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**Environmental management — Water  
footprint — Principles, requirements  
and guidelines**

*Management environnemental — Empreinte eau — Principes,  
exigences et lignes directrices*

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# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
3.1 Terms relating to types and classifications of water.....	1
3.2 Terms relating to water.....	3
3.3 Terms relating to life cycle assessment and water footprint assessment.....	3
3.4 Terms relating to interpretation and reporting of water footprint results.....	5
3.5 Terms relating to products, product systems, processes and organizations.....	6
3.6 Terms relating to data and data quality.....	8
<b>4 Principles</b> .....	<b>8</b>
4.1 General.....	8
4.2 Life cycle perspective.....	8
4.3 Environmental focus.....	9
4.4 Relative approach and functional unit.....	9
4.5 Iterative approach.....	9
4.6 Transparency.....	9
4.7 Relevance.....	9
4.8 Completeness.....	9
4.9 Consistency.....	9
4.10 Accuracy.....	9
4.11 Priority of scientific approach.....	9
4.12 Geographical relevance.....	9
4.13 Comprehensiveness.....	10
<b>5 Methodological framework</b> .....	<b>10</b>
5.1 General requirements.....	10
5.2 Goal and scope definition.....	11
5.3 Water footprint inventory analysis.....	15
5.4 Water footprint impact assessment.....	20
5.5 Interpretation of the results.....	24
5.6 Limitations of water footprint.....	25
<b>6 Reporting</b> .....	<b>25</b>
6.1 General.....	25
6.2 Additional requirements and guidance for third-party reports.....	26
6.3 Comparative assertion and comparative studies.....	29
<b>7 Critical review</b> .....	<b>29</b>
7.1 General.....	29
7.2 Need for critical review.....	30
7.3 Critical review by internal or external expert.....	30
7.4 Critical review by panel of interested parties.....	30
<b>Annex A (normative) Additional requirements and guidelines for organizations</b> .....	<b>31</b>
<b>Bibliography</b> .....	<b>33</b>

## 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.

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 documents 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](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 5, *Life cycle assessment*.

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## Introduction

Water is an essential natural resource.

The issue of water and its management has become increasingly central to the global debate on sustainable development. This interest has been driven by growing water demand, increasing water scarcity in many areas and/or degradation of water quality. This drives the need for a better understanding of water related impacts as a basis for improved water management at local, regional, national and global levels.

It is therefore desirable to have appropriate assessment techniques that can be used in an internationally consistent manner.

One of the techniques being developed for this purpose is the water footprint assessment.

There is a growing demand for assessing and reporting water footprints. Various methodologies exist to do so and currently these methodologies emphasise different aspects related to water. There is therefore a need to ensure consistency in assessing and reporting water footprints.

This International Standard is expected to benefit organizations, governments and other interested parties worldwide by providing transparency, consistency, reproducibility and credibility for assessing and reporting the water footprint of products, processes or organizations.

A water footprint assessment conducted according to this International Standard:

- is based on a life cycle assessment (according to ISO 14044);
- is modular (i.e. the water footprint of different life cycle stages can be summed to represent the water footprint);
- identifies potential environmental impacts related to water;
- includes relevant geographical and temporal dimensions;
- identifies quantity of water use and changes in water quality;
- utilizes hydrological knowledge.

A water footprint assessment can assist in:

- a) assessing the magnitude of potential environmental impacts related to water;
- b) identifying opportunities to reduce water related potential environmental impacts associated with products at various stages in their life cycle as well as processes and organizations;
- c) strategic risk management related to water;
- d) facilitating water efficiency and optimization of water management at product, process and organizational levels;
- e) informing decision-makers in industry, government or non-governmental organizations of their potential environmental impacts related to water (e.g. for the purpose of strategic planning, priority setting, product or process design or redesign, decisions about investment of resources);
- f) providing consistent and reliable information, based on scientific evidence for reporting water footprint results.

A water footprint assessment alone is insufficient to be used to describe the overall potential environmental impacts of products, processes or organizations.

The water footprint assessment according to this International Standard can be conducted and reported as a stand-alone assessment, where only impacts related to water are assessed, or as part of a life cycle

## ISO 14046:2014(E)

assessment, where consideration is given to a comprehensive set of environmental impacts and not only impacts related to water.

In this International Standard, the term “water footprint” is only used when it is the result of an impact assessment.

The specific scope of the water footprint assessment is defined by the users of this International Standard in accordance with its requirements.

NOTE 1 In this International Standard, the term “product” includes services.

NOTE 2 In this International Standard, the term “environmental impacts” includes categories generally found in impact models used in life cycle assessment, such as impacts on ecosystems, on human health and on resources.

