



ISO/TC 113 Business Plan

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BUSINESS PLAN

ISO/TC 113

Hydrometry

EXECUTIVE SUMMARY

Many regions in the world suffer, to varying degrees, from problems related to either the scarcity or the abundance of water in the form of droughts and flooding. Presently, the damage caused by droughts is even more severe than the damage caused by floods. Today in a world population of six billion, over one billion people do not have access to clean water.

Furthermore, the fresh water supply by nature and the abstraction of fresh water by the countries' inhabitants is not uniformly distributed worldwide for reasons including regional climatic conditions as well as human activities. Particularly those countries, which are facing water scarcity, should be able to cope with the demand of water for their various uses. In order to achieve this it is absolutely essential to carefully manage the water resources.

Given the expected growth of the world's population and the probability of adverse conditions due to climate change there is a risk that the above mentioned problems will be seriously aggravated in the near future. In addition it is becoming clear that the often fragile water environment needs to be protected, which results in additional pressures and water management issues.

A proper and quantitative assessment of surface and ground water resources is possible only by its proper measurement. Therefore, the provision of good quality hydrometric data (describing water flow and sediment transport) across the whole of the hydrological cycle is essential for the optimum management of water resources and the protection of the aquatic environment.

Long-term statistics of hydrometric data are prerequisite for many civil-engineering works such as infrastructure and housing developments at rivers, flood defenses, or water-storage reservoirs and hydropower projects. Sound hydrometric data are indispensable to avoid costly and risky errors in the layout of water-related engineering works. Furthermore, real-time hydrometric data offer instant benefits in the operation and control of water systems or as inputs to flood-forecasting models. However, the measurement of water flow is complex and, under certain situations, the process becomes highly cumbersome. The measurement of sediment is

no less difficult. Internationally accepted standards describing the best way to perform such measurements are therefore indispensable.

Rivers and other water bodies do not respect national boundaries. Consequently, the management of river basins and groundwater resources cannot be achieved at the national political level alone. Consequently, co-operation between organizations and countries is imperative. These bodies need clear, internationally accepted standards in stream flow measurements to ensure that they are all producing hydrometric data of the required quality, which are based upon agreed procedures. Such data are required for the mutual verification of adherence to intergovernmental agreements related to the quantities of water abstracted from shared resources or to sources and loads of pollutants.

Regarding the measurement of water flow, ISO, TC 113 aims at providing appropriate guidelines and standard procedures, which are based on state of the art knowledge and experience as well as recent innovations in science and technology. The defined objective of TC 113 is the formulation of International Standards, Technical Reports, Technical Specifications and Publicly Available Specifications covering methods, procedures, instruments and equipment relating to techniques for the measurement of discharge, water level and sediment transport in open channels as well as groundwater movement and other related issues. In almost every country the planners, designers, contractors, tribunals, courts and national service providing departments concerned with water resource management widely refer to these international standards.

Other major users of these hydrometric standards belong to the instrument and equipment industry, because the TC113 standards enable the removal of unnecessary trade barriers by harmonizing the technical regulations and by incorporating international standards at national and regional levels. In recent decades, the evolution of microelectronics and under water acoustics has found application in a lot of new hydrometric instruments. Here, international standardization can help to ensure that methods and instruments produce comparable results that are also compatible with historical data.

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 163 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 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, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

About ISO/TC113

ISO/TC 113 'HYDROMETRY' attends to the work of standardization of methods, procedures, instruments and equipment relating to techniques for hydrometric determinations of water level, velocity, discharge and sediment transport in open channels; precipitation and evapotranspiration; availability and movement of groundwater, including terminology and symbols; collection, evaluation, analysis, interpretation and presentation of data; description and use of instruments, equipment and structures used for measurement and evaluation of uncertainties. In the broadest sense, it mainly deals with the subject of water and sediment measurement in open channels including movement and availability of groundwater.

