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Small craft — Anchoring, mooring and towing — Strong points

Petits navires — Mouillage, amarrage et remorquage — Points d'ancrage

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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.

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ISO 15084 was prepared by Technical Committee ISO/TC 188, *Small craft*.

Small craft — Anchoring, mooring and towing — Strong points

1 Scope

This International Standard specifies requirements for strong points for attaching chains, cables and lines for anchoring, mooring and towing small craft. It does not specify the requirement for any strong point from which the craft can tow other vessels. This standard is applicable to small craft with a hull length up to 24 m.

This International Standard does not define anchor weights or the length of chains and lines.

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 8666:2002, *Small craft — Principal data*

3 Terms and definitions

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

3.1
strong point
any fitting on a boat designed to be used for the attachment of anchor chains, anchor lines, tow lines, and warps

EXAMPLES Bollards, cleats, samson posts, mast steps, bow eyes on trailerable craft, winches, windlasses, capstans and similar devices

3.2
design category
sea and wind conditions for which a boat is assessed to be suitable

3.2.1
design category A
category for "ocean" sailing
category of boats considered suitable for significant wave heights above 4 m and wind speeds in excess of Beaufort Force 8, but excluding abnormal conditions, e.g. hurricanes

3.2.2
design category B
category for "offshore" sailing
category of boats considered suitable for significant wave heights up to 4 m and wind speeds of Beaufort Force 8 or less

3.2.3
design category C
category for "inshore" sailing
category of boats considered suitable for significant wave heights up to 2 m and wind speeds of Beaufort Force 6 or less

3.2.4
design category D
category for sailing in "sheltered" waters
category of boats considered suitable for significant wave heights up to and including 0,30 m with occasional waves of 0,5 m height, for example from passing vessels, and wind speeds of Beaufort Force 4 or less

3.3
fully loaded ready-for-use condition
boat with a displacement mass m_{LDC} according to ISO 8666, fully equipped for the intended use

3.4
breaking strength
strength limit at which a strong point, its fastening elements or the supporting or surrounding structure start to display permanent deformation or evidence of structural failure, e.g. material damage

4 Symbols

For the purposes of this International Standard, the symbols and associated units in Table 1 apply.

Table 1 — Symbols

Symbol	Unit	Meaning	Reference
L_C	m	Calculation length	6.2
L_H	m	Length of the hull, according to ISO 8666	ISO 8666
L_{WL}	m	Length of the waterline, according to ISO 8666	ISO 8666
P_n	kN	Horizontal load on the strong point	6.2
f		Design category coefficient	6.2
m_{LDC}	kg	Loaded displacement mass of the craft	ISO 8666

5 General requirements

5.1 A strong point may be used for different purposes. An anchoring or towing strong point may be used for mooring.

5.2 The minimum number of strong points shall be as follows:

— all craft: one anchoring/towing point forward;

— craft over 6 m L_H: at least one mooring point aft;

— craft over 12 m L_H: at least one additional mooring point both forward and aft;

— craft over 18 m L_H: at least one additional mooring point both port and starboard.

6 Strength requirements

6.1 Introduction

The assessment of the breaking strength shall be made according to 6.2, 6.3 or 6.4.

6.2 Horizontal load

Each strong point shall be designed and installed, so that it will take a horizontal load, P_n, in kilonewtons without failure of the strong point or the surrounding structure to which it is attached:

— forward, for anchoring and being towed:

$$P_1 = f\left(4{,}3L_C - 5{,}4\right)$$

— forward, for mooring:

$$P_2 = f\left(3{,}5L_C - 4{,}3\right)$$

— aft

$$P_3 = f\left(3{,}0L_C - 3{,}8\right)$$

where

f = 1,0 (design categories A and B)

= 0,9 (design category C)

= 0,75 (design category D)

L_C is the calculation length:

$$L_C = \frac{L_H + L_{WL}}{2}$$

The breaking strength of a strong point for any application need not be higher than that required to withstand a load representing the mass of the boat in the fully loaded ready-for-use condition, m_{LDC}.

