# 8. Ensuring the Integrity of Labeling and Standards-Setting Programs

**Guidebook Prescriptions for Ensuring the Integrity of Labels and Standards Programs**

1. Establish the existing testing capacities of industry and the public sector and identify appropriate national or international accreditation bodies.
2. Establish fair, consistent, and practical criteria for certifying the energy efficiency of products.
3. Tailor the compliance approach to practicalities and available public and private resources.
4. Regularly monitor progress. Report both compliance and non-compliance.
5. Establish a graduated response to non-compliance, including private warning, public notification, and ordering of changes.
6. Establish sufficient penalties and adequate administrative processes to pose a credible threat to transgressors.
7. Resolve questions, disputes, and allegations promptly with clear decisions.

## 8.1 The Importance of Reliable Energy-Performance Information

The integrity of energy-performance information for equipment covered by standards is a primary requirement for a successful standards-setting and labeling program. All standards-setting and labeling programs rely on measuring and accurately declaring the energy consumption and energy efficiency of the equipment concerned. Without a means of measuring equipment energy performance, it is impossible to launch a meaningful standards-setting and labeling program. It is also essential that equipment energy performance be measured in a consistent way and that the values reported within the program are accurate. Without these safeguards, apparent improvements in equipment efficiency and reported energy savings will likely be illusory. Consequently, a large part of the development of any standards-setting and labeling program revolves around establishing a reliable system for measuring and declaring the energy performance of the equipment covered by the labels or standards.

Standards-setting and labeling programs give a commercial advantage to products that appear to have higher energy performance and a disadvantage to those that appear to have lower performance.

Therefore, it is in a manufacturer's or vendor's interest to be seen as offering more efficient equipment. These commercial pressures can be a strong incentive to make false declarations about equipment performance; it is highly probable that some declared values will be bogus unless adequate controls are in place to detect false claims. Thus, it is critical to establish a testing and compliance regime that minimizes the risk of false and inaccurate declarations of product energy performance.

Appliance energy performance is determined by product testing; for the testing to be credible, there needs to be:

- confidence in the accuracy of the measured results
- confidence in the validity of the declared results

Chapter 4 addresses the establishment of test protocols and facilities. In this chapter, we examine the different types of testing and compliance regimes and their role in ensuring confidence and consistency in test results and communicating results to the public. In particular, this chapter addresses the establishment of a testing, accreditation, certification, verification, and compliance regime as a means of ensuring program integrity and public confidence. Each of the key terms is explained in the next section.

## 8.2 Concepts and Definitions

Once standards-setting and labeling programs are in place, energy-performance test results are needed before an appliance can be put on the market. The test results provide the information needed for the energy label and/or demonstrate that the product satisfies a minimum energy performance standard (MEPS). Additional energy-performance testing may be needed after an appliance has been on the market to demonstrate that the appliance still achieves the stated energy performance.

The degree of certainty required for the test results is a key aspect of program design and has implications not only for the credibility of the program impacts, but also for the cost of implementing the program. In practice, all standards-setting and labeling programs strike a balance between the conflicting aims of maximizing reliability of the reported test results and minimizing program costs.

### 8.2.1 What is a Test?

A test is defined by the International Standards Organization (ISO)/(International Electrotechnical Commission (IEC) Guide 2 as a "technical operation that consists of the determination of one or more characteristics of a given product, process or service according to a specified procedure." Test data result from the performance of a test. If the test method is well written, it is sufficient for the test data to comply with the test method's requirements for accuracy and variability. Testing is performed in test laboratories; energy-performance test protocols and facilities are discussed in Chapter 4.

### 8.2.2 What are Accreditation and Certification?

- Accreditation is the process of verifying that a test laboratory is competent to do a specified test.
- Certification is the process of endorsing (usually through verification) the validity of declared results.

### 8.2.3 What is a Verification Regime?

A verification regime is the process specified by the agency authorizing the standards and labels to determine whether the declared energy performance of equipment available on the market is accurate.

### 8.2.4 What is a Compliance Regime?

A compliance regime is the process by which the agency operating the program aims to ensure that market actors abide by the program requirements and that appliances are not labeled with false information. A compliance regime includes the elements above plus additional legal steps.

### 8.2.5 Steps in Establishing Testing, Verification, and Compliance Regimes

The major steps in ensuring the integrity of energy-efficiency labeling and standards-setting programs are shown in Figure 8-1.

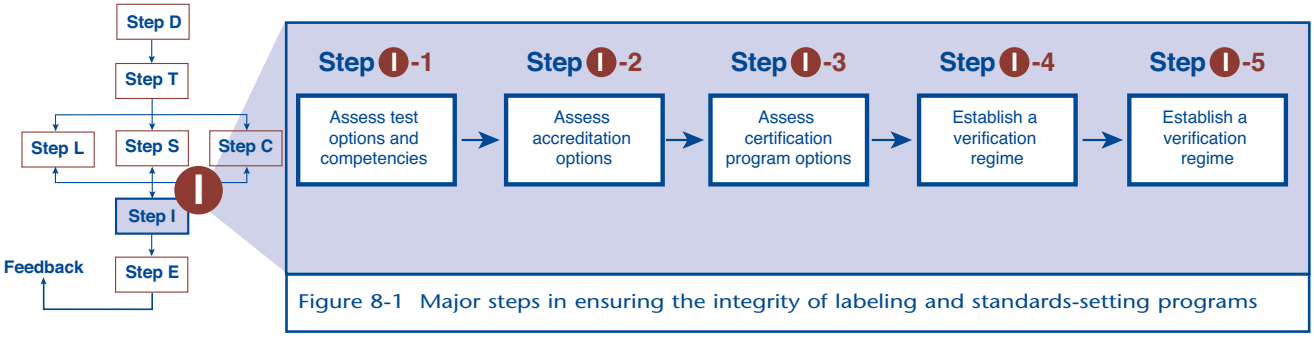


Figure 8-1 Major steps in ensuring the integrity of labeling and standards-setting programs

Each of these steps is discussed in Sections 8.4 through 8.8 below. It is important to note that the design of accreditation and certification regimes requires highly specialized expertise. It is generally best to consult an expert familiar with ISO test lab accreditation and test standards while designing these parts of a standards and labels program, as designing these elements would be extremely challenging work for a program manager who is new to the field.

## 8.3 Technical Sources of Error and Variability in Measuring Equipment Energy Performance

When designing a testing and compliance regime for standards-setting and labeling programs it is important to have a clear idea of how and why equipment energy performance might vary from one test to another and how the type of testing and compliance regime that is established might minimize

variation. It is important that the testing regime minimize the risk of systematic errors. This might mean, for example, avoiding test labs that fail to adequately calibrate equipment or cross reference test results and that consistently record energy consumption values that are significantly lower (or higher) than the "true" values.