Till recently, availability of water had been taken for granted. It is not so any more. The rapid growth in population coupled with increasing economic activities has put tremendous pressure on the available water resources of the world. Although, in most of the countries, irrigation remains the major consumer of water at present, and may continue to be so in the years to come, with a view to meeting the requirement of food and fibre, demands from other sectors such as domestic and industries have been growing significantly. Water conservation and water

audit measures to improve the efficiency of water use are being stressed upon to meet the ever increasing demands of water. A proper assessment of water resources potential has, therefore, become a pre-requisite for its sustainable development and management. Without a precise estimate of the availability of the water resources, it is impossible to plan, design, construct, operate and maintain water resource projects catering to competing demands of irrigation, drought and flood management, domestic and industrial water supply, generation of electrical energy, fisheries, navigation, environment management etc. The availability of water in any area can only be assessed through proper measurement of water in the surface channels and groundwater in that area.

Measurement of water is, in itself, a matter of complex procedures because of the fact that water, a common commodity, is available in nature in many forms, assuming the shape/form of the terrain/structures through which it flows. Under certain situations, the process becomes highly cumbersome, uncertain and error-prone. The measurement of sediment is no less difficult. The correct methods and instruments are to be selected carefully for a particular situation and requirement, so as to achieve error-free measurement results. TC 113 attempts to provide appropriate guidelines and standard procedures which are based on recent breakthroughs and innovations in science and technology from time to time. Use of ultrasonics, microwaves, information and communication technology and other computer based technologies are incorporated in the standards by TC 113. These are made available to the consumers/users in form of standards which tend to include simplified and accurate description of methods and instrumentation.

General description of the market

TC 113 is responsible for the formulation of International Standards and Technical Reports etc. covering methods, procedures, instruments and equipment relating to the techniques for the measurement of flow (velocity, discharge), water level and sediment transport in open channels apart from ground water movement and other related issues. The instrument and equipment industry, particularly engaged in the manufacture, testing, installation of various types of meters, gauges and other instruments/ equipments for the water measurement are the major users of the International Standards. The planners, designers, contractors, tribunals, courts etc. in almost every country of the world concerned with the development of the water resources and in resolving issues connected with water sharing amongst the states/countries; widely refer to the International Standards developed by TC 113.

Structure of the market: Suppliers/Manufacturers

A number of countries have their own standards on hydrometric determinations. However, they also depend upon the ISO standards because these are applicable world wide and due to their universal acceptance, have wider usage. In the ISO standards, the instruments and apparatus which are used in the determinations are also described. This helps the countries requiring these instruments, in choosing the correct instruments for their requirements and approaching the market accordingly. Major manufacturers of such instruments are also guided by the specifications provided by the ISO standards. Ultimately, these standards are useful both to manufacturers as well as users.

Structure of the market: Customers

Major users of the ISO standards are civil engineers, designers, contractors, arbitrators, courts, universities, colleges, tribunals and various government departments/organizations responsible for the work of hydrometric determinations and planning of water resources. On the manufacturer side, users are the water measurement instruments industry, the pump manufacturing industry, the water supply equipment industry, the communication products industry, electronics and software industry, plastics and metal industry and other subsidiary industries and customers, far too numerous to list.

Major factors which may have an impact on the development of the markets

There are a number of rivers transcending borders of one or more countries which requires resolution of issues on sharing of water and various other disputes, amongst two or more riparian countries. ISO standards have a wide acceptability amongst such countries, while ascertaining the quantum of flow in time and space. The standards provide a common basis for the process of resolution of the disputes which is more acceptable than a nation's individual standards. The ISO standards provide the methodologies and procedures of international level. Similarly, the types of instruments and their specifications have to be of international standards which are made available by the ISO/TC 113.

