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Environmental management systems — Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area —

Part 2: Water

Systèmes de management environnemental — Lignes directrices pour l'utilisation de l'ISO 14001 afin de prendre en compte les conditions et aspects environnementaux dans le cadre d'une thématique environnementale donnée —

Partie 2: Eau

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 1, *Environmental management systems*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/SS S26, *Environmental management*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 14002 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

0.1 Background

Water is a vital element for the functioning of all living systems on earth and therefore also for human life and well-being. Ecosystems and related biodiversity, also seen as natural capital, can only deliver their multiple values and provide their natural services when appropriately preserved, their resilience maintained, and the respective planetary boundaries respected by economy and society. Protection of water resources is an integral part of sustainable development and is essential for achieving the United Nations' Sustainable Development Goals (SDGs)[25], specifically SDG 6 (clean water and sanitation) and SDG 14 (life below water). Furthermore, protection of water resources has an indirect impact on other goals, such as SDG 2 (zero hunger), SDG12 (responsible consumption and production), SDG13 (climate action) and SDG15 (life on land).

Many organizations apply the general ISO 14001 framework to manage their interactions with the environment. This document provides guidance and examples focused on applying the ISO 14001 framework to address water-related environmental aspects and impacts, as well as water-related environmental conditions and dependencies on water that can have an effect on the organization. It supports organizations to plan action(s) in relation to environmental impacts, and to water dependencies and vulnerabilities at their site(s), in the watershed, and in the life cycle of their products and services. This includes strategic planning and taking actions in relation to:

— protecting aquatic ecosystems and ecosystem services as well as related ecosystems contributing to water balance (e.g. forests);

— protecting water supplies and ensuring water availability;

— minimizing the use of water and water consumption;

— protecting and enhancing water quality;

— adapting and responding to water-related environmental conditions, such as seawater rise, changing precipitation patterns, or gradual changes in water availability and quality;

— preparing for foreseeable water-related events, such as flooding and droughts.

This document is designed for compatibility with other standards related to sustainable use and protection of water resources. It is based on ISO 14002-1 and follows the same approach and order as ISO 14001 but does not address every subclause.

0.2 Risk-based approach

The document refers to water-related environmental aspects, environmental impacts, environmental conditions, and the associated water-related risks and opportunities, including those across the life cycle of an organization's products and services, where appropriate. This document enables organizations to address:

— actual and potential adverse or beneficial impacts on water resources and aquatic ecosystems, originating from their activities or their supply chains;

— actual and potential effects on the organization itself, including risks and opportunities related to the dependency on water.

Potential effects on the organization can include acute and chronic physical threats (e.g. from extreme events such as the flooding of an organization's premises, or the accumulation of pollution in an organization's water supply) as well as transitional risks and opportunities related to changes in regulations, technology, the market, or to the organization's reputation, and opportunities for contributions to sustainable development from a life cycle perspective.

The magnitude of water-related risks and opportunities is influenced by various context-related factors (e.g. climatic, geographical, ecological, socio-economic, water footprint of the organization, applicable compliance obligations), including:

— an organization's vulnerability to water scarcity, water quality, changes in ecosystem services, flooding, and climate change;

— the condition or quality of water bodies or aquatic ecosystems an organization has or can have an impact on, or depends upon;

— increasing competition for water use or conflict over safe access to water resources in a particular location;

