Measuring equipment management: monitoring measuring equipment, ensuring calibration, securing quality

Measuring equipment management refers to the systematic planning, monitoring and documentation of all measuring and test equipment within the company. The aim is to ensure that every measuring machine, dial gauge or test software used functions properly at the time of application, is correctly calibrated and that its results meet the requirements of standards such as ISO 9001 or IATF 16949. The topic is relevant for buyers and supply chain managers because test processes are outsourced to suppliers, the use of test equipment is contractually regulated, and the costs of calibration, maintenance or new procurement must be taken into

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account in the category strategy. A well-organised measuring equipment management system reduces complaint costs, avoids recall discussions and secures process capability along the entire supply chain.

Key facts at a glance

01 Measuring equipment management covers the procurement, calibration, maintenance, monitoring and disposal of all measuring and test equipment.

02 The normative basis includes ISO 9001, ISO 10012 and IATF 16949 as well as industry-specific customer requirements.

03 Test equipment lists with unique identification, calibration status and traceability are key evidence in audits.

04 In practice, test equipment is typically monitored in calibration intervals ranging from a few months to several years, depending on criticality classification and frequency of use.

05 Relevant for purchasing are buy-to-buy decisions, the test equipment responsibility agreement and calibration costs among the value drivers of the category.

06 Digital measuring equipment management systems reduce administrative effort and enable automatic reminders and status tracking.

Definition: measuring equipment management

Measuring equipment management is the holistic organisation of all activities that ensure measuring and test equipment reliably fulfil their defined tasks. It covers the entire life cycle from needs assessment, procurement and qualification through use, calibration and maintenance to decommissioning.

Distinction from quality assurance and calibration

Calibration is a sub-process within measuring equipment management: it determines the relationship between displayed and actual measured values. Quality assurance and quality planning, by contrast, define which characteristics are to be monitored with which test equipment. In conjunction with a quality assurance agreement with the supplier, it is specified who performs which tests and which test equipment is permissible in doing so.

Normative requirements

ISO 9001 requires that monitoring and measuring resources are suitable and are checked at appropriate intervals. ISO 10012 provides recommendations for measurement processes and measuring equipment management. Industry standards such as IATF 16949 in the automotive industry or VDA 6.3 in process audits further tighten the requirements, for example with regard to traceability and the capability of test equipment. Buyers should include these requirements in supplier evaluation and audits.

Types of test equipment in industrial practice

Typical test equipment ranges from simple measuring tools such as vernier callipers and micrometers, through metrological systems such as coordinate measuring machines, thickness gauges, hardness testers and run-out testers, to software-based systems such as optical measuring machines or CAQ applications. Reference workpieces, master and gauge pieces and calibration standards also belong to this category. The more critical the test equipment is for product quality, the higher the requirements for calibration and monitoring typically are.

Measuring equipment management process: from procurement to decommissioning

The process follows the life cycle of the test equipment and connects quality planning, purchasing and production. Every step should be clearly defined and documented so that traceability is guaranteed during audits and complaints.

Needs assessment and procurement

Which test equipment is required is determined by the inspection plan within the framework of APQP or the quality planning process. On this basis, purchasing assesses whether test equipment should be procured in-house, supplied by the customer or outsourced to a testing and calibration laboratory. In addition to acquisition costs, operating costs for calibration, consumables and maintenance are included in the assessment; this is part of the category value driver analysis.

Qualification and initial calibration

Before first use, new test equipment must be qualified and calibrated. This includes defining the permissible measuring range, test equipment capability (MFA) and the initial calibration intervals. For hazardous or highly critical characteristics, for example in automotive or medical technology, system analysis using MSA methods such as Gage R&R is also common. Evidence and results are documented in the test equipment database.

Calibration, monitoring and decommissioning

In operation, test equipment is calibrated and maintained at defined intervals, often by accredited laboratories. A calibration system (labels, database entries, traceability to national standards) keeps track of the status. When test equipment can no longer be economically maintained or capability is no longer given, it is decommissioned, including removal from the test equipment inventory. If a test item fails during calibration, interim measurements must typically be critically assessed in practice – a case for a defined deviation workflow.

Measuring equipment management as a procurement topic

For purchasing, the topic touches on several decision dimensions: make-or-buy for testing, contract design with calibration providers and cost control in the test and measuring technology category.

