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NVLAP THERMAL INSULATION MATERIALS

Timothy Rasinski

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Timothy Rasinski
National Voluntary Laboratory Accreditation Program
Standards Coordination Office
Laboratory Programs

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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 and the referenced ISO/IEC 17025 requirements. They tailor the general criteria found referenced in NIST Handbook 150 and ISO/IEC 17025 to the specific tests, calibrations, or types of tests or calibrations covered by a LAP.

NIST Handbook 150-15, *NVLAP Thermal Insulation Materials*, presents the technical requirements and guidance for the accreditation of laboratories under the NVLAP Thermal Insulation Materials LAP. The 2019 edition incorporates changes resulting from the release of the 2017 edition of ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*, and NIST Handbook 150, as well as editorial improvements. The 2020 edition of NIST Handbook 150-15 supersedes and replaces the 2006 edition.

The handbook was revised with the participation of technical experts in the field of thermal insulation materials 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;

- clause numbers 4 & 5 are now clauses 4 through 8 to align with the 2017 edition of ISO/IEC 17025 (hereafter referred to as ISO/IEC 17025);

- redundant requirements for specific equipment, certifications, records, etc. found in the various standards for test methods used in the program were removed.

This handbook is also available on the NVLAP website (https://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

The Thermal Insulation Materials (TIM) Program was established in 1979 at the request of three private sector thermal insulation trade associations. The purpose of the program is to accredit laboratories that produce reliable thermal insulation test data. The TIM program was the first of the NVLAP laboratory accreditation programs.

1 General information

1.1 Scope

1.1.1 NIST Handbook 150-15 specifies the technical requirements and provides guidance for the accreditation of laboratories under the NVLAP Thermal Insulation Materials Laboratory Accreditation Program (TIM LAP). 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 TIM LAP.

1.1.2 ISO/IEC 17025, NIST Handbook 150, this handbook, and test methods indicated on the (proposed) scope of accreditation constitute the collective body of requirements that must be met by a laboratory seeking NVLAP accreditation for the TIM LAP.

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

1.2 Organization of handbook

The numbering and titles of clauses four through eight of this handbook match those of ISO/IEC 17025. The primary subclauses in clauses 4 through 8 (e.g., 4.1, 4.2, etc.) are also numbered and titled to correspond with those of ISO/IEC 17025, even when there are no additional requirements.

1.3 Program description

1.3.1 The NVLAP TIM LAP provides for laboratory accreditation to ensure that standard test procedures are followed to measure corrosiveness; thermal resistance; strength; flammability; mass, density, and dimensional stability; and related material properties. The TIM LAP accredits laboratories that use standard test methods from ASTM International (ASTM), Code of Federal Regulations (CFR), the Technical Association of the Pulp and Paper Industry (TAPPI), the Canadian General Standards Board (CGSB), the International Organization for Standardization (ISO), Military Specifications (MIL), and other recognized test methods.

1.3.2 A listing of the test methods included in the program is given in the test methods and calibration parameter listing available on the NVLAP website. The list is grouped by the program “product testing”, then by “thermal insulation materials”. Once at the thermal insulation materials program level, the tests are grouped by:

- Canadian standards (specifications),
- corrosiveness,
- mass, density, and dimensional stability,
- flammability,
- related material properties,
- strength,

- and thermal resistance.

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*

— *ISO/IEC 17025 General requirement for the competence of testing and calibration laboratories*

— ASTM C168, *Standard Terminology Relating to Thermal Insulation*

1.5 Terms and definitions

For the purposes of this handbook, the terms and definitions given in NIST Handbook 150 and in ASTM C168 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 ISO/IEC 17025, NIST Handbook 150 and this handbook. Checklists contain definitive statements or questions about all aspects of the NVLAP requirements for accreditation, and form part of the Onsite Assessment Report (see NIST Handbook 150). The current version of each checklist is available from NVLAP.

1.6.2 NVLAP General Criteria Checklist

All NVLAP programs use the NVLAP General Criteria Checklist (ISO/IEC 17025:2017) (formerly called the NIST Handbook 150 Checklist), which contains the requirements published in ISO/IEC 17025 and NIST Handbook 150. The checklist items are numbered to correspond to clauses 4 through 8 of ISO/IEC 17025 and annexes A, B, and E of NIST Handbook 150.

