

# Traceable 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 Fixed Point**

Certificate Number: 900000-1

Date of Calibration: 01-JAN-2003

## 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

Katharine Ellison

## SECTION 4: CERTIFICATE INFORMATION

Description of DUT	:100 Ohm PRT	Date Received	:01-JAN-2003
Order Number	:123456	Date of Calibration	:01-JAN-2003
Manufacturer	:Henry Troemner, LLC	Date of Issue	:01-JAN-2003
Model	:1234ABC	Temperature Range	:Ar TP to A1 FP
Serial Number	:ABC1234		

## SECTION 5: ENVIRONMENTAL CONDITIONS DURING TEST

Temperature: 20.17°C

Relative Humidity: 42.70%

## 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	$W(T_{90})$ 1mA	$W(T_{90})$ Zero Power	Uncertainty of Standard mK
Hg TP	0.84717902	0.84717639	0.50
H <sub>2</sub> O TP	-	-	0.17
Ga MP	1.11812526	1.11812179	0.32
Sn FP	1.89270133	1.89169546	0.61
Zn FP	2.55904323	2.55903529	1.08

The resistance of the DUT at 273.16K (TPW) was 25.5567  $\Omega$  at 1mA and 25.5566  $\Omega$  at zero power.

### ITS-90 Coefficients at 1mA

R (0.010): 25.5567

a5: -1.57155541E-4

a8: -1.01543792E-4

b5: 3.53925891E-4

b8: -1.16765137E-4

According to the ITS-90, the SPRT to meet one of the following criteria:

$$W(29.7649^{\circ}\text{C}) \geq 1.11807 \quad \text{or} \quad W(-38.8344^{\circ}\text{C}) \leq 0.844235$$

The  $W(29.7649^{\circ}\text{C})$  for the DUT at the time of the calibration was 1.11812 at 1mA.

## SECTION 8: COMPARISON CALIBRATION PROCEDURE DATA

Procedure: TMP-FXCAL

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## SECTION 9: GENERAL INFORMATION

This fix point calibration was performed in 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 standard platinum resistance thermometer was calibrated using fixed point methods. The instrument was compared to laboratory standards, which are directly traceable to the National Institute of Standards and Technology (NIST).

Standards				
Manufacturer	Model	Serial Number	Cal Due Date	Description
ASL	F18	9028001176	9/19/03	A/C Bridge
Tinsley	5685A	274599	2/11/03	Standard Resistor
Tinsley	5685A	279681	2/11/03	Standard Resistor
Pond Engineering	K18C	99075	3/26/06	Mercury Cell
Isotech	ITL-M-E13	E13-110	8/24/05	Triple Point of Water
Isotech	ITL-M-17401	Ga 319	8/24/05	Gallium Cell
Isotech	ITL-M-17669	Sn 116	8/24/05	Tin Cell
Isotech	ITL-M-17671	Zn 168	12/11/05	Zinc 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.

**Hg TP** - Mercury triple point

**H<sub>2</sub>O TP** - Water triple point

**Ga MP** - Gallium melt point

**Sn FP** - Tin freeze point

**Zn FP** - Zinc freeze point