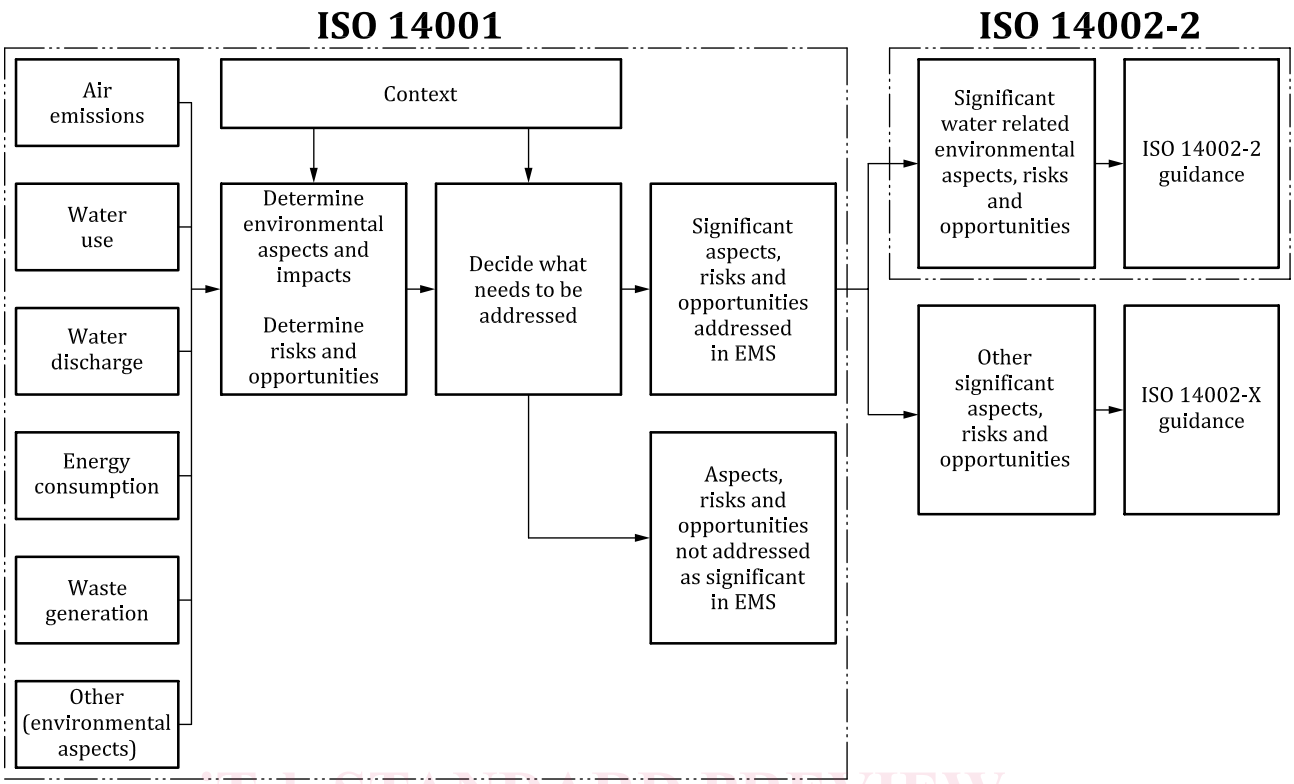
— the condition of infrastructures, including water supply, distribution systems and wastewater treatment.

0.3 Holistic approach to the management of water

An environmental management system according to ISO 14001 requires an organization to evaluate its activities, products and services in order to determine its significant environmental aspects and environmental conditions affecting the organization, as well as relevant risks and opportunities that need to be addressed. This process involves applying a life cycle perspective as part of a comprehensive evaluation of the various impacts an organization can have on the environment and how it depends on it.

An organization that intends to focus its environmental management efforts on water should recognize the interrelations of water with other environmental media and respective ecosystems. It should be aware that the actions it plans and implements to improve water quality or availability can incur adverse impacts on other environmental media like soil and air, or impacts on terrestrial ecosystems. For example, aeration basins or ponds used in wastewater treatment can emit volatile organic compounds to air, and taking action to enhance biodegradation of trichloroethylene in contaminated groundwater can lead to the formation of intermediates or metabolites such as vinyl chloride that are even more hazardous in the ecosystem, and to humans. To avoid such unintended consequences, this document encourages an organization to take a holistic approach when managing water.

