



**International
Standard**

ISO 5411

**Ships and marine technology —
Submersibles — Vocabulary**

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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 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.

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Introduction

Many countries have the technology and ability to design, construct and operate submersibles, together with the industrial capability and resources to support safe and effective submersible operations. To enable greater international understanding and collaboration between participating regions, operators and manufacturers, it is advantageous to use a common set of terms and concept definitions. This will result in several benefits including facilitating comparison of products, contributing to innovation, reducing misunderstanding, improving efficiency and enabling international trade. In essence, standardized terminology is fundamental to a series of standardization activities of submersibles.

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Ships and marine technology — Submersibles — Vocabulary

1 Scope

This document provides basic terminology and concepts related to submersibles. It covers 11 aspects of terminology related to submersibles: types, performance, structural system, mechanical system, electrical system, acoustic system, control system, surface system, work pattern, test and maintenance and personnel.

It is not applicable to particular conditions, such as the classification and construction of submersibles.

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 Types

3.1.1

submersible

type of powered vessel that can travel and manoeuvre underwater

3.1.2

manned submersible

submersible (3.1.1) that encloses one or more persons within its *pressure hull* (3.3.2), fitted with one or more available surface accesses, or underwater pressurized or non-pressurized accesses

3.1.3

tethered submersible

submersible (3.1.1) with an *umbilical* (3.8.1) or *tether* (3.8.2) attached to the surface, *support ship* (3.8.4) or underwater structure

3.1.4

untethered submersible

submersible (3.1.1) without an *umbilical* (3.8.1) or *tether* (3.8.2)

3.1.5

transport submersible

manned submersible (3.1.2), designed for the movement of cargo, equipment or *passengers* (3.11.3) in addition to *crew* (3.11.2) underwater, for recreation, scientific expedition, rescue or other purposes

3.1.6

passenger submersible

passenger-carrying mobile vessel, which primarily operates under water and relies on surface support

[SOURCE: IMO MSC/Circ. 981, 1.2.12]

3.1.7

deep submergence rescue vehicle

DSRV

submarine rescue vehicle

SRV

manned submersible (3.1.2) and *untethered submersible* (3.1.4), specifically designed to evacuate persons from a disabled or distressed submarine using an underwater mating interface to create one or more dry personnel transfer structures under normobaric or hyperbaric conditions

3.1.8

lock-out submersible

manned submersible (3.1.2) and *untethered submersible* (3.1.4), equipped with a lock-in or lock-out chamber and access hatch for entry, egress and accommodation of a diver or *divers* (3.11.4) with an adjustable *operating pressure* (3.2.8) capability

3.1.9

towed submersible

tethered submersible (3.1.3) towed by a power-driven vessel with depth and attitude adjustment ability

3.1.10

atmospheric diving suit

ADS

anthropomorphic and single-person *tethered submersible* (3.1.3) with manually operated articulated arms and/or legs, which can perform related underwater tasks, withstanding external pressure and maintaining internal pressure at or near one atmosphere

3.1.11

dry diving bell

manned submersible (3.1.2) and *tethered submersible* (3.1.3), equipped with a hemispherical frame and specialized apparatus for transferring persons between the underwater site and deck or the *deck compression chamber* (3.8.6) of a *support ship* (3.8.4) for operation, rescue or other purposes

3.1.12

saturation diving system

complex of functionally integrated technical means, devices and facilities in which a *diver* (3.11.4) is exposed to hyperbaric pressure for a period until the diver's blood and tissues have absorbed all the gas

Note 1 to entry: The time required for decompression becomes constant at this hyperbaric pressure after the diver's blood and tissues have absorbed all of the gas.

