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Profiles of National Standards-Related Activities

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FOREWORD

The National Institute of Standards and Technology's (NIST) has developed a wide range of reference publications which provide ready access to information about organizations responsible for standards development, product certification, and accreditation. While most of these focus on U.S. activities (e.g., *Directory of Private Sector Product Certification Programs,* and *Standards Activities of Organizations in the United States*), some compile information on international or regional organizations (e.g., *Directory of European Regional Standards-Related Organizations*). These directories are very useful to domestic enterprises, and are often-used references outside the United States.

With the expanding global economy, there is an increasing demand from the private sector and government agencies throughout the world for details on metrology and calibration systems, accreditation bodies, and certifying organizations of current and potential trading partners. In many countries, no single body is responsible for all aspects of metrology, standards, testing, and quality (MSTQ); and a wide range of public and private sector organizations may be involved. Obtaining authoritative information can be difficult and time-consuming since there is no single worldwide database of MSTQ activities. To fill this void, NIST has prepared *Profiles of National Standards-Related Activities*.

Users will find in one place a wealth of information about the MSTQ systems of the world's major economies and many less-developed countries. Perusal of the entries will demonstrate that there are many different models for national MSTQ systems. For the first time the information gathered in one place provides names and addresses of a country's metrology center and legal metrology agency; its primary standards and quality organizations; government and private sector accreditors of calibration and testing laboratories; product certifiers; quality and environmental management system registrars; information sources and many other aspects of the country's industrial infrastructure. When all the descriptive information for a country is considered, a clearer picture emerges of the state of development of that country's MSTQ system.

This is the first edition of this directory. Some countries did not respond to requests for information, while others did not provide all the information requested. As this directory becomes more widely used, we trust that existing entries will be updated and expanded and that countries not yet included will submit entries.

ACKNOWLEDGMENTS

ABSTRACT

This directory describes the metrology, standardization, testing, and quality (MSTQ) activities of more than 70 countries. Each entry includes basic data on the country's economy and trade; agencies and institutions responsible for metrology and calibration, standards development, testing, product certification, quality and environmental system registration and accreditation; and key contacts and information sources. Entries are formatted to facilitate access to specific information. An introductory section provides general information on development of the directory and an overview of world-wide MSTQ activities.

Keywords: accreditation; calibration; certification; conformity assessment; metrology; mutual recognition agreements; registration; standards; testing

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INTRODUCTION

As the world moves toward a global economy driven by rapid technological change, standards and conformity assessment have become strategic business issues. Most nations recognize that an effective industrial infrastructure includes not only ready access to capital, energy, and transportation, but the systems and institutions which support metrology, standardization, testing, and quality (MSTQ). The ability to compete in global markets is directly related not only to the availability of MSTQ resources, but the credibility of certification programs, calibration systems, environmental management registration, and accreditation schemes. Attention to MSTQ issues has expanded from coteries of technical specialists to the board rooms of major corporations, conclaves of heads of state, and the front pages of business and financial journals. A basic problem for both experienced technical specialists and those newly involved in MSTQ issues is identifying the responsible MSTQ organizations within the countries in which they are planning to do business. At times it can be difficult identifying these organizations even within their own countries. This directory aims to alleviate this problem by providing information on the primary institutions or agencies which are responsible for, or coordinate, national MSTQ activities.

Scope and Format

This directory profiles the MSTQ systems of the world's major economies and many less-developed countries. The entries are based on information from a wide range of sources together with information provided by the principals. Rather than providing a questionnaire with a request to fill in the blanks, a draft entry was prepared from existing data sources in accordance with the format presented in Appendix I. Each organization received only those sections of the draft entry for which it has responsibility. Recipients were asked to verify or correct the information and, if necessary, coordinate with other organizations within their country to ensure that all relevant national organizations were listed. Entries or portions of entries were sent to more than 300 organizations. Many organizations did not respond despite numerous reminders. Nevertheless, more than 200 responses were received; and the information presented here is the best available at this time. As this directory becomes widely circulated, it is anticipated that missing information will be provided so that all entries will be complete, and those countries which chose not to be included will reconsider and submit entries.

