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Standard Practice for Evaluating the Performance of Mechanical Testing Laboratories[1]

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INTRODUCTION

Criteria for laboratory assessment are commonly divided into two classes: generic (or general) and specific. The generic criteria are applicable to all laboratories regardless of the type of test being performed. Specific criteria are interpretations of the generic criteria applied to more limited areas of testing, such as a product class, type of test, or a particular test method.

The sources of the criteria for this practice include ISO/IEC Guide 25 (see Section 2), Guide E 548 and Practice A 880. If inconsistencies exist between these documents, the criteria given in this practice have precedence.

Accreditation is only an indicator of the quality of service furnished by the laboratory and does not relieve normal contractual responsibilities.

All information gained by an assessor or by an accreditation agency must be treated as confidential. Such information shall be handled on a "need to know" basis and shall not be divulged without the express written consent of the laboratory management.

1. Scope

1.1 This practice interprets the generic criteria listed in the referenced documents as they apply to mechanical testing. The omission of generic criteria contained in any of the reference documents does not necessarily mean that they are inapplicable to this practice.

1.2 The specific criteria assess features of organization, facilities, personnel, testing procedures, and record keeping to give an indication of the precision of the test results and the validity of the reports produced by a mechanical testing laboratory.

1.2.1 Some specific criteria of this practice may not be applicable when tests are only conducted for the company with which the lab is affiliated or when the tests are conducted on a company's own products and are reported only within the company or to purchasers of those products. When exceptions to this practice exist, the assessor shall be informed of them. The exceptions shall be made available to the assessor if requested.

1.2.2 An appendix applicable to a specific test method further defines the specific criteria listed in the main portion of the practice.

1.2.2.1 The test methods state some requirements without numerical values or recommended procedures for determining whether the requirements are met. One purpose of an appendix is to provide procedures and quantitative values which may be used during assessment. It is not to be considered as the requirements for assessment or for testing according to the method. Only the assessor or the accrediting agency can state requirements for assessment. Similarly, only the responsible subcommittee can state the requirements of the test method. Where mandatory requirements of the test method are referenced, mandatory wording is used in the appendix.

1.2.2.2 For the purposes of this appendix it is assumed that when a measurement is required, some degree of accuracy is implied even if none is stated.

1.2.2.3 If an assessor chooses to require any of these criteria, then the laboratory should be prepared to demonstrate compliance by measurement made during the assessment or to have at hand a report of such measurement made previously.

1.2.3 An appendix covering details peculiar to certain tests is appended to this practice as follows:

Rockwell Hardness Test (Test Methods E 18)	Appendix X1
Brinell Hardness Test (Test Method E 10)	Appendix X4

1.2.4 The specific test methods and practices applicable to the work of the laboratory and listed in 2.1 should be employed in assessing the capability of the laboratory.

1.3 The laboratory being accredited may be part of a larger organization.

1.4 Testing, approval, and certification of a company's own products or services, or both, by its own laboratory does not constitute a conflict of interest.

[1] This practice is under the jurisdiction of ASTM Committee E-28 on Mechanical Testingand is the direct responsibility of Subcommittee E28.12 on Accreditation of Mechanical Test Laboratories.

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2. Referenced Documents

2.1 *ASTM Standards:*

A 880 Practice for Criteria for Use in Evaluation of Testing Laboratories and Organizations for the Exami-nation and Inspection of Steel, Stainless Steel, and Related Alloys[2]

E 4 Practices for Force Verification of Testing Machines[3]

E 6 Terminology Relating to Methods of Mechanical Testing[3]

E 8 Test Methods for Tension Testing of Metallic Materials[3]

E 8M Test Methods for Tension Testing of Metallic Materials [Metric][3]

E 10 Test Method for Brinell Hardness of Metallic Materials[3]

E 18 Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials[3]

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications[4]

E 83 Practices for Verification and Classification of Extensometers[3]

E 140 Hardness Conversion Tables for Metals[3]

E 208 Test Method for Conducting Drop-Weight Test to Determine Nil-Ducility Transition Temperature of Ferritic Steels[3]

E 548 Guide for General Criteria Used for Evaluating Laboratory Competence[4]

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method[4]

E 919 Specification for Software Documentation for a Computerized System[5]

E 1187 Terminology Relating to Laboratory Accreditation[4]

