NIST HANDBOOK 150-16
2006 Edition

National Voluntary Laboratory Accreditation Program

COMMERCIAL PRODUCTS TESTING

Lawrence I. Knab

National Voluntary Laboratory Accreditation Program
Standards Services Division
Technology Services

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Carlos M. Gutierrez, Secretary

National Institute of Standards and Technology
William A. Jeffrey, Director

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Contents

Foreword

The NIST Handbook 150 publication series sets forth the procedures, requirements, and guidance for the accreditation of testing and calibration laboratories by the National Voluntary Laboratory Accreditation Program (NVLAP). The series is comprised of the following publications:

- NIST Handbook 150, *NVLAP Procedures and General Requirements*, which contains the general procedures and requirements under which NVLAP operates as an unbiased third-party accreditation body;

- NIST Handbook 150-xx program-specific handbooks, which supplement NIST Handbook 150 by providing additional requirements, guidance, and interpretive information applicable to specific NVLAP laboratory accreditation programs (LAPs).

The program-specific handbooks are not stand-alone documents, but rather are companion documents to NIST Handbook 150. They tailor the general criteria found in NIST Handbook 150 to the specific tests, calibrations, or types of tests or calibrations covered by a LAP.

NIST Handbook 150-16, *NVLAP Commercial Products Testing*, presents the technical requirements and guidance for the accreditation of laboratories under the NVLAP Commercial Products Testing LAP. The 2006 edition incorporates changes resulting from the release of the newest editions of ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*, and NIST Handbook 150, as well as editorial improvements. The 2006 edition of NIST Handbook 150-16 supersedes and replaces the 1995 edition.

The handbook was revised with the participation of technical experts in the field of commercial products testing and was approved by NVLAP. The following main changes have been made to this handbook with respect to the previous edition:

- all references to applicable international guides and standards have been updated;

- on-site assessment checklists and the test method selection list are no longer included in order that they may be provided as separate documents, which may be updated at different intervals than the handbook;

- the body of the handbook has been restructured to conform with internationally accepted rules for the structure and drafting of standards, where appropriate, to promote ease of use and understanding.

This handbook is also available on the NVLAP web site (http://www.nist.gov/nvlap).

Questions or comments concerning this handbook should be submitted to NVLAP, National Institute of Standards and Technology, 100 Bureau Drive, Stop 2140, Gaithersburg, MD, 20899-2140; phone: 301-975-4016; fax: 301-926-2884; e-mail: nvlap@nist.gov.

Introduction

In 1984 the Commercial Products Testing (CPT) Program was established at the request of the International Coalition for Procurement Standards (ICPS) to enable purchasing authorities to specify in their purchase contracts that vendors use accredited laboratories for product testing. The program identified standards and test methods for paints and related coatings, paper and related products, and mattresses.

In 1985 the Building Seals and Sealants Program was established in response to a request from ASTM Committee C-24, Building Seals and Sealants. The Building Seals and Sealants Program was subsequently added to the CPT Program, and the Plastics field of testing was added in 1988. In 1990 the Plumbing field of testing was added to the CPT Program in response to a request from the California Energy Commission. At the request of the Roof Consultants Institute, the Roofing field of testing was added to the CPT Program in 1997.

1 General information

1.1 Scope

1.1.1 NIST Handbook 150-16 specifies the technical requirements and provides guidance for the accreditation of laboratories under the NVLAP Commercial Products Testing Laboratory Accreditation Program (CPT Program). It supplements the NVLAP procedures and general requirements found in NIST Handbook 150, by tailoring the general criteria found in NIST Handbook 150 to the specific tests and types of tests covered by the CPT Program.

1.1.2 NIST Handbook 150, this handbook, and their respective checklists (see 1.6) constitute the collective body of requirements that must be met by a laboratory seeking NVLAP accreditation for the CPT Program.

1.1.3 This handbook is intended for information and use by accredited CPT laboratories, assessors conducting on-site assessments, laboratories seeking accreditation, other laboratory accreditation systems, users of laboratory services, and others needing information on the requirements for accreditation under the CPT Program.

1.2 Organization of handbook

The numbering and titles of the first five clauses of this handbook match those of NIST Handbook 150. The primary subclauses in clauses 4 and 5 (e.g., 4.1, 4.2, etc.) are also numbered and titled to correspond with those of NIST Handbook 150, even when there are no requirements additional to those in NIST Handbook 150.