NOTE 3 Reporting is different from communication. Requirements and guidelines for reporting are included in this International Standard, but requirements and guidelines for communication, such as environmental labels or declarations, are outside the scope of this International Standard.

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# Environmental management — Water footprint — Principles, requirements and guidelines

## 1 Scope

This International Standard specifies principles, requirements and guidelines related to water footprint assessment of products, processes and organizations based on life cycle assessment (LCA).

This International Standard provides principles, requirements and guidelines for conducting and reporting a water footprint assessment as a stand-alone assessment, or as part of a more comprehensive environmental assessment.

Only air and soil emissions that impact water quality are included in the assessment, and not all air and soil emissions are included.

The result of a water footprint assessment is a single value or a profile of impact indicator results.

Whereas reporting is within the scope of this International Standard, communication of water footprint results, for example in the form of labels or declarations, is outside the scope of this International Standard.

NOTE Specific requirements and guidelines for organizations are given in [Annex A](#).

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 14044:2006, *Environmental management — Life cycle assessment — Requirements and guidelines*

## 3 Terms and definitions

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

### 3.1 Terms relating to types and classifications of water

#### 3.1.1

##### **freshwater**

water having a low concentration of dissolved solids

Note 1 to entry: Freshwater typically contains less than 1 000 mg/l of dissolved solids and is generally accepted as suitable for withdrawal and conventional treatment to produce potable water.

Note 2 to entry: The concentration of total dissolved solids can vary considerably over space and/or time.

#### 3.1.2

##### **brackish water**

water containing dissolved solids at a concentration less than that of *seawater* (3.1.4), but in amounts that exceed normally acceptable standards for municipal, domestic and irrigation uses

Note 1 to entry: The concentration of total dissolved solids in brackish water can vary from 1 000 mg/l to 30 000 mg/l.

Note 2 to entry: The concentration of total dissolved solids of many brackish waters can vary considerably over space and/or time.

### 3.1.3

#### **surface water**

water in overland flow and storage, such as rivers and lakes, excluding *seawater* (3.1.4)

### 3.1.4

#### **seawater**

water in a sea or an ocean

Note 1 to entry: Seawater has a concentration of dissolved solids greater than or equal to 30 000 mg/l.

### 3.1.5

#### **groundwater**

water which is being held in, and can be recovered from, an underground formation

[SOURCE: ISO 11074:2005, 3.2.2, modified — Note has been removed.]

### 3.1.6

#### **fossil water**

*groundwater* (3.1.5) that has a negligible rate of natural recharge on the human time-scale

Note 1 to entry: The term “non-renewable water” is sometimes used for this concept.

### 3.1.7

#### **water body**

entity of water with definite hydrological, hydrogeomorphological, physical, chemical and biological characteristics in a given geographical area

EXAMPLE Lakes, rivers, groundwaters, seas, icebergs, glaciers and reservoirs.

Note 1 to entry: In case of availability, the geographical resolution of a water body should be determined at the goal and scope stage: it may regroup different small water bodies.

### 3.1.8

#### **drainage basin**

area from which direct surface runoff from precipitation drains by gravity into a stream or other *water body* (3.1.7)

Note 1 to entry: The terms “watershed”, “drainage area”, “catchment”, “catchment area” or “river basin” are sometimes used for the concept of “drainage basin”.

Note 2 to entry: Groundwater drainage basin does not necessarily correspond in area to surface drainage basin.

Note 3 to entry: The geographical resolution of a drainage basin should be determined at the goal and scope stage: it may regroup different sub drainage basins.

### 3.1.9

#### **elementary water flow**

water entering the system being studied that has been drawn from the environment, or water leaving the system being studied that is released into the environment

[SOURCE: ISO 14044:2006, 3.12, modified]



## 3.2 Terms relating to water

### 3.2.1

#### **water use**

use of water by human activity

Note 1 to entry: Use includes, but is not limited to, any *water withdrawal* (3.2.2), water release or other human activities within the *drainage basin* (3.1.8) impacting water flows and/or quality, including in-stream uses such as fishing, recreation, transportation.

Note 2 to entry: The term “water consumption” is often used to describe water removed from, but not returned to, the same drainage basin. Water consumption can be because of evaporation, transpiration, integration into a product, or release into a different drainage basin or the sea. Change in evaporation caused by land-use change is considered water consumption (e.g. reservoir). The temporal and geographical coverage of the *water footprint assessment* (3.3.2) should be defined in the goal and scope.

### 3.2.2

#### **water withdrawal**

anthropogenic removal of water from any *water body* (3.1.7) or from any *drainage basin* (3.1.8), either permanently or temporarily

Note 1 to entry: The term “water abstraction” is sometimes used for this concept.

