

Generic Quality Manual Template as per ISO/IEC-17025

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REVISION HISTORY		
Description of Change	Author	Effective Date
Initial release	-	

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1.0 General

1.1 Index and Revision Status

The laboratory shall ensure that the numbering of the quality manual corresponds directly to the numbering of ISO/IEC-17025 standard.

Updates of the manual will be made by re-issuing the relevant section of this manual and adapting the issue level in the index.

1.2 Purpose

The quality manual, management system and demonstrates the laboratory's ability to execute the indicated tests and/or calibrations and to meet regulatory requirements.

The manual establishes compliance with ISO 17025.

2.0 Laboratory background

2.1 Activities

Describe the background, activities, personnel and tests handled by the laboratory.

The laboratory's tests /calibrations include:

- List out the tests / calibrations provided by the laboratory
- Distinguish between the tests which are part of the management system and those tests which are not.

2.2 History

Describe the history of the laboratory.

3.0 Definitions and conventions

3.1 Definitions and terminologies

The quality manager is responsible for setting up and maintaining a list of definitions, conventions and terminology.

The laboratory shall attach the list added to the manual.

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3.2 Abbreviations

The quality manager is responsible for setting up and maintaining a list of abbreviations used in the quality manual.

The laboratory shall attach the list added to the manual.

4.0 General requirements

4.1 Impartiality

The laboratory activities are undertaken impartially and structured and managed so as to safeguard impartiality.

The laboratory management is committed to impartiality.

The laboratory does not allow commercial, financial, political or other pressures to compromise impartiality.

The laboratory identifies risks to its impartiality on an on-going basis. This includes those risks that arise from its activities, or from its relationships, or from the relationships from its personnel.

If a risk to impartiality is identified, the laboratory demonstrates how it eliminates or minimizes such risks.

4.2 Confidentiality

The laboratory ensures the protection of its customer's confidential information and proprietary rights, including the protecting the electronic storage and transmission of results.

The laboratory is responsible through legally enforceable commitments, for the management of all information obtained or created during the performance of laboratory activities. The laboratory informs the customer in advance, of the information it intends to place in the public domain. Except for information that the customer makes publicly available, or when agreed between the laboratory and the customer, all other information is considered proprietary information and shall be regarded as confidential.

When the laboratory is required by law or authorized by contractual arrangements to release confidential information, the customer concerned is notified of the information provided (unless prohibited by law).

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Information about the customer obtained from sources other than the customer is confidential between the customer and the laboratory. The provider of this information is confidential to the laboratory and is not shared with the customer, unless agreed by the source.

Personnel, including any committee members, contractors, personnel of external bodies, or individuals acting on the laboratory's behalf, keep confidential all information obtained or created during the performance of laboratory activities, except as required by law.

5.0 Structural requirements

5.1. Legal identity

- 5.1.1 The laboratory is registered/authorized under the Government/State statute XYZ
NOTE: enter Government/State statute title, number, and/or article number.

Indicate the legal identity of the laboratory. If the laboratory hasn't its own legal identity because it is part of a larger company, indicate the legal identity of this larger company.

5.2. Organization

- 5.2.1 The laboratory is part of the State (NOTE: enter State and department of the State that the laboratory is a part of). Authority, interrelation, and responsibilities of all laboratory personnel are on file in the form of job descriptions and organizational charts. The responsibilities of Quality Manager and Technical Manager are assigned to designated staff as shown in the organizational chart.

5.3. Responsibility

NOTE: The following is an example of laboratory personnel responsibilities.

Indicate the responsibilities of key personnel of the large organization that influence testing activities (Quality Manager, Tech Manager, and Support Manager) too.

- Put general function descriptions in the quality manual
- Put detailed function descriptions and organization chart with names and replacements in separate documents (Only for people influencing quality)

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5.3.1. Director/CEO/Head of Laboratory

The Director/CEO/Head of Laboratory is responsible for the overall compliance of the laboratory Quality Manual and is the direct supervisor of the State Metrologist/Accreditation Body/Authority.

5.3.2. Management (Program Manager)

The management of the laboratory

- a) Implements and enforces the applicable good laboratory practices described in reference documents;
- b) Provides resources, adjusts workloads, and provides training opportunities for laboratory staff to facilitate completion of assigned tasks in a safe work environment consistent with test requirements and personnel capabilities; and
- c) Assigns deputies for both the technical and quality managers in the case of an absence.

5.3.2. Technical Manager

The technical manager

- a) Is a metrologist who has completed the required level of NIST OWM training as specified in accreditation requirements for the level at which the laboratory maintains accreditation;
- b) Is responsible for the overall administrative and technical operations of the laboratory;
- c) Specifies and/or approves all methodologies used;
- d) Implements good laboratory practices by providing instruction and training as needed, develops work plans and procedures, and requires that these be followed in all day-to-day operations;
- e) Assigns only competent personnel to complete tests;
- f) Attests, by signature, to the validity of all laboratory tests and reports (a list of Approved Signatories is maintained in the laboratory and

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- g) Ensures continued accreditation of the laboratory.

5.3.4. Quality Manager

The quality manager

- a) Is a metrologist who has completed the required level of NIST OWM training as specified in accreditation requirements for the level at which the laboratory maintains accreditation;
- b) Coordinates internal audits of the laboratory for continued improvement;
- c) Maintains, analyzes, and updates statistical data and/or control charts;
- d) Participates in available and relevant proficiency tests, round-robins, and/or inter laboratory collaborative studies;
- e) Where necessary, identifies, develops, and implements improvement of the laboratory measurement capability to meet the requirements of NIST, department programs, and laboratory customers;
- f) Maintains the quality manual; and
- g) Has direct access to management and to the technical manager.