1.3 Program description

1.3.1 The NVLAP program for Commercial Products Testing provides for laboratory accreditation to ensure that standard test procedures for paints, paper, plastics, plumbing, seals/sealants, and roofing are performed properly. The CPT Program accredits laboratories that use standard test methods from ASTM International (ASTM), American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME), Technical Association of the Pulp and Paper Industry (TAPPI), General Services Administration (GSA), Canadian General Standards Board (CGSB, CAN/CGSB), and Factory Mutual Research Corporation (FMRC), Federal standards, and other recognized test methods.

1.3.2 Listings of the test methods included in the CPT Program is given in separate Test Method Selection Lists for the following fields of testing: paints, paper, plastics, plumbing, seals/sealants, and roofing. These Test Method Selection Lists are part of the CPT application package, which is available from NVLAP upon request. A laboratory may seek accreditation to all of the selected methods offered in a field of testing or a subset of its choice. A laboratory may request test methods to be added to the program. Test method additions will be handled in accordance with NVLAP procedures in NIST Handbook 150 for adding to or modifying an established LAP (see NIST Handbook 150, clause 2).

1.4 References

The following documents are referenced in this handbook. The latest edition of the referenced document (including any amendments) shall apply within one year of publication or within another time limit specified by regulations or other requirement documents.

— NIST Handbook 150, *NVLAP Procedures and General Requirements*

— ASTM C717, S*tandard Terminology of Building Seals and Sealants*

— ASTM D16, *Standard Terminology for Paint, Related Coatings, Materials and Applications*

— ASTM D883, *Standard Terminology Relating to Plastics*

— ASTM D1079, *Terminology Relating to Roofing and Waterproofing*

— ASTM D1968, *Standard Terminology Relating to Paper and Paper Products*

— ASTM E178, *Standard Practice for Dealing with Outlying Observations*

— 2000 International Plumbing Code, Chapter 2, *Definitions*

1.5 Terms and definitions

For the purposes of this handbook, the terms and definitions given in the references listed in 1.4 apply.

1.6 Program documentation

1.6.1 General

Assessors use NVLAP checklists to ensure that each laboratory receives an assessment comparable to that received by others and to assure completeness, uniformity, and objectivity. Checklists assist assessors in documenting the assessment to the NVLAP requirements found in NIST Handbook 150, this handbook, and the checklists themselves. Checklists contain definitive statements or questions about all aspects of the NVLAP requirements for accreditation, and form part of the On-Site Assessment Report (see NIST Handbook 150). The current version of each checklist is available from the NVLAP web site at <http://www.nist.gov/nvlap>.

1.6.2 NIST Handbook 150 Checklist

All NVLAP programs use the NIST Handbook 150 Checklist (formerly called the General Operations Checklist), which contains the requirements published in NIST Handbook 150. The checklist items are numbered to correspond to clauses 4 and 5 and annexes A and B of NIST Handbook 150.

1.6.3 NIST Handbook 150-16 Checklist

The NIST Handbook 150-16 Checklist (also referred to as the CPT Program-Specific Checklist) addresses requirements specific to commercial products testing. This checklist is used for all fields of testing in the CPT Program (i.e., there is not a separate checklist for each CPT field). The checklist

includes testing requirements, with an emphasis on observing and performing tests, testing accuracy, instrumentation, calibration, personnel competency, and test reporting. The checklist contains requirements expressed at a more detailed level than found in this handbook. The NVLAP assessor is required to supplement the CPT Program-Specific Checklist with the specific requirements for the individual test methods being assessed.

1.6.4 Test Method Review Summary

The assessor uses the Test Method Review Summary to review the laboratory's ability to perform the CPT test methods. The review of the test methods by the assessor ranges from observing tests to having laboratory staff describe the test procedures. The assessor notes on the Test Method Review Summary the depth into which each part of the test method was reviewed (Observed Test, Examined Apparatus, Walked/Talked Through Test, Listened to Description of Procedures).

1.6.5 NVLAP Lab Bulletins

NVLAP Lab Bulletins are issued to laboratories and assessors, when needed, to clarify program-specific requirements and to provide information about program additions and changes.

2 LAP establishment, development and implementation

This clause contains no information additional to that provided in NIST Handbook 150, clause 2.

