

World Class
Resistance Temperature Detectors



RTD Products - Company Overview

RTD Products has focused and specialized on the manufacture of platinum wire wound RTD elements for more than 25 years.

All our RTDs are manufactured at our factory in Southport, UK where we work to the regulations of the International Electrochemical Commission (IEC).

Our in-house knowledge and experience along with our passion for world class quality and customer service has been key to our continuous growth and success and has resulted in RTD Products position as a worldwide leader in the manufacture of platinum wire wound RTD elements.

Our dedicated sales and customer service team ensure that all our customers have the right RTD solution delivered to them on time.

Along with our devoted and reliable customer service team, our technical support team is able to provide support to customers requiring more practical information.

If you require the highest and most reliable quality of RTD, along with unrivalled sales, customer service and technical support please do not hesitate to contact us.



What is an RTD?

If the following are key to your temperature measuring needs then the most effective temperature measuring device would be a Resistance temperature detector:

- accuracy and stability
- accuracy over a wide temperature range
- area rather than point sensing would improve control
- a high degree of standardization

RTDs are a type of very accurate and precise thermometer. They function by exploiting the predictable change in electrical resistance of certain materials with changing temperature.

The most commonly used metal in an RTD element is platinum, which has many characteristics that make it an almost perfect material for resistance temperature measurement. These characteristics include its stability, high temperature rating, a near linear relationship between resistance and temperature and its ability to be heated and cooled repeatedly without negative effects.

The resistance of platinum changes in a positive and virtually linear fashion thus for each increase in temperature there is a directly proportional increase in resistance.

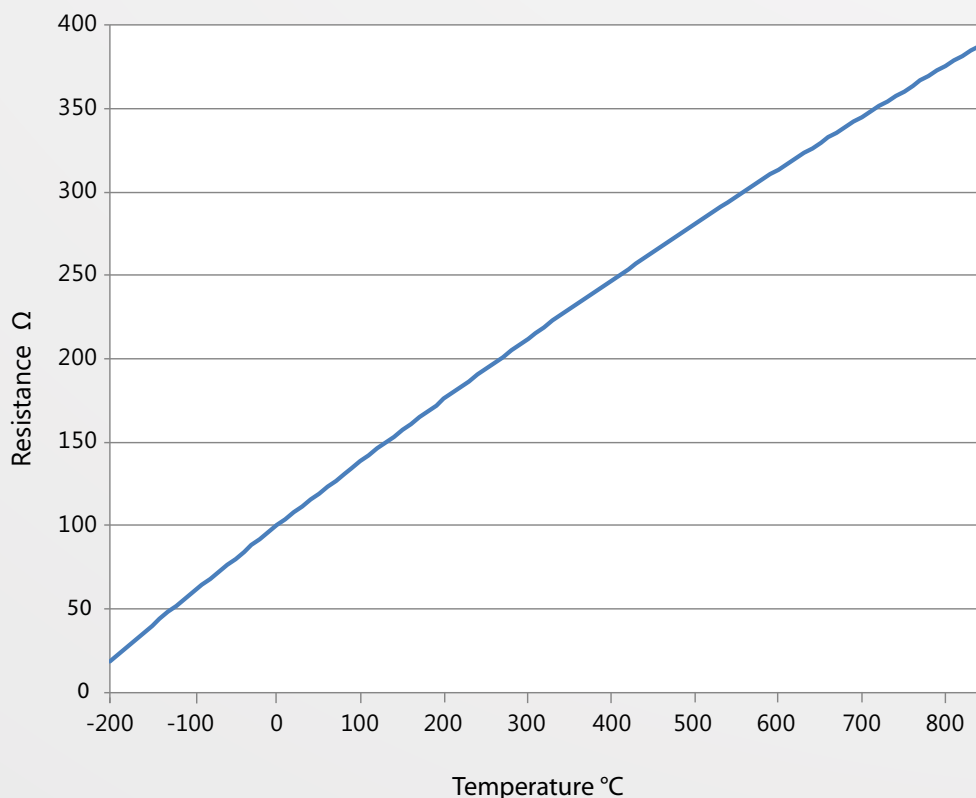
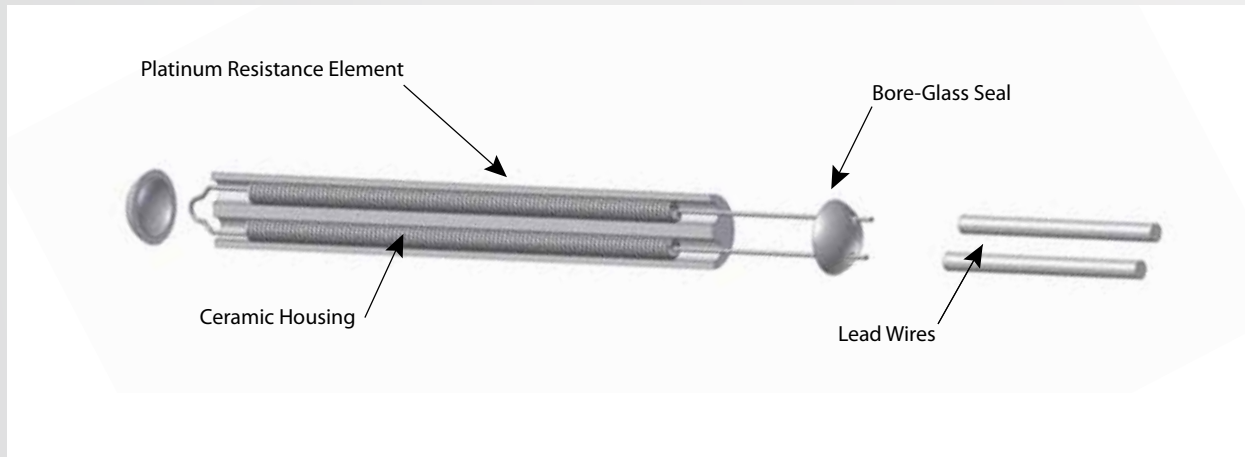