### 8.3.1 Sources of Error

In measuring the energy performance of equipment, technical errors can result from:

- inaccuracy in the equipment used to measure the test results
- variability in the accuracy of the equipment used to measure the test results
- variability in the environmental conditions maintained during the test (e.g., different ambient temperatures or airflow rates)
- variability in the procedure followed when conducting the test (i.e., variability in the way the test is set up and conducted)
- variability among individual products within a product class
- deterioration of a product's energy performance as the product ages
- inexperience of technicians performing the tests

The more complex the test procedure and the more sensitive the energy-performance results are to the test conditions, the greater the likely variability from one test to another. Furthermore, most standards-setting and labeling programs apply to mass-produced energy-using appliances such as refrigerators and air conditioners. Because energy tests for these appliances are time consuming and costly, it is impractical to require that each unit (e.g., every single air conditioner) be tested, Instead, testing regimes usually require that a sample of units be tested for each model. For example, if a manufacturer produces a particular model of refrigerator-freezer with a model reference code of ZK200, the test regime may require a small sample of all the ZK200 appliances to be tested to determine the energy performance of the model in general. The assumption is that the production of the ZK200s is sufficiently standardized that the measured energy performance of the sample will be representative of all the ZK200s being p roduced; however, in practice, the actual variation in energy performance from one ZK200 to another will depend on the degree to which the manufacturer has standardized the production process.

Most energy-using appliances addressed by standards-setting and labeling programs are relatively stable, so their physical characteristics are unlikely to change much within the first few years following their manufacture. If for some reason different-aged products were being tested, deterioration in performance over several years could introduce another source of variability.

### 8.3.2 Assessing the Competence of Testing Laboratories

Because of the inherent variability of products, described above, most test laboratories and procedures are evaluated by testing a single piece of equipment repeatedly in a single laboratory or shipping it from

laboratory to laboratory to enable fair comparisons. Two concepts are applied to describe errors in measuring the energy performance of a single piece of equipment: *accuracy* and *variability*. The following paragraphs address the *accuracy* and two types of *variability* (*repeatability* and *reproducibility*) of test results.

### 8.3.3 Accuracy of Testing Laboratories

*Accuracy* refers to the degree of departure of the test result from the "true" value. For example, if a device whose power consumption is 1,000 W is measured and the result is 1,001 W, the test or measurement is inaccurate by 1 W. Benchmarks abound for the reasonably achievable accuracy of energy performance tests for various products. Labeling and standards program developers and mangers should insist on internationally accepted, high levels of accuracy for the equipment and procedures used in their verification regime.

### 8.3.4 Variability Among Testing Laboratories

*Variability* refers to the degree of difference among the results of several repetitions of the same test. For example, if the above device with a power consumption of 1,000 W were measured three times and the power consumption was recorded as 1,001 W, 999 W, and 1,000 W, these results are less variable than if measurements for that product were 950 W, 1,000 W and 1,050 W although the mean value is the same in both cases. This variability in test results for a particular new product may be different than the inherent variability in the performances of the many products that may be produced in a particular production line or the possible variability in the performance of a particular product as it ages. The issue here is in the variability in testing, not variability in the *product*. Variability in testing can be further defined in terms of *repeatability* and *reproducibility*.

*Repeatability* is a measure of the consistency of test results within a particular test facility. It is the variation among the test results when the same refrigerator, for example, is tested more than once in the same test laboratory.

*Reproducibility* is a measure of the variation of test results among different test facilities. It is the variation among the test results when the same refrigerator is, for example, tested according to the same test protocol in different test laboratories. Achieving an acceptable level of reproducibility is a key challenge for conformity assessment programs that use multiple laboratories. As with the testing accuracy, program developers and mangers should insist on internationally accepted, high levels of repeatability and reproducibility from the test facilities used in the testing regime.

### 8.3.5 Acceptable Targets for the Variability of Test Results

To meet good international standards, test labs doing compliance or certification testing for refrigerators should achieve:

- repeatability of measurements within ±2% and
- reproducibility (with other labs in the same testing program) of ±4%.

Failure to attain these levels implies a flaw in the testing system. The most serious flaws are fundamental inadequacies in the test facilities because these problems may require complete or partial rebuilding of the facilities to rectify the problem. Program managers need to be aware that existing test facilities in the private and/or public sector are not always adequate to meet internationally acceptable standards of repeatability and reproducibility. When this is the case, the facilities should be rebuilt or a decision must be made to allow measurements that fall short of international norms. In the latter case, it is often difficult to export products without paying for additional testing in an international facility.

## 8.4 Step 1-1: Assess Options and Competencies for Testing Products

Generally, standards-setting and labeling programs are initiated and run by government agencies although some private-sector examples exist. Usually distinct bodies (agencies) are individually responsible for testing, certification, accreditation, and verification although some of these responsibilities may be assumed by a single entity. To be credible, agencies involved in accreditation and certification need to be independent third-party bodies, meaning that they are wholly independent from the suppliers of the equipment to be certified or of the test laboratories seeking accreditation. The agency operating the standards-setting and labeling program should designate the agencies responsible for each of these tasks within the program. For voluntary programs, the agency managing the standards and labeling scheme typically has complete freedom to set its own rules for program participation and to choose the agencies it wishes to handle testing, certification and accreditation. The situation can be more complex for mandatory programs because the choice of testing, certification, accreditation, and verification regimes may be constrained by existing legal precedents and jurisdictions (e.g., the government agency operating the program may be legally required to use a specific accreditation body or may have to implement its verification process according to some existing legal framework).

Many countries initiating a standards or labeling scheme will find that there are inadequate testing capabilities to support the program, so additional testing capacity will need to be developed. Testing can be performed by laboratories differing widely in size, legal status, purpose, technical competence, and range of services offered. They may be:

- government regulatory laboratories
- government research laboratories
- government-supported laboratories
- college/university laboratories
- independent private-sector laboratories

- laboratories affiliated with or owned by industrial firms or industry associations
- manufacturers' in-house laboratories

Test laboratories can be for profit or non-profit and operate facilities in one or multiple domestic locations or countries.

Selection of a test regime is an integral part of the selection of verification and compliance regimes as described in Sections 8.7 and 8.8. Preparation for selecting the test regime begins with a careful assessment of the pros and cons of all the options. The material presented in Chapter 4 can be useful in that assessment.

## 8.5 Step 1-2: Assess Accreditation Options for Verifying the Competence of Testing Facilities and Legitimizing Test Results

Product tests, as described in the previous section, are often complex and require that identical conditions and procedures be established and followed each time tests are conducted. As a result, program managers should not assume that a testing regime will produce acceptable levels of repeatability and reproducibility for test results until this has been reasonably proven. To increase the chances that testing will achieve repeatable and reproducible results, program managers must require verification of the competence of the test laboratories involved in the program and standardization of laboratory procedures. Accreditation aims to verify competence and standardization.

