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Ships and marine technology — Ship's mooring and towing fittings — Mooring chocks

Navires et technologie maritime — Corps-morts et ferrures de remorquage de navires — Chaumards

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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 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 Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 4, *Outfitting and deck machinery.*

This second edition cancels and replaces the first edition (ISO 13713:2012), which has been technically revised.

The main changes compared to the previous edition are as follows:

— technical guidelines have been added in 7.2;

— the definition of SWL (3.1) has been reworded;

— the leader line in Figure 1 has been amended;

— technical information on FEM has been added in A.3.2.

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

The mooring chock is a type of ship's mooring and towing fitting installed on the shipside to lead the mooring and towing rope from the ship's inboard to outboard.

The mooring chocks are normally adopted for ships which use nylon or other synthetic ropes other than wire ropes considering the small bending ratio (for wire ropes, see ISO 13729).

Ships and marine technology — Ship's mooring and towing fittings — Mooring chocks

1 Scope

This document specifies the types, nominal sizes, dimensions and materials, as well as construction, manufacturing and marking requirements, for mooring chocks installed to lead the mooring and towing rope of a ship.

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.

IMO Circular MSC/Circ.1175, *Guidance on shipboard towing and mooring equipment*

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:

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

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

3.1
safe working load
SWL
safe load limit (maximum permissible load) of the fittings used for mooring and towing

4 Classification

4.1 Type

The mooring chocks shall be classified by its installation site as belonging to one of the following types:

a) Type A: deck-mounted mooring chock;

b) Type B: bulwark-mounted mooring chock.

4.2 Nominal sizes

The nominal sizes, $L \times H$, of mooring chocks are denoted by reference to the width and height of the opening of the chock, in millimetres. For the mooring chocks having the same size, the letter of the alphabet, i.e. A or B, is followed by the nominal size for the different safe working loads (SWL).

The nominal sizes are: 250 × 200, 300 × 250, 350 × 250, 400 × 250, 450 × 250, 500 × 250A, 500 × 250B

5 Dimensions

The mooring chocks shall have dimensions and particulars in accordance with Tables 1, 2, 3 and 4, and Figures 1 and 2.

6 Materials

The following material shall be used for manufacturing the mooring chocks:

— steel casting material having a yield point of not less than 235 N/mm^2 or equivalent.

The carbon contents of the steel casting shall not be more than 0,23 % considering weldability.

7 Construction

7.1 The foundation of the mooring chocks shall be determined by considering the actual load direction. The foundation and welding connections to the hull shall guarantee a reliable transmission of the maximum loading of the mooring chocks to the hull construction without any plastic deformation or cracks.

7.2 The tensile strength of the mooring rope may be reduced depending on the bend radius (D/d ratio) through the mooring fittings, in accordance with the rope manufacturer's guidelines.

8 Manufacturing and inspection

8.1 All surfaces of the mooring chocks, including welded surfaces, shall be free from any visible flaws or imperfections.

8.2 All surfaces in contact with the ropes shall be free from surface roughness or irregularities likely to cause damage to the ropes by abrasion.

8.3 The mooring chocks shall be coated externally with an anti-corrosion protective finish.

9 Marking

9.1 The SWL for the intended use of the mooring chocks shall be noted in the towing and mooring plan available on board for the guidance of the shipmaster, as specified in IMO circular MSC/Circ.1175.

9.2 The actual SWL on board shall be determined by considering the foundation and under deck reinforcement, and it shall be marked on the towing and mooring plan. The actual SWL shall not be over the SWL indicated in this document.

