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## ISO/TC 224 / SC

Title

**Service activities relating to  
drinking water supply systems and  
wastewater systems - Quality  
criteria and performance  
indicators**

Secretariat AFNOR

Circulated to P- and O-members, and to technical committees and organizations in liaison for:



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*English title*

**Service activities relating to drinking water and wastewater - Guidelines for  
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**Activités de service relative à l'eau potable et à l'assainissement - Lignes  
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Introductory note

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## **Service activities relating to drinking water and wastewater — Guidelines for the service to users**

*Activités de service relatives ç l'eau potable et à l'assainissement — Lignes directrices pour le service aux usagers*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 24510 was prepared by Technical Committee ISO/TC 224, *Service activities relating to drinking water supply systems and wastewater systems - Quality criteria of the service and performance indicators*.

## **Editing Group notes for ISO/CD 24510**

*The following notes were developed during the Editing Group meeting that took place in Valencia in preparation of the draft of ISO 24510 for the CD stage. The changes suggested in this document clearly exceed the editorial tasks that were assigned to the editing group, and consequently were not introduced in the draft (but the title of the proposed new clauses are included).*

*However, the group considered that the proposed changes could improve the consistency between the three documents and advised to include them in a side note to the CD in order to receive feedback from the member bodies.*

*The proposed changes can be summarised as follows:*

- ***An additional clause is suggested to be inserted between the clauses 4 and 6, that would correspond to clause 5 in ISO/CD 24511 and ISO/CD 24512***

*The new clause 5, which is proposed, would deal with the components of management regarding the service to users.*

- ***Clause 6 should be split into 2 new clauses, one dealing with guidelines and the other with performance indicators. Blanks should be filled in for every item corresponding to the needs and expectations of clause 4.***

*At the present stage, for every need and expectation of users, there is a performance indicator and/or guidance. However, there are no PIs and guidance for every need and expectation defined in clause 4. During WG 2 work, this was the result of not finding suitable universal indicators for every item in clause 4. However, for these clauses examples could be given.*

- ***Sub clauses 7.1 and 7.2 of ISO/CD 24511 and ISO/CD 24512 adapted to WG2 contents should be included in the Performance Assessment clause (clause 7)***



## Introduction

### 0.1 General

Water constitutes a worldwide challenge for the 21st century, both in terms of the management of available water resources and the provision of access to drinking water and sanitation for the world's population. The United Nations (UN) in 2002 recognized that access to water is an essential human right, and in conjunction with national governments, it set ambitious goals "Millennium Development Goals" to increase access to drinking water and wastewater services particularly in developing countries. International conferences on sustainable development and water (e.g. the World Summit on Sustainable Development in Johannesburg in September 2002 and the third World Water Forum in Kyoto in March 2003) stressed this issue and the UN agencies (i.e. WHO, UNESCO, etc.) have developed recommendations and programs to advance this framework.

In addition to public health protection, the sound management of the drinking water and wastewater utilities (hereinafter referred to as "water utilities") is an essential element of the integrated management of water resources. Sound management practices of these utilities will contribute, both quantitatively and qualitatively, to sustainable development.

Water utilities contribute to social cohesion and economic development within a community and the quality and efficiency of service have implications for virtually all activities of the society. They also enhance environmental protection through integrated management of water resources and the principles of sustainable development.

Because water is considered both an "economic" and "social" good, the management of water utilities should be transparent to and inclusive of stakeholders, identified according to the local context. The stakeholders should be involved in both setting service objectives and assessing the adequacy and efficiency of service delivery. The stakeholders involved in water services include among others: users, national and/or regional and/or local public authorities charged with the regulation and oversight of the water services, public or private operators of the water utilities, non governmental organisations (NGOs), research organisations, laboratories and special interest groups. The relationship among stakeholders vis-à-vis water services varies around the world. In many countries, there are bodies that have responsibility (in whole or in part) for overseeing water service activities, whether or not the utilities are publicly or privately owned or operated and whether or not they are strongly regulated or self regulated.

Examples of these bodies include:

- governments (national or local) or public agencies acting with legal or legislative authority,
- associations of the services themselves (i.e., national or regional drinking water or wastewater associations),
- autonomous bodies seeking to play a public and/or oversight role (e.g., organizations of concern such as non-governmental organizations) and
- water users and customers.

This standard does not prescribe the respective roles of various bodies/stakeholders nor define required processes for local, regional, or national bodies that may be involved in the provision of water services. In particular, the standard does not interfere with the free choice of the responsible bodies regarding the general organisation and the management of their utilities. The standard is applicable to publicly and privately owned and operated utilities alike, and does not favour any particular ownership or operational model.

The organisation of water utilities falls within a legal and institutional framework specific to each country. The Ministerial declaration from the Third World Water Forum recommends, in this respect, that governments endeavour to reinforce the role of local public authorities, particularly as regards the ensuring of adequate water services.

The aim of the water utilities is to cover everybody in their area, and to provide users the continuous supply of drinking water and the collection and treatment of wastewaters, under economic and social conditions that are acceptable both for users and responsible bodies. Water utilities should comply with the requirements of relevant authorities and meet specified expectations, while ensuring the long-term sustainability of the service. In a context of scarcity of resources, including financial resources, it has to be ensured that the investments made in installations are appropriate and that necessary attention is given to proper maintenance and effective use of the installations. This will contribute to the efficient operation of the water utilities and to the optimisation of available resources.

The aim of this standard is to provide the relevant stakeholders with guidelines for improving the service and the management of water utilities, consistent with the overarching objectives fixed by the international intergovernmental organizations noted above and by the national competent authorities. The standard is intended to facilitate dialogue between the stakeholders, enabling them to develop a mutual understanding of the functions and tasks that fall within the scope of water utilities.

The following standards provide guidelines for defining and assessing service to users, and for managing drinking water and wastewater utilities.

The following ISO standards address:

ISO 24510 – Service activities relating to drinking water and wastewater – Guidelines for the service to users (service oriented standard)

ISO 24512 - Service activities relating to drinking water and wastewater – Guidelines for the assessment of drinking water services and the management of utilities (management oriented standard)

ISO 24511- Service activities relating to drinking water and wastewater – Guidelines for the assessment of wastewater services and the management of utilities (management oriented standard)

The ISO 24511 and ISO 24512 standards set out in sequence a description of water services and briefly describe the physical (infrastructural) and managerial (institutional) components of utilities. Core **objectives** for water services considered to be globally relevant at the broadest level are set out followed by guidelines for the management of the utilities. These are then related to examples of possible actions that may be taken to achieve the objectives. Each action can also be characterized by related **service assessment criteria**. Finally, for each service assessment criterion there is a range of possible **related performance indicators** that might be used to assess the performance of the service.

The object of the ISO 24510, ISO 24511 and ISO 24512 standards is not to lay down systems of specifications supporting direct certification of conformity, but to give guidelines for continuous quality improvement of the management of the water utilities.

Implementation of these ISO standards does not depend on adoption of the ISO 9000 and/or ISO 14000 series standards. Nevertheless, these guidelines are consistent with and supportive of those management systems standards. These guidelines are also consistent with the principle of the "plan-do-check-act" (PDCA) approach: they link, through a dynamic and interactive process, general methods and tools for developing locally-adapted specifications and objectives, together with the management components and activities, necessary for assessing performance. Implementation of an overall ISO 9001 and/or ISO 14001 management system may facilitate the implementation of these guidelines, and conversely, these guidelines may help to achieve the technical provisions of the ISO 9001 and ISO 14001 standards for organizations choosing to implement them.

