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AAENDE
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ISO Awareness

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Abstract:

This document describes the structure of the International Organization for Standardization (ISO) and explains the rules governing the development of International Standards and other ISO deliverables. It further illustrates how these principles are applied in the field of non-destructive testing.

1 Who ISO is

ISO is a network of the national standards institutes of 157 countries, on the basis of one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system.

ISO is a non-governmental organization. Nevertheless, ISO occupies a special position between the public and private sectors. This is because, on the one hand, many of its member institutes are part of the governmental structure of their countries, or are mandated by their government. On the other hand, other members have their roots uniquely in the private sector, having been set up by national partnerships of industry associations.

Therefore, ISO is able to act as a bridging organization in which a consensus can be reached on solutions that meet both the requirements of business and the broader needs of society, such as the needs of stakeholder groups like consumers and users.

ISO has more than 16 500 International Standards and other types of normative documents in its current portfolio. ISO's work programme ranges from standards for traditional activities, such as agriculture and construction, through mechanical engineering, manufacturing and distribution, to transport, medical devices, information and communication technologies, and to standards for good management practice and for services.

2 Who can join ISO

Membership of ISO is open to national standards institutes most representative of standardization in their country (one member in each country). Full members, known as "Member bodies", each have one vote, whatever the size or strength of the economy of the country concerned. In addition, ISO has two categories of membership for countries which do not yet have a fully developed national standards activity. They pay reduced membership fees. "Correspondent members" are entitled to participate in any policy or

technical body as observers, with no voting rights. "Subscriber members" are institutes from countries with very small economies that nevertheless wish to maintain contact with international standardization.

Although individuals or enterprises are not eligible for membership, both have a range of opportunities for taking part in ISO's work, or in contributing to the development of standards through the ISO member in their country. Individuals may be selected by member institutes to serve on national delegations participating in ISO technical committees. Individuals and enterprises may provide their input during the process of developing a national consensus for presentation by the delegation. This may done through national mirror committees to the corresponding ISO technical committee. International organizations and associations, both non-governmental and representing industry sectors, can apply for liaison status to a technical committee. They do not vote, but can participate in the debates and the development of consensus.

3 How ISO standards benefit society

For businesses, the widespread adoption of International Standards means that suppliers can base the development of their products and services on specifications that have wide acceptance in their sectors. This, in turn, means that businesses using International Standards are increasingly free to compete on many more markets around the world.

For innovators of new technologies, International Standards on aspects like terminology, compatibility and safety speed up the dissemination of innovations and their development into manufacturable and marketable products.

For customers, the worldwide compatibility of technology which is achieved when products and services are based on International Standards gives them a broad choice of offers, and they also benefit from the effects of competition among suppliers.

For governments, International Standards provide the technological and scientific bases underpinning health, safety and environmental legislation.

For trade officials, International Standards create "a level playing field" for all competitors on those markets. The existence of divergent national or regional standards can create technical barriers to trade. International Standards are the technical means by which political trade agreements can be put into practice.

For developing countries, International Standards that represent an international consensus on the state of the art constitute an important source of technological know-how. By defining the characteristics that products and services will be expected to meet on export markets, International Standards give developing countries a basis for making the right decisions when investing their scarce resources and thus avoid squandering them.

For consumers, conformity of products and services to International Standards provides assurance about their quality, safety and reliability.

For everyone, International Standards contribute to the quality of life in general by ensuring that the transport, machinery and tools we use are safe.

For the planet we inhabit, International Standards on air, water and soil quality, and on emissions of gases and radiation, can contribute to efforts to preserve the environment.

4 The hallmarks of the ISO brand

Democratic
Every member body (full members) has the right to take part in the development of any standard which it judges to be important to its country's economy. No matter what the size or strength of that economy, each participating member in ISO has one vote. Each country is on an equal footing to influence the direction of ISO's work at the strategic level, as well as the technical content of its individual standards.

Voluntary
ISO standards are voluntary. As a non-governmental organization, ISO has no legal authority to enforce the implementation of its standards. A certain percentage of ISO standards - mainly those concerned with health, safety or the environment - has been adopted in some countries as part of their regulatory framework, or is referred to in legislation for which it serves as the technical basis. Such adoptions are sovereign decisions by the regulatory authorities or governments of the countries concerned; ISO itself does not regulate or legislate. However, although ISO standards are voluntary, they may become a market requirement, as has happened in the case of ISO 9001 quality management systems, or of dimensions of freight containers and bank cards.