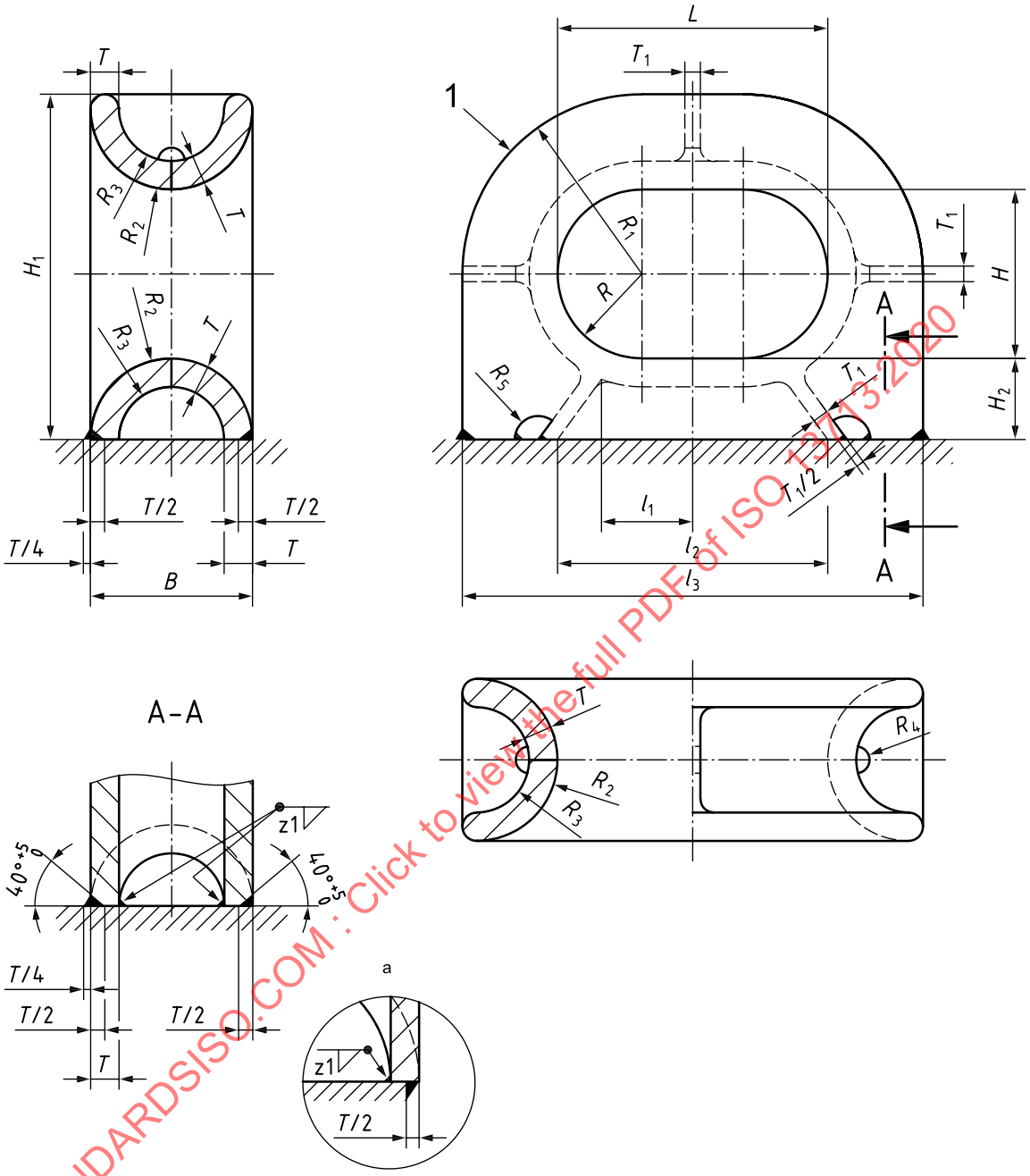
9.3 The mooring chock shall be clearly marked with its SWL by weld bead or equivalent. The SWL shall be expressed in tonnes (symbol 't') and be placed so that it is not obscured during operation of the fitting.

EXAMPLE SWL XXX t

9.4 The SWL mark shall be placed on the foundation of the chock or on the deck.

9.5 The radii of edges and corners not shown in Figures 1 and 2 shall be of minimum 25 mm.

Dimensions in millimetres



Key

1 mooring chock

[a] Alternative welding method.

Figure 1 — Type A — Deck-mounted mooring chocks

Table 1 — Dimensions of Type A — Deck-mounted mooring chocks

Dimensions in millimetres

Nominal size $L \times H$	l_1	l_2	l_3	B	H_1	H_2	R	R_1	R_2
250 × 200	100	250	444	160	377	80	100	197	80
300 × 250	110	300	536	200	468	100	125	243	100
350 × 250	125	350	608	220	489	110	125	254	110
400 × 250	135	400	682	240	511	120	125	266	120
450 × 250	150	450	760	260	535	130	125	280	130
500 × 250A	175	500	832	280	556	140	125	291	140
500 × 250B	175	500	840	280	560	140	125	295	140

Table 2 — Dimensions *(continued)* and SWL of Type A — Deck-mounted mooring chocks

Dimensions in millimetres

Nominal size $L \times H$	R_3	R_4	R_5	T	T_1	Welding leg length[a] z_1	SWL[b]		Calculated weight[c] kg
							kN	t	
250 × 200	46	20	15	34	18	8,5	353	36	73
300 × 250	64	25	20	36	20	9	491	50	121
350 × 250	72	30	20	38	20	9,5	589	60	151
400 × 250	78	30	20	42	23	10,5	736	75	200
450 × 250	80	30	20	50	28	12,5	981	100	280
500 × 250A	88	30	20	52	30	13	1 128	115	338
500 × 250B	80	30	20	60	36	15	1 373	140	396