The hydro-climatological conditions of a country dictate the conditions of drought, flood, sedimentation, erosion of banks/beds, requirement of storage reservoirs, disaster management and various other hydrological features of that country. Therefore, the demand of the standards also depends upon such conditions. Demands may be related to various types of instruments required for observation and measurement of water and silt on the one hand and meteorological equipment like rain-gauges, temperature gauges, solar radiation, humidity, wind velocity and wind direction etc. on the other. With the advent of sophisticated equipment involving real-time communication, the demand for such equipment is on the increase. ISO/TC 113 intends to satisfy the demands of the countries requiring such sophisticated equipment by standardizing specifications and operational usage.

The demand is also expected to vary with social and political changes in the market.

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:

Description of the world business environment

According to UN estimates, the total amount of water on earth is about 1400 million km³. The fresh water constitutes a very small proportion of this enormous quantity. About 2.7% of the total water available on the earth is fresh water, of which about 75.2% lies frozen in Polar Regions and 22.6% as ground water. The rest is available in lakes, rivers, atmosphere moisture, soil and vegetation. The details are given below:

Fresh Water (Gross)	- 2.7% of 1400 million km ³ = 37.8 million km ³
Lies frozen in Polar Regions	- 75.2% of 37.8 million km ³

		= 28.4256 million km ³
Ground water	- 22.6% of 37.8 million km ³	= 8.5428 million km ³
Balance as available in Lakes, rivers, atmosphere Moisture, soil & vegetation	- (37.8 - 28.4256 - 8.5428)	= 0.8316 million km ³

Fresh water which is received by way of precipitation is a finite, naturally renewable resource. However, it is significantly unevenly distributed in time and space. Hydro-climatological conditions of a region, therefore, set the limits for its availability. This fresh water comprises of Green water and Blue water. Green water, or soil water, is that component of rainfall that is stored in the soil and then evaporates, or is incorporated in plants and organisms, and is thus the main source of water for natural eco-systems and for rain fed agriculture.

Blue water, or renewable surface water runoff and ground water recharge, is the main source of human withdrawals and the traditional focus of water resource management. The total blue water available annually is about 40,000 km³. Not all of this water can be used because some falls in a place or time, that precludes its' tapping, even if at all economically and technically feasible storages were built. It is estimated that on an average, annually about 9000 - 14000 km³ is available for utilization.

Water Demand

Present Status

At present water withdrawals for various purposes is about 3800 km³ comprising of 2500 km³ for irrigation, 750 km³ for industry, 350 km³ for municipalities and 200 km³ for reservoirs (as evaporation loss). The global per capita water availability is about 6600 m³/year. However, this availability varies substantially from region to region and parts of world are water stressed. Countries or regions are broadly considered water stressed when the annual per capita availability is between 1000 - 2000 m³. With availability below 1000 m³, a country is deemed 'Water Scarce'. In 1990, eighteen countries in the world were 'Water Scarce'. Most of these are located in Asia and Africa and are already facing food shortages. In 12 countries, the availability is less than 500 m³.

Projection for 2025

The water withdrawals needed for human use in 2025 would be about 5200 km³ comprising of 3200 km³ for agriculture, 1200 km³ for industry, 600 km³ for reservoirs (as evaporation loss).

Due to population growth between 2000 -2025, the global average annual per capita availability of renewable water resources is projected to fall from 6600 m³ to 4800 m³.

About 30 countries in the world would be 'Water Scarce' by the year 2025 and about 19 countries would be having availability lower than 500 m³ by the year 2025.

In order that all the countries in the world, particularly those which are going to face the water scarcity in future, should be able to cope with the demand of water for their various uses, it is absolutely essential for them to carry out planning of their water resources. An assessment of the water resources, whether surface waters or ground waters, is

possible only by its proper measurement. ISO Standards provide the authorities the necessary guidance by way of detailing standard methodologies and procedures and appropriate instrumentation for the measurement of flows and other hydrometric determinations.