Laboratory accreditation is a specialized process and requires a competent accreditation body (AB) to carry it out. There are well-established and accepted international requirements for ABs, which are set out in ISO Guide 58 (ISO 1993). This guide stipulates that the AB should be an independent organization capable of auditing and assessing the proposed laboratories. The requirement of independence means that the AB should have no connection with the laboratories that it accredits and no interest in whether the application for accreditation is successful or not.

One of the goals of accreditation is to harmonize the application of test methods and submission of test results. In most industrialized nations, there is one national AB that is responsible for accreditation of all types of laboratory tests, most of which do not concern energy (e.g., product safety, noise, durability, electromagnetic properties). Thus, the decision of whether or not to establish a national accreditation body is normally made outside the domain of the energy-efficiency standards-setting and labeling effort and will typically be part of a national industrial strategy. If no competent national accreditation body is available, it is possible to seek accreditation from an established international AB (see insert: *International Accrediation Bodies* on next page). If an AB (national or international) is designated to support the labeling or standards program, it needs to have developed competency to accredit labs conducting each of the specific product tests being considered before it can issue accreditation for those tests. Accreditation is given on a test-by-test basis, not on a facility basis, so it is common that test labs are

## International Accreditation Bodies

The International Laboratory Accreditation Cooperation, ILAC, has three types of members as defined below:

*FULL MEMBERS*

Accreditation bodies that meet the requirements for Associates and have been accepted as signatories to the ILAC MRA

*ASSOCIATES*

Accreditation bodies that:

1) operate accreditation schemes for testing laboratories, calibration laboratories, inspection bodies, and/or other services as decided from time to time by the ILAC General Assembly;
2) can provide evidence that they are operational and committed to comply with:
   (a) the requirements set out in relevant standards established by appropriate bodies such as the ISO and the IEC as well as ILAC application documents and
   (b) the obligations of the ILAC MRA
3) are recognized in their home economy as offering an accreditation service.

*AFFILIATES*

Accreditation bodies that are:

1) currently operating, being developed, or intended to be developed for testing laboratories, calibration laboratories, inspection bodies, and/or other services as decided from time to time by the ILAC General Assembly and
2) declare their intention to operate their accreditation programs in compliance with the requirements set out in relevant standards established by appropriate international bodies such ISO and IEC as well as ILAC application documents.

accredited to conduct some tests but not others (see insert: *The Process of Becoming Accredited* on page 213–214).

### 8.5.1 Ensuring International Acceptability of Test Results

Most countries, including all industrialized countries, are signatories of the International Laboratory Accreditation Cooperation (ILAC), which is a formal agreement to encourage international recognition of accreditation schemes and test results reported by accredited laboratories. If a test lab has been accredited by an ILAC member agency to perform a specific test, then ILAC signatory countries are legally obligated to accept the lab's results if produced according to that specific test. It takes considerable effort on the part of a national accreditation agency to receive ILAC membership; the agency must be able to demonstrate repeatedly high standards; however, once the agency is an ILAC member, the way is opened to much decreased accreditation costs and wide access for national producers to international product markets. A full listing of ILAC Members is in Table 8-1.

## 8.6

### Step 1-3:

### Assess Certification Program Options for Validating That Products Comply with Standards and Label Requirements

As with the selection of a test regime, the selection of an AB and an accreditation process is an integral part of the selection of verification and compliance regimes as described in Sections 8.7

**Table 8-1** **ILAC Members Listed by Category**

*ILAC members are accessible around the world.*

| Full Members (MRA Signatories) | |
|---|---|
| 1 | National Association of Testing Authorities, Australia (NATA), Australia |
| 2 | Bundesministerium fur Wirtschaft und Arbeit (BMWA), Austria |
| 3 | Belgische Kalibratir Organisatie/Organisation Belge D'Etalonnage (BELTEST BKO-OBE), Belgium |
| 4 | General Coordination for Accreditation (CGCRE/INMETRO), Brazil |
| 5 | Standards Council of Canada (SCC), Canada |
| 6 | Hong Kong Accreditation Service (HKAS), Hong Kong, China |
| 7 | China National Accreditation Board for Laboratories (CNAL), People's Republic of China |
| 8 | Czech Accreditation Institute (CAI), Czech Republic |
| 9 | Danish Accreditation (DANAK), Denmark |
| 10 | Finnish Accreditation Service (FINAS), Finland |
| 11 | Comité Français d'Accreditation (COFRAC), France |
| 12 | DACH, Germany |
| 13 | Deutsches Akkreditierungssystem Prüfwesen (DAP), Germany |
| 14 | Deutsche Akkreditierungsstelle Mineralöl (DASMIN), Germany |
| 15 | German Accreditation Body Technology (DATech), Germany |
| 16 | Deutscher Kalibrierdienst (DKD), Germany |
| 17 | Hellenic Accreditation Council (ESYD), Greece |
| 18 | National Accreditation Board for Testing & Calibration Laboratories (NABL), India |
| 19 | National Accreditation Body of Indonesia (KAN), Indonesia |
| 20 | Irish National Accreditation Board (INAB), Ireland |
| 21 | Israel Laboratory Accreditation Authority (ISRAC), Israel |
| 22 | Sistema Nazionale per l'Accreditamento di Laboratori (SINAL), Italy |
| 23 | Servizio di Taratura in Italia (SIT), Italy |
| 24 | International Accreditation Japan (IA Japan), Japan |
| 25 | The Japan Accreditation Board for Conformity Assessment (JAB), Japan |
| 26 | Korea Laboratory Accreditation Scheme (KOLAS), Republic of Korea |
| 27 | Department of Standards Malaysia (DSM), Malaysia |
| 28 | Raad voor Accreditatie (RvA), Netherlands |
| 29 | International Accreditation New Zealand (IANZ), New Zealand |
| 30 | Norwegian Accreditation (NA), Norway |
| 31 | Romanian Accreditation Association (RENAR), Romania |

