



## TDI Information Sheet

### Why Wire Wound?

#### Summary

There are two broad types of platinum temperature sensor or “platinum resistors” *wire wound* and *film* types. TDI manufacture wire wound platinum resistors.

#### Standard Platinum Resistance Thermometers, SPRTs

The ITS-90 specifies the SPRT as the interpolation device over the range of -259 °C to 962 °C

“Between the triple point of equilibrium hydrogen (13.8033 K) and the freezing point of silver (961.78°C)  $T_{90}$  is defined by means of platinum resistance thermometers calibrated at specified sets of defining fixed points and using specified interpolation procedures.”

SPRTs are fabricated from a coil of high purity wire.

#### Industrial Platinum Resistance Thermometers, IPRTs

Manufacturers of high quality, wide range IPRTs also employ sensing elements constructed from coiled platinum wire as wire wound platinum resistors offer advantages over film types

- Wider Temperature Ranges
- Less Self Heating
- All Platinum Construction – no thermal EMFs
- Greater Stability / Reproducibility
- The shape suits tubular sheaths
- Use More Platinum benefiting homogeneity and manufacturing consistency



Wire wound detectors are suitable for

Laboratory Standard Thermometers  
Working Standard Thermometers  
High Accuracy Thermometers  
Wide Operating Range Devices  
Thermometers requiring low uncertainty calibration  
Low Drift Applications

Inferior platinum film types exhibit properties of a strain gauge and eventually react with the adhesive that bonds the film to the substrate.

### **Benefits of TDI Wire wound Platinum Resistors**

There are two main assembly techniques for wire wound devices. Firstly a bifilar winding is wound around a glass or ceramic bobbin, attached to lead wires and sealed by a layer of glass. This type is very rugged and can withstand high vibration. The disadvantage of this construction is that the wire is subject to strain during temperature cycling and that the wire is not directly in contact with the surrounding air.

A second construction type uses a fine coil of platinum wire led through holes in an alumina tube and attached to more robust leads. The coil is then attached along part (partially supported) or all (totally supported) of its length and the leads are sealed in place with either glass or ceramics.

TDI is expert in this latter design, having produced more than 6 million detectors since 1983. TDI have the skills and experience to engineer platinum resistors closest to the requirements of the working standard thermometer. TDI can provide detectors optimised for high stability or high vibration. Benefit from TDI's world leading expertise and experience in the production of the finest wire wound sensors.



TDI Detectors – as used by the world’s leading suppliers of high accuracy IPRTs  
Isothermal Technology use TDI products exclusively in its range of Industrial, Secondary and  
Primary Resistance Thermometers