Each entry is formatted into the following sections, and key information is highlighted to facilitate access:

Basic Data
To enable readers to put the MSTQ information into context, each entry includes comparative data on the country's size and population, basic financial indicators, and primary exports, imports, and trading partners. Most of the data in this section are extracted from the 1995 Central Intelligence Agency (CIA) *World Factbook*, supplemented by data from the World Bank and the U.S. Department of Commerce. As with most data of this type, these are cumulative data which are one to two years old at time of publication and should, therefore, be used only as relative indicators of each country's capabilities and capacities.

National MSTQ Coordination
Recipients were asked to identify the organization which coordinates, or provides the forum for coordinating, standards-related activities at the national level.

Metrology and Calibration Services
One indicator of a nation's capability to produce manufactured goods of uniform quality, deliver the quantities ordered, and comply with quality system registration and laboratory accreditation criteria is the capability and capacity of its metrology and calibration services. Memberships in the International Bureau of Weights and Measures (BIPM), International Organization of Legal Metrology (OIML), and regional metrology networks provide some measure of experience, proficiency, and knowledge of current practices. Budgetary information and the number of accredited secondary calibration laboratories are not only useful indicators, but can help all countries to benchmark their existing or planned metrology systems.

Standards Development and Adoption
Much of the information in this section had been collected in prior years by the International Organization for Standardization (ISO) from its member bodies and published every four or five years in the ISO *Memento*. ISO had decided to forego publishing the 1996 edition and the accumulated data were made available for this directory. Each ISO member body received a copy of the reformatted data for verification and updating. It was also asked to indicate the number of other government and private sector standards developers within its country and the total number of available standards. The total number of publicly available standards is the combined total of: (a) all standards developed or adopted by the primary (national) standards body; and (b) all other standards developed by other national organizations. Participation in international and regional standardization organizations is listed for each country. Membership may be held by an agency or organization other than the primary standards body.

Testing and Product Certification
This section lists the accreditors of testing laboratories and product certifiers and the number of laboratories and certifiers which have been accredited. In many cases, respondents provided information on existing and pending mutual recognition agreements (MRAs) and memoranda of understanding (MOUs).

Quality Management Registration
This section provides indicators on the extent to which ISO 9001 and ISO 9002 have been implemented, and further insight on the country's accreditation system including certification of quality assessors.

Related Information
Many countries require that certain standards-related activities be performed by certified technicians or accredited organizations. Others provide opportunities for voluntary certification. This section summarizes information on these requirements and the responsible organizations. Additionally, information is provided on environmental management standards and their implementation, and the primary source of information on MSTQ topics. This source is usually the designated World Trade Organization (WTO) Enquiry Point. If the country is not a member

of WTO or has not notified the WTO as to the Enquiry point, the source is identified as the Information Center.

An Overview

Gathering related MSTQ information in one location provides an opportunity to consider the national frameworks within which the responsible organizations function and their interrelationship. The most noteworthy observation is that among the listed countries the focus for policy, direction, and coordination has shifted from the primary standards body to the national accrediting authority. The WTO agreement on Technical Barriers to Trade has provided the impetus to create an efficient, transparent, fair and harmonized means of international acceptance of traded goods. To support domestic industries and promote trade, countries have established, or are in the process of establishing, a national infrastructure for accrediting testing and calibration laboratories; inspection bodies; and certifiers of products, personnel, quality systems, and other standards-related activities. Nations are implementing the concept of "one-step conformity assessment" not only to minimize costs, but to achieve recognition by other nations. The national accrediting authority fills the need for a recognized body empowered to formalize agreements with regional organizations and other nations. This development, which centers on the implementation of standards rather than on their preparation, coupled with the enhanced role of regional and international standards organizations, has prompted some primary standards bodies to reassess their role and organizational structure. In many cases, the national accrediting authority is also the national MSTQ coordinator or part of the government agency which serves as the coordinator. Half of the listed countries identified a national body which coordinates or oversees MSTQ activities. Nearly all of these organizations are government agencies. Four members of the European Union have such coordinating bodies: Austria, Belgium, Italy, and the United Kingdom. Canada, Mexico, and the United States did not identify MSTQ coordinating bodies.