3.1.13

seabed laboratory

submersible (3.1.1) designed to conduct a field inspection and support a long-term underwater habitat for persons or other creatures for an in-situ test

3.2 Performance

3.2.1

life expectancy

designed number of dives that a *submersible* (3.1.1) can complete safely before requiring an appropriate technical engineering review of its structural integrity to ensure it can again be safely operated underwater

3.2.2

design mission time

time period for a *submersible* (3.1.1) from launch to recovery, when the designed mission is performed under operating conditions defined by the manufacturer

3.2.3

working time

time period which consists of *design mission time* (3.2.2), excluding the processing time of the *launch and recovery system* (3.8.5) and the related surfacing and submerging

3.2.4

bottom time

time during which a *submersible* (3.1.1) is permitted to sit on seabed

3.2.5

light weight

air mass of a complete *submersible* (3.1.1) including all its permanently installed components, liquids and gas in machinery and *pipings* (3.4.16) to their working levels as defined by the manufacturer, but excluding consumables, *payload* (3.2.6), persons and effect

3.2.6

payload

passengers (3.11.3) from the *transport submersible* (3.1.5), rescued persons from the *deep submergence rescue vehicle* (3.1.7) or other items carried by a *submersible* (3.1.1) in addition to the *crew* (3.11.2), *pilot* (3.11.1) and permanently fitted equipment, performing the specific mission

3.2.7

operating depth

depth in metres of water (seawater or fresh water) for which a *submersible* (3.1.1) normally operates

3.2.8

operating pressure

pressure which a *submersible* (3.1.1) withstands to operate normally

Note 1 to entry: It is expressed in megapascals (MPa).

3.2.9

design depth

maximum *operating depth* (3.2.7) to which a *submersible* (3.1.1) is designed to dive safely, as measured from the surface to its keel

3.2.10

design pressure

maximum pressure which a *submersible* (3.1.1) can withstand to dive safely

Note 1 to entry: It is expressed in megapascals (MPa). [ISO 5411](https://standards.iteh.ai/ISO-5411)

3.2.11

collapse depth

depth at which a *submersible's pressure-resistant structure* (3.3.1) is predicted to fail, causing the *pressure hull* (3.3.2) to collapse

3.2.12

collapse pressure

external pressure which is liable to causing the *pressure-resistant structure* (3.3.1) to collapse

3.2.13

test depth

pre-determined depth used to enable safe pressure testing of the *submersible* (3.1.1) during manufacture and through life certification of the vessel

3.2.14

test pressure

pressure withstood by the *pressure-resistant structure* (3.3.1) of a *submersible* (3.1.1) during tests such as the *tightness test* (3.10.13) or the *hydrostatic pressure test* (3.10.14)

3.2.15

life support system

equipment and systems required to maintain a *manned submersible* (3.1.2) in a habitable condition in all anticipated operating conditions

[SOURCE: IMO MSC/Circ. 981, 1.2.6, modified — "the passenger submersible craft" has been replaced by "a manned submersible" in the definition.]

3.2.16

breathing air supply system

equipment providing breathing air to the *manned compartment(s)* (3.3.3) while a *manned submersible* (3.1.2) is surfaced or submerged

[SOURCE: ISO 22252:2020, 3.7, modified — "the submersible" has been replaced by "a manned submersible" in the definition.]

3.2.17

carbon dioxide removal

apparatus removing carbon dioxide from the pressure hull for persons within a *manned submersible* (3.1.2) during its underwater operation and observation

3.2.18

diving and operation training simulation system

system that can simulate the physical appearance, internal structure, underwater view, operation procedure and fault response of a *submersible* (3.1.1), with a view to reducing training cost, improving training efficiency and ensuring training safety

3.3 Structural system

3.3.1

pressure-resistant structure

material structure capable of withstanding external pressure from the water column in which a *submersible* (3.1.1) is designed to operate, or internal pressure from the *pressure hull* (3.3.2)

Note 1 to entry: A pressure-resistant structure includes the lock-in or lock-out chamber, *viewport* (3.3.4), *buoyancy material* (3.3.7) and other relevant equipment.

3.3.2

pressure hull

shell capable of withstanding the internal and external *design pressure* (3.2.10), in which occupants and the required equipment are housed

[SOURCE: ISO 21173:2019, 3.7, modified — "external pressure" has been replaced by "external design pressure" in the definition.]

3.3.3

manned compartment

compartment within the *pressure hull* (3.3.2) designed to accommodate persons inside a *manned submersible* (3.1.2)

3.3.4

viewport

penetration (3.3.15) in a *manned submersible* (3.1.2) including *window* (3.3.5), flange, retaining ring, and *seal* (3.3.16)

[SOURCE: IMO MSC/Circ. 981, 1.2.18, modified — "the pressure boundary" has been replaced by "a manned submersible" in the definition.]