Figure 1 shows how ISO 14001 and the parts of the ISO 14002 series can be applied using a holistic approach.



Key

EMS environmental management system

Figure 1 — Interaction between ISO 14001 and the ISO 14002 series

0.4 Using this document to address the environmental topic area of water within an environmental management system

An organization can use this document to help determine how best to address the sustainable use and protection of water resources within an environmental management system. This can be related to, for example:

— specific commitment(s) in the organization's environmental policy, e.g. related to prevention of water pollution, efficient use of water, preservation of aquatic ecosystems and related biodiversity, or sustainable use of marine ecosystem services;

— one or more of its significant environmental aspects or compliance obligations related to water use, water conservation, water pollution, aquatic ecosystems and species, ecosystem services, etc.;

— compliance with applicable legal requirements and permits;

— commitments related to an organization's social responsibility;

— specific risks and opportunities that need to be addressed for water-related environmental conditions or with regard to dependencies on water.

0.5 Case studies

The guidance provided in this document includes four case studies of organizations applying the ISO 14001 framework to address water-related environmental aspects and environmental impacts, environmental conditions, and the associated risks and opportunities that need to be addressed. The organizations in these case studies are fictional, and serve as illustrative examples in diverse contexts, including different industry sectors known to have water-related environmental aspects and environmental impacts, and different geographic locations and environmental conditions. These cases

are provided to illustrate how this document can be applied, with examples from different settings and perspectives, and are not intended as models or templates for applying ISO 14001 or this document.

The first of these cases represents a paper mill and is incorporated in the main body of the document, with examples shown in each clause as appropriate. The other three cases, representing a water utility, a dairy cooperative, and a chemical manufacturing facility, are provided for further reference in Annexes A, B and C. Annex D provides clarification on the usage of some concepts and terminology in this document to enhance user understanding.

0.6 Benefits

The benefits of applying this document can include:

— supporting the fulfilment of compliance obligations related to water withdrawal, water consumption, water quality and public policies;

— enhancing environmental performance and fostering resilient ecosystems by achieving environmental objectives through the management of water-related environmental aspects;

— protecting the environment through prevention or mitigation of adverse impacts on water resources and ecosystems;

— preventing and mitigating water-related business risks and leveraging opportunities in an organization's operations and its supply chain, in response to changing environmental conditions;

— aligning the environmental management system with the organization's strategic direction, e.g. to support specific environmental policy or organizational commitments related to sustainable use and protection of water resources;

— supporting water-related SDGs;

— contributing to compliance with international agreements and conventions related to water as well as the transition to a circular economy (reduction, replacement and reuse of water).

These benefits can also lead to cost reductions, security of supply and production, better relations with relevant interested parties, improved public image, or the maintenance of a social "licence to operate".

Environmental management systems — Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area —

Part 2: Water

1 Scope

This document gives general guidelines for organizations seeking to address water-related environmental aspects, environmental impacts, environmental conditions, and the associated risks and opportunities within an environmental management system in accordance with ISO 14001.

The document addresses issues for environmental management related to water quantity and quality, such as water withdrawal, efficient use of water, and water discharge, as well as approaches to cope with water-related events such as flooding and droughts. The document considers the interconnections of water with other environmental media and takes a holistic approach to the management of water due to its impacts on ecosystems, ecosystem services, related biodiversity, as well as human life and well-being.

This document is applicable to organizations irrespective of their size, type, financial resources, location and sector. It is applicable to all types of water and considers a life cycle perspective.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 14001, *Environmental management systems — Requirements with guidance for use*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14001 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
environmental topic area
area of interest or concern for environmental management in an organization in relation to its surroundings

[SOURCE: ISO 14002-1:2019, 3.1]

3.2
environmental aspect
element of an organization's activities or products or services that interacts or can interact with the environment

Note 1 to entry: An environmental aspect can cause (an) *environmental impact(s)* (3.4). A significant environmental aspect is one that has or can have one or more significant environmental impact(s).

