



**International
Standard**

ISO 18692-1

**Fibre ropes for offshore
stationkeeping —**

**Part 1:
General specification**

*Cordages en fibres pour le maintien en position des structures
marines —*

Partie 1: Spécification générale

**Second edition
2026-06**

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Published in Switzerland

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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 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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 38, *Textiles*.

This second edition cancels and replaces the first edition (ISO 18692-1:2018), which has been technically revised.

The main changes are as follows:

- a notice has been added related to safety risks related to products used in this document;
- the document has been restructured aligning the different clauses;
- the document has been revised to allow different methods for verifying marine-grade of ropes made from high-modulus fibres.

A list of all parts in the ISO 18692 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.

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Fibre ropes for offshore stationkeeping —

Part 1: General specification

WARNING — The use of rope and cordage products has inherent safety risks which are subject to highly variable conditions, and which can change over time. Conformance with this document does not guarantee safe use under all circumstances. If the user has any questions or uncertainties about the proper use of rope or cordage or about safe practices for offshore stationkeeping, a competent person shall be consulted.

1 Scope

This document specifies the main characteristics and test methods of new fibre ropes used for offshore station keeping.

Fibre ropes for stationkeeping can be manufactured from different rope materials.

This document provides general requirements applicable to all types of ropemaking materials. The subsequent parts of the ISO 18692 series provide the specific requirements for each rope core material (as quoted in the title of each part) that are not addressed within this document.

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 1968, *Fibre ropes and cordage — Vocabulary*

ISO 2060, *Textiles — Yarn from packages — Determination of linear density (mass per unit length) by the skein method*

ISO 2062, *Textiles — Yarns from packages — Determination of single-end breaking force and elongation at break using constant rate of extension (CRE) tester*

ISO 7500-1, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1968 and the following apply.

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

breaking force

BF

maximum force applied in straight tension to a rope, which causes it to rupture

3.2

core

central part which is the load-bearing part of the rope

3.3

cover

braided cover or other protective layer, which is placed over the rope *core* (3.2)

Note 1 to entry: The cover has no significant contribution to the rope strength.

3.4

dynamic stiffness

ratio of rope load to strain variations between the lower (trough) and upper (peak) stresses imposed during testing, normalized by the rope minimum breaking strength

Note 1 to entry: See [B.3.6.2](#).

3.5

fibre material declaration

document prepared by the fibre producer attesting the type and grade of fibre material and the properties of the fibre

3.6

marine finish

process and substance used on a fibre, or yarn, to improve the performance of the product in a marine environment

3.7

marine grade fibre

fibre having adequate performance, for use in a marine environment

Note 1 to entry: This is generally achieved by using a marine finish.

3.8

minimum breaking strength

MBS

specified minimum value that the *breaking force* (3.1) of a rope achieves when tested following the procedure described in this document

Note 1 to entry: In this document, the specified MBS is that of a terminated rope.

3.9

prototype rope

rope fully complying with the rope design specification made for the purpose of testing either before an order is placed or before regular rope production begins for an order

3.10

qualified rope

rope already certified by the manufacturer as complying with the requirements laid down in this document, including all the relevant prototype testing

3.11

recognized classification society

RCS

classification society being a member of the International Association of Classification Societies (IACS), with recognized and relevant competence and experience in fibre rope mooring, and with established rules/guidelines for related classification

3.12

rope construction

manner in which the fibres, yarns and strands are assembled together in making the rope

Note 1 to entry: In parallel-construction ropes, rope core is made of sub-ropes, i.e. laid or braided ropes, that are laid together in parallel.

3.13

rope design specification

document which completely describes the design of the rope, including all details of *rope construction* (3.12) and related numerical data, the material chemical composition and the manufacturing method

3.14

rope manufacturing specification

document which completely describes the process of making the rope, including instructions for each step of the manufacturing process

3.15

rope manufacturing report

document which completely describes the rope product, including rope design, termination design, and assembly length, and which includes the material certificates, material test results and the various checklists

3.16

rope termination termination

method by which the rope is attached to the assembly interface

EXAMPLE Splice, potted socket, wedged socket.

