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| ATF-LS-E21 Maintenance and Calibration of Measuring Devices | Published Online: March 2018 |
| Authority: Technical Leader | |
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- I. **Purpose:** This document defines the policies, work instructions, schedule and documentation for the maintenance and calibration of measuring devices in the trace evidence discipline.
- II. **Scope:** This document is applicable to the trace evidence discipline of the ATF Forensic Science Laboratories, which includes the Explosives Section, the Fire Debris Analysis Section and the Trace Evidence Section.

Unless otherwise stated in a discipline-specific method or this procedure, the measurements documented in the trace evidence discipline are recorded for comparative or descriptive purposes only. It has been established that these measurements do not significantly affect the test result and that the associated contribution from a calibration would contribute little to the total uncertainty of the test result. Accordingly, measuring devices used for these measurements do not require calibration. These measurements are regarded as approximate or nominal and when applicable, should be reported as such.

The ATF laboratory ensures that the equipment used for all measurements can provide the uncertainty of measurement needed by adhering to the guidelines in this protocol.

- III. **References:**
ATF-LS-4.6 Purchase and Receipt of Materials that Matter
ATF-LS-5.6 Measurement Traceability
Instrument/equipment-specific manufacturer manuals

IV. **Apparatus/Reagents:** None

V. **Safety Precautions:** None

- VI. **Procedures:**
Measuring devices with movable parts, such as calipers and micrometers, shall be calibrated and/ or verified according to the established schedule. When a traceable measuring device is utilized the examiner should be able to identify which measurement device was used, either by recording the unique identification number in the case notes or by always using an assigned tool.

ATF Forensic Science Laboratories have determined that when reporting approximate or nominal measurements in the trace evidence disciplines, rulers and other instruments that do not have movable parts do not have a significant effect on the test result; therefore they are exempt from this requirement. Rulers and other instruments without movable parts must be replaced when they exhibit notable wear or damage.

The vendors of traceable measuring devices and calibration services must be accredited to ISO/IEC 17025. Refer to ATF-LS-4.6 Purchase and Receipt of Materials that Matter for the purchasing requirements.

Performance Check / Calibration schedules:

- Microscopes – Microscopes that are used for detailed and accurate measurements will be subjected to a performance check once a year with a calibrated stage micrometer. The stage micrometer should be taken out of service and sent out for a quality check by an external calibration lab if damage occurs. If all of the points on the stage micrometer are not certified/ calibrated, be sure that only certified/calibrated points are used for the performance check. Work instructions for performing this procedure are in ATF-LS-E19 and ATF-LS-TE02.
- Balances – Balances will either be calibrated externally or have an in-house performance check performed at least once a year using a certified weight set. Work instructions for performing the in-house performance check are noted below. The weight set used for performance checks will be sent to an external calibration lab every 5 years.
- Calipers and micrometers – Calipers and micrometers will be subjected to a performance check at least once a year with a calibrated gauge block set. Work instructions for performing those performance checks are noted below. The gauge block sets used for performance checks will be sent to an external calibration lab every 5 years.

Work Instructions:

- Calipers and Micrometers
 - Use at least three different blocks that represent the range of measurements typically taken with the tool. (Pick blocks that are at least 0.010 inch apart for micrometers and 0.25 inch apart for calipers)
 - Insert the center of the block into the caliper/micrometer and measure.
 - Record the size of the gauge block used and the measurement obtained.
 - If the caliper/micrometer is within the tolerance on all measurements, the tool has been verified. If the caliper does not measure within the tolerance, the caliper should be re-set and repeat steps one through three. The tolerance on micrometers is 0.003 inch and on calipers 0.05 inch.
- Balances
 - Use a certified weight set.
 - Use at least three different weights on the balance that span the range of weights.
 - The balance is considered to be within tolerance when the weights are within ± 10 times the readability of the balance.
 - Record the weights used and measurement obtained.

Controls: Logbooks will be reviewed during the annual internal quality reviews.