E 1301 Guide for the Development and Operation of Laboratory Proficiency Testing Programs[4]

E 1323 Guide for Evaluating Laboratory Measurement Practices and the Statistical Analysis of the Resulting Data[4]

E 1856 Guide for Evaluating Computerized Data Acquisition Systems Used to Acquire Data from Universal Testing Machines[3]

2.2 *ISO Standard:*

ISO/IEC Guide 25 General Requirements for the Competence of Calibration and Testing Laboratories[6]

2.3 *Other:*

ANSI/NSCL-Z540–1 Military Standard Calibration Systems Requirements[6]

3. Terminology

3.1 Definitions for terms used are found in Terminology E 6, E 1187, ISO/IEC Guide 25, ANSI/NSCL-Z540–1 and the Compilation of ASTM Standard Definitions.[7]

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *batch*—a definite quantity of some product or material produced under conditions that are considered uniform.

3.2.2 *calibration*—the comparison of measuring and test equipment or a measurement standard of unknown accuracy to a measurement standard of known accuracy in order to detect, correlate, report, or minimize by adjustment any variation in the accuracy of the measuring and test equipment or measurement standard being compared.

3.2.3 *standardization of an instrument*—the correlation of an instrument response to a standard of known accuracy.

3.2.4 *verification*—checking or testing of the measuring and test equipment to assure conformance to specified requirements. Verification may be accomplished in two ways, direct and indirect, and may or may not include calibration as defined in 3.2.2.

3.2.4.1 Direct verification involves comparison with standards of known value (for example, mass, length, time, voltage) which have an unbroken chain of traceability to national standards.

3.2.4.2 Indirect verification involves testing materials having known properties.

4. Significance and Use

4.1 This practice contains criteria for assessing a laboratory's performance and reporting of results of mechanical tests. The criteria have been selected to serve the interests of the three parties most concerned: the purchaser of the service, the assessor who acts as agent for the purchaser, and the supplier of the service.

NOTE 1—In some cases, one individual may represent two of the parties.

4.2 In some instances, additional criteria may be specified by the assessor or purchaser.

5. Quality System

5.1 The laboratory shall establish and maintain a quality system appropriate to the type, range, and volume of its activities. The laboratory shall document its policies and objectives for good laboratory practice and quality services. The laboratory management shall ensure that the quality system policies and objectives are understood and implemented by all laboratory personnel.

5.2 The quality system shall be formally documented in a Quality Manual which shall be available for use by all laboratory personnel. The quality manager (however named) shall be responsible for maintaining and keeping current the Quality Manual (see 5.3).

5.2.1 The Quality Manual and related quality documentation shall state the policies, organizational structure, and procedures established by the laboratory in order to meet the requirements of this practice.

NOTE 2—Technical procedures such as test methods and lists of current vendors may be contained in separate documentation provided that the Quality Manual refers to this documentation by name and describes the scope of its contents.

5.3 The quality system adopted to satisfy the requirements of this practice shall be reviewed at least annually by the management to ensure its continuing suitability and effectiveness and to introduce any necessary changes or improvements.

[2] *Annual Book of ASTM Standards*, Vol 01.03.
[3] *Annual Book of ASTM Standards*, Vol 03.01.
[4] *Annual Book of ASTM Standards*, Vol 14.02.
[5] *Annual Book of ASTM Standards*, Vol 14.01.
[6] Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.
[7] Available from ASTM Headquarters.

6. Organization

6.1 Where relevant, the following information about the laboratory organization shall be made available to the accrediting authority for on-site assessment:

6.1.1 The specific identity, address, and location of the organization to be accredited.

6.1.2 Brief history of the laboratory, scope of operation, and type of users served.

6.1.3 A list or chart showing the relevant internal organizational components, including their location and primary functions.

6.1.4 A written outline or chart delineating job titles and incumbents.

6.1.5 A list of external technical services used by the laboratory for calibration, verification, repair, and subcontracted testing and the service performed by each.

6.1.5.1 Documentation concerning periodic quality surveys of vendors and verification services listed in paragraph 6.1.5.

6.1.6 Security rules and procedures for handling clients' proprietary rights and confidential information which shall be clearly described in the quality manual.

