FINAL
DRAFT

INTERNATIONAL
STANDARD

**ISO/FDIS
21072-3**

ISO/TC **8**/SC **2**

Secretariat: ANSI

Voting begins on:
2020-06-26

Voting terminates on:
2020-08-21

Ships and marine technology — Marine environment protection: performance testing of oil skimmers —

Part 3: High viscosity oil

Navires et technologie maritime — Protection de l'environnement marin: essais de performance des écumeurs du pétrole —

Partie 3: Pétrole haute densité

Reference number
ISO/FDIS 21072-3:2020(E)

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Published in Switzerland

Contents

Page

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).

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).

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

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 ISO/TC 8, *Ships and marine technology*, Subcommittee SC 2, *Marine environmental protection*.

This second edition cancels and replaces the first edition (ISO 21072-3:2010), of which it constitutes a minor revision. The changes compared to the previous edition are as follows:

— the focus of this second edition continues to address testing oil skimmers in high viscosity oil, but due to the withdrawal of ISO 20172-1:2019, the following from ISO 20172-1:2019 has been added: the terms and definitions 3.2 through 3.10, and Subclause 4.4, “Oil slick thickness”;

— minor revisions to the key in Figure 1;

— example updated in Table 1.

A list of all parts in the ISO 21072 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

ISO 21072 standardizes performance testing of oil skimmers used in marine pollution control.

Some oil skimmers have previously been performance tested under non-standard conditions and procedures, with declared performance parameters being of limited value to the end user, especially under field conditions.

ISO 21072 provides methods for carrying out and recording the results of full-scale tests for a skimmer under a variety of test conditions.

Ships and marine technology — Marine environment protection: performance testing of oil skimmers —

Part 3: High viscosity oil

1 Scope

This document specifies a methodology for establishing quantitative performance data for oil skimmers for recovery of oil with high viscosity (above 50 000 cP), so the end user can objectively judge, compare and evaluate the design and performance of different skimmers. The methodology applies to testing in a basin and requires control of oil properties and oil slick characteristics.

The method is applicable to all types of skimmers provided that the equipment dimensions are within the physical limitations of the test basin. The test procedure provides full-scale test results for the unit tested, under controlled conditions, and for one or more classes of highly viscous oil. Attention is drawn to the care required when applying the test results to predict a realistic skimmer performance under field conditions.

For dedicated/in-built systems, the test procedures outlined in this document are only applicable to the skimming device as such, not to the entire skimming system.

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 16165, *Ships and marine technology — Marine environment protection — Vocabulary relating to oil spill response*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16165, and the following apply.

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

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

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

3.1
high viscosity oil
oil that due to its properties does not easily flow to a *skimmer* (3.9)

3.2
data collection period
period of time within the *steady-state period* (3.10) when recovered fluid is collected for establishing performance data

3.3
debris
solid or semi-solid substance that could interfere with the operation of a spill control system

3.4
emulsification factor
EF
amount of water emulsified into the oil as a result of the skimming/pumping process, not including water originally in the test fluid

Note 1 to entry: It is expressed as a decimal fraction between 0 and 1.

3.5
fluid recovery rate
FRR
total volume of fluid recovered per time

Note 1 to entry: It is expressed in cubic metres per hour.

3.6
recovery efficiency
RE
ratio of test fluid (oil or emulsion) recovered to the total volume of fluid recovered

Note 1 to entry: It is expressed as a percentage.

3.7
oil recovery rate
ORR
volume of test fluid (oil or emulsion) recovered per unit time

Note 1 to entry: It is expressed in cubic metres per hour.