### 3.2.3

#### **water degradation**

negative change in *water quality* (3.2.4)

### 3.2.4

#### **water quality**

physical (e.g. thermal), chemical and biological characteristics of water with respect to its suitability for an intended use by humans or ecosystems

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## 3.3 Terms relating to life cycle assessment and water footprint assessment

### 3.3.1

#### **water footprint**

metric(s) that quantifies the potential environmental impacts related to water

Note 1 to entry: If water related potential environmental impacts have not been comprehensively assessed, then the term “water footprint” can only be applied with a qualifier. A qualifier is one or several additional words used in conjunction with the term “water footprint” to describe the impact category/categories studied in the water footprint assessment, e.g. “water scarcity footprint”, “water eutrophication footprint”, “non-comprehensive water footprint”.

### 3.3.2

#### **water footprint assessment**

compilation and evaluation of the inputs, outputs and the potential environmental impacts related to water used or affected by a product, process or organization

Note 1 to entry: In this International Standard, the term “study” is often used as synonym for “water footprint assessment”.

### 3.3.3

#### **comprehensive water footprint assessment**

*water footprint assessment* (3.3.2) that fulfils the principle of comprehensiveness

Note 1 to entry: The principle of comprehensiveness implies to consider all environmentally relevant attributes or aspects of natural environment, human health and resources related to water, including *water availability* (3.3.16) and *water degradation* (3.2.3).

## ISO 14046:2014(E)

### 3.3.4

#### **life cycle**

consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to final disposal

[SOURCE: ISO 14044:2006, 3.1]

### 3.3.5

#### **life cycle assessment**

##### **LCA**

compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its *life cycle* (3.3.4)

[SOURCE: ISO 14044:2006, 3.2]

### 3.3.6

#### **life cycle inventory analysis**

##### **LCI**

phase of *life cycle assessment* (3.3.5) involving the compilation and quantification of inputs and outputs for a product throughout its *life cycle* (3.3.4)

[SOURCE: ISO 14044:2006, 3.3]

### 3.3.7

#### **water footprint inventory analysis**

phase of *water footprint assessment* (3.3.2) involving compilation and quantification of inputs and outputs related to water for products, processes or organizations as stated in the goal and scope definition phase

Note 1 to entry: This includes, where relevant, air, water and soil emissions that impact *water quality* (3.2.4).

### 3.3.8

#### **system boundary**

set of criteria specifying which unit processes are part of a product system or the activities of an organization

[SOURCE: ISO 14044:2006, 3.32, modified]

### 3.3.9

#### **cut-off criteria**

specification of the amount of material or energy flow or the level of environmental significance associated with unit processes or product system to be excluded from a study

[SOURCE: ISO 14040:2006, 3.18]

### 3.3.10

#### **water footprint impact assessment**

phase of a *water footprint assessment* (3.3.2), following the *water footprint inventory analysis* (3.3.7), aimed at understanding and evaluating the magnitude and significance of the potential environmental impacts related to water of a product, process or organization

[SOURCE: ISO 14044:2006, 3.4, modified]

### 3.3.11

#### **impact category**

class representing environmental issues of concern to which *life cycle inventory analysis* (3.3.6) results may be assigned

[SOURCE: ISO 14044:2006, 3.39]

**3.3.12****impact category indicator**

quantifiable representation of an *impact category* ([3.3.11](#))

Note 1 to entry: The shorter expression “category indicator” can be used for improved readability.

[SOURCE: ISO 14044:2006, 3.40, modified — Note has been modified.]

**3.3.13****water footprint profile**

compilation of *impact category indicator* ([3.3.12](#)) results addressing potential environmental impacts related to water

Note 1 to entry: If a water footprint profile is comprehensive, it can be called “water footprint profile” without any qualifier – the results of this water footprint profile can be called *water footprint* ([3.3.1](#)); if a water footprint profile is not comprehensive, it needs to be associated with a qualifier that describes objectively what has been assessed.

**3.3.14****characterization factor**

factor derived from a characterization model which is applied to convert an assigned *life cycle inventory analysis* ([3.3.6](#)) result to the common unit of the *category indicator* ([3.3.12](#))

Note 1 to entry: The common unit allows calculation of the category indicator result.

