

**CALIBRATION REPORT FOR
DIGITAL THERMOMETER**

**WASHINGTON STATE PATROL
S/N: 091796 ID #SPXM02308
Report Number: Z239182**

ICL CALIBRATION LABORATORIES, INC.



Cert 526.01 Calibration

ISO/IEC 17025 and ANSI/NCSL Z540-1 accredited

The specialists in ASTM and laboratory thermometers & hydrometers

Members: A2LA ASTM API NCSLI ASQ NCWM

Setting new standards in calibration excellence!

1501 SE Decker Avenue, Suite 118, Stuart, FL 34994 USA

Tel: 772-286-7710 1-800-713-6647

Fax: 772-286-8737 email: sales@icllabs.com

Internet: www.icllabs.com

CALIBRATION REPORT FOR DIGITAL THERMOMETER

The instrument or device identified below was examined and calibrated in ICL's metrology laboratory 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 - IDS

6403 W. ROWAND ROAD

SPOKANE, WA 99224

Purchase order number: NOT AVAILABLE

Submitted by: WASHINGTON STATE PATROL

ICL internal reference (SO): 364705

DATES

Date received: 12-19-2016

Date report issued: 12-21-2016

Recalibration date specified by client: December 21, 2017

UUT (Unit Under Test) INFORMATION

Sensor information:

Manufacturer: GUTH LABS INC.

Model No: 4300

Serial No: 091796 ID #SPXM02308

Description: 165mm X 4.05mm STEM

Manufacturer's specified temperature range: 29.5 to 38.5 °C

Calibrated range (limited calibration): 33 to 35 °C

Sensor immersion: AT LEAST 93mm RECOMMENDED

Readout device information:

Manufacturer: GUTH LABS INC.

Model No: 4300

Serial No: 091796 ID #SPXM02308

Engineering units: degrees Celsius (°C) or degrees Fahrenheit (°F), user selectable.

NOTE: The accuracy tolerance for this system calibration (sensor and readout) is either the root-sum-square of the accuracy tolerance of the sensor and the accuracy tolerance of the readout device, (if separate, independent devices), or the manufacturer's specification for the sensor and readout combination. Please see the 'Tolerance' column which appears in the 'Results of Calibration' table on the next page.

RESULTS OF PHYSICAL EXAMINATION

The condition of this device was satisfactory with no visually apparent defects, unless noted below. Minor cosmetic defects are generally not noted unless they are judged to impact the usability of the device.

Technician's comments: UUT needs a full battery for calibration. A new 9 volt battery was installed prior to calibration.

CALIBRATION PROCEDURE

ICL Procedure 04, which references relevant elements of ASTM E77, ASTM E220, ASTM E644 and ASTM E2593.

LABORATORY ENVIRONMENTAL CONDITIONS

Temperature: 23 °C +/- 5 °C, Relative humidity: between 30% and 80%



RESULTS OF CALIBRATION

AS FOUND

Nominal Temp	Standard Rdg.	UUT Reading	Correction	Tolerance	Accept Limit*	P/F/Ind	Uncertainty
33.000 °C	32.998 °C	33.01 °C	-0.01 °C	± 0.020 °C	± 0.013 °C	Pass	± 0.016 °C
34.000 °C	33.999 °C	34.00 °C	0.00 °C	± 0.020 °C	± 0.013 °C	Pass	± 0.016 °C
35.000 °C	35.002 °C	35.01 °C	-0.01 °C	± 0.020 °C	± 0.013 °C	Pass	± 0.016 °C

The 'As Found' values were determined to be within tolerance, and no adjustment of this device was required or undertaken.

