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Marine technology — Seawater desalination — Vocabulary

Navires et technologie maritime — Dessalement de l'eau de mer — Terminologie

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Contents

Foreword..... iv
Introduction..... v
1 Scope..... 1
2 Normative references 1
3 Terms and definitions..... 1
3.1 Basic definitions 1
3.2 Water intake 2
3.3 Pre-treatment..... 3
3.4 Membrane desalination 5
3.5 Distillation desalination..... 7
3.6 Post-treatment 10
3.7 Auxiliary terms..... 10
Bibliography 13
Index 15

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Foreword

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This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 13, *Marine technology*.

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

Establishing a standardized set of terms and definitions is highly important for the production of scientific and engineering publications in a technical area, including the development of standards. The absence of a standardized terminology can ultimately result in inefficiencies and a high-probability of misinterpretation.

This document defines terms and definitions used in the entire process of seawater desalination. The flow process of seawater desalination is given in [Figure 1](#). Desalination methods are mainly categorized into distillation processes and membrane processes. Both processes involve mutual parts of water intake, pre-treatment and post-treatment, but differ in terms of membrane desalination and distillation desalination. In addition, the auxiliary part consisting of membrane cleaning and agents dosing is essential for specific processes.

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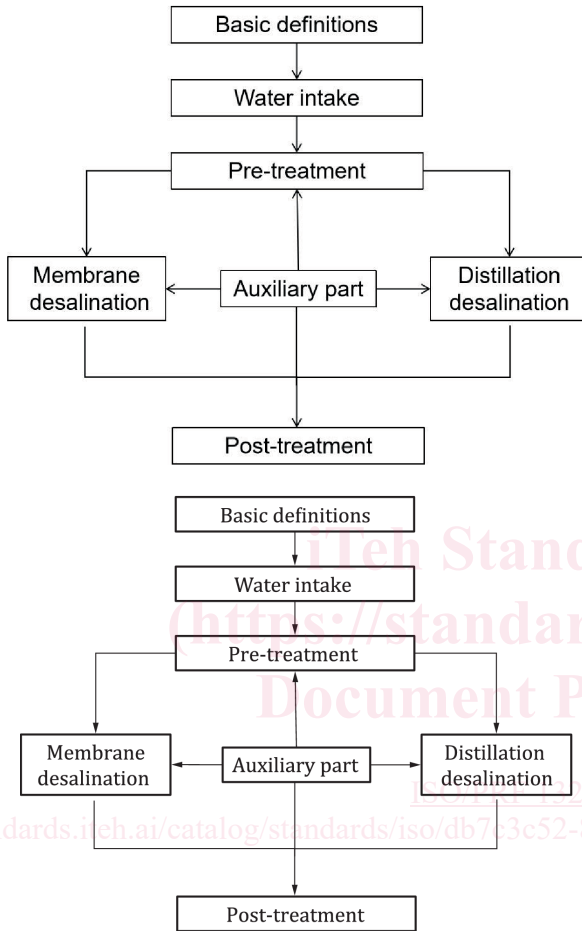


Figure 1 — Flow diagram of seawater desalination terminology

This document aims to provide guidance for unified terminology in seawater desalination; remove any obstacles to communication in management, industry and academia; and promote multi-field cooperation in more countries and regions. The objective of this document is to consolidate unified descriptions of seawater desalination activities, for the benefit of all users and stakeholders.

Marine technology — Seawater desalination — Vocabulary

1 Scope

This document defines terms and definitions for the integral seawater desalination process. It covers basic definitions, as well as specific subject matter including water intake, pre-treatment, membrane desalination, distillation desalination, post-treatment and auxiliary part.

This document applies to all types and sizes of seawater desalination facilities and systems, and to all types of stakeholders involved in seawater desalination.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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 Basic definitions

3.1.1

seawater desalination

process which removes excess substances such as organisms and salts from seawater to make it usable as municipal water, industrial water and for other applications

3.1.2 <https://standards.iteh.ai/catalog/standards/iso/db7c3c52-8f55-44bf-b11e-0d9de901b266/iso-prf-13205>

seawater desalination system

set of interrelated or interacting units for *seawater desalination* (3.1.1(3.1.1)) processes, including *source water intake* (3.2.1(3.2.1)) system, *pre-treatment* (3.3.1(3.3.1)) facilities, membrane and distillation separation devices, post-treatment facilities and electronic control unit, etc.

3.1.3

source water

raw water

inlet water supplied to the *seawater desalination system* (3.1.2(3.1.2))

3.1.4

feed water

inlet water supplied to an individual component or a device of *seawater desalination system* (3.1.2(3.1.2))

3.1.5

desalinated water

freshwater produced by distillation and membrane desalination plants

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[SOURCE: ISO 23446:2021, 3.1, modified — term changed from "desalted water" to "desalinated water"; in the definition, "seawater reverse osmosis" has been replaced by "distillation and membrane".]