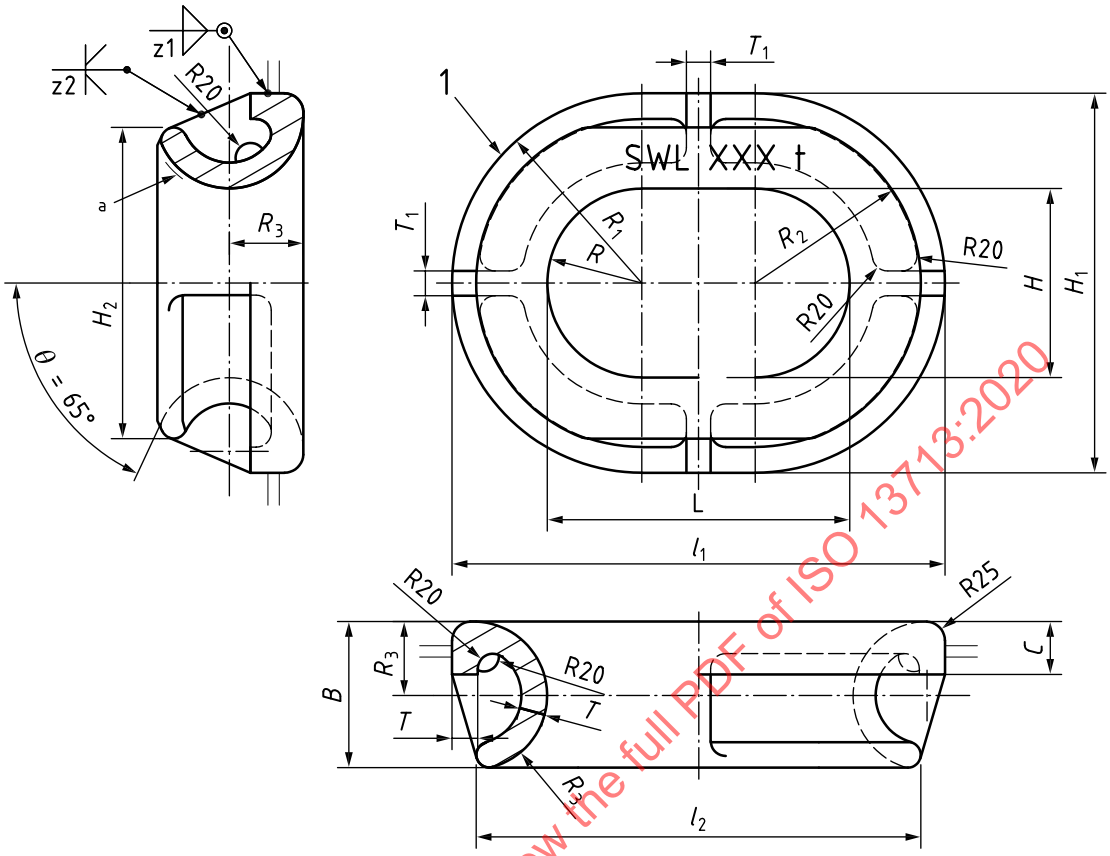
[a] The welding method may be changed based on the same welding volume/strength.

[b] The SWLs shown are for reference only. These are based on the loadings as mentioned in Annex A.

The "SWL" which is marked on the fitting may be adjusted depending on the actual loading conditions of mooring rope under the agreement between the user and the manufacturer.

[c] The calculated weight (mass) is for reference only.

Dimensions in millimetres



Key

1 mooring chock

θ° maximum available line leading angle limited by the end of curve surface (for reference)

a SWL marking.

The SWL mark shall be provided on the chock or on the shell plate near the chock.

