



Quality Procedures Manual

Metrology System Maintenance

1. POLICY.

FDE is committed to proper selection, repair, and calibration of Measurement & Test Equipment (M&TE) and measurement standards used to verify quality and accuracy of products and services delivered to the customer.

2. RESPONSIBILITY.

The Quality Assurance Department, under direction of the QA Manager, is responsible for establishing and monitoring the company test equipment and measurement standards program. This procedure applies to the calibration, repair and/or modification of all M&TE and measurement standards utilized by FDE in the performance of providing products or services; and to all departments and individuals who use these items.

3. DEFINITIONS.

Calibration: "The comparison of M&TE or measurement standards of unknown accuracy to a measurement standard of known accuracy in order to detect, correlate, report, or eliminate by adjustment any variation in the accuracy of the instrument being compared." (MIL-STD 45662A, Par. 3.1), or
"The comparison of an ensemble of unverified uncertainty to a calibration ensemble of quantified uncertainty to detect or correct any deviation from required performance specifications." (ANSI)

Calibration control: A documented system for assuring that measuring and test equipment devices and measurement standards are calibrated, and that this is done at intervals that assure their accuracy.

Calibration interval: The period of time between calibrations. Intervals can vary for devices depending upon their stability, purpose, and degree of usage.

Calibration system: A documented system for assuring that measuring and test equipment devices and measurement standards are calibrated, and that this is done at periodic intervals that assure their accuracy and traceability.

Calibration recall: A system for indicating in advance the mandatory recall date for re-calibration of each measuring and test equipment device and for each measurement standard.

Certification: Approval given for the use of newly acquired or reworked or modified measuring and test equipment devices or processes following an examination that has verified that they are compatible with other devices or processes in the system and when calibrated according to specifications are accurate and capable of fulfilling intended functions.

Measuring and test equipment (M&TE): "All devices used to measure, gage, test, inspect or otherwise determine compliance with prescribed technical requirements." (MIL-STD 45662A, Par. 3.3)

Measurement standard (reference): An instrument or device of the highest order of accuracy which is used in a calibration system as a primary standard of reference, its accuracy traceable to the NIST.

Measurement standard (transfer): An instrument or device in a calibration system used to transfer measurements from the reference standard to a lower echelon "working" standard or directly to the measuring or test equipment being calibrated so as to avoid wear or deterioration of the reference standard.



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Measurement standard (interim): An instrument used as a standard until an authorized standard is established.

Metrology: The science of testing and measurements.

4. IMPLEMENTATION.

- A. All M&TE and measurement standards used to determine an item's conformance to specified requirements (Level I Equipment) are to be calibrated. This calibration is to occur at regularly scheduled intervals as determined by the QA Manager using manufacture or Government recommendations as a basis and also considering the items stability, purpose, and environment. Calibration shall be undertaken anytime there is reason to believe the instrument or device needs recalibration.
- B. All M&TE devices will be calibrated to “working” measurement or “transfer” measurement standards. These in turn will have been calibrated to reference measurement standards which are calibrated and certified by NIST.
- C. Calibration History records are to be maintained that identify each item of M&TE and each measurement standard. This history will list and date each instance of calibration, citing measurements and adjustments. The records are to be able to demonstrate traceability of the calibration process to NIST.
- D. Each item of M&TE or measurement standard is to be labeled showing the date of the most recent calibration, the number of the technician who performed the calibration, and the date when the next calibration is scheduled. If the item is too small for this type of marking, a color code or smaller identifying mark is to be used which is keyed to independently maintained records that cite the same data.
- E. Departments using measuring and test equipment are responsible for monitoring calibration due dates and submitting instruments and devices for calibration on schedule.
- F. Inspectors and service technicians shall not accept measurement values obtained on non-Level I M&TE or on Level I M&TE that has exceeded calibration due dates.
- G. M&TE instruments and device calibration due dates can be extended by written authorization of the QA Manager but in no case beyond 30 days from the original due data.
- H. Employee owned measuring equipment shall not be used for any calibration or product acceptance measurements and must be marked with Level II M&TE labels indicating that the item is not controlled or calibrated and is for reference only.
- I. Purchasing is responsible for coordinating with Quality Assurance in the selection and acquisition of commercial M&TE, including the evaluation and selection of subcontractors to perform M&TE calibration and/or repair.
- J. All new, repaired or modified M&TE are to be examined and when proven acceptable, submitted for calibration.
- K. The Purchasing Department is responsible for securing and providing to the QA Manager calibration and maintenance instructions for all commercial M&TE that has been procured.



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- L. The QA Manager will be responsible for procuring and maintaining all measurement standards required to support product measurement requirements.
- M. The QA Manager will be responsible for developing interim measurement standards in those instances where reference measurement standards are not yet established.
- N. M&TE that has exceeded the calibration due date shall be marked with “Out-of-Service” labels and removed from inspection and test areas.
- O. Computers and other equipment in inspection and test areas that do not require control and calibration may be marked with Level III equipment labels, indicating no calibration is required.

5. REFERENCE.

Forms: [QP-013](#), Calibration Labels