3.8
oily phase
oil that is water-free or incorporates emulsified or encapsulated water that does not readily separate out

3.9
oil skimmer
skimmer
mechanical device used to remove oil from the water surface

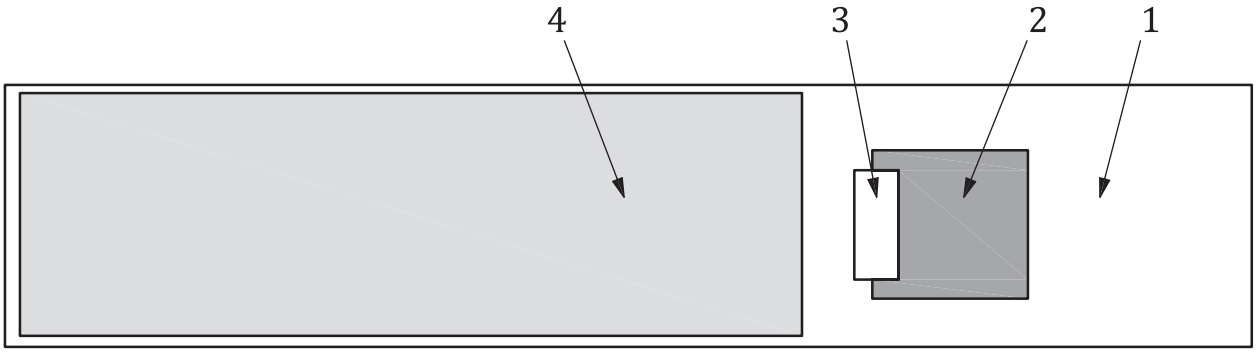
3.10
steady-state period
period of time during which the test conditions and operating parameters are constant or within acceptable variability ranges

4 Test facility requirements

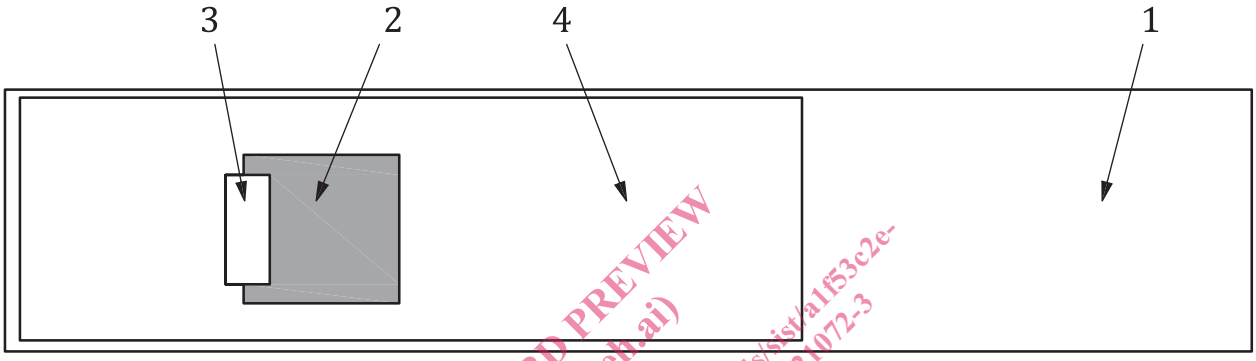
4.1 General

This document is applicable to any test arrangement that allows for the control and monitoring of the test conditions specified.

Figure 1 gives examples of test arrangements.



a) Test tank set-up prior to commencement of test and under test conditions



b) Skimmer moving through slick under test conditions

Key

1 test tank
2 skimmer body
3 pick-up/entrance of oil to skimmer
4 test oil

Figure 1 — Examples of test arrangements

4.2 Oil properties

The facility shall be able to maintain the oil properties for the duration of the test. Analytical equipment shall be available for measuring oil properties (see 9.1).

4.3 Air and water temperature

Testing may be carried out at any water temperature, provided that requirements with respect to oil properties are met. The facility shall be able to maintain the water temperature in the test basin at a selected test temperature with maximum variation of ±2 °C throughout the testing period.

4.4 Oil slick thickness

The test facility shall incorporate means of measuring oil slick thickness before and after the test, with an accuracy of at least ±20 %.

4.5 Measuring tanks

In order to provide for sufficient replicates during the test process, the test facility shall incorporate a sufficient number of calibrated tanks for accurately measuring the fluid recovery rate, oil recovery rate, and water uptake. The tank volumes shall correspond to the expected recovery rate of the unit to