Market-driven
ISO develops only those standards for which there is a market requirement. The work is carried out by experts from the industrial, technical and business sectors which have asked for the standards, and which subsequently put them to use. These experts may be joined by others with relevant knowledge, such as representatives of government agencies, consumer organizations, academia and testing laboratories.

Consensus
Although ISO standards are voluntary, the fact that they are developed in response to market demand, and are based on consensus among the interested parties, ensures widespread applicability of the standards. Consensus, like technology, evolves and ISO takes account both of evolving technology and of evolving interests by requiring a review of its standards at least every five years to decide whether they should be maintained, updated or withdrawn. In this way, ISO standards retain their position as the state of the art, as agreed by an international cross-section of experts in the field.

Globally relevant
ISO standards are technical agreements which provide the framework for compatible technology worldwide. They are designed to be globally relevant - useful everywhere in the world. Developing technical consensus on this international scale is a major operation. In all, there are some 3 000 ISO technical groups (technical committees, subcommittees, working groups etc.) in which some 50 000 experts participate annually to develop ISO standards.

5 ISO and world trade

ISO, together with IEC (International Electrotechnical Commission) and ITU (International Telecommunication Union), has built a strategic partnership with the WTO (World Trade Organization) with the common goal of promoting a free and fair global trading system. The political agreements reached within the framework of the WTO require underpinning by technical agreements. ISO, IEC and ITU, as the three principal organizations in international standardization, have the complementary scopes,

the framework, the expertise and the experience to provide this technical support for the growth of the global market.

The WTO's *Agreement on Technical Barriers to Trade* (TBT) includes the *Code of Good Practice for the Preparation, Adoption and Application of Standards*. The TBT Agreement recognizes the important contribution that International Standards and conformity assessment systems can make to improving efficiency of production and facilitating international trade. Therefore, where International Standards exist or their completion is imminent, the Code states that standardizing bodies should use them as a basis for standards they develop. In the interest of transparency, the Code requires that standardizing bodies that have accepted its terms notify this fact to the ISO/IEC Information Centre located at the ISO Central Secretariat. Standardizing bodies having accepted the Code must publish their work programmes and also notify the existence of their work programmes to the ISO/IEC Information Centre. On behalf of the WTO, ISO periodically publishes a Directory of standardizing bodies that have accepted the *WTO TBT Standards Code*.

6 How the ISO system is managed

All strategic decisions are referred to the ISO members, who meet for an annual General Assembly. The proposals put to the members are developed by the ISO Council, drawn from the membership as a whole. ISO Council meets twice a year and its membership is rotated to ensure that it is representative of ISO's membership. Operations are managed by a Secretary-General, which is a permanent appointment. The Secretary-General reports to the ISO Council, the latter being chaired by the President who is a prominent figure in standardization or in business, elected for two years. The Secretary-General is based at ISO Central Secretariat in Geneva, Switzerland, with a compact staff which provides administrative and technical support to the ISO members, coordinates the decentralized standards' development programme, and publishes the output.

7 How the ISO system is financed

ISO's national members pay subscriptions that meet the operational cost of ISO's Central Secretariat. The subscription paid by each member is in proportion to the country's Gross National Income and trade figures. Another source of revenue is the sale of standards. However, the operations of ISO Central Secretariat represent only about one fifth of the cost of the system's operation. The main costs are borne by the member bodies which manage the specific standards' development projects and the business organizations which provide experts to participate in the technical work. These organizations are, in effect, subsidizing the technical work by paying the travel costs of the experts and allowing them time to work on their ISO assignments.

8 How ISO decides what standards to develop

Working through the ISO system, it is the sectors which need the standards that are at the origin of their development. What happens is that the need for a standard is felt by an industry or business sector which communicates the requirement to one of ISO's national members. The latter then proposes the new work item to ISO as a whole. If accepted, the work item is assigned to an existing technical committee. Proposals may also be made to set up technical committees to cover new scopes of activity. In order to

use resources most efficiently, ISO only launches the development of new standards for which there is clearly a market requirement.

The focus of the technical committees is necessarily specialized and specific. In addition, ISO has three general policy development committees that provide strategic guidance for the standards' development work on cross-sectoral aspects. They are: CASCO (conformity assessment); COPOLCO (consumer policy), and DEVCO (developing country matters). These committees help to ensure that the specific technical work is aligned with broader market and stakeholder group interests.