NOTE: Many laboratories are limited in staff. These laboratories are often operated by one person or a part-time person. In these cases, the responsibilities of both technical and quality manager fall on that person. Special care and precaution must be taken and documented to ensure that the management system and measurements are not adversely affected by limited laboratory staff.

- 5.4. The top management ensures that appropriate communication processes are established within the laboratory for implementation of the management system, and that communication takes place regarding the effectiveness of the management system.
- 5.5. The top management ensures that the integrity of the management system is maintained when changes to the management system are implemented.

6.0 Resource requirements

6.1 General

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- 6.1.1. The laboratory has available the personnel, facilities, equipment, systems and support services necessary to perform its laboratory activities.
- 6.1.2. The laboratory recognizes that many factors determine the correctness and reliability of the tests and/or calibration performed by a laboratory. These factors include contributions from: human factors, accommodation and environmental conditions, test and calibration methods and method validation, equipment, measurement traceability, and handling of test and calibration items.
- 6.1.3. The extent to which the factors contribute to the total uncertainty of measurement differs considerably between (types of) test and between (types of) calibrations. The laboratory takes into account these factors in developing test and calibration methods and procedures, in the training and qualification of personnel, and in the selection and calibration of the equipment it uses.

6.2 Personnel

- 6.2.1 All personnel of the laboratory, either internal or external, that could influence the laboratory activities shall act impartially, be competent and work in accordance with the laboratory's management system.
- 6.2.2 The laboratory shall document the competence requirements for each function influencing the results of laboratory activities, including requirements for education, qualification, training, technical knowledge, skills and experience.
- 6.2.3 The laboratory shall ensure that the personnel have the competence to perform laboratory activities for which they are responsible and to evaluate the significance of deviations.
- 6.2.4 The management of the laboratory shall communicate to personnel their duties, responsibilities and authorities.
- 6.2.5 The laboratory shall have procedure(s) and retain records for:
- a) Determining the competence requirements;
 - b) Selection of personnel;
 - c) Training of personnel;
 - d) Supervision of personnel;
 - e) Authorization of personnel;
 - f) Monitoring competence of personnel.
- 6.2.6 The laboratory shall authorize personnel to perform specific laboratory activities, including but not limited to, the following:

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- a) Development, modification, verification and validation of methods;
- b) Analysis of results, including statements of conformity or opinions and interpretations;
- c) Report, review and authorization of results.

6.3 Facilities and environmental conditions

6.3.1 The facilities and environmental conditions shall be suitable for the laboratory activities and shall not adversely affect the validity of results.

NOTE: Influences that can adversely affect the validity of results can include, but are not limited to, microbial contamination, dust, electromagnetic disturbances, radiation, humidity, electrical supply, temperature, sound and vibration.

6.3.2 The requirements for facilities and environmental conditions necessary for the performance of the laboratory activities shall be documented.

6.3.3 The laboratory shall monitor, control and record environmental conditions in accordance with relevant specifications, methods or procedures or where they influence the validity of the results.

6.3.4 Measures to control facilities shall be implemented, monitored and periodically reviewed and shall include, but not be limited to:

- a) Access to and use of areas affecting laboratory activities;
- b) Prevention of contamination, interference or adverse influences on laboratory activities;
- c) Effective separation between areas with incompatible laboratory activities.

6.3.5 When the laboratory performs laboratory activities at sites or facilities outside its permanent control, it shall ensure that the requirements related to facilities and environmental conditions are met.

6.4 Equipment

6.4.1 The laboratory shall have access to equipment (including, but not limited to, measuring instruments, software, measurement standards, reference materials, reference data, reagents, consumables or auxiliary apparatus) that is required for the correct performance of laboratory activities and that can influence the results.

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NOTE 1: A multitude of names exist for reference materials and certified reference materials, including reference standards, calibration standards, standard reference materials and quality control materials. ISO 17034 contains additional information on reference material producers (RMPs). RMPs that meet the requirements of ISO 17034 are considered to be competent. Reference materials from RMPs meeting the requirements of ISO 17034 are provided with a product information sheet/certificate that specifies, amongst other characteristics, homogeneity and stability for specified properties and, for certified reference materials, specified properties with certified values, their associated measurement uncertainty and metrological traceability.

NOTE 2: ISO Guide 33 provides guidance on the selection and use of reference materials. ISO Guide 80 provides guidance to produce in-house quality control materials.

- 6.4.2 When the laboratory uses equipment outside its permanent control, it shall ensure that the requirements for equipment are met.
- 6.4.3 The laboratory shall have a procedure for handling, transport, storage, use and planned maintenance of equipment in order to ensure proper functioning and to prevent contamination or deterioration.
- 6.4.4 The laboratory shall verify that equipment conforms to specified requirements before being placed or returned into service.
- 6.4.5 The equipment used for measurement shall be capable of achieving the measurement accuracy and/or measurement uncertainty required to provide a valid result.
- 6.4.6 Measuring equipment shall be calibrated when the measurement accuracy or measurement uncertainty affects the validity of the reported results, and/or calibration of the equipment is required to establish the metrological traceability of the reported results.

NOTE: Types of equipment having an effect on the validity of the reported results can include those used for the direct measurement of the measurand, e.g. use of a balance to perform a mass measurement; those used to make corrections to the measured value, e.g. temperature measurements; those used to obtain a measurement result calculated from multiple quantities.

- 6.4.7 The laboratory shall establish a calibration programme, which shall be reviewed and adjusted as necessary in order to maintain confidence in the status of calibration.