AS LEFT

Nominal Temp	Standard Rdg.	UUT Reading	Correction	Tolerance	Accept Limit*	P/F/Ind	Uncertainty
33.000 °C	32.998 °C	33.01 °C	-0.01 °C	± 0.020 °C	± 0.013 °C	Pass	± 0.016 °C
34.000 °C	33.999 °C	34.00 °C	0.00 °C	± 0.020 °C	± 0.013 °C	Pass	± 0.016 °C
35.000 °C	35.002 °C	35.01 °C	-0.01 °C	± 0.020 °C	± 0.013 °C	Pass	± 0.016 °C

GUARD BANDING

ISO/IEC 17025:2005(E) requires, in Section 5.10.4.2., that, "When statements of compliance are made, the uncertainty of measurement shall be taken into account." One valid way of complying with this requirement is applying a 'guard band' to the device's tolerance. The guard band is calculated as a function of the test uncertainty ratio (TUR), the ratio of the tolerance of the UUT to the measurement uncertainty. Basically, the smaller the uncertainty is relative to the tolerance, the smaller the guard band. A TUR of 5:1 typically results in a guard band of zero, or nearly zero. A 4:1 TUR produces in a guard band very close to zero. A 3:1 TUR results in a modest guard band. And so forth. As TUR declines, the guard band becomes larger. The use of the guard band in the decision process is designed to reduce the probability of a false acceptance (PFA), or a false failure, to 2% or less. The method and equations we use for calculation of the guard band comply with the requirements of ANSI/NCSS Z540.3

The *Accept Limit(s) are calculated by subtracting the guard band from the tolerance. The Accept Limit is essentially a new tolerance, for this calibration only, which we use to make a declaration of Pass, Fail, or Indeterminate, as explained below:

Pass The measured value falls within the interval described by the test point plus or minus the Accept Limit.

Fail The measured value falls outside the interval described by the test point plus or minus (the tolerance + the guard band).

Ind (Indeterminate) The measured value is indeterminate, falling in that statistical 'grey' area, too close to permit a credible determination. It is statistically and metrologically imprudent to declare that the instrument is definitively either 'in-tolerance' or 'out-of-tolerance'.

LIMITATIONS OF USE

This is a limited, or partial-range calibration, and accordingly, this instrument may be used with confidence only within the range bracketed by the test points. The calibrated range for this thermometer is effectively from 33 to 35 °C

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 both Type A and Type B contributors. Type A contributors include 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. Type B contributors include comparator uniformity, uncertainty of the calibration of the reference standard, stem conduction and other immersion effects, the sensitivity and accuracy of the reference standard thermometer's readout, resolution of the reference standard and resolution of the 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). This uncertainty calculation is consistent with the requirements of 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 1990 (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 contaminants, or by other, less obvious causes such as low battery level or failure of internal components. Accordingly, ICL Calibration Laboratories, Inc. represents that the calibration data provided in this report were those values observed during the performance of this calibration, however cannot be responsible for inaccurate readings which may be experienced in future uses due to conditions or circumstances which are beyond our control.

TRACEABILITY INFORMATION

This calibration is traceable to the International System of Units (the SI, or *Système international d'unités*) through NIST, via an unbroken chain of comparisons. Our primary temperature reference is a NIST calibrated SPRT (Standard Platinum Resistance Thermometer), used exclusively for the calibration of our working standard PRTs, which in turn are used to calibrate our clients' instruments. Measurement uncertainty, which increases at each comparison in the chain, has been calculated at each step and is fully documented.

ICL maintains three NIST calibrated Rosemount model 162CE 25.5 Ohm SPRTs, for redundancy and to permit sequential rotation to NIST for calibration. As of this date, traceability from -196 to 420 °C (-320 to 788 °F) is conveyed through S/N 5369, MTE-358, calibrated by NIST on May 28, 2015. NIST GMP-11 recommends a 36-month calibration interval for SPRTs. PRTs and other working standard thermometers are calibrated annually against the reference SPRT, per NIST GMP-11 recommendations, and are monitored continually using measurement assurance strategies including check standards, control charts and monthly triple point of water checks.

The comparators and working standards used in the performance of this calibration are indicated below, organized by test point.