3.17

termination specification

document which completely describes the design of the termination and the process of making that termination, including materials and steps for making or assembling the termination

3.18

torque

moment that produces or tends to produce a twisting or a rotating motion around rope axis, when a tension is applied to the rope, or changed

3.19

yarn-on-yarn abrasion performance

ability of a fibre to withstand wear due to motion against adjacent fibres (internal abrasion)

4 Materials

4.1 Rope core material

4.1.1 Fibre tenacity

The fibre used in the core of the rope shall be in accordance with the specific requirements of each respective part of the ISO 18692 series and shall be qualified and tested in accordance with [Annex A](#).

4.1.2 Marine grade

The fibre used in the core of the rope shall be marine grade fibre.

4.2 Rope cover material

When polyester yarn is used in the protective cover, it shall conform with [Annex A](#) and should have a minimum tenacity of 0,73 N/tex.

4.3 Other materials

Other materials employed in rope assembly shall be identified in the rope design/rope manufacturing specification.

For each material, the following shall be specified, as applicable:

- a) base material;
- b) size (e.g. linear density, mass per unit area);
- c) relevant strength properties (e.g. break load, tenacity, stiffness).

5 Requirements — Rope properties

5.1 Minimum breaking strength

The minimum breaking strength of the rope, when tested according to [Clause 7](#) and [Annex B](#), shall conform to specific requirements of each respective part of the ISO 18692 series.

5.2 Minimum core tenacity

The rope minimum core tenacity, measured according to [Annex B](#), shall be in accordance with specific requirements of each respective part of the ISO 18692 series.

5.3 Dynamic stiffness at end of bedding-in

The dynamic stiffness at the end of the bedding-in sequence shall be measured on the prototype testing in step 8 of the rope test procedure in [B.3.1](#).

5.4 Torque properties

5.4.1 Torque-neutral rope

A rope is considered torque-neutral if it has a torque factor, Q , of less than 0,005, see [Formula \(1\)](#):

$$Q = \frac{T}{d \cdot F} \quad (1)$$

where

- Q is the torque factor;
- d is the rope diameter, expressed in millimetres (mm);
- F is the force applied to the rope, expressed in kilonewtons (kN);
- T is the torque generated by the rope, expressed in newton metres (N·m).

The test method to demonstrate torque-neutral behaviour is defined in [B.6.1](#).

Parallel construction ropes having braided sub-ropes or an equal number of left lay and right lay twisted sub-ropes, which are all identical in every respect except for twist direction, are inherently torque-neutral (see also [6.2](#)). These constructions do not need to have their torque generation verified.

5.4.2 Torque-matched rope

A rope is considered torque-matched if its torsional characteristic over the design load range is essentially the same as that of the wire rope to which it is to be connected.

When tested as described in [B.6.2](#), the angular rotation in the wire rope element shall not exceed 5° per rope lay.

5.5 Cyclic loading performance

The rope shall have demonstrated performance under cycling loading following the requirements of [7.1.6](#) and [B.5](#).

5.6 Particle ingress protection

Unless otherwise specified, the rope shall be constructed with a protection of the core against the ingress of particles having a size greater than 5 µm (microns) or as agreed between involved parties. Testing of the protection shall be performed in accordance with [B.7](#). The tests shall be performed on one rope size.

6 Requirements — Rope layout and construction

6.1 General

The typical section of a rope shall comprise a rope core, providing intended strength and stiffness, and a cover.

6.2 Type of construction

The rope shall be of one of the following types of construction:

- torque-neutral (torque-free) construction (type TF);
- torque-matched construction (type TM).

The type of rope shall be specified by the purchaser.

NOTE Torque-neutral ropes are intended for use in mooring systems together with chain or torque-neutral spiral strand wire ropes. Torque-matched ropes are intended for use in mooring systems together with six-strand wire ropes or other non torque-neutral wire ropes.

6.3 Rope core

6.3.1 The total number of yarns in the rope shall be at least the number specified in the rope design specification.

6.3.2 The rope core and in sub-ropes shall be uninterrupted over the length of the rope except splices at the end of terminations.

Strands shall be uninterrupted over the length of the rope, with no splice or strand interchange.

Yarns and rope yarns may be joined if necessary.