9 Who develops ISO standards

ISO standards are developed by technical committees comprising experts from the industrial, technical and business sectors which have asked for the standards, and which subsequently put them to use. These experts may be joined by others with relevant knowledge, such as representatives of government agencies, testing laboratories, consumer associations, environmentalists, academic circles and so on. The experts participate as national delegations, chosen by the ISO national member institute for the country concerned. These delegations are required to represent not just the views of the organizations in which their participating experts work, but of other stakeholders too. According to ISO rules, the member institute is expected to take account of the views of the range of parties interested in the standard under development and to present a consolidated, national consensus position to the technical committee

At the end of 2006, there were 3 041 technical bodies in the ISO system, including 193 ISO technical committees

10 How ISO standards are developed

The national delegations of experts of a technical committee meet to discuss, debate and argue until they reach consensus on a draft agreement. This is then circulated as a Draft International Standard (DIS) to ISO's membership as a whole for comment and balloting. Many members have public review procedures for making draft standards known and available to interested parties and to the general public. The ISO members then take account of any feedback they receive in formulating their position on the draft standard. If the voting is in favour, the document, with eventual modifications, is circulated to the ISO members as a Final Draft International Standard (FDIS). If that vote is positive, the document is then published as an International Standard.

Every working day of the year, an average of eight ISO meetings are taking place somewhere in the world. In between meetings, the experts continue the standards' development work by correspondence. Increasingly, their contacts are made by electronic means and some ISO technical bodies have already gone over entirely to electronic working, which speeds up the development of standards and reduces travel costs.

11 When speed is of the essence

ISO standards are developed according to strict rules to ensure that they are transparent and fair. The reverse side of the coin is that it can take time to develop consensus among the interested parties and for the resulting agreement to go through the public review process in the ISO member countries. For some users of standards, particularly those

working in fast-changing technology sectors, it may be more important to agree on a technical specification and publish it quickly, before going through the various checks and balances needed to win the status of a full International Standard. Therefore, to meet such needs, ISO has developed different categories of specifications, allowing publication at an intermediate stage of development before full consensus: Publicly Available Specification (PAS), Technical Specification (TS), Technical Report (TR), International Workshop Agreement (IWA).

12 ISO's international partners

ISO collaborates with its partners in international standardization, the International Electrotechnical Commission (IEC) and International Telecommunication Union (ITU). The three organizations, all based in Geneva, Switzerland have formed the World Standards Cooperation in order to better coordinate their activities, as well as the implementation of International Standards.

ISO is one of the few non-governmental organizations having an observer status in the World Trade Organization. Its contribution is increasingly solicited in relation to the elimination of technical barriers to trade.

ISO collaborates with the United Nations Organization and its specialized agencies and commissions, particularly those involved in the harmonization of regulations and public policies such as:

- CODEX Alimentarius, on food safety measurement, management and traceability;
- UN Economic Commission for Europe (UN/ECE), on the safety of motor vehicles and the transportation of dangerous goods;
- World Health Organization (WHO), on health technologies;
- International Maritime Organization (IMO), on transport security;
- World Tourism Organization (UNWTO), on the quality of services related to tourism.

In addition, ISO cooperates with UN organizations that provide assistance and support to developing countries, such as the United Nations Conference on Trade and Development (UNCTAD), the United Nations Industrial Development Organization (UNIDO) and the International Trade Centre (ITC).

ISO's technical committees have formal liaison relations with over 600 international and regional organizations, which complement this impressive network and which, together with the network of its national members, is key for the global relevance, actual use and recognition of its Standards by the market forces and the general public.

ISO has reinforced its links, too, with international organizations representing different groups of stakeholders, including:

- World Economic Forum (WEF),
- Consumers International (CI),
- World Business Council for Sustainable Development (WBCSD), and
- International Federation of Standards Users (IFAN).

ISO also collaborates regularly with the major international organizations for metrology, quality and conformity assessment.

13 ISO's regional partners

Many of ISO's members also belong to regional standardization organizations. This makes it easier for ISO to build bridges with regional standardization activities throughout the world. ISO has recognized regional standards organizations representing Africa, the Arab countries, the area covered by the Commonwealth of Independent States, Europe, Latin America, the Pacific area, and the South-East Asia nations. These recognitions are based on a commitment by the regional bodies to adopt ISO standards - whenever possible without change - as the national standards of their members and to initiate the development of divergent standards only if no appropriate ISO standards are available for direct adoption.

14 Conformity assessment

Conformity assessment may consist of any one of, some of, or all of the following: sample testing, inspection, process evaluation, supplier's declaration of conformity, management system certification/registration, personnel certification, product certification, mutual recognition of results and the accreditation and peer assessment of the competence of the organizations conducting these activities – collectively known as "conformity assessment bodies".

ISO and IEC jointly develop standards and guides for all those activities. ISO does not carry out certification to ISO 9001:2000, ISO 14001:2004, or any other of its standards, nor does it control the certification business sector.

