

QUALITY ASSURANCE SIMULATOR THERMOMETER CERTIFICATION RECORD

SIMULATOR SERIAL # DR3903

Date	Simulator Thermometer Serial #	Reference Thermometer Serial #	Simulator Thermometer Temperature	Reference Thermometer Temperature	Temperature Difference	Acceptable	Location	Simulator Serial #	Technician
09/23/13	DR3903	091798	34	33.98	-02	Y	SEATTLE LAB (VALIDATION)	DR3903	DENTON

QUALITY ASSURANCE SIMULATOR THERMOMETER CERTIFICATION RECORD

SIMULATOR SERIAL # DR3904

Date	Simulator Thermometer Serial #	Reference Thermometer Serial #	Simulator Thermometer Temperature	Reference Thermometer Temperature	Temperature Difference	Acceptable	Location	Simulator Serial #	Technician
09/23/13	DR3904	091798	34	33.97	-03	Y	SEATTLE LAB (VALIDATION)	DR3904	DENTON

QUALITY ASSURANCE SIMULATOR THERMOMETER CERTIFICATION RECORD

SIMULATOR SERIAL # DR4483

Date	Simulator Thermometer Serial #	Reference Thermometer Serial #	Simulator Thermometer Temperature	Reference Thermometer Temperature	Temperature Difference	Acceptable	Location	Simulator Serial #	Technician
09/30/13	DR4483	091797	34.01	33.98	-03	Yes	WSP Marysville DRAGER	DR4483	E. McCourt
04/23/13	DR4483	091797	34.06	34.05	-01	YES	TOX LAB	DR4483	MCOURT, E
05/03/12	DR4483	091797	33.98	33.96	-02	Yes	WSP Marysville .15 QAP	DR4483	E. McCourt
05/31/11	DR4483	091797	34.11	34.08	-03	Yes	WSP Marysville .15	DR4483	E. McCourt
10/06/10	DR4483	091797	33.98	33.97	-01	Yes	WSP Marysville .15	DR4483	E. McCourt
03/23/10	DR4483	091797	34.02	33.97	-05	Yes	WSP MARYSVILLE .15 QAP	DR4483	McCourt
09/10/09	DR4483	091797	34.07	34.04	-03	Yes	QAP .15 WSP Marysville	DR4483	E. McCourt
03/11/09	DR4483	091797	34.04	34.02	-02	Yes	WSP Marysville QAP .15	DR4483	E. McCourt
09/24/08	DR4483	091797	34.02	34	-02	Yes	WSP Marysville Lab .15 QAP	DR4483	E. McCourt
04/01/08	DR4483	091797	34.03	34	-03	Yes	.15 QAP WSP Marysville	DR4483	E. McCourt
10/01/07	DR4483	091797	33.99	33.96	-03	Yes	QAP .15 WSP Marysville	DR4483	E. McCourt
04/23/07	DR4483	091797	34.04	34.02	-02	Yes	WSP Marysville .15 QA	DR4483	E. McCourt

QA_thermcert

Revision: Original

QUALITY ASSURANCE SIMULATOR THERMOMETER CERTIFICATION RECORD

SIMULATOR SERIAL # DR4533

Date	Simulator Thermometer Serial #	Reference Thermometer Serial #	Simulator Thermometer Temperature	Reference Thermometer Temperature	Temperature Difference	Acceptable	Location	Simulator Serial #	Technician
09/23/13	DR4533	091798	34.01	33.99	-0.02	y	SEATTLE LAB (VALIDATION)	DR4533	DENTON

QA_thermcert
Revision: Original

Approved by the State Toxicologist

Page 1 of 1
Effective Date: 07/14/09

QUALITY ASSURANCE SIMULATOR THERMOMETER CERTIFICATION RECORD

SIMULATOR SERIAL # DR4760

Date	Simulator Thermometer Serial #	Reference Thermometer Serial #	Simulator Thermometer Temperature	Reference Thermometer Temperature	Temperature Difference	Acceptable	Location	Simulator Serial #	Technician
10/08/13	DR4760	091803	34.01	34	-.01	YES	TAC LAB VALIDATION	DR4760	A. Havener
04/23/13	DR4760	091803	34.06	34.06	.00	YES	TOX LAB	DR4760	HAVENNER,

