

ICL CALIBRATION LABORATORIES, INC.



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

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REPORT OF TEST FOR DIGITAL THERMOMETER

THIS IS TO CERTIFY THAT THE INSTRUMENT DESCRIBED BELOW HAS BEEN EXAMINED AND TESTED IN ICL'S CALIBRATION LABORATORY USING THE MOST SENSITIVE MICROPROCESSOR CONTROLLED CONSTANT TEMPERATURE EQUIPMENT AVAILABLE, AGAINST NIST CALIBRATED PRIMARY 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, MIL-STD 45662A, THE ISO9000, AND THE QS9000 SERIES OF QUALITY STANDARDS.

CUSTOMER INFORMATION:

GUTH LABORATORIES, INC.
590 NORTH 67TH STREET
HARRISBURG, PA 17111

PURCHASE ORDER NUMBER: 2025706

SUBMITTED BY: GUTH LABORATORIES, INC. DATE RECEIVED FOR CALIBRATION: 06-26-2002

INSTRUMENT DESCRIPTION:

Serial No: 300905 Inscription: EUTECHNICS Date report issued: 07-10-2002 Scale: Celsius (Centigrade)

DIGITAL THERMOMETER Scale range: -20/130C Scale divisions: .01 °C Immersion: PROBE

MODEL NO: 4400 TOLERANCE: +/- 0.015C

RESULTS OF PHYSICAL EXAMINATION:

THE PHYSICAL CONDITION OF THIS INSTRUMENT WAS SATISFACTORY AND IT APPEARED THAT ALL SYSTEMS WERE FUNCTIONAL.

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

RESULTS OF CALIBRATION:

| TEST TEMPERATURE | 'AS FOUND' READING | 'AS LEFT' READING | CORRECTION | EXPANDED UNCERTAINTY (K=2) |
|------------------|--------------------|-------------------|------------|----------------------------|
| 33.00°C | 32.99°C | 32.99°C | 0.01°C | 0.021°C |
| 34.00°C | 33.99°C | 33.99°C | 0.01°C | 0.021°C |
| 35.00°C | 34.99°C | 34.99°C | 0.01°C | 0.021°C |

THE 'AS FOUND' READINGS WERE WITHIN THE TOLERANCE STATED ABOVE AND NO ADJUSTMENTS WERE MADE TO THIS INSTRUMENT.

OUR CALIBRATION SYSTEM UNCERTAINTIES ARE AS FOLLOWS: FROM -80 to <-41C, +/- 0.045C; FROM -41 to <0C, +/- 0.017C; AT 0C, +/- 0.006C; FROM >0 to 28C, +/- 0.019C; FROM >28 to 105C, +/- 0.018C; FROM >105 to 150C, +/- 0.021C; FROM >150 to 200C, +/- 0.024C; FROM >200 TO 300C, +/- 0.039C; FROM 300 TO 410C, +/-0.052C; FROM >410 to 700C, +/-0.74C; FROM >700 to 900C, +/- 0.81C; >900C to 1000C, +/- 0.95C THESE UNCERTAINTIES HAVE BEEN CALCULATED ACCORDING TO ANSI-NCSL Z540-2, 'GUIDE TO THE EXPRESSION OF UNCERTAINTY IN MEASUREMENT', USING A COVERAGE FACTOR OF K=2 TO EXPRESS THE EXPANDED UNCERTAINTY AT APPROXIMATELY A 95% CONFIDENCE LEVEL.

THE UNCERTAINTIES PRESENTED ABOVE IN THE 'RESULTS' TABLE MAY BE LARGER THAN OUR SYSTEM UNCERTAINTIES, AS THE RESOLUTION OF THIS INSTRUMENT, ESTIMATED TO BE 0.01°C, HAS 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 40% AND 60%

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: J. JEFF KELLY

THE CALIBRATION PERFORMED AND DOCUMENTED BY THIS REPORT OF TEST 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

The NIST primary reference standard(s), transfer standard(s) and, (if applicable), comparator(s) used in this test are listed below:

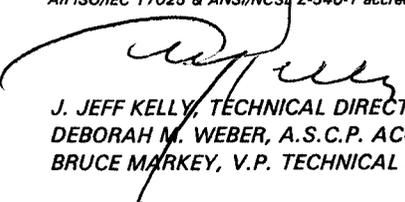
TEMP: 33.00°C Reference: NIST SPRT S/N 1035, Transfer standards: 537360 & 24453 Comparator: PolyScience water bath MTE-06
TEMP: 34.00°C Reference: NIST SPRT S/N 1035, Transfer standards: 537360 & 24453 Comparator: PolyScience water bath MTE-06
TEMP: 35.00°C Reference: NIST SPRT S/N 1035, Transfer standards: 537360 & 24453 Comparator: PolyScience water bath MTE-06

THE NIST REFERENCE THERMOMETER REFERRED TO ABOVE IS A STANDARD PLATINUM RESISTANCE THERMOMETER (SPRT), CALIBRATED BY NIST IN APRIL, 2001. ICL HAS SPECIFIED A ONE YEAR PERIOD OF VALIDITY FOR THIS CALIBRATION. ALL PRT TRANSFER STANDARDS WERE CALIBRATED AGAINST THIS SPRT IN JANUARY OF 2002, AND ARE ON A SIX MONTH CALIBRATION INTERVAL. LIQUID IN GLASS TRANSFER STANDARDS WERE CALIBRATED IN JULY OF 2001 AGAINST THIS SPRT AND ARE ON A ONE YEAR CALIBRATION INTERVAL.

THE EXPANDED UNCERTAINTIES (K=2) PROVIDED BY NIST FOR THIS SPRT CALIBRATION ARE AS FOLLOWS: -195.6 to <0C: +/- 0.0023C; 0.01C: +/- .0014C; >0 to 95C: +/- 0.0024C; >95C to 300C: +/- 0.0048C; >300 to 420C: +/- 0.0075C

ICL CALIBRATION LABORATORIES, INC.

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


J. JEFF KELLY, TECHNICAL DIRECTOR
DEBORAH M. WEBER, A.S.C.P. ACCREDITED TECHNOLOGIST
BRUCE MARKEY, V.P. TECHNICAL SERVICES



This document prepared by LORI PARR and reviewed by KAREN ALLEBORN

DATE REPORT ISSUED: 07-10-2002 THIS CALIBRATION IS VALID THROUGH: July 10, 2003

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 report applies only to the item calibrated.

SERIAL NUMBER: 300905
REPORT NUMBER: KF109167

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