CSA Z24511:10
(ISO 24511:2007, MOD)
National Standard of Canada
(reaffirmed 2019)

CSA Z24511:10
Activities relating to drinking water and wastewater services — Guidelines for the management of wastewater utilities and for the assessment of wastewater services
(ISO 24511:2007, MOD)

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Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users to judge its suitability for their particular purpose.

National Standard of Canada

CSA Z24511:10

Activities relating to drinking water and wastewater services — Guidelines for the management of wastewater utilities and for the assessment of wastewater services

(ISO 24511:2007, MOD)

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CAN/CSA-Z24511-10
Activities relating to drinking water and wastewater services — Guidelines for the management of wastewater utilities and for the assessment of wastewater services

CSA Preface

This is the first edition of CAN/CSA-Z24511, *Activities relating to drinking water and wastewater services — Guidelines for the management of wastewater utilities and for the assessment of wastewater services*, which is an adoption, with Canadian deviations, of the identically titled ISO (International Organization for Standardization) Standard 24511 (first edition, 2007-12-01).

This Standard was reviewed for Canadian adoption by the CSA Technical Committee on Water Quality Management Systems, under the jurisdiction of the Strategic Steering Committee on Business Management and Sustainability, and has been formally approved by the Technical Committee. This Standard has been approved as a National Standard of Canada by the Standards Council of Canada.

January 2010

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(c) Wording of the proposed change; and
(d) Rationale for the change.

Canadian deviations

Introduction

[Add the following]

A reliable supply of safe drinking water that is visually appealing and readily available is a fundamental expectation among Canadians. Similarly, Canadians want wastewater (including all solid and gaseous residues of human waste) to be disposed of or reused in a safe and environmentally sustainable manner. Utility owners and operators strive for continuous improvement of their water services and the professional development of their staff to ensure that they are able to meet and exceed users' needs and the applicable laws and regulations for their area of jurisdiction.

The new International Organization for Standardization standards, ISO 24510, ISO 24511, and ISO 24512, have been developed to provide guidelines for the improvement of service to users, the management of water utilities, and the assessment of water services. These Standards were published in December 2007 and are now being implemented throughout the world. In the context of these Standards, the word "water" is intended to cover drinking water and wastewater.

The CSA Technical Committee on Water Quality Management Systems was established to review these International Standards and help to bring about their application to Canadian water system management. The intent is to ensure that Canadian utilities and stakeholders have access to the best and most current guidelines available.

The ISO Standards, adopted with Canadian deviations as CAN/CSA-Z24510, CAN/CSA-Z24511, and CAN/CSA-Z24512, present a significant advance in using performance indicators to improve the management of water services and systems and build on existing concepts for improvement in a uniform and internationally recognized manner. The three Standards are intended to cover the complete range of performance indicators related to water system management.

The following is an overview and guide for using these Standards in Canada:

CAN/CSA-Z24510 (guidelines for the assessment and improvement of service to users). This Standard outlines the objectives for service with respect to users' needs and expectations and the assessment of service to users. It also provides examples of performance indicators (PIs) linked to that assessment.

CAN/CSA-Z24511 and **CAN/CSA-Z24512** (guidelines for the management of water utilities and the assessment of water services)

These Standards provide brief descriptions of the physical/infrastructural and managerial/institutional components of water utilities. They outline the objectives for water utilities and provide guidelines for their management. They also set out guidelines for the assessment of water services and examples of performance indicators (PIs) linked to that assessment.