ISO promotes the international harmonization of conformity assessment activities and the worldwide acceptance of the results through ISO/CASCO, its general policy committee on conformity assessment. ISO/CASCO works both on the principles and the practice of conformity assessment. It develops documents that are published as ISO/IEC International Standards or Guides. The voluntary criteria contained in these documents represent an international consensus on good practice and therefore facilitates the mutual recognition of conformity assessment results.

ISO/CASCO's objectives are to:

- study means of assessing the conformity of products, processes, services and management systems to appropriate standards or other technical specifications;
- prepare standards and guides relating to the practice of testing, inspection and certification of products, processes and services, and to the assessment of management systems, testing laboratories, inspection, certification and accreditation bodies, and their operation and acceptance, and
- promote mutual recognition and acceptance of national and regional conformity assessment systems, and the appropriate use of International Standards for testing, inspection, certification, assessment and related purposes.

15 ISO/TC 135, Non-destructive testing

The scope of ISO/TC 135 is to develop International standards covering non-destructive testing as applied generally to constructional materials, components and assemblies. Its mission is:

- to elaborate a coherent set of standards for each non-destructive testing method which give the possibility to compare results

- by verification of instrument or products in order to be able to perform the testing in comparable conditions,
- by using of the same procedures,
- by using of a common terminology, and

- to elaborate standards for qualification and certification of non-destructive testing personnel and for qualification of methods.

It has therefore the following structure, with each subcommitee covering a specific test method (except for SC 7):

- TC 135/SC 2, Surface methods
- TC 135/SC 3, Ultrasonic testing
- TC 135/SC 4, Eddy current methods
- TC 135/SC 5, Radiation methods
- TC 135/SC 6, Leak detection methods
- TC 135/SC 7, Personnel qualification
- TC 135/SC 8, Infrared thermography for non-destructive testing
- TC 135/SC 9, Acoustic emission testing

Within the technical committee and some of its subcommittees, some subjects are allocated to working groups. This allows an effective allocation of experts to the work of their expertise and interest.

Many ISO committees applying non-destructive testing techniques are in liaison with ISO/TC 135 or its subcommittees, as well as the following international organizations: the European Commission, the European Organization for Quality (EOQ), the International Atomic Energy Agency (IAEA), the International Committee for Non-destructive Testing (ICNDT), the International Institute of Welding (IIW), the International Union of Laboratories and Experts in Construction Materials, Systems and Structures (RILEM) and the World Customs Organization (WCO).

31 countries from all over the world are P-members of ISO/TC 135 and 36 others have the status of observer. The secretariats of the technical committee and subcommittees are held by 7 different countries from all continents except Oceania.

The standards elaborated by ISO/TC 135 are important to national authorities, industries where security of persons, properties and the quality of products is involved [for example industries in the fields of energy (nuclear, gas), transport (aerospace, train, car, ship, petrochemical, civil engineering), architecture, basic industries (rolled, forged and cast steel, tubes, aluminium, welding), mechanical industries (pressure vessels, parts manufacturing, equipment manufacturing)], to laboratories and inspection bodies (material manufacturing, pre- and in-service inspection) and to personal certification bodies and manufacturers of equipment for non-destructive testing.

They are mainly general test method standards useful for all partners and used as reference for the development of application standards by others ISO committees with regard to specific applications such as forging, tubes, welding, etc.

There are also general standards such as qualification and certification of personnel which objectives are to harmonize practices between certification bodies to authorize mutual recognition.

In Europe, the standards specifying procedures for non-destructive testing are classified as Harmonized Supporting Standard in the frame of the Pressure Equipment Directive and the others are “supporting standards”.

Some standards developed by ISO/TC 135 are referenced by the national codes for the fabrication of pressure vessel equipment.

ISO/TC 135’s priorities are as follows:

- the elaboration of standards for terminology (general terms, terms common to all methods and specific terms to each method);
- for each method, the elaboration of standards specifying general principles and verification of equipment, and
- to maintain liaisons as close as possible with other ISO technical committees involved in specific non-destructive testing applications in order for the standards prepared by ISO/TC 135 to be referenced in application standards and the needs expressed by these specific TC to be taken into consideration.

The work is sometimes hindered by the lack of experts nominated to participate in the development of new projects or revisions of existing documents (the activation of a new work item requires the nomination of experts by at least 5 P-members having voted in favour of the proposal). This problem is partly solved by the collaboration with CEN/TC 138, as the feeder of European Standards to ISO/TC 135, as far as possible via the Vienna Agreement. More contributions from Asian and Pan-American countries are highly expected.