Use of these standards is voluntary in accordance with ISO rules. The standards are sufficiently flexible and allow adaptation according to local, regional or national needs.

The recommendations given in the standards are focused on functions, on results and on general organization without insisting on the means, in order to permit the broadest possible use of the standards, while respecting the cultural, socio-economic, climatic and legal variations of the different countries and regions of the world. As a consequence, it should be understood that the expectations of local users may be impossible to meet due to factors such as climate conditions, resources availability, and the difficulties relating to the economic sustainability of the water services, particularly regarding financing and the users' ability to pay for improvements. These conditions may restrict the implementation of some provisions of the standards in developing countries. Efforts should therefore be focused on the identification of priorities and the provisions of the standards that assist with implementing the priorities.

Following these principles, defining service coverage is a political choice, and resulting performance can only be assessed regarding the targeted value.

These standards, and more specifically the performance indicators (PI's) given as examples, should not in any case be considered as a prerequisite or condition for the implementation of a water policy or for the financing of projects or programs.

In order to assess and improve the services and to ensure proper monitoring of implementation, the stakeholders may establish an appropriate number of performance indicators (PI's), selecting them from the examples given or developing other relevant performance indicators taking in account the methodology described in the standards. The PI's should relate to the objectives for which they are defined and be used to set required or targeted values. In order to meet the principle of adaptability to local contexts, the standards also indicate procedures and tools facilitating local implementation, but do not impose any specific indicator or any minimum value or performance range. The use of PI's is only one of the possible support tools for continuous improvement.

Finally, the standard is not aimed at defining specifications concerning the quality of the drinking water supplied or the wastewaters discharged: this falls within the responsibility of the national or international public authorities; nor does address specifications for the design and construction of the installations and equipment, or with the methods for analysing the quality of the waters.

## 0.2 Service to users

ISO 24510 is to some extent different in nature from ISO 24511 and ISO 24512. First, the target audience of ISO 24510 may be different (e.g. the standard currently addresses users' expectations that pertain to relevant authorities, responsible bodies and operators). In addition, it is written from a different perspective (the users' rather than the management's). Therefore parts of the ISO 24510, ISO 24511 and ISO 24512 may be on the same issues, but may contain different guidelines, due to the differences in perspective and target audience.

# Service activities relating to drinking water and wastewater — Guidelines for the service to users

## 1 Scope

This standard specifies the characteristics of the elements of service activities, relating to drinking water supply services and wastewater services, in order to meet the users expectations. It includes:

- the definition of a language common to the different stakeholders;
- the definition of the elements and characteristics of the services to users needed to meet users' expectations;
- the definition of users' needs and expectations;
- service to users assessment criteria and related system of performance indicators.

This standard specifically excludes:

- methods of design and construction of water systems,
- regulating management structure and methodology of water service activities of operation and management including contracting.
- situations where the point of delivery or point of collection are not the same as the point-of-use or point-of-entry, respectively
- topics relating to the system inside buildings.

## 2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE The list of terms given below is common to ISO/CD 24510, 24511 and 24512.

### 2.1

#### **accuracy**

the closeness of agreement between a test result and the accepted reference value

NOTE The term accuracy, when applied to a set of test results, involves a combination of random components and a common systematic error or bias component.

[ISO 5725-1: 1994]

### 2.2

#### **affordability**

ability to be economically bearable by the **users** (2.41)

NOTE The affordability may be estimated through the level of prevailing charges for water services in relation to the available income of targeted social groups of consumers.

## 2.3

### **assessment**

**process** (2.27), or result of this process, comparing a specified subject matter to relevant references

## 2.4

### **asset**

capital good used for the provision of the **service** (2.38)

EXAMPLES Tangibles assets: buildings, pipes, wells, tanks, treatment plants, equipments, hardware; intangible assets: software, databases.

NOTE 1 Assets may be tangible or intangible.

NOTE 2 Contrary to consumables, assets may be depreciated in accounting systems.

## 2.5

### **asset management**

the processes that enable a **water utility** (2.44) to optimise the cost of providing, maintaining and disposing of infrastructure assets for specified **performances** (2.24)

## 2.6

### **availability**

extent to which a **water utility's** (2.44) infrastructure asset, resources and employees enable effective provision of **services** (2.38) to **user** (2.41) as specified

## 2.7

### **community**

one or more natural or legal persons and, in accordance with national legislation or practice, their associations, organisations or groups, having interests in the area where the **service** (2.38) is provided

## 2.8

### **confidence grade**

**assessment** (2.3) of the **quality** (2.28) in terms of **accuracy** (2.1) and reliability

## 2.9

### **connection**

service connection

set of physical components ensuring the link between a **point of delivery** (2.25) and the water main or the point of collection and the sewer

NOTE In wastewater systems, connection is synonymous with drain.

## 2.10

### **coverage**

extent to which a **water utility's** (2.44) assets allow **services** (2.38) to **users**

## 2.11

### **customer**

**user** (2.41) who has a direct or indirect relation by means of a **service agreement** (2.39) with the **water utility** (2.44)

## 2.12

### **drinking water**

water intended for human consumption

**2.13****drinking water system**

infrastructures

infrastructures necessary for supplying **drinking water** (2.12)**2.14****effectiveness**

extent to which planned activities are realised and planned results achieved

[ISO 9000: 2000]

**2.15****efficiency**

relationship between the result achieved and the resources used

[ISO 9000: 2000]

**2.16****environment**

surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation

NOTE 1 Surroundings in this context extend from within an organisation to the global system.

[ISO 14001:2004]

NOTE 2 For the application of the standard, environment is considered as a specific stakeholder.

**2.17****infrastructure**system of tangible fixed assets needed for the operation of a **water utility** (2.44)

NOTE Adapted from ISO 9000: 2000.

**2.18****interruption**situation where the **service** (2.38) is not available

NOTE Interruptions may be planned or unplanned.

**2.19****maintenance**

set of activities aimed at keeping or restoring an asset in order to perform required functions in specified conditions

NOTE Maintenance is a combination of technical, administrative and managerial activities.

**2.20****management**

coordinated activities to direct and control an organisation

NOTE In English, the term “management” sometimes refers to people, i.e. a person or group of people with authority and responsibility for the conduct and control of an organization. When “management” is used in this sense, it should always be used with some form of qualifier to avoid confusion with the concept “management” defined above. For example, “management shall...” is depreciated whereas “top management shall...” is acceptable.

[ISO 9000: 2000]

**2.21**

**management system**

system to establish policy and objectives and to achieve those objectives

[ISO 9000: 2000]

NOTE A management system of a drinking water and/or wastewater utilities can include different management systems, such as a quality management system, a financial management system or an environmental management system.

**2.22**

**on-site facility**

set of physical assets necessary for supplying **drinking water** (2.12) or collecting and treating **wastewater** (2.42) without connection to a utility

**2.23**

**operator**

person or organisation, which performs day-to-day activities necessary for the provision of the **service** (2.38)

NOTE 1 There may be one or several operators for a given service. For example, distinct operators for installations operation, billing and recovering service.