6.4 Protective cover

6.4.1 A protective cover shall be provided around the rope core to protect the rope core from mechanical damages (mainly abrasion) during handling and in service.

The protection shall be water-permeable.

6.4.2 A polyester braided protective cover shall have a minimum thickness, t , with:

- $t = 7,0$ mm, for a reference number RN equal or above 100;
- $t = 0,07 \times \text{RN}$, but not less than 4 mm, for a reference number RN less than 100.

Strand interchanges, i.e. the overlapping continuation of an interrupted strand with another identical strand following the same path, are permitted if they are properly staggered.

6.4.3 If an alternative protective cover is used, it shall demonstrate at least a level of protection equal to that of a polyester braided cover as per [4.2](#) and [6.4.2](#).

6.4.4 A braided cover shall include coloured strands forming a pattern so that rope twist during installation or in service can be observed. There shall be a minimum of one “S” coloured strand and one “Z” coloured strand to form a cross on the rope.

An alternative protective cover shall be fitted with an axial stripe of contrasting colour, or other means, to identify rope twist during installation or in service.

6.5 Terminations

The terminations shall be made of an eye splice plus abrasion protection materials.

There may be other terminations provided that they do not jeopardize the rope performance.

The dimensions and arrangement of the eye shall match the diameter and groove shape of the thimble (or other interface piece) to be used for end connections, and shall be the same as for the rope prototype testing. Eyes shall be formed in opposite direction: one eye laid to the left of the rope central axis and the other to the right of the rope central axis (in a S shape).

In the splice area, the integrity and the continuity of rope cover and particle-ingress protection, if fitted, shall be preserved or restored.

The eye and the splice area shall be further covered by an abrasion protection coating such as polyurethane.

Each termination shall be made according to the manufacturing practice as described in the termination specification.

6.6 Length of rope

The bedded-in lengths of the rope sections shall be calculated in accordance with [7.2.2](#), under 20 % of MBS, unless otherwise agreed on the purchase order or contract.

The calculated length of supplied rope shall be within ± 1 % of the specified length, unless otherwise agreed on the purchase order, or in the contract.

For each supplied rope, the actual length at the reeling tension, or during manufacture, shall be reported as an indicative value.

The length of short sections (typically less than about 20 m), if any, shall be mutually agreed between the purchaser and the manufacturer.

Adequate extra length shall be manufactured in order to prepare the samples for testing, which are considered to be part of the delivery.

7 Rope testing

7.1 Type test

7.1.1 General

Type tests demonstrate that ropes certified by the manufacturer as complying with the requirements laid down in this document possess the properties specified in this document. The purpose of these tests is to verify the design, material and method of manufacture of each size of finished rope, including protective cover and terminations.

All ropes to be type tested shall be in accordance with all the other requirements laid down in this document. The tests specified below shall be carried out on a prototype rope for each size of rope, unless otherwise noted in this clause.

Any change in the design, material, method of manufacture, including protective cover and terminations, which can lead to a modification of the properties as defined in [Clause 5](#) shall require that the type tests specified in this document be carried out on the modified rope.

7.1.2 Sampling and testing

The number of rope samples to be tested shall be in accordance with the specific requirements of each respective part of the ISO 18692 series.

7.1.3 Strength and stiffness tests

7.1.3.1 Samples shall be tested according to the procedure specified in [Annex B](#), and each shall be capable of meeting the specific requirements of each respective part of the ISO 18692 series.

7.1.3.2 The rope core tenacity and dynamic stiffness at end of bedding-in shall be calculated according to the methods defined in [B.3](#).

7.1.3.3 Measurement of the static stiffness and of the dynamic stiffness at other load levels shall be performed within the same tests. These measurements are, however, not required when results are available for another qualified rope of the same design, material and method of manufacture, with a reference number of not less than 150.

NOTE 1 These stiffness measurements are performed for design purposes only. There are no acceptance criteria on these parameters.

NOTE 2 Same design means the same number of elements (strands, subropes, etc.) and all dimensions (diameters, lay length, etc.) in same proportion or, for a parallel construction, identical subropes in a different number

NOTE 3 These stiffness measurements can be also performed on a separate rope sample (see [B.3.5](#)).

7.1.4 Linear density test

The linear density shall be calculated from the measured weight and length according to the method defined in [B.4](#).