Figure 2 — Type B — Bulwark-mounted mooring chocks

Table 3 — Dimensions of Type B — Bulwark-mounted mooring chocks

Dimensions in millimetres

Nominal size $L \times H$	l_1	l_2	B	H_1	H_2	C	R	R_1	R_2
250 × 200	450	398	154	408	327	57	100	200	174
300 × 250	516	460	168	466	387	60	125	233	205
350 × 250	582	520	177	482	395	65	125	241	210
400 × 250	652	588	193	502	412	70	125	251	219
450 × 250	734	662	213	534	433	77	125	267	231
500 × 250A	812	730	237	562	447	82	125	281	240
500 × 250B	828	750	253	578	466	82	125	289	250

Table 4 — Dimensions *(continued)* and SWL of Type B — Bulwark-mounted mooring chocks

Dimensions in millimetres

Nominal size $L \times H$	R_3	T	T_1	Welding leg length[a]		SWL[b]		Calculated weight[c]
				z_1	z_2	kN	t	kg
250 × 200	78	26	20	8	8	353	36	48
300 × 250	85	27	24	8	9,5	491	50	83
350 × 250	90	29	25	9	10	589	60	100
400 × 250	98	34	32	9,5	13	736	75	145
450 × 250	108	41	36	12,5	14,5	981	100	215
500 × 250A	120	41	36	12,5	14,5	1 128	115	235
500 × 250B	128	48	41	14,5	16,5	1 373	140	266

[a] The welding method may be changed based on the same welding volume/strength.

[b] The SWLs shown are for reference only. These are based on the loadings as mentioned in Annex A.

The "SWL" which is marked on the fitting may be adjusted depending on the actual loading conditions of mooring rope under the agreement between the user and the manufacturer.

[c] The calculated weight (mass) is for reference only.

Annex A
(normative)

Basis for strength assessment of mooring chocks

A.1 General

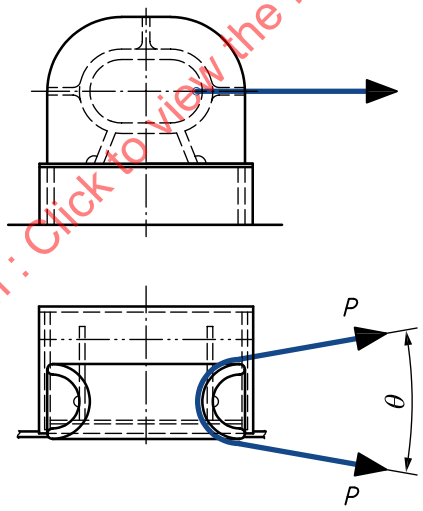
The strength of the mooring chocks was evaluated by finite element model analysis and determined based on the following design criteria.

A.2 Loading

The mooring chocks shall be designed to withstand the horizontal (Figure A.1) and vertical (Figures A.2 and A.3) load cases.

The horizontal and vertical loadings were considered individually, but both loadings were not considered simultaneously.

A.2.1 Case 1 — Horizontal loading



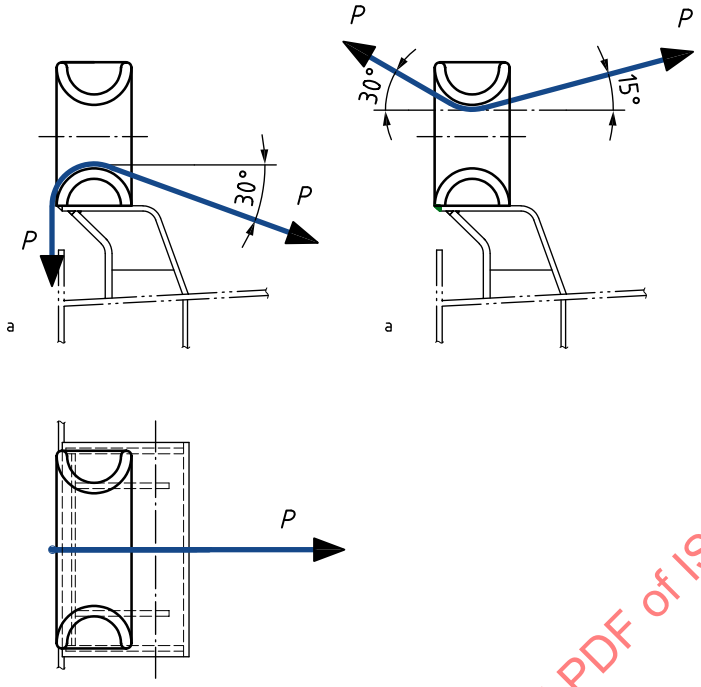
Key

P mooring force or towing force

NOTE The loads were considered for a rope deflected 180° (θ = 0°) through the mooring chock.

Figure A.1 — Case 1 — Horizontal loading

A.2.2 Case 2 — Vertical loading



Key

P mooring force or towing force

[a] Ship side.

NOTE The loads were considered for a rope deflected through the mooring chock, as shown in this figure.
Vertical down side: outboard down 90°, inboard down 30°.
Vertical up side: outboard up 30°, inboard up 15°.

Figure A.2 — Vertical loading for Type A — Deck-mounted mooring chocks