There are many stakeholders with an interest in water services in Canada. These Standards can be used by all stakeholders for guidance; however, the primary stakeholders are as follows:

Standard	Primarily used by
CAN/CSA-Z24510	Utility owners and operators and occasionally regulators, users, and special interest groups
CAN/CSA-Z24511	Utility owners and operators
CAN/CSA-Z24512	Utility owners and operators

Recommendations for use of these Standards

CAN/CSA-Z24511 and CAN/CSA-Z24512 provide guidance to utility managers and are intended to be used to measure achievements and improvements through the use of performance indicators. These Standards are very similar in structure and are focused on the continuous improvement of systems and development of staff to improve service as well as to meet regulatory and legal requirements. It is recommended that they be applied as follows:

Clause in CAN/CSA-Z24511 and CAN/CSA-Z24512	**Recommended application in Canada**
Introduction	General information
1 Scope	General information
2 Terms and definitions	Use as shown. **Notes:** **(1)** *"Responsible body" — in Canada, the responsible body is usually a municipal authority.* **(2)** *"Relevant authority" — in Canada, the relevant authority is usually the government of the province or territory in which the utility is located and can also be the federal government.*
3 Components of drinking water supply systems/ wastewater systems	Use as a checklist of system components that can be considered by the utility in future capital works. **Note:** *Some systems might not include all of these components.*
4 Objectives for the drinking water utility/ wastewater utility	Use these six objectives and develop sub-objectives for the utility where necessary to define the strategic and/or operational focus. **Note:** *For Objective 4.3, "Meeting users' needs and expectations", see ISO 24510.*
5 Management components of a drinking water utility/wastewater utility	Use as a checklist of management components that can be considered by the utility. **Note:** *The management system might not include some of these components.*
6 Guidelines for the management of drinking water utilities/wastewater utilities	Use these guidelines to define the strategic and/or operational focus.
7 Assessment of water services/wastewater services	This general guide for assessment should be used as necessary to define the strategic and/or operational focus.
8 Performance indicators	Use the methodology defined and develop at least two performance indicators for each objective (or sub-objective) defined in Clause 4.
Annexes A to F	Use the annexes as guidelines as referenced in the Standard.

Note: *The examples of performance indicators that appear in these Standards are used to illustrate a general approach to defining and monitoring performance indicators. In practice, to achieve meaningful measurements, the definition of a performance indicator and its related benchmarks should clearly state all of the sub-variables that might or should be part of the performance measurement. For example, when the number of written responses to written complaints is used as a performance indicator, the definition might need to specify the form of the written response, e.g., letter, fax, or e-mail.*

It is recommended that utilities use CAN/CSA-Z24510 as a supplement to CAN/CSA-Z24511 and CAN/CSA-Z24512 in the development of

(a) objectives related to meeting users' needs and expectations (see Clause 4.3 of CAN/CSA-Z24511 and CAN/CSA-Z24512); and
(b) user-related performance indicators (see Clause 8 of CAN/CSA-Z24511 and CAN/CSA-Z24512).

CAN/CSA-Z24510 also provides guidance on elements of service and guidelines for satisfying users.

3 Components of wastewater systems

3.1 General

[Replace with the following]

A wastewater system generally comprises

(a) collection and transport of wastewater and residues removed from wastewater;
(b) treatment of wastewater and residues removed from wastewater;
(c) disposal/reuse of treated wastewater; and
(d) disposal/reuse of residues.

See Clause B.1.

3.4 On-site systems

3.4.2 Treatment

[Add the following]

In addition, in response to the increasing demand for non-potable water to substitute for scarce potable water supplies, on-site treatment technologies are being developed for particle removal and disinfection to allow the use of treated grey water and storm water for non-potable purposes within buildings. Examples of such uses include toilets, laundries, and even showering.

[Add the following clause]

3.4A Disposal/reuse of treated wastewater

Treated wastewater has traditionally been disposed of (discharged) as effluent into receiving bodies of water. However, in recent years, treated wastewater has increasingly been used/reused as a substitute for potable water in applications such as the following (depending on the level of treatment provided):

(a) industrial water supplies;
(b) recharging aquifers (indirect potable water use);
(c) irrigation of lands; and
(d) non-potable purposes inside buildings with separated potable and non-potable water systems.

E.2 Examples of performance indicators related to assessment criteria

E.2.1 General

[Add the following]

In Canada, the National Water and Wastewater Benchmarking Initiative should be examined to select benchmarks having relevance in the Canadian context. For further information, visit www.nationalbenchmarking.ca.

