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Ships and marine technology — Marine environment protection — Tank and piping systems for facilitating 5 ppm oil water separation

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CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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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.

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).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee 8, *Ships and marine technology*, Subcommittee 2, *Marine environment protection*.

Introduction

Marine environment protection is required by law in accordance with national, regional and international regulations.

The *international Convention for the Prevention of Pollution by Ships* (MARPOL) was adopted in 1973 and it has been regularly updated by amendments made by the Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO). MARPOL is the legal basis for the prevention of marine pollution. MARPOL requires the installation of oil water separation systems to treat fluids consisting of mixtures of oil and water generated on board ships.

On fixed offshore marine structures, oil in water emulsions, oil mixtures of surface water, fuel and lubrication oil and many other regulated substances arise. There is a desire to separate these mixtures to a concentration less than what is currently required by MARPOL. This document addresses the optimization of oil water separation to 5 ppm for fixed offshore marine structures and ships.

This document is also applicable to ships operating in designated sea areas determined by the relevant authorities.

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Ships and marine technology — Marine environment protection — Tank and piping systems for facilitating 5 ppm oil water separation

1 Scope

This document provides requirements for tanks, piping and separation systems facilitating the separation of contaminated fluids of oil and water on fixed offshore marine structures and ships. Treatment is performed by separation systems that optimize oily water separation to a concentration equal to or less than 5 ppm.

NOTE On fixed offshore marine installations (e.g. converter stations and transformer substations of offshore wind turbines), oil-water emulsions, oily mixtures, surface water, fuel and lubricating oil spills and similar substances arise.

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.

IMO MEPC. 107(49), *Revised guidelines and specifications for pollution prevention equipment for machinery space bilges of ships*

ISO 8217, *Petroleum products — Fuels (class F) — Specifications of marine fuels*

ISO 9377-2, *Water quality — Determination of hydrocarbon oil index — Part 2: Method using solvent extraction and gas chromatography*

IEC 60092-502, *Electrical installations in ships, Part 502: Tankers – Special features*

3 Terms and definitions

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

3.1

parts per million

PPM

Parts of oil per million parts of water by volume

Note 1 to entry: 1 PPM equals one per million by volume.

3.2

PPM display

Numerical scale display of ppm oil content by volume

4 Technical specifications

4.1 Oil water separation equipment (OWSE)

Oil water separation equipment (OWSE) installed on fixed offshore marine structures shall be constructed suitable for offshore use. OWSE may also apply to ships operating in designated sea areas determined by the relevant authorities.

OWSE shall comprise:

- Oil water separator (5 ppm OWS)
- 5 ppm oil content meter (5 ppm OCM)
- Automatic discharge stopping device (ADSD)

OWSE shall, if intended to be fitted in locations where flammable atmospheres may be present, comply with the relevant safety regulations for such spaces. Any electrical or electronic equipment which is part of the 5 ppm oil water separation equipment shall be designated for use in non-hazardous areas, or shall be type approved by the Administrations or recognized organizations on their behalf as safe for use in hazardous areas.

[Figure 1](#) shows an example of the functional layout of OWSE.

OWSE shall be resistant to corrosion and to other conditions of the marine environment where it is in use.

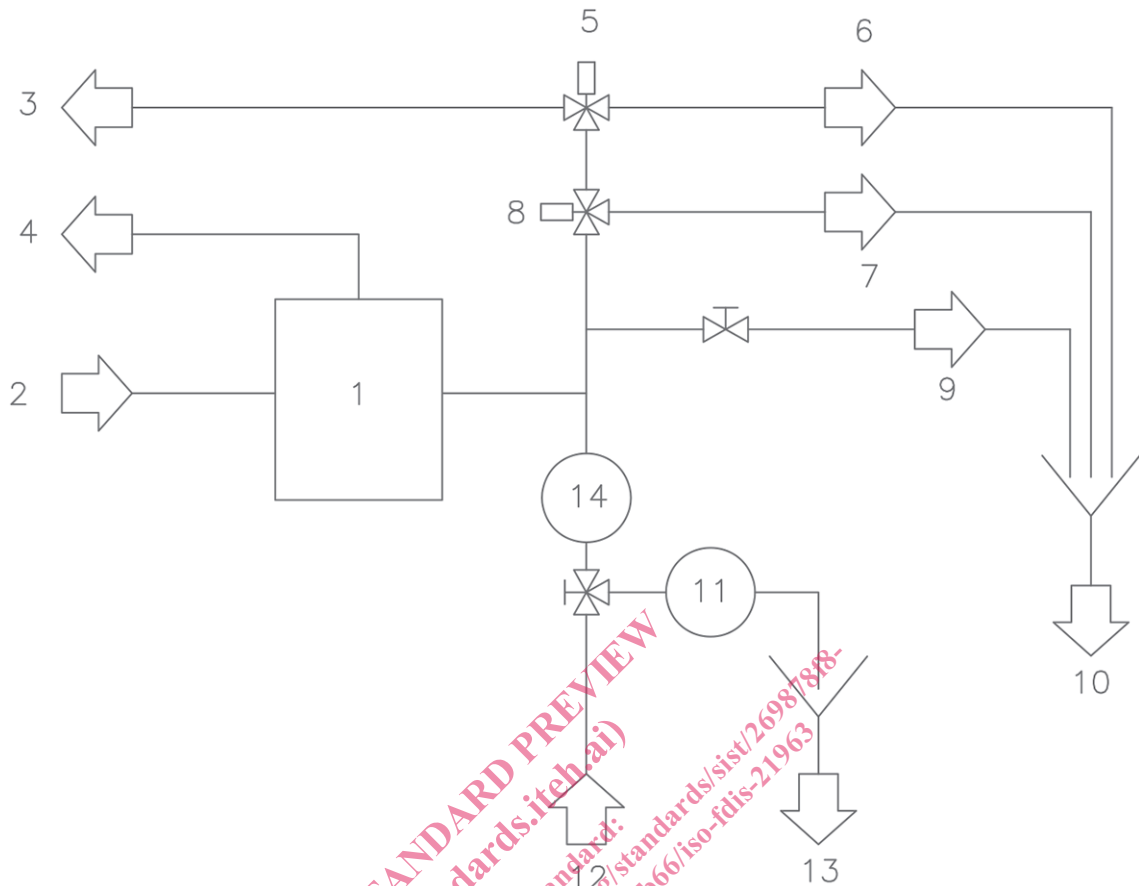
An OCM may include an oil contact alarm.