Most countries have centralized standardization systems within a single standards body. However, it may be a surprise to some that the standardization systems in many countries are not monolithic. Some of the larger countries have numerous standards developing organizations in addition to the primary standards body. In Germany, for example, 153 private sector standards developers have prepared 15 000 standards, while Deutsches Institut für Normung (DIN) has prepared 22 000. In Japan, more than 200 trade associations and professional societies prepare standards within the Japanese Industrial Standards Committee (JISC) framework. In France, 30 semi-autonomous sectorial bodies (bureaux de normalisation) prepare industry-specific standards, while Association française de normalisation (AFNOR) prepares cross-cutting horizontal standards. In the United States, it is estimated that there are 620 formal and informal developers of standards in the private sector, as well as 80 Federal agencies which develop standards (See NIST SP 806, 1996 Edition).

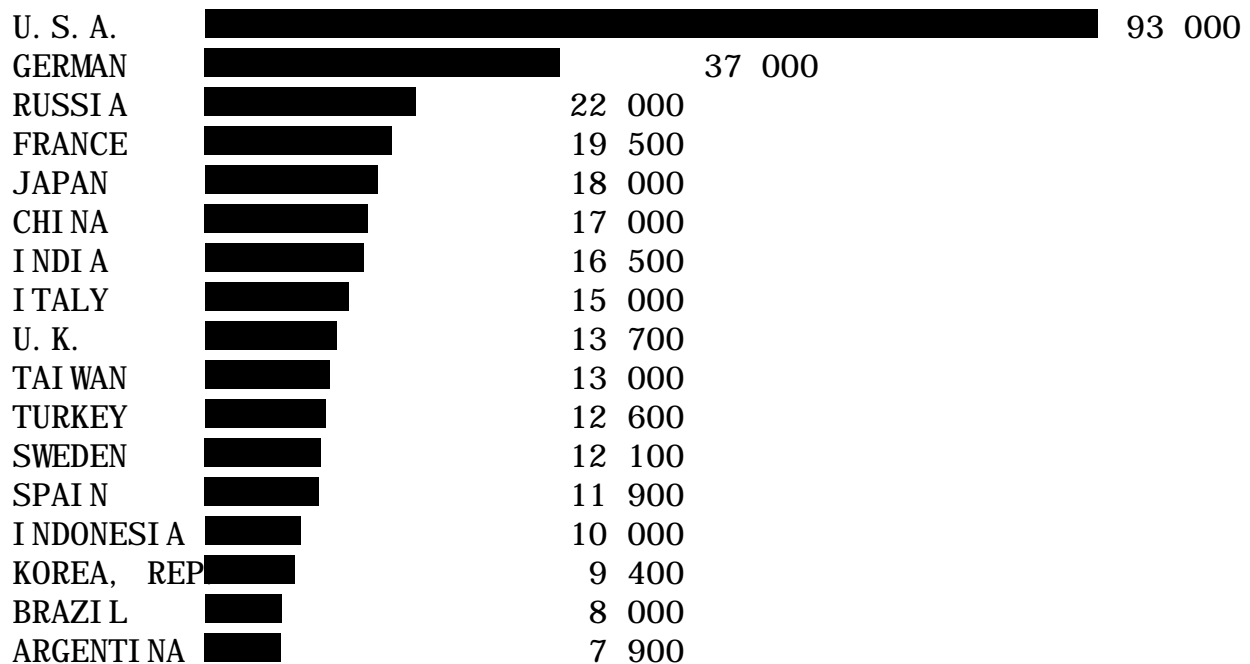|	
U. S. A.	████████████████████████████████████ 93 000
GERMAN	█████████████████ 37 000
RUSSIA	█████ 22 000
FRANCE	█████ 19 500
JAPAN	█████ 18 000
CHINA	████ 17 000
INDIA	████ 16 500
ITALY	████ 15 000
U. K.	███ 13 700
TAIWAN	███ 13 000
TURKEY	███ 12 600
SWEDEN	███ 12 100
SPAIN	███ 11 900
INDONESIA	██ 10 000
KOREA, REP	██ 9 400
BRAZIL	██ 8 000
ARGENTINA	██ 7 900