*Continued on next page*

Table 8-1 ILAC Members Listed by Category (continued)

| | Full Members (MRA Signatories) - continued |
|---|---|
| 32 | Singapore Accreditation Council (SAC), Singapore |
| 33 | Slovak National Accreditation Service (SNAS), Slovakia |
| 34 | Slovenian Accreditation (SA), Slovenia |
| 35 | South African National Accreditation System (SANAS), South Africa |
| 36 | Entidad Nacional de Acreditacion (ENAC), Spain |
| 37 | Swedish Board for Accreditation and Conformity Assessment (SWEDAC), Sweden |
| 38 | Swiss Accreditation Service (SAS), Switzerland |
| 39 | Chinese National Laboratory Accreditation (CNLA), Chinese Taipei |
| 40 | The Bureau of Laboratory Quality Standards, Department of Medical Sciences, Ministry of Public Health, Thailand (BLQS-DMSc), Thailand |
| 41 | Thai Industrial Standards Institute (TISI), Thailand |
| 42 | United Kingdom Accreditation Service (UKAS), United Kingdom |
| 43 | American Association for Lab Accreditation (A2LA), USA |
| 44 | International Accreditation Service, Inc (IAS), USA |
| 45 | National Voluntary Laboratory Accreditation Program (NVLAP), USA |
| 46 | Vietnam Laboratory Accreditation Scheme (VILAS), Vietnam |
| | **Associates** |
| 1 | Organismo Argentino de Acreditacion (OAA), Argentina |
| 2 | Instituto Nacional De Normalizacion (INN), Chile |
| 3 | State Office for Standardization and Metrology – National Accreditation Service (DZNM-NSO), Croatia |
| 4 | National Accreditation Body of Republica de Cuba (ONARC), Cuba |
| 5 | Egyptian Accreditation Council (EGAC), Egypt |
| 6 | National Laboratories Accreditation Bureau (NLAB), Egypt |
| 7 | Nemzeti Akkreditalo Testulet (NAT), Hungary |
| 8 | Iran Accreditation System (IAS), Iran |
| 9 | Jordan Institution for Standards & Metrology (JISM), Jordan |
| 10 | entidad mexicana de acreditación, a.c. (ema), Mexico |
| 11 | Pakistan National Accreditation Council (PNAC), Pakistan |
| 12 | Bureau of Product Standards Laboratory Accreditation Scheme (BPSLAS), Philippines |
| 13 | Polish Centre for Accreditation (PCA), Poland |
| 14 | Tunisian Accreditation Council (TUNAC), Tunisia |

| Associates (continued) | |
|---|---|
| 15 | Turkish Accreditation Agency (TURKAK), Turkey |
| 16 | Assured Calibration and Laboratory Accreditation Select Services (ACLASS), USA |

| Affiliates | |
|---|---|
| 1 | General Directorate of Standardization (DPS), Albania |
| 2 | Department for Standardization, Metrology and Certification under the RA Government (SARM), Republic of Armenia |
| 3 | Committee for Standardization, Metrology and Certification under Council of Ministers of the Republic of Belarus (Gosstandart), Republic of Belarus |
| 4 | Quality Management Program – Laboratory Services (QMP-LS), Canada |
| 5 | Cyprus Org. Standards & Control Quality (CYS), Cyprus |
| 6 | Organismo de Acreditacion Ecuatoriano (OAE), Ecuador |
| 7 | National Council of Science and Technology (NCST), El Salvador |
| 8 | Oficina Guatemalteca de Acreditacion (OGA), Guatemala |
| 9 | National Centre for Accreditation of Kazakhstan (NCAK), Kazakhstan |
| 10 | State Inspection for Standardization and Metrology of the Government of Kyrgyz Republic (Kyrgyzstandard), Kyrgyzstan |
| 11 | Mauritius Accreditation Service (MAURITAS), Mauritius |
| 12 | Department of Technical Supervision, Standardization and Metrology of the Republic of Moldova, Republic of Moldova |
| 13 | Ministry of Industry, Trade, Energy and Mines (MCI), Morocco |
| 14 | The Agency for Standardization, Metrology, Certification and Trade Inspection under the Ministry of Economics and Trade of the Republic of Tajikistan, Tajikistan |
| 15 | Trinidad & Tobago Bureau of Standards (TTBS), Trinidad And Tobago |
| 16 | International Accreditation Registry (IAR), USA |
| 17 | National Forensic Science Technology Center, Inc. (NFSTC), USA |
| 18 | TUV Rheinland of North America, Inc. (TUV), USA |
| 19 | National Accreditation Agency of Ukraine (NAAU), Ukraine |
| 20 | Uzbek Agency for Standardization, Metrology and Certification (UZSTANDARD), Uzbekistan |

*Reference: www.ilac.org*

## The Process of Becoming Accredited

### Steps to Accreditation

The AB is responsible for developing an assessment procedure for each product category and test procedure for which it offers accreditation for (e.g., room air conditioners to be tested under ISO 5151: 1999).

To be internationally accepted, the accreditation assessment procedure should be based on ISO/IEC 17025 (ISO 1999) and assess the following items:

- staffing levels
- facilities or equipment available
- quality procedures
- test procedures
- calibration procedures
- maintenance procedures
- the qualification report

There is sometimes confusion between the ISO 9000 series requirements, which deal with general quality management and assurance issues) and ISO 17025. The latter is more stringent because it includes technical requirements for the operation of a testing laboratory [i.e., participation in proficiency testing (see below), adherence to specified test methodologies, and technical competence of laboratory personnel], which are not addressed in ISO 9002.

The accreditation body must test a laboratory's competence for each product and test category by:

- identifying the accreditation scheme and requirements
- preparing program application form
- identifying standards and test methods
- making an informal visit
- evaluating the application and documentation
- performing on-site laboratory inspection
- resolving discrepancies (when found)
- witnessing testing and proficiency testing
- giving final approval and accreditation
- performing regular reassessment as defined in the accreditation scheme

### Proficiency Testing

As discussed above, problems with the accuracy and variability of test results result not only from

and 8.8. Preparation for that determination begins with a careful assessment of the pros and cons of all accre-ditation options.

Certification is done by a Certification Organization (CO). The CO provides the structure required and is responsible for defining and administering the certification program. The CO generally comprises either a governmental or an industry association tasked with implementing performance and energy-verification programs. Program documentation must be a procedural guide or operations manual. These documents should contain the information necessary to effectively operate a certification program for each product category.

The responsibilities of the CO may include:

- development of program documentation
- collection of statistical data

errors by laboratory staff or defects in test equipment but also from factors such as flaws or variables in the test method or in sample selection. The selection of good test methods is vital to the production of good test results. Because test results are an essential component of most conformity assessment programs, the ability to acquire good test data is also essential for the credibility of any certification program. Proficiency testing is defined in ISO Guide 43 (ISO 1997). A laboratory's compliance with ISO/IEC 17025 and ISO Guide 43 or their equivalent provides some assurance of the laboratory's competence. However, because ISO 17025 describes only general requirements, more specific requirements will likely be necessary for each product to be tested. A detailed acceptance criterion should be developed, which may include correlation (round-robin) testing of a reference sample at several laboratories. Round-robin testing is described in Subsection 8.7.2.

