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

**Part 2:
Static water conditions**

*Navires et technologie maritime — Protection de l'environnement marin:
essais de performance des écumeurs du pétrole —
Partie 2: Conditions en eau calme*

ISO 21072-2:2009

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 21072-2 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 2, *Marine environment protection*.

ISO 21072 consists of the following parts, under the general title *Ships and marine technology — Marine environment protection: performance testing of oil skimmers*.

— *Part 1: Moving water conditions*

— *Part 2: Static water conditions*

— *Part 3: High viscosity oil*

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Introduction

ISO 21072 (all parts) standardizes the 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 (all parts) provides for carrying out, and recording results of, full-scale tests for a skimmer under a variety of test conditions, where there is limited or no access to specialist test facilities.

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

Part 2: Static water conditions

1 Scope

This part of ISO 21072 specifies a methodology for establishing quantitative performance data for oil skimmers under static water conditions, 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 oil. Attention is drawn to the care required when applying the test results to predict skimmer performance under field conditions.

For dedicated/inbuilt systems, the test procedures outlined in this part of ISO 21072 can only be used for the skimming device as such, not the entire skimming system.

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2 Normative references

The following referenced documents are indispensable for the application 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 — Terminology 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.

3.1

data collection period

the period of time within the **steady-state period** (3.9) when recovered fluid is collected for establishing performance data

[ISO 21072-1:2009]

3.2

debris

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

[ISO 21072-1:2009]

3.3
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 It is expressed as a decimal fraction between 0 and 1.

[ISO 21072-1:2009]

3.4
fluid recovery rate
FRR

total volume of fluid recovered per time

NOTE It is expressed in cubic metres per hour.

[ISO 21072-1:2009]

3.5
recovery efficiency
RE

ratio of test fluid (oil or emulsion) recovered to the total volume of fluid recovered

NOTE It is expressed as a percentage.

[ISO 21072-1:2009]

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3.6
oil recovery rate
ORR

volume of test fluid (oil or emulsion) recovered per unit time

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NOTE It is expressed in cubic metres per hour.

[ISO 21072-1:2009]

3.7
oily phase

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

[ISO 21072-1:2009]

3.8
oil skimmer
skimmer

mechanical device used to remove oil from the water surface

[ISO 21072-1:2009]

3.9
steady-state period

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

[ISO 21072-1:2009]

4 Test facility requirements

This part of ISO 21072 is applicable to any test arrangement that allows for the control and monitoring of the test conditions.

The test facility shall be designed and equipped to control the following parameters.

- **Oil properties.** The facility shall be able to maintain the oil properties for the duration of the test. Oil analytical equipment shall be available for measuring oil properties (see 9.2).
- **Air and water temperature.** Testing may be carried out at any water temperature, provided that requirements with respect to oil properties are met. The test temperature shall always be well above the pour point of the oil, unless the purpose is to assess the collection of non-flowing/semi-solid oil. The facility shall be able to maintain the water temperature in the test basin at a selected test temperature with maximum variation of $\pm 2,0$ °C.
- **Oil slick thickness.** The test facility shall incorporate means of measuring oil slick thickness before and after the test, with a proven accuracy of at least ± 20 %.
- **Measuring tanks.** In order to provide for sufficient replicates during the test process, the test facility shall incorporate a sufficient number of calibrated tanks to accurately measure FRR, ORR, and water uptake. The tank volumes shall correspond to the expected recovery rate of the unit to be tested so as to provide data collection periods of sufficient duration and with sufficient measuring accuracy (see 10.1).

5 Clearance requirements

Throughout testing, there shall be sufficient clearance between the skimmer and the tank walls and any containment device, so as not to restrict oil flow to the skimmer or otherwise impede normal operation of the unit.

Since the necessary clearance varies with oil viscosity and unit recovery rate, adequate oil in-flow to the skimmer shall be demonstrated in each specific case, through oil flow observations or slick thickness measurements. Ensure that the clearance between the tank wall and outer limit of the skimmer is at no point less than 50 % of the greatest width (diameter or equivalent dimension) of the skimmer under test.

In considering the depth of water on which the oil layer is floating, the skimmer or its oil/water interface shall at all times be able to free-float on the water. The clearance between the unit and the tank floor shall be sufficient to not interfere with normal operations of the skimmer.

6 Test parameters

6.1 General

Testing shall establish quantitative performance data for the unit as a function of the following parameters:

- test oil properties;
- oil slick thickness;
- skimmer operating parameters;
- debris interference.