QUALITY ASSURANCE SIMULATOR THERMOMETER CERTIFICATION RECORD

SIMULATOR SERIAL # DR4761

Date	Simulator Thermometer Serial #	Reference Thermometer Serial #	Simulator Thermometer Temperature	Reference Thermometer Temperature	Temperature Difference	Acceptable	Location	Simulator Serial #	Technician
10/07/13	DR4761	091803	34.06	34.05	-.01	YES	TAC LAB VALIDATION	DR4761	A. Havenner
04/23/13	DR4761	091803	34.01	34.06	.05	YES	TOX LAB	DR4761	HAVENNER,

QA_thermcert

Revision: Original

QUALITY ASSURANCE SIMULATOR THERMOMETER CERTIFICATION RECORD

SIMULATOR SERIAL # DR4968

Date	Simulator Thermometer Serial #	Reference Thermometer Serial #	Simulator Thermometer Temperature	Reference Thermometer Temperature	Temperature Difference	Acceptable	Location	Simulator Serial #	Technician
05/15/13	DR4968	091798	33.99	33.98	-.01	Yes	Burlington Lab .10 sim	DR4968	Cam Birman
06/14/12	DR4968	091795	34.13	34.12	-.01	Yes	Burlington .10 QAP Sim	DR4968	Cam Birman

QA_thermcert

Revision: Original

QUALITY ASSURANCE SIMULATOR THERMOMETER CERTIFICATION RECORD

SIMULATOR SERIAL # DR4990

Date	Simulator Thermometer Serial #	Reference Thermometer Serial #	Simulator Thermometer Temperature	Reference Thermometer Temperature	Temperature Difference	Acceptable	Location	Simulator Serial #	Technician
05/15/13	DR4990	091798	34.09	34.09	.00	Yes	Burlington Lab .15 sim	DR4990	Cam Birman
05/09/12	DR4990	091795	34.06	34.08	-.02	Yes	WSP Burlington .15 QAP	DR4990	Cam Birman

QA_thermcert

Revision: Original

QUALITY ASSURANCE SIMULATOR THERMOMETER CERTIFICATION RECORD

SIMULATOR SERIAL # DR4492

Date	Simulator Thermometer Serial #	Reference Thermometer Serial #	Simulator Thermometer Temperature	Reference Thermometer Temperature	Temperature Difference	Acceptable	Location	Simulator Serial #	Technician
09/23/13	DR4492	091798	33.99	33.97	-.02	Y	SEATTLE LAB (VALIDATION)	DR4492	DENTON

QA_thermcert

Revision: Original

Approved by the State Toxicologist

Page 1 of 1

Effective Date: 07/14/09

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CERT. 526.01 CALIBRATION

ISO/IEC 17025 and ANSI/NCSL Z540-1 accredited
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Internet: www.icllabs.com

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CALIBRATION REPORT FOR DIGITAL THERMOMETER

Report No. W204688 Page 1 of 2 SO: 346430

THE INSTRUMENT DESCRIBED BELOW WAS EXAMINED AND TESTED IN ICL'S ISO/IEC 17025 ACCREDITED CALIBRATION LABORATORY, USING NIST TRACEABLE REFERENCE STANDARDS, IN ACCORDANCE WITH ICL'S ISO/IEC 17025 CALIBRATION PROCEDURE REFERENCED BELOW. THIS CALIBRATION MEETS THE REQUIREMENTS OF ISO/IEC 17025, ANSI/NCSL Z540-1-1994, (WHICH SUPERSEDED AND REPLACED MIL-STD 45662A), AND THE ISO-9000 AND QS-9000 SERIES OF QUALITY STANDARDS.

