INTERNATIONAL STANDARD

ISO 17339

Second edition
2018-07

Ships and marine technology — Life saving and fire protection — Sea anchors for survival craft and rescue boats

Navires et technologie maritime — Ancres flottantes pour embarcations de sauvetage et canots de secours

Reference number
ISO 17339:2018(E)

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Published in Switzerland

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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 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 on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 1, *Maritime safety*.

This second edition cancels and replaces the first edition (ISO 17339:2002), which has been technically revised.

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

A sea anchor is a vital component to a drifting waterborne craft in keeping the preferred angle to wind direction, enhancing stability and reducing drift speed. The International Life-Saving Appliance Code prescribes the carriage and use of sea anchors for survival craft and rescue boats, yet the revised recommendation on testing of lifesaving appliances does not provide requirements of performance and testing procedure for the sea anchors. This document addresses those areas in which the IMO recommendation is silent, in order to facilitate consistent implementation by maritime Administrations.

This document addresses the performance and testing of sea anchors for survival craft and rescue boats and it is intended for use as a companion to the IMO Revised recommendation on testing of life-saving appliances and also to encompass all other relevant life-saving appliances covered by this document and not necessarily regulated by IMO instruments.

Ships and marine technology — Life saving and fire protection — Sea anchors for survival craft and rescue boats

1 Scope

This document specifies requirements for the design, performance and prototype testing of sea anchors fitted to survival craft (lifeboats and liferafts) and rescue boats in accordance with the IMO International Life-Saving Appliance Code.

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 9227:2012, *Corrosion tests in artificial atmospheres — Salt spray tests*

ISO 4892-2:2013, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps*

ASTM D 471-06, *Standard Test Method for Rubber Property-Effect of Liquids*

EN 590, *Automotive fuels - Diesel - Requirements and test methods*

3 Terms and definitions

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

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

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

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

3.1
sea anchor
device to stabilize the motion and to reduce wind-driven drift of a waterborne craft such as a survival craft or rescue boat

4 Design and performance criteria

4.1 General

A sea anchor shall

1) be constructed with proper workmanship and materials;

2) not be damaged in stowage throughout the air temperature range −30 °C to +65 °C;

3) be capable of operating throughout the seawater temperature range −1 °C to +30 °C;

4) be rot-proof, corrosion-resistant, and not be unduly affected by seawater, oil or fungal attack;

5) be resistant to sunlight deterioration;

6) be capable of satisfactory operation in a seaway.

4.2 Drag force

A sea anchor shall develop the minimum drag forces specified in Table 1, when tested in accordance with 5.2.

4.3 Towing line

The towing line used to secure the sea anchor to a survival craft or rescue boat shall be inherently rot-proof. It shall be at least 30 m long, not less than 8 mm in diameter and have a breaking load including attachments and knots of not less than:

— 7,5 kN for liferafts of capacity up to 10 persons;

— 10,0 kN for liferafts of capacity 11 persons to 25 persons;

— 10,0 kN for all other survival crafts and rescue boats, or a force corresponding to a safety factor of 3 based on a towing strain test at 3 knot, whichever is the greater.

4.4 Shroud line

A sea anchor shall have means to prevent twisting of the line and shall be of a type which is unlikely to turn inside out between its shroud lines.

4.5 Attachments

Attachments shall be corrosion-resistant. In case a sea anchor mouth having a ring, the ring shall retain its ring form when deployed regardless of the packed shape.

4.6 Stabilization

A sea anchor shall be stable when towed through the water at speeds up to 3 knot.

4.7 Deployment

A sea anchor shall unfold with mouth open immediately on deployment into water from its packed condition and shall remain unfolded.

4.8 Design

Any designs that meet all of the performance requirements of this document may be accepted.

Table 1 — Minimum required drag force by craft type and size

Craft	Minimum required drag force at indicated speed kilo-newton (kN)	
	2 knot	3 knot
Liferafts of capacity up to 10 persons	0,20	0,35
Liferafts of capacity 11 persons up to 25 persons	0,31	0,55
Liferafts of capacity 26 persons up to 75 persons Lifeboats and rescue boats up to 6 m in length	0,45	0,79
Liferafts of capacity 76 persons up to 150 persons Lifeboats and rescue boats over 6 m and up to 9 m in length	0,61	1,07
Lifeboats over 9 m in length	0,80	1,40

5 Prototype testing

5.1 Material test

5.1.1 Strength test for fabric

5.1.1.1 Sample conditioning

5.1.1.1.1 General

Prior to the test, fabrics shall be conditioned.

5.1.1.1.2 Standard conditioning

Samples shall be conditioned at a temperature of 20 °C ± 2 °C and a relative humidity of (65 ± 4) % for not less than 24 h.