INTERNATIONAL STANDARD

ISO 24511

First edition
2007-12-01

Activities relating to drinking water and wastewater services — Guidelines for the management of wastewater utilities and for the assessment of wastewater services

Activités relatives aux services de l'eau potable et de l'assainissement — Lignes directrices pour le management des services publics de l'assainissement et pour l'évaluation des services fournis

Reference number
ISO 24511:2007(E)

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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 24511 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*.

ISO 24511 is one of a series of standards addressing water services. The full series consists of the following International Standards:

— ISO 24510, *Activities relating to drinking water and wastewater services — Guidelines for the assessment and for the improvement of the service to users*

— ISO 24511, *Activities relating to drinking water and wastewater services — Guidelines for the management of wastewater utilities and for the assessment of wastewater services*

— ISO 24512, *Activities relating to drinking water and wastewater services — Guidelines for the management of drinking water utilities and for the assessment of drinking water services*

Introduction

NOTE Words in bold are key terms which are defined in Clause 2.

0.1 Water issues: global context and policies framework

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. In 2000, the United Nations (UN) recognized that access to water is an essential human right, and in conjunction with national governments, it set ambitious goals (the "Millennium Development Goals") to increase access to **drinking water** and **wastewater services,** including safe disposal or reuse of **residues** (hereinafter jointly referred to as "water **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, the third World Water Forum in Kyoto in March 2003 and the fourth World Water Forum in Mexico City in March 2006) have highlighted this issue, and UN agencies (including WHO and UNESCO) have developed recommendations and programmes to establish a framework in which to advance.

The United Nations' Commission on Sustainable Development (CSD13) has emphasised that governments (referred to as "**relevant authorities**" in this International Standard) have a primary role in promoting improved access to safe **drinking water** and basic sanitation through improved governance at all levels and appropriate enabling **environments** and regulatory frameworks, with the active involvement of all **stakeholders**. This **process** should incorporate institutional solutions to make the water sector more productive and the **management** of water resources more sustainable. In this respect, the Ministerial declarations from the Third and Fourth World Water Forum recommended that governments endeavour to reinforce the role of parliaments and local public authorities, particularly with regard to the provision of adequate water **services**, and recognized that an effective collaboration with and between these actors is a key factor for meeting water-related challenges and goals.

Examples of key issues for efficient **drinking water** and sanitation services policy frameworks are:

— clear definition of the roles of the different **stakeholders**;

— definition of sanitary rules and organization for **assessment** of compliance;

— processes to assure consistency between the policies regarding urban development and **water utility infrastructure**;

— regulation for water withdrawal and **wastewater** discharge;

— information to the **users** and to the **communities**.

0.2 Water utilities: general objectives

In addition to public health protection, sound **management** of the **drinking water** and **wastewater utilities** (hereinafter jointly referred to as "**water utilities**") is an essential element of integrated water resources **management**. When applied to these utilities, sound **management** practices will contribute, both quantitatively and qualitatively, to **sustainable development**. Sound utility **management** also contributes to social cohesion and economic development of the **communities** served, because the **quality** and **efficiency** of water **services** have implications for virtually all activities of society.

As water is considered a "social good" and activities related to water **services** support the three aspects (economic, social and environmental) of **sustainable development**: it is logical that the **management** of **water utilities** be transparent to and inclusive of all **stakeholders** identified in accordance with the local context.

There is a broad array of types of **stakeholders** that can play a role in activities related to water **services**.

Examples of such **stakeholders** include:

— governments or public agencies (international, national, regional or local) acting with legal or legislative authority;

— associations of the utilities themselves (e.g. international, regional/multinational and national **drinking water** or **wastewater** associations;

— autonomous bodies seeking to play an overview role (e.g. organizations concerned, such as non-governmental organizations);

— **users** and associations of water **users**.

The relationships between **stakeholders** and **water utilities** vary around the world. In many countries, there are bodies that have responsibility (in whole or in part) for overseeing the activities related to water **services**, whether the utilities are publicly or privately owned or operated and whether they are regulated by **relevant authorities** or acting in a system of technical self-regulation. Standardization and technical self-regulation are possible ways of ensuring involvement of all **stakeholders** and meeting the subsidiarity principle.