**Role of the Assessor**

An essential feature of all third-party laboratory accreditation schemes is on-site assessment for compliance with specified criteria. This assessment is carried out either by assessors directly employed by the accreditation body or, more commonly, by part-time expert assessors appointed by the body to act on its behalf. In either case, the assessor plays a vital role in determining the credibility of the scheme. Assessors should hold appropriate technical and professional qualifications and have recent experience in the activities they are going to assess. All potential assessors, regardless of background, experience, or qualifications, should attend an appropriate training course that familiarizes them with the relevant accreditation criteria, assessment techniques, and human aspects of assessment. At the end of a training course successful participants should:

- be familiar with the specific requirements of ISO/IEC 17025, ISO/IEC Guide 43, ISO Guide 58 and other requirements used by the AB
- know how to apply these requirements to specific calibration and testing laboratories
- be able, with the guidance and supervision of an experienced lead assessor, to plan, organize, conduct, and report on the assessment of a laboratory

- publication of directories of certified product
- selection of products
- ongoing evaluations of laboratories and proficiency testing

The CO may be required to:

- conduct factory inspections
- define and apply procedures to verify test data produced from a manufacturer's "Qualified Test Facility"
- setup and compile a verification record
- specify the information and format of a qualification report

### 8.6.1 Third-party Certification

With third-party certification, a producer's claim of conformity to a standard is validated by a technically and otherwise competent third party (i.e., a body not controlled by or under the influence of the producer or buyer).

The sponsor of the third-party program (the certifying organization) may be responsible for:

- collecting the required data
- generating test results or conducting inspections
- reviewing results of the above activities
- making a final determination on the product's conformance or lack of conformance

The certifying organization may also delegate all or part of the data collection and review activities to another party or parties.

The degree of confidence that can be placed in third-party certification programs varies greatly depending on:

- the number and types of testing/inspection methods used within the program to ensure product conformance
- the adequacy of the manufacturer's quality-control system
- the competence of the body that conducts the testing and/or inspection and evaluates the test results

Recommended criteria and procedures for third-party certification programs can be found in ISO/IEC Guide 65 (ISO 1996).

### 8.6.2 Laboratories Used for Product Certification

Testing laboratories will test the products and report the results to the CO as defined by the procedural guide for the standards or labeling program. Typically, testing laboratories need accreditation by the AB prior to initiating any testing for the CO. The test laboratory should be an independent third-party organization with strict confidentiality procedures.

Responsibilities of the test laboratory include:

- adherence to ISO 17025 requirements
- participation in ongoing laboratory evaluations such as proficiency testing
- independence, i.e. the laboratory should not be associated with manufacturers

As with the selection of a test regime, an AB, and an accreditation process, the selection of a CO and certification process is an integral part of the selection of verification and compliance regimes as described in Sections 8.7 and 8.8. Preparation for selection of a CO and certification process begins with a careful assessment of the advantages and disadvantages of all options. A list of standards applicable to test laboratories and to accreditation and certification bodies is provided in Table 8-2.

**Table 8-2** **International Standards Applicable to Test Laboratories and Accreditation and Certification Bodies**

*There are several international standards to help guide product certification.*

| | |
|---|---|
| ISO/IEC Guide 28: | General rules for a model third-party certification system for products |
| ISO/IEC Guide 43-1: | Proficiency testing by inter-laboratory comparisons |
| ISO/IEC Guide 44: | General rules for ISO and IEC international third-party certification schemes for products |
| ISO/IEC Guide 58: | Calibration and testing laboratory accreditation systems—General requirements for operation and recognition |
| ISO/IEC Guide 61: | General requirements for assessment and accreditation of certification/registration bodies |
| ISO/IEC Guide 65: | General requirements for bodies operating product certification systems |
| ISO/IEC TR 17010: | General requirements for bodies providing accreditation of inspection bodies |
| ISO 17025: | General Requirements for the Competence of Calibration and Testing Laboratories) |

## 8.7 Step 1-4: Establish a Verification Regime for Declaring and Verifying that Manufacturers are Complying with Standards and Label Requirements

In both theory and practice, there are many permutations of the testing, reporting (declaration), and verification regime used to support standards-setting and labeling programs. Verification procedures can be separated into two broad categories: those that apply when a product is first introduced to the market and those that apply to products already on the market.

### 8.7.1 Verifying a Product's Performance When It Is First Introduced to the Market

Depending on the scheme adopted, product suppliers may have to meet certain requirements before they can put their products on the market. For example, a supplier may be required to register the product with a government office or a designated certification body, which may entail acknowledging awareness of all the legal requirements pertaining to the standards-setting and labeling program and asserting that the product meets those requirements. Alternatively, there may be no registration requirement, and the supplier may be free to put its product directly on the market as long as, for example, the product is supplied with an energy label.

Similarly, a supplier putting a product on the market may be required to prove that the product's energy performance has been tested. Proof may entail sending a test report to the registration or certification body. Alternatively, proof of testing may be accepted based on trust, and it might suffice to simply report the test values (either to the registration body or on the energy label and in the product documentation) without supplying a test report.

Also, there may or may not be requirements related to the competence and independence of the laboratory doing the test (i.e., the lab may or may not have to be accredited to do the test and be independent of the supplier).

If the supplier of the product (the manufacturer or importer) is allowed to make its own declaration of the product's energy performance when the product is first put on the market, this is termed "self-certification." Self-certification applies even when the product is tested in a third-party laboratory if the testing is done at the manufacturer's behest and the manufacturer controls the distribution of the test results. If a third-party laboratory is required to determine the energy-performance values and a third-party certification body to declare the results, this is termed "third-party certification."

The combinations of the elements described above result in four levels of self-certification and one of third-party certification as shown in Table 8-3.

**Table 8-3** | **Type of Certification** | *Requirements for certification may vary.*

| Certification Type | Registration | Test Report | Proof of Accreditation of Test Lab |
|---|---|---|---|
| Requirement for Type A self-certification | – | – | – |
| Requirement for Type B self-certification | ✓ | – | – |
| Requirement for Type C self-certification | ✓ | ✓ | – |
| Requirement for Type D self-certification and 3rd-party certification | ✓ | ✓ | ✓ |

In addition, any of the following test lab options may be used or required for initial testing with Type D self-certification and third-party certification:

a) a single government-designated lab

b) a single third-party lab managed by a certification body

c) one of several government-designated labs

d) one of several third-party labs managed by a certification body

### 8.7.2 Check Testing Products Already on the Market

Once a product has been placed on the market, the agency operating the standards-setting and labeling program can verify that the declared energy performance is accurate by operating a check-testing program. Check testing involves taking a sample of products either from the factory floor or from the point of sale for independent third-party testing. In some cases, a single test laboratory is used for this testing; in others, multiple laboratories are used.