CUSTOMER INFORMATION

WASHINGTON STATE PATROL
811 EAST ROANOKE
SEATTLE, WA 98102

PURCHASE ORDER NUMBER: NOT AVAILABLE

SUBMITTED BY: WASHINGTON STATE PATROL

DATES

DATE RECEIVED: 03-28-2013 DATE REPORT ISSUED: 04-02-2013

INSTRUMENT INFORMATION

DIGITAL THERMOMETER INSCRIPTION: GUTH LABS INC.

MODEL: 4300 RANGE: 29.5/38.5C DIVISIONS: 0.01°C IMMERSION: APPROX. 6 INCHES

ENGINEERING UNITS: degrees Celsius

SERIAL NUMBER: 091803

ACCURACY TOLERANCE: +/- 0.02C PER CUSTOMER

RESULTS OF PHYSICAL EXAMINATION

THIS INSTRUMENT WAS RECEIVED IN OPERABLE CONDITION, UNLESS OTHERWISE NOTED.

NOTE: The on/off switch pad was cleaned prior to calibration.

CALIBRATION PROCEDURE USED: ICL Procedure 04, which is drawn from ASTM E 77, E 220 and E 563

RESULTS OF CALIBRATION



AS FOUND

TEST TEMP	READING	CORRECTION	ACCEPT LIMIT* (+ or -)	P/M/F	UNCERTAINTY
33.001°C	33.01°C	-0.01°C	0.014°C	PASS	0.016°C
33.998°C	34.01°C	-0.01°C	0.014°C	PASS	0.016°C
35.001°C	35.00°C	0.00°C	0.014°C	PASS	0.016°C

NO ADJUSTMENTS WERE MADE TO THIS INSTRUMENT.

AS LEFT

TEST TEMP	READING	CORRECTION	ACCEPT LIMIT* (+ or -)	P/M/F	UNCERTAINTY
33.001°C	33.01°C	-0.01°C	0.014°C	PASS	0.016°C
33.998°C	34.01°C	-0.01°C	0.014°C	PASS	0.016°C
35.001°C	35.00°C	0.00°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:

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

Our best measurement capabilities are: at Liquid Nitrogen (approximately -196C), +/- 7.3 mK; from -80 to 0C, +/- 12 mK; at 0C, +/- 3.7 mK; at 0.01C (TPW), +/- 2.1 mK; from 0.01 to 100C, +/- 7.1 mK; from 100 to 200C, +/- 12 mK; from 200 to 300C, +/- 16 mK;

from 300 to 420C, +/- 21 mK; from 420 to 500C, +/- 0.068C; from 500 to 650C, +/- 0.068C; from 650 to 700C, +/- 1.3C; from 700 to 1000C, +/- 1.3C. These uncertainties have been calculated utilizing the methods elaborated in NIST Technical Note 1297 and the ANSI-NCSS document Z-540-2 entitled 'Guide to the Expression of Uncertainty in Measurement', commonly referred to as the 'GUM'. A coverage factor of 2 sigma (k=2) has been applied to the standard uncertainty in order to express the expanded uncertainty at approximately a 95% confidence level.

THE UNCERTAINTIES PRESENTED ABOVE IN THE 'RESULTS' TABLE ARE LARGER THAN OUR BEST MEASUREMENT CAPABILITIES, AS THE RESOLUTION OF THIS INSTRUMENT, ESTIMATED TO BE 0.01°C, AND OTHER CONTRIBUTIONS HAVE BEEN FACTORED INTO THE CALCULATION.

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 LABORATORY, (2) DRIFT OF THE INSTRUMENT, (3) HYSTERESIS OF THE INSTRUMENT, OR (4) ANY MEASUREMENT UNCERTAINTIES INTRODUCED BY THE USER.

LABORATORY ENVIRONMENTAL CONDITIONS: TEMPERATURE: 23°C +/- 2°C RELATIVE HUMIDITY: BETWEEN 30% AND 70%

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 ON ALL COMPONENTS FUNCTIONING PROPERLY. CORRECT TEMPERATURE INDICATION MAY BE IMPEDED BY PHYSICAL DAMAGE TO THE PROBE OR CABLE ASSEMBLY, CONTAMINATION OF ELECTRICAL CONTACTS WITH WATER, OIL, OR OTHER MATERIAL, OR BY 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 TEST HOWEVER CANNOT BE RESPONSIBLE FOR INACCURATE READINGS WHICH MAY BE EXPERIENCED IN FUTURE USES DUE TO CONDITIONS WHICH ARE BEYOND OUR CONTROL.