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- 6.4.8 All equipment requiring calibration or which has a defined period of validity shall be labelled, coded or otherwise identified to allow the user of the equipment to readily identify the status of calibration or period of validity.
- 6.4.9 Equipment that has been subjected to overloading or mishandling, gives questionable results, or has been shown to be defective or outside specified requirements, shall be taken out of service. It shall be isolated to prevent its use or clearly labelled or marked as being out of service until it has been verified to perform correctly. The laboratory shall examine the effect of the defect or deviation from specified requirements and shall initiate the management of nonconforming work procedure.
- 6.4.10 When intermediate checks are necessary to maintain confidence in the performance of the equipment, these checks shall be carried out according to a procedure.
- 6.4.11 When calibration and reference material data include reference values or correction factors, the laboratory shall ensure the reference values and correction factors are updated and implemented, as appropriate, to meet specified requirements.
- 6.4.12 The laboratory shall take practicable measures to prevent unintended adjustments of equipment from invalidating results.
- 6.4.13 Records shall be retained for equipment which can influence laboratory activities. The records shall include the following, where applicable:
- a) The identity of equipment, including software and firmware version;
 - b) The manufacturer's name, type identification, and serial number or other unique identification;
 - c) Evidence of verification that equipment conforms with specified requirements;
 - d) The current location;
 - e) Calibration dates, results of calibrations, adjustments, acceptance criteria, and the due date of the next calibration or the calibration interval;
 - f) Documentation of reference materials, results, acceptance criteria, relevant dates and the period of validity;
 - g) The maintenance plan and maintenance carried out to date, where relevant to the performance of the equipment;
 - h) Details of any damage, malfunction, modification to, or repair of, the equipment.

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6.5 Metrological traceability

- 6.5.1 The laboratory shall establish and maintain metrological traceability of its measurement results by means of a documented unbroken chain of calibrations, each contributing to the measurement uncertainty, linking them to an appropriate reference.

NOTE 1: In ISO/IEC Guide 99, metrological traceability is defined as the “property of a measurement result whereby the result can be related to a reference through a documented unbroken chain of calibrations, each contributing to the measurement uncertainty”.

- 6.5.2 The laboratory shall ensure that measurement results are traceable to the International System of Units (SI) through:

- a) Calibration provided by a competent laboratory; or

NOTE 1: Laboratories fulfilling the requirements are considered to be competent.

- b) Certified values of certified reference materials provided by a competent producer with stated metrological traceability to the SI; or

NOTE 2: Reference material producers fulfilling the requirements of ISO 17034 are considered to be competent.

- c) Direct realization of the SI units ensured by comparison, directly or indirectly, with national or international standards.

NOTE 3: Details of practical realization of the definitions of some important units are given in the SI brochure.

- 6.5.3 When metrological traceability to the SI units is not technically possible, the laboratory shall demonstrate metrological traceability to an appropriate reference, e.g.:

- a) Certified values of certified reference materials provided by a competent producer;
- b) Results of reference measurement procedures, specified methods or consensus standards that are clearly described and accepted as providing measurement results fit for their intended use and ensured by suitable comparison.

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6.6 Externally provided products and services

6.6.1 The laboratory shall ensure that only suitable externally provided products and services that affect laboratory activities are used, when such products and services:

- a) Are intended for incorporation into the laboratory's own activities;
- b) Are provided, in part or in full, directly to the customer by the laboratory, as received from the external provider;
- c) Are used to support the operation of the laboratory.

NOTE: Products can include, for example, measurement standards and equipment, auxiliary equipment, consumable materials and reference materials. Services can include, for example, calibration services, sampling services, testing services, facility and equipment maintenance services, proficiency testing services and assessment and auditing services.

6.6.2 The laboratory shall have a procedure and retain records for:

- a) Defining, reviewing and approving the laboratory's requirements for externally provided products and services;
- b) Defining the criteria for evaluation, selection, monitoring of performance and re-evaluation of the external providers;
- c) Ensuring that externally provided products and services conform to the laboratory's established requirements, or when applicable, to the relevant requirements, before they are used or directly provided to the customer;
- d) Taking any actions arising from evaluations, monitoring of performance and re-evaluations of the external providers.

6.6.3 The laboratory shall communicate its requirements to external providers for:

- a) The products and services to be provided;
- b) The acceptance criteria;
- c) Competence, including any required qualification of personnel;
- d) Activities that the laboratory, or its customer, intends to perform at the external provider's premises.

7. Process requirements

7.1 Review of requests, tenders and contracts

7.1.1 The laboratory shall have a procedure for the review of requests, tenders and contracts. The procedure shall ensure that:

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- a) The requirements are adequately defined, documented and understood;
- b) The laboratory has the capability and resources to meet the requirements;
- c) Where external providers are used, the requirements of are applied and the laboratory advises the customer of the specific laboratory activities to be performed by the external provider and gains the customer's approval;

NOTE: It is recognized that externally provided laboratory activities can occur when the laboratory has the resources and competence to perform the activities, however, for unforeseen reasons is unable to undertake these in part or full; the laboratory does not have the resources or competence to perform the activities.

- d) The appropriate methods or procedures are selected and are capable of meeting the customers' requirements.

NOTE: For internal or routine customers, reviews of requests, tenders and contracts can be performed in a simplified way.

7.1.2 The laboratory shall inform the customer when the method requested by the customer is considered to be inappropriate or out of date.

7.1.3 When the customer requests a statement of conformity to a specification or standard for the test or calibration (e.g. pass/fail, in-tolerance/out-of-tolerance), the specification or standard and the decision rule shall be clearly defined. Unless inherent in the requested specification or standard, the decision rule selected shall be communicated to, and agreed with, the customer.

NOTE: For further guidance on statements of conformity, ISO/IEC Guide 98-4.

7.1.4 Any differences between the request or tender and the contract shall be resolved before laboratory activities commence. Each contract shall be acceptable both to the laboratory and the customer. Deviations requested by the customer shall not impact the integrity of the laboratory or the validity of the results.