NOTE 2 The operator may be legally distinct or not from the responsible body.

**2.24**

**performance**

achievements of an activity, a **process** (2.27) or an organization

**2.25**

**point of delivery**

point of entry

physical fixed interface beyond which the utility is not legally responsible

EXAMPLES A connection box, a meter, the limit between public and private property.

NOTE The point of delivery is generally defined in the service agreement.

**2.26**

**point of use**

physical fixed interface where the **user** (2.41) normally takes the water for the intended use

EXAMPLES A tap, a public drinking fountain.

NOTE 1 The point of use may be in private or public property.

NOTE 2 The point of use may be the same as the point of delivery, for example in the case of a public drinking fountain.

**2.27**

**process**

set of interrelated or interacting activities which transforms inputs into outputs

[ISO 9000:2000]

**2.28**

**quality**

degree to which a set of inherent characteristics fulfils **requirements** (2.34)

[ISO 9000: 2000]

NOTE Clearly distinguish between quality of the product (drinking water or treated wastewater) and quality of the service; this standard does not define the product quality.

## 2.29

### **quality management system**

**management system** (2.21) to direct and control a **water utility** (2.44) with regard to **quality** (2.28)

NOTE Adapted from ISO 9000:2000.

## 2.30

### **registered customer**

**customer** (2.11) for whom relevant information is recorded by the **responsible body** (2.36) or **operator** (2.23)

## 2.31

### **rehabilitation**

operation on an infrastructure restoring its initial level of **performance** (2.24)

NOTE Adapted from EN 752-5: 1997.

## 2.32

### **relevant authority**

competent authority

body entitled to lay down policies and legal framework and/or to check the compliance with these rules, concerning activities of **water utilities** (2.44)

EXAMPLES National, regional or local governments, public agencies, regulators.

NOTE The relevant authorities fix the general legal framework for the organization of the drinking water and wastewater utility, with which the water utilities (i.e. the responsible bodies and their operators) have to comply.

## 2.33

### **repair**

action on a non-conforming product, equipment or facility to make it acceptable for the intended use

NOTE 1 Adapted from ISO 9000: 2000.

NOTE 2 Repair includes remedial action taken on a previously conforming product to restore it for use, for example as part of maintenance.

NOTE 3 Repair can affect or change parts of the non-conforming product.

NOTE 4 Repair may be planned (preventive maintenance) or due to emergency.

## 2.34

### **requirement**

need or expectation that is stated, generally implied or obligatory

[ISO 9000: 2000]

NOTE "generally implied" means that it is custom or common practise for the drinking water and/or wastewater utilities, the users of the service and other interested parties, that the need or expectation under consideration is implied.

## 2.35

### **residues**

sub-products resulting from the different processes applied to **drinking water** (2.12) or **wastewater** (2.42)

EXAMPLES Sludge, septage, sand or grit, grease, debris.

NOTE Residues may be liquid, solid or mixed.



### 2.36

#### **responsible body**

body which has the overall legal responsibility for providing drinking water and/or wastewater services and for establishing the policy and the general organization of the relevant **water utility (2.44)**, for a given geographic area

EXAMPLES      A regional or local government, a city, a public agency, a private company.

NOTE 1      The responsible body can be public or private.

NOTE 2      The responsible body may operate directly the system with its own means or entrust a contractor for the operation.

### 2.37

#### **restriction**

situation where the service does not meet the availability conditions specified in the **service agreement (2.39)**

NOTE      Restrictions may be planned or unplanned.

### 2.38

#### **service**

result of a **process (2.27)**

NOTE 1      Adapted from the definition of "product" given in ISO 9000: 2000

NOTE 2      Services are one of the four generic categories of products with software hardware and process materials. Many products comprise elements belonging to different generic products categories. Whether the product is then called service depends on the dominant element.

NOTE 3      Service is the result of at least one activity necessarily performed at the interface between the supplier and user and is generally intangible. Provision of a service can involve for example the following:

- activity performed on a customer supply tangible product (e.g. wastewater),
- activity performed on a customer supply intangible product (e.g. processing new connections demands),
- delivery of an intangible product (e.g. delivery of information), and
- creation of ambience for the user (e.g. customer reception offices).

### 2.39

#### **service agreement**

establishment of an accord between the **registered customer (2.30)** and the **water utility (2.44)** on the conditions of service provisions

EXAMPLE      A contract.

NOTE      It may be implicit or explicit.

### 2.40

#### **stakeholder**

person or group or organization having an interest in the performance or success of an organization

EXAMPLES      Users and building owners, responsible body, operator, employees of the operator, external product suppliers and providers of other services, contractors, communities, consumers and environmentalist associations, relevant authorities, financial institutions.

NOTE 1      Adapted from the definition of "interested party" given in ISO 9000: 2000

NOTE 2      For the application of the standard, environment is considered as a specific stakeholder.

**2.41****user**

end user

person, group or organization, that benefits from drinking water delivery or from service of collecting and/or treating its effluents

NOTE 1 Users are a category of stakeholder.

NOTE Users may belong to various economic sectors: domestic users, commerce, industry, tertiary activities, agriculture.

**2.42****wastewater**

water affected by human activities and storm waters, discharged to the **environment** (2.16) or sewer

NOTE This includes sanitary and industrial wastewater allowed to be discharged into a sewer system outside buildings, as well as sanitary waste in undiluted form, sanitary wastewater combined with storm water, and storm water that does not include sanitary wastewater.

**2.43****wastewater system**

infrastructures

infrastructures necessary for collecting and treating **wastewater** (2.42)

**2.44****water utilities**

the overall processes, activities and means necessary for supplying **drinking water** (2.12) or collecting and treating **wastewater** (2.42) and providing the associated **services** (2.38)

**3 Components of the service relating to the user****3.1 General**

There are three essential components of service to users: provision of services, contract management and billing, and fostering the relationship with the users. Additionally the service to user is also affected by other relationships of the utility. Most of the components of the service with regards to users are common to both water supply services and wastewater services, unless stated otherwise.

**3.2 Provision of the service****3.2.1 Application for service**

Application for the service comprises all the procedures for users to apply for water supply and wastewater services.

**3.2.2 Drinking water supply/wastewater discharge**

The drinking water supply includes all the procedures to supply and maintaining the quality of drinking water services. The wastewater discharge comprises the procedures for providing wastewater services.

**3.2.3 Crisis management**

Crisis management encompasses the organisation of users' information and measures to maintain or restore service and to prevent or minimize the impact on the system and the damages on assets and properties in case of major incidents or natural disasters.

### **3.3 Contract management and billing**

#### **3.3.1 Service agreement**

The service agreement includes the establishment of an agreement, implicit or explicit, between the user and the responsible body and/or operator.

#### **3.3.2 Billing**

Billing encompasses the conditions relating to billing for service, terms of payment and information on applicable rates.

### **3.4 Fostering the relationship with the users**

#### **3.4.1 Identification and general information**

Identification and general information include all procedures to provide general information on the service to the user.

#### **3.4.2 Contact with users**

The contact with users involves all forms of communication between the user and the responsible body and/or operator.

#### **3.4.3 Request processing**

Request processing comprises all written or verbal responses to the user and any resulting actions necessary to address the user's request or complaint or notification.

#### **3.4.4 Participation of users**

Participation of users is carried out through the procedures enabling participation in how the service is supplied.