[SOURCE: ISO 14044:2006, 3.37]

**3.3.15****environmental mechanism** (standards.iteh.ai)

system of physical, chemical and biological processes for a given *impact category* ([3.3.11](#)), linking the *life cycle inventory analysis* ([3.3.6](#)) results to *category indicators* ([3.3.12](#)) and to category endpoints

[SOURCE: ISO 14044:2006, 3.38] <http://standards.iteh.ai/catalog/standards/sist/1ccc9106-9cb2-403c-8406-669824187a9e/iso-14046-2014>

**3.3.16****water availability**

extent to which humans and ecosystems have sufficient water resources for their needs

Note 1 to entry: Water availability depends on the location and timing. The temporal and geographical coverage and resolution for evaluating water availability should be determined at the goal and scope phase.

Note 2 to entry: *Water quality* ([3.2.4](#)) can also influence availability, e.g. if quality is not sufficient to meet users needs.

Note 3 to entry: Land and water management (e.g. forestry, agriculture, conservation of wetlands, hydropower) can modify water availability (e.g. regulating river flows and recharging groundwater).

Note 4 to entry: If water availability only considers water quantity, it is called *water scarcity* ([3.3.17](#)).

**3.3.17****water scarcity**

extent to which demand for water compares to the replenishment of water in an area, e.g. a *drainage basin* ([3.1.8](#)), without taking into account the *water quality* ([3.2.4](#))

**3.4 Terms relating to interpretation and reporting of water footprint results****3.4.1****comparative assertion**

environmental claim regarding the superiority or equivalence of one product versus a competing product that performs the same function

[SOURCE: ISO 14044:2006, 3.6]

### 3.4.2

#### **interested party**

person or organization that can affect, be affected by, or perceive themselves to be affected by the results of a water footprint assessment

## 3.5 Terms relating to products, product systems, processes and organizations

### 3.5.1

#### **product**

goods or service

Note 1 to entry: The product can be categorized as follows:

- service (e.g. transport, implementation of events);
- software (e.g. computer program, dictionary);
- hardware (e.g. engine mechanical part);
- processed material (e.g. steel);
- agricultural and forest products (e.g. food, lumber, paper).

[SOURCE: ISO 14044:2006, 3.9, modified]

### 3.5.2

#### **co-product**

any of two or more *products* (3.5.1) coming from the same *unit process* (3.5.6) or *product system* (3.5.4)

[SOURCE: ISO 14044:2006, 3.10]

### 3.5.3

#### **waste**

substances or objects which the holder intends or is required to dispose of

Note 1 to entry: The definition is taken from the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal* (22 March 1989) but is not confined in this International Standard to hazardous waste.

[SOURCE: ISO 14044:2006, 3.35]

### 3.5.4

#### **product system**

collection of *unit processes* (3.5.6) with elementary and product flows, performing one or more defined functions, and which models the *life cycle* (3.3.4) of a *product* (3.5.1)

[SOURCE: ISO 14044:2006, 3.28]

### 3.5.5

#### **process**

set of interrelated or interacting activities that transforms inputs into outputs

[SOURCE: ISO 14044:2006, 3.11]

**3.5.6****unit process**

smallest element considered in the *life cycle inventory analysis* (3.3.6) for which input and output data are quantified

[SOURCE: ISO 14044:2006, 3.34]

**3.5.7****functional unit**

quantified performance of a *product system* (3.5.4), *process* (3.5.5) or *organization* (3.5.11) for use as a reference unit

Note 1 to entry: In the case of a *water footprint assessment* (3.3.2) for organizations, the term “reporting unit” can replace the term “functional unit”.

[SOURCE: ISO 14044:2006, 3.20, modified]

**3.5.8****reference flow**

measure of the outputs from *processes* (3.5.5) in a given *product system* (3.5.4) required to fulfil the function expressed by the *functional unit* (3.5.7)

[SOURCE: ISO 14044:2006, 3.29]

**3.5.9****product category**

group of products that can fulfil equivalent functions

[SOURCE: ISO 14025:2006, 3.12] (standards.iteh.ai)

**3.5.10****product category rules**

set of specific rules, requirements and guidelines for developing Type III environmental declarations for one or more *product categories* (3.5.9)

[SOURCE: ISO 14025:2006, 3.5]

Note 1 to entry: Product category rules are compliant with ISO 14044.

**3.5.11****organization**

person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives

**3.5.12****facility**

single installation, set of installations or production processes (stationary or mobile), which can be defined within a single geographical boundary, organizational unit or production process

[SOURCE: ISO 14064-1:2006, 2.21]

**3.5.13****water footprint inventory**

result of a *water footprint inventory analysis* (3.3.7), including elementary flows which are usable for subsequent *water footprint impact assessment* (3.3.10)

**3.5.14****direct water footprint inventory**

*water footprint inventory* (3.5.13) considering inputs and outputs resulting from activities within the established organizational boundaries