Awarding test and calibration services

Calibration and testing services are frequently outsourced to accredited providers. In tendering, factors alongside price include the scope of accreditation, lead times, traceability and the handling of complaints. An escalation process and clearly defined contacts should be agreed so that a swift response is possible in the event of delayed returns or calibration deviations. Legally, the service is often provided under a contract for work and services, which affects liability and acceptance.

Agreements with suppliers

Quality assurance agreements regulate whether suppliers use their own test equipment, which capabilities must be demonstrated and what test certificates should look like. When onboarding new suppliers, this is part of requalification or initial approval. Buyers and quality assurance should consolidate the requirements in a procurement guideline so that suppliers receive uniform requirements and audit findings are reduced.

Controlling costs and contracts

Calibration costs can be reduced through framework agreements with volume commitments, bundled calibration cycles and standardised device classes. For long-term testing capacity – for example for a test laboratory to be built – a price and adjustment clause for consumables or working hours may also be sensible. When awarding critical test services, a binding period for offers and a binding schedule for return delivery can be agreed.

Key KPIs in measuring equipment management

KPIs make the state of the test equipment inventory measurable and support prioritisation and budget negotiations. In practice, a handful of key indicators have proven their worth.

Calibration status and deadline overruns

The calibration status indicates what percentage of active test equipment is currently calibrated and released. Target values in well-organised operations are typically above 98 per cent. Deadline overruns must be documented and assessed, as they are considered nonconformities in audits and in practice can affect the validity of earlier measurement results.

Test equipment capability and failure rates

Test equipment capability (MFA) or a Gage R&R metric shows whether a test item can handle the required variation; common target values in practice are of the order of MFA greater than 1.33, or Gage R&R acceptance limits of below 10 per cent for non-critical applications. The failure rate at calibrations

– i.e. how many devices are found outside tolerance – is an early indicator of intervals that are too long or of wear.

Lead times and costs per test item

Calibration lead times and costs per test item or per calibration event make providers comparable and provide arguments for negotiating contacts and contracts. The share of external versus internal calibration also reveals optimisation potential. Combined with the calibration status, this provides a picture of whether measuring equipment management is operating economically and process-reliably.

Risks and controls in measuring equipment management

Errors in measuring equipment management have a direct impact on product quality, delivery capability and audit ratings. Prevention starts with organisation, system support and clear responsibility.

Typical risks

Common problems are overdue calibrations, missing or illegible calibration labels, incomplete traceability, use of unsuitable test equipment and unnoticed damage to measuring devices. Particularly risky: when a borrowed or external test item enters the process unchecked, or a test item is used again after repair without requalification. With customer-owned or customer-supplied measuring equipment, the condition is often unclear as well.

Controls and responsibilities

A clearly designated test equipment owner per site, a uniform deviation workflow for quantity and status (also for test equipment) and an established escalation process in the event of failures reduce risks. Before consuming calibration services, interval proposals and status must be checked; for planned changes to calibration frequency, this counts as a technical change. Visual checks, plausibility sampling and internal audits complement the system controls.

Documentation and audit readiness

All activities – calibration certificates, maintenance records, operating and handling instructions, training records – must be documented so that they are auditable during customer and certification audits. At suppliers, buyers and quality document test equipment topics in the audit and in supplier evaluation. Unclear test and measurement conditions at suppliers are a typical trigger for complaints and should be resolved early via a quality assurance agreement.

Current developments: digitalisation and integrated quality systems

Measuring equipment management is becoming increasingly digital and part of networked quality systems. This facilitates integration into ERP and MES and noticeably reduces administrative effort.

Software-supported measuring equipment management

Modern CAQ and test equipment management systems centrally manage the device inventory, interval proposals, calibration history and failure statistics. Automatic reminders, barcode or RFID labelling and mobile recording at the workplace replace Excel lists and paper labels. In selection, the number of system functions matters less than integration into existing ERP and CAQ environments and the ability to map customer-specific test equipment classes.

Integration into quality and supplier processes

Measuring equipment management increasingly intersects with topics such as process capability, MSA, requalification and product life cycle management. Anyone who links test equipment costs and status with supplier data can take targeted action in supplier development. Automatic spend classification also helps to make calibration and testing services visible as a category in their own right rather than disappearing into the indirect spend area.