7.1.5 The customer shall be informed of any deviation from the contract.

7.1.6 If a contract is amended after work has commenced, the contract review shall be repeated and any amendments shall be communicated to all affected personnel.

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7.1.7 The laboratory shall cooperate with customers or their representatives in clarifying the customer's request and in monitoring the laboratory's performance in relation to the work performed.

NOTE: Such cooperation can include:

- a) Providing reasonable access to relevant areas of the laboratory to witness customer-specific laboratory activities;
- b) Preparation, packaging, and dispatch of items needed by the customer for verification purposes.

7.1.8 Records of reviews, including any significant changes, shall be retained. Records shall also be retained of pertinent discussions with a customer relating to the customer's requirements or the results of the laboratory activities.

7.2 Selection, verification and validation of methods

7.2.1 Selection and verification of methods

7.2.1.1 The laboratory shall use appropriate methods and procedures for all laboratory activities and, where appropriate, for evaluation of the measurement uncertainty as well as statistical techniques for analysis of data.

NOTE: "Method" as used can be considered synonymous with the term "measurement procedure" as defined in ISO/IEC Guide 99.

7.2.1.2 All methods, procedures and supporting documentation, such as instructions, standards, manuals and reference data relevant to the laboratory activities, shall be kept up to date and shall be made readily available to personnel.

7.2.1.3 The laboratory shall ensure that it uses the latest valid version of a method unless it is not appropriate or possible to do so. When necessary, the application of the method shall be supplemented with additional details to ensure consistent application.

NOTE: International, regional or national standards or other recognized specifications that contain sufficient and concise information on how to perform laboratory activities do not need to be supplemented or rewritten as internal procedures if these standards are written in a way that they can be used by the operating personnel in a laboratory. It can be necessary to provide additional documentation for optional steps in the method or additional details.

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7.2.1.4 When the customer does not specify the method to be used, the laboratory shall select an appropriate method and inform the customer of the method chosen. Methods published either in international, regional or national standards, or by reputable technical organizations, or in relevant scientific texts or journals, or as specified by the manufacturer of the equipment, are recommended. Laboratory-developed or modified methods can also be used.

7.2.1.5 The laboratory shall verify that it can properly perform methods before introducing them by ensuring that it can achieve the required performance. Records of the verification shall be retained. If the method is revised by the issuing body, verification shall be repeated to the extent necessary.

7.2.1.6 When method development is required, this shall be a planned activity and shall be assigned to competent personnel equipped with adequate resources. As method development proceeds, periodic review shall be carried out to confirm that the needs of the customer are still being fulfilled. Any modifications to the development plan shall be approved and authorized.

7.2.1.7 Deviations from methods for all laboratory activities shall occur only if the deviation has been documented, technically justified, authorized, and accepted by the customer.

NOTE: Customer acceptance of deviations can be agreed in advance in the contract.

7.2.2 Validation of methods

7.2.2.1 The laboratory shall validate non-standard methods, laboratory-developed methods and standard methods used outside their intended scope or otherwise modified. The validation shall be as extensive as is necessary to meet the needs of the given application or field of application.

NOTE: Validation can include procedures for sampling, handling and transportation of test or calibration items. The techniques used for method validation can be one of, or a combination of, the following:

- a) Calibration or evaluation of bias and precision using reference standards or reference materials;
- b) Systematic assessment of the factors influencing the result;

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- c) Testing method robustness through variation of controlled parameters, such as incubator temperature, volume dispensed;
- d) Comparison of results achieved with other validated methods;
- e) Interlaboratory comparisons;
- f) Evaluation of measurement uncertainty of the results based on an understanding of the theoretical principles of the method and practical experience of the performance of the sampling or test method.

7.2.2.2 When changes are made to a validated method, the influence of such changes shall be determined and where they are found to affect the original validation, a new method validation shall be performed.

7.2.2.3 The performance characteristics of validated methods, as assessed for the intended use, shall be relevant to the customers' needs and consistent with specified requirements.

NOTE: Performance characteristics can include, but are not limited to, measurement range, accuracy, measurement uncertainty of the results, limit of detection, limit of quantification, selectivity of the method, linearity, repeatability or reproducibility, robustness against external influences or cross-sensitivity against interference from the matrix of the sample or test object, and bias.

7.2.2.4 The laboratory shall retain the following records of validation:

- a) The validation procedure used;
- b) Specification of the requirements;
- c) Determination of the performance characteristics of the method;
- d) Results obtained;
- e) A statement on the validity of the method, detailing its fitness for the intended use.

7.3 Sampling

7.3.1 The laboratory shall have a sampling plan and method when it carries out sampling of substances, materials or products for subsequent testing or calibration. The sampling method shall address the factors to be controlled to ensure the validity of subsequent testing or calibration results. The sampling plan and method shall be available at the site where sampling is undertaken. Sampling plans shall, whenever reasonable, be based on appropriate statistical methods.

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7.3.2 The sampling method shall describe:

- a) The selection of samples or sites;
- b) The sampling plan;
- c) The preparation and treatment of sample(s) from a substance, material or product to yield the required item for subsequent testing or calibration.

7.3.3 The laboratory shall retain records of sampling data that forms part of the testing or calibration that is undertaken. These records shall include, where relevant:

- a) Reference to the sampling method used;
- b) Date and time of sampling;
- c) Data to identify and describe the sample (e.g. number, amount, name);
- d) Identification of the personnel performing sampling;
- e) Identification of the equipment used;
- f) Environmental or transport conditions;
- g) Diagrams or other equivalent means to identify the sampling location, when appropriate;
- h) Deviations, additions to or exclusions from the sampling method and sampling plan.

