ICL CALIBRATION LABORATORIES, INC.

ACCREDITED
CERT. 526.01 CALIBRATION

ISO/IEC 17025 and ANSI/NCSL Z540-1 accredited
The specialists in ASTM and laboratory thermometers & hydrometers
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Setting new standards in calibration excellence!

1501 Decker Avenue Suite 118 Stuart, FL 34994 USA
Tel: 772 286 7710 **1-800-713-6647**
Fax: 772 286 8737 E-mail: sales@iclcalibration.com
Internet: www.icllabs.com

CALIBRATION REPORT FOR DIGITAL THERMOMETER

The instrument identified herein was examined and calibrated in ICL's calibration laboratory, using NIST traceable standards, following the calibration procedure referenced below. This calibration fulfills the requirements of ISO/IEC 17025-2005, 'General Requirements for the Competence of Testing and Calibration Laboratories' and ANSI/NCSL Z540-1-1994,'Calibration Laboratories and Measuring and Test Equipment - General Requirements'.

CLIENT

WASHINGTON STATE PATROL
811 EAST ROANOKE
SEATTLE, WA 98102

Purchase order number: NOT AVAILABLE

Submitted by: WASHINGTON STATE PATROL

DATES

Date received: 04-02-2014 Date report issued: 04-10-2014

UUT (Unit Under Test) INFORMATION

DIGITAL THERMOMETER Inscription: GUTH LABS INC.

Model: 4300 Range: 29.5/38.5C Divisions: 0.01°C

Engineering units: degrees Celsius Immersion: APPROX. 6 INCHES

Serial number: 091803

Accuracy tolerance: +/- 0.02C PER CUSTOMER

RESULTS OF PHYSICAL EXAMINATION

This instrument was received in operable condition, unless otherwise noted.

CALIBRATION PROCEDURE

ICL Procedure 04, which is drawn from ASTM E77, E220 and E563

LABORATORY ENVIRONMENTAL CONDITIONS

Temperature: 23°C +/- 2°C Relative humidity: 30 to 70%

RESULTS OF CALIBRATION

AS FOUND

TEST POINT	UUT READING	CORRECTION	TOLERANCE	ACCEPT LIMIT*	P/M/F	UNCERTAINTY
33.001°C	33.01°C	-0.01°C	0.02°C	0.014°C	PASS	0.016°C
33.996°C	34.00°C	0.00°C	0.02°C	0.014°C	PASS	0.016°C
34.996°C	35.00°C	0.00°C	0.02°C	0.014°C	PASS	0.016°C

No adjustments were made to this instrument.

AS LEFT

TEST POINT	UUT READING	CORRECTION	TOLERANCE	ACCEPT LIMIT*	P/M/F	UNCERTAINTY
33.001°C	33.01°C	-0.01°C	0.02°C	0.014°C	PASS	0.016°C
33.996°C	34.00°C	0.00°C	0.02°C	0.014°C	PASS	0.016°C
34.996°C	35.00°C	0.00°C	0.02°C	0.014°C	PASS	0.016°C

**ACCEPT LIMIT(s) The acceptance limit(s) shown above represent a statistical evaluation of the instrument's tolerance relative to the uncertainty of the measurement. If required, the acceptance limit is set to a value smaller than the tolerance. The difference between the tolerance and the acceptance limit is the 'guard band'. The guard band is imposed to reduce the probability of a false acceptance (PFA), or a false failure, to 2% or less.*

P/M/F Accordingly, there are three possible calibration outcomes at any particular test point:

1. PASS The calibration result falls within the interval described by the test point + or - (the tolerance MINUS the guard band).
*2. MARG** (marginal) The calibration result is 'borderline', or 'indeterminate'; it is therefore statistically and metrologically imprudent to declare that the instrument is definitively either 'in-tolerance' or 'out-of-tolerance'.*
3. FAIL The calibration result falls outside the interval described by the test point + or - (the tolerance PLUS the guard band).

The methodology and equations used for determination of guard bands and acceptance limits comply with the requirements of ANSI/NCSL Z540.3

LIMITATIONS OF USE

The calibration performed is a limited, or partial-range calibration, and accordingly, limitations of use are imposed as follows:

This instrument can be used with confidence only within the range bracketed by the test points and/or immediately around the test points.

MEASUREMENT UNCERTAINTY

The measurement uncertainty reported is the expanded uncertainty at 2 sigma (k=2), to provide a confidence level of approximately 95%.

