



ACCREDITING INDEPENDENT FIRE TESTING LABORATORIES

A Guide for State Fire Marshals and Their Staffs

**Produced by the
Science Advisory Committee
of the
National Association of State Fire Marshals
October 2001**

A. Scope of this Guide

The Science Advisory Committee of the National Association of State Fire Marshals (NASFM) has prepared this document to assist State Fire Marshals, as users of fire test results, in understanding the laboratory accreditation process, the criteria used, and the scope of accreditation, to help in assessing the value of a particular accreditation. This guide is specific to product testing laboratories and does not address the special issues of forensic tests on evidence. It should not be construed that the requirements, criteria, or organizations listed adequately describe the category of forensic testing.

B. Introduction

From time to time, state fire marshals may receive test or certification data from manufacturers concerning the performance of a particular product. The state fire marshal may be called upon to review the test data and determine if the product meets established criteria, and to evaluate whether

- the laboratory followed a procedure from a widely accepted test standard,
- the laboratory is a credible organization, and
- the accrediting body follows accepted practices.

The purpose of this guide is to describe how testing laboratories are accredited and the available accreditation standards, along with criteria for judging the credibility of the laboratory and its accrediting body.

An appendix at the end of this guide lists contact information for various agencies and organizations that address safety testing and laboratory accreditation.

C. Requirements for Accreditation

“Accreditation” is defined by the International Organization for Standardization (ISO) as a “procedure by which an authoritative body gives formal recognition that a body or person is competent to carry out specific tasks.”

However, it is important to remember that the term *accredited* can refer to very different types of assessments and assessment procedures. According to a report by the National Institute of Standards and Technology (NIST) entitled *The ABC's of the U.S. Conformity Assessment Program* (NISTIR 6014), in 1989 the U.S. Government Accounting Office noted the use of 10 different terms for “accreditation” with at least 18 different meanings by the 20 programs it reviewed. Moreover, the requirements for achieving accreditation vary from program to program. Therefore if a laboratory claims to be accredited, it would be wise to find out which authoritative body issued the accreditation.

Three other factors are worth noting:

- First, it is critical to understand that accreditation of a laboratory is limited to a certain scope or areas of competence. It should be emphasized that some customary laboratory accreditation programs are specific or limited to named test methods and standards. It is conceivable that any laboratory may be accredited for competency with some tests, but not others. The accreditation does, however, indirectly imply some basic level of organization or competency in a laboratory's testing operations.
- Second, not all laboratories choose to seek accreditation. Typically, they participate in accreditation programs in expectation of some type of economic return — such as new or expanded business opportunities.
- Third, having a test conducted by an “accredited laboratory” is no guarantee that the test itself is good. That is an entirely different question.

D. Types of Accreditation Bodies

In the United States, there is no centralized coordinating body for accreditation, even though there can be coordination between specific programs [see section F, below]. One result of this lack of centralization is that requirements vary as to whether a laboratory is impartial — that is, without conflict of interest with regard to products being tested.

According to NISTIR 6014, there are three types of accreditation programs in the U.S.:

- Federal government laboratory accreditation programs
- State and local government laboratory accreditation programs
- Private sector laboratory accreditation programs

1. Federal Government Programs

Comprehensiveness. Federal government accreditation programs vary in their comprehensiveness, given that the requirements and scope of each accreditation program typically are tailored to meet specific agency needs. For example, although the National Voluntary Laboratory Accreditation Program (NVLAP) is comprehensive, other agencies usually focus on regulation or procurement rather than laboratory accreditation or designation.

Eligibility. Eligibility requirements also vary. Some examples:

- Only state laboratories may apply to NIST’s program for accrediting state weights and measures laboratories.
- The Veterans Affairs program accredits only the laboratories of its medical centers.
- The Defense Logistics Agency designates or accredits laboratories found to be capable of performing specific tests on products procured by that agency.

Examples of Federal Accreditation Programs

- a. Nationally Recognized Test Laboratory Accreditation Program (NRTL)

The Occupational Safety and Health Administration (U.S. Department of Labor) established the Nationally Recognized Testing Laboratory Accreditation Program, giving additional laboratory organizations the authorization to certify products. All electrical products used in the workplace must be tested and listed or labeled by a nationally recognized testing laboratory (NRTL).

