NOVA-TECH INTERNATIONAL
OAKTON®
800 Rockmead Dr Ste 102 • Houston, TX 77339-2496
Tel: (281) 359-8538 • Toll Free Tel: (866) 433-6682
Fax: (281) 359-0084 • Toll Free Fax: (866) 433-6684
sales@novatech-usa.com • www.novatech-usa.com

RTD Selection Guide

What is an RTD?

RTD stands for Resistance Temperature Detector. This is the sensing technology that determines temperature by measuring the change in electrical resistance across two metal wires. The resistance value is then measured and interpreted by a RTD thermometer, and displayed for a user to view. While RTD wire can be made of any metal, platinum is the metal of choice due to its excellent repeatability, stability, and resistance to corrosion and chemicals.

The temperature to resistance curve varies for different RTD elements. All Oakton RTD probes have an Alpha coefficient of 0.003850 Ω/Ω/°C (DIN IEC 751). Resistance at ice point (0°C) is 100 Ω. This curve is well documented and so ensures cross-compatibility between Oakton RTD thermometers and probes and those made by other thermometry suppliers.

Why choose an RTD?

RTDs are more accurate and stable than other sensors, such as thermocouples, but they cannot be used to measure extremely high temperatures. Choose an RTD sensor if you are willing to pay a little more for increased accuracy and repeatability.

Conversely, RTDs have a wider temperature range compared to thermistor probes but lower overall system accuracy. When your expected measurements require a balance between range and accuracy, RTDs are the best choice.

The table at right shows the general trade-offs.

Time constants and temperature response

Temperature probe response is often stated as time constant. By definition, a probe reaches 63% of its final value within one time constant. Within five time constants, the probe will reach 99% of final reading. The time constant or response depends on a number of factors including junction design, sheath materials, and type of sensing element.

System Accuracies—RTD vs Thermistor and Thermocouple

Instrument	Recommended temperature range	Widest possible temperature range	Typical accuracies
Platinum RTD			
Probes	–297 to 932°F (–182 to 500°C)	—	±0.2 to 0.35% of reading
Meters	—	—	±0.1% of reading and ±1°F (±1°C)
Thermistor			
400-series probes	–40 to 302°F (–40 to 150°C)	—	±0.36°F (±0.2°C) from 32 to 167°F (0 to 75°C)
Meters	—	—	±0.2 to 0.4°F (±0.1 to 0.2°C)
Thermocouple			
Type J probes	32 to 1336°F (0 to 724°C)	–310 to 1832°F (–190 to 1000°C)	±1.8 to 7.9°F or ±0.4% of reading above 32°F, whichever is greater
Type K probes	32 to 2300°F (0 to 1260°C)	–418 to 2507°F (–250 to 1375°C)	
Type T probes	–299 to 700°F (–183 to 371°C)	–418 to 752°F (–250 to 400°C)	±0.9 to 3.6°F or ±0.4% of reading above 32°F, whichever is greater
Type E probes	32 to 1600°F (0 to 871°C)	32 to 1650°F (0 to 898°C)	±1.8 to 7.9°F or ±0.4% of reading above 32°F, whichever is greater
Meters	—	—	±0.1 to 1% of reading and ±1.8°F (±1°C)

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WD-17002-04 NIST-traceable certificate for RTD system (meter + probe)
WD-17000-04 NIST-traceable certificate for RTD meter
WD-17001-04 NIST-traceable certificate for RTD probe
Service includes test data calibrated at four temperature test points.

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Acorn® Temp 6 RTD Thermometer

Our simplest RTD thermometer

Standard mini-three-pin connector
▼ Accepts a variety of 100 Ω Pt 100 probes

All push-button operation
▼ For fast, easy use

Compact size
▼ Fits right in your pocket—take your Oakton Temp meter anywhere!

°C/°F selectable

Minimum and maximum temperature display
▼ Displays highest/lowest temperature since meter was switched on, or use Min/Max Hold Mode to continuously update lowest/highest temperature

Temperature offset calibration adjustment
▼ Push-button adjustment for fine-tuning factory calibration

Hold function
▼ Freezes measurements for convenient reading and recording

Auto-off function
▼ Turns off meter after 17 minutes of nonuse to save batteries

Optional rubber armor
▼ Protects meter and features a built-in stand

Rubber armor features built-in stand

Applications
General: Ideal for any application that requires measuring/monitoring the temperature of any liquid, solid, semisolid, or gel.
Industrial: Use in photo developing, chemical, and plating industries.

Select a probe to match your application
See page 18 to see our wide selection of probes.