3 Accreditation process

3.1 General

An overview of the laboratory accreditation process is provided in NIST Handbook 150, clause 3, and includes information pertaining to application for accreditation; on-site assessment; proficiency testing; accreditation decision; granting accreditation; renewal of accreditation; changes to scope of accreditation; monitoring visits; and suspension, denial, revocation, and voluntary termination of accreditation.

3.2 Management system review

3.2.1 Prior to applying to NVLAP for accreditation, a laboratory shall have a fully implemented management system. A copy of the quality manual and relevant associated documents, including a cross-reference document, shall be sent to NVLAP with the application forms.

3.2.2 The cross-reference document shall verify that all requirements of this handbook and clauses 4 and 5 and annexes A and B of NIST Handbook 150 and are addressed and their locations clearly identified in the management system documentation.

3.2.3 Prior to the on-site assessment, the assigned assessor reviews all relevant management system documentation for conformity with NVLAP requirements, including the requirements of this handbook and NIST Handbook 150. During this review, the assessor may request may request additional management system documents and/or records, which will be returned upon request.

3.3 On-site assessment

3.3.1 The purpose of the on-site assessment is to determine if the laboratory is following its documented management system and to assess the competence of the laboratory's delivery of its testing services.

3.3.2 The on-site assessment will take place at the laboratory site. Prior to the visit, the NVLAP assessor provides a preliminary agenda, which may change due to findings observed during the on-site assessment. Efforts will be made to minimize disruption to the normal working routines during the assessment. The assessor will need time and workspace to complete assessment documentation during his/her time at the laboratory site.

3.3.3 All laboratory equipment required to perform accredited testing shall be available for assessment and in good working order. The laboratory shall be prepared to demonstrate selected test methods as requested by the assessor. The assessment will cover the requirements identified in this handbook, NIST Handbook 150, the CPT Program-Specific Checklist, the laboratory's quality manual, and the laboratory's written detailed test instructions.

3.3.4 The laboratory shall make available all supporting technical information in a format that is conducive to a detailed review. The assessor may request additional information to clarify issues regarding nonconformities or to delve more deeply into technical issues.

3.3.5 The activities covered during a typical on-site assessment are described below.

a) *Opening meeting:* The NVLAP assessor will meet with laboratory management, supervisory personnel, and other appropriate staff members to explain the purpose of the on-site assessment and to discuss the schedule for the assessment activities. Information provided by the laboratory on its application form may be discussed during this meeting.

b) *Staff interviews:* The NVLAP assessor will ask the laboratory manager to assist in arranging times for individual interviews with laboratory staff members. The assessor will interview staff members filling key positions (e.g., Laboratory Manager, Technical Director, Quality Manager, Authorized Representative, Approved Signatories) and staff members who have an effect on the outcome of the testing, including staff who conduct the testing. The assessor does not need to talk to all staff members; however, the assessor will select staff members representing all aspects of the laboratory. These interviews are conducted to determine if the staff members are properly trained, assigned, and supervised, and are technically competent for the tasks assigned to them.

c) *Records review:* The NVLAP assessor will review laboratory documentation, including the management system, quality manual, equipment and maintenance records, record-keeping procedures, testing procedures, laboratory test records and reports, personnel competency records, personnel training plans and records, and safeguards for the protection of sensitive and proprietary information. The assessor will review the laboratory's own detailed instructions (see 5.4.1) to perform commercial products testing according to the standard test procedures for which it seeks accreditation, the range of specimens and conditions it can test, and the descriptions of the maintenance and calibration of its specific equipment.

Laboratory staff shall be available to answer questions; however, the assessor may wish to review the documents and records alone. The assessor usually does not ask to remove any laboratory documents or records from the laboratory premises.

NVLAP assessors do not need access to employee information that may be considered sensitive or private such as salary, medical information, or performance reviews for work done outside the scope of the laboratory's accreditation. However, this information is often stored together with technical information that an assessor will need to check (e.g., job descriptions, résumés, and technical performance reviews). In these cases, the assessor will work with the laboratory to ensure the review is performed without violating individual privacy. At the discretion of the laboratory, a member of its human resources department may be present during the review of personnel information.

d) *Internal audit and management review:* The NVLAP assessor will review and discuss with the laboratory staff the laboratory's internal audit and management review activities, which are separate and distinct activities. The discussion will include all aspects of those activities including the management system procedures, the audit findings, the actions taken to resolve problems identified, and the results of the management review.