3.1.6

product water

water produced by *post-treatment* (3.6.3) of *desalinated water* (3.1.5(3.1.5)) such as *mineralization* (3.6.4) and *waters blending* (3.6.5)

[SOURCE: ISO 23446:2021, 3.2, modified — "desalted water" was replaced by "desalinated water".]

3.1.7

brine

concentrate (reject) stream from a membrane or a distillation device performing desalination, with a salinity that is higher than seawater

3.1.8

concentration factor

CF

ratio of the concentration of components in the retentate (concentrate, *brine* (3.1.7)) to the concentration of the total components in the feed

Note 1 to entry: Concentration factor (CF) is generally expressed by C_b/C_f , where C_b is brinewater concentration and C_f is feedwater concentration.

3.1.9

recovery rate

ratio of the permeate volume to the feed volume

[SOURCE: ISO 23070:2020, 3.10]

3.1.10

element

component containing the membrane, generally replaceable, such as hollow ~~fiber~~^{fiber} spiral wound cartridge or cassette

[SOURCE: ASTM D6161-2019, 5.1, modified — in the definition, " — "hollow ~~fiber~~^{fiber}" has been added to the definition.]

3.1.11

module

membrane *element* (3.1.10) combined with the element's housing

Note 1 to entry: ~~Pressure~~^{The pressure} vessel (3.4.3) containing the membrane element(s).

[SOURCE: ASTM D6161-2019, 5.1, modified — in — part of the original definition, "Pressure vessel containing membrane element(s)" has been moved to Note 1 to entry.]

3.2 Water intake

3.2.1

water intake

process of withdrawing seawater from the source

3.2.2

surface intake

seawater collected from the open ocean above the seabed

Note 1 to entry: Surface intakes can be single purpose or collocated with a power plant as well as offshore submerged, nearshore submerged, or nearshore surface intakes, etc.

3.2.3

subsurface intake

seawater collected via *vertical wells* (3.2.3.1), infiltration galleries or other locations beneath the seabed

Note 1 to entry: Subsurface intakes can be onshore (vertical wells), including vertical beach wells or deep aquifer wells, horizontal wells, radial or collector wells, and beach infiltration galleries; or offshore wells, including horizontal drains (wells), and seabed infiltration galleries.

3.2.3.1

vertical well

well which is well-drilled straight down into the underlying rock or unconsolidated coastal aquifer system

3.2.3.2

slant well

well which is well-drilled at an angle from the horizontal into the underlying rock or unconsolidated coastal aquifer system

3.2.3.3

infiltration gallery

filtering device which is a horizontal drain made from open jointed or perforated pipes, or a blocked drain, which is laid below the water table and collects seawater

3.2.3.4

tunnelled intake

seawater collected from deep water by the tunnelled structure

Note 1 to entry: The tunnel is built over the full distance from the intake structure to the diffusers offshore.

3.3 Pre-treatment

3.3.1

pre-treatment

processes such as chlorination, filtration, coagulation, clarification, dechlorination, etc., which may be used on feed water (3.1.4) ahead of reverse osmosis (3.4.2) membrane devices and distillation devices to minimize scaling (3.6.2) and blockage potential, and to control biological activity

3.3.2

sterilization

process which inactivates or removes all living organisms (including vegetative and spore forms) as well as viruses

[SOURCE: ISO 6107:2021, 3.539]

3.3.3
dissolved air flotation
DAF

flotation process by which low density particles are removed from seawater by using fine bubbles which are produced by the reduction in pressure of a water stream saturated with air

[SOURCE: ISO 20480-4:2021, 3.2, modified — Note 1 to entry has been ~~deleted~~~~removed~~.]

3.3.4
flocculation

formation of large separable particles by aggregation of small particles; the process is usually assisted by mechanical, physical, chemical or biological means

[SOURCE: ISO 6107:2021, 3.234]

3.3.5
sedimentation

process of settling and depositing suspended solids in water under the action of gravity

3.3.6
sand filter

device used to remove suspended solids

Note 1 to entry: ~~the sand~~ Sand filter is made up of layers of inert medium, usually quartz/silica sand.

3.3.7
~~multi-media~~multimedia **filter**
MMF

layered filtration media in a pressurized container, used to reduce the level of suspended solids (turbidity) in incoming *feed water* (3.1.4~~(3.1.4)~~).

Note 1 to entry: Media layers can consist of anthracite, activated carbon, quartz/silica sand and garnet.

[SOURCE: ISO 22519:2023, 3.1.3]

3.3.8
self-cleaning filter

filtration system used to reduce the level of suspended solids (turbidity) in incoming *feed water* (3.1.4~~(3.1.4)~~), as well as automatically clean itself

Note 1 to entry: The self-cleaning filter starts automatic cleaning mechanisms according to the pre-set cleaning cycle or system differential pressure due to the accumulation of suspended solids (turbidity).

3.3.9
microfiltration
MF

pressure driven membrane-based separation process designed to remove particles and dissolved macromolecules in the approximate range of 0,05 µm to 2 µm

[SOURCE: ASTM D6161-2019, 5.1]