight</b>	1 kg (2 lb.)

## Ordering Information

<b>5649-20-X</b>	Type R TC, 508 mm (20 in)
<b>5649-20CX</b>	Type R TC, 508 mm (20 in), with reference junction
<b>5649-25-X</b>	Type R TC, 635 mm (25 in)
<b>5649-25CX</b>	Type R TC, 635 mm (25 in), with reference junction
<b>5650-20-X</b>	Type S TC, 508 mm (20 in)
<b>5650-20CX</b>	Type S TC, 508 mm (20 in), with reference junction
<b>5650-25-X</b>	Type S TC, 635 mm (25 in)
<b>5650-25CX</b>	Type S TC, 635 mm (25 in), with reference junction

X = termination. Specify "B" (bare wire), "W" (generic copper-to-copper TC connector), or "R" (standard Type R/S TC connector). Models with reference junctions should not specify "R" and models without reference junctions should not specify "W".

**1918-B** Four-point calibration by fixed point (Sn, Zn, Al, Ag). Extrapolated to  $1450^\circ\text{C}$ .

Note: Calibration uncertainty for individually calibrated 5650s by fixed point is  $\pm 0.25^\circ\text{C}$  below  $1100^\circ\text{C}$  and  $\pm 2.0^\circ\text{C}$  above  $1100^\circ\text{C}$ . 2609 case included with new models.

**2609** Spare Case (for 635 mm [25 in] long TC)