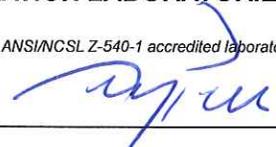
Nominal Temp	Calibration method	Comparator	Serial No.	MTE No.	Manufacturer
33.000 °C	Comparison w/PRT	PP15R water bath	1B13C0895	414	PolyScience
34.000 °C	Comparison w/PRT	PP15R water bath	1B13C0895	414	PolyScience
35.000 °C	Comparison w/PRT	PP15R water bath	1B13C0895	414	PolyScience

Nominal Temp	Standard used	Next Due	Serial No.	MTE No.	Manufacturer	Position
33.000 °C	5628-15 PRT	09/29/17	2521	374	Fluke Cal	Standard
33.000 °C	5628-15 PRT	09/29/17	2603	375	Fluke Cal	Check standard
34.000 °C	5628-15 PRT	09/29/17	2521	374	Fluke Cal	Standard
34.000 °C	5628-15 PRT	09/29/17	2603	375	Fluke Cal	Check standard
35.000 °C	5628-15 PRT	09/29/17	2521	374	Fluke Cal	Standard
35.000 °C	5628-15 PRT	09/29/17	2603	375	Fluke Cal	Check standard

TECHNICIAN: CHRIS 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:  _____

Reviewed by:  _____

Deborah M. Weber, Quality Associate
 J. Jeff Kelly, Senior Quality Associate
 Michael C. Kelly, Technical Manager
 Date report issued: 12-21-2016

This report document was prepared by Lori J. Parr
 Recalibration date specified by client: December 21, 2017

NIST GMP-11 (September 2014), 'Good Measurement Practice for Assignment and Adjustment of Calibration Intervals for Standards' cautions that, 'Temperature standards are dynamic with use. Shock, contamination and other factors can cause drift from accepted values'. GMP-11 recommends an initial calibration interval of 12 months for digital thermometers, standard thermistors and PRTs.

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 may not be reproduced except in full without the express written permission of ICL Calibration Laboratories, Inc.

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

End of Report No. Z239182



CERTIFICATE OF ANALYSIS
EBS - ETHANOL BREATH STANDARD

DRAEGER SAFETY DIAGNOSTICS, INC
ATTN: ACCOUNTS PAYABLE
101 TECHNOLOGY DRIVE

INVOICE#: 5091894
PO#: 45200767
CUST. ITEM #: 4401020
DATE: Aug. 19, 2016

METHOD OF ANALYSIS: IR Breath Alcohol Analyzer
ANALYTICAL ACCURACY: +/-0.002 BrAC or +/-2% whichever is greater.
CALGAZ LOT#: 499298
ETHANOL IN NITROGEN

PRODUCT EXPIRATION: Jul. 20, 2019

COMPONENT	PPM	(BrAC)
ETHANOL	208.4	(0.080)
NITROGEN	BAL	
AVERAGE ANALYTICAL VALUE	PPM	(BrAC)
ETHANOL	210.9	(0.081)

REFERENCE STANDARD	CYLINDER	CONCENTRATION PPM
N.M.I. TRACEABLE STANDARDS*	ND18375	260.6

* CERTIFICATION TRACEABLE TO National Metrology Institute Traceable Standards.

TRACEABILITY

Preparation:

Gas mixtures manufactured with balances calibrated by an ISO 17025 accredited company using NIST traceable weights and meets or exceeds the requirements of NIST Handbook 44.

Calibration test CG/01/05/16/DW01, CG/01/05/16/DW02, CG/01/05/16/DW03, or CG/01/05/16/DW04 dated, 5th January 2016 applies.

Analytical:

Analytical Instruments Calibrated Using NMI Traceable Standards.

Certification Numbers: 3222611-01, 3222611-02, 3222611-03, ND18375-20160516, 2014080238-2, 2014080238-3, ND38453-20151009

No affecting environmental conditions during analysis.

*NMI is recognized by NIST through the Mutual Recognition Agreement (CIPM MRA).
CALGAZ calibration devices were found to meet all applicable requirements of the National Highway Traffic Safety Administration Model Specifications for calibrating units for breath alcohol testers.

MANUFACTURED DATE: Jul. 20, 2016

CALGAZ CYLINDER SIZE: 6DM

APPROVED BY :

"We certify that all the cylinders for the Lot numbers identified herein are manufactured and tested within the requirements of CFR 49 part 178.65 and that physical and chemical test reports are on file and copies will be furnished upon request."

CALGAZ, Div. of Air Liquide America Specialty Gases LLC
821 Chesapeake Drive, Cambridge, MD 21613-0149
Phone: (410)228-6400 Fax: (410)228-4251