Fig. 1 Resistance Temperature Curve for 100Pt Platinum RTD ($\alpha = 0.00385$)

Wire Wound RTDs

A 100Pt wire wound RTD is constructed by winding fine platinum wire into a coil until there is enough to provide a resistance of 100 Ω .

This coil is then inserted into a ceramic tube and threaded through 2 bore holes at the top of the ceramic (4 bore holes for a 2 coil, or Duplex, construction).



Standard RTD elements usually range from 1 to 5mm diameter and 10 to 50mm in length.

The construction, as shown above, allows the platinum coil to move freely within the ceramic sheath, helping give the RTD long term stability and resistance to vibration. The boreholes are backfilled with bore glass once the coils have been inserted giving additional support to the coils.

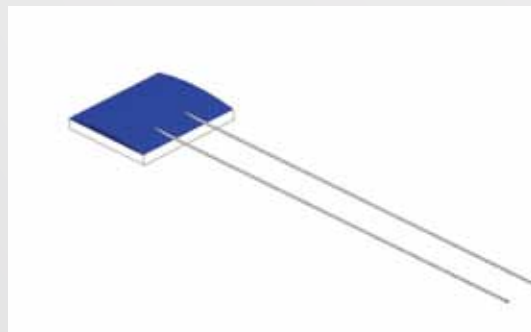
RTD Products RTDs are capable of withstanding vibration and acceleration levels of up to 30g over the frequency range 10Hz to 1 kHz.

Wire wound RTDs are the most accurate RTDs and designed for use in a wide range of applications.

Platinum Thin Film RTD

The thin film style of RTD is now the most common type of RTD due to the fact that it can be mass produced thus giving these RTDs a relatively low cost.

Thin film elements are manufactured by depositing a thin layer of platinum on to a substrate. The metal is deposited in a specific pattern and then trimmed to a specific resistance. The element is then coated with either a thin layer of glass or epoxy for moisture resistance.



These platinum RTDs are the least expensive to manufacture, can be mass produced and are relatively hard wearing. They also allow greater resistances (e.g. 1000 Ω) to be placed in smaller areas.

RTD Tolerances

RTDs can be manufactured to different tolerances. Higher tolerances give temperature readings that have a much smaller margin of error relative to those with lower tolerances.

A standard tolerance classification system has been defined and is used industry wide. The IEC system is seen as the industry standard, although there are other tolerance classes that exist.

The IEC has industry standard classes of W0.1, W0.15, W0.3 and W0.6.

