






Reference Probes

Model	Probe Range:	Transition Junction Range	Size	Basic Accuracy *	Minimum Immersion Depth	Calibration
Secondary Reference PRT						
	5615-6	-200 °C to 300 °C	-50 °C to 200 °C	152 mm x 4.76 mm (6.0 in x 0.188 in)	± 0.013 °C at 0.010 °C	100 mm (4.0 in) 17025 calibration included
	5615-9	-200 °C to 420 °C	-50 °C to 200 °C	229 mm x 4.76 mm (9.0 in x 0.188 in)	± 0.013 °C at 0.010 °C	100 mm (4.0 in) 17025 calibration included
	5615-12	-200 °C to 420 °C	-50 °C to 200 °C	305 mm x 6.35 mm (12.0 in x 0.250 in)	± 0.013 °C at 0.010 °C	127 mm (5.0 in) 17025 calibration included
Precision Industrial PRT						
	5627A-6	-200 °C to 300 °C	0 °C to 150 °C	152 mm x 4.7 mm (6.0 in x 0.187 in)	± 0.05 °C at 0 °C	100 mm (4.0 in) 17025 calibration included
	5627A-9	-200 °C to 300 °C	0 °C to 150 °C	229 mm x 4.7 mm (9.0 in x 0.187 in)	± 0.05 °C at 0 °C	100 mm (4.0 in) 17025 calibration included
	5627A-12	-200 °C to 420 °C	0 °C to 150 °C	305 mm x 6.35 mm (12.0 in x 0.250 in)	± 0.05 °C at 0 °C	127 mm (5.0 in) 17025 calibration included
Secondary Standard PRT						
	5628	-200 °C to 661 °C	0 °C to 80 °C	305 or 381 mm x 6.35 mm (12.0 or 15.0 in x 0.250 in)	± 0.006 °C at 0 °C	127 mm (5.0 in) 17025 calibration included
Full Immersion PRT						
	5606	-200 °C to 160 °C	-200 °C to 160 °C	50 mm x 3.1 mm (2.0 in x .0125 in)	± 0.05 °C	76 mm (3.0 in) No calibration included Optional 17025 calibration: 1924-4-10
Thermistor Secondary Probe						
	5610	0 °C to 100 °C	0 °C to 100 °C	152 or 229 mm x 3.2 mm (6.0 or 9.0 in x 0.125 in)	± 0.01 °C	76 mm (3.0 in) NIST traceable calibration included Optional 17025 calibration: 1925-A

* "Basic Accuracy" - Includes calibration uncertainty and short-term repeatability. It does not include long-term drift.

Five of the most common industrial probes were selected for easy reference, though additional probes are available through distribution. For additional information on any Fluke probes, please refer to the data sheets or contact Fluke.

Combined accuracies can be found for most thermometer selections on pages 5-97 of the "Industrial temperature readout and probe selection guide" (Fluke Pub ID 13281-eng Rev 01) or by using the formula presented on the backside of this card.

Anatomy of a PRT Model Name:

Most Fluke Calibration models have 3 sections indicating the model name, probe length in inches, and termination.

Example:

5615-12-P

Model - Length - Termination

5615 - 12 - P (infocon connector)

Selecting the temperature probe (PRTs):

- ◇ Select a reference probe that covers the full **temperature range** of the sensor application.
- ◇ Make sure the **length** is sufficient for accurate measurement for the application
 - **Drywell:** The PRT should be long enough to reach the bottom of the dry-well
 - **Bath:** Bottom of probe should be in line with the sensing element of the unit under test
- ◇ Consider the **diameter**
 - **Minimum immersion depth** is determined by the diameter of the selected probe and the length of its internal sensing element.
 - A general rule is the **minimum probe immersion** needs to be 20 times the probe diameter plus the sensor length.

Safety considerations for user and probe

- The transition junction is located inside the probe handle base where the probe connects to the cable and can be damaged by extreme temperatures.
- Exposing the probe handle to extreme temperatures poses safety concerns for the user, since it may be too hot or cold to touch without safety gear.
- If high temperatures in the transition junction cause the insulation resistance to decrease below 100 MΩ, the performance of the probe might also decrease.

Example:

5615-12 Full Range: -200 °C to 420 °C.

5615-12 transition junction range: -50 °C to 200 °C

• This means the probe is able to operate from -200 °C to 420 °C and needs to be long enough to keep the transition from reaching temperatures in excess of -50 °C to 200 °C

$$b_{total} = \sqrt{(b_1)^2 + (b_2)^2 + (b_3)^2}$$

$$b_{total} = \sqrt{(ref)^2 + (stability)^2 + (uniformity)^2}$$

$$\pm 0.113^{\circ}C = \sqrt{(\pm 0.05^{\circ}C)^2 + (\pm 0.1^{\circ}C)^2 + (\pm 0.02^{\circ}C)^2}$$

Determining the combined accuracy of a probe and readout:

To ensure we are meeting the customer's accuracy requirements, we need to combine the specs of the probe and the readout it will be used with. Many of these calculations have been done for you and can be found on the battle cards for each readout. The formula to the left can be used to determine any combined accuracy not already published.

Model	Description	Channels	Termination
1502A/1504	Tweener	1	D
1523/1524	Reference Thermometer	1/2	P
1529	Chub E-4	4	L
1586A w/ Card	Super-Daq	20/40	B
1586A w/ Multiplexer	Super-Daq	20/40	L
9142-P, 9143-P, 9144-P	Field Metrology Well	1	A
9170-R, 9171-R, 9172-R, 9173-R	Metrology Well	1	D
9190-p	Ultra-Cool Metrology Well	1	A

Photo	Type	Description
	A	INFO-CON for 914X
	B	Bare wire
	D	5-pin DIN for Tweener or 917X
	G	Gold pins
	I	INFO-CON for 1521 or 1522
	J	Banana plugs
	L	Mini spade lugs
	M	Mini banana plugs
	P	INFO-CON for 1523 or 1524
	S	Spade lugs

FULL IMMERSION PROBES—5606 & 5623

PRTs are typically not designed to have the transition and cabling fully immersed. While the effects may not be immediate, exposure over time can cause condensation to develop internally which will reduce the reliability and life of the probe. There are specially designed full-immersion probes that can solve the problems of immersion depth and withstand harsh temperatures without compromising the probe or test results.