1.6.3 NIST Handbook 150-15 Checklist

The NIST Handbook 150-15 Checklist (also referred to as the TIM Program-Specific Checklist) addresses requirements specific to thermal insulation materials testing, including testing requirements, with an emphasis on observing and performing tests, testing accuracy, instrumentation, calibration, personnel competency, and test reporting.

1.6.4 Test Method Review Summary

The assessor uses the Test Method Review Summary to review the laboratory's ability to perform the TIM 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. Lab bulletins providing additions or changes to the current program will supersede the requirements of the current published handbook until the additions or changes are published in a revision of the handbook. Lab bulletins are posted on the program-specific handbooks page of the NVLAP website.

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; onsite 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.

3.2.2 Prior to the onsite assessment, the assigned assessor will review all relevant management system documentation against NVLAP requirements, including the requirements of ISO/IEC 17025, this handbook and NIST Handbook 150. During this review, the assessor may request additional management system documents and/or records, which will be returned upon request.

3.3 Onsite assessment

3.3.1 General information

3.3.1.1 The purpose of the onsite assessment is to determine the laboratory's compliance with ISO/IEC 17025, NIST Handbook 150, this handbook, its own management system, and to assess the capability and competence of the testing activities for which accreditation is being requested.

3.3.1.2 Testing performed at locations other than the primary facility covered under the accreditation will be reviewed on a case-by-case basis to determine the extent of onsite review necessary at the other locations.

3.3.1.3 Prior to the onsite assessment, the NVLAP assessor will provide a preliminary agenda. The laboratory may not be granted accreditation or renewal if not prepared to conduct test demonstrations, have equipment in good working order, and be ready for examination according to the requirements identified in ISO/IEC 17025, this handbook and NIST Handbook 150.

3.3.1.4 The laboratory shall make available all supporting technical information. All relevant documentation shall be provided to NVLAP and its assessor(s) in English.

3.3.1.5 In addition to the checklists to help assure the completeness, objectivity, and uniformity of the onsite assessment, the assessor uses the NVLAP Test Method Review Summary form to review the capability of the laboratory personnel to perform testing for which accreditation is sought. The test method review ranges from observing tests to having laboratory staff describe the test procedures. The assessor notes the depth to which each part of the test method was reviewed and records the results of the review.

3.3.2 Typical onsite assessment

The NVLAP assessor performs the following activities during a typical onsite assessment:

a) Conducts an opening meeting with the laboratory to explain the purpose of the onsite visit and to discuss the schedule for the day(s). At the discretion of the laboratory manager, other staff may attend the meeting.

b) Reviews laboratory documentation not provided for review prior to the assessment, including management system records, 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.

   At least one laboratory staff member shall be available to answer questions; however, the assessor may request to review the documents and records alone.

c) Examines equipment and facilities, observes the demonstration of selected test methods by the appropriate personnel assigned to conduct the tests, and interviews those personnel. The demonstrations requested may be selective or all-inclusive and shall include use of sample test devices, preparation of test device, establishment of test conditions, the setup/use of major equipment. The assessor will also review the test data/reports and examine the hardware/software for functionality and appropriateness.

d) Completes an Onsite Assessment Report, which contains the NVLAP Onsite Assessment Signature Sheet with Narrative Summary, NVLAP General Criteria Checklist (ISO/IEC 17025:2017), NIST Handbook 150-15 Checklist, and the Test Method Review Summary. The assessor will also enter any nonconformities and/or comments into the NVLAP interactive website (NIWS).

e) Conducts a closing meeting with the laboratory to explain the findings of the visit. At the closing meeting, the report shall be signed by the assessor and the laboratory's authorized representative to acknowledge the discussion of the outcome of the onsite assessment. The authorized representative's signature does not necessarily indicate agreement, merely receipt, and challenges may be made through NVLAP. The process for resolving nonconformities identified during the onsite is documented in NIST Handbook 150.