e) *Equipment and software:* The NVLAP assessor will examine and determine the suitability of all equipment and facilities required to perform the standard test methods for which the laboratory is accredited (or is seeking accreditation). The appropriate environmental conditions required for testing will be assessed. The assessor will observe the demonstration of selected procedures by appropriate personnel assigned to conduct the tests, and interviews those personnel. The assessor will review test data, examine hardware and software for function and appropriateness, and review software validation and verification procedures.

f) *Demonstrations:* The demonstrations requested may be selective or all-inclusive. The NVLAP assessor will observe the demonstration of testing procedures by technical personnel assigned to conduct the tests, and will discuss the tests with the technical personnel to assure their understanding of the procedures. The demonstrations shall include sample test material(s), preparation of devices, establishment of test conditions, and the setup/use of major equipment. The assessor uses the Test Method Review Summary (see 1.6.4) and the CPT Program-Specific Checklist in reviewing and summarizing the laboratory's ability to conduct the test methods.

The NVLAP assessor may select and trace the history of one or more samples from receipt to final issuance of the test reports.

g) *Proficiency testing:* The NVLAP assessor will discuss all aspects of proficiency testing results with appropriate staff. Test methodology and records documenting the laboratory's execution of the testing will be reviewed and discussed. Any unusual trends or outlying results will be discussed.

The assessor may provide a proficiency test sample and request testing or a demonstration.

h) *On-site assessment report:* The assessor will complete an On-Site Assessment Report, which summarizes the findings and clearly lists all nonconformities and comments (positive or negative). This report normally consists of the On-Site Assessment Report, the NIST Handbook 150 Checklist, the CPT Program-Specific Checklist, and the Test Method Review Summary. The first page of the report shall be signed by the assessor and the laboratory's Authorized Representative or designee to acknowledge the discussion, but this does not necessarily indicate

agreement by the laboratory. A copy of the report is given to the laboratory representative for retention and the assessor sends the original to NVLAP.

i) *Closing meeting:* The NVLAP assessor will conduct a closing meeting with the laboratory manager, supervisory personnel, and other appropriate staff members to discuss the findings. During the visit the assessor will have categorized all problems identified as nonconformities and comments. They will be discussed at the closing meeting and resolutions may be mutually agreed upon. The assessor will specifically note items that have been corrected during the on-site assessment along with any recommendations for other action(s). The process for resolving nonconformities identified during the on-site is documented in NIST Handbook 150. Disagreements between the laboratory and an assessor may be referred to NVLAP for resolution.

3.3.6 The laboratory shall resolve or formulate a plan to resolve all nonconformities and provide a response to NVLAP within 30 days from the date of the on-site assessment.

3.3.7 The laboratory shall review all comments for potential improvements in commercial products testing.

3.4 Proficiency testing

3.4.1 General requirements

3.4.1.1 NIST Handbook 150 defines proficiency testing and describes how it is included in the accreditation process. Laboratories applying for initial accreditation shall participate satisfactorily in proficiency testing, provided the proficiency testing is offered during the application period. Laboratories renewing accreditation shall have satisfactorily participated in all required proficiency testing during their previous accreditation period. Failure to participate is considered a nonconformity and could result in suspension of accreditation for those test methods in question.

3.4.1.2 Unsatisfactory performance in proficiency testing (e.g., outlying results) is a technical nonconformity that must be resolved by the laboratory to maintain its accreditation for the test method(s) in question. After notification of unsatisfactory performance, the laboratory shall take corrective action to investigate and resolve nonconformities in a timely manner, according to the requirements of NIST Handbook 150 for the control of nonconforming work. Unsatisfactory performance in proficiency testing may result in suspension or revocation of accreditation for those test methods in question.

3.4.1.3 The laboratory shall make available to NVLAP the results of proficiency testing for use during the laboratory's on-site assessment. The assessor will discuss any problems indicated by proficiency testing with appropriate laboratory personnel responsible for developing and implementing plans for resolving the problems.

3.4.2 Specific requirements

3.4.2.1 Paper and plastics fields of accreditation

Laboratories seeking accreditation in the fields of paper and plastics shall enroll and maintain participation in proficiency testing programs provided by Collaborative Testing Services (CTS), Sterling, VA. The laboratories shall participate in all test methods for which they are seeking accreditation and which CTS offers as part of its testing service. The laboratories apply and pay proficiency testing fees

directly to CTS. After each CTS proficiency testing round, the laboratory shall submit their identified CTS results to NVLAP for review.