### **3.5 Other relationships**

#### **3.5.1 Environment**

The relationships with the environment include those of the utility with the surroundings in which it operates.

#### **3.5.2 Safety and emergency management**

Safety and emergency management procedures include the information, plans and solutions provided in the event of an emergency.

#### **3.5.3 Quality of drinking water supply**

The quality of drinking water comprises the health and aesthetic aspects of the supplied drinking water.

## **4 Objectives for the service in respect of users' needs and expectations**

### **4.1 General**

Clause 4 is intended to recognize normal expectations of users and not to delineate requirements for relevant authorities, responsible bodies or operators. The quality of the service provided to the users depends on their needs and expectations and the ability of the institutions providing the water services to meet them. All elements of need and expectation listed, relate to both water supply services and wastewater services unless stated otherwise.

### **4.2 Access to water services**

Because drinking water supply services and wastewater services are considered a basic human need, the users and potential users expect that all practical steps will be taken to ensure their access to them. Where physical connection to the infrastructure is not practical, users expect other forms of access to be available. They also expect that the relevant authority or responsible body plan the development of water services, and inform them on the time schedule.

### **4.3 Provision of the service**

#### **4.3.1 Time to establish the service**

The user expects to be provided with the service in a reasonable and specified time where covered by the service. An explanation may be required on the specific conditions under which the service can be provided and when.

#### **4.3.2 Repairs**

The user expects that the repairs to be carried out within a reasonable time. The user expects to be warned in advance of planned repairs that would affect the service. The user expects that unplanned repairs affecting the service are finished within a reasonable time. In all cases the user expects the inconvenience will be minimized.

#### **4.3.3 Price of service**

The user expects the service to be fairly priced and that the relevant authority and/or responsible body ensure that affordability is not a barrier of access.

#### **4.3.4 Quantity of drinking water supply**

The user expects to receive sufficient water at the point of delivery to satisfy their needs.

#### **4.3.5 Pressure of drinking water supply**

Where the user is physically connected to the drinking water supply system, the user expects an adequate level of water pressure at the point of delivery at all times

#### **4.3.6 Continuity of drinking water supply**

Where the user is physically connected to the drinking water supply system, the user expects the water supply to be continuous. In the event that continuous supply is not possible, the user expects that supply be managed in an equitable manner and that they be informed of the conditions and times of interruptions.

Where the user is not physically connected to the drinking water supply system, the user expects the supply to be available on a regular basis.

#### **4.3.7 Coverage and availability of drinking water services**

Where there is a service based on physical connections in a service area, the user expects that water supply is provided throughout the service area and that where it is not, alternative delivery systems for the water supply will be made.

#### **4.3.8 Wastewater discharge**

Where the user is physically connected to a wastewater system, the user expects to be able to discharge wastewater at any time and without delay or risk to human health directly into the wastewater system.

Where the user is not physically connected to a wastewater system, the user expects to be able to transfer septage as necessary at regular intervals and without delay or risk to human health.

#### **4.3.9 Property flooding backup of storm and wastewater systems**

The user expects that no wastewater system backups or flooding affect a property. In the case of a backup or flooding event, the user expects that its duration and effects are minimized.

#### **4.3.10 Coverage and availability of wastewater services**

Where there is a service based on physical connections in a service area, the user expects that wastewater service is provided throughout the service area, and that where it is not, alternative systems for wastewater collection will be made.

### **4.4 Contract management and billing**

#### **4.4.1 Availability of a clear agreement**

The user expects a service agreement with clear, fair and documented conditions. The user expects to be informed of any change to the agreement or its conditions, in a reasonable amount of time. Additionally, the user expects procedures for the establishment and cancellation of the agreement.

#### **4.4.2 Fairness of billing**

The user expects to be fairly billed for the service provided.

#### **4.4.3 Response to billing complaints**

The user expects a response to a billing complaint from the responsible body and/or operator that clearly resolves the problem in a reasonable amount of time, with fair consideration of any monetary issues caused by billing errors.

#### **4.4.4 Clarity of billing**

The user expects clear, accurate and detailed information on the structure and content of bills, available while the service agreement is in force.

#### **4.4.5 Methods of payment**

The user expects regular billing and flexible methods of payment.

## **4.5 Fostering the relationship with users**

### **4.5.1 General**

The user expects:

- any enquiry addressed to the responsible body, operator or relevant authority by any means to be responded to and resolved within a reasonable amount of time;
- guaranteed confidentiality;
- updated available information;
- competent and respectful contact persons.

### **4.5.2 Telephone enquiries**

The user expects telephone calls to be responded to in a reasonable amount of time, either directly or by being transferred to the appropriate service department. The user expects telephone availability for emergencies at all times.

### **4.5.3 Office visits to the operator or responsible body**

The user expects to be welcomed and assisted effectively and directed to the appropriate person. The user also expects:

- convenient opening hours that are respected;
- reasonable, well-managed waiting times;
- suitable public reception area guaranteeing confidentiality.

### **4.5.4 Visits to the user**

The user expects employees of the operator to respect the appointment time, to show proper identification and to minimize any inconvenience to the user.

### **4.5.5 Written complaints and requests**

The user expects that any written complaint or request (including those by electronic media, such as e-mails and faxes) are carefully considered. The user expects a clear, accurate, personalised response in a reasonable time.

### **4.5.6 Notification on restrictions and interruptions**

The user expects to be notified of any restrictions or interruptions of the service.

### **4.5.7 Availability of service information**

The user expects that all information regarding public aspects of the service, according to local conditions, including the designation of responsibilities, is issued by the operator, responsible body and relevant authorities in an open and transparent manner.

#### **4.5.8 Community outreach**

The user expects the operator and/or responsible body to proactively provide information regarding the utility through community outreach efforts.

#### **4.5.9 Participation of the users**

The user expects that participation is encouraged and enabled by a transparent participatory process and the right to put forward the users' interest in such matters as prices, standards and physical connection or alternative service development.

### **4.6 Protection of the environment**

#### **4.6.1 Use of natural resources**

The user expects that the operator, responsible body and relevant authorities promote and apply a sustainable use of the water resources, as well as other natural resources. See Annex A.

#### **4.6.2 Wastewater treatment**

The user expects efficient and effective treatment of wastewater that complies with applicable local regulations and/or guidelines, before it is returned to the environment.

#### **4.6.3 Environmental impact**

The user expects that the negative environmental impacts resulting from the service provided are minimized and kept within reasonable and legal limits at all times.

### **4.7 Safety and emergency management**

In the event of an emergency affecting the service or the safety of the users, the user expects timely information on the following:

- the nature of the incident;
- the risks involved; and
- contact details such as:
  - what to do;
  - the time before normal service is resumed; and
  - temporary solutions available.

The user also expects that all negative impacts resulting from emergency situations should be minimized.

### **4.8 Quality of drinking water**

#### **4.8.1 Public health quality**

The user expects to be supplied with water that poses no threat to public health and complies with applicable local regulations and/or guidelines.

#### 4.8.2 Aesthetic quality

The user expects to be supplied with water, which is aesthetically pleasing with respect to taste, colour and odour.