3 BENEFITS EXPECTED FROM THE WORK OF THE ISO/TC

Benefits expected from the works of ISO/TC 113 are multifarious; foremost amongst which is the world wide usage of the standards for the ultimate aim of adequate food grain production for the burgeoning masses and settlement of inter-state and international water disputes. This Technical Committee assists in providing means for alleviating/reducing poverty in the world by concentrating on efforts for improving management and allocation of water resources and access to water and sanitation, thereby achieving improved health and sustainable livelihood for the poor. As most of the major problems of water as well as poverty, are faced by developing countries, effective planning and management, based upon proper measurement and assessment of both surface and ground waters will help them in elimination of poverty.

Adequate production of food and fibre will go a long way in improving the environment in the world. Both ground water and surface water are being polluted by industrial wastewater discharges and agricultural runoffs. This is leading to increased degradation of the rivers and lakes eco-systems. Over drawal of ground water causes salinity ingress and polluting the ground water resources. TC 113 has laid down exacting criteria/procedure in this regard enabling sustainable ground water development.

The standards formulated by ISO/TC 113 have been helpful to users in assessing and planning of their water resources. These standards have been, and will continue to be, utilized to avoid unnecessary trade barriers by harmonizing the technical regulations and incorporation of international standards at national and regional levels.

4 REPRESENTATION AND PARTICIPATION IN THE ISO/TC

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

TC113 Hydrometry

4.2 Analysis of the participation

Apart from the P and O members, ISO TC 113 has a close liaison with WMO, UNESCAP, TC 30, TC 147 and others. The strategic difference between participating and observer countries is that only participating countries have the right to vote in the committee.

By virtue of their size, availability, market share, resource, experience and historical background, China, India, USA, UK and the European countries are the most pro-active in the field of water resources development and management and are consequently represented in the TC 113 committee/ sub committees/ working groups responsible for drafting standards. However, increased participation from among developed countries, developing countries and countries with economies in transition is the key strategic objective of TC 113 and efforts are made from time to time to achieve this by the committee.

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

5.1 *Defined objectives of the ISO/TC*

- a) To cover all aspects of water flow measurements and groundwater availability in formulation of its standards, so as to provide viable tools for achieving reliability and accuracy in water measurements aimed at self sufficiency in meeting future water demands.
- b) To adjust the existing work programme and scope for relevance to the needs of the market and to establish a purposeful and helpful library of standards.
- c) To make the standards increasingly relevant globally, in the changing times, by timely delivery.
- d) To coordinate the work programme in closer liaison with CEN/TC 318, and other liaison members of TC 113 like WMO, UNESCAP etc.
- e) To increasingly avail of electronic tools for communication and work for greater efficiency in production of deliverables.

Work on Flow Measurement in Open Channels was initiated as early as 1954 by a subcommittee under TC 30, with one working group for Velocity Area methods. TC 113 was formed in 1964. TC 113 has more than 70 ISO deliverables to its credit which are continuously reviewed and revised from time to time. New ISO deliverables are formulated as per new developments in the market and technical breakthroughs and innovations in the field.

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

There are five sub-committees under TC 113 which work towards achieving the goal for better water management by standardizing flow measurements and in generating authentic data/information. In order to achieve above objectives, TC 113 intends to adopt the following strategies:

- a) Introduce other relevant work items related to water resources development and restructure the TC accordingly, if required.
- b) Establish the priority of work items within SC's and WG's.
- c) Give priority to timely circulation of documents and adherence to target dates.
- d) Limit meetings to the optimum and use other means of communication (e.g. electronic mail) to resolve issues and further progress of documents.
- e) Make maximum use of the Vienna Agreement to develop standards by using available CEN standards and standards of other Standards Developing Agencies (SDA's) for global use and to extend necessary cooperation and maintain liaison with other ISO committees and SDA's.

The structure of TC 113 consists of the TC, having a number of sub-committees which in turn create working groups for conveniencing the process of standards formulation. Sub-committees are created depending upon the necessity and conformity with the requirements. Working groups are set up by the sub-committees, for short periods as the need arises, and are disbanded when their objectives are achieved. TC 113 formulates all ISO deliverables like International Standards, Technical Reports, Technical Specifications and Publicly Available Specifications.