The aim of **water utilities** is logically to offer **services** to everybody in the area of responsibility of the utility, and to provide **users** with a continuous supply of **drinking water** and the collection and treatment of **wastewater**, under economic and social conditions that are acceptable to the **users** and to the utility. **Water utilities** are expected to meet the requirements of **relevant authorities** and the expectations specified by the **responsible bodies** in conjunction with the other **stakeholders**, while ensuring the long-term sustainability of the service. In a context of scarcity of resources, including financial resources, it is advisable that the investments made in installations be appropriate and that necessary attention be paid to proper maintenance and effective use of the installations. It is advisable that water **tariffs** generally aim at meeting cost-recovery principles and at promoting **efficiency** in the use of the resources, while striving to maintain affordable basic access to water **services**.

It is advisable that the **stakeholders** be involved in both setting **service** objectives and assessing the adequacy and **efficiency** of **service.**

0.3 Objectives, content and implementation of this International Standard

The objective of this International Standard is to provide the relevant **stakeholders** with guidelines for assessing and improving the **service** to **users**, and with guidance for managing **water utilities**, consistent with the overarching goals set by the **relevant authorities** and by the international intergovernmental organizations noted above. This International 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 series of standards addressing water services consists of ISO 24510 (**service**-oriented), this International Standard and ISO 24512 (both **management**-oriented).

ISO 24510 addresses the following topics:

— a brief description of the components of the **service** relating to the **users**;

— core objectives for the **service**, with respect to **users**' needs and expectations;

— guidelines for satisfying **users**' needs and expectations;

— **assessment** criteria for **service to users** in accordance with the provided guidelines;

— examples of **performance indicators** linked to the **assessment** criteria that can be used for assessing the **performance** of the **service.**

This International Standard and ISO 24512 address the following topics:

— a brief description of the physical/infrastructural and managerial/institutional components of **water utilities**;

— core objectives for **water utilities**, considered to be globally relevant at the broadest level;

— guidelines for the **management** of the **water utilities**;

— guidelines for the **assessment** of the water **services** with **service assessment** criteria related to the objectives, and **performance indicators** linked to these criteria.

The **performance indicators** presented in this International Standard, ISO 24510 and ISO 24512 are simply for purposes of illustration, because assessing the **service** to **users** cannot be reduced to a single or universal set of **performance indicators**.

The scope formally excludes the installations inside a user's premises. However, attention is drawn to the fact that the **quality** of the supplied water (or discharged **wastewater**) can be adversely impacted between the **point-of-delivery** (or, in the case of wastewater, the **point-of-collection)**, and the **point-of-use** (or, in case of wastewater, the **point-of-discharge**) by the installations inside the premises. Some **stakeholders**, e.g. **relevant authorities**, owners, contractors and **users,** can have a role to play regarding this issue.

Because the organization of **water utilities** falls within a legal and institutional framework specific to each country, this International Standard does not prescribe the respective roles of various **stakeholders**, nor does it define required internal organizations for local, regional or national bodies that can be involved in the provision of water **services**. In particular, this International Standard does not interfere with the free choice of the **responsible bodies** regarding the general organization and the **management** of their **utilities**. This International Standard is applicable to publicly and privately owned and operated **utilities** alike, and does not favour any particular ownership or operational model.

The guidelines given in this International Standard, ISO 24510 and ISO 24512 focus on **users'** needs and expectations and on the water **services** themselves, without imposing a means of meeting those needs and expectations, the aim being to permit the broadest possible use of this International Standard, ISO 24510 and ISO 24512 while respecting the cultural, socio-economic, climatic, health and legislative characteristics of the different countries and regions of the world. It should therefore be understood that, in the short term, it might not always be possible to meet the expectations of local **users**. This can be due to factors such as climate conditions, resource availability and difficulties relating to the economic sustainability of the water **services**, particularly regarding financing and the **users'** ability to pay for improvements. These conditions can limit the achievement of some objectives or restrict the implementation of some recommendations in developing countries. However, this International Standard is drafted with such constraints in mind and, for example, allows for differing levels of fixed networks and the need for on-site alternatives. Notwithstanding the need for flexibility in terms of engineering and hardware, many recommendations in this International Standard, such as consultation mechanisms, are intended to apply universally.

