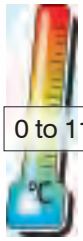

Copper Point SPRT
Model 108462

- Novel Design
- Sapphire Mandrel
- Pressurized Sheath

The ITS-90 specifies the SPRT to the freezing point of silver, 961.78°C. Thermocouples can be used beyond this temperature but it is difficult to see small changes in temperature. For a Type R thermocouple the voltage sensitivity at the copper point is 14μV/°C; a change of 1 μV is equivalent to a voltage change of 71mK. When using thermocouples electrical noise limits the ability to follow small changes in the copper freezing plateau and so attention was turned to the development of a new resistance thermometer allowing better measurements to be made.

Isotech has a long history of making SPRTs to the Silver point (Model 96178) and this experience was combined with new research to produce the new copper point SPRT (Model 108462).

Ro is nominally 0.25Ω the same as the silver point SPRT but the platinum winding is held in place on a new type of synthetic sapphire mandrel. The platinum 'loves' oxidising but 'hates' reducing atmospheres. The thermometer sheath is made of alumina. It is air filled and hence surrounded by 20% oxygen. Uniquely the sheath is connected to a small air pump to pressurise the 108462 with air so that any leakage is outwards, whilst maintaining an oxygen rich atmosphere around the winding. This is what gives the thermometer its stability.

The four platinum lead wires are separated with tubes of quartz glass and passed through four bores. In use the winding is biased to +9V DC with the included ioniser.

Following around 30 years of research, with earlier results formally presented at TEMPMEKO & ISHM 2010 and at the 9th International Temperature Symposium (ITS9) Isotech have commercialised the design to allow other researchers to benefit from the technology and novel design.

http://www.isotech.co.uk

Specification

Model	**108462**
Measuring Range	0°C to 1100°C
Ro	0.25Ω
Length	650mm
Diameter	7.5mm

Performance

These devices are offered as research thermometers and the performance is described in the paper available on the Isotech website.

"Investigations into the performance of copper point standard resistance thermometer"

J.P. Tavener