The proficiency test samples, like all others received by the laboratory, shall be listed or entered into the normal sample tracking and identification system for control and data recording. The proficiency testing shall **not** be contracted out to another laboratory.

Experience has shown that these proficiency test samples are often useful to the laboratory as training artifacts, or as calibration-check samples. **However, in no case shall proficiency test samples be considered as calibration standards or standard reference materials or be used as substitutes for calibration standards that are traceable to NIST or other national metrology institutes (NMIs).**

Using the test data from proficiency testing, the laboratory shall monitor its own testing performance. Procedures for receiving, analyzing, and monitoring the laboratory's test results shall be documented in its quality manual.

3.4.2.2 Paints, plumbing, seals and sealants, and roofing fields of accreditation

At the current time, no proficiency testing is required for the fields of paints, plumbing, building seals and sealants, and roofing. If proficiency testing is established for any of these fields, laboratories will be advised by NVLAP in advance of the effective date by which they must participate and the required fees or payments to NVLAP or the proficiency testing contractor.

4 Management requirements for accreditation

4.1 Organization

There are no requirements additional to those set forth in NIST Handbook 150.

4.2 Management system

4.2.1 If the laboratory uses a computer-based documentation system, the laboratory should consider ease of usability by the staff. The laboratory shall ensure that the requirements of NIST Handbook 150 are met so that staff are knowledgeable of the online documentation system and can, if authorized, readily retrieve needed information.

4.2.2 The laboratory shall have readily available the latest published version of all of the test methods for which accreditation has been requested.

4.2.3 If a customer, for whatever reason (e.g., regulatory requirement), requires accreditation to previous versions of a test method, then the laboratory shall document that requirement and shall have readily available the required version of the test method.

4.2.4 When a test method references another test method, guide, practice, or specification, the laboratory shall have readily available the referenced documents, where relevant.

4.2.5 In addition to the information specified in NIST Handbook 150, the quality manual and/or supporting management system documentation shall include:

a) testing facilities and scope of services offered;

b) policy and procedures for use of subcontractors, if applicable;

c) procedures and actions concerning damaged or altered test materials and specimens;

d) the range (e.g., size, shape, density, and property level) of test specimens that a laboratory can test for each test method;

e) procedures for maintenance and calibration of the equipment used in conducting the tests in the CPT Program;

f) procedures for receiving, analyzing, and monitoring the laboratory's proficiency test results.

4.3 Document control

There are no requirements additional to those set forth in NIST Handbook 150.

4.4 Review of requests, tenders and contracts

There are no requirements additional to those set forth in NIST Handbook 150.

4.5 Subcontracting of tests and calibrations

There are no requirements additional to those set forth in NIST Handbook 150.

4.6 Purchasing services and supplies

The laboratory shall evaluate vendors and verify or test incoming equipment, materials, and supplies that affect the quality and accuracy of the test results. Examples include equipment vendors; calibration services/certificates; general laboratory equipment and supplies, including chemicals and glassware; and data processing and acquisition equipment.

4.7 Service to the customer

There are no requirements additional to those set forth in NIST Handbook 150.

4.8 Complaints

There are no requirements additional to those set forth in NIST Handbook 150.

4.9 Control of nonconforming testing and/or calibration work

There are no requirements additional to those set forth in NIST Handbook 150.

4.10 Improvement

There are no requirements additional to those set forth in NIST Handbook 150.

4.11 Corrective action

There are no requirements additional to those set forth in NIST Handbook 150.

4.12 Preventive action

There are no requirements additional to those set forth in NIST Handbook 150.

4.13 Control of records

4.13.1 All records (test/calibration/verification, etc.; hardcopy and electronic) shall include the identity of the personnel responsible for the sampling, preparation, calibration, testing, and checking of results, and where appropriate, the associated date. Records will be reviewed during the on-site assessment either in total or by selective sampling.

4.13.2 Records for each test, including calibration of test equipment, shall contain sufficient information to permit the same or another laboratory to reproduce the test plan in a manner that would make it possible to obtain comparable test results. These records shall be kept for a period of at least three years following the issuance of a test report, unless a longer period is required by the customer, regulation, or the laboratory's own procedures.

4.14 Internal audits

4.14.1 The internal audit shall cover compliance with NVLAP, laboratory management system, regulatory, contractual, and testing requirements.

4.14.2 An applicant laboratory shall conduct at least one complete internal audit prior to the first on-site assessment. The records will be reviewed by the NVLAP assessor before or during the on-site assessment visit.

