Secondary Reference Temperature Standards

- Affordable wide-range accuracy
- Excellent stability
- Reference-grade platinum sensing element
- NVLAP-accredited calibration included, lab code 200706-0

For years, you've relied on our 5612, 5613, and 5614 Secondary Reference Probes. These field-durable, lab-accurate PRTs have been replaced by the 5615, which comes with a NVLAP accredited calibration.

The 5615-12 is a Platinum Resistance Thermometer (PRT) with an Inconel™ 600 sheath that's 305 mm (12 in) long and 6.35 mm (0.250 in) in diameter. It is a secondary reference temperature standard designed to bridge the gap between the highest laboratory standards and industrial or second-tier lab locations. It has short-term accuracy of ±0.013 °C at 0.01 °C.

The element is constructed of reference-grade platinum wire (99.999 % pure) for excellent stability. The wire is wound in a coil and placed in a mandrel where it's uniformly supported in a manner that virtually eliminates hysteresis. The electrical configuration is a four-wire current-potential hookup that eliminate the effects of lead-wire resistance.

These Inconel™-sheathed probes have a fully supported sensing element, making them more durable than SPRTs. The element is protected in an ultrahigh-purity ceramic case with a hermetic glass seal to improve output stability by locking out moisture and contaminants.

This probe comes calibrated with ITS-90 coefficients, making it compatible with many excellent readout devices, including Hart's 1529 Chub-E4, 1560 *Black Stack,* and 1502A Tweener. It bridges the gap between a 100-ohm industrial RTD and an SPRT.

For those needing faster thermal response, or where diameter and immersion depth are problems, order the 5615-9 or 5615-6. These probes are excellent reference probes for comparison calibrations in a Hart dry-well. The sheaths of the 5615-6 and 5615-9 are 4.76 mm (0.188 in) in diameter.

A printout of sensor resistance is provided in 1 °C increments for each probe. The 5615-9 and 5615-12 are calibrated from −196 °C to 420 °C. The 5615-6 is calibrated to 300 °C.

We've tested many of the probes on the market. We've used them in our manufacturing facility and tested them in the lab, and this is an excellent secondary standards PRT. Other instruments on the market are priced much higher, have lower stability, or are of lower quality. Remember, these are reliable instruments and each probe comes with its own individual NVLAP-accredited calibration, lab code 200706-0.

Ordering Information

5615-6-X	Secondary Standard PRT, 4.76 mm x 152 mm (0.188 x 6.0 in), −200 °C to 300 °C
5615-9-X	Secondary Standard PRT, 4.76 mm x 229 mm (0.188 x 9.0 in), −200 °C to 420 °C
5615-12-X	Secondary Standard PRT, 6.35 mm x 305 mm (0.250 x 12.0 in), −200 °C to 420 °C
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).

Secondary Reference Temperature Standards

Specifications

Temperature range	5615-12 and 5615-9: –200 °C to 420 °C 5615-6: –200 °C to 300 °C
Nominal resistance at 0 °C	100 Ω ± 0.10 Ω
Temperature coefficient	0.0039250 Ω/Ω/°C
Accuracy[1]	See footnote
Short-term repeatability[2]	±0.013 °C at 0.010 °C
Drift[3]	±0.01 °C at 0.010 °C
Sensor length	28 mm (1.1 in)
Sensor location	6.9 mm ± 3.3 mm from tip (0.27 in ± 0.13 in)
Sheath diameter tolerance	±0.127 mm (±0.005 in)
Sheath material	Inconel™ 600
Minimum insulation resistance	1000 MΩ at 23 °C
Transition junction temperature range[4]	–50 °C to 200 °C
Transition junction dimensions	71 mm x 13 mm dia (2.8 in x 0.5 in)
Maximum immersion length	5615-6: 102 mm (4 in) 5615-9: 178 mm (7 in) 5615-12: 254 mm (10 in)
Response time[5]	9 seconds typical
Self heating (in 0 °C bath)	50 mW/°C
Lead-wire cable type	Teflon™ insulated with Teflon™ jacket, 22 AWG
Lead-wire length	183 cm (72 in)
Lead-wire temperature range	–50 °C to 200 °C
Calibration	NVLAP-accredited calibration included, lab code 200706-0. Please see calibration uncertainty table and its explanation of changeable uncertainties.

[1]"Accuracy" is a difficult term when used to describe a resistance thermometer. The simplest way to derive "accuracy" is to combine the probe drift specification and calibration uncertainty with readout accuracy at a given temperature.
[2]Three thermal cycles from min to max temp, includes hysteresis, 99.9 % confidence
[3]After 100 hrs at max temp, 99.9 % confidence
[4]Temperatures outside this range will cause irreparable damage. For best performance, transition junction should not be too hot to touch.
[5]Per ASTM E 644

NVLAP† Calibration Uncertainty

Temperature	Expanded Uncertainty (k=2)
–196 °C	0.024 °C
–38 °C	0.011 °C
0 °C	0.010 °C
200 °C	0.018 °C
420 °C‡	0.029 °C

Note: Calibration uncertainties depend on the uncertainties of the lab performing the calibration. Subsequent calibrations of this probe performed with different processes, at different facilities, or with changed uncertainty statements may state different uncertainties.
†Lab code 200706-0
‡5615-6 excluded

Interim checks save trouble later

You spend good money getting your reference standards calibrated. How can you be sure that they continue to measure accurately prior to their next calibration? One way is to periodically compare them to other reference standards with higher accuracy. Such a test is called an interim check.

An interim check that most of us are familiar with is the use of a water triple point cell to check the stability of a PRT. The ISO 17025 suggests the use of interim checks as a quality safeguard. Do this regularly, keep good records, and you may improve your accuracy by more than a factor of 10. And if you find a problem, you'll be glad you found it sooner rather than later!