Note 2 to entry: Significant environmental aspects are determined by the organization applying one or more criteria.

[SOURCE: ISO 14001:2015, 3.2.2]

3.3
environmental condition
state or characteristic of the environment as determined at a certain point in time

[SOURCE: ISO 14001:2015, 3.2.3]

3.4
environmental impact
change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's *environmental aspects* (3.2)

[SOURCE: ISO 14001:2015, 3.2.4]

3.5
risks and opportunities
potential adverse effects (threats) and potential beneficial effects (opportunities)

[SOURCE: ISO 14001:2015, 3.2.11]

3.6
life cycle
consecutive and interlinked stages of a product (or service) system, from raw material acquisition or generation from natural resources to final disposal

Note 1 to entry: The life cycle stages include acquisition of raw materials, design, production, transportation/delivery, use, end-of-life treatment and final disposal.

[SOURCE: ISO 14001:2015, 3.3.3]

3.7
water consumption
portion of water use that is neither returned to the original water source after being withdrawn nor available for reclamation

Note 1 to entry: Water consumption refers to water used by an organization.

[SOURCE: ISO 46001:2019, 3.31, modified — Note 1 to entry replaced.]

3.8
ecosystem
dynamic complex of plant, animal and micro-organism communities, and their non-living environment interacting as a functional entity

EXAMPLE Deserts, coral reefs, wetlands, rain forests, boreal forests, grasslands, urban parks, cultivated farmlands.

Note 1 to entry: Ecosystems can be influenced by human activity.

[SOURCE: ISO 14008:2019, 3.1.6]

3.9
ecosystem service
benefit people obtain from *ecosystems* (3.8)

Note 1 to entry: These are generally distinguished into provisioning, regulating, supporting and cultural services. Ecosystem services include the provisioning of goods (e.g. food, fuel, raw materials, fibre), regulating services (e.g. climate regulation, disease control), and non-material benefits (cultural services) (e.g. spiritual or aesthetic benefits). The supporting services are necessary for the production of all other ecosystem services (e.g. soil formation, nutrient cycling, water cycling) and are also referred to as "ecosystem functions".

Note 2 to entry: Ecosystem services are sometimes called "environmental services" or "ecological services".

[SOURCE: ISO 14008:2019, 3.2.11]

3.10
leading indicator
metric that gives an indication of expected performance

[SOURCE: ISO 10014:2021, 3.9]

3.11
lagging indicator
metric that gives an indication of past performance

[SOURCE: ISO 10014:2021, 3.10]

4 Planning actions

4.1 General

An organization that has an interest in the sustainable use and protection of water resources, has significant environmental aspects and impacts related to water, or has identified risks and opportunities that need to be addressed due to effects of changing water-related environmental conditions should undertake a planning process to determine appropriate actions. This process includes a commitment by the organization's leadership, as well as interested parties where relevant, to address water-related interests and concerns, and should involve a review of information and circumstances to:

— gain an understanding of the organization's context in relation to water;

— establish baselines for water-related environmental performance and conditions.

An organization can benefit from taking a broad perspective in this review, considering activities that are connected to the water balance of the organization (i.e. related to water inputs and outputs), its sites or units and other environmental aspects such as releases to soil or emissions to air (e.g. particulate matter, acid rain precursors) that can lead to water pollution.

NOTE ISO 46001:2019, Annex C, provides guidance on preparing a water balance.

4.2 Understanding the organization and its context related to water

4.2.1 Conduct a water-related review

When deciding on appropriate actions, an organization should review and consider its internal and external issues and circumstances in relation to water use, dependency, vulnerabilities and related compliance obligations to be addressed in its environmental management system. This consideration should also include taking a life cycle perspective of an organization's products and services including water-related impacts in their supply chain.

Gathering detailed information, including related strategies, objectives, and targets can be useful.

