Standard Operating Procedure (SOP)

Preparation and Verification of Calibration Tools and Reference Standards

This SOP details the **preparation and verification of calibration tools and reference standards**, emphasizing proper selection, inspection, and validation processes to ensure accuracy and reliability in measurement instruments. It includes guidelines for handling, storage, documentation, and periodic verification to maintain traceability and compliance with quality standards, thereby supporting consistent and precise calibration activities.

1. Purpose

To define the procedures for preparing, inspecting, and verifying calibration tools and reference standards used for calibration activities, ensuring their traceability, accuracy, and reliability.

2. Scope

This procedure applies to all calibration tools and reference standards used within the facility for measurement and calibration purposes.

3. Responsibilities

- **Calibration Personnel**: Prepare, inspect, and verify tools and standards as per this SOP.
- **Quality Assurance**: Ensure traceability, compliance, and documentation.
- **Supervisors/Managers**: Oversee training, audit processes, and resolve deviations.

4. Definitions

- **Calibration Tool:** Any device or equipment used to perform calibration tasks.
- **Reference Standard:** A measurement standard, traceable to national/international standards, used to ensure the accuracy of measurements.
- **Traceability:** The property of a measurement result relating it to national or international standards.

5. Procedure

1. **Selection of Calibration Tools and Standards**
    - Choose appropriate tools and standards based on the required measurement range, accuracy, and application.
    - Ensure standards are traceable to recognized national/international bodies (e.g., NIST, ISO).
2. **Inspection and Preparation**
    - Visually inspect all items for damage, contamination, or wear.
    - Clean surfaces as necessary using proper, non-abrasive methods and approved cleaning agents.
    - Verify validity of the calibration certificate and expiration dates before use.
3. **Verification Process**
    - Compare reference standards against higher-level or master standards at defined intervals.
    - Document any observed deviations or corrective actions taken.
    - Test repeatability and consistency according to approved protocols.
4. **Handling and Storage**
    - Store tools and standards in designated environments to prevent damage and contamination (e.g., temperature/humidity controlled cabinets).
    - Protect items from mechanical shock, dust, and moisture.
    - Label all storage containers with identification and calibration status.
5. **Documentation**
    - Record each preparation and verification activity in the Calibration Logbook or digital system.
    - Attach copies of valid calibration certificates for reference standards and tools used.
    - Maintain records for traceability and audits in accordance with regulatory requirements.
6. **Periodic Verification**
    - Conduct periodic verification as per the defined schedule (minimum annually or as specified).
    - Review and update verification intervals based on equipment criticality and usage frequency.
7. **Non-conformance and Corrective Actions**
    - Immediately quarantine any tool or standard found out of specification or compromised.

- Report and document non-conformance; initiate corrective actions as per the Quality Manual.

6. References

- ISO/IEC 17025: General requirements for the competence of testing and calibration laboratories
- NIST Technical Notes
- Internal Quality Manual

7. Attachments/Forms

- Calibration Logbook Template
- Equipment/Standard Receipt and Inspection Form
- Corrective Action Report Form

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