## 5 Management components in respect to users

*(An additional clause is suggested – see editing group notes at the beginning of the document).*

## 6 Guidelines for assessing and improving service to users

### 6.1 General

The service to the users should be assessed and can be improved taking into account the users' expectations. The fulfilment of these expectations can often be measured by means of performance indicators although in some occasions, no universal measure can be applied and only improvement guidelines can be given. Performance indicators and guidelines are linked to the users' expectations defined in clause 4.

The guidelines and performance indicators presented in clause 5 are intended to be universally relevant, however particular performance indicators included here may not be applicable in all circumstances (e.g. in populations with high illiteracy rates, performance indicators based on written complaints will not be valuable, in non network systems, performance indicators related to pressure measures will not be relevant, etc.).

Additionally, these performance indicators are not intended for metric benchmarking (among or within countries) since the corresponding context information has not been defined.

In light of varying degrees of economic development the guidelines and performance indicators presented in clause 5 may not be applied yet in some countries, in which case they should be considered as goals for continuous improvement.

### 6.2 Access to drinking water and wastewater services

#### Access to drinking water and wastewater services

**Guidance:** Relevant authorities and responsible bodies should take institutional and economical measures to put in place drinking water supply and wastewater systems which could include resource management, physical infrastructure extension and alternative means of supply for those who are not connected.

The fact that certain communities are not connected to water and wastewater physical infrastructure should not be taken to mean that there is no service to which the standard should apply. There should be other provision such as wells, mobile drinking water delivery, regulated vendors and drinking water points, latrines, septic tanks and other forms of provision, which should be considered as part of the service.

Measures to ensure equitable access may include grants, loans, social tariffs, subsidies (and/or cross subsidies among income households), free allocation of safe water to meet human basic needs, etc.



## 6.3 Provision of the service

### 6.3.1 Time to establish the service

**Performance indicator:** Number of new connections installed within a target time / total number of new connections requested x 100 (%)

**Guidance:** This performance indicator can only be used for network systems and areas where the service is available. In these cases, for the performance indicator to be applied, a local customer service commitment should exist specifying a maximum connection time (in days) for regular connections, and the comment that in some countries compensation is offered when the deadline is not met. Special connections should be addressed individually.

- Connection time should be defined as the period from the time the user application process is completed until the service is available for the user.
- The application procedures should be clearly specified by the operator or responsible body.

In the absence of a network system, the user should be informed about when the service will be provided.

### 6.3.2 Repairs

**Guidance:** For planned repairs the operator should inform the user in advance with an estimate of the time and duration of the interruption of the service. For unplanned repairs that affect the service, the operator should inform the user about the estimated time until normal service is restored. In all repairs the operator should minimize the inconveniences to the user.

### 6.3.3 Price of service

**Guidance:** The responsible body should make publicly available elements composing the total cost of the service and the extent to which this cost is covered by revenues from the users.

The extent, nature and purpose of relevant subsidies should be identified, as should any calculations of affordability for users. Information on those factors influencing variations in price (e.g. cost inflation, environmental regulations, emergencies, network extensions, water quality and availability, etc.) should also be given.

### 6.3.4 Quantity of drinking water supply

**Guidance:** The operator, responsible body and relevant authorities should make adequate estimations of future demands. The estimates should lead to a reliable drinking water supply in the future that satisfies those demands. They should also promote an efficient use of drinking water.

**6.3.5 Pressure of drinking water supply**

**Performance indicator:** Number of written pressure related complaints / (total number of contracts/1000)

**Comment:** Total number of complaints is not necessarily an indicator of poorer service, but it may be correlated to possibility of complaints.

**6.3.6 Continuity of drinking water supply**

**Performance indicator:** Number of hours when the system is pressurised during the year / (365 x 24) x 100 (%)

**Comment:** When there are subsystems supplied in different periods of time, the indicator has to be assessed individually for each subsystem and the result is a weighted average using the number of service connections of each subsystem as weighting factor. In leap years, 365 should be replaced by 366.

Interruptions due to unplanned system failures or to on-going repair or rehabilitation works should not be accounted for by this variable. In most intermittent supply systems, supply interruptions are not simultaneous all over the network. When there are subsystems supplied in different periods, the indicator has to be assessed individually for each subsystem and the result is a weighted average using the number of service connections of each subsystem as weighting factor.

**Guidance:** For non-network systems, regular service should be provided at reasonable intervals known by the user.

**6.3.7 Coverage and availability of drinking water services**

**Performance indicator:** Number of properties with access to the water supply service / total number of properties in the geographical area covered by the responsible body 100 (%)

**Comment:** If accurate data is available, the number of properties can be replaced by the resident population with access to the service. When evaluating this indicator, significant changes in the number of properties or the resident population should be taken into account.

#### 6.3.8 Property flooding by wastewater

**Performance indicator:** (Number of registered customers' properties flooded by overflows caused by backup) / (total number of registered customers' properties)\*100 (%)

**Comment:** Floods originated by exceptional natural conditions should not be accounted for in this indicator. What is exceptional will depend on the local conditions and regulations (e.g. the design conditions of the sewer system).

#### 6.3.9 Coverage and availability of wastewater services

**Performance indicator:** Number of properties with access to the wastewater service / total number of properties in the geographical area covered by the responsible body \* 100 (%)

**Comment:** If accurate data is available, the number of properties can be replaced by the resident population with access to the service. When evaluating this indicator, significant changes in the number of properties or the resident population should be taken into account. The concept of property should be defined according to local conditions and regulations.

**Guidance:** Non-recognized settlements should be taken into account in the assessment of coverage.

### 6.4 Contract management and billing

#### 6.4.1 Availability of a clear contract / agreement

**Guidance:** The service agreement should have clear, fair and documented conditions and comply with local regulations and guidelines. Any changes in the agreement should be notified to the user and the cancellation procedures should be flexible.

#### 6.4.2 Fairness of billing

**Performance indicator:** Number of written billing related complaints / total number of contracts

**Guidance:** The fairness of metering can be assessed estimating the average precision of meters from statistical samples. The user should be informed that in most cases, the water meter's inherent error always tends to under measure supply.

In the case of specific complaints about the accuracy of a meter, the operator should perform a meter test in the presence of the user, and replace it when appropriate.

In the event of billing on the basis of methods other than metering, the operator should make clear the basis for the calculation of the bill and allow for mechanisms that safeguard against billing errors, in which case the operator should have a clear procedure for reimbursement.

Depending on the terms of the service agreement, in the event of failure to supply, the bill may be reduced accordingly.

**6.4.3 Response to billing complaints**

**Performance indicator:** Number of billing complaints answered within the specified time / Total number of billing complaints x 100 (%)

**Comment:** A local customer service commitment should exist specifying a maximum response time (in days) for billing complaints.

**6.4.4 Clarity in the bill**

**Guidance:** Bill contents should be as clear and understandable for each registered customer as possible. Operators and/or responsible bodies may prepare documents that will enable a better explanation of the terms of the bill to the user (rates list, especial cases, etc.)

**6.5 Fostering the relationship with users****6.5.1 Telephone enquiries**

**Guidance:** Operators should not only answer the telephone calls, but also provide final solutions or answers to users in a timely manner. The targeted period of time will depend on each operator.

**6.5.2 Office visits to the operator or responsible body**

**Guidance:** Operators or responsible bodies should take efforts in their offices to:

- establish convenient opening hours that are respected;
- provide the means to have reasonable, well-managed waiting times;
- prepare a suitable public reception area that guarantees confidentiality;
- provide the customer with easy understandable documents;
- simplify as much as possible the application procedures;
- disclose water related information actively;
- clearly identify their employees.