7. Personnel

7.1 The following information shall be available for on-site assessment:

7.1.1 A written outline or chart delineating the responsibility and authority of each relevant position category, including a summary description of work performed, authority, responsibility, education, and training.

7.1.2 A description of the training programs for each relevant position and a record of the task certification(s) for current employees.

7.1.3 A cross-index listing of each of the tests being accredited and the names of the persons fully qualified to perform those tests.

7.2 The minimum requirements for qualification and training of persons operating the testing machines, recording data, or reporting results should include:

7.2.1 Ability to demonstrate familiarity with and depth of understanding of the quantitative measurements involved.

7.2.2 Detailed knowledge of the test method(s) and the operation of the testing equipment used for the tests for which that person is qualified. The test methods may be simplified versions, but must include all instructions related to the function performed. An assessor may ask the technician to demonstrate competency by performing tests and discussing the test methods.

7.2.3 Access to advice from a technical leader who can answer questions regarding interpretation of test methods and repeatability of the results.

7.3 A technician in training may perform tests only if a qualified technician is present. The qualified technician shall act as trainer and shall review the results. Both shall sign all log sheets and reports.

NOTE 3—The terms technician-in-training, qualified technician, and technical leader are not required titles. They are only to be considered as descriptors of three levels of competence analogous to the apprentice, journeyman, and master classifications used by the skilled trades. A qualified technician in one test may be a technician in training in another test.

7.3.1 When the technician in training is judged competent, by performance, examination, or both, an annotation shall be made in the training record or a report shall be written stating the dates of the training and the completion date. Other information may be included such as the results of examination or the number of tests performed while in training. The report shall be signed by the supervisor and the qualified technician who acted as trainer.

7.4 The qualifications and training of the technical leader shall include:

7.4.1 Knowledge of the tests being accredited, including testing technique, theoretical basis of the calculation(s), and operating principles of the equipment.

NOTE 4—This information may be found in textbooks on testing written for college-level courses in engineering, metallurgy, or polymeric materials.

7.4.2 Sufficient knowledge of metrology and elementary statistics to identify out-of-control conditions, set schedules for verification, and organize collaborative-test programs.

7.5 The technical leader may be a consultant and need not be employed full time in the laboratory being accredited, but should have regular contact with the laboratory and be available for discussions with the assessor.

7.6 There shall be no evidence of commercial, financial, or other pressures which might adversely affect the integrity of the test results.

8. Measuring and Test Equipment

8.1 The testing laboratory shall have in its possession or have access to all items of measuring and test equipment specified by the test method(s) for which the laboratory is being accredited. Operating instructions pertinent to the test(s) being assessed shall be available for the operator(s) and for on-site assessment.

8.2 Appropriate maintenance procedures for laboratory measuring and test equipment shall be available to operating personnel and for on-site assessment.

8.3 When an item of measuring and test equipment has been subjected to overloading or mishandling, gives suspect results, or is shown by verification or other means to be defective, it shall be taken out of service and clearly labeled until it has been repaired, recalibrated if necessary, and re-verified.

8.4 A maintenance record shall be maintained for each major item of equipment. This record shall include:

8.4.1 The name of the item of equipment,

8.4.2 The manufacturer's name, type identification, and serial number,

8.4.3 Date received and date placed in service,

8.4.4 Current location, when appropriate, and

8.4.5 Details of maintenance.

8.4.6 In the case of measuring equipment:

8.4.6.1 Date and results of the previous verifications,

NOTE 5—It is recommended that all prior verification results be made a permanent part of this record.

8.4.6.2 The scheduled period of time between successive verifications, and

8.4.6.3 A label or tag indicating the date of the last verification and the due date of the next shall be attached to the equipment.

8.5 Where computers, or automated measuring and test equipment, or both, are used, the laboratory shall ensure that the computer software is documented such as in Specification E 919. This documentation shall be available to the operator and for on-site assessment.

8.5.1 Validation of computer software shall be accomplished by comparing output to known results before initial use and after any changes have been made.

9. Verification of Measuring and Test Equipment

9.1 Test methods usually state the method of verifying or calibrating, or both, the measuring and test equipment and auxiliary instruments and the permitted deviations. Documentary evidence shall be available for on-site assessment to show that the equipment meets these requirements.

