

Series 200 and 300

Testing

100% Tested:

Accuracy at 0°C and insulation resistance at ambient temperature and humidity.

Verification Testing:

200 Series:

For accuracy at 0°, 200° and 420°C.

Insulation resistance at 20°C for 30 days at 100% relative humidity.

Repeatability after 10 cycles between -200°C and 500°C.

Long term stability after 1000 hours at 400°C.

Vibration resistance per ASTM procedure E644 to qualification level parameters.

300 Series:

For accuracy at 0°, 100° and 200°C.

Insulation resistance at 20°C for 30 days at 100% relative humidity.

Repeatability after 10 cycles between -50° and 200°C.

Vibration resistance per ASTM procedure E644 to qualification level parameters.

Qualification Testing:

Short Term Repeatability:

Less than $\pm 0.04\%$ change in ice point resistance after 10 consecutive cycles between the minimum and maximum temperature for each series.

Long Term Stability:

Ice point resistance shift after 1000 hours at the maximum temperature for the series.

Series 200: Less than $\pm 0.05\%$ ($\pm 0.13^\circ\text{C}$)

Series 300: Less than $\pm 0.10\%$ ($\pm 0.26^\circ\text{C}$)

Long Term Temperature Cycling:

Less than $\pm 0.1\%$ ($\pm 0.25^\circ\text{C}$) change in ice point resistance after 1000 cycles from 20 to the maximum temperature for each series.

Vibration Resistance:

Series 200:

Less than $\pm 0.03\%$ ($\pm 0.075^\circ\text{C}$) ice point shift for 30 minutes at 21g peak vibration; 5-350 Hz continuous sweep, at 20°C for unsupported stem lengths of 5-1/2 inches or less.

Series 300:

For all 1/4" standard sheath diameter RTDs; less than $\pm 0.03\%$ (0.075°C) ice point shift for 30 minutes at 21g peak vibration; 5 - 350 Hz continuous sweep, at 20°C for unsupported stem lengths of 5 1/2" or less. The g level was ramped from 1 to 21g's over the 5 to 30 Hz range.

Mechanical Durability Test: 300 Series

This test ("slapper test") was developed by Burns Engineering to simulate industrial environments. The RTD is mounted in a mechanical/pneumatic test stand in which the sheath is rotated from side to side, striking metal plates at a rate of 30 cycles per minute.

Series 300 RTDs continue to meet performance specifications after 1000 cycles.

Series 200 and 300

Overview and Specifications

Series Overview:

The Series 200 and 300 are highly configurable to meet the needs of your specific application. Available styles include direct immersion, spring loaded and capsule style. These RTDs are built with coil, wound or thin film sensing elements depending upon the needs of your application. With better than IEC 60751/ASTM 1137 interchangeability, configuration options for nearly any process (including a Bending Option ref: pg 18), and a proven track record for durability, the Series 200 and 300 have the performance and flexibility to ensure accurate measurements in even the toughest applications.

Multiple configurations are approved by Factory Mutual (FM) for hazardous environments:

EXPLOSION PROOF: CLASS I, DIV. 1, GROUPS A, B, C, D

DUST IGNITION PROOF: CLASS II & III, DIV. 1, GROUPS E, F, G

NEMA 4X (CARBON STEEL THERMOWELLS ARE APPROVED FOR NEMA 4 ONLY)

Series 200 Description:

The Series 200 design consists of a proprietary element constructed with high purity platinum and minimal stress to assure accurate readings over its long life expectancy. The high purity materials, durable sheath design and unique construction techniques provide excellent vibration and shock resistance to ensure accuracy in tough applications over a wide temperature range.

Series 300 Description:

The Series 300 design incorporates a high purity platinum element specifically developed to stringent Burns criteria and fully supported in a 316 stainless steel sheath to provide ultimate vibration resistance, durability, and stability in an RTD. Even under the harshest conditions the Series 300 delivers reliable performance.

Performance Specification:	Series 200	Series 300
Element Resistance: at 0°C nominal	100 ohms	100 ohms
Temperature Coefficient: nominal	0.00385 ohms/ohm/°C	0.00385 ohms/ohm/°C
Temperature Range: (Operating range)	-200°C to 500°C	-50°C to 200°C
Burns Tolerance Class: (% of resistance at 0°C)	Code 10: ±.10% Code 05: ±.05%	Code 10: ±.10%
Alpha Tolerance:	0.00385 ± 0.000005 ohms/ohm/°C.	0.00385 ± 0.0000135 ohms/ohm/°C
Insulation Resistance:	500 megohms @ 500 VDC, 20°C	500 megohms @ 250 VDC
Time Constant: (63.2% response to step change in water moving at 3 fps)	4 seconds	6 seconds
Interchangeability Tolerance: (Itl = absolute value of temperature in °C.)	Code 05: Tolerance°C=±(0.13+0.00185 Itl), Code 10: Tolerance°C=±(0.26+0.0037 Itl)	Code 10: Tolerance°C=±(0.26+0.0037 Itl)
Self Heating: (in water moving at 3 fps.)	18mW/°C	10mW/°C
Hysteresis:	0.04% maximum between -200°C and 500°C	0.08% maximum between -50°C and 200°C

Material Specification:	Series 200	Series 300
Lead Wire: PTFE insulated nickel-plated stranded copper	22 AWG standard (24 AWG for dual). Also available in fiberglass and polyimide.	22 AWG standard (26 AWG for dual). Also available in polyimide.
Sheath Material: High purity compacted ceramic insulation	316 stainless steel is standard.	316 stainless steel is standard.