If a single test laboratory is recognized as the reference laboratory for the program, it is not always necessary for the laboratory to be accredited (although accreditation is clearly preferable). However, if the lab is not accredited, the following complications can be expected:

- If the laboratory is not also used for the initial energy-performance tests that must be reported when a product is first released, suppliers can justly complain that they have no means of knowing whether the tests that they commission for first declarations will tally with the later check tests or not.
- Results will not be accepted outside the jurisdiction of the program.

If multiple labs are used for check-testing, it is essential that they be accredited and conduct regular cross-testing among each other (i.e., that they establish and regularly reestablish that they have acceptable levels of reproducibility for the given test). One commonly used cross-testing process is round-robin testing in which the same sample is sent for testing to each of the labs concerned. The sample can be tested at a coordinating lab at the beginning and end of the process to ensure that no significant changes have taken place in the sample during the round-robin test period, or the sample can be returned to the coordinating lab for testing after each test and before it is send out to the next lab. Comparison of the results produced by each lab identifies adjustments needed by any lab to produce conformance to the testing procedure.

Any of the test lab options listed for initial testing with Type D self-certification and third party certification may also be applied for check testing.

### 8.7.3 Advantages and Disadvantages of Each Approach

Program managers and regulators need to strike an appropriate balance between the rigor and comprehensiveness of the testing, certification, accreditation, and compliance regimes and the cost and feasibility of their implementation. It is important for standards-setting and labeling programs, particularly compliance requirements, to be designed to appropriately account for the capacity of market players to supply standardized products. The most appropriate solution will vary from one country to another and will depend on a number of locally specific issues. Nonetheless, the following broad conclusions can be drawn:

- Relying on pure self-certification with no additional means of verifying claimed performance may result in poor program credibility and widespread abuse.
- The degree to which manufacturers can be relied upon to check each other's products and report suspected abuses to regulators will depend upon the size, resources, and capabilities of the manufacturing sector. In general, this approach is only likely to be successful if there is strong competition regarding energy performance and if the industry is highly concentrated, well resourced, and strongly competitive.
- Industry is only likely to be able to establish a credible third-party certification program if the industrial sector is well organized, well resourced, and strongly competitive and if there is an established, dominant trade association.

- Verification testing is likely to be cheaper than government-operated certification, but is usually less comprehensive.
- Government-sponsored certification becomes a more attractive solution when local industry does not have the required testing capacity, and there is no third-party lab locally available for initial product testing.
- Accreditation and proficiency testing are essential if more than one laboratory is to be used for compliance (verification) testing or for government certification.
- Using a single lab for certification and/or verification testing avoids reproducibility tolerances but results in the lab in question becoming a reference lab for all self-certification testing (i.e., testing done in the suppliers' own labs).

## 8.8 Step 1-5: Establish a Compliance Regime for Ensuring that Manufacturers Are Complying with Standards and Label Requirements

Testing, accreditation, certification, and verification all contribute to the overall compliance regime; however, to be complete, the regime also requires additional measures to monitor compliance and address non-compliance.

### 8.8.1 Establishing a Legal Basis and Identifying Degress of Non-compliance

The legal basis of the program needs to be firmly established so the compliance conditions can be fixed. If the program is mandatory and a government driven program, it will require legal sanction and establishment of penalties and procedures to address non-compliance. The legal basis for punishing non-compliance sometimes has to be built from scratch, but it is also common that relevant legislation is already in place (e.g., for safeguarding the integrity of information provided to consumers), and non-compliance can be addressed within the framework of that existing legislation.

If participation in the program is voluntary, as for endorsement labeling, abuses can be treated softly e.g., with threats that endorsement will be removed and/or abuses publicized. If a country has a copyright law, it is possible to protect a voluntary label by copyrighting it and then addressing any abuses under the provisions of the copyright law.

### 8.8.2 Types of Abuse

Several types of potential abuse need to be considered in the compliance regimes of standards-setting and labeling programs, related to different actors in the marketplace.

Potential abuses involving suppliers of the original equipment (manufacturers or importers):

- failure to provide an energy label or other required energy-performance rating information
- failure to register a product (if required)
- failure to provide proof of testing (if required)
- failure to submit a product for testing (if required)
- failure to cooperate with certification or verification testing bodies
- falsification of a product's energy performance resulting in misleading labeling or a false statement of compliance with a MEPS

Potential abuses involving the resellers of equipment (retailers, wholesalers and distributors):

- failure to provide an energy label or other required energy-performance rating information
- failure to display an energy label or other required energy-performance rating information at the point of sale
- falsification of a product's energy label or a false statement of compliance with a MEPS
- failure to provide required energy-performance information in product catalogs, websites, or other promotional media (if required)
- failure to register a product (if required)
- failure to provide proof of testing (if required)
- failure to submit a product for testing (if required)
- failure to cooperate with compliance authorities

### 8.8.3 Establishing Penalties for Non-compliance

Penalties are a necessary but insufficient component of compliance regimes. Penalties need to be firm enough to deter non-compliance but, no matter how draconian, will have no impact if mechanisms are not also in place to monitor compliance. International non-compliance penalties range from informal warnings to exorbitant fines that could cause a business to go bankrupt. Typically, penalties take into account the scale of the abuse, the degree of intent or negligence, and other factors such as the financial resources of the perpetrator. A common penalty for manufacturers whose products fail to attain the required or stated energy performance level is removal of the right to sell the product plus some kind of fine. These measures can also be complemented by public embarrassment of the offender through publication of the offense.

### 8.8.4 Designing Compliance Agencies and Establishing Compliance Monitoring

Mandatory programs must establish or designate an agency that is responsible for coordinating compliance issues. This agency is sometimes the same one that initiated the standards-setting and

labeling program [e.g., U.S. DOE or the Tunisian Agency for Renewable Energy (ANER)]. In other cases, agencies responsible for compliance are separate from the standards-implementing agency. For example, in Europe the labeling program is initiated and managed by the European Commission, but enforcement is the responsibility of each E.U. member state and its designated agencies. Whatever the coordinating agency is, it will often work with other governmental agencies to establish the compliance regime. For example, in the U.K., compliance actions are administered by the Department of Environment, Food, and Rural Affairs in coordination with Customs and Excise (which handles imports and exports) and local authorities who manage a network of officers monitoring trading standards compliance for all manner of traded goods and services.

Building a reliable compliance monitoring process is a key element in ensuring a program's integrity. In the case of mandatory MEPS, compliance authorities are concerned with ensuring that all appliances on the market are registered as complying with the performance requirements (i.e., only registered appliances are on the market) and ensuring that the declared energy performance of appliances is accurate. For mandatory energy labeling, an additional monitoring requirement is needed to ensure that labels are correctly displayed at the point of sale and that they are provided as required through all other points of the distribution chain.