Before 1988, the only two laboratory organizations that were authorized to certify products for use in the workplace were Underwriters Laboratories (UL) and Factory Mutual Research Corp. Now, however, there are 17 designated organizations including the Canadian Standards Association.

b. National Voluntary Laboratory Accreditation Program (NVLAP)

The National Voluntary Laboratory Accreditation Program provides third-party accreditation to testing and calibration laboratories. Its accreditation programs are established in response to congressional mandates, administrative actions by the federal government, or requests by private-sector organizations. NVLAP operates from the offices of the National Institute of Standards and Technology.

c. Defense Logistics Agency (DLA)

The DLA is located within the Department of Defense. The DLA only designates or accredits laboratories found to be capable of performing specific tests on products procured by that agency. As such, this program is restricted to potential government suppliers.

d. Department of Veterans Affairs (VA)

The VA program accredits only the laboratories of its medical centers. Their general position is that, “The Testing Laboratory shall provide qualified personnel, materials, equipment, and transportation as required to perform the services identified/required herein, within the agreed to schedule and/or time frame.”

2. State and Local Government Programs

Again, the reasons vary as to why states and local bodies would accredit laboratories. Sometimes, the purpose is to assist them in enforcing federal regulations.

But in most cases, the purpose is to test regulated products and require that those products be inspected or tested by an approved laboratory. For example, state and local government agencies regulate building and electrical products by requiring that they be tested or inspected and bear the mark of a recognized or approved testing laboratory.

Example of State and Local Government Accreditation Programs

a. The International Conference of Building Officials (ICBO)

ICBO has been one of the leading sources of building and construction codes for more than 75 years. The association prides itself on providing excellent products and services to ensure the public's safety. Since 1994, ICBO has been a partner with the Building Officials and Code Administrators International (BOCA) and the Southern Building Code Congress International (SBCCI) in the International Code Council, which publishes the *International Codes*. These documents are intended to be adopted by reference as local and state laws governing construction. In addition to providing the codes, ICBO has a branch devoted to certification, the ICBO Evaluation Service (ICBO ES). ICBO ES accreditation for a laboratory means that the laboratory may submit test reports for clients who are seeking an ICBO ES evaluation report, and an accredited agency may contract with ICBO ES report holders to carry out periodic inspections at their manufacturing facilities.

3. Private Sector Programs

Private sector accrediting bodies also operate for a variety of reasons. Many operate as a key part of a private sector certification program. Some assist government agencies in enforcing regulations, such as in the testing of building and construction products. Still others may help laboratories defend their competence in professional malpractice matters or help an industry avoid government regulation through self-policing.

Example of Private Sector Accreditation Programs

a. The American Association for Laboratory Accreditation (A2LA)

A2LA operates an accreditation program which accredits laboratories in a number of testing fields. The fundamental goals of A2LA are to achieve customer satisfaction through meeting the needs of both laboratories and their users for competent testing; improve the quality of laboratories and the test data they produce; and increase acceptance of accredited laboratory test data to facilitate trade. Membership in A2LA is open to any individual, institution or corporation interested in supporting its mission.

E. Criteria to Judge Laboratory Credibility

Some state fire marshals find they must develop accreditation or certification procedures for independent testing laboratories. In that event, certain criteria are helpful. The following are taken from the NISTIR 6014.

1. *Laboratory organization and independence.* The laboratory should be a legal entity. It and its staff should be impartial or independent — free from any outside influence that might bias the integrity and objectivity of the testing.
2. *Financial integrity.* The laboratory's resources should be sufficient to enable it to properly use and maintain test equipment and the facility; to perform all required

functions satisfactorily; and to adequately indemnify itself against financial liabilities and penalties.

