Secondary Reference Thermistor Probes

- Short-term accuracy to ± 0.01 °C; one-year drift < ± 0.01 °C
- Accredited NVLAP calibration optional
- Flexible Teflon and silicone coated fast-response models
- Rugged polished stainless steel sheaths

Hundreds of thousands of thermistors are sold every year, but only a few have the stability necessary for use as high-accuracy thermometry standards. If you're looking for economical lab-grade thermistor probes for accurate work across a narrow temperature range, Hart's Secondary Reference Series thermistor probes are the best you can buy.

These thermistors are available in a variety of sheath materials appropriate for your specific application. In addition to our metal-sheathed probes, we offer flexible Teflon encapsulated and silicone coated thermistors that have smaller tips and can measure those places where even a metal-sheathed thermistor can't reach.

Teflon encapsulated thermistor

The 5611T is an especially versatile Teflon coated thermistor probe. With a Teflon encapsulated tip that is just 3 mm (0.12 in) in diameter and a Teflon coating that makes it impervious to most liquids, the Teflon Probe is handy for measuring in a wide variety of applications, including bio-pharmaceuticals. It's even immersible to nearly 20 feet and flexible enough that you could roll it up into a ball in your hand if you wanted to!

The 5611T's thermistor bead is encapsulated in a Mylar sleeve that is encapsulated inside a Teflon sleeve. The Teflon sleeve is then melted around the Teflon-insulated cable, forming a moisture-proof seal.

Stainless steel sheathed thermistors

Our stainless steel metal-sheath probes include our 5610-6 and 5610-9 immersion probes, as well as our 5665 fully immersible probe. These probes are great for measuring in air, liquid or soil.

Silicone coated thermistor

With a diameter at the tip of just 1.5 mm (0.06 in), the 5611A's tip has the smallest diameter of any of our secondary reference thermistors and can fit nearly anywhere. Its faster response time, flexible sheath, and silicone coating make the 5611A great for use in many applications. However, applications involving silicone oil could damage the thermistor and should be avoided.

Higher performance

All of Hart's secondary reference thermistors have small diameters and very small sensing elements, which means they require far less immersion than a PRT to avoid errors caused by stem effect. Self heating is usually negligible, giving them an advantage when taking measurements in air. Their small size also improves response time, allowing measurements to be taken more quickly.

If your application involves frequent handling, you'll be especially interested to know thermistors are less susceptible to mechanical shock than PRTs. The bottom line may be better accuracy in fieldwork.

Additionally, higher base resistance and larger resistance coefficients make it easier to achieve precision readings with thermistors, so better resolution and accuracy are possible for a lower cost. All of these thermistors have a negative temperature coefficient of resistance (NTC). For additional information about thermistors, please see "Thermistors: the under-appreciated temperature standards" on page 76.)

Readouts

These probes come in a complete assembly ready for use, and each works well with the uncertainties of our thermometer readouts: the 1504 Tweener, the 1521 and 1522 Handheld Thermometers, the 1529 Chub-E4, the 1560 *Black Stack,* and the 1575A and 1590 Super-Thermometers.

These probes provide most accurate readings when coupled with a 2563 Standards Thermistor Module or 1590 Super-Thermometer, but they are most portable when used with a 1521 Little Lord Kelvin.

Calibrated accuracy

What's more, the Secondary Reference Series Thermistors are accurate to ± 0.01 °C and cover the temperature range of 0 °C to 100 °C. They come with a NIST-traceable calibration and a resistance-versus-temperature table printed in 0.1 °C increments that can be interpolated to 0.0001 °C. NVLAP accredited calibrations as single thermistors or as systems combined with their readouts, are also available.

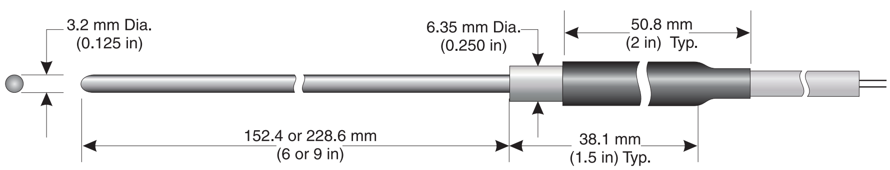
No other sensors can match the accuracy and price combination of these high-accuracy thermistor probes. Try one and you'll agree.

