

# CALIBRATION PROCEDURE

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Abstract:

This document describes calibration procedures.

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**REVISION LOG**

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## 1.0 PURPOSE

This document defines the procedures necessary for calibration of measuring equipment.

## 2.0 THEORY

Measurement results are only valid when M&TE of known accuracy is used. This calibration procedure ensures M&TE is properly verified for accuracy against known standards. Measurement devices that are used to indicate process feedback are not subject to calibration, such as short-circuit or open-circuit, hot or cold, off or on, etc; however, when a measurement device is used to determine conformance to a Customer requirement, then the device should be properly verified for accuracy.

## 3.0 DEFINITIONS

- Accuracy Ratio – [REDACTED]
- Adequacy - [REDACTED]
- Calibration: [REDACTED]
- Gages – [REDACTED]
- Inspection Aid – [REDACTED]
- M&TE - [REDACTED]
- Procurement of M&TE - [REDACTED]
- Recall – [REDACTED]
- Significantly out-of-tolerance - [REDACTED]
- Special Equipment [REDACTED]
- Standards - [REDACTED]

## 4.0 GENERAL CALIBRATION PROCEDURE

4.1 Calibration is performed by [REDACTED].

4.2 Measuring instruments are to be calibrated at a temperature of [REDACTED] and [REDACTED] relative humidity. Sufficient temperature stabilization time is allowed before calibration. For cases where calibration must be conducted in the production area, [REDACTED]

4.3 A number is issued when a gage does not provide its own serial number. [REDACTED]

4.4 All M&TE are kept clean and when not in use are [REDACTED]

4.5 A **Recall Log** is maintained on all M&TE and standards. The log provides [REDACTED]

4.6 The number of items scheduled for monthly recertification is [REDACTED]

4.7 In addition to the **Recall Log**, a **Calibration Report** is kept on each Company-owned gage/standard, which includes [REDACTED]

4.8 Calibration intervals may be established based on one or more of the following criteria: [REDACTED]

4.9 Adjustable M&TE is periodically recalibrated based upon [REDACTED]

TABLE I, Calibration Intervals

Calibration Cycle	Recalibration Cycles to Qualify for New Calibration Cycle	New Calibration Cycle
Annual	[REDACTED]	[REDACTED]
Bi-Annual	[REDACTED]	[REDACTED]
3 - 4 Years	[REDACTED]	[REDACTED]
5 Years	[REDACTED]	[REDACTED]

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4.10 Interval Adjustment: M&TE whose calibration error is recorded as being greater than the last recorded calibration error but not significantly out of tolerance [REDACTED]

4.11 M&TE calibration intervals may be extended or adjusted [REDACTED]

4.12 Overdue items should be [REDACTED]

4.13 A **Calibration Sticker** is used to identify individual items of M&TE. The sticker displays [REDACTED]

4.14 Calibration Standards/Special Equipment  
 The following is the position of the National Conference of Standards Laboratories (NCSL):  
 [REDACTED]

Calibration of standards/special equipment is conducted by checking against laboratory standards available at outside laboratories. Approved calibration laboratories are listed in the **Approved Supplier's List**. When calibrations are made for standards/special equipment, the calibration lab is required to submit a report that contains, as appropriate:

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

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4.15 A **Calibration Report** and **Recall Log** is maintained on all Transfer Standards, indicating [REDACTED]

4.16 The calibration department places all Customer furnished inspection gages in the calibration system unless [REDACTED]

4.17 Traceability: **Inspection Work Instructions** and **Manufacturing Travelers** specify measurement and test equipment utilized for product conformance inspection.

When specified, [REDACTED]

4.18 Non-Calibrated M&TE: Upon request, non-calibrated M&TE may be submitted for calibration. Non-calibrated measurement devices may [REDACTED] under the following conditions:

- 1) [REDACTED]
- 2) [REDACTED]

A non-calibrated measurement device that is verified accurate [REDACTED]

4.19 Calibration Not Required M&TE

4.19.1 [REDACTED] is exempt from calibration, such as but not limited to [REDACTED]

4.19.2 [REDACTED] that is checked for accuracy prior to use [REDACTED]

4.19.3 [REDACTED] are exempt from calibration, such as but not limited to [REDACTED]

4.19.4 [REDACTED] are exempt from shelf life control.

NIST traceability is not required for [REDACTED]

4.19.5 [REDACTED] are exempt from calibration; however, [REDACTED]

4.19.6 [REDACTED] are exempt from calibration; however, [REDACTED]

4.20 Employee Owned Tools: Personal tooling or gages owned by employees are calibrated prior to use and are placed on a calibration schedule.

4.21 Storage and Handling of M&TE: [REDACTED]

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4.22 M&TE requiring transportation to a calibration laboratory is [REDACTED]

4.23 M&TE storage areas are [REDACTED]

4.24 Archive / Long-Term Storage: M&TE does not require accuracy verification prior to archive / long-term storage if it was not:

- [REDACTED]
- [REDACTED]
- [REDACTED]

M&TE that has been calibrated and stored must [REDACTED]

## 5.0 OUT-OF-TOLERANCE EQUIPMENT AND TOOLING

5.1 Calibrated M&TE that is found to be significantly out of tolerance, damaged, inoperative, erratic or exhibiting some other form of anomalous condition is [REDACTED]

5.2 M&TE found significantly out of tolerance at recalibration for 2 interval cycles is [REDACTED]

5.3 An instrument whose calibration error is significantly out-of-tolerance over a short portion of a specified range may [REDACTED]

5.4 Any product certified with M&TE subsequently found to be out-of-tolerance is [REDACTED]



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## 6.0 LOST EQUIPMENT

6.1 Measurement and test equipment that cannot be located is classified as "Lost".

## 7.0 MANAGEMENT REVIEW

7.1 Management Review meetings are conducted according to the *QMS-04 Management Process Procedure*. During Management Review,

## APPENDIX 1

Setting and/or selecting a reference standard to calibrate a measurement device.

Requirement:

The measurement range of a device being checked for accuracy must

**VOLTMETER:**

A voltmeter shall be verified for accuracy within an equivalent range on the reference standard:

A voltmeter reference standard may have scales that range from 2-20V, 20-200V, etc.

The voltmeter being checked for accuracy must be set to bracket within a range of the reference standard - or -

**OTHER MEASUREMENT DEVICES**

Any reference standard whose maximum measurement range is the same as the device being checked for accuracy must

For instance,

## APPENDIX 2

Nonadjustable M&TE is inherently stable and includes

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The Operator is only required to check inherently stable M&TE for damage prior to each use because

[REDACTED]

For instance,

[REDACTED]

To control the inventory of inherently stable M&TE, the Responsible Authority

[REDACTED]

[REDACTED]

[REDACTED]

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