3. *Staff qualifications.* Each staff member should have adequate education, training, knowledge, and experience to perform the tasks, and the laboratory should maintain an appropriate level of supervision. The training of each staff member should be kept current and documented.
4. *Adequate quality system.* The laboratory should have a quality system appropriate to the type and amount of work performed. The system should be documented, available for consultation by staff. Management should review the system periodically and revise it as needed. Internal audits should be conducted and documented.
5. *Sampling requirements.* When a laboratory receives test material, it should require the organization submitting samples to state that the materials submitted are representative of the entire quantity. This should be done whether or not the size of the test material submitted is greater than the amount required for the test. If sample selection is the responsibility of the test laboratory, it should use appropriate sampling methods or techniques.
6. *Sample control and integrity requirements.* Maintaining the integrity of the sample involves preventing it from being damaged or contaminated during any stage of its collection, shipment, storage, or handling.
7. *Statistical methods requirements.* Statistical methods used to interpret or provide more information about test data should be appropriate for the type and level of testing being done. Control charts should be used to alert laboratory personnel to potential problems in test procedures or equipment. These help distinguish random errors from systematic (assignable cause) errors or variations.
8. *Recordkeeping.* A laboratory should maintain all test records, observations, calculations, and derived data for all tests it performs for an appropriate time period or as required by law.
9. *Test report content.* Test reports should include all information relevant to sample selection, test performance, and test results. Test data should be displayed in a format that is easy to understand. Data should be routinely audited and validated — that is, checked for questionable values and accepted or rejected based on an established set of criteria.
10. *Available operational manuals.* To ensure the quality of the work performed, the laboratory should have readily available instructions on the operation and maintenance of all materials and equipment; copies of the test methods and standards employed, with any other instructions needed on their application; sample selection and handling procedures; and any other relevant information.

11. *Proficiency testing program.* To ensure the competence of its testing processes, the laboratory should participate in proficiency testing (e.g. Round Robin Testing). Proficiency testing allows a laboratory to compare its test results with results other laboratories obtain from tests performed on the same or similar items.
12. *Facilities and equipment.* The laboratory should own or have access to all equipment required to perform all test methods it conducts. To ensure accuracy, the laboratory should require test methods to be conducted in a controlled environment — one free from excessive temperatures or temperature fluctuations, dust, moisture, dryness, vibration, and electromagnetic or other interference.
13. *Equipment maintenance.* Equipment calibration, preventive maintenance, repair procedures, and the choice of reference materials used for calibration should be appropriate for the nature and amount of work being performed. Equipment calibrations should be traceable to some ultimate or national reference standards. Maintenance records should be complete.
14. *Control over subcontractors.* The laboratory should have a system to ensure that testing and related work performed by subcontractors is at an acceptable level of quality.
15. *Appeals procedure.* The laboratory should have a mechanism to deal with technical questions, appeals, complaints, and challenges originating either from the customer or from interested regulatory parties, or others.
16. The NASFM Science Advisory Committee would add an additional criterion: *Evidence of active participation in national and international standards development organizations appropriate to the tests conducted by the subject laboratory.* It is in this way that a laboratory learns of the "ins and outs" of a particular test, which are often not seen in print.

"Standards development organizations" refer to **[add]** Standards organizations recognize the link between testing and laboratory competence. The resource that accreditors use to evaluate laboratory competence is ISO/IEC Guide 17025, "General Requirements for the Competence of Calibration and Testing Laboratories."

F. National Cooperation for Laboratory Accreditation (NACLA)

The United States was unique in having many accrediting organizations with no national coordination, until the recent establishment of a nonprofit organization, the National Cooperation for Laboratory Accreditation (NACLA). NACLA has the mission of coordinating U.S. laboratory accreditation—in other words, accrediting the accrediting bodies (as opposed to accrediting the labs themselves). It does so by granting recognition (accreditation) to those that meet the relevant international standard: ISO/IEC Guide 58 "Calibration and testing laboratory accreditation systems-General Requirements for operation and recognition." In the interest of efficiency, the NACLA system, it is hoped, will promote mutual acceptance of accreditations among accrediting organizations.

A secondary goal is to serve as the U.S. link to the worldwide lab accreditation system, helping to achieve worldwide acceptance of U.S. tests, calibrations, and accreditations. NACLA is the U.S. link to the International Laboratory Accreditation Cooperation (ILAC) as well as regional accrediting authorities in the European Union, the Asia-Pacific region, and elsewhere.

NACLA is a voluntary program, and it is a partnership of public and private sectors. It is housed at the National Institute of Standards and Technology (NIST).

The first three accrediting bodies to be recognized by NACLA were the American Association for Laboratory Accreditation (A2LA), the International Conference of Building Officials Evaluation Service (ICBO ES), and the National Voluntary Laboratory Accreditation Program (NVLAP).