Sustainability and the circular economy

For test equipment too, resource efficiency and service life are coming into focus: repair instead of replacement, refurbishment of measuring tools and proper disposal of electronic measuring devices in accordance with WEEE (the Electrical and Electronic Equipment Regulations) are practical examples. Topics such as Product Environmental Footprint (PEF) have so far played a minor role for test equipment, but are gaining importance among energy and measuring device manufacturers.

Typical metrics

Metric	Typical value
Calibration status	> 98 % *Proportion of active test items with valid calibration; well-organised operations achieve this consistently.*
Calibration deadline overruns	< 2 % *Overdue test items per quarter; every overrun should be assessed and documented.*
Test equipment capability (MFA)	> 1.33 *Common target value for non-critical to critical measurement tasks; higher depending on the requirement.*
Failure rate at calibration	< 5 % *Devices found outside tolerance per calibration cycle; higher values indicate intervals that are too long.*
External calibration lead time	5–10 working days *Typical benchmark for accredited laboratories; important for the availability of critical test equipment.*

Practical example

A medium-sized mechanical engineering company with around 350 employees discovered during a customer audit that several vernier callipers and two torque measuring devices were overdue for calibration. The cause was local Excel lists with no central reminder function. The purchasing function subsequently re-tendered and consolidated the calibration services.

- Introduction of a software-supported test equipment register with barcode labelling and automatic reminders before the end of the interval.
- Consolidation of calibration services with two accredited providers with agreed lead times and a volume commitment.
- Anchoring test equipment requirements in the quality assurance agreement with the key suppliers.
- Establishment of a quarterly status review between purchasing and quality assurance as a fixed component of supplier evaluation.

Conclusion

Measuring equipment management is far more than calibration deadline administration: it secures the validity of every measurement along the supply chain and is thus a key lever for product quality, audit capability and cost efficiency. Procurement professionals benefit twice over – from cheaper, more reliable calibration services and from clearer contracts with suppliers on testing responsibility and evidence. Those who treat test equipment as a category in its own right, control intervals on a data-driven basis and consolidate services sustainably reduce complaints and audit nonconformities. Digital systems significantly reduce the administrative effort. A functioning measuring equipment management system is therefore a sensible component of any holistic supplier and quality strategy.

Frequently asked questions

? What is measuring equipment management?

Measuring equipment management refers to the systematic organisation of all measuring and test equipment within a company. It covers needs assessment, procurement, qualification, calibration, maintenance, monitoring and decommissioning. The aim is to ensure that every item of test equipment is correct, traceable and capable at the time of use. The normative basis includes, among others, ISO 9001 and ISO 10012.

? Which standards apply to measuring equipment management?

The key standards are ISO 9001 (requirements for monitoring and measuring equipment) and ISO 10012 (measurement processes and measuring equipment). In the automotive industry, IATF 16949 and VDA requirements are added. Customer-specific requirements, for example in medical or aerospace engineering, must also be observed. Which standard applies in a specific case depends on the industry and customer agreements.

? How often must test equipment be calibrated?

The calibration interval depends on the test equipment, the frequency of use, the ambient conditions and the criticality of the measured characteristic. In practice, intervals typically range from three months to several years. Manufacturer specifications are a starting point, but should be extended or shortened in a data-based manner using failure statistics. If a test item frequently falls out of tolerance, the interval should be shortened.

? Who bears responsibility for test equipment at the supplier?

This is usually specified in the quality assurance agreement between customer and supplier. It is common for the supplier to ensure the capability, calibration and documentation of its test equipment, while the customer specifies test methods and evidence requirements. Special rules apply to customer-supplied test equipment. In case of doubt, responsibility should be clearly and contractually regulated in writing.

? What happens if a test item is overdue for calibration?

An overdue calibration is considered a nonconformity in an audit and can call into question the validity of measurement results from the interim period. In practice, the affected batches or measured values must then be assessed – if necessary via a defined deviation workflow. In addition, the test equipment must be withdrawn from use and requalified. Repeated overdue calibrations are a typical audit finding.

? Is software worthwhile for measuring equipment management?

Above a certain number of test items – in practice often from around 100 devices – CAQ or test equipment management systems significantly facilitate administration. They offer automatic reminders, histories, failure statistics and audit reports. The decisive factors are integration into existing ERP and quality systems and the ability to map company-specific test equipment classes. Software selection should involve the users in the quality function.

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