

Standard Operating Procedure (SOP): Equipment Calibration and Maintenance Procedures

Purpose: This SOP describes **equipment calibration and maintenance procedures**, covering the systematic approach to regularly calibrate, inspect, and maintain equipment to ensure optimal performance, accuracy, and safety. It includes scheduling calibration intervals, documenting calibration records, performing preventive maintenance, troubleshooting common equipment issues, and establishing responsibilities for personnel involved. The goal is to minimize equipment downtime, extend service life, and maintain compliance with quality and safety standards.

1. Scope

This procedure applies to all equipment requiring calibration and/or maintenance within the facility, including but not limited to analytical instruments, measurement tools, and production machinery.

2. Responsibilities

- **Equipment Custodian:** Ensure equipment is available for calibration/maintenance and facilitate access.
- **Maintenance Personnel/Technicians:** Perform calibration and maintenance as scheduled and document activities.
- **Quality Assurance (QA):** Review calibration and maintenance records; ensure compliance with standards.
- **Department Managers:** Oversee adherence to the schedule and resolve resource or scheduling conflicts.

3. Definitions

- **Calibration:** The process of configuring equipment to provide results within an acceptable range by comparing and adjusting it to a known standard.
- **Maintenance:** Routine and preventive actions performed to ensure equipment remains in proper working condition.
- **Preventive Maintenance:** Scheduled service intended to prevent equipment failure and prolong its lifecycle.

4. Procedure

4.1 Equipment List and Schedule Creation

1. Maintain an up-to-date inventory of all equipment requiring calibration and/or maintenance.
2. Assign unique identification numbers to each piece of equipment.
3. Establish calibration and maintenance intervals based on manufacturer recommendation, regulatory requirements, or internal policy.
4. Create a schedule and communicate to all relevant personnel.

4.2 Calibration Procedures

1. Locate standard/reference materials required for calibration.
2. Follow equipment-specific calibration instructions as per the manufacturer's manual or internal protocol.
3. Record calibration data, including pre- and post-calibration readings.
4. Label equipment with calibration status, date, and next due date.
5. If equipment fails calibration, remove from service and initiate corrective actions.

4.3 Preventive Maintenance

1. Perform routine inspections (visual, functional) based on schedule.
2. Complete cleaning, lubrication, part replacement, and adjustments as prescribed.
3. Document actions and observations in the maintenance log.
4. Report findings or failures to the responsible manager for further action.

4.4 Troubleshooting

1. Upon detection of malfunctions, follow equipment troubleshooting guides.
2. Record the issue, actions taken, and resolution or escalation in the equipment log.
3. If issue persists, remove equipment from service and notify technical support or manufacturer as needed.

4.5 Documentation and Records

- 1. Maintain calibration and maintenance records for each equipment item.
- 2. Records must include date, task performed, person responsible, results/status, and due date for next action.
- 3. Backup all records as required by organizational policy.
- 4. Ensure records are readily available for audits and reviews.

5. Documentation Templates

5.1 Equipment Calibration Record (Sample)

Equipment ID	Description	Date	Calibration Performed By	Pre-Calibration Reading	Post-Calibration Reading	Status	Next Due Date	Comments
EQ-001	pH Meter	2024-06-15	J. Doe	7.35	7.00	Pass	2024-09-15	None

5.2 Maintenance Log (Sample)

Equipment ID	Description	Date	Service Performed	Performed By	Status	Comments
EQ-002	Centrifuge	2024-06-10	Lubricated rotor	M. Smith	Completed	Rotor in good condition

6. Review and Update

This SOP should be reviewed annually or following any significant changes in regulatory requirements or equipment inventory. Updates must be approved and version controlled.

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