Secondary Reference Thermistor Probes

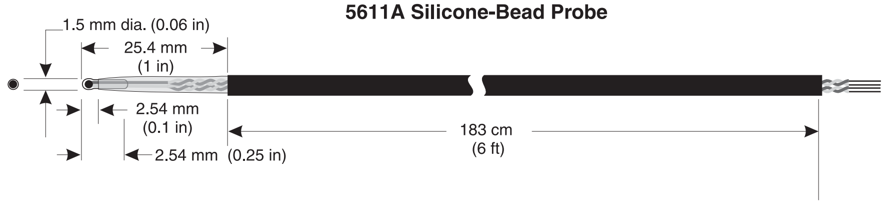
Specifications

Resistance	Nominal 10,000Ω at 25 °C
Range	0 °C to 100 °C
Calibration	R vs. T table with 0.1 °C increments, interpolation equation furnished
Calibration Uncertainty	Table and equation are accurate to ±0.01 °C
Drift	Better than ±0.01 °C per year
Repeatability	Better than ±0.005 °C
Size and Construction	See illustrations below.
Termination	Specify when ordering.

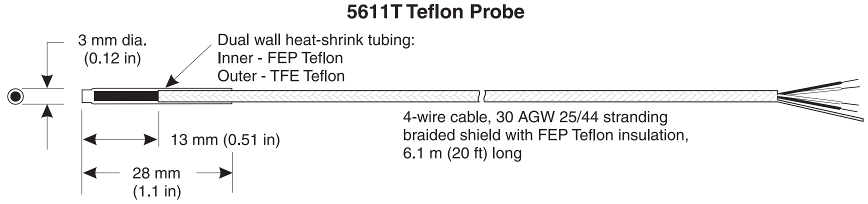
5610 Stainless Steel Immersion Probe



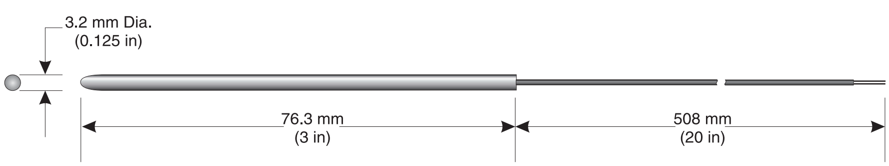
5611A Silicone-Bead Probe



5611T Teflon Probe



5665 Stainless Steel Miniature Immersion Probe



Ordering Information

5610-6-X	152 mm (6 in) Immersion Probe
5610-9-X	229 mm (9 in) Immersion Probe
5611A-11X	Silicone-Bead Probe
5611T-X	Teflon Probe
5665-X	Miniature Immersion Probe
1925-A	Calibration, 100 ° span, 6 points over span, NVLAP-accredited
1935-A	System calibration, 100 ° span, 6 points over span, NVLAP-accredited
2601	Probe Carrying Case

X = termination. Specify "B" (bare wire), "D" (5-pin DIN for Tweener Thermometers), "G" (gold pins), "I" (INFO-CON for 1521 or 1522 Handheld Thermometers), "J" (banana plugs), "L" (mini spade lugs), "M" (mini banana plugs), or "S" (spade lugs).

Handle your probe correctly

Good thermometer handling procedures help maintain calibration accuracy. Here are a few pointers.

Don't

- Don't subject a PRT to physical shock or vibration.
- Don't bend a probe that is not designed for bending.
- Don't subject a thermometer to sudden extreme temperature changes.
- Don't install compression fittings on a probe sheath.
- Don't subject a thermometer to temperatures outside its range.
- Don't subject a thermometer's transition junction, handle, or lead wires to temperatures outside their ranges (which likely differ from the thermometer's range).
- Don't immerse the probe past the bottom of its handle.

Do

- Do immerse a probe to at least its minimum immersion depth.
- Do allow the thermometer time to stabilize before taking readings.
- Do use the proper current to prevent self-heating errors.
- Do check your probe's R_{TPW} value frequently.
- Do test the shunt resistance of your probe periodically. (Shunt resistance is the resistance between the probe sensor and the probe sheath.)