Important information for a review related to water should include operational and watershed-related information, and information related to the organization's environmental aspects and impacts. This can include, for example:

— information related to the watershed, water source or water body, including:

  — the status of water availability, extraction and limits on access to water (e.g. over withdrawal from water catchment, water conflicts);

  — geographic features or characteristics of the site (e.g. drainage, river basin);

  — sensitivity of ecosystems to changes in water quantity and quality;

  — local water sources, river basin and catchment information (e.g. water balance, water quality, important water-related areas, other water users, governance framework), considering national and transboundary situations;

  — situations that can lead to over-exploitation of aquatic ecosystems (e.g. overfishing, mass tourism, energy production);

— information related to the organization's operations, including:

  — the quantity of water used (water withdrawn, consumed, lost or returned to the original water source);

  — characteristics of wastewater generated (e.g. the level of treatment, treatment capacity, and effluent quality);

  — the quality of water required for the organization's activities;

  — identified water-related events or conditions that can affect the organization (e.g. floods, drought, threats to water quality, consequences of climate change);

  — interested parties and their relevant needs or expectations;

  — specific compliance obligations (e.g. permits, licences, voluntary agreements).

4.2.2 Review water-related environmental aspects and impacts

When deciding on the appropriate actions, an organization should review the environmental aspects of its activities that can have an impact on water (use, quality, conditions) and aquatic ecosystems, and identify those that that are significant and that it will address in its environmental management system. An organization should examine the water inputs and outputs from its activities (e.g. using a water balance chart) as well as its products and services and consider the relevant needs and expectations of its interested parties.

Information related to water inputs and outputs can include:

— current water sources (e.g. water bodies, precipitation, groundwater);

— current water uses (e.g. drinking, cleaning, cooling water, irrigation, industrial process, ingredient of products), water quality and quantity;

— current water reuse, recycling and recirculation;

— current water discharges;

— potential conflicts of water users.

Process flow diagrams and water balance charts for the organization, its sites or its units can help to understand the inputs and outputs of an organization's activities, and the potential water-related environmental aspects.

An organization should also consider its water-related environmental aspects and impacts from all applicable stages of the life cycle of its products and services, including those resulting from the use of its products and services. Product-related environmental aspects and impacts are important inputs to the product design and procurement processes, including use of water in the production phase as well as water that is embedded in the product itself.

NOTE Water embedded in a product can be determined with a water footprint. This can be important for companies in sectors such as agriculture, food and beverage, energy, chemicals, pharmaceuticals, medical devices and cosmetics.

An organization should consider the potential effects originating from the dependency on and vulnerability to water. This can include considerations of:

— nearby water sources the organization relies on and that are impacted by other organizations using the same water source, or by environmental conditions;

— the impact of activities along the supply chain on water resources, if relevant;

— the impact of water consumption and water pollution on the environment including aquatic and terrestrial ecosystems, and local communities.

4.2.3 Determine risks and opportunities that need to be addressed

Taking into consideration the issues identified as part of the context of the organization (see 4.2), including water-related environmental conditions, dependencies on water, as well as compliance obligations, the identified environmental aspects and impacts (see 4.2.2), and the effectiveness of existing control measures, an organization should determine the water-related risks and opportunities and prioritize those to be addressed to achieve the intended outcomes and policy commitments of its environmental management system. This can help to prevent undesired or unintended impacts on the environment or effects on the organization itself.

There are many techniques that can be applied for evaluating water-related risks and opportunities to determine what needs to be addressed. When carrying out the analysis, it can be prudent to involve internal and external interested parties. They can bring information pertinent to the analysis of risks and opportunities, and some of the risks and opportunities can also affect them. An organization can benefit from applying a perspective that takes into account what is important and relevant (material) for its interested parties to determine how and where to prioritize and focus its response and strategy.

Table 1 provides an example of an organization in the paper sector and its priorities for taking action (what needs to be addressed). Annexes A to C provide additional examples in other sectors.