NIST has a memorandum of understanding with NACLA whereby it will rely on NACLA-recognized laboratory accrediting bodies “in support of its role as designating authority in mutual recognition arrangements between the U.S. and other regions of the world.” (Quoted material is from a NACLA news release dated October 2, 2000).

G. International Coordination

The International Laboratory Accreditation Cooperation (ILAC) was formalized as a cooperation of 44 countries in 1996. ISO/IEC/EN 17025 “General Requirements for the Competence of Calibration and Testing Laboratories” (formerly ISO Guide 25 & EN 45001) has been adopted by many countries’ accreditation bodies to accredit their own testing and calibration laboratories. ILAC and ISO/IEC/EN 17025, then, have facilitated international agreements (called mutual recognition agreements) that are crucial in allowing test data to be accepted between countries.

These agreements are advantageous for two reasons: they have enabled accredited laboratories to achieve a form of international recognition, and they have allowed test data accompanying exported products to be more readily accepted on overseas markets. In effect, this system reduces costs for manufacturers as well as importers, because it virtually eliminates the need for products to be retested in another country.

Essentially all laboratories accredited according to ISO 17025 should maintain the same high level of practice and provide reliable, reproducible data in their tests.

APPENDIX

American Council of Independent Laboratories (ACIL)

1629 K St., NW, Suite 400
Washington, DC 20006
Phone: (202) 887-5872
Fax: (202) 887-0021

www.acil.org

ACIL is a nonprofit organization that calls itself “the voice of the laboratory testing industry.” The Conformity Assessment Section of ACIL consists of firms with interests including testing; third-party product certification; and listing and labeling in accordance with applicable domestic and international safety and performance standards.

American Association for Laboratory Accreditation (A2LA)

5301 Buckeystown Pike, Suite 350
Frederick, MD 21704
Phone: (301) 644-3248
Fax: (301) 662-2974

www.a2la.org

A2LA is a nonprofit, professional membership society committed to the success of laboratories through the administration of a broad-spectrum, nationwide laboratory accreditation system and a full range of training on laboratory practices taught by experts in their field.

American National Standards Institute (ANSI)

1819 L St., NW
Washington, DC 20036
Phone: (202) 293-0020
Fax: (202) 293-9287

www.ansi.org

ANSI administers and coordinates the U.S. private sector voluntary standardization system. It does not develop standards but facilitates their development by establishing consensus among qualified groups. It has three methods of accreditation: organization, committee, and canvass.

American Society for Testing and Materials (ASTM)

100 Barr Harbor Dr.
West Conshohocken, PA 19428-2959
Phone: (610) 832-9585
Fax: (610) 832-9555

<http://www.astm.org/>

ASTM, a nonprofit organization, is one of the largest voluntary standards development organizations in the world, publishing more than 10,000 standards annually.

Canadian Standards Association (CSA International)

178 Rexdale Blvd.

Toronto, Ontario, Canada

Phones: (416) 747-4000 or (800) 463-6727

Fax: (416) 747-4149

www.csa-international.org

CSA is an independent, nonprofit organization whose more than 1,300 committees write, develop, and approve standards.

Factory Mutual Research

FM Global Corporate Headquarters

P.O. Box 7500

Johnston, RI 02919

<http://www.fmglobal.com/>

Test Center: Phone (401) 568-6250

Test Center: Fax: (401) 568-6241

Factory Mutual Research is a nonprofit research and testing organization managed by FM Global.

International Conference of Building Officials Evaluation Service (ICBO ES)

Headquarters

5360 Workman Mill Road

Whittier, California 90601-2298

http://www.icbo.org/ICBO_ES/

ICBO ES recognizes (accredits) testing laboratories to conduct technical evaluations of building products, components, methods, and materials, which can subsequently issue reports showing that products and systems meet ICCBO code requirements.

International Laboratory Accreditation Cooperation (ILAC)

c/o NATA (National Association of Testing Authorities, Australia)

7 Leeds St.

Rhodes NSW 2138

Australia

Phone: +612 9736 8222

Fax: +612 9743 5341

ILAC is an international cooperation between the various laboratory accreditation programs operated throughout the world.

