# CERTIFICATE OF CALIBRATION

*This is a re-printed certificate. Re-printed on: 16 September 2021*

**ISSUED BY:** THERMOSENSE LIMITED

**DATE OF ISSUE:** 04 September 2021 **CERTIFICATE No:** X2002X

UKAS CALIBRATION

**21817**



APPROVED SIGNATORY

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Temperature & Process Measurement

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**Customer:** Customer / Customer / Customer **Order Reference:** 123999

**Address:** Address / Void / Sample / Address / Void / Sample / Address / Void / Sample / Address / Void / Sample

**Device Description:** Duplex Pt100 with Terminal Head

**Device Identity:** X1-999-X1 **Sensor Type:** PT100 (3 wire configuration) Flat Film Detector

**Sensor Length:** 190mm **Sensor Diameter:** 6.0mm **Immersion Depth:** 155/140

**Procedure Used:** pt2b3ab **Calibration Points Requested:** 11 **Ambient Temperature:** 24.9°C ± 1.2°C

**Equipment Used:** Isotech Venus 4951 Dry Block Calibrator (381785/1) /Isotech Jupiter 4852 Dry Block Calibrator (40911/1)
Isotech milliK & millisKanner (391730/2 & 20AS76/1) / Isotech milliK & millisKanner (391730/1 & 391730/3)

**Reference(s) Used:** PRT (391730/5) / PRT (40865/1)

**The device was examined and found to be in a satisfactory condition.**

*Results annotated hereon are applicable only to the device(s) identified above.*

## Results of Calibration

| Actual Temperature °C | UUT Value mA | UUT Temperature °C | Error °C | Uncertainty (±) °C |
|---|---|---|---|---|
| 0.002 | 4.485 | 0.002 | -0.000 | 0.20 |
| 35.020 | 7.896 | 35.178 | +0.157 | 0.20 |
| 70.037 | 11.296 | 70.240 | +0.203 | 0.20 |
| 100.146 | 14.216 | 100.353 | +0.206 | 0.20 |
| 150.090 | 19.071 | 150.420 | +0.330 | 0.50 |
| 0.002 | 4.481 | -0.040 | -0.042 | 0.20 |
| 35.020 | 7.896 | 35.178 | +0.157 | 0.20 |
| 70.037 | 11.286 | 70.137 | +0.100 | 0.20 |
| 100.146 | 14.212 | 100.311 | +0.165 | 0.20 |
| 150.090 | 19.057 | 150.275 | +0.185 | 0.50 |
| 150.090 | 19.066 | 150.368 | +0.278 | 0.50 |

The values above were ascertained from the output terminals of an Input Transmitter, using the following settings: 4mA= -5 °C 20mA= 160 °C
The output of the transmitter was converted to thermal units using the following formula: Temp Rdg = Low Limit + (High Limit – Low Limit) x (mA out -4) / 16

The results indicated above show the probe to be within the tolerances of Class B Accuracy, as defined by BS EN 60751:2008.
The results above in combination with certificate X2001X indicate AMS2750 (REV.F) compliance.

The calibration was performed in multiple Dry Block Calibrators using IEC 60751 (2008) Temperature Conversion. **Coil Reference:** 2219403
The accuracy of precision sensors may be diminished by the number, the length and the quality of connections or the terminations made to them.
Part of an AMS duplex assembly calibrated in conjunction with Certificates X2001X & X2003/4X

*N.B.: Where statements of conformity are made, they include the effects of uncertainty and guard banding in compliance with ILAC-G8: 09/2019 (para 4.2.2).*

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements. UKAS is one of the signatories to the Multilateral Agreement to the European co-operation Accreditation (EA) for the mutual recognition for calibration certificates issued by accredited laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units of measurement realised at the National Physical Laboratory or other recognised national metrological institute