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

The following factors are felt to be instrumental in affecting the development of international standards in accordance with the objective and strategies of the business plan:

- i) Difficulty in finding the required five participating member bodies willing to take part in the development of a project.
- ii) Few countries being able to devote resources for the work of ISO/TC 113.
- iii) The cost of hosting meetings of TC/SC's continues to be a concern. Lack of offers to host the meetings may become a serious constraint. Inadequate attendance of the delegates from 'P' member bodies in the meetings is also a matter of concern.
- iv) Ballots issued by the Secretariats of the TC/SC's not receiving timely response from the concerned member bodies on the committees, also results in delay in taking decisions by the Secretariat. It also affects timely development of the deliverable in compliance with the ISO time norms.
- v) Postal communications are becoming prohibitive in cost, whereas the sophistication in electronic communication requires expert training and necessary hardware and software to be installed at all levels including at the secretariat levels for effective communication. Lack of necessary infra-structure for electronic functioning is detrimental to the standardization process.

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

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

7.1 [Structure of the ISO committee \(ISO/TC 113-Hydrometry\)](#)

Scope: Standardization of methods, procedures, instruments, and equipments relating to techniques for hydrometric determination of water level, velocity, discharge and sediment transport in open channels, precipitation and evapotranspiration, availability and movement of ground water, including:

- terminology and symbols;
- collection, evaluation, analysis, interpretation and presentation of data;
- evaluation of uncertainties

7.1.1 [ISO/TC 113/SC 1 - Velocity area methods-Structure](#)

Scope: Standardization of methods and procedures relating to techniques for the hydrometric determination of:

- a) water level, velocity, cross sectional area and bathymetry for discharge determination in open channels;
- b) water level and volume in lakes and reservoirs; and
- c) related issues.

7.1.2 [ISO/TC 113/SC 2 - Flow measurement structures-Structure](#)

Scope: Standardization of the design and performance of flow measurement structures including methods and procedures relating to techniques for the evaluation, analysis, interpretation and presentation of data and related issues.

7.1.3 [ISO/TC 113/SC 5 - Instruments, equipment and data management- Structure](#)

Scope: Standardization of instruments, their performance, data management and related issues.

7.1.4 [ISO/TC 113/SC 6 - Sediment transport -Structure](#)

Scope: Standardization of methods and procedures relating to techniques for the hydrometric determination of sediment discharge and transport in open channels, and related issues.

7.1.5 [ISO/TC 113/SC 8 - Ground water -Structure](#)

Scope: Standardization of procedures for direct measurement and related inferential method to assess ground water movement, availability, recharge, discharge and aquifer properties.

7.2 Current projects of the ISO technical committee and its subcommittees

7.2.1 [TC 113 'Hydrometry' projects](#)

7.2.1.1 [TC 113/SC 1 – 'Velocity area methods' projects](#)

7.2.1.2 [TC 113/SC 2 – 'Flow measurement structures' projects](#)

7.2.1.3 [TC 113/SC 5 –'Instruments, equipment and data management ' projects](#)

7.2.1.4 [TC 113/SC 6 – 'Sediment transport' projects](#)

7.2.1.5 [TC 113/SC 8 – 'Ground water' projects](#)

7.3 Publications of the ISO technical committee and its subcommittees

7.3.1 [TC113 – 'Hydrometry' publications](#)

7.3.1.1 [TC113/SC1 – ‘Velocity area methods’ publications](#)

7.3.1.2 [TC113/SC2 – ‘Flow measurement structures’ publications](#)

7.3.1.3 [TC113/SC5 – ‘Instruments, equipment and data management.’ publications](#)

7.3.1.4 [TC113/SC6 – ‘Sediment transport’. publications](#)

7.3.1.5 [TC113/SC8 – ‘Ground water’. publications](#)

Reference information

[*Glossary of terms and abbreviations used in ISO /TC Business Plans*](#)

[*General information on the principles of ISO's technical work*](#)

[*How ISO standards are developed?*](#)

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