SOP Template: Temperature Calibration for Thermometers and Equipment

This SOP outlines the procedures for **temperature calibration for thermometers and equipment**, including the preparation of calibration standards, selection of appropriate reference instruments, calibration methods, recording and documentation of calibration results, equipment adjustment and verification, and maintenance of calibration records. The purpose is to ensure accuracy and reliability of temperature measurements in various applications by implementing standardized calibration practices and maintaining compliance with industry standards and regulatory requirements.

1. Purpose

To define the standardized process for calibration of thermometers and temperature measuring equipment in order to ensure measurement accuracy and traceability to national/international standards.

2. Scope

This SOP applies to all laboratory and process thermometers, temperature data loggers, temperature measuring instruments, and environmental chambers used within [Company/Department Name].

3. Responsibilities

- **Laboratory Personnel:** Perform calibration and maintain records.
- **QA/QC Manager:** Review calibration records, ensure compliance, and address deviations.
- **Maintenance Staff:** Assist in equipment adjustment and maintenance.

4. Definitions

- **Calibration:** The process of comparing a device under test (DUT) with a traceable reference standard.
- **Reference Standard:** A thermometer or instrument calibrated against national/international standards.
- **DUT (Device Under Test):** The thermometer or equipment being calibrated.

5. Materials & Equipment

- Reference standards (traceable thermometers, probes, or baths)
- Calibration bath/dry block or temperature-controlled environment
- Data recording sheet or software
- Cleaning materials
- Labels/stickers for calibrated equipment

6. Procedure

1. **Preparation**
    - Verify the reference standard's calibration status and certificate validity.
    - Clean and inspect the Device Under Test (DUT).
    - Prepare the calibration environment, ensuring stability and uniformity of temperature.
2. **Selection of Calibration Points**
    - Select temperature points relevant to the device's intended range (e.g., 0Â°C, ambient, and upper range).
    - Allow sufficient stabilization time at each calibration point.
3. **Calibration Process**

- Immerse/probe DUT and reference standard simultaneously into calibration medium at selected temperature points.
- Allow readings to stabilize (as specified; typically 2-5 minutes).
- Record DUT and reference readings at each calibration point.
- Repeat for all temperature points.

4. **Adjustment and Verification**
   - If the DUT is adjustable, calibrate or adjust as per manufacturer's instructions.
   - Verify the readings post-adjustment to confirm accuracy within acceptable tolerances.
5. **Documentation**
   - Complete calibration record or certificate, including:
     - ID & serial number of device
     - Calibration date
     - Operator's name
     - Reference standard used (with certificate no. & expiry)
     - Observed values and corrections
   - Label the calibrated device with date, due date, and calibration status.
6. **Record Retention**
   - Maintain calibration records for minimum [X] years, as specified by regulations.

7. Acceptance Criteria

- Difference between DUT and reference standard must not exceed specified tolerance (e.g., Â±0.5Â°C).
- Out-of-tolerance devices must be adjusted, repaired, or replaced.
- Deviations must be documented and investigated.

8. References

- ISO/IEC 17025: General requirements for the competence of testing and calibration laboratories
- Manufacturer's manuals
- Internal quality manuals/procedures

9. Revision History

Version	Date	Summary of Changes	Approved By
1.0	[Date]	Initial issue	[Name/Title]

[End of SOP]