3.4 Proficiency testing

3.4.1 NIST Handbook 150 defines proficiency testing and describes how it is included in the accreditation process.

3.4.2 Section 7.7.2 of ISO/IEC 17025 requires a laboratory "monitor its performance by comparison with results of other laboratories, where available and appropriate." NVLAP is not aware of any widely available interlaboratory comparison for thermal insulation materials testing. Laboratories may choose to organize interlaboratory comparisons among themselves, but NVLAP does not require participation in interlaboratory comparison in the TIM program. If an appropriate interlaboratory comparison becomes available, NVLAP may require participation and will notify all laboratories of requirements.

3.4.3 Unsatisfactory performance or failure to participate in any prescribed proficiency testing, may result in suspension of laboratory accreditation for those test methods in question.

4 General Requirements

4.1 Impartiality

There are no requirements additional to those set forth in ISO/IEC 17025.

4.2 Confidentiality

There are no requirements additional to those set forth in ISO/IEC 17025.

5 Structural Requirements

There are no requirements additional to those set forth in ISO/IEC 17025.

6 Resource Requirements

6.1 General

There are no requirements additional to those set forth in ISO/IEC 17025.

6.2 Personnel

The laboratory's technical director (or an appropriate supervisor) shall possess appropriate experience and expertise in thermal insulation materials testing. The technical director or supervisor shall have the technical competence and the supervisory capability to direct the work of professionals and technicians in thermal insulation material testing.

6.3 Facilities and environmental conditions

There are no requirements additional to those set forth in ISO/IEC 17025.

6.4 Equipment

There are no requirements additional to those set forth in ISO/IEC 17025.

6.5 Metrological traceability

There are no requirements additional to those set forth in ISO/IEC 17025.

6.6 Externally provided products and services

There are no requirements additional to those set forth in ISO/IEC 17025.

7 Process Requirements

7.1 Review of requests, tenders and contracts

There are no requirements additional to those set forth in ISO/IEC 17025.

7.2 Selection, verification and validation of methods

There are no requirements additional to those set forth in ISO/IEC 17025.

7.3 Sampling

There are no requirements additional to those set forth in ISO/IEC 17025.

7.4 Handling of test or calibration items

There are no requirements additional to those set forth in ISO/IEC 17025.

7.5 Technical records

There are no requirements additional to those set forth in ISO/IEC 17025.

7.6 Evaluation of measurement uncertainty

There are no requirements additional to those set forth in ISO/IEC 17025.

7.7 Ensuring the validity of results

The laboratory shall participate in any prescribed PT (See section 3.4). Any prescribed PT will be identified on the TIM program page on the NVLAP web site.

7.8 Reporting of results

There are no requirements additional to those set forth in ISO/IEC 17025.

7.9 Complaints

There are no requirements additional to those set forth in ISO/IEC 17025.

7.10 Nonconforming work

There are no requirements additional to those set forth in ISO/IEC 17025.

7.11 Control of data and information management

There are no requirements additional to those set forth in ISO/IEC 17025.

8 Management system requirements

8.1 Options

There are no requirements additional to those set forth in ISO/IEC 17025.

8.2 Management system documentation

There are no requirements additional to those set forth in ISO/IEC 17025.

8.3 Control of management system documents

There are no requirements additional to those set forth in ISO/IEC 17025.

8.4 Control of records

The minimum retention time for all records pertaining to the laboratory's accreditation in the TIM program shall be 3 years.

8.5 Actions to address risks and opportunities

There are no requirements additional to those set forth in ISO/IEC 17025.

8.6 Improvement

There are no requirements additional to those set forth in ISO/IEC 17025.

8.7 Corrective actions

There are no requirements additional to those set forth in ISO/IEC 17025.

8.8 Internal audits

8.8.1 An applicant laboratory shall at least one complete internal audit in accordance with ISO/IEC 17025 prior to the first onsite assessment. The records will be reviewed by the NVLAP assessor before or during the onsite assessment.

8.8.2 Internal audits are separate and distinct from both management reviews (see 8.9) and NVLAP onsite assessments.

8.9 Management reviews

An applicant laboratory shall perform at least one complete management review in accordance with ISO/IEC 17025 prior to the first onsite assessment. The records will be reviewed by the NVLAP assessor before or during the onsite assessment.