#### 6.5.3 Visits to the user

**Guidance:** Operators employees in their visits to the user should make sure that:

- they are properly identified;
- they act in a polite and competent manner;
- confidentiality is guaranteed;
- they comply with the previously made arrangements and appointed hours.

#### 6.5.4 Written complaints and requests

**Performance indicator:** (Number of written complaints answered within the target time) / Total number of written complaints) \* 100 (%)

**Guidance:** Operators and responsible bodies should not only answer written complaints, but also should try to provide a final solution or answer to the users. The targeted period of time will depend on each operator and responsible body. A local customer service commitment should exist specifying a maximum response time (in days) for written complaints.

#### 6.5.5 Notification on restrictions/interruptions

**Guidance:** The operator should notify in advance the affected users' about any planned restrictions or interruptions of the service. In the case of unplanned or exceptional restrictions or interruptions, the operator, responsible body or relevant authorities should advise on the reason and the expected duration of the service restriction or interruption.

### 6.5.6 Availability of service information

**Guidance:** The operator, responsible body and relevant authorities should openly and transparently provide the users with general information including public aspects of the service and the designation of responsibilities according to local conditions. This information should be provided in a manner to make the greatest impact on the greatest number of users.

**Comment:** Users may request the operator, responsible body and/or relevant authorities to disclose information. There are some cases that information disclosure is controlled by law. However, when possible, operator, responsible body and relevant authorities should disclose information actively when requested to do so.

**Example:**

Depending on local conditions, public aspects of the service may include:

Customer service:

- contact details (office hours, telephone contacts);
- complaints procedures;
- billing procedures and payment procedures;
- how to seek available help to pay the bill (e.g. social security).

Legal framework:

- customer contracts;
- rights of users;
- responsibilities of users;
- rate structure and level;
- rate setting procedures;
- existing contracts (e.g. concessions, management agreements);
- proposals for new or renewed contracts;
- procedures for contract awards.

Operational matters:

- time lines for service extension;
- emergency procedures.

Financial matters:

- cost structure;
- pricing formula.

#### 6.5.7 Community outreach

**Guideline:** The operator should participate in local community activities, whenever these are in touch with the service items. This participation can lead to a good relationship with the local community by providing information actively. This detail becomes crucial especially when it is essential to get good cooperation of community and volunteer activity in the case of emergency.

#### 6.5.8 Participation of the users

**Guidance:** The operator and/or responsible body should encourage and promote participation by users, which can take several forms. Examples are:

- ongoing consultation through standing user committees which may monitor customer complaints and standards of service;
- participation in dispute resolution for individual cases
- consultation at critical decision points such as new programmes to extend networks, setting prices for a new period, consideration of content of new operator contracts. Consultation can take place between users and operators, responsible bodies and/or relevant authorities, either jointly or separately.

### 6.6 Protection of the environment

#### 6.6.1 Efficiency in the use of resources

**Guidance:** The operator and responsible body should strive for efficiency and sustainability in the use of water and other resources (e.g. energy) while complying with local regulations and guidelines. Water suppliers should strive to reduce leakage in the system.

The operator, responsible body and relevant authorities should also undertake actions such as:

- cooperate to minimize contamination of the environment;
- establish source water protection;
- monitor the quantity and quality of water resources in catchment areas;
- participate in commissions responsible for river basins;
- provide education and general information about efficient water use.

### 6.6.2 Wastewater treatment

**Guidance:** The operator, responsible body and/or the relevant authorities should provide the users with information regarding the applicable local regulations and guidelines, and the level of compliance with those regulations and guidelines.

### 6.6.3 Environmental impact

**Guidance:** Operators and responsible bodies should take positive actions to minimize their environmental impact. The results of implementation should be communicated to the stakeholders. These actions should be in accordance to local regulations and guidelines and could be guided by an environmental management system (e.g. ISO 14001).

## 6.7 Safety and emergency measures

### 6.7.1 Safety and emergency procedures

**Guidance:** The operator, responsible body and relevant authorities should develop an emergency plan that includes training procedures and appropriate information for the users.

## 6.8 Quality of drinking water (drinking water supply)

### 6.8.1 Public health quality of the drinking water

**Performance indicator:** Total number of treated drinking water tests complying with the local regulations and guidelines in a year / total number of tests of treated drinking water carried out during the year x 100

**Guideline:** The operator or responsible body should include in a periodic report (e.g. the annual report) a summary of water quality related problems.

### 6.8.2 Aesthetic and sensory quality of the drinking water

**Performance indicator:** Number of written complaints related to drinking water quality issues / (total number of contracts/1000)

**Guidance:** Complaints are not the only measure for perception of quality. It can be complemented by customer surveys on a periodic basis.

**Comment:** Total number of complaints is not necessarily an indicator of poorer service, but it may be correlated to possibility of complaints. Complaints should address quality issues of the product regarding the service, and not others (e.g. temperature).



## **7 Assessment in respect to users**

*(An additional clause is suggested to include performance indicators from clause 6 and subclauses 7.1 and 7.2 adapted from ISO/CD 24511 and ISO/CD 24512 on assessment– see editing group notes at the beginning of the document).*

## **8 Introduction to performance indicators**

### **8.1 General**

Performance indicators are used to measure the efficiency and effectiveness of a utility in achieving its objectives (particularly those identified in clause 4).

Performance indicators should be used within the context of a comprehensive service assessment system. This system should include, amongst other tools, a coherent set of indicators and the related components that allow for a clear definition of these performance indicators and assist in their interpretation.

### **8.2 Performance indicators systems**

#### **8.2.1 General**

A performance indicator system comprises a set of performance indicators, context information and variables.

#### **8.2.2 Performance indicators**

Individual performance indicators should be unique and collectively appropriate for representing the relevant aspects of the service in a true and unbiased way.

Each performance indicator should:

- be clearly defined, with a concise and unequivocal meaning;
- be assessed from variables that can be easily measurable at a reasonable cost,
- contribute to the expression of the level of actual performance achieved
- in a certain area,
- allow for a clear comparison with targeted objectives and simplify an
- otherwise complex analysis,
- be verifiable,
- be simple and easy to understand, and
- be objective and avoid any personal or subjective appraisal.

Performance indicators are typically expressed as ratios between variables. These ratios may be commensurate (e.g. %) or non-commensurate (e.g. \$/m<sup>3</sup>). In the case of non-commensurate ratios, the denominator should represent one dimension of the system (e.g. number of service connections; total water main length; annual costs). This allows for comparisons through time, or between systems of different sizes.

Variables that may vary substantially in time (e.g. annual discharge volumes) particularly if not under the control of the utility should be avoided as denominators in the indicator ratios. An exception can be made when the numerator varies in the same proportion as the denominator.

A clear processing rule should be defined for calculating each indicator. The rule should specify all the variables required and their algebraic combination. The variables may be data generated and managed within the utility (utility data) or externally (external data). The use of internal utility data is generally preferred to *external data* because the quality of external data is out of the control of the utility. The interpretation of the performance indicators should not be carried out without taking into account the context, particularly if it is based on comparisons with other cases. Therefore, complementary to the performance indicators, the context information should consider also the characteristics of the system and the region in which the services are provided.

