BUSINESS PLAN

ISO/TC 146
Air quality

EXECUTIVE SUMMARY

The objectives of the ISO/TC are reflected in the scope of TC 146:

> Standardization of tools for air quality characterization of emissions, workplace air, ambient air, indoor air, in particular measurement methods for air pollutants (particles, gases, odours, micro-organisms) and for meteorological parameters, measurement planning, procedures for Quality Assurance/Quality Control (QA/QC) and methods for the evaluation of results including the determination of uncertainty.
>
> Excluded:
> - the establishment of limit values for air pollutants;
> - the air quality in clean rooms;
> - radioactive substances.

The general public, workers and/or the environment can be exposed to hazardous substances in air, which occur naturally or are released by industrial processes or household appliances and products. Therefore, the presence of these substances in air, emissions to air, and in indoor air needs to be limited. To be able to measure the concentrations of air pollutants standardization of measurement methods is necessary to realize consistency throughout the world.

The most interested parties (the stakeholders) in the standards to be elaborated by the ISO/TC146 are:

- through direct interest: measurement organisations (governmental, industrial, private) as direct users of the standards; legislators, regulators and industry as direct users of the results of the measurements; manufacturers or suppliers of air quality abatement equipment, plants and systems, to prove the efficiency of their equipment; instrument manufacturers; manufacturers of home construction materials to monitor the releases from their products;
- through indirect interest: the Public, to ensure that they are protected from air pollution; governments, industry (as employer) and trade unions (as representative of the employees) in assuring a safe working environment.

The worldwide market of measurements of air quality characteristics is estimated to be a total amount in the order of USD 1 000 million in 2004. Increasing industrial development with accompanying air pollution, especially in heavily populated areas, will very likely increase this amount significantly in the upcoming years.

The standards support legal authorities and manufacturers by specifying technically detailed requirements to fulfil basic legal requirements. The standards are basis for the legal verification. The standards serve test houses involved in metrological testing in the accreditation process.

The standards give the user practical help in handling and calibrating the equipment thus meeting specified quality criteria, and they improve the quality of data obtained from the equipment from different manufacturers. The standards give the manufacturer guidance in respect of performance requirements, range of application, product reliability, etc.

The principle objective is to produce standards as tools for the characterisation of air quality (ambient air, workplace air, indoor air, emissions, and meteorology):

- which are providing measurements with known quality and reliability, obtained as a result of field trials,
- which ensure the provision of comparable results,

- which support environmental policy and industry,
- which are appropriate to avoid the risks (for human health and environment) of producing air quality data that are not sound and harmonized worldwide.

1 INTRODUCTION

1.1 ISO technical committees and business planning

The extension of formal business planning to ISO Technical Committees (ISO/TCs) is an important measure which forms part of a major review of business. The aim is to align the ISO work programme with expressed business environment needs and trends and to allow ISO/TCs to prioritize among different projects, to identify the benefits expected from the availability of International Standards, and to ensure adequate resources for projects throughout their development.

1.2 International standardization and the role of ISO

The foremost aim of international standardization is to facilitate the exchange of goods and services through the elimination of technical barriers to trade.

Three bodies are responsible for the planning, development and adoption of International Standards: ISO (International Organization for Standardization) is responsible for all sectors excluding Electrotechnical, which is the responsibility of IEC (International Electrotechnical Committee), and most of the Telecommunications Technologies, which are largely the responsibility of ITU (International Telecommunication Union).

ISO is a legal association, the members of which are the National Standards Bodies (NSBs) of some 140 countries (organizations representing social and economic interests at the international level), supported by a Central Secretariat based in Geneva, Switzerland.

The principal deliverable of ISO is the International Standard.

An International Standard embodies the essential principles of global openness and transparency, consensus and technical coherence. These are safeguarded through its development in an ISO Technical Committee (ISO/TC), representative of all interested parties, supported by a public comment phase (the ISO Technical Enquiry). ISO and its Technical Committees are also able to offer the ISO Technical Specification (ISO/TS), the ISO Public Available Specification (ISO/PAS) and the ISO Technical Report (ISO/TR) as solutions to market needs. These ISO products represent lower levels of consensus and have therefore not the same status as an International Standard.

ISO offers also the International Workshop Agreement (IWA) as a deliverable which aims to bridge the gap between the activities of consortia and the formal process of standardization represented by ISO and its national members. An important distinction is that the IWA is developed by ISO workshops and fora, comprising only participants with direct interest, and so it is not accorded the status of an International Standard.