7.4 Handling of test or calibration items

7.4.1 The laboratory shall have a procedure for the transportation, receipt, handling, protection, storage, retention, and disposal or return of test or calibration items, including all provisions necessary to protect the integrity of the test or calibration item, and to protect the interests of the laboratory and the customer. Precautions shall be taken to avoid deterioration, contamination, loss or damage to the item during handling, transporting, storing/waiting, and preparation for testing or calibration. Handling instructions provided with the item shall be followed.

7.4.2 The laboratory shall have a system for the unambiguous identification of test or calibration items. The identification shall be retained while the item is under the responsibility of the laboratory. The system shall ensure that items will not be confused physically or when referred to in records or other documents. The system shall, if appropriate, accommodate a sub-division of an item or groups of items and the transfer of items.

7.4.3 Upon receipt of the test or calibration item, deviations from specified conditions shall be recorded. When there is doubt about the suitability of an item for test or calibration, or when an item does not conform to the description provided, the laboratory shall consult the customer for further instructions before proceeding and

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shall record the results of this consultation. When the customer requires the item to be tested or calibrated acknowledging a deviation from specified conditions, the laboratory shall include a disclaimer in the report indicating which results may be affected by the deviation.

- 7.4.4 When items need to be stored or conditioned under specified environmental conditions, these conditions shall be maintained, monitored and recorded.

7.5 Technical records

- 7.5.1 The laboratory shall ensure that technical records for each laboratory activity contain the results, report and sufficient information to facilitate, if possible, identification of factors affecting the measurement result and its associated measurement uncertainty and enable the repetition of the laboratory activity under conditions as close as possible to the original. The technical records shall include the date and the identity of personnel responsible for each laboratory activity and for checking data and results. Original observations, data and calculations shall be recorded at the time they are made and shall be identifiable with the specific task.

- 7.5.2 The laboratory shall ensure that amendments to technical records can be tracked to previous versions or to original observations. Both the original and amended data and files shall be retained, including the date of alteration, an indication of the altered aspects and the personnel responsible for the alterations.

7.6 Evaluation of measurement uncertainty

- 7.6.1 Laboratories shall identify the contributions to measurement uncertainty. When evaluating measurement uncertainty, all contributions that are of significance, including those arising from sampling, shall be taken into account using appropriate methods of analysis.

- 7.6.2 A laboratory performing calibrations, including of its own equipment, shall evaluate the measurement uncertainty for all calibrations.

- 7.6.3 A laboratory performing testing shall evaluate measurement uncertainty. Where the test method precludes rigorous evaluation of measurement uncertainty, an estimation shall be made based on an understanding of the theoretical principles or practical experience of the performance of the method.

- 7.6.4 NOTE 1 In those cases where a well-recognized test method specifies limits to the values of the major sources of measurement uncertainty and specifies the form of presentation of the calculated results, the laboratory is considered to have satisfied by following the test method and reporting instructions.

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NOTE 2 For a particular method where the measurement uncertainty of the results has been established and verified, there is no need to evaluate measurement uncertainty for each result if the laboratory can demonstrate that the identified critical influencing factors are under control.

NOTE 3 For further information, ISO/IEC Guide 98-3, ISO 21748 and the ISO 5725 series.

7.7 Ensuring the quality of results

7.7.1 The laboratory shall have a procedure for monitoring the validity of results. The resulting data shall be recorded in such a way that trends are detectable and, where practicable, statistical techniques shall be applied to review the results. This monitoring shall be planned and reviewed and shall include, where appropriate, but not be limited to:

- a) Use of reference materials or quality control materials;
- b) Use of alternative instrumentation that has been calibrated to provide traceable results;
- c) Functional check(s) of measuring and testing equipment;
- d) Use of check or working standards with control charts, where applicable;
- e) Intermediate checks on measuring equipment;
- f) Replicate tests or calibrations using the same or different methods;
- g) Retesting or recalibration of retained items;
- h) Correlation of results for different characteristics of an item;
- i) Review of reported results;
- j) Intralaboratory comparisons;
- k) Testing of blind sample(s).

7.7.2 The laboratory shall monitor its performance by comparison with results of other laboratories, where available and appropriate. This monitoring shall be planned and reviewed and shall include, but not be limited to, either or both of the following:

- a) Participation in proficiency testing;

NOTE: ISO/IEC 17043 contains additional information on proficiency tests and proficiency testing providers. Proficiency testing providers that meet the requirements of ISO/IEC 17043 are considered to be competent.

- b) Participation in interlaboratory comparisons other than proficiency testing.

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7.7.3 Data from monitoring activities shall be analysed, used to control and, if applicable, improve the laboratory's activities. If the results of the analysis of data from monitoring activities are found to be outside pre-defined criteria, appropriate action shall be taken to prevent incorrect results from being reported.

7.8 Reporting of results

7.8.1 General

7.8.1.1 The results shall be reviewed and authorized prior to release.

7.8.1.2 The results shall be provided accurately, clearly, unambiguously and objectively, usually in a report (e.g. a test report or a calibration certificate or report of sampling), and shall include all the information agreed with the customer and necessary for the interpretation of the results and all information required by the method used. All issued reports shall be retained as technical records.

NOTE: Test reports and calibration certificates are sometimes referred to as test certificates and calibration reports, respectively. Reports can be issued as hard copies or by electronic means, provided that the requirements are met.

7.8.1.3 When agreed with the customer, the results may be reported in a simplified way. Any information listed in to that is not reported to the customer shall be readily available.