These classes translate as follows in terms of resistance and temperature tolerances:

IEC Standard	DIN4370	Temperature Range °C	Tolerance Ω at 0°C	Tolerance at 0°C
W0.03	1/10 Din	-100 to 350	100 \pm 0.012 Ω	\pm 0.03°C
W0.1	1/3 Din	-100 to 350	100 \pm 0.04 Ω	\pm 0.10°C
W0.15	Class A (1/2 Din)	-100 to 450	100 \pm 0.06 Ω	\pm 0.15°C
W0.3	Class B (Din)	-196 to 660	100 \pm 0.12 Ω	\pm 0.30°C
W0.6	Class C	-196 to 660	100 \pm 0.23 Ω	\pm 0.60°C

For example a W0.15 (Class A) RTD giving a reading of 0°C has a margin of error of \pm 0.15°C or \pm 0.06 Ω . So a W0.15 (Class A) RTD could show a resistance of between 99.94 and 100.06 at 0°C.

An RTD giving a resistance value of 99.77 at 0°C would be classed as a W0.6 (Class C) tolerant RTD.

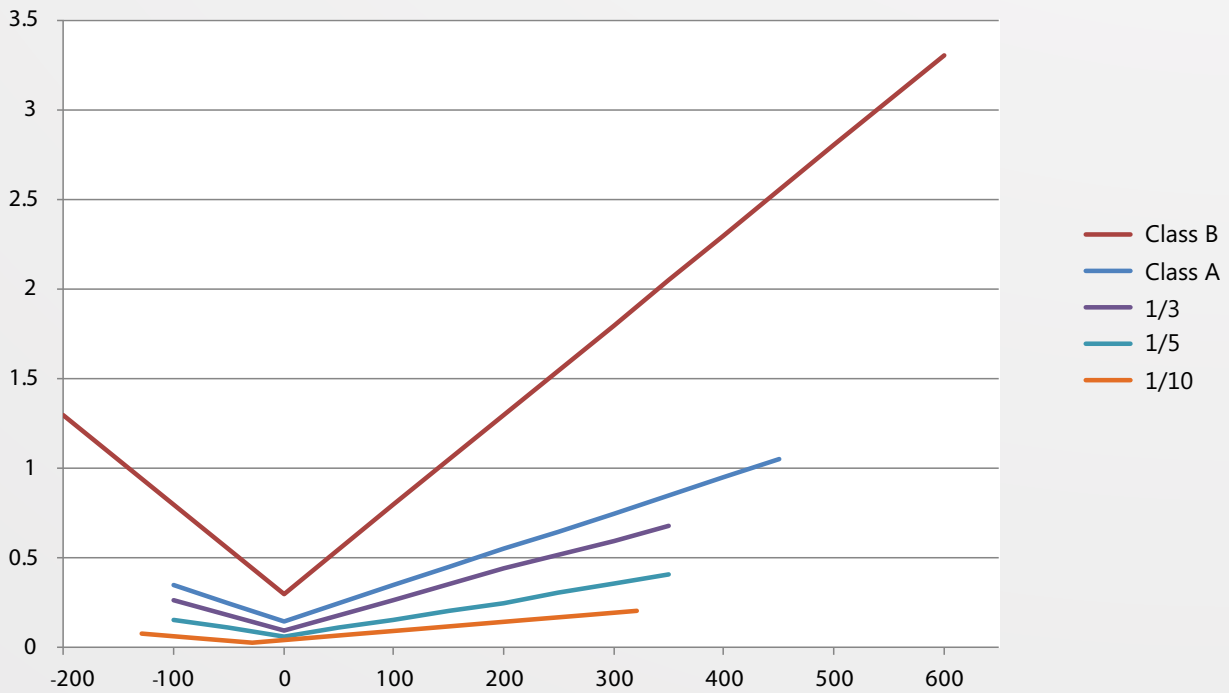


Fig. 2 Tolerances for RTDs as defined by IEC 60751

Industry Standards

The relationship between platinum resistance and temperature is well understood and depending on the purity of platinum used the temperature coefficient differs.

The most common type of RTD sensor is known as the Pt100, this is because the sensor has a resistance of 100 ohms at 0°C. There are RTDs with base resistance of 500 or 1000 ohms available on the market, but they are less widespread.