NOTE 6—The terms calibration and verification are interchangeable in this standard to meet the requirements of the user's specific accreditation/audit requirements. Some users have responsibilities to meet the requirements of ISO Guide 25 and ANSI/NSCL-Z540–1, while others must meet the requirements of other standards/documents. This standard should satisfy requirements of all.

NOTE 7—The documentary evidence is usually the verification report, and is often called a certificate.

9.1.1 If not specified by the test method, the error in the auxiliary instruments used to verify or calibrate the equipment used for a test shall be, whenever possible, less than one quarter of the permitted error in the quantity being measured or of the tolerance of the required dimensions. The error in the auxiliary equipment shall be evaluated at least at the limits of the measuring range of the test equipment or the permitted range of its dimensions.

NOTE 8—The commonly accepted metrology calibration ratio for test measurement and diagnostic equipment is 4 to 1; however, with advances that have been made with test measurement and diagnostic equipment in recent years, this ratio is difficult to maintain.

9.2 If the reported test result is calculated from measured values of a fundamental quantity such as length, mass, force, or time domain, the measuring and test equipment used to make quantitative measurements shall be verified using primary, secondary, or tertiary standards traceable to the appropriate national standards such as those maintained by the National Institute of Standards and Technology (NIST) in the United States.

9.2.1 When secondary or tertiary standards are used, documents showing comparative readings of these standards and the primary standard or compliance with an accredited calibration program shall be available for on-site assessment.

9.2.2 All certificates or reports of calibration for measurement standards should be kept readily accessible (available for on-site inspection) and should contain the following information:

9.2.2.1 Identification or serial number of the measurement standard or measuring and test equipment to which the report pertains,

9.2.2.2 Identification of the calibration source and report number,

9.2.2.3 Date of calibration and signature (or facsimile) of the author of the report,

9.2.2.4 Calibration assigned values with a statement of uncertainties,

9.2.2.5 Relevant conditions (for example, temperature, relative humidity, gravitational correction, etc.) under which the calibration was performed and for which the stated assigned values and uncertainties are valid,

9.2.2.6 Corrections which must be applied if standard conditions of temperature, gravity, air buoyancy, etc., are not met or differ from those at the time and place of calibration, and

9.2.2.7 A statement attesting to the fact that the measurement standards used in obtaining the results are traceable to the national laboratory, if the calibrating laboratory is other than the national laboratory.

9.2.3 The verification report shall show the values from the calibration standard and from the measuring and test equipment being verified. The verification report shall show the values in the as-found condition before any corrections or adjustments if the measuring and test equipment is found to be out of the specified tolerance.

NOTE 9—The as-found calibration may consist of a limited number of data points. When it is impossible to perform an as-found calibration because of damage to the equipment, the report should state this fact.

9.2.4 If adjustments are made, they shall be described in the report. Where practical, the position, or setting of the dial, potentiometer, etc. shall be retained by sealing, pinning, or other devices, to prevent accidental changes and to make deliberate changes obvious.

9.3 When test methods require that testing machine parts have specified weights or dimensions, a metrological certificate shall show the measured values of the specified quantities. The certificate shall be available for on-site assessment.

9.3.1 The metrological certificate shall show the measured weights or dimensions, identify the measuring and test equipment used, describe the measures taken to ensure that the instruments are accurate, and state an estimate of the uncertainty of the measurement process. The metrological certificate shall be dated and include the signature, printed business name, business address, and business telephone number of the inspector.

9.3.2 For parts not subject to wear or distortion, and that are not adjustable, the verification report is valid without time limit.

9.3.3 A dimension which changes during normal use shall be re-measured at intervals not exceeding the shorter of that stated in the test method or the equipment manufacturer's manual. If the dimension exceeds the specified tolerance, the part shall be repaired, replaced, or re-machined to meet the specification, and the equipment shall be re-verified in accordance with the appropriate procedures. If the measurement is still within tolerance, the latest measurement shall be added to the verification report and to the maintenance record of the piece of equipment and dated in both cases. If limit gages (GO and NO GO) are used, the limit settings shall be stated on the verification record.

9.3.4 Parts which shall be re-measured, regardless of appearance, are listed in the test method or the manufacturer's manual.

9.3.5 When any part that may affect the accuracy or precision of test results is repaired, replaced, re-machined, or adjusted, verification shall be repeated and a new verification report issued. The change shall be recorded in the maintenance record for the piece of equipment.