7.8.2 Common requirements for reports (test, calibration or sampling)

7.8.2.1 Each report shall include at least the following information, unless the laboratory has valid reasons for not doing so, thereby minimizing any possibility of misunderstanding or misuse:

- a) A title (e.g. "Test Report", "Calibration Certificate" or "Report of Sampling");
- b) The name and address of the laboratory;
- c) The location of performance of the laboratory activities, including when performed at a customer facility or at sites away from the laboratory's permanent facilities, or in associated temporary or mobile facilities;
- d) Unique identification that all its components are recognized as a portion of a complete report and a clear identification of the end;
- e) The name and contact information of the customer;
- f) Identification of the method used;
- g) A description, unambiguous identification, and, when necessary, the condition of the item;

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- h) The date of receipt of the test or calibration item(s), and the date of sampling, where this is critical to the validity and application of the results;
- i) The date(s) of performance of the laboratory activity;
- j) The date of issue of the report;
- k) Reference to the sampling plan and sampling method used by the laboratory or other bodies where these are relevant to the validity or application of the results;
- l) A statement to the effect that the results relate only to the items tested, calibrated or sampled;
- m) The results with, where appropriate, the units of measurement;
- n) Additions to, deviations, or exclusions from the method;
- o) Identification of the person(s) authorizing the report;
- p) Clear identification when results are from external providers.

NOTE: Including a statement specifying that the report shall not be reproduced except in full without approval of the laboratory can provide assurance that parts of a report are not taken out of context.

7.8.2.2 The laboratory shall be responsible for all the information provided in the report, except when information is provided by the customer. Data provided by a customer shall be clearly identified. In addition, a disclaimer shall be put on the report when the information is supplied by the customer and can affect the validity of results. Where the laboratory has not been responsible for the sampling stage (e.g. the sample has been provided by the customer), it shall state in the report that the results apply to the sample as received.

7.8.3 Specific requirements for test reports

7.8.3.1 In addition to the requirements listed in , test reports shall, where necessary for the interpretation of the test results, include the following:

- a) Information on specific test conditions, such as environmental conditions;
- b) Where relevant, a statement of conformity with requirements or specification;
- c) Where applicable, the measurement uncertainty presented in the same unit as that of the measurand or in a term relative to the measurand (e.g. percent) when it is relevant to the validity or application of the test results; a customer's instruction so requires, or the measurement uncertainty affects conformity to a specification limit;
- d) Where appropriate, opinions and interpretations;
- e) Additional information that may be required by specific methods, authorities, customers or groups of customers.

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7.8.3.2 Where the laboratory is responsible for the sampling activity, test reports shall meet the requirements listed in where necessary for the interpretation of test results.

7.8.4 Specific requirements for calibration certificates

7.8.4.1 In addition to the requirements listed in , calibration certificates shall include the following:

- a) The measurement uncertainty of the measurement result presented in the same unit as that of the measurand or in a term relative to the measurand (e.g. percent);

NOTE According to ISO/IEC Guide 99, a measurement result is generally expressed as a single measured quantity value including unit of measurement and a measurement uncertainty.

- b) The conditions (e.g. environmental) under which the calibrations were made that have an influence on the measurement results;
- c) Annex Aa statement identifying how the measurements are metrologically traceable;
- d) The results before and after any adjustment or repair, if available;
- e) Where relevant, a statement of conformity with requirements or specification;
- f) Where appropriate, opinions and interpretations.

7.8.4.2 Where the laboratory is responsible for the sampling activity, calibration certificates shall meet the requirements listed in where necessary for the interpretation of calibration results.

7.8.4.3 A calibration certificate or calibration label shall not contain any recommendation on the calibration interval, except where this has been agreed with the customer.

7.8.5 Reporting sampling – specific requirements

7.8.5 Where the laboratory is responsible for the sampling activity, in addition to the requirements listed in , reports shall include the following, where necessary for the interpretation of results:

- a) The date of sampling;
- b) Unique identification of the item or material sampled (including the name of the manufacturer, the model or type of designation and serial numbers, as appropriate);

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- c) The location of sampling, including any diagrams, sketches or photographs;
- d) A reference to the sampling plan and sampling method;
- e) Details of any environmental conditions during sampling that affect the interpretation of the results;
- f) Information required to evaluate measurement uncertainty for subsequent testing or calibration.

7.8.6 Reporting statements of conformity

7.8.6.1 When a statement of conformity to a specification or standard is provided, the laboratory shall document the decision rule employed, taking into account the level of risk (such as false accept and false reject and statistical assumptions) associated with the decision rule employed, and apply the decision rule.

NOTE: Where the decision rule is prescribed by the customer, regulations or normative documents, a further consideration of the level of risk is not necessary.

7.8.6.2 The laboratory shall report on the statement of conformity, such that the statement clearly identifies:

- a) To which results the statement of conformity applies;
- b) Which specifications, standards or parts thereof are met or not met;
- c) The decision rule applied (unless it is inherent in the requested specification or standard).

7.8.7 Reporting opinions and interpretations

7.8.7.1 When opinions and interpretations are expressed, the laboratory shall ensure that only personnel authorized for the expression of opinions and interpretations release the respective statement. The laboratory shall document the basis upon which the opinions and interpretations have been made.

7.8.7 It is important to distinguish opinions and interpretations from statements of inspections and product certifications as intended in ISO/IEC 17020 and ISO/IEC 17065, and from statements of conformity as referred.

7.8.7.2 The opinions and interpretations expressed in reports shall be based on the results obtained from the tested or calibrated item and shall be clearly identified as such.

7.8.7.3 When opinions and interpretations are directly communicated by dialogue with the customer, a record of the dialogue shall be retained.

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7.8.8 Amendments to reports

7.8.8.1 When an issued report needs to be changed, amended or re-issued, any change of information shall be clearly identified and, where appropriate, the reason for the change included in the report.

7.8.8.2 Amendments to a report after issue shall be made only in the form of a further document, or data transfer, which includes the statement "Amendment to Report, serial number... [or as otherwise identified]", or an equivalent form of wording. Such amendments shall meet all the requirements.