The most widely used platinum is one defined by the IEC 60751 publication (International Electrotechnical Committee). IEC standard platinum has a temperature coefficient, or α value, of 0.00385 ohms/ohms/°C. This means that for every degree change in temperature there is a resistance change of 0.385 ohms. So at 0°C the resistance is 100 ohms, at 100°C resistance = 138.5 ohms.

JIS standard platinum has a temperature coefficient, or (α) value, of 0.003916 ohms/ohms/°C. So a 100 ohm platinum RTD will increase in resistance by 0.3916 ohms for every 1°C of temperature increase. So at 0°C the resistance is 100 ohms, at 100°C resistance = 139.16 ohms

RTD Product Range

Our standard* Platinum RTD Product Range is available in:

- 2 and 4 wire
- IEC Classes: W0.6, W0.3, W0.15, W0.1, W0.06 and W0.03
- DIN Classes: Class C, B, A, 1/3 Din, 1/5 Din, 1/10 Din
- Lead length 6mm (+/-1mm)
- Temperature Range: -200°C to +660°C
- Pre-aged (as an additional service)
- Standard Calibration Point: 5mm from ceramic body
- Calibrated to IEC specifications
- Manufactured and tested to IEC specifications

All RTDs are partially supported by aluminum oxide glass

All RTDs are supplied with 2 lead wires for single and 4 lead wires for duplex to avoid resistance pollution

All products are batch coded in order to ensure traceability

Products are packaged to ensure safe and damage free delivery

*Customer specific assemblies and tolerances are available on request

RTD Product Range

Standard (2 wire)	DUPLEX (4 wire)	Diameter (mm)	Length (mm)	Lead diameter (mm)	Lead Resistance	Sensing Length
PR0815		0.8	15	0.15	0.006398	13
PR0915		0.9	15	0.15	0.006398	13
PR1210		1.20	10	0.23	0.002721	8
PR1215		1.20	15	0.23	0.002721	13
PR1408					0.00	
PR1415		1.40	15	0.23	0.002721	13
	PR1415D	1.40	15	0.25	0.002303	13
PR1425		1.40	25	0.23	0.002721	22
	PR1425D	1.40	25	0.25	0.002303	22
PR1515		1.50	15	0.23	0.002721	13
	PR1515D	1.50	15	0.25	0.002303	13
PR1608		1.50	8	0.25	0.002303	8
PR1615		1.60	15	0.23	0.002721	13
	PR1615D	1.60	15	0.25	0.002303	13
PR1625		1.60	25	0.23	0.002303	22
	PR1625D	1.60	25	0.25	0.002303	22
PR2006		2.00	6	0.25	0.002303	6
PR2015		2.00	15	0.35	0.001175	13
	PR2015D	2.80	15	0.35	0.001039	13
PR2808		2.80	8	0.35	0.001039	8
PR2815		2.80	15	0.35	0.001039	13
	PR2815D	2.80	15	0.35	0.001039	13
PR2825		2.80	25	0.35	0.001039	22
	PR2825D	2.80	25	0.35	0.001039	22
PR3008		3.00	8	0.35		
PR3015		3.00	15	0.35	0.001039	13
	PR3015D	3.00	15	0.35	0.001039	13
PR3025		3.00	25	0.35	0.001039	22
	PR3025D	3.00	25	0.35	0.001039	22
PR3208		3.20	8	0.35	0.001039	8
PR3215		3.20	15	0.35	0.001039	13
	PR3215D	3.20	15	0.35	0.001039	13
PR3225		3.20	25	0.35	0.001039	22
	PR3225D	3.20	25	0.35	0.001039	22
PR3815		3.80	15	0.35	0.001039	13
	PR3815D	3.80	15	0.35	0.001039	13
PR3825		3.80	25	0.35	0.001039	22
	PR3825D	3.80	25	0.35	0.001039	22
PR4515		4.50	15	0.35	0.001039	13
	PR4515D	4.50	15	0.35	0.001039	13
PR4530		4.50	30	0.35	0.001039	26

RTD Products, part of the British Rototherm Group of Companies, is the UK's leading manufacturer of platinum resistance temperature detectors and associated products.

From our factory in Southport, Merseyside, the highest quality platinum resistance temperature detectors are manufactured and sent across the world.

All devices are manufactured from traceable materials and their construction is controlled by our BS EN ISO 9001: 2008 approved Quality System, using the latest techniques in production and testing.



ISO9001:2008

RTD Products

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