



Calibration Standards, Records, and Tips

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*The World's Finest Manufacturers of
Temperature, Pressure & Humidity,
Test and Calibration Instruments*

Calibration Laboratory Standards

- Exist to ensure metrological functions are performed using sound metrology techniques

Common Standards

- **Common Standards are:**
 - ISO 17025
 - ISO 10012
 - ANSI / NCSL – Z540.3-2006
 - MIL-STD-45662

ISO 17025:2005

- **General Requirements for the Competence of Testing and Calibration Laboratories**
 - Quality System for calibration labs
 - Includes technical competency
 - Requires 3rd party accreditation

ISO 10012:2003

- **Similar to the 17025 technical section**
 - Used in conjunction with ISO 9000 QMS
 - Requires 3rd party accreditation

ANSI / NCSL – Z540.3-2006

- **Current standard for ensuring equipment and techniques used in calibration of measurement equipment are technically sound**
 - No accreditation required
 - Does not include QMS requirements

MIL-STD-45662

- **Retired Military standard for control of calibration equipment and processes**
 - Replaced by ANSI Z540

Other Relative Standards

- **ILAC-G24**
 - International Laboratory Accreditation Cooperation
- **ASTM E2623**
- **ASTM E2593**

ILAC-G24

- **Guidelines for determination of calibration intervals of measuring instruments**
- **Available at: www.ilac.org**

ASTM E2623

- **Standard Practice for Reporting Thermometer Calibrations**
- **Contains sample calibration reports**
- **Available at: www.astm.org**

ASTM E2593

- **Standard Guide for Accuracy Verification of Industrial Platinum Resistance Thermometers**
- **Includes verification of accuracy and evaluation of calibration uncertainties**
- **Available at: www.astm.org**

Calibration Standards



Questions?

Calibration Record

- **Document detailing all pertinent information for a specific calibration performed**
- **Required for Temperature Indicating Devices and Reference Devices when calibration is performed in-house**

Proposed Rule Ref: 113.40(a)(1)(ii)...(A)...(B)

NIST TRACEABLE CERTIFICATE OF CONFORMANCE

Customer Info

CUSTOMER: _____
PURCHASE ORDER NO: _____ ORDER NO: _____
MODEL/PART NO: _____ QTY: _____
SERIAL NO.(S): _____

This is to certify that the instrument(s) listed above were calibrated to meet the published catalog specifications.

Standards

Uncertainty Statement

Our Quality Management System is certified to conform to ISO9001:2008. We maintain a calibration system in conformance with ANSI/NCSL Z-540 and MIL-STD-45662A. Calibrations are performed against standard instruments, traceable to the National Institute of Standards and Technology (NIST). Unless otherwise indicated, the standards used have a test ratio of four times greater than the unit being calibrated. Measurement uncertainties are estimated at a confidence level of 95%. This report shall not be reproduced, except in full, without written approval of the laboratory.

ATTACHMENT: NIST Traceable Calibration Data Sheet(s) are included and are a part of this certification.

APPLICABLE PROCEDURE(S): _____

Procedure

Report #

TEST REPORT NO.s : _____

Signatures

NAME: _____
TITLE: _____

DATE

Records, and Tips

CALIBRATION DATA SHEET FOR NIST TRACEABILITY

DST/DSX 500/600 SERIES METER DISPLAY SECTION

Customer Name: _____ Test Report Number: _____
 Meter Model Number: _____ S/N: _____
 Probe Model Number: _____ S/N: _____
DATA: As Rec'd: _____ As Left: _____ Temp: _____ %R.H.: _____

General Info

Data Type

Accuracy specification is: $\leq 300F(148.89C) = .3F(.2C)$; $> 300F(148.89C) = .25\%$.
 As left spec is As received * .75.

Accuracy Specification:	°F	°C
$\leq 300^{\circ}F$ (148.89°C) in °	0.225	0.1333
$> 300^{\circ}F$ (148.89°C) in %	0.1875	0.1875

°F Data						
	Temperature Source	Bath Temperature		Display Reading	Error °F	P/F Status
		Nom°F	Act°F			
Test Point 1						
Test Point 2						
Test Point 3						
Test Point 4						
Test Point 5						

Data

°C Data						
	Temperature Source	Bath Temperature		Display Reading	Error °C	P/F Status
		Nom°C	Act°C			
Test Point 1						
Test Point 2						
Test Point 3						
Test Point 4						
Test Point 5						

Notes: Measurements are made in °F and calculated to derive °C data.
 For transmitter versions, attach QCR-155 for transmitter data.

Standard Instrument

INSTR NO.	DESCRIPTION	MODEL NO.	SERIAL NO.	CALIB DATE	CALIB DUE	MFG	TEST NO.
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

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www.palmerw

Conducted by: _____ Date: _____
 Q.S. Acceptance: _____ Date: _____

Symposium
 Signatures
 April 2, 2010

Calibration Record

- **Includes the following:**
 - Test Report Number: Unique document ID# assigned by test lab or department
 - Customer Info: Name, address, contact information, PO#, and location

Unit Under Test

- **UUT information to include:**
 - Manufacturer
 - Model #
 - Serial number
 - Unique ID# (your in-house reference number)

Proposed Rule Ref: 113.40(a)(1)

Calibration Information

- **Calibration information to include:**
 - Test procedure # (SOP, Work Instruction)
 - Date of Calibration
 - Calibration performed by: name, company, location
 - Environmental conditions
 - Temperature
 - Relative Humidity Percentage

Indication of Type of Data

- **“As Found Data” – “Before Data”**
 - Measurement data prior to adjustment
 - Critical for determining effects of out of tolerance conditions
- **“As Left Data” – “After Data”**
 - Measurement data after adjustments are made

Calibration Data

- **Usually in chart form and includes:**
 - Temperature source (ice bath, oil bath, steam bath, etc.)
 - Actual Temperature
 - UUT reading
 - Error, deviation, correction
 - Allowable error - (may be in SOP)
 - Indication of In Tolerance or Out of Tolerance
 - Accept / Reject
 - Pass / Fail

Standard Instruments / Equipment

- **Standard Instruments / Equipment - Calibrated Reference Device**
 - ID #'s
 - Description
 - Calibration due date

Proposed Rule Ref: 113.40(a)(1)...(B)

Miscellaneous

- **Signatures**
- **Legal Statements**
 - Statement of Measurement Uncertainty
 - “May not be reproduced, except in full, without permission...”
- **Calibration tags**
 - To list customer specified due date
- **Retention time of reports**

Calibration Tips

- **Recall Software**
 - Search on “Calibration Recall Software”
- **Test Report Numbers**
 - If done in-house, MS Access database or similar
- **Before adjustment measurements first!**
 - If data is in tolerance, adjustments may not be necessary, and before and after data may be the same

Calibration Tips

- **Data:** If forms perform automatic calculations, the form must be validated!
- **Calibrate in environmentally controlled areas or choose your time carefully**
- **Data** - Look at it!
- **Labels** - Brother P-Touch printer or equivalent
- **Personnel training** - “Trained, competent personnel” required

Calibration Technician



Calibration Standards, Records, and Tips

Calibration Records

Questions?

Thank you