Monitoring compliance regarding the correct display or provision of energy labels by retailers, wholesalers, and distributors is a simple matter of organizing inspections (typically unannounced) of premises. Incognito inspectors posing as consumers can also see if retailers make false claims about the information provided on labels. Assessing false energy-performance claims is more complex. Typically governments rely on some combination of the following mechanisms:

- Verification testing (check testing), in which samples of appliances to be tested may be taken either from the factory floor and the point of sale, or both
- Challenge testing, in which manufacturers are informally encouraged to test their competitors' products and inform the authorities of suspected falsification.

Verification testing has the advantage that the government or administering agency has full control of the scale and nature of testing and is not reliant on the cooperation of commercial agencies. It also has the advantage of not requiring any testing competence among manufacturers and of ensuring a level playing field for manufacturers regardless of their testing capabilities. Similarly, it avoids the risk of collusion among manufacturers.

A good program requires verification testing. Challenge testing can be a valuable addition to, limiting (though not to zero) the need for government verification testing. Challenge testing has the sole advantage that it can significantly reduce the testing burden and thus costs to the administering agency; however, challenge testing presumes that manufacturers have the capability and motivation to do regular tests of their competitors' products. Challenge testing can be a reasonable option when there is a large, well-organized, highly competitive industrial base as is the case in large economies such as Europe and the U.S.; however, it is much less feasible in less-developed markets.

## 8.9 International Examples of Different Program Integrity Schemes

Examples from Australia, the E.U., the U.S., Tunisia, and the Philippines illustrate compliance verification by a government agency, self-certification under a regional policy, government reliance on private compliance certification, and government control of certification, respectively.

### 8.9.1 Compliance Verification by Government: Australia

Australia offers a good example of how a government can ensure compliance through verification testing. In Australia, energy labeling is mandatory under state government legislation and regulations that give force to the relevant Australian national standards (Harrington 1999). Regulations also specify energy labeling requirements for appliances, including offenses and penalties for non-compliance. To ensure a high degree of credibility and compliance, the state governments of Australia use a national testing program in which appliances are purchased from retail outlets and tested in accredited independent laboratories to verify the claims on the energy label and compliance with MEPS. This check-testing program publishes selection criteria, which target those appliances that appear most likely to fail the test rather than using random sampling to verify the detailed registration test reports that regulators require from suppliers registering appliances. Table 8-4 shows the large number of check tests that are conducted to confirm the accuracy of the representations on labels in Australia.

*A large majority of check tests confirm the accuracy of suppliers' labeling representations.*

**Table 8-4 Results from the Australian Check-Testing Program 1991 to 2000**

| Year | Total Number of Appliances Approved Regulators | Total Number of Checktest Failures | Percentage of Registrations that Fail |
|---|---|---|---|
| 1999-2000 | 624 | 1[1] | 0.2% |
| 1998-1999 | 525 | 31 | 5.9% |
| 1997-1998 | 668 | 20 | 3.0% |
| 1996-1997 | 490 | 28 | 5.7% |
| 1995-1996 | 359 | 39 | 10.9% |
| 1994-1995 | 386 | 11 | 2.8% |
| 1993-1994 | 369 | 14 | 3.8% |
| 1992-1993 | 414 | 8 | 1.9% |
| 1991-1992 | 322 | 0 | 0.0% |

*Source: Grubbert 2001*

*[1]: This low figure resulted from the reduced scope of the check test program in this year*

Appliances that fail check testing in Australia are subject to a range of sanctions under state laws. Regulatory agencies ensure that appliance suppliers who fail check testing are given a reasonable opportunity to respond. If a supplier agrees with the check test, the appliance is "deregistered" (the supplier's right to sell the appliance is withdrawn). If a supplier disputes the check-test finding, the supplier is required to supply three additional units for testing at an independent laboratory. Statistical modeling has shown that failure of four units indicates a high probability that the model could not meet the standard's requirements.

Australia acknowledges that significant public resources are required to support check testing, not only to purchase and test units but also to foster the skills of the accredited testing laboratories. The costs of the check-testing program are shared between the public and private sector; all initial check tests are funded by government agencies, but any subsequent testing to verify or overturn the check-test result is at the supplier's expense.

The Australian Greenhouse Office has established an enforcement mechanism by entering into a memorandum of understanding with the Australian Competition and Consumer Commission, which employs a range of sanctions for misleading and deceptive conduct arising from wrongly labeled or non-MEPS-compliant appliances and equipment. These sanctions include possible fines of millions of dollars. In 2003, the enforcement mechanism was activated, resulting in a Chinese manufacturer and an Australian retail chain entering into agreements with the commission to publicly correct marketing claims about the efficiency of a range of washing machines.

### 8.9.2 Self-certification within a Regional Policy Framework: The E.U.

The E.U. energy-labeling scheme operates based on a self-certification process in which the product supplier is responsible for the accuracy of the information it provides on the energy label. To avoid trade barriers under the terms of the European Single Market, the energy-labeling rules are developed centrally by the European Commission and the Energy Labeling Regulatory Committee where each E.U. member state is represented by appointed representatives. Energy-performance test standards are also developed centrally by the European test standards agencies CEN (the European Committee for Standardization,) and CENELEC (the European Committee for Electrotechnical Standardization), which are direct counterparts of ISO and IEC.

Product suppliers have to provide proof of testing (energy test reports) upon request of the E.U. member state where the product is sold. The labs used to do this testing do not have to be third-party labs or accredited by law (although these requirements do apply for safety testing). However, many retailers and/or distributors require third-party certification as part of their own requirements for the performance and quality of the products they sell.

Enforcement of the labeling scheme is the responsibility of each E.U. member state, not the European Commission. Thus, although the commission can oblige member states to have an enforcement process in place, the commission cannot determine what that process should be. In consequence, the approaches used vary considerably among member states.

The first round of control is provided by manufacturer challenge testing of competitors' products. For example, members of the European Committee of Domestic Equipment Manufacturers (CECED) instigated their own internal challenge testing program. Within this program, if a manufacturer tests a competitor's product and finds that the product's energy consumption has been underreported, the testing manufacturer can issue a challenge through CECED. CECED will then arrange to have the appliance tested at a third-party laboratory, and, if the challenge is supported, the product supplier has to pay for testing and administration costs and relabel the product. However, if the challenge is not supported, the challenger has to pay all testing and administration costs. This agreement only applies to CECED members and thus does not cover the 10 to 15% of products manufactured by non-members.

