

AMS_02

CALIBRATION POLICIES AND PROCEDURES



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AMS Quality Control Department



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1. PROCEDURE

This procedure specifies the responsibilities for controlling the accuracy of measuring and test equipment to be used during AMS_02 integration phases in the Clean room at CERN, Preveessin, Bldg 867 .

2. APPLICATION

This procedure applies to the AMS_02 quality control department and to all AMS *Groups and individuals who use measuring and test equipment in AMS* integration phases. The AMS quality control department has the prime responsibility for operation of the calibration system.

3. DEFINITION

3.1 CALIBRATION: comparing measuring and test equipment with measuring standards known accuracy, to detect and adjust deviations from the standards. Calibration is needed to control measurement errors and uncertain to acceptable levels. For calibration of measuring and test equipment, acceptable levels of uncertainty are defined by the tolerance limits of the equipment's parameters established by the manufacturers. The outcome is the maintenance of the equipment within the defined accuracy of the manufacturer's design tolerances.

3.2 CALIBRATION CONTROL: a documented system for assuring that measuring and test equipment devices are calibrated, and that this is done at intervals that assure accuracy.

3.3 CALIBRATION RECALL: a system for indication in advance for each measuring and test equipment devices and the date when it is next due to be calibrated.

3.4 CALIBRATION INTERVAL: the period of time between calibration intervals can vary for devices depending upon their stability, purpose, and degree of usage.

3.5 CERTIFICATION: approval given for the use of newly acquired or reworked, modified measuring and test equipment devices or processes following an examination that has verified that they are compatible with other devices to be processed into the system, and, capable of fulfilling intended functions.

3.6 MEASURING AND TEST EQUIPMENT: all devices used to measure, gauge, test, inspect, or otherwise examine items to determine compliance with specifications.

3.7 MEASUREMENT STANDARD (REFERENCE): an instrument or device of the highest order of accuracy which is used in a calibration system as primary standard of reference, its accuracy traceable to the National Institute of Standard and Technology or equivalent European National Metrology Institutes.

3.8 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 to avoid wear or deterioration of the reference standard.

3.9 MEASUREMENT STANDARD (INTERIM): an instrument used as standard until an authorized standard is established.

4. PROCEDURE

4.1 GENERAL

4.1.1 All measuring and test equipment instruments and devices used to determine item's conformance to specifications requirements will be calibrated. This calibration will occur at regularly schedule intervals determined on the basis of stability, purpose, and usage or sooner if there is some reason to believe that the instrument or device needs recalibration

Generally calibration will be performed at the following events:

- Initial purchase
- Repair
- Periodic calibration (See Table I)
- When accuracy is in doubt

4.1.2 All measuring and test equipment devices will be calibrated to working measurement standards or transfer measurement standards which are calibrated and certified by the National Institute of Standards and Technology or equivalent European National Metrology Institutes. Calibration will be performed by external contractors with verifiable standard traceability.

4.1.3 AMS quality control department is responsible in the selection and acquisition of contractors to perform measuring and test equipment calibration and/or repair work for the AMS owned equipments.

4.1.4 Records will be maintained with all the calibration certificates by AMS quality control department. Calibration Certificate has to identify each item of measuring and test equipment instruments and devices and list and date of each instance of calibration, citing measurements and adjustments. The records are to be able to demonstrate traceability of the calibration work to the National Institute of Standard and Technology or equivalent European National Metrology Institutes. The purpose of the traceability of measurements is to ensure that the measurements are accurate and credible by referencing them to a recognized national or international physical standard

4.1.5 Each item of measuring and test equipment is to be marked showing the date of the most recent 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 date.



4.1.6 The environment where measuring and test equipment instruments and devices are to be both calibrated and used will be controlled to the extent necessary to assure required accuracy, with consideration given to temperature, humidity, vibration, cleanliness, and other controllable factors.

4.1.7 All new, reworked, repaired, or modified measuring and test equipment instruments and devices are to be examined, and when proved acceptable, certified as complying with requirements by the AMS quality control department.

4.1.8 Inspectors and test technicians cannot accept measurements values obtained on measuring and test equipment that have exceeded calibration due dates.

4.1.9 Measuring and test equipments storage has to be properly done at the end of each use in devoted container and tool boards provided in the AMS assembly area.

4.1.10 AMS quality control department is responsible for monitoring calibration due dates and submitting instruments and devices for calibration on schedule.