4.14.3 For accredited laboratories, internal audit reports conducted since the previous on-site assessment shall be made available for review.

4.14.4 Internal audits are separate and distinct from management reviews (see 4.15).

4.15 Management reviews

4.15.1 Periodic reviews of the management system shall reflect adherence to NVLAP requirements and the laboratory's quality objectives.

4.15.2 Management reviews shall review all nonconformities and may reflect positive aspects of the management system.

4.15.3 An applicant laboratory shall perform at least one complete management review prior to the first on-site assessment. The records will be reviewed by the NVLAP assessor before or during the on-site assessment visit.

4.15.4 The report of the management review shall be available during the NVLAP on-site assessment.

5 Technical requirements for accreditation

5.1 General

There are no requirements additional to those set forth in NIST Handbook 150.

5.2 Personnel

5.2.1 The laboratory shall maintain a list of personnel designated to fulfill NVLAP requirements including: Laboratory Director, Technical Director, Team Leaders, NVLAP Authorized Representative, NVLAP Approved Signatories, and the staff responsible for conducting the testing.

5.2.2 The laboratory's Technical Director (or an appropriate supervisor) shall be experienced in commercial products testing and shall have the technical competence and the supervisory capability to direct the work of professionals and technicians in commercial products testing.

5.2.3 When key personnel [see 3.3.5 b)] are added to or removed from the staff, the notification to NVLAP of the personnel changes shall include a current résumé for each new staff member.

5.2.4 Laboratories shall document the required qualifications for each staff position, including a résumé of qualifications; laboratory testing procedures to which the person is assigned and authorized to perform; and the results of periodic testing performance reviews. The laboratory shall evaluate the competency of each staff member for each test method the staff member is authorized to conduct. For each staff member, the staff member's immediate supervisor, or a designee appointed by the Laboratory Director, shall conduct annually an assessment and an observation of performance. These annual performance reviews shall be documented, dated, signed by the supervisor and the employee, retained in the personnel file and be available for review by the assessor. For the purpose of on-site assessments, a separate personnel folder of information specific to applicable NVLAP requirements may be provided instead of the complete folder, which may contain confidential information not needed for the assessment.

The CPT Program-Specific Checklist lists specific personnel competency requirements as related to testing.

5.2.5 The laboratory shall have a description of its training program for ensuring that staff is able to perform tests properly. The training program shall be updated and current staff members shall be given additional training when test methods are updated or procedures change, or when the individuals are assigned new responsibilities. Each staff member may receive training for assigned duties either through on-the-job training, formal classroom study, attendance at conferences, or another appropriate mechanism. The laboratory shall ensure that each new staff member is trained for the testing duties assigned.

5.2.6 Training materials that are maintained within the laboratory shall be kept up-to-date, including applicable versions of standard test methods, as well as appropriate reference documents, texts, and scientific and industry periodicals. These materials shall be readily available to the laboratory staff.

5.2.7 Individuals hired to perform testing activities are sometimes referred to as *subcontractors*. NVLAP does not make a distinction between full-time laboratory employees and individuals hired on a contract to work in that laboratory. NVLAP requires that the CPT testing laboratory maintain responsibility for and control of any work performed within its scope of accreditation. The laboratory shall ensure all individuals performing testing activities satisfy all NVLAP requirements, irrespective of the means by which individuals are compensated (e.g., the laboratory must ensure all test personnel receive proper training and supervision and are subject to annual performance reviews, etc.).

5.3 Accommodation and environmental conditions

The laboratory workspace and environmentally controlled spaces (e.g., constant temperature-relative humidity rooms or cabinets) shall be checked for the required conditions. Monitoring and control devices shall be calibrated and functioning properly so as to maintain and record the required environmental conditions.

5.4 Test and calibration methods and method validation

5.4.1 Standard test methods

5.4.1.1 The management system documentation shall contain or make reference to detailed written instructions of the procedures, practices, instructions and equipment that the laboratory uses in conducting the test methods for which it seeks or holds accreditation. These detailed instructions, including those for equipment operation, calibration checks, and quality control checks, shall address any laboratory-specific information not contained in the standard method. When necessary, the test method shall be supplemented with additional detailed instructions beyond the test method to ensure consistent application.

5.4.1.2 A laboratory may be accredited to perform standard test methods in their entirety or to perform only specific sections in the test method. Accreditation restrictions to specific sections of the test method shall be stated on the laboratory's scope of accreditation.