THIS CALIBRATION WAS PERFORMED BY: DEBORAH M. WEBER

THE CALIBRATION PERFORMED AND DOCUMENTED BY THIS CALIBRATION REPORT IS A LIMITED 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.

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 26.5 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	012	Polyscience	5614 PRT 524105	127	Hart Scientific	09/08/13
34.00°C	7310 water bath	012	Polyscience	5614 PRT 524105	127	Hart Scientific	09/08/13
35.00°C	7310 water bath	006	PolyScience	5614 PRT 576776	130	Hart Scientific	09/08/13

ICL CALIBRATION LABORATORIES, INC.

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

Approved by: _____

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

Data reviewed by: _____

Karen Mangold
This report document was prepared by LORI PARR

DATE REPORT ISSUED: 04-02-2013 RECALIBRATION DATE SPECIFIED BY CLIENT: April 02, 2014

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

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

Report No. W204688 Page 2 of 2 Serial No: 091803

ICL CALIBRATION LABORATORIES, INC.



CERT. 526.01 CALIBRATION

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CALIBRATION REPORT FOR DIGITAL THERMOMETER

Report No. W207589 Page 1 of 2 SO: 348096

THE INSTRUMENT DESCRIBED BELOW WAS EXAMINED AND TESTED IN ICL'S ISO/IEC 17025 ACCREDITED CALIBRATION LABORATORY, USING NIST TRACEABLE REFERENCE STANDARDS, IN ACCORDANCE WITH ICL'S ISO/IEC 17025 CALIBRATION PROCEDURE REFERENCED BELOW. THIS CALIBRATION MEETS THE REQUIREMENTS OF ISO/IEC 17025, ANSI/NC SL Z540-1-1994, (WHICH SUPERSEDED AND REPLACED MIL-STD 45662A), AND THE ISO-9000 AND QS-9000 SERIES OF QUALITY STANDARDS.

CUSTOMER INFORMATION

WASHINGTON STATE PATROL
811 EAST ROANOKE
SEATTLE, WA 98102

PURCHASE ORDER NUMBER: NOT AVAILABLE

SUBMITTED BY: WASHINGTON STATE PATROL

DATES

DATE RECEIVED: 07-22-2013 DATE REPORT ISSUED: 08-02-2013

INSTRUMENT INFORMATION

DIGITAL THERMOMETER INSCRIPTION: GUTH LABS INC.

MODEL: 4300 RANGE: 29.5/38.5C DIVISIONS: 0.01°C IMMERSION: APPROX. 6 INCHES

ENGINEERING UNITS: degrees Celsius

SERIAL NUMBER: 091797

ACCURACY TOLERANCE: +/- 0.02C PER CUSTOMER

RESULTS OF PHYSICAL EXAMINATION

THIS INSTRUMENT WAS RECEIVED IN OPERABLE CONDITION, UNLESS OTHERWISE NOTED.

CALIBRATION PROCEDURE USED: ICL Procedure 04, which is drawn from ASTM E 77, E 220 and E 563

RESULTS OF CALIBRATION

AS FOUND

TEST TEMP	READING	CORRECTION	ACCEPT LIMIT* (+ or -)	P/M/F	UNCERTAINTY
33.001°C	33.01°C	-0.01°C	0.014°C	PASS	0.016°C
33.997°C	34.00°C	0.00°C	0.014°C	PASS	0.016°C
34.996°C	35.00°C	0.00°C	0.014°C	PASS	0.016°C

NO ADJUSTMENTS WERE MADE TO THIS INSTRUMENT.