4.2 AMS-OWNED EQUIPMENTS

4.2.1 AMS-owned measuring and test equipment instruments and devices will be color marked to be clearly identified and distinguished from Personal equipment

4.3 PERSONAL EQUIPEMENTS

4.3.1 Personal equipments that is not subjected to periodic calibration will be permitted only when no test or measuring data is needed to be recorded. In these cases the equipment must be clearly identified as “UNCALIBRATED” or similar. Equipments so identified cannot be utilized for process requiring calibrated instrument.

4.3.2 Personal equipments subjected to periodic calibration will be subjected well in advance to AMS quality control department for acceptance. These equipments will follow the same AMS-owned equipment policy and will be under the AMS quality control department responsibility.

4.3.3 Calibration certificates of Personal equipments subjected to periodical calibration will be maintained in a separate devoted record by AMS quality control department.

5. PROCEDURE (CONTROL AND RECALL)

5.1 The AMS quality control department is responsible for the identification, calibration, repair, and calibration record keeping of all measuring and test equipment devices and all measurement standards. The records must offer traceability to the National institute of Standards and Technology or equivalent European National Metrology Institutes.



5.2 All personnel and Groups using measuring and test equipments have the responsibility for seeing that an item of equipment is not used when its calibration period has expired. Such items are to be returned to the quality control department for calibration arrangements.

5.3 A calibration/service data record will be created and maintained for each item of measurement standards, measuring equipment, and test equipment, under the responsibility of AMS quality control department. It is to be filled out as follows:

5.3.1 THE ITEM'S NAME AND SERIAL NUMBER

5.3.2 THE ITEM'S MANUFACTURER

5.3.3 THE MODEL NAME AND/OR NUMBER

5.3.4 THE CALIBRATION DATE

5.3.5 THE RECALL DATE OR DATES

5.3.6 THE CALIBRATION SPECIFICATION NUMBER

5.3.7 THE CALIBRATION CERTIFICATE

5.3.8 THE CALIBRATION HISTORY: CALIBRATION SPECIFICATION NUMBERS AND CERTIFICATES EXPIRED.

5.3.9 THE DATE OF SERVICE

5.3.10 THE REPAIR ACTION TAKEN AND PERIOD

5.4 Calibration and repair status identification is accomplished through the use of decals applied to each item of measuring equipment, and test equipment. These decals are as follows: a calibration due decal, which shows the date when the next calibration; a not calibrated decal, which carried the notice that the item of equipment to which this decal is attached is not to be used for official measurement proposes; and out-of-service decal, and with the notice that the equipment to which the decal is attached, must be repaired and/or calibrated before use. It carries the name or stamp of the person who has determined that this condition exists and the date.

5.5 Items having dials, levers and or knobs that must remain positioned for purposes of calibration, i.e.: ovens, electronic test equipment, etc., etc., must have a tamper proof seal located so as to prevent any change in calibration parameters.

5.6 The AMS quality control department has the responsibility for continually examining the calibration intervals assigned to the measurement devices and extending or shortening them as required.

5.7 Calibration of a measurement device can be requested at any time, regardless of the calibration due date for that device, following the occurrence of any event that places the devices accuracy in doubt.



5.7.1 Equipment that has an out of tolerance condition, fails calibration, or whose tamper proof seal is broken, requires quality engineering to assess the appropriate corrective action as follows:

5.7.1.1 Remove failed equipment from process.

5.7.1.2 Identify material, parts, or assemblies tested or measured within calibration cycle of failed equipment.

5.7.1.3 Evaluate the out of tolerance range and declare case by case the measure performed acceptable or not.

5.7.1.4 Repair/replacement of failed equipment prior to use in any process upon discovery.

5.7.1.5 Record in a file the Out of Tolerance Action (OTA) to support the above process.



TABLE I

LIST OF TEST EQUIPMENT THAT REQUIRE A CALIBRATION AND CALIBRATION INTERVALS

ITEM NUMBER FORMAT INTERVAL MONTHS

MECHANICAL

- Micrometers MCXXX 6
- Vernier Calipers VCXXX 6
- Height Gages HGXXX 6
- Dial Calipers DCXXX 6
- Dial Indicators DIXXX 6
- Flow Meters FMXXX 6
- Barometers BMXXX 6
- Thermometers TMXXX 6
- Hydrometers HMXXX 6
- Pressure Gages PGXXX 6
- Torque Wrenches TWXXX 6
- Weighing scale WSXXX12
- Measuring Stands MSXXX 12