The uncertainty is calculated considering Type A contributors including the standard deviation of the measurement process from check standard control charts, the standard deviation of monthly Triple Point of Water calibrations of the standard, and UUT variability observed during the calibration, as well as Type B contributors, which include comparator uniformity, uncertainty of the calibration of the standard, stem conduction and other immersion effects, the sensitivity and accuracy of the standard thermometer's readout, and resolution of the standard and UUT.

The Type A and B contributors are combined using the root-sum-square method to obtain the standard uncertainty at 1 sigma. The standard uncertainty is then multiplied by 2 to obtain the expanded uncertainty at 2 sigma (k=2).

The expanded uncertainty presented in this report was calculated using methodology consistent with the ISO Guide to the Expression of Uncertainty in Measurement (the 'GUM') and NIST Technical Note 1297.

The expanded uncertainties(K=2) reported here do not contain estimates for (1) any effects that may be introduced by transportation of the instrument between ICL and the user's facility, (2) drift of the instrument, (3) hysteresis of the instrument, or (4) any measurement uncertainties introduced by the user.

NOTES AND SUPPLEMENTAL INFORMATION

All temperatures given in this report are those defined by the International Temperature Scale of (ITS-90)

IMPORTANT NOTE: The correct operation of digital electronic thermometers is dependent upon all components functioning properly. Correct temperature indication may be impeded by physical damage to the sensor or cable assembly, contamination of electrical contacts or components by water, oil or other materials, or by other, less obvious causes such as low battery level or failure of internal components. Accordingly, ICL Calibration Laboratories, Inc. represents that the values indicated above were those observed during the performance of this calibration however cannot be responsible for inaccurate readings which may be experienced in future uses due to conditions which are beyond our control.

TRACEABILITY INFORMATION

This calibration is traceable to NIST through an unbroken chain of comparisons. The reference standard is used to calibrate the transfer standard, which in turn is used to calibrate the client's instrument. Every step in the chain is fully documented, and measurement uncertainty has been calculated at each step.

Our NIST primary reference thermometer from -196 to 420C is a Rosemount model 162CE 25.5 Ohm SPRT, serial no. 5058, calibrated by NIST on August 17, 2012. NIST GMP-11 recommends a 36 month calibration cycle for SPRTs. PRT transfer standards and ASTM liquid-in-glass transfer standards are calibrated annually against this SPRT, per NIST GMP-11 recommendations.

Test Point	Comparator	MTE#	Manufacturer	Transfer Standard	MTE#	Manufacturer	Next Due
33.00°C	7310 Water bath	007	PolyScience	5628-15 PRT 2603 375		Fluke Cal	01/15/15
34.00°C	7310 Water bath	007	PolyScience	5628-15 PRT 2603 375		Fluke Cal	01/15/15
35.00°C	7310 Water bath	007	PolyScience	5628-15 PRT 2603 375		Fluke Cal	01/15/15

TECHNICIAN: *J. JEFF KELLY*

ICL CALIBRATION LABORATORIES, INC.

An ISO/IEC 17025 & ANSI/NCSL Z-540-1 accredited laboratory - American Association for Laboratory Accreditation Certificate #526.01

Approved by: Deborah M. Weber

J. Jeff Kelly, Technical Director
Deborah M. Weber, Quality Deputy

Reviewed by: Karen Mangold

Karen Mangold
This report document was prepared by LORI PARR

Date report issued: 04-10-2014 *Recalibration date specified by client: April 10, 2015*

NIST GMP-11 (Mar '03), 'Good Measurement Practice for Assignment and Adjustment of Calibration Intervals for Standards' states that, 'Temperature standards are dynamic with use. Shock, contamination and other factors can cause drift from accepted values'. Table 4 of GMP-11 recommends recalibration of liquid-in-glass thermometers, standard thermistors and PRTs at 12 month intervals. Liquid-in-glass thermometers used for 'Temperature Critical Parameters' should be recalibrated at 6 month intervals. NIST GMP-11 is available for download in Adobe .pdf format on our website at www.icllabs.com Follow the link for 'Downloads'.

The API 'Manual of Petroleum Measurement Standards', Chapter 7, June, 2001, specifies a 12 month recalibration interval for liquid-in-glass thermometers (see section 8.3) and for portable electronic thermometers (PETs). See section 8.2

The user should be aware that any number of factors may cause this instrument to drift out of calibration before the specified calibration interval has expired.

This calibration report applies only to the item calibrated. This calibration report shall not be used to claim product endorsement by the A2LA.