



TDI Information Sheet

IEC Standards

Summary

IEC 60751 Ed 2 2008 has a new tolerance scheme. The resistance to temperature relationship is unchanged. IEC 60751 Edition 2.0 2008-07 advises other tolerances be based on W0.3 which is equivalent to the earlier IEC Class B and DIN B.

TDI's tolerance offerings remain unchanged except that strictly speaking 1/10th DIN becomes 1/10th IEC 60751 Edition 2.0 2008-07 W0.3

History

The current International Standard for Industrial Platinum Resistance Thermometers and Platinum Temperature Sensors is IEC 60751 Edition 2.0 2008-07.

It replaces the first edition from 1983, which was amended firstly in 1986 and secondly in 1995.

Changes

In 1995 the resistance to temperature relationship was changed, bringing it into line with the ITS-90 after a review of the current state of IPRTs in general.

The resistance to temperature relationship is,

For the range -200 °C to 0 °C

$$R_t = R_0 [1 + At + Bt^2 + C(t-100\text{ °C})-t^3]$$

and for the range 0 °C to 850 °C

$$R_t = R_0 [1 + At + Bt^2]$$



Prior to Amendment 2 in 1995 the values for A, B and C were,

$$A = 3.90802 \times 10^{-3}$$

$$B = -5.802 \times 10^{-7}$$

$$C = -4.273\ 50 \times 10^{-12}$$

From 1995 the values have been,

$$A = 3.9083 \times 10^{-3}$$

$$B = -5.775 \times 10^{-7}$$

$$C = -4.183 \times 10^{-12}$$

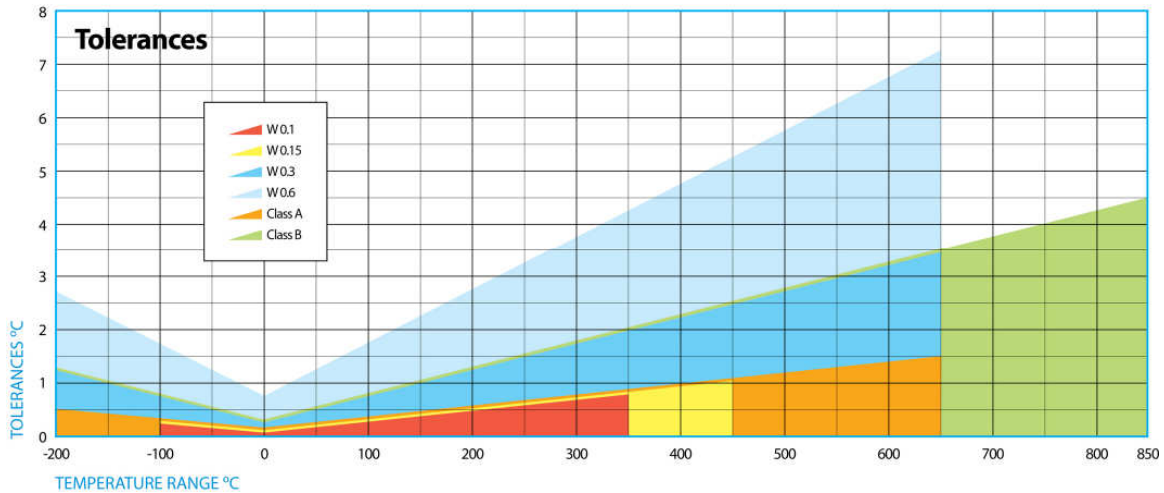
These values remain unchanged in IEC 60751 Edition 2.0 2008-07 from IEC 751 Amendment 2 1995, there is no change in the temperature / resistance relationship.

Changes in IEC 60751 Edition 2.0

Changes this edition include new tolerance classes and changes to tests. The standard differentiates between the detector or sensor and the complete thermometer.

Industrial Platinum Resistance Temperature Sensors are referred to as “platinum resistors” or “resistors” and Industrial Platinum Resistors Thermometers are referred to as “thermometers”.

Tolerances are published for both resistors and thermometers and the tolerances are different for wire wound resistors (as made by TDI) and film types. Wire wound types have a wider range of validity. The chart below shows a summary of the tolerances for wire wound resistors to the earlier and current standards.



Tolerance Values as a Function of Temperature for 100Ω sensors

Note: Class A and Class B relate to IEC 751 1983 / BS EN 60751 1996.

The newer standard, IEC 60751 Edition 2.0 2008-07 introduces a new scheme of tolerance class.

For wire wound resistors

Range °C	Tolerance, °C	
W0.1	-100 to 350	$\pm(0.1 + 0.0017 t)$
W0.15	-100 to 450	$\pm(0.15 + 0.002 t)$
W0.3	-196 to 660	$\pm(0.3 + 0.005 t)$
W0.6	-196 to 660	$\pm(0.6 + 0.01 t)$

Note that W0.15 and W0.3 have a tolerance of the same magnitude as the earlier Class A & B but are valid over narrower temperature ranges.

The vast majority of TDI customers select tolerances tighter than the published standards.



Other Tolerances available from TDI

These have been commonly specified as being a fraction of the Class B, now W0.3 tolerance, also known by many as DIN B from the earlier DIN 43760 standard.

TDI – Available Tolerance Types

Interchangeability at 0 °C

±0.05%	1/2 Class B (or DIN B)
±0.03%	1/3 Class B (or DIN B)
±0.02%	1/5 Class B (or DIN B)
±0.01%	1/10 Class B (or DIN B)

As the sensor is used further away from 0 °C these errors can be expected to rise in accordance with an alpha uncertainty of ± 3 ppm.

IEC 60751 can be purchased from www.iec.ch