5.1.1.1.3 Accelerated weathering

Samples shall be exposed in a xenon weathering machine in accordance with ISO 4892-2:2013, as further defined by the following specifications.

— Exposure: 500 kJ/(m^2 × nm) at 340 nm of UV radiation.

— Sample mounting: mount samples with the face side (the side normally exposed to sunlight in service) toward the light so that the centre of each sample is in the same plane as the perpendicular to the centreline of the light source.

— Irradiance: 0,55 W/m^2 at 340 nm.

— Filters: daylight filters.

— Black panel temperature: (63 ± 2) °C.

— Dry bulb temperature: (42 ± 2) °C.

— Relative humidity: 50 % (during light-only cycle).

— Water temperature: (20 ± 5) °C.

— Test cycles: 102 min of light/18 min of light and continuous water spray/24 min dark and water spray.

5.1.1.1.4 Immersion in oil

Samples shall be immersed for 70 h in fuel B according to ASTM D 471-06, diesel fuel according to EN 590 or typical fuels used in the intended area of application.

5.1.1.2 Test method

5.1.1.2.1 General

On completion of each separate conditioning, samples shall be measured using the following procedure.

5.1.1.2.2 Procedure

Set the gauge length of the tensile-testing machine to 100 mm ± 1 mm.

Set the rate of extension of the tensile-testing machine to 50 mm/min.

Clamp a test specimen centrally so that its longitudinal centre line passes through the centre point of the front edges of the jaws and becomes perpendicular to the edges of the jaws to have the line drawn on the test specimen coincide with one edge of the jaws.

After closing the upper jaw, avoid pretension when adjusting the specimen along the guide line in the lower jaw so that the fabric hangs under its own weight when the lower clamp is closed.

Engage the device for recording the maximum force. Put the movable clamp in motion and extend the test specimen to the point of rupture. Record the maximum force in newtons. Perform the test at least on five test specimens of each fabric direction.

5.1.1.3 Compliance criteria

The average of five samples shall comply with manufacturer's specification for each direction.

5.1.2 Strength test for structural webbing

5.1.2.1 Sample conditioning

Prior to the test, structural webbings shall be conditioned in accordance with 5.1.1.1.2 and 5.1.1.1.3.

5.1.2.2 Test method

5.1.2.2.1 General

On completion of each separate conditioning, samples shall be measured using the following procedure.

5.1.2.2.2 Procedure

Set the gauge length of the tensile-testing machine to 200 mm ± 1 mm for structural webbings with elongation at maximum force up to 75 % or to 100 mm ± 1 mm for fabrics having an elongation at maximum force of more than 75 %.

Set the rate of extension or elongation of the tensile-testing machine as a function of the elongation at maximum force of the structural webbing as specified in Table 2.

Table 2 — Rate of extension or elongation

Gauge length mm	Elongation at maximum force of structural webbing %	Rate of elongation %/min	Rate of extension mm/min
200	< 8	10	20
200	8 to 75	50	100
100	> 75	100	100

Clamp a test specimen centrally so that its longitudinal centre-line passes through the centre point of the front edges of the jaws.

Engage any device for recording the maximum force and elongation at maximum force. Put the movable clamp in motion and extend the test specimen to the point of rupture. Record the maximum force in newtons. Perform the test at least on five test specimens.

5.1.2.3 Compliance criteria

The average of five samples shall comply with manufacturer's specification.

5.1.3 Corrosion test for metal attachments

Corrosion-resistant metal attachments shall be qualified by corrosion test in accordance with ISO 9227:2012.

After the salt spray test, the metal attachments shall be subjected to strength test as described in 5.5 to demonstrate satisfactory operation.

Stainless steel having a Pitting Resistance Equivalent Number (PREN) of 22 or higher does not need to be subjected to corrosion testing.

5.2 Temperature cycling test

5.2.1 Any specimen for the deployment test, the towing test and the strength test, as described in 5.3, 5.4 and 5.5, shall be subjected to the following temperature cycling prior to these tests.

5.2.2 The specimen shall be alternately subjected to surrounding temperatures of −30 °C and 65 °C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable:

1) an 8 h exposure at a minimum temperature of 65 °C to be completed in one day;
2) the specimen removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20 °C ± 3 °C until the next day;
3) an 8 h exposure at a maximum temperature of −30 °C to be completed the next day;
4) the specimen removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20 °C ± 3 °C until the next day.

5.3 Deployment test

A sea anchor, in its packed condition, with its full length of towing line shall be thrown into water and the line shall then be pulled. The sea anchor shall then attain its designed shape immediately or within a distance of not more than 1 m.