AS LEFT

TEST TEMP	READING	CORRECTION	ACCEPT LIMIT* (+ or -)	P/M/F	UNCERTAINTY
33.001°C	33.01°C	-0.01°C	0.014°C	PASS	0.016°C
33.997°C	34.00°C	0.00°C	0.014°C	PASS	0.016°C
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*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:

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

Our best measurement capabilities are: at Liquid Nitrogen (approximately -196C), +/- 7.3 mK; from -80 to 0C, +/- 12 mK; at 0C, +/- 3.7 mK; at 0.01C (TPW), +/- 2.1 mK; from 0.01 to 100C, +/- 7.1 mK; from 100 to 200C, +/- 12 mK; from 200 to 300C, +/- 16 mK; from 300 to 420C, +/- 21 mK; from 420 to 500C, +/- 0.068C; from 500 to 650C, +/- 0.068C; from 650 to 700C, +/- 1.3C; from 700 to 1000C, +/- 1.3C. These uncertainties have been calculated utilizing the methods elaborated in NIST Technical Note 1297 and the



ANSI-NCSL document Z-540-2 entitled 'Guide to the Expression of Uncertainty in Measurement', commonly referred to as the 'GUM'. A coverage factor of 2 sigma (k=2) has been applied to the standard uncertainty in order to express the expanded uncertainty at approximately a 95% confidence level.

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THIS CALIBRATION WAS PERFORMED BY: DEBORAH M. WEBER

THE CALIBRATION PERFORMED AND DOCUMENTED BY THIS CALIBRATION REPORT IS A LIMITED CALIBRATION AND ACCORDINGLY, LIMITATIONS OF USE ARE IMPOSED AS FOLLOWS:

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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	012	Polyscience	5628-15 PRT 1211	271	Hart Scientific	09/08/13
34.00°C	7310 water bath	012	Polyscience	5628-15 PRT 1211	271	Hart Scientific	09/08/13
35.00°C	7310 water bath	012	Polyscience	5628-15 PRT 1211	271	Hart Scientific	09/08/13

ICL CALIBRATION LABORATORIES, INC.

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Approved by:

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

Date reviewed by:

Karen Mangold
This report document was prepared by LORI PARR

DATE REPORT ISSUED: 08-02-2013 RECALIBRATION DATE SPECIFIED BY CLIENT: August 02, 2014

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

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

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Internet: www.icllabs.com

CALIBRATION REPORT FOR DIGITAL THERMOMETER

Report No. W208889 Page 1 of 2 SO: 348743

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: 08-30-2013 Date report issued: 09-11-2013

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: 091798

Accuracy tolerance: +/- 0.02C (PER CUSTOMER)

RESULTS OF PHYSICAL EXAMINATION

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

NOTE: UUT was received with a low battery. A new 9 volt battery was installed prior to calibration.

NOTE: The on/off switch pad was cleaned.

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	33.00°C	0.00°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
34.999°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	33.00°C	0.00°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
34.999°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



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. According, ICL Calibration Labs, 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.

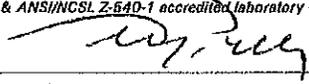
Our NIST primary reference thermometer from -196 to 420C is a Rosemount model 162CE 25.5 Ohm SPRT, serial no. 5058, calibrated by NIST on August 17, 2012. NIST GMP-11 recommends a 36 month calibration cycle for SPRTs. PRT transfer standards and ASTM liquid-in-glass transfer standards are calibrated annually 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	012	Polyscience	5614 PRT 524105	127	Hart Scientific	09/08/14
34.00°C	7310 water bath	012	Polyscience	5614 PRT 524105	127	Hart Scientific	09/08/14
35.00°C	7310 water bath	012	Polyscience	5614 PRT 524105	127	Hart Scientific	09/08/14

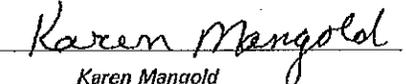
TECHNICIAN: DEBORAH M. WEBER

ICL CALIBRATION LABORATORIES, INC.

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Date report issued: 09-11-2013

Recalibration date specified by client: September 11, 2014

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.

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

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