In order to assess and improve the **service to users** and to ensure proper monitoring of the improvements, an appropriate number of **performance indicators (PIs)** or other methods for checking compliance with **requirements** can be established. The use of **PIs** is only one of the possible support tools for continuous improvement. Stakeholders can select **PIs** from the examples given or develop other relevant **PIs**, taking into account the principles described in this International Standard, ISO 24510 and ISO 24512. The **PIs** logically relate to the objectives for which they are defined through the **assessment** criteria, and are used to measure **performance**. They can also be used to set required or targeted values. This International Standard does not impose any specific **indicator** or any minimum value or **performance** range. It respects the principle of adaptability to local contexts, facilitating local implementation.

While it is in no way intended that this International Standard, ISO 24510 and ISO 24512, and more specifically the **performance indicators** given as examples, be considered as a prerequisite or condition for

the implementation of a water policy or for the financing of projects or programmes, they can serve to assess progress towards policy goals and the objectives of financing programmes.

The objective of this International Standard, ISO 24510 and ISO 24512 is not to lay down systems of specifications supporting direct certification of conformity, but to provide guidelines for the continuous improvement and for the **assessment** of the **service**. Use of this International Standard, ISO 24510 and ISO 24512 is voluntary, in accordance with ISO rules.

This International Standard, ISO 24510 and ISO 24512 are consistent with the principle of the "plan-do-check-act" (PDCA) approach: they propose a step-by-step process, from identifying the components and defining the objectives of the utility to establishing **performance indicators**, with a loop back to the objectives and to the **management**, after having assessed the **performances**. Figure 1 summarizes the content and application of this International Standard. Implementation of this International Standard, ISO 24510 and ISO 24512 does not depend upon adoption of the ISO 9000 series and/or the ISO 14000 series of standards. Nevertheless, this International Standard, ISO 24510 and ISO 24512 are consistent with those **management systems** standards. Implementation of an overall ISO 9001 and/or ISO 14001 **management system** can facilitate the implementation of the guidelines contained within this International Standard, ISO 24510 and ISO 24512; conversely, these guidelines can help to achieve the technical provisions of ISO 9001 and ISO 14001 for organizations choosing to implement them.