Additional information on performance indicators and grading systems for performance indicators are provided in Annex B.

### 8.2.3 Variables

Each variable should:

- fit the definition of the performance indicator or context information it is used for,
- refer to the same geographical area and the same period of time or reference date as the performance indicator or context information it will be used for, and
- be as reliable and accurate as the decisions made based on it require.

Some of the variables are external data and mainly informative, and their availability, accuracy, reference dates and limits of the corresponding geographical area is generally out of the control of the utility. In this case, variables should also:

- whenever possible be collected from official sources, and
- be essential for the performance indicator assessment or interpretation.

### 8.2.4 Context information

Context information defines inherent characteristics of a system that are relevant for the interpretation of the performance indicators. There are two possible types of context information:

- Information describing pure context and external factors that are not under the control of the utility (e.g. demographics, topography, climate, etc.), and
- Characteristics that can only be influenced by management decisions in the long term (e.g. age of the infrastructures).

## 8.3 Quality of the information

The quality of the data should reflect the importance of the assessment being conducted.

A scheme providing information on data quality is needed so that users of the performance indicators and context information are aware of the reliability of the information available. The value of the performance indicators is questionable without this scheme.

The recommended confidence grade of a performance indicator can be assessed in terms of its accuracy and reliability. The accuracy accounts for measurement errors in the acquisition of input data. The reliability accounts for uncertainties in how reliable the source of the data may be.

An example of a confidence-grading scheme is presented in Annex B.

## Annex A (informative)

### A methodological note and guidance for evaluating the sustainable development component of drinking water and wastewater services

#### A.1 Overall definitions

The most common framework used by countries in developing indicators of sustainable development starts with the idea of three pillars of sustainability: environmental, economic, and social, but institutional aspects are also a dimension covered by the notion of sustainable development. In fact, a key factor in the sustainable development approach is the **integral view** taken by these central elements.

**The environmental or ecological element** of sustainable development is related to natural capital but also to the infrastructures as a specific capital, on which society and economy depend on. In our case, freshwater and waste water quality are concerned, but also network system state and the needs of future generations, as well as protection of water resources and their rationale uses.

**The economic aspects of sustainable development** deal with the viability of economical solutions to ensure access to water, from a social and environmental point of view. Adequate access to water services is essential for life, ensuring such access requires substantial capital investments and recurrent costs over long periods of time. However, meeting this need of infrastructure services has to be compatible with the needs of poor and vulnerable groups who may be adversely affected by increases in tariffs.

**The social axe of sustainable development** can be regarded as a principle, which implies that drinking water and wastewater service provision has to be thought in light of social equity and development. Low incomes and poverty objectively reduce economic affordability. Within the European community, **affordability** of water is considered as a common criterion for evaluating social concerns in the provision of drinking water and wastewater. Therefore, measures which provide economic support to ensure access to water in order to satisfy safe and basic needs for all, are measured as Sustainable Development Indicator (SDI). Legal and institutional framework protecting user's interests and incorporating equity considerations in the planning of drinking water and wastewater services, are also concerned.

Actions of education and information aiming to promote more efficient and responsible collective water resource uses are also concerned (notion of community outreach). It supposes improvements in relationships with local communities, users, non-government organisations, schools, etc.

**The institutional aspect of sustainable development** is the last major axe identified. In this field, the legal and institutional framework for access to information, consultation and participation of water users and civil society are concerned. The way public voice in decision-making related to water resources, tariff policy and investments strategies are taken in account, and the extent to which legal or non-legal forms of democracy are applied is measured. Transparency, stakeholder accountability, and voluntary standards are also criteria that are considered as well as government relations with civil society.

#### A.2 Methodological principles to build SDI

The development of a set of indicators is generally the way followed (OECD, 2002). Another approach, still in its emerging phase, uses the notion of “capital stock”<sup>1</sup> as a unifying concept to select indicators. A number of

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<sup>1</sup> For instance, the Canadian approach identifies three types of capital: produced, natural and human. The purpose of indicators is to track whether today's economic activity is threatening the ability of future generations to create their own healthy economy. Statistics Canada (2001) suggest that the indicators developed using a capital approach would differ from those derived from a more traditional three-pillar approach but do not explore this in any depth.

countries involved in sustainable development indicators (SDI) have referred to the Bellagio Principles<sup>2</sup> (Hardi and Zdan 1997, see Bibliography) as guidelines for the choice of indicators, their design, interpretation and communication (see Box 1).

### BOX 1. BELLAGIO PRINCIPLES

#### Principle 1. Guiding Vision and Goals

Assessment of progress toward sustainable development should be guided by a clear vision of sustainable development and goals that define that vision.

#### Principle 2. holistic Perspective

Assessment of progress toward sustainable development should:

- include review of the whole system as well as its parts,
- consider the well-being of social, ecological, and economic sub-systems, their state as well as the direction and rate of change of that state, of their component parts, and the interaction between parts,
- consider both positive and negative consequences of human activity, in a way that reflects the costs and benefits for human and ecological systems, in monetary and non-monetary terms

#### Principle 3. Essential Elements

Assessment of progress toward sustainable development should:

- consider equity and disparity within the current population and between present and future generations, dealing with such concerns as resource use, over-consumption and poverty, human rights, and access to services, as appropriate,
- consider the ecological conditions on which life depends,
- consider economic development and other, non-market activities that contribute to human/social well-being.

#### Principle 4. Adequate Scope

Assessment of progress toward sustainable development should:

- adopt a time horizon long enough to capture both human and ecosystem timescales thus responding to needs of future generations as well as those current to short term decision-making,
- define the space of study large enough to include not only local but also long distance impacts on people and ecosystems,
- build on historic and current conditions to anticipate future conditions - where we want to go, where we could go.

#### Principle 5. Practical Focus

Assessment of progress toward sustainable development should be based on:

<sup>2</sup> The Bellagio principles emerged as the synthesis of deliberations of an international group of measurement practitioners and researchers that came together in Bellagio, Italy in 1996 to review progress to date and to garner insights from ongoing efforts for the development of sustainable development indicators.

- an explicit set of categories or an organising framework that links vision and goals to indicators and assessment criteria,
- a limited number of key issues for analysis,
- a limited number of indicators or indicator combinations to provide a clearer signal of progress,
- standardising measurement wherever possible to permit comparison,
- comparing indicator values to targets, reference values, ranges, thresholds, or direction of trends, as appropriate.

#### **Principle 6. Openness**

Assessment of progress toward sustainable development should:

- make the methods and data used accessible to all,
- make explicit all judgments, assumptions, and uncertainties in data and interpretations.

#### **Principle 7. Effective Communication**

Assessment of progress toward sustainable development should:

- be designed to address the needs of the audience and set of users,
- draw from indicators and other tools that are stimulating and serve to engage decision-makers,
- aim, from the outset, for simplicity in structure and use of clear and plain language.

#### **Principle 8. Broad Participation**

Assessment of progress toward sustainable development should:

- obtain broad representation of key grass-roots, professional, technical and social groups, including youth, women, and indigenous people - to ensure recognition of diverse and changing values,
- ensure the participation of decision-makers to secure a firm link with adopted policies and resulting action.