Alternatively, the European air-conditioning manufacturer's association, Eurovent, operates its own certification schemes for 14 different types of air-conditioning equipment. Within these schemes, any manufacturer who wishes its products to be included in the Eurovent catalog and database has to abide by the certification process, under which Eurovent makes unannounced factory inspections and sends a certain percentage (which varies depending on the product type) of models produced by the manufacturer to a third-party lab for verification testing. If the energy performance is found to be overstated based on testing of the sample, the manufacturer has to amend the declared performance to accord with the third-party results or withdraw from the catalog the whole series of models related to the tested base model.

Aside from manufacturers' associations' own efforts, many European countries rely strongly on the results of product testing by third-party laboratories operated by consumer organizations. If the test labs operated by these bodies find that energy-performance results are overstated, the findings are publicized in widely read consumer's magazine test reports. These tests can also act as a screening mechanism for governments who wish to do their own limited verification testing with the intent of launching legal proceedings against abuses.

Some E.U. countries operate their own check-testing programs, in which the governments purchase samples of appliances on sale in the national market, test performance, and compare the results with the declared values. The most comprehensive scheme is operated in Denmark, but the Netherlands and the U.K. also conduct check-testing programs. Some E.U. countries have reached informal arrangements to share compliance test results and coordinate compliance testing activities.

### 8.9.3 Government Blessing of Private Certification Programs: The U.S.

The U.S. essentially operates a system of self-certification for product energy performance; however, labeling and standards are enforced through a mixture of industry-sponsored third-party certification schemes and challenge testing, depending on the product.

Under U.S. law, the U.S. DOE is given certain rights to enforce product MEPS; these rights include:

- access to manufacturers' records
- the power to oblige a manufacturer to supply products for third-party verification testing at the manufacturer's expense

- the ability to levy penalties of up to $110 for each violation or instance of non-compliance

A "violation" is defined as each unit sold for each day of non-compliance. Thus, if a manufacturer unfairly declared the energy performance of a product for a year during which time 5,000 units were sold, U.S. DOE could levy a penalty of up to $110 x 365 x 5,000 = $200 million. The magnitude of the penalty is discretionary up to the maximum limit; in practice, U.S. DOE would likely negotiate a penalty.

### Mandatory Market Access Conditions

Before distributing its products, a manufacturer or supplier must send a certification report to U.S. DOE, containing energy-performance data and a completed compliance conformity declaration. In addition, suppliers have to file a report each time they discontinue a model, keep testing records for not less than 2 years, and provide access to their records on request from U.S. DOE.

The compliance statement must certify that:

- the basic models comply with the appropriate energy-conservation standards
- all required testing was conducted in conformance with appropriate test procedures
- the reported information is true, accurate, and complete
- the manufacturer or private labeler is aware of the penalties for violations of the act

For each basic model of an appliance, the certification report documents the model's energy-consumption characteristics and capacity.

### Testing and Certification Regimes

Product suppliers have to conduct their own energy-performance testing and supply the data for both U.S. DOE's minimum efficiency standards program and the Federal Trade Commission (FTC) EnergyGuide labeling program. The same test procedure, designed and maintained by U.S. DOE, is used for both.

For residential consumer products marketed in the U.S., manufacturers must test a sample of each basic model of the product to establish its efficiency level and verify its compliance with the applicable energy-efficiency descriptor value specified by law. The test procedure for each product incorporates a sampling plan designed to give reasonable assurance that the true mean performance of the equipment being manufactured and sold meets or exceeds the applicable value and is accurately determined.

A pragmatic approach has been adopted to manage certification so that in cases where there is a strong and well-organized trade association that has initiated its own credible product-certification scheme, U.S. DOE will allow the trade association to compile and report test results in the form of a directory of members' products. Otherwise, manufacturers and other suppliers will send the test results and a completed regulatory compliance statement directly to U.S. DOE program managers.

Examples of trade-association-led certification programs recognized by U.S. DOE include:

- The Air-conditioning and Refrigeration Institute (ARI) program for central air conditioners,
- The program of GAMA, an association of appliance and equipment manufacturers, for water heaters, furnaces and boilers and
- The Association of Home Appliance Manufacturers (AHAM) program for room air conditioners.

Each of these certification programs employs an independent third-party lab to conduct verification testing as follows:

- manufacturers test their own units and submit the results to the trade organization
- the trade organization publishes a directory of their members' products, which includes the energy-performance results
- the trade organization contracts the third-party lab to test some of the unit
- the third-party lab selects units, at random and without prior notice, from a warehouse or assembly line
- U.S. DOE is sent a copy of the directory

Typically, the third-party test laboratory will allow a 5% difference (tolerance) between a supplier's self-certified energy performance results and its own test results before any revision is made to the claimed efficiency. Witnesses are not allowed for the first verification test of a product by the third-party lab; however, if a supplier contests the results of the third-party test, the supplier is allowed to witness a re-test. If a product is tested because of a challenge from a competitor (i.e., because a competitor claims that the self-certified energy performance is false and issues a formal challenge through the challenge test procedures of the certification program), the competitor is not allowed to witness the product test.

Each of these trade-association-managed certification schemes has its own specific features. In the case of AHAM's certification program for room air conditioners, these are as follows:

- a directory of members' products is published twice a year
- a single third-party lab is used to do all the product verification testing
- EER values are reported to FTC and U.S. DOE
- every year 50% of each manufacturer's new models are tested by the third-party lab, and
- 10% of all models carried over from the preceding year are retested

Thus, overall, about 25% of models in the directory are tested in a third-party lab each year.

The decision about which specific models will be tested is made by the third-party test lab, so manufacturers have no advance notice of which models will be tested or when. If a manufacturer has incorrectly rated a model's EER or capacity, the manufacturer must inform the dealers of the new rating

and must supply corrected energy labels. Meanwhile, AHAM notes the revised ratings in its directory. Any participant who does not comply with these requirements can no longer take part in the certification program.

The costs of the trade-association certification programs are paid by a pro-rata charge based on an assessment of the numbers of each appliance that are shipped.

### 8.9.4 Government-controlled Certification: Tunisia and the Phillippines

The state-controlled approach that is being adopted by Tunisia for its refrigerator energy-labeling program has been in use in the Philippines for some years. In the Tunisian refrigerator certification program, every model of refrigerator to be sold on the market has to be tested by the state-operated lab. A single sample of each model is sent to the lab for an energy-performance test. If the manufacturer accepts the results, this information is included on the energy label. The label is then printed by the government and supplied to the manufacturer. If the manufacturer does not accept the test results, the manufacturer can pay for and witness additional tests of other samples of the same model. To ensure that there is a limited risk of modifications to the model delivered for certification-testing compared with the model sold on the market, the Tunisian government also plans to carry out verification testing of appliances chosen at random at the point of sale.