9.4 When the test method requires that specified ambient conditions be maintained or reported, the instrument(s) used to measure these conditions shall be periodically verified, using check standards, at the upper and lower bound of the specified range. The verification report for the instrument(s) shall be available for on-site assessment.

9.4.1 The check standard may be a similar instrument which has been verified using a certified standard and that is to be used only for examining the instruments used in testing. The report should state the date of verification, the reference instrument(s) used, and the precautions taken to ensure that the reference instrument(s) is (are) accurate.

9.4.2 Unless otherwise stated in the test method, the time interval between verifications shall not exceed that stated in the appropriate test method or standard.

9.5 When test conditions are specified by the test method, the instrument(s) used to determine that these conditions are met shall be verified. Examples are loading rates, temperatures and time of specimen conditioning, and specimen temperature during testing. Preceding paragraphs 9.1.1, 9.4, and 9.4.1 apply unless more accurate measurements are required by the test method or practice.

10. Laboratory Proficiency and Quality Assurance Testing

10.1 To establish laboratory competence and assess the precision (repeatability and reproducibility), accuracy, and bias of test methods, tests should be performed at regular intervals on specimens specially obtained for these purposes. Laboratory performance evaluation should include interlaboratory proficiency programs as well as in-house (intralaboratory) quality assurance programs.

10.2 All tests shall be made using measuring and test equipment meeting the requirements of Section 8.

10.3 When the test method specifies the type of specimen or the source, that specimen type shall be used.

10.4 Specimen sources for performance evaluation may include, but are not limited to the following:

10.4.1 *Standard Reference Materials*—Standard reference materials, as defined by the National Institute of Standards and Technology (NIST), are well-characterized materials produced in quantity and certified for one or more physical properties.

10.4.2 *Reference Samples (bulk distributed samples used in interlaboratory test programs)*—These are specimens prepared from bulk material and given out to each participant by a designated laboratory, not necessarily by a reference or contracting laboratory.

NOTE 10—Membership to the ASTM subcommittee responsible for the test method of interest may provide opportunities for participation in interlaboratory test programs and may furnish a forum involving other interested members.

10.4.3 *Certified Commercial Samples*—This is a reference material, whose properties are certified by a technically valid procedure accompanied by or traceable to a certificate or other documentation which is issued by a certifying body.

10.4.4 *Intralaboratory Split Samples*—This is a subsample or replicate portion of a bulk sample obtained in such a manner that it is not believed to differ significantly from other portions of the same sample. Although used in establishing laboratory control charts, such measurements might be considered proficiency testing, if results are compared occasionally with the performance of other laboratories.

10.5 When relevant, standard practices, guides, specifications, and statistical methods must be followed in material sampling and handling, specimen preparation and data analysis; for example, Guide E 1301, Practice E 691, and Guide E 1323.

10.6 When relevant, documentary evidence must be available that describes material, methods, equipment, and computations used within each program.

NOTE 11—A laboratory should obtain the assistance of a person familiar with statistical procedures and materials being tested or experience in practical work with data from materials testing in order to ensure that acceptable statistical methods of analysis and evaluation of results are applied.

11. Test Methods and Procedures

11.1 The laboratory shall follow documented procedures to ensure the samples, test blanks, and specimens are obtained in the specified required locations and orientations and have the appropriate dimensions.

11.1.1 Documentation shall exist showing that the laboratory procedures have been reviewed to assure that the laboratory is working to the appropriate issues of the standard test methods.

NOTE 12—In the case of ASTM standards, maintaining the latest issues of the applicable annual book(s) of ASTM standards evidences a good faith effort to fulfill the above requirement.

11.2 Laboratories seeking accreditation shall have a current copy of each of the test methods specified in the request for accreditation. On request, the laboratory shall furnish the assessor copies of those test methods except those contained in the *Annual Book of ASTM Standards*.

11.3 Before performing testing for a client using recently acquired equipment, tests shall be conducted in accordance with Section 10 to demonstrate the capability of the instrument and the proficiency of the operator.

11.4 Examples of test reports for each test method shall be available for on-site assessment.

11.5 The system for retaining the identity of the material being tested shall be available for on-site assessment. The system should include the following:

11.5.1 Finished specimens received for testing shall be uniquely and permanently identified by the client or the laboratory. This identification shall appear on all laboratory records and on the final report.

