

Calibration Certificate

201 Wolf Drive • P.O. Box 87 • Thorofare, NJ 08086-0087 • Phone:856-686-1600 • Fax:856-686-1601 • www.troemner.com • e-mail: troemner@troemner.com

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Temperature Comparison

Serial Number: 123456

Certificate Number: 277208D

Date of Calibration: 18-MAR-04

SECTION 1: NAME AND ADDRESS OF CUSTOMER

End User

Henry Troemner LLC
201 Wolf Drive
Thorofare, NJ 08086

Client

Henry Troemner LLC
201 Wolf Drive
Thorofare, NJ 08086

SECTION 2: APPROVED SIGNATORY

Joseph Moran

SECTION 3: PERSON PERFORMING WORK

Mike O'Toole

SECTION 4: CERTIFICATE INFORMATION

Description of DUT :100 Ohm SPRT
Order Number :126
Manufacturer :Hengar
Model :3925
Serial Number :123456

Date Received :20-FEB-04
Date of Calibration :18-MAR-04
Date of Issue :18-MAR-04
Temperature Range :-196°C to 420°C

SECTION 5: ENVIRONMENTAL CONDITIONS DURING TEST

Temperature: 21° C ± 1.5°C

Relative Humidity: 40%RH ± 20%RH

SECTION 6: PERTINENT INFORMATION

Reference standards used to perform the calibration are listed in Section 9.

The thermometer calibrated for this report has been calibrated in accordance with Troemner's calibration procedure.

This calibration also meets specifications as outlined in ISO 9001, ISO/IEC 17025, ANSI/NCSL Z540-1-1994, NCR Document 10CFR50 Appendix B, and applicable documents.

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SECTION 7: COMPARISON CALIBRATION DATA

Calibration Point °C	Actual Temperature °C	DUT Measured Resistance (Ohms)	Uncertainty of Standard °C
As Found TPW	0.010	100.0485	0.001
-196	-195.600	18.9113	0.011
-38	-38.073	84.7660	0.008
Final TPW	0.010	100.0490	0.001
232	231.540	189.1845	0.024
420	418.352	256.5118	0.031

ITS-90 Coefficients at 1mA

R (0.01) 100.049

a4: -1.75546072 E-04

a8: -3.44229870 E-04

b4: 1.05994645 E-04

b8: -1.66688643 E-04

*Denotes out of tolerance condition from specification

SECTION 8: CALIBRATION PROCEDURE DATA

Procedure: TMP-CAL Rev. 004

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SECTION 9: GENERAL INFORMATION

The DUT, a platinum resistance thermometer, was calibrated by comparison to laboratory SPRTs. The laboratory standards are traceable to the National Institute of Standards and Technology (NIST). The DUT's resistance at the temperature of the standard was determined using an AC resistance ratio bridge delivering a constant current of 1mA. This calibration was performed at Troemner's Temperature Calibration Laboratory at 201 Wolf Drive, Thorofare, NJ 08086 unless otherwise noted on page one. The temperature scale used in this laboratory is the International Temperature Scale of 1990 (ITS-90). This laboratory uses the NIST coefficient notations for the ITS-90 subranges as described in the NIST Technical Note 1265. The immersion depth of the DUT during calibration was 200mm. The DUT displayed on this certificate was found to be in tolerance of the specifications at the time of calibration except where noted.

Standards				
Manufacturer	Model	Serial Number	Cal Due Date	Description
ASL	F18	9028001176	22-APR-04	A/C Bridge
Rosemount	162CE	4855	19-FEB-05	SPRT
Isotech	670	176	04-SEP-04	SPRT
Tinsley	5685A	TR100-01	09-SEP-05	Standard Resistor
Tinsley	5685A	TR300-01	09-SEP-05	Standard Resistor
Isotech	ITL-M-E13	111	28-SEP-05	TPW Cell

SECTION 10: DEFINITIONS AND TERMS

UNCERTAINTY - The error in assignment of the probes resistance due to the measurement process. Uncertainty is calculated per NIST Technical Note 1297 using a coverage factor of $K = 2$ ($K = 2$ defines an interval having a level of confidence of approximately 95 percent).

DUT - Device Under Test. Item being calibrated.