2 BUSINESS ENVIRONMENT OF THE ISO/TC

2.1 Description of the Business Environment

The general public, workers and/or the environment can be exposed to hazardous substances in air, which occur naturally or are released by industrial processes or household appliances and products. These hazardous substances can be very toxic, harmful, odorous or corrosive, be irritants, sensitisers, carcinogenic, mutagenic, teratogenic, or pathogenic. Therefore, the presence of these substances in air, emissions to air, and in indoor air needs to be limited. To be able to measure the concentrations of air pollutants, inter alia showing compliance with limit values, monitoring the environment, demonstrating efficiency of abating equipment, standardization of measurement methods is necessary to realize consistency throughout the world.

ISO/TC 146 "Air quality" prepares standards as tools, which allow the air quality to be measured and comparable results to be obtained. This is an ongoing process because political changes and increase of knowledge concerning the influence of air pollutants on human health and the environment. These changes lead to new pollutants to be measured and lower concentration levels of known air pollutants, requiring new standards continuously. Political changes and developments in toxicology can influence what are deemed to be safe levels of air quality for the public or the environment.

The following political, economic, technical, regulatory, legal and social dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of this ISO/TC. They may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

The main influencing factors to be considered are the following:

- Political Factors – Two factors that are likely to increase the need for measurement methods are the "Polluter Pays Principle" and the "Precautionary Principle".
- Economic Factors – Development of trading of emissions becomes more and more an instrument for a cost-effective abatement of air pollution. This trading connects emissions to money requiring more attention for comparability and reliability of the results of measurements. Another economic factor is that reducing pollution will lead to fewer health problems and therefore lower expense on illness/hospitals.
- Social Factors – The public expect continuous controls on pollution and is more aware of environmental effects. More and more information about air pollution (ambient air quality, emissions) becomes available to public access for instance through the Internet. This sets requirements for the quality of data to which the use of standard measurement methods is necessary.
- Technical Factors – As the expectation is for lower pollution levels, the greater the need to develop standardised methods of measurement.
- Legal Factors – International environmental legislation has over the years, imposed a number of directives and limit values that require both industry and supervisory authorities to improve, monitor and control air quality and industrial affects on air quality. This development in directives is an ongoing process and needs to be considered especially in the view of harmonisation efforts.

Manufacture of environmental measuring equipment in general, is technologically, highly innovative. Corresponding to the diversity of hazardous substances in the environment and the variety of measurement methods numerous small and medium sized companies worldwide manufacture those instruments.

The standards to be developed serve the producers of environmental measuring equipment as well as the users of the equipment in the laboratories, ambient networks and stations around the world. Thus, the harmonization of metrological standards serving the official verification of instruments results in a high impact on competition. In respect of regulatory obstacles, national verification laws, labour safety, consumer and environmental protection as well as the related laws and directives (partly in development, e.g. for environmental metrology in Europe) shall be considered. The world level impact of the standardization work is given by the close co-operation with liaison partners such as OIML, and with regional standardization organizations like CEN, especially in the fields of legal metrology and of laboratory instruments.

The most interested parties (the stakeholders) in the standards to be elaborated by the ISO/TC146 are:

- through direct interest
  - measurement organisations (governmental, industrial, private) as direct users of the standards
  - legislators, regulators and industry as direct users of the results of the measurements (demonstration of compliance to limit values and monitoring of effects to the environment)
  - manufacturers or suppliers of air quality equipment, plants and systems, to prove the efficiency of their equipment
  - instrument manufacturers, to provide the necessary measurement equipment
  - manufacturers of building products to monitor the releases from their products

- through indirect interest
  - the Public, to ensure that they are protected from air pollution
  - governments, industry (as employer) and trade unions (as representative of the employees) in assuring a safe working environment.

Major factors on the development of the markets are environmental legislation and technical innovation. Regarding QA/QC aspects especially performance requirements requested by users and legal authorities are strongly influencing the innovation process.

2.2 Quantitative Indicators of the Business Environment

The following list of quantitative indicators describes the business environment in order to provide adequate information to support actions of the ISO/TC.

It is not easy to calculate the financial profit of harmonized measurements. On the one hand, non-harmonized measurements can result in measures taken wrongly, relating to human health and to the installation of abatement equipment. On the other hand, harmonization leads to improvement of efficiency in carrying out air pollution measurements.

A recent survey estimated the costs for the measurement of SO_2, NO_2, CO and O_3 only in ambient air by governmental networks in a major West-European country to be about USD 35 million per year. Extrapolation based on the costs per capita the total market in Europe for the measurement of these air constituents is estimated to be about USD 200 million.