7.1.5 Cyclic loading endurance test

One sample shall be tested for cyclic loading. However, a cyclic loading (endurance) test performed with one size of qualified rope having the same design, material and method of manufacture including protective cover and terminations, shall be enough to qualify all sizes with an MBS between 50 % and 200 % of the size tested. The test for cyclic loading (endurance) is not required if such data are available.

The cyclic loading endurance test shall be performed according to the procedure specified in [B.5](#).

A load range shall be selected by the manufacturer, and the rope shall withstand, without breaking, at least the number of cycles for that load range, as given in [Figure B.2](#).

7.1.6 Torque properties tests

Where applicable, torque property tests shall be performed according to the procedure specified in [B.6](#).

These tests are, however, not required when results are available for another qualified rope of the same design, material, method of manufacture and termination, with a reference number of not less than 150.

7.1.7 Particle ingress protection test

The particle ingress protection test shall be performed in accordance with the procedure specified in [B.7](#).

This test is, however, not required when results are available for another qualified rope of the same design, material, method of manufacture and termination with a reference number of not less than 150.

7.1.8 Protective cover thickness

The thickness of the protective cover shall be verified.

The thickness of a braided cover shall be measured as twice the thickness of cover strands under the maximum braiding tension.

7.2 Testing of current production

7.2.1 Sampling and testing

For ropes that conform to the requirements of this document, based on type tests in accordance with [7.1](#), the following tests shall be performed on one sample taken from the manufacturing process, for each type and size of rope:

- a) breaking strength and core tenacity, according to the procedure in [Annex B](#);
- b) protective cover thickness verification.

7.2.2 Length measurement

The bedded-in length of each supplied rope section (other than short sections) shall be calculated from the linear density, ρ_{T} , using [Formulae \(2\)](#) and [\(3\)](#):

$$L = L_1 + 2 \cdot L_s \quad (2)$$

$$L_1 = \frac{(m_{\text{T}} - m_{\text{s}}) \cdot 1\,000}{\rho_{1,20}} \quad (3)$$

where

- L is the length of the rope in metres (m);
- L_1 is the unspliced length of the rope in metres (m)
- L_s is the length of the spliced part from the foot of the splice to the centre of the termination fitting (see [Figure B.1](#))
- m_{T} is the mass of the total rope length in kilograms (kg);
- m_{s} is the mass of the materials used to form the eyes and the splices in kilograms (kg);
- $\rho_{1,20}$ is the linear density of the rope, in ktex, obtained from the type test, see also [B.4.2](#).

The length of short rope sections shall be measured at a load of 2 % of MBS as the length between the centres of termination fittings (see [Figure B.1](#)).

8 Rope manufacturing report

8.1 Prototype rope

A complete and detailed report of the prototype rope manufacturing shall be supplied, including the fibre manufacturer, the fibre type and finish and all rope characteristics that may influence the mechanical properties, like design, material specifications, method of manufacture, including protective cover and terminations, with sketches or pictures.

A complete and detailed report of type tests, with sketches or pictures of the test set-up, shall also be provided.

8.2 Current production

The manufacturing report of supplied ropes shall be provided. A complete and detailed report of rope tests with sketches and pictures of the test set-up shall also be provided.

9 Certification documentation

The certificate of approval and control, issued by a recognized classification society (RCS), shall be presented together with the ropes, in order to ensure that testing and fabrication are in accordance with the approved specifications.

The rope manufacturer shall issue a manufacturer declaration or obtain a certificate including at least the following information:

- a) the reference number;
- b) the type of construction;
- c) the rope core material;
- d) the linear density;
- e) the MBS;
- f) the individual identification number;
- g) the length at a specified load;
- h) the length at the reeling handling tension.

NOTE A suggestion for manufacturer declaration can be found in [Annex D](#).

10 Marking, labelling and packaging

10.1 Marking

A tape of at least 3 mm wide printed with a reference identifying the manufacturer shall be incorporated into the rope. The maximum distance between two consecutive markings shall be 0,5 m.

10.2 Labelling

An identification plaque or alternative means shall be installed close to the splice with the following information, as a minimum:

- a) the purchase identification;
- b) the individual identification number;