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Validate instrumentation data acquisition checklist and QA steps

Validate instrumentation data acquisition with an interactive checklist; commentable controls and options to export as PDF/Excel for compliant audits and reporting.

Project:
Date:
Filled by:

Pre-Run Setup and Scheduling	
1	Synchronize logger and gateway clocks via NTP/PTP using a verified time server; acceptance: drift ≤ 1 s per 24 h; evidence: time-sync screenshot and server address logged.
2	Configure sampling frequency per approved schedule using manufacturer software; acceptance: interval exactly matches plan (e.g., 60 s, 300 s); evidence: exported configuration file with version and timestamp.
3	Verify power availability (mains/UPS/battery) and estimate runtime; acceptance: ≥ 1.5× longest maintenance interval; evidence: photo of power setup, UPS status printout, runtime calculation.
4	Check local storage capacity versus expected data volume; acceptance: ≥ 14 days buffer at set rate; evidence: storage free-space screenshot and calculation sheet.

Data Acquisition Frequency Verification	
5	Run a 30 min controlled acquisition and count records; acceptance: expected count within ±1 sample of theoretical; evidence: exported log and record-count summary.
6	Review timestamps for monotonic order and UTC timezone; acceptance: no duplicates, no gaps > 2× interval; evidence: CSV preview with checks report.
7	Confirm active channels match approved sensor list; acceptance: only authorised channels enabled; evidence: signed channel map and configuration export.
8	Validate event/threshold logging parameters where applicable; acceptance: trigger and hysteresis per plan; evidence: parameter screenshot and test event log.

Validation and Quality Control Steps	
9	Apply plausibility range checks without interpreting trends; acceptance: values within defined engineering limits; evidence: automated QA report with zero hard-limit violations.
10	Calculate file checksums (SHA-256) on raw and exported datasets; acceptance: hashes stored with files; evidence: checksum manifest and verification log.
11	Ensure consistent missing-data code (e.g., -9999) across all channels; acceptance: single agreed code documented; evidence: configuration reference and file snippet.
12	Record calibration certificate IDs and validity dates for each sensor; acceptance: all active sensors listed and in date; evidence: calibration register with scanned certificates.
13	Enforce SI units and column metadata in outputs; acceptance: units declared (e.g., °C, m, kPa) and consistent; evidence: approved data dictionary and template check.

Data Backup and Redundancy	
14	Configure automated daily backups to onsite NAS and offsite cloud; acceptance: two independent locations; evidence: backup job screenshots and schedules.
15	Perform monthly restore test from both locations; acceptance: 100% file recovery and checksum match; evidence: restore log and comparison report.
16	Enable write-once (immutable) export after daily acquisition; acceptance: WORM or locked folder policy active; evidence: storage policy screenshot and test write attempt.
17	Implement removable media rotation where used; acceptance: weekly rotation, labelled with date and volume ID; evidence: photos and hash report per media.

Reporting and Data Handover Format	
18	Standardize CSV headers, order, encoding (UTF-8), and delimiter; acceptance: matches approved template; evidence: template file and validator pass screenshot.
19	Include a metadata sheet listing sensor IDs, coordinates, elevation reference, units, and sampling interval; acceptance: all fields complete; evidence: metadata CSV.
20	Provide daily summary with record counts, uptime, gaps, and alarms; acceptance: KPIs clearly shown; evidence: generated PDF and machine-readable JSON.
21	Use UTC timestamps, ISO 8601 format, and consistent file naming; acceptance: YYYY-MM-DD and versioned names; evidence: sample files and naming convention note.

Audit and Traceability	
22	Maintain a change log for configuration edits; acceptance: date, reason, approver, before/after; evidence: signed change record.
23	Capture cabinet and seal photos at each visit; acceptance: date-stamped images stored by location; evidence: photo set in site folder.
24	Collect digital sign-off from operator and QA reviewer; acceptance: both signatures recorded; evidence: signed checklist PDF with QR verification.

Comments:

Filled by:

Signature:

Introduction	How to use this checklist
Validate instrumentation data acquisition with this focused, process-only checklist. It streamlines instrumentation monitoring workflows by confirming data logging frequency, validation steps, resilient backups, and standardized report formats. Related terms you may use include data logging verification, sensor data QA, and automated acquisition control. The scope stops at acquisition and quality control; it expressly excludes any geotechnical interpretation, trend analysis, or engineering conclusions. By applying consistent time synchronisation, channel mapping, and SI unit enforcement, teams avoid gaps, duplicates, corrupt files, and nonconforming deliverables. Robust backup routines and periodic restore tests prevent data loss, while a clear handover format reduces rework and accelerates approvals. Use this checklist across construction and operations to protect continuity, enable quick audits, and maintain confidence in monitoring outputs without discussing what the data means. Start in interactive mode to tick items, add comments, upload evidence, and export the completed record to PDF or Excel with a QR code for authentication.	1. Preparation: Gather logger software, NTP/PTP access, checksum tool, storage calculator, approved templates, PPE, and site access permits. Confirm network connectivity, backup destinations, and authority requirements for retention. 2. Open the checklist, choose the project, and start Interactive Mode. Attach the monitoring plan, sensor list, and data dictionary. Set timezone to UTC and prefill sampling intervals. 3. Using the Interactive Checklist: Tick items as completed, add time-stamped comments, and upload screenshots, logs, and photos. Mention issues and tag reviewers for rapid resolution. 4. Export and share: Generate a clean PDF for stakeholders and an Excel/CSV evidence pack for records. Ensure filenames follow the naming convention and include UTC dates. 5. Sign-Off: Capture digital signatures from the operator and QA reviewer. Archive with QR authentication and distribute links to the project team for audit readiness.