An example of a schematic plan for management of oil in water effluent in fixed marine offshore structures is shown in [Figure A.1](#) of [Annex A](#).

An example of a schematic diagram for management of the separation and treatment of oil in water effluent on fixed marine structures is shown in [Figure A.2](#) of [Annex A](#).

A fixed offshore marine structure or ships fitted with OWSE shall, at times, have a copy of the operating and maintenance manuals available.

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**Key**

- | | | | |
|---|--|----|---|
| 1 | 5 ppm OWS | 8 | ADSD |
| 2 | mixture inlet, filling and rinsing (oil free water) | 9 | sampling location |
| 3 | discharge treated water, oil <5ppm into the sea | 10 | back to bilge water holding tank or bilge |
| 4 | discharge separated media into waste oil tank | 11 | OCM |
| 5 | manual recirculation facility or valve for testing (inherently safe) | 12 | flushing water inlet |
| 6 | discharge for testing | 13 | drain |
| 7 | recirculation water, oil >5ppm | 14 | flow switch controller |

Figure 1 — Example of functional layout of OWSE**4.2 5 ppm OWS**

A 5 ppm OWS shall be designed to reduce the oil content in an oil-in-water mixture to a volume concentration equal to or less than 5 ppm.

A 5 ppm OWS shall be so designed that it functions automatically. However, fail-safe arrangements to avoid any discharge in case of malfunction shall be provided.

The 5 ppm OWS may include any combination of a separator utilizing gravity separation, filtration, and coalescing to produce an effluent with an oil content not exceeding 5 ppm by volume.

The 5 ppm OWS shall utilize a continuous automatic process and shall indicate when it is in operation. It shall be capable of continuous operation for at least 24 hours or normal duty without attention.

All parts of the 5 ppm OWS which are subject to wear and tear, as well, shall be easily accessible for maintenance.

4.3 Oil content meter (OCM)

An OCM shall be able to measure the oil content in the water mixture by a resolution of 1 ppm and provide a ppm display. The ppm reading shall not be affected by emulsions and/or the type of oil.

An OCM shall give an alarm signal of the oil content exceeds 5 ppm in the effluent. The response time of the OCM, that is the duration between a deviation in the sample being supplied to the OCM and the display showing the current oil content (ppm) shall not exceed 5 s.

If the OCM is flushed with water for more than 5 s, the system shall create an alarm.

The accuracy of the OCM shall be checked at least every 5 years according to the manufacturer's instructions. Alternatively, the unit may be replaced by a calibrated OCM. The calibration certificate for the OCM, certifying the date of the last calibration check, shall be retained on the fixed offshore marine installation for inspection purposes. The accuracy checks can only be done by the manufacturer or duly authorized entity.

The Administration shall require the type approval of the 5 ppm OCM[2].

4.4 Automatic discharge stopping device

The ADSD shall stop automatically any discharge overboard of the oily mixture if the content of the effluent exceeds 5 ppm measured by the OCM, or when failure of the OCM occurs.

The ADSD shall consist of a valve arrangement, installed in the effluent outlet line of the 5 ppm OWS, which diverts the effluent mixture from being discharged overboard back to the source or other tank if the free oil content of the effluent exceed the pre-set value.

4.5 Electric and electronic systems

The switchboard of OWSE shall be type approved by the Administration or recognized organization on their behalf in accordance with [Annex C](#) of this document.

4.6 Heating facilities

If the OWSE is fitted with heating facilities to retain the oil in it to a maximum of 40°C by any process, the certificate of type approval shall be endorsed with the following statement:

"The 5 ppm OWSE is fitted with heating facility"

5 Installation requirements

5.1 5 ppm OWS

For inspection purposes, a sampling point shall be provided at a position in a vertical section of the water effluent piping as close as is practicable to the 5 ppm OWS outlet. Recirculation facilities shall be provided, after and adjacent to the overboard outlet of the stopping device to enable the OWSE system to be tested with the overboard discharge closed (see [Figure 1](#)).

The recirculating facility shall be so configured as to prevent under all operating conditions any bypass of the OWS.

The capacity of the supply pump shall not exceed 90% of the rated capacity of the 5 ppm OWS.

The OWS shall be fitted with a permanently attached nameplate giving any operational or installation limits considered necessary by the manufacturer.