Extrapolating from a market survey report the private market for air pollution measurements (waste gas and air quality) carried out by environmental laboratories in 2004 is estimated to be USD 500 million in Europe, growing to USD 700 million in 2010. Assuming that at present most of the waste gas measurements are carried out by the industry itself and most of the air quality measurements are carried out by public organizations, the total market for waste gas and ambient air quality measurements is likely to be more than USD 2 500 million in 2004 growing to more than USD 3 600 million in 2010.

The global market for metrological equipment for environmental monitoring amounts a multiple of this budget and can be expected to expand significantly with regard to the demand of developing countries and the technological innovation. However reliable data for a reasonable estimation of the total volume are not available.

The amount of money involved with the measurement of the quality of work place atmosphere in the USA is estimated to be around USD 50 million. Worldwide this is estimated to be about USD 1000 million in total.

3 BENEFITS EXPECTED FROM THE WORK OF THE ISO/TC

The standards support legal authorities and manufacturers by specifying technically detailed requirements to fulfil basic legal requirements. The standards are basis for the legal verification. The standards serve test houses involved in metrological testing in the accreditation process.

The standards give the user practical help in handling and calibrating the equipment thus meeting specified quality criteria and they improve the quality of data obtained from the equipment from different manufacturers.

The standards give the manufacturer guidance in respect of performance requirements, range of application, product reliability, etc.

The standards serve other Technical Committees in developing test standards e.g. for materials testing, analytical procedures and techniques as well as cross-referencing.

4 REPRESENTATION AND PARTICIPATION IN THE ISO/TC

4.1 Countries/ISO members bodies that are P and O members of the ISO committee

4.2 Analysis of the participation

The overview of P- and O-members demonstrates a rather good distribution over the world. However the P-members are mainly coming from the most developed countries, whilst the O-members originate mainly from the less developed areas. Although this is understandable more active participation from the present O-members is preferable.

Manufacturers, users of the standards and equipment, research institutions and governmental authorities are well represented in TC 146 and its subcommittees. Regarding active membership, there is an emphasis on experts from European countries.

5 OBJECTIVES OF THE ISO/TC AND STRATEGIES FOR THEIR ACHIEVEMENT

5.1 Defined objectives of the ISO/TC

The principle objective is to produce standards as tools for the characterisation of air quality (ambient air, workplace air, indoor air, emissions, and meteorology):

- which are providing measurements with known quality and reliability, obtained as a result of field trials,
- which ensure the provision of comparable results,
- which support environmental policy and industry,
- which are appropriate to avoid the risks (for health and environment) of producing air quality data that are not sound and harmonized worldwide.

A secondary principle is to promote new work items and pursue close liaison with other relevant TC's of ISO and CEN, especially CEN/TC 264 "Air Quality", and organizations (governmental and non governmental), to prevent duplication of effort and ensure effective use of resources.

Another objective is to provide International Standards which can, by the "Vienna Agreement", also be accepted as European Standards relating to measurement methods for characterisation of air quality.

5.2 Identified strategies to achieve the ISO/TC's defined objectives

To achieve the overall objectives it is necessary to have a strategy in place comprising the following instruments and protocols:

- Standards as tools in the context of the work undertaken by this TC, will principally be methods (including reference methods) for the measurement of air quality. These will be supported by other more strategic standards, such as the provision of performance criteria for continuous measurement instruments, methods for estimating levels of uncertainty to be used, and planning standards to ensure comparability, etc.
- Liaise and consult with stakeholders about new work items (tools), especially legislators and industry.
- Where applicable, undertake the field validation of proposed standards (i.e. comparability, uncertainty and variances evaluation) to ensure repeatability and reproducibility levels can be established which provide confidence in the use of the methods and enhance international harmonisation.
- Identify research needs, which affect new work items.
- Encourage working groups to operate more effectively, especially through correspondence.

- Manage the programme for the production of standards to achieve deadlines/target dates, especially by holding plenary and working group meetings.
- Review the work programme every two years.
- The TC has agreed to work in English at meetings, therefore translation is not required.
- The ISO/TC will actively pursue the co-operation with CEN/TC 264 "Air quality" according to the Vienna Agreement. As DIN undertakes the secretariats of both, the ISO/TC 146 and the CEN/TC 264, overlap of work will be avoided by standards development with parallel voting.
- Take into consideration the information provided by the liaison members of ISO/TC 146 and other organizations in regular contact with ISO/TC 146.