11.5.2 When finished specimens are not provided, the identification shall be placed on the material, such that the identification is not destroyed when the specimens are machined. If this is not possible, care must be taken to transfer all

numbers from the material to the machined specimens. The original material dimensions and the location of each specimen shall be documented and kept with the laboratory records. Each piece of excess material retained shall be marked with the same identification as the specimen.

11.6 Procedures for receipt, retention, and disposal of specimens and excess material shall be available for on-site assessment.

11.6.1 Facilities for filing laboratory records and reports shall be available and arranged for easy retrieval.

11.6.2 Facilities for storing tested specimens, when required by the quality manual or clients, shall be available and arranged for easy retrieval. The environment of the storage area shall be appropriate for the material(s) being stored.

12. Environment

12.1 Testing areas shall have sufficient lighting and clearance for efficient testing, periodic inspections, and maintenance.

12.2 Generally the temperature in a laboratory shall be between 50 and 100°F (10 and 38°C) unless otherwise specified for the specific type of test performed. Concentrated heating or cooling sources should not be located near or directed toward the testing equipment.

12.3 The atmosphere should be sufficiently clear of dust, dirt particles, and corrosive vapors so that neither dirt accumulation nor corrosion occur.

12.4 During testing, the machines shall not be subjected to excessive vibration from other equipment such as forging hammers or passing vehicles. Vibrations will be considered excessive if detectable by touch or if the indicating device vibrates visibly while a static force is being exerted.

12.5 If electrical interference (including RF frequencies) is present, its magnitude must not cause a problem with the measuring or test equipment being used.

12.6 Bench space provided for marking specimens and making measurements shall be clear except for the tools and instruments required for the test. The bench space shall be sufficiently clean so that papers used to record data will not be smudged, stained, or rendered illegible.

12.7 A clean and quiet area shall be available for use by personnel to make calculations and to write reports.

13. Test Records and Reports

13.1 The laboratory shall maintain a chronological receiving record showing the date, client's name, and a brief description of all material received. The description should include the number of pieces, the approximate amount or size of each specimen, and any permanently marked identification symbols.

13.1.1 If the test material is not permanently and uniquely identified when received, see 11.4.

13.2 The filed record of each test should include all original observations and calculated results. Where practical, the record should also include records provided by autographic equipment and subsequent calculations.

13.2.1 All sheets should be dated and numbered in sequence for filing. All data sheets shall be traceable to the test operator. No erasures or eradication of original observations are permitted. Erroneous written or printed data shall be lightly struck out and the correct data conspicuously added and initialed by the person making the change.

13.2.2 When data are processed by computers, the laboratory shall have procedures to protect data at all times against unauthorized access, alteration, loss, and destruction. Audit trails or other methods shall be used to record the identity of persons who make corrections to data values and to record the values before and after corrections.

13.2.3 Sufficient information shall be included so that the test can be repeated. Pertinent items may include one or more of the following: test method, specimen drawing number, description of the machine, identification of the machine used, or range and settings of controlled variables.

13.3 The results of each test or series of tests for the same client should be summarized in a final report. A complete and exact copy of the final report should be filed with the other test records. The final report should provide at least the following information:

13.3.1 Name and address of the laboratory,

13.3.2 Name and address of the client, if applicable,

13.3.3 Date and other information, such as report serial numbers, which would aid in locating the filed records, and

13.3.4 A table or other readable format with a title including the test-method designation(s) and showing the applicable test result(s) for each specimen. Any deviation from the specified method shall be cited.

13.3.5 Signature and title of the person accepting technical responsibility for the validity of the contents. A stamp or computer-printed name is acceptable for the signature.

13.4 The retention period for the records, tested specimens and excess material shall comply with the following:

13.4.1 Legal requirements,

13.4.2 Contractual requirements of the client,

13.4.3 Laboratory policy, and

13.4.4 Other requirements.

14. Complaints and Errors

14.1 The laboratory shall have a documented policy and procedures for the resolution of complaints received from clients or other parties about the laboratory's activities. A record shall be maintained of all complaints and the resolution of the complaints.

14.2 The laboratory shall have a written policy and procedures for the handling of errors discovered after the final report has been issued.

15. Keywords

15.1 accreditation; laboratory accreditation; mechanical testing