5.4.2 Off-site testing

5.4.2.1 A laboratory may be accredited for tests conducted at locations other than the laboratory's own facilities provided the testing complies with all NVLAP requirements. Examples of off-site testing are sampling and testing at off-site locations, such as a manufacturing facility, warehouse, or construction site.

5.4.2.2 The laboratory shall provide a step-by-step procedure for personnel to follow when performing off-site testing.

5.4.2.3 The laboratory shall maintain records of its off-site testing.

5.4.2.4 If a laboratory selects off-site testing methods to be included in its scope of accreditation, it shall provide to the NVLAP assessor the following:

a) complete step-by-step procedure for personnel to follow when performing the standard off-site test;

b) demonstration of the test procedure;

c) folder or file containing raw data from off-site tests;

d) test reports and test data sheets;

e) demonstration of compliance with NVLAP calibration and traceability requirements;

f) evidence that adequate supervision during the off-site testing is provided by a qualified staff member of the accredited laboratory.

5.4.3 Additional requirements

The CPT Program-Specific Checklist contains additional requirements related to test methods and conduct of tests, including mechanical, physical, and chemical properties, and reference materials.

5.4.4 Estimation of measurement uncertainty

At a minimum, the management system documentation shall list the important variables that substantially affect the uncertainty of the test results. This can be done for groups of similar test methods (e.g., grouped by mechanical, physical, or electrical properties) rather than for each test method. The uncertainty shall be determined and reported if required by the test method or the customer.

5.5 Equipment

The CPT Program-Specific Checklist contains additional requirements related to equipment.

5.6 Measurement traceability

5.6.1 By definition, measurement traceability is an attribute of the measurement result. Therefore, it applies to the result of the test as it relates to a stated reference. However, traceability is established to the stated reference usually through the calibration of the measurement and test equipment (M&TE) used to conduct the test, and/or through the use of standard reference materials, each with a known value(s) and a previously established path of traceability. Uncertainty is also an attribute of the measurement result and is therefore necessary for traceability to exist.

5.6.2 To account for the effects on traceability of the calibration of M&TE, the laboratory shall determine equipment calibration, verification, and maintenance intervals based on the equipment's

frequency of use and the environment in which it is used, and also in accordance with standard test methods, manufacturer's recommendations, or as specified in the CPT Program-Specific Checklist, whichever results in a shorter time between calibrations. Extension of the time interval between calibrations is acceptable if the laboratory can provide justification for increasing the interval.

5.6.3 Proper performance of the testing equipment shall be periodically verified as needed.

5.6.4 The reference standards used and the environmental conditions at the time of calibration shall be documented for all calibrations.

5.6.5 Certificates are required for calibrations performed by outside services. A calibration certificate shall indicate uncertainty or accuracy tolerance limits, and traceability of reference standards.

Certificates may not be required when a laboratory performs its own calibration and records are kept. If the testing laboratory performs its own calibration, the standard metrological procedures used, the environmental conditions, and the measurement uncertainty shall be documented. For such calibrations, the testing laboratory shall have properly trained personnel who understand the importance of the various factors that affect the uncertainty of the calibration and its effect on the uncertainty of the final test result (see NIST Handbook 150, 5.4.6).

5.6.6 In addition to the information specified in NIST Handbook 150, 5.5.5, calibration or verification records shall include the following:

a) a list of all equipment variables requiring calibration, traceability, or verification;

b) range of calibration/traceability/verification;

c) resolution (precision or the number of digits read) of the instrument and its allowable error (i.e., tolerance);

d) periodic verification dates and schedule;

e) identity of the laboratory individual/group or external service responsible for calibration;

f) identity and source of reference standard and traceability.

5.7 Sampling

Appropriate sampling plans shall be included in the management system when they are required by the test method or when the laboratory is required to sample. Sampling includes the selection of test specimens from larger pieces or batches of material.

5.8 Handling of test and calibration items

The CPT Program-Specific Checklist contains additional requirements related to handling of test items.

5.9 Assuring the quality of test and calibration results

There are no requirements additional to those set forth in NIST Handbook 150.

5.10 Reporting the results

Where appropriate, test reports shall clearly state that the test results apply to the product or system as tested and, if required, conform to regulator requirements.

6 Additional requirements

There are no additional requirements beyond NIST Handbook 150 and its associated normative annexes, and any other normative references previously cited in this handbook.