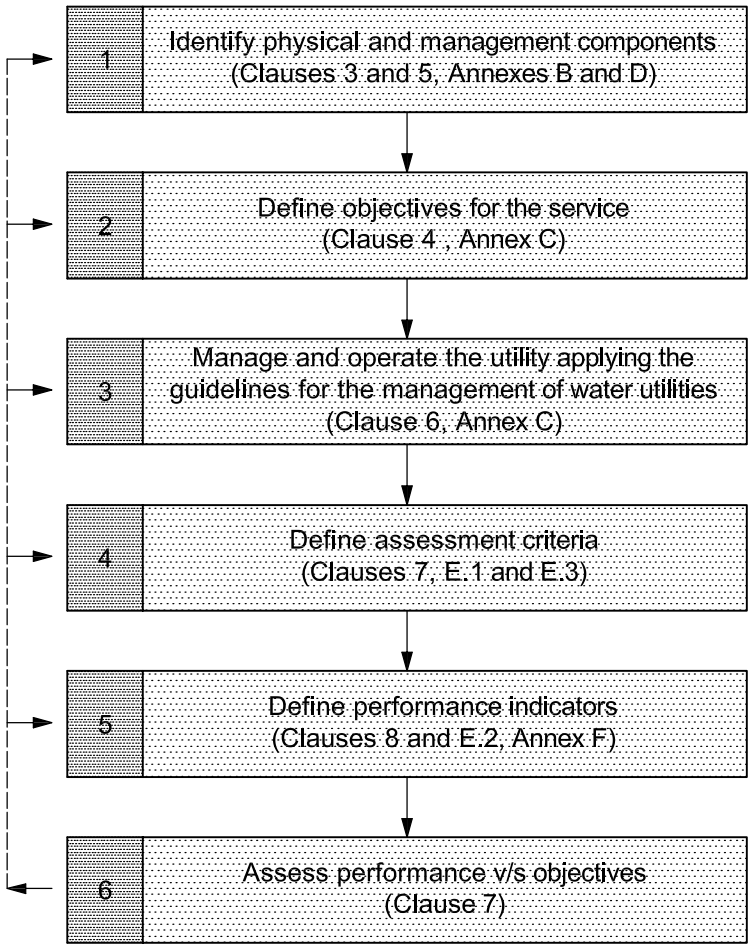

Figure 1 — Content and application of this International Standard

0.4 Wastewater services

Wastewater systems are built and operated mainly to protect public health and the **environment**. The type of **wastewater system** needs to be chosen and adapted in context with the density of the population, climatic conditions, environmental **requirements** for treatment and the technical/socio-economical ability of the **responsible body** to implement it, operate it and maintain it. It needs to be cost effective and sustainable, as well as permitting phased development to overcome the financial constraints while not compromising the stated objectives.

Operationally, the broad objectives of a utility are to provide **wastewater** collection **services** on a continuous or at least intermittent basis (depending on the service mechanism chosen), meeting the related capacity **requirements**. Methods of **wastewater** treatment and/or disposal need to correspond to the chosen collection system.

Appropriately treated **wastewater** is eventually returned to the **environment** and can have significant impact on both quantity and **quality** of natural water resources.

Effective and safe management of **residues** resulting from **wastewater** treatment, including their final disposal or reuse, is becoming increasingly important due to concerns about both environmental protection and resource conservation.

Since it often has a lifetime stretching over several human generations, **wastewater infrastructure** needs to demonstrate intergenerational equity. Consequently, a **wastewater utility**, regardless of ownership, is public in nature and will be subject to public scrutiny and policy. Other criteria, such as cost/**affordability** and **service** sustainability, are addressed in appropriate clauses of this International Standard.

Activities relating to drinking water and wastewater services — Guidelines for the management of wastewater utilities and for the assessment of wastewater services

1 Scope

This International Standard provides guidelines for the management of wastewater utilities and for the assessment of wastewater services.

This International Standard is applicable to publicly and privately owned and operated wastewater utilities, but does not favour any particular ownership or operational model.

NOTE 1 Wastewater is always generated when water is used or consumed. Accordingly, sources of wastewater can be residential, industrial, commercial or institutional. Collected storm water or (melted) snow can also be considered as wastewater, as it often carries contaminants and pathogens picked up from air or ground surfaces on its way to a collection system. In certain circumstances, especially in undeveloped areas, sanitary waste is collected in an undiluted form.

This International Standard addresses wastewater systems in their entirety and is applicable to systems at any level of development (e.g. pit latrines, on-site systems, networks, treatment facilities).

The following are within the scope of this International Standard:

— the definition of a language common to different stakeholders;

— objectives for the wastewater utility;

— guidelines for the management of wastewater utilities;

— service assessment criteria and related examples of performance indicators, all without setting any target values or thresholds.

The following are outside the scope of this International Standard:

— methods of design and construction of wastewater systems;

— regulation of the management structure and the methodology of wastewater service activities of operation and management;

— regulation of the content of contracts or subcontracts;

— topics related to the systems inside buildings, between the point-of-discharge and the point-of-collection.

NOTE 2 This International Standard, ISO 24510 and ISO 24512 comprise a series of standards addressing water services. It is therefore advisable to use these three International Standards in conjunction with each other.

NOTE 3 The list of terms and definitions in Clause 2 is common to this International Standard, ISO 24510 and ISO 24512.

NOTE 4 Annex A contains three tables of correspondence between equivalent terms in English, French and Spanish.