Specifications
Range: –418 to 2501°F (–250 to 1372°C)
Resolution: 0.1°F/C from –99.9 to 299.9°F/C; 1°F/C outside this range
Accuracy: ±0.25% of reading plus 0.9°F (0.5°C) above –99.9°F/C, ±0.25% of reading plus 2°F (1°C) below –99.9°F/C
Display: single-line LCD, ⅞" high
Power: four AAA batteries (included), for >200 hours continuous use
Probe: one 100 Ω platinum RTD with mini-three-pin DIN connector (not included)
Dimensions: 5.5" x 2.7" x 1.3" (14 x 7 x 3.5 cm)
Weight: 0.9 lb (0.4 kg)

Ordering Information

ISO 9001:2000 CERTIFIED SUPPLIER CE 3 year warranty

Catalog number	Description	Included
WD-35626-20	Acorn Temp 6	Meter, rubber armor, and batteries
WD-85000-02	Certified meter kit	Meter, general-purpose probe (08117-70), NIST-traceable certification, rubber armor, and batteries

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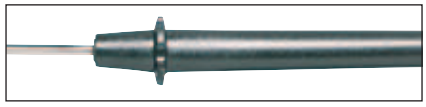
RTD Probes

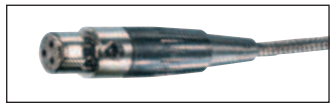
Provide excellent accuracy, stability, and repeatability

Use our RTD probes to measure temperature when accuracy is important. All probes include a 5-ft PVC coiled cord with strain relief that protects from repeated flexing and tugging. Ergonomic, easy-grip 5" long glass-filled nylon handle provides maximum heat insulation and impact resistance. Fingerstops on handle prevent probe from rolling and fingers from sliding when inserting probe into hard materials.

The 316 stainless steel sheath (tip casing) provides durability, strength, and maximum abrasion resistance. Rugged three-pin circular connector with positive-locking tab prevents loose connections. Compatible with all Oakton and Acorn® RTD thermometers.



Nylon handle



Three-pin connector

A General-Purpose: Designed for most common and liquid immersion applications.

B Penetration: Pointed tip style for penetration into hard and semi-solid materials. Sturdy stainless steel tip casing prevents tip from bending when inserting.

C Surface: Flat sensor wires are encased in hardened MgO ceramic insulation to ensure positive contact even under vibrating circumstances and extreme conditions.

D Air/Gas: Perforated shield allows air and other gases to flow into sensor for quick readings. Metal shield also absorbs radiated heat and minimizes sensor error.

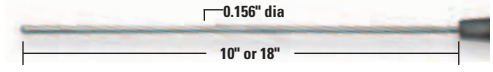
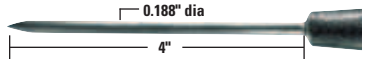
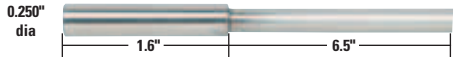
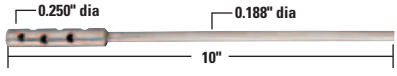
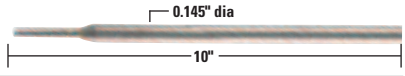
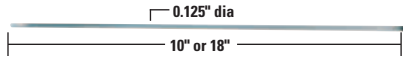
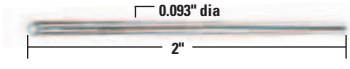
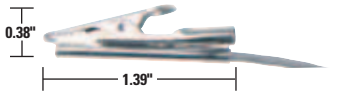
E FEP-Coated: Same as our general-purpose tip, but this tip has a FEP coating over the tip casing for use with acids and strong chemicals.

F Small Diameter: Same as our general-purpose tip, but this probe has a ⅛" diameter tip for insertion into soft and semisoft materials.

G Smallest Diameter Wedge: Small diameter angled tip with point can be wedged into tight areas and minimizes damage to samples.

H Alligator Clip: Clips onto objects up to ⅜" thick. The 10-ft, 304 stainless steel flexible braid over fiberglass cable has no handle.

Specifications & Ordering Information

Key	Catalog number	Temperature range	Tip length	Dimensions
A	WD-08117-70 WD-08117-72	–58 to 932°F (–50 to 500°C)	10" 18"	
B	WD-08117-85	–58 to 932°F (–50 to 500°C)	4"	
C	WD-08117-75	–58 to 932°F (–50 to 500°C)	8"	
D	WD-08117-90	–58 to 932°F (–50 to 500°C)	10"	
E	WD-08117-87	–50 to 500°F (–50 to 260°C)	10"	
F	WD-08117-73 WD-08117-74	–58 to 932°F (–50 to 500°C)	10" 18"	
G	WD-08117-80	–58 to 932°F (–50 to 500°C)	2"	
H	WD-08117-89	–58 to 932°F (–50 to 500°C)	1.5"	

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NIST TRACEABLE