



Belz Instruments Pvt. Ltd.

(An ISO 9001:2015 Certified Company)

Patent Application No.
202411030964

CRYO TEM

Temperature Sensor
Calibration Equipment

Range: -196°C to +50°C



Calibrate with Confidence

Temperature sensors calibration is an important activity, as precise temperature measurement & control is required in many applications.

Since ITS-90 (International Temperature Scale 1990) is the only valid traceability, the reference temperature sensors are calibrated at fixed points specified in ITS-90 (Table 1).

Table 1. The fixed points of the International Temperature Scale of 1990 (ITS-90)

	T (K)	t(°C)
Triple point of hydrogen	13.8033	-259.3467
Triple point of neon	24.5561	-248.5939
Triple point of oxygen	54.3584	-218.7916
Triple point of argon	83.8058	-189.3442
Triple point of mercury	234.3156	-38.8344
Triple point of water	273.16	0.01
Melting point of gallium	302.9146	29.7646
Freezing point of indium	429.7485	156.5985
Freezing point of tin	505.078	231.928
Freezing point of zinc	692.677	419.527
Freezing point of aluminium	933.473	660.323
Freezing point of silver	1234.93	961.78
Freezing point of gold	1337.33	1064.18
Freezing point of copper	1357.77	1084.62

The freezing and melting points are at one standard atmosphere pressure. 'Triple points' refer to the unique temperature at which the three phases (solid, liquid and vapour) coexist at equilibrium.

The reference sensors are calibrated at fixed points as per ITS-90 are then further used to calibrate industrial temperature sensors using liquid baths/ dry block calibrators as temperature sources in place of fixed points cells.

The calibrations carried out by using fixed point cells as per ITS-90 are very time consuming & expensive. Hence, for fast & economical calibrations liquid bath or dry block calibrators are used.

There are many manufactures for liquid baths & dry block calibration sources for the temperature range -40°C to 1200°C. However for calibration of temperature below -40°C is a big challenge. There are very few manufactures worldwide manufacturing liquid or dry blocks for the range -196°C to -40°C, and are very expensive propositions. Also the baths / dry block calibrators in this range facilitate the calibration at few fixed points in the range -196°C to -40°C

Since there are many applications to calibrate temperature sensors (thermocouple, RTD etc.) in the range of +50°C to -196°C, a single equipment for this range at affordable cost was always a dire need.

Belz has worked on this problem & by rigorous R&D efforts has innovated a LN₂ Liquid Bath to provide continuous temperature range -196°C to +50°C at a very affordable prices. Now there is no need to have multiple baths to cover this range.

The liquid bath 'Cryo-Tem' has the following unique features:

- Temperature Range : -196°C to +50°C
- Temp. Set Point : Adjustable Throughout the Range
- Cooling Medium : Liquid Nitrogen (LN₂)
- Stability : ±0.05°C (30 minutes)
- Immersion Depth : upto 200mm
- Temperature Sensor Size : 1mm to 10mm diameter
- Data Logging : USB Port (back-up)
- Display : Set Value, Process Value, Ambient Temp., Real Time Clock, LN₂ Level, DUC Temperature etc.
- Overall Dimension (LxWxH) : 450 x 300 x 600mm

Illustration & specifications are subject to change without prior notice.

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