



Standard Specification for Chocks, Ship Mooring, Cast Steel¹

This standard is issued under the fixed designation F2936; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers the principal dimensions and materials of closed chocks for installation on ships used for mooring.

1.2 Chocks can be used with either wire rope or fiber and synthetic ropes.

1.3 Chocks are for mounting directly on a deck, seat (foundation), or for mounting in a bulwark.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

2. Referenced Documents

2.1 *ASTM Standards*:²

A27/A27M Specification for Steel Castings, Carbon, for General Application

2.2 *ANSI Standard*:

B 46.1 Surface Texture³

3. Terminology

3.1 *Definitions of Terms Specific to This Standard*:

3.1.1 *bulwark*—a structural enclosure along the edge of the ship to serve as a rail.

3.1.2 *closed chock*—a metal flared ring