To reach the objectives in the most efficient way, the ISO/TC is divided in 6 subcommittees:

- SC 1: Stationary Source emissions
- SC 2: Workplace Atmospheres
- SC 3: Ambient Atmospheres
- SC 4: General Aspects
- SC 5: Meteorology
- SC 6: Indoor Air

6 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE ISO/TC WORK PROGRAMME

Every two years the work programme of ISO/TC 146 "Air quality" is reviewed to take account of any constraints that have arisen during the previous period.

Two main factors are identified that play an important role in relation to the timely delivery of the required standards:

- availability of experts, and
- lack of funding for field validation of measuring methods.

Experts are originating from public and private bodies. Time and cost are provided by their employees, but to a limited amount. Field trials for validation of air pollution measurement are very expensive compared to validation of other measurement methods. On the other hand standards which are foreseen for the implementation of environmental laws and directives (e.g. in Europe) need to be validated.

Due to the fact, that there is an emphasis on the involvement and participation of European experts in standards work, future International Standards may suffer from limited acceptability to the wider international market. More active participation of National Standardization Organisations and experts from Africa, America and Asia would be very welcome.

7 STRUCTURE, CURRENT PROJECTS AND PUBLICATIONS OF THE ISO/TC

This section gives an overview of the ISO/TC's structure, scopes of the ISO/TCs and any existing subcommittees and information on existing and planned standardization projects, publication of the ISO/TC and its subcommittees.

7.1 Structure of the ISO committee

SC 1: Stationary Source emissions

Elaboration of standards in the field of emission of stationary sources excluding the establishment of limit values. The standards are used as references in legislation, in showing compliance with requirements, both in legal and industrial applications, in showing performance of abatement equipment.

SC 2: Work Place Atmospheres

Elaboration of standards in the field of workplace atmospheres excluding the establishment of limit values. The standards are used as references in promulgated health standards, by practitioners of occupational/ industrial hygiene in workplace monitoring for compliance purposes and for health outcomes, by sampling hardware manufacturers in design and required performance of said hardware, and by researchers in the field of occupational health and industrial hygiene

SC 3: Ambient Atmospheres

Elaboration of standards in the field of ambient atmospheres excluding the establishment of limit values. The standards are used to determine components of ambient atmospheres that may arise from human activities or occur naturally. These standards are used in legislation, by reference, to determine compliance with limit or reference values, by public or private entities to determine the current components of ambient atmospheres, and in research on the composition, fate, and transport of constituents of the atmosphere. The subcommittee's responsibilities include all ancillary practices and quality assurance procedures necessary to ensure acceptable performance and maintenance of its standards.

SC 4: General Aspects

Consideration and standardization of any matters within the scope of ISO/TC 146 which are not exclusively within the scope of SC 1, SC 2, SC 3, SC 5 or SC 6 and of common interest. The basic responsibilities include terminology; planning of air quality measurements; definition of performance characteristics of air quality measuring methods; determination of performance characteristics of air quality measuring methods; statistical analysis of air quality data; determination of measurement uncertainty of air quality data; assessment of performance of air quality measuring methods; definition of formats for the international exchange of air quality data; quality assurance; conflicts of interest between other subcommittees; maintenance of existing standards.

SC 5: Meteorology

Elaboration of standards in the field of meteorological measurements and analyses that are focused on, but not limited to, air quality programs. The meteorological standards may include identifying:

The initial standards being developed are focused on basic surface-based and remote-sensing instrument system descriptions and test methods. Further work is planned in standardizing observation systems and analytical methods and models that have general meteorological applications. Other planned work includes promoting standardization of new measurement and analysis techniques.

SC 6: Indoor Air

Standardization of any matters within the scope of ISO/TC 146 dealing with indoor air. This comprises gases, particles, odours, micro-organisms, and emissions from building products and furnishings. The indoor environment is defined as follows: dwellings, having living rooms, bedrooms, DIY (do-it-yourself) rooms, recreation rooms and cellars, kitchens and bathrooms; workrooms or work places in buildings which are not subject to health and safety inspections in regard to air pollutants (for example offices, sales premises); pub-

lic buildings (for example hospitals, schools, kindergartens, sports halls, libraries, restaurants and bars, theatres, cinemas and other function rooms), and also cabins of vehicles.

7.2 Current projects of the ISO technical committee and its subcommittees

7.3 Publications of the ISO technical committee and its subcommittees

Reference information

Glossary of terms and abbreviations used in ISO/TC Business Plans

General information on the principles of ISO's technical work