7.8.8.3 When it is necessary to issue a complete new report, this shall be uniquely identified and shall contain a reference to the original that it replaces.

7.9 Complaints

7.9.1 The laboratory shall have a documented process to receive, evaluate and make decisions on complaints.

7.9.2 A description of the handling process for complaints shall be available to any interested party on request. Upon receipt of a complaint, the laboratory shall confirm whether the complaint relates to laboratory activities that it is responsible for and, if so, shall deal with it. The laboratory shall be responsible for all decisions at all levels of the handling process for complaints.

7.9.3 The process for handling complaints shall include at least the following elements and methods:

- a) Description of the process for receiving, validating, investigating the complaint, and deciding what actions are to be taken in response to it;
- b) Tracking and recording complaints, including actions undertaken to resolve them;
- c) Ensuring that any appropriate action is taken.

7.9.4 The laboratory receiving the complaint shall be responsible for gathering and verifying all necessary information to validate the complaint.

7.9.5 Whenever possible, the laboratory shall acknowledge receipt of the complaint, and provide the complainant with progress reports and the outcome.

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7.9.6 The outcomes to be communicated to the complainant shall be made by, or reviewed and approved by, individual(s) not involved in the original laboratory activities in question.

NOTE: This can be performed by external personnel.

7.9.7 Whenever possible, the laboratory shall give formal notice of the end of the complaint handling to the complainant.

7.10 Management of Nonconforming work

7.10.1 The laboratory shall have a procedure that shall be implemented when any aspect of its laboratory activities or results of this work do not conform to its own procedures or the agreed requirements of the customer (e.g. equipment or environmental conditions are out of specified limits, results of monitoring fail to meet specified criteria). The procedure shall ensure that:

- a) The responsibilities and authorities for the management of nonconforming work are defined;
- b) Actions (including halting or repeating of work and withholding of reports, as necessary) are based upon the risk levels established by the laboratory;
- c) An evaluation is made of the significance of the nonconforming work, including an impact analysis on previous results;
- d) A decision is taken on the acceptability of the nonconforming work;
- e) Where necessary, the customer is notified and work is recalled;
- f) The responsibility for authorizing the resumption of work is defined.

7.10.2 The laboratory shall retain records of nonconforming work and actions as specified in b) to f).

7.10.3 Where the evaluation indicates that the nonconforming work could recur, or that there is doubt about the conformity of the laboratory's operations with its own management system, the laboratory shall implement corrective action.

7.11 Control of data and information management

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7.11.1 The laboratory shall have access to the data and information needed to perform laboratory activities.

7.11.2 The laboratory information management system(s) used for the collection, processing, recording, reporting, storage or retrieval of data shall be validated for functionality, including the proper functioning of interfaces within the laboratory information management system(s) by the laboratory before introduction. Whenever there are any changes, including laboratory software configuration or modifications to commercial off-the-shelf software, they shall be authorized, documented and validated before implementation.

NOTE: "Laboratory information management system(s)" includes the management of data and information contained in both computerized and non-computerized systems. Some of the requirements can be more applicable to computerized systems than to non-computerized systems. Commercial off-the-shelf software in general use within its designed application range can be considered to be sufficiently validated.

7.11.3 The laboratory information management system(s) shall:

- a) Protected from unauthorized access;
- b) Safeguarded against tampering and loss;
- c) Operated in an environment that complies with provider or laboratory specifications or, in the case of non-computerized systems, provides conditions which safeguard the accuracy of manual recording and transcription;
- d) Maintained in a manner that ensures the integrity of the data and information;
- e) Include recording system failures and the appropriate immediate and corrective actions.

7.11.4 When a laboratory information management system is managed and maintained off-site or through an external provider, the laboratory shall ensure that the provider or operator of the system complies with all applicable requirements.

7.11.5 The laboratory shall ensure that instructions, manuals and reference data relevant to the laboratory information management system(s) are made readily available to personnel.

7.11.6 Calculations and data transfers shall be checked in an appropriate and systematic manner.

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8. Management requirements

8.1 Options

8.1.1 General

The laboratory shall establish, document, implement and maintain a management system that is capable of supporting and demonstrating the consistent achievement of the requirements and assuring the quality of the laboratory results. In addition to meeting the requirements of to, the laboratory shall implement a management system in accordance with Option A or Option B.

8.1.2 Option A

As a minimum, the management system of the laboratory shall address the following:

8.1.3 Management system documentation control of management system documents, control of records, actions to address risks and opportunities, improvement, corrective actions, internal audits and management reviews.

8.1.4 Option B

A laboratory that has established and maintains a management system and that is capable of supporting and demonstrating the consistent fulfillment of the requirements also fulfils at least the intent of the management system requirements specified.

8.2 Management system documentation (Option A)

8.2.1 Laboratory management shall establish, document, and maintain policies and objectives for the fulfillment of the purposes and shall ensure that the policies and objectives are acknowledged and implemented at all levels of the laboratory organization.

8.2.2 The policies and objectives shall address the competence, impartiality and consistent operation of the laboratory.

8.2.3 Laboratory management shall provide evidence of commitment to the development and implementation of the management system and to continually improving its effectiveness.

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8.2.4 All documentation, processes, systems, records, related to the fulfillment of the requirements shall be included in, referenced from, or linked to the management system.

8.2.5 All personnel involved in laboratory activities shall have access to the parts of the management system documentation and related information that are applicable to their responsibilities.

8.3 Control of management system documents (Option A)

8.3.1 The laboratory shall control the documents (internal and external) that relate to the fulfillment of this manual.

NOTE: In this context, “documents” can be policy statements, procedures, specifications, manufacturer’s instructions, calibration tables, charts, text books, posters, notices, memoranda, drawings, plans, etc. These can be on various media, such as hard copy or digital.