Sample

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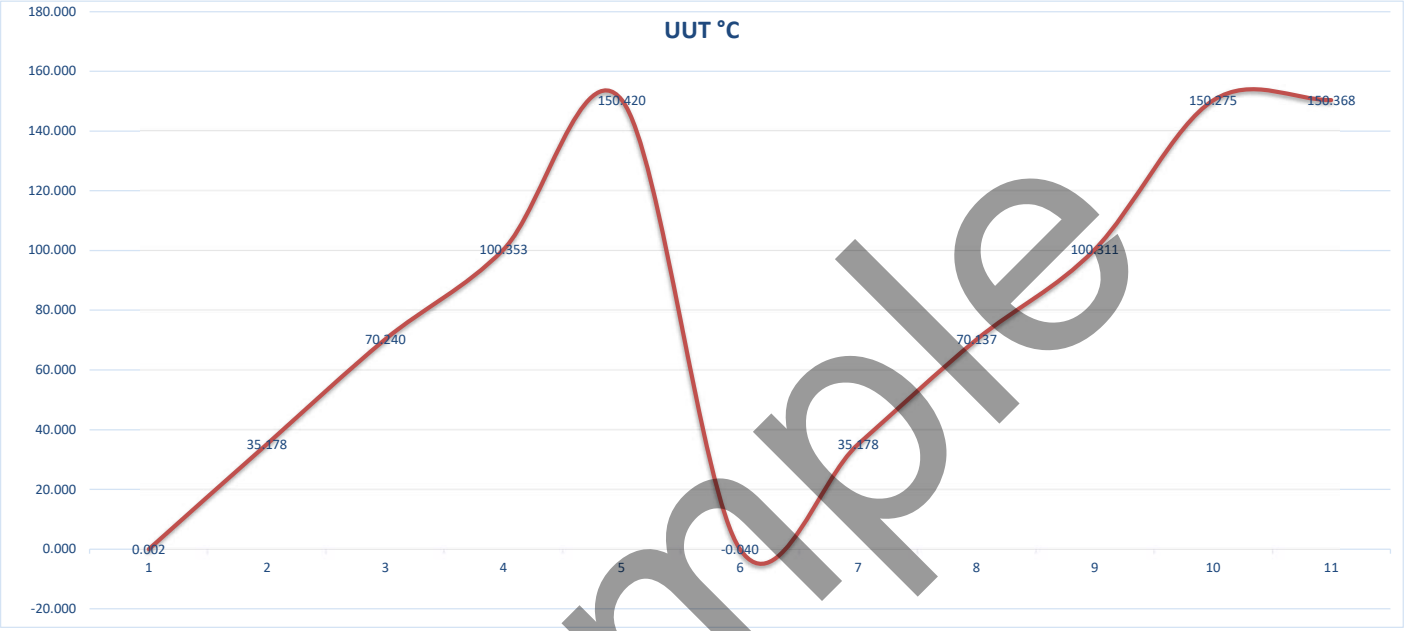
# Supplementary and Supporting Calibration Information and Data

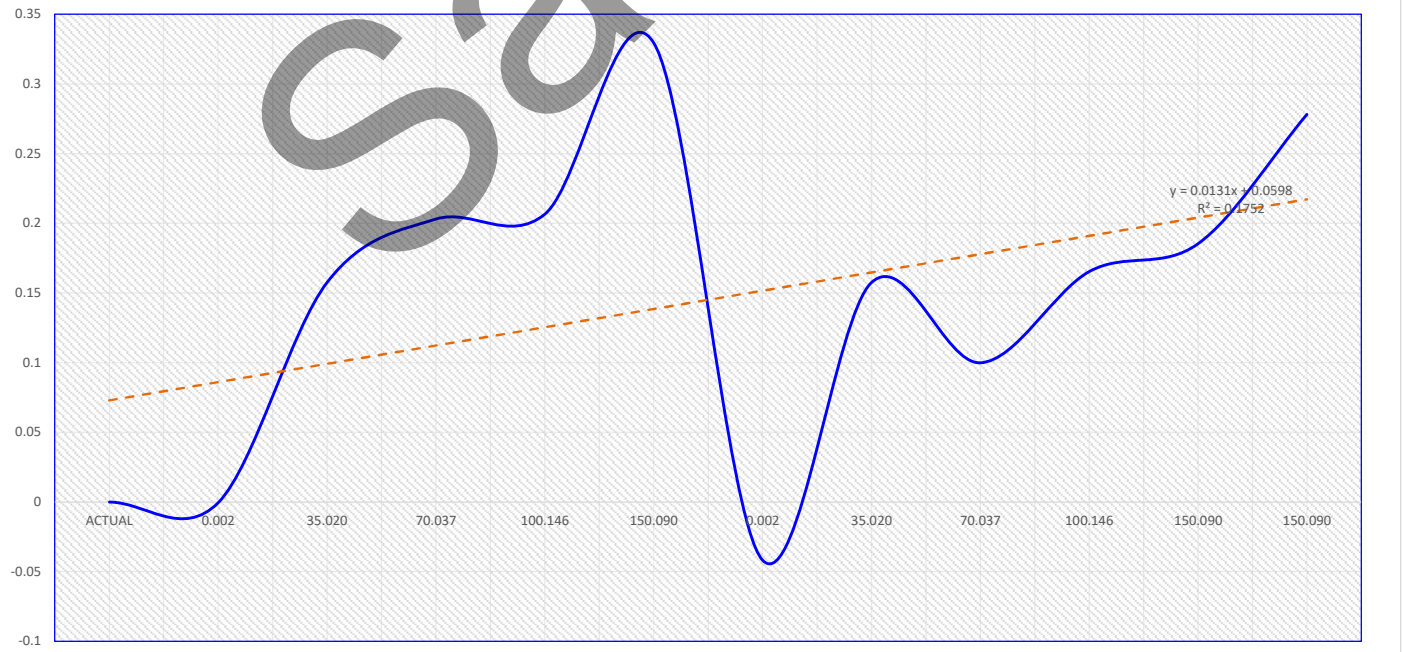


**The information indicated below is taken from the calibration data annotated overleaf.**

**Graph 1:** Shows the rise and/or fall in temperature in the calibration specification.




**Graph 2:** Shows the deviation revealed in calibration between the actual temperature (Graph 1) and that indicated by the test sample.




The blue line above indicates the direction and magnitude of deviation from the true temperature value. The dotted line indicates the trend of deviation from true across the range of the calibration points employed. The formula is that of the trend line. For the purposes of setting offsets; regard should be taken of the parallelity of the trend line to the base line.

*The results indicated above show the probe to be within the tolerances of Class B Accuracy, as defined by BS EN 60751:2008.*

Sample