#### **Principle 9. Ongoing Assessment**

Assessment of progress toward sustainable development should:

- develop a capacity for repeated measurement to determine trends,
- be iterative, adaptive, and responsive to change and uncertainty because systems are complex and change frequently,
- adjust goals, frameworks and indicators as new insights are gained,
- promote development of collective learning and feedback to decision-making.

#### **Principle 10. Institutional Capacity**

Continuity of assessing progress toward sustainable development should be assured by:

— clearly assigning responsibility and providing ongoing support in the decision-making process, providing institutional capacity for data collection, maintenance and documentation supporting development of local assessment capacity.

### A.3 Elements of reference

*Performances des marchés des industries de réseaux prestataires de services d'intérêt général*, rapport de la Commission Européenne, Direction Générale des Affaires Economiques et Financière, Service de l'évaluation économique, 2001.

*Overview of sustainable development indicators used by national and international agencies*, OECD statistics working papers, 2002.

OECD global forum on sustainable development : *Conference on financing the environmental dimension of sustainable development*", April 2002.

*Water for People, Water for Life*, United Nation World water development report, 2003

## Annex B (informative)

### Performance indicators and related components - An example of a confidence-grading scheme

#### B.1 General

The quality of input data should be therefore assessed in terms of its accuracy and reliability: The accuracy accounts for measurement errors in the acquisition of input data.

NOTE 1 No measurement device is completely accurate, and some of the data to be used to assess the performance indicators may have been obtained by less accurate methods.

The reliability accounts for uncertainties in how reliable the source of the data may be.

NOTE 2 Old records may be reliable in terms of depicting the current situation of assets.

#### B.2 Reliability bands

##### B.2.1 A - Highly reliable

Actual	Data based on sound records, procedures, investigations or analyses that are properly documented and recognized as the best available assessment methods.
Forecasts	Based on extrapolations of high-quality records covering or applicable to 100% of the service's area, kept and updated for a minimum of five years (the forecast will have been reviewed during the reporting period).

##### B.2.2 B - Reliable

Actual	Generally as in band A, but with minor shortcomings, e.g.: some of the documentation is missing, the assessment is old, or some reliance on unconfirmed reports or some extrapolations are made.
Forecasts	Based on extrapolations of records covering or applicable to more than 50% of the service's area, kept and updated for a minimum of five years. The forecast will have been reviewed during the previous two years.

##### B.2.3 C - Unreliable

Actual	Data based on extrapolation from a limited sample for which band A or B is available.
Forecasts	Based on extrapolations of records covering more than 30% of the service's area. The forecast will have been reviewed during the previous five years.

##### B.2.4 D - Highly unreliable

Actual	Data based on unconfirmed verbal reports and/or cursory inspections or analysis.
Forecasts	Based on extrapolated information not complying with bands A, B or C.

### B.3 Accuracy bands

Accuracy is defined as the approximation between the result of a given measurement and the (conventionally) correct value for the variable to be measured. The accuracy bands presented below are based on the system adopted in England and Wales.

They are to be applied to the measurement and not to the measuring equipment - for example, in some cases the equipment may be highly accurate but is used out of range. Whenever the measurement accuracy cannot be assessed, it should be graded as greater than 100%.

The accuracy bands suggested are:

- 1) Better than or equal to  $\pm 1\%$
- 2) Not band 1, but better than or equal to  $\pm 5\%$
- 3) Not bands 1 or 2, but better than or equal to  $\pm 10\%$
- 4) Not bands 1, 2 or 3, but better than or equal to  $\pm 25\%$
- 5) Not bands 1, 2, 3 or 4 but better than or equal to  $\pm 50\%$
- 6) Not bands 1, 2, 3, 4 or 5 but better than or equal to  $\pm 100\%$
- X) Values which fall outside the valid range, such as  $> 100\%$ , or small numbers.

### B.4 Overall confidence grades

The confidence grades (c.g.) will be an alphanumeric code, which couples the reliability band and the accuracy band, for instance:

- A2 - Data based on sound records etc. (Highly Reliable, Band A) which is estimated to be within  $\pm 5\%$  (Accuracy band 2).
- C4 - Data based on extrapolation from a limited sample (Unreliable, Band C), which is estimated to be within  $\pm 25\%$  (Accuracy band 4).

The reliability and accuracy bands would form the matrix of confidence grades shown below (table B.1):

Accuracy Bands (%)	Reliability bands			
	A	B	C	D
[0; 1]	A1	++	++	++
[1; 5]	A2	B2	C2	++
[5; 10]	A3	B3	C3	D3
[10; 25]	A4	B4	C4	D4
[25; 50]	++	++	C5	D5
[50; 100]	++	++	++	D6
NOTE: '++' indicates confidence grades that are considered to be incompatible				

**Table B.1 — Matrix of confidence grades**



Confidence grades should be assessed for every water service and for every indicator, and the corresponding results reported as follows:

Year	Result	'short description' PI1	'short description' PI2	'short description' PI3	'short description' PI4	'short description' PI5	'short description' PI...
1996	PI c.g.	20% B3	87%/year [C4]	34/m <sup>3</sup> A2	40/km sewer A1	55%/year B3	45% A3
1997	PI c.g.	21% A2	86%/year B3	30/m <sup>3</sup> A1	45/km sewer B1	65%/year B2	45% B2
1998	PI c.g.	23% A1	84%/year C2	31/m <sup>3</sup> A1	42/km sewer A3	67%/year [B4]	45% A2
1999	PI c.g.	23% B2	85%/year A3	26/m <sup>3</sup> A3	40/km sewer C1	68%/year C2	45% C1
...	...	...	...	...	...	...	...
NOTE: '[ ]' means that the original values were corrected by the audit							

**Table B.2 — Reporting of confidence grades (c.g.) for a sequence of years**

To make it possible for comparisons to be carried out between services, confidence grades should be chosen appropriately and applied consistently. The descriptions outlined above are minimum values expected, to achieve the quality of information stated.

Clearly, "A1" or "A2" confidence grades can be achieved for some input variables, although they may not be generally attainable. Services are encouraged to aim for a grade of "B2" (i.e. good or excellent) or better.

Confidence grades can only be estimated directly for the variables. Based on these, PI confidence grades can either be assessed either quantitatively or, at least, qualitatively.

## Bibliography

- [1] ISO 24511: 200X<sup>3)</sup>, Service activities relating to drinking water and wastewater – Guidelines for the assessment of wastewater services and the management of utilities
- [2] ISO 24512: 200X<sup>1)</sup>, Service activities relating to drinking water and wastewater – Guidelines for the assessment of drinking water services and the management of utilities
- [3] ISO 9001:2000, Quality management systems – Requirements
- [4] ISO 14001: 2004, Environmental management systems – Requirements with guidance for use
- [5] ISO 5725-1: 1994, Accuracy (trueness and precision) of measurements methods and results – Part 1: General principles and definitions
- [6] ISO 9000:2000, Quality management systems – Fundamental and vocabulary
- [7] EN 752-5:1997, Drain and sewer systems outside buildings – Part 5: Rehabilitation
- [8] JWWA Q 100 – „Guidelines for the management and assessment of a drinking water supply service“. Japan Water Works Association, 2005.
- [9] Hardi and Zdan, 1997, cited by J.L. Hass, F. Brunvoll, H. Hoie, in OECD Statistic Working Paper, 2002.

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3) In preparation