International Electrotechnical Commission (IEC)

3, rue de Verenbe, Case postale 56

CH-1211 Geneva 20, Switzerland

Phone: +41 22 919 02 11

Fax: +41 22 919 03 00

www.iec.ch

The IEC covers the technical field of electrical and electronic engineering and is closely affiliated with the ISO. Together, the IEC and the ISO (see below) have produced a series of

guides. A relevant one is Guide 25, *General Requirements for the Competence of Calibration and Testing Laboratories*. It has been used by laboratory accreditation programs worldwide to establish accreditation requirements designed to promote confidence in the calibrations and testing results of laboratories.

International Standards Organization (ISO)

1, rue de Verenbe, Case postale 56

CH-1211 Geneva 20, Switzerland

Phone: +41 22 749 01 11

Fax: +41 22 733 34 30

www.iso.ch

The ISO is a non-governmental federation of national standards bodies from approximately 130 countries (one from each country). Its work results in international agreements, called “international standards.” Together with the IEC, ISO has produced a series of guides used by lab accreditation programs.

National Cooperation for Laboratory Accreditation (NACLA)

NACLA Secretariat

P.O. Box 4045

Gaithersburg, MD 20899-0001

Phone: (301) 975-6472

Fax: (301) 963-2871

<http://www.nacla.net/>

NACLA is a recently established nonprofit, membership organization. It is a voluntary program that assesses U.S. accreditation bodies and grants recognition to those that meet the relevant international standard: ISO-IEC Guide 58. The NACLA Secretariat is housed at the National Institute of Standards and Technology (NIST).

National Electrical Manufacturers Association (NEMA)

210` L St., NW, Suite 300

Washington, DC 20037

Phone: (202) 457-8400

Fax: (202) 457-8473

www.nema.org

NEMA is a nonprofit organization that issues standards for electrical products.

National Institute of Standards and Technology (NIST)

100 Bureau Drive

Gaithersburg, MD 20899

www.nist.gov

NIST is a non-regulatory agency within the U.S. Department of Commerce’s Technology Administration. Its mission is to strengthen the U.S. economy and improve the quality of life by working with industry to develop and apply technology, measurements, and standards.

National Technical Information Service (NTIS)

Springfield, VA 22161

Phone: (703) 605-6000

www.ntis.gov

NTIS is the official resource for government-sponsored information in science, technology, engineering, and business. Its electronic catalog includes more than 400,000 publications and other media.

National Voluntary Laboratory Accreditation Program (NVLAP)

National Institute of Standards and Technology

100 Bureau Dr., MS 2140

Gaithersburg, MD 20899-2140

Phone: (301) 975-4016

Fax: (301) 926-2884

www.ts.nist.gov/nvlap

The NVLAP program provides third-party accreditation to testing and calibration laboratories.

National Fire Protection Association International (NFPA)

1 Batterymarch Park

Quincy, MA 02269-9101

Phone: (617) 770-3000

Fax: (617) 770-0700

www.nfpa.org

The mission of NFPA is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating scientifically based consensus codes and standards, research, training, and education. NFPA is developing the first consensus-based building code.

Nationally Recognized Testing Laboratory Program (NRTL)

Director

Office of Technical Programs and Coordination Activities

NRTL Program

Occupational Safety and Health Administration

US Department of Labor

200 Constitution Avenue NW, Room N3653

Washington, DC 20210

Phone: (202) 693-2110

<http://www.osha-slc.gov/dts/otpc/nrtl/index.html>

The NRTL Program, a part of OSHA's Directorate of Technical Support, recognizes private sector organizations as NRTLs, and recognition signifies that an organization has met the necessary qualifications specified in the regulations for the Program. The NRTL determines that specific equipment and materials ("products") meet consensus-based standards of safety to provide the assurance, required by OSHA, that these products are safe for use in the U.S. workplace.

Northeast Product Safety Society (NPSS)

2 Milliston Rd., Suite 2GN

Millis, MA 02054

www.nepss.org

This nonprofit organization is dedicated to the safety of electrical products.

Underwriters Laboratories, Inc.

333 Pfingsten Road

Northbrook, IL 60062-2096

Phone: (847) 272-8800

Fax: (847) 272-8129

www.ul.com

UL is an independent, nonprofit product safety testing and certification organization founded in 1894.