8.3.2 The laboratory shall ensure that:

- a) Documents are approved for adequacy prior to issue by authorized personnel;
- b) Documents are periodically reviewed, and updated as necessary;
- c) Changes and the current revision status of documents are identified;
- d) Relevant versions of applicable documents are available at points of use and, where necessary, their distribution is controlled;
- e) Documents are uniquely identified;
- f) The unintended use of obsolete documents is prevented, and suitable identification is applied to them if they are retained for any purpose.

8.4 Control of records (Option A)

8.4.1 The laboratory shall establish and retain legible records to demonstrate fulfillment of the requirements in this manual.

8.4.2 The laboratory shall implement the controls needed for the identification, storage, protection, back-up, archive, retrieval, retention time, and disposal of its records. The laboratory shall retain records for a period consistent with its contractual obligations. Access to these records shall be consistent with the confidentiality commitments, and records shall be readily available.

NOTE: Additional requirements regarding technical records are given in .

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8.5 Actions to address risks and opportunities (Option A)

8.5.1 The laboratory shall consider the risks and opportunities associated with the laboratory activities in order to:

- a) Give assurance that the management system achieves its intended results;
- b) Enhance opportunities to achieve the purpose and objectives of the laboratory;
- c) Prevent, or reduce, undesired impacts and potential failures in the laboratory activities;
- d) Achieve improvement.

8.5.2 The laboratory shall plan:

- a) Actions to address these risks and opportunities;
- b) How to integrate and implement these actions into its management system; evaluate the effectiveness of these actions.

NOTE: Although this manual specifies that the laboratory plans actions to address risks, there is no requirement for formal methods for risk management or a documented risk management process. Laboratories can decide whether or not to develop a more extensive risk management methodology than is required by this manual, e.g. through the application of other guidance or standards.

8.5.3 Actions taken to address risks and opportunities shall be proportional to the potential impact on the validity of laboratory results.

NOTE 1: Options to address risks can include identifying and avoiding threats, taking risk in order to pursue an opportunity, eliminating the risk source, changing the likelihood or consequences, sharing the risk, or retaining risk by informed decision.

NOTE 2: Opportunities can lead to expanding the scope of the laboratory activities, addressing new customers, using new technology and other possibilities to address customer needs.

8.6 Improvement (Option A)

8.6.1 The laboratory shall identify and select opportunities for improvement and implement any necessary actions.

NOTE: Opportunities for improvement can be identified through the review of the operational procedures, the use of the policies, overall objectives, audit results,

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corrective actions, management review, suggestions from personnel, risk assessment, analysis of data, and proficiency testing results.

8.6.2 The laboratory shall seek feedback, both positive and negative, from its customers. The feedback shall be analyzed and used to improve the management system, laboratory activities and customer service.

NOTE: Examples of the types of feedback include customer satisfaction surveys, communication records and review of reports with customers.

8.7 Corrective actions (Option A)

8.7.1 When nonconformity occurs, the laboratory shall:

- a) React to the nonconformity and, as applicable:
 - take action to control and correct it;
 - address the consequences;
- b) Evaluate the need for action to eliminate the cause(s) of the nonconformity, in order that it does not recur or occur elsewhere, by:
 - reviewing and analyzing the nonconformity;
 - determining the causes of the nonconformity;
 - determining if similar nonconformities exist, or could potentially occur;
- c) Implement any action needed;
- d) Review the effectiveness of any corrective action taken;
- e) Update risks and opportunities determined during planning, if necessary;
- f) Make changes to the management system, if necessary.

8.7.2 Corrective actions shall be appropriate to the effects of the nonconformities encountered.

8.7.3 The laboratory shall retain records as evidence of:

- a) The nature of the nonconformities, cause(s) and any subsequent actions taken;
- b) The results of any corrective action.

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8.8 Internal audits (Option A)

8.8.1 The laboratory shall conduct internal audits at planned intervals to provide information on whether the management system:

- a) Conforms to the laboratory's own requirements for its management system, including the laboratory activities; the requirements of this manual;
- b) Is effectively implemented and maintained.

8.8.2 The laboratory shall:

- a) Plan, establish, implement and maintain an audit programme including the frequency, methods, responsibilities, planning requirements and reporting, which shall take into consideration the importance of the laboratory activities concerned, changes affecting the laboratory, and the results of previous audits;
- b) Define the audit criteria and scope for each audit;
- c) Ensure that the results of the audits are reported to relevant management;
- d) Implement appropriate correction and corrective actions without undue delay;
- e) Retain records as evidence of the implementation of the audit programme and the audit results.

8.9 Management reviews (Option A)

8.9.1 The laboratory management shall review its management system at planned intervals, in order to ensure its continuing suitability, adequacy and effectiveness, including the stated policies and objectives related to the fulfillment of this manual.

8.9.2 The inputs to management review shall be recorded and shall include information related to the following:

- a) Changes in internal and external issues that are relevant to the laboratory;
- b) Fulfillment of objectives;
- c) Suitability of policies and procedures;
- d) Status of actions from previous management reviews;

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- e) Outcome of recent internal audits;
- f) Corrective actions;
- g) Assessments by external bodies;
- h) Changes in the volume and type of the work or in the range of laboratory activities;
- i) Customer and personnel feedback;
- j) Complaints;
- k) Effectiveness of any implemented improvements;
- l) Adequacy of resources;
- m) Results of risk identification;
- n) Outcomes of the assurance of the validity of results; and
- o) Other relevant factors, such as monitoring activities and training.

8.9.3 The outputs from the management review shall record all decisions and actions related to at least:

- a) The effectiveness of the management system and its processes;
- b) Improvement of the laboratory activities related to the fulfillment of the requirements of this manual;
- c) Provision of required resources;
- c) Any need for change.

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