Figure 1 Some of the world's larger collections of national standards.

Figure 1 compares the number of standards in some of the major collections in the world. (Countries formerly associated with the Soviet bloc generally have large numbers of standards, e.g., Ukraine 21 000, Belarus 19 000, Poland 15 400, Bulgaria 13 000.) The U.S. total includes 8000 Department of Defense standards for uniquely military applications. These should be subtracted from the total for comparisons with the totals of other nations. The number of available standards, however, is not necessarily indicative of their level of implementation or their value to industry and commerce. Some claim that in spite of 5-year reviews, 25 to 30 percent of U.S. standards refer to and document obsolescent technology that, while appropriate for spares and maintenance of older equipment, is no longer appropriate for new designs. This situation probably exists in many other countries. The number of national standards reported by all respondents exceeds 560 500. The total number of standards published by those ISO member bodies which did not respond is 90 600. On this basis, and taking into account (a) the under-reporting of standards prepared by national organizations other than the ISO member body, and (b) national standards of countries which are not yet members of ISO, it is estimated that there are currently about 780 000 national standards in the world. It is probable that a significant portion are very similar to each other. Those responding report that from 5 to 90 percent of their national standards are identical to, technically equivalent to, or based on international standards; the average is 43 percent.

There are insufficient data from the larger countries to derive useful indicators on the number of secondary calibration laboratories, accredited testing laboratories, or product certifiers. Table 1 illustrates the wide range of data in these categories. There appears to be some correlation between the number of enterprises registered to ISO 9000 and the number of calibration laboratories as shown in Table 2.

Table 1 Comparison of accredited laboratories in selected countries

Country	GDP $ billions	Accredited Laboratories	
		Calibration	Testing
United Kingdom	1045	570	
Italy	998	72	
Brazil	886	65	70
Mexico	723	36	214
Indonesia	571	19	10
Australia	375	200	2328
Taiwan	257		100
South Africa	194		86
Malaysia	167	18	71
Sweden	163		380
Switzerland	148		145
Finland	82		66
Singapore	57		70
Ireland	49	12	57

Table 2. Comparison of the number of facilities registered to ISO 9001 and 9002
        and the number of accredited secondary calibration laboratories

Country	ISO 9000 Facilities	Accredited Calibration Labs
United Kingdom	50 000	570
Australia	10 000	200
Italy	4 000	72
Ireland	2 500	12
Brazil	1 250	65
Malaysia	836	18
Mexico	340	36
Indonesia	38	19

Future Updates

The value of a directory of this type is dependent on the completeness and currency of its information. Now that MSTQ institutions and agencies throughout the world can see the product and test its usefulness, it is hoped that they will keep NIST advised of any changes in their entries. They are particularly encouraged to provide the full range of data that will enable users to have a complete profile of their MSTQ activities. Users are also encouraged to suggest improvements for subsequent editions. Organizations that are not included in this directory are invited to use the form in Appendix I to send pertinent information to:

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This directory will in the near future be available on the Internet. The Web site will include forms so that listed organizations can update their entries, and new entries can be submitted by those not yet listed.