6.3 Direct calculation

The assessment of the breaking strength of the strong points may be made by direct calculation, taking into account the design category, the configuration of the craft with special regard to the windage area, the hull form, and the wave spectrum in the intended area of operation.

6.4 Matching strength

Where a boat manufacturer specifies or supplies lines, chains or cables which exceed the requirements of 6.2 (e.g. where the craft is intended to be used in extreme conditions or lines are required to be easier to handle), the breaking strength of the related strong point shall be not less than 125 % of the rope or chain that is specified or supplied.

7 Detailed requirements

7.1 Structural support

Craft structures in the vicinity of strong points shall be reinforced to take the loads calculated according to 6.2 to 6.4. Doubling plates or washers of adequate size shall be used where the strong points are secured with nuts and bolts.

7.2 Corrosion resistance

Strong points shall be made of materials that are resistant to or protected against corrosion.

Where non-metallic (plastics) strong points are provided, the material shall be UV stabilized. In addition, a warning notice shall be listed in the owner’s manual to replace strong points showing visible signs of deterioration.

7.3 Labelling

Where the intended use of a strong point for anchoring and/or being towed is not self evident, the strong point shall be labelled.

8 Owner’s manual

The information specified in Annex A shall be included in the owner's manual

9 Strength of synthetic fibre ropes

See Annex B for information.

Annex A
(normative)

Information to be provided in the owner's manual

A.1 Caution

The boat manufacturer shall provide information on the breaking strength of the strong points.

The breaking strength of lines/chains shall in general not exceed 80 % of the breaking strength of the respective strong point.

A.2 Caution

Where the purpose of a specific strong point is not self evident, the boat manufacturer shall label the strong point (strong point designated for anchoring and/or towing) and provide suitable information in the owner's manual.

A.3 Caution

Always tow or be towed at a slow speed. Never exceed the hull speed of a displacement craft when being towed.

A.4 Caution

A tow line shall always be made fast in such a way that it can be released when under load.

A.5 Responsibility

It is the owner's/operators responsibility to ensure that mooring lines, towing lines, anchor chain(s), anchor lines and anchor(s) are adequate for the vessel's intended use, i.e. the lines or chains do not exceed 80 % of the breaking strength of the respective strong point.

Owners should also consider what action will be necessary when securing a tow line on board.

A.6 Non-metallic strong points

Where non-metallic strong points are installed, their limited life time shall be taken into consideration. They shall be replaced once they show any signs of deterioration, visible surface cracks or permanent deformation.

NOTE Black items are less prone to UV degradation than light-coloured ones.

Annex B
(informative)

Material strength of synthetic fibre ropes/dimensions of strong points

Boat builders should use the rope/chain manufacturers' published technical information or the appropriate International Standards to ascertain the minimum breaking strength of lines/chains in order to establish the dimensions of the strong points. For conventional synthetic fibre ropes, Table B.1 may be used as guidance.

Table B.1 — Mechanical properties of 3-strand hawser-laid synthetic ropes

Polyamide ropes		Polyester ropes		Polypropylene ropes	
Nominal diameter	Minimum breaking strength (ISO 1140)	Nominal diameter	Minimum breaking strength (ISO 1141)	Nominal diameter	Minimum breaking strength (ISO 1346)
mm	kN	mm	kN	mm	kN
6	7,35	6	5,8	6	5,9
8	13,2	8	10,5	8	10,4
10	20,4	10	16,8	10	15,3
12	29,4	12	24,0	12	21,7
14	40,2	14	33,7	14	29,9
16	52,0	16	43,4	16	37,0
18	65,7	18	54,8	18	47,2
20	81,4	20	68,2	20	56,9
22	98,0	22	82,0	22	68,2
24	118,0	24	98,5	24	79,7
26	137,0	26	115,5	26	92,2

Bibliography

[1] ISO 1140, *Ropes — Polyamide — Specification*

[2] ISO 1141, *Ropes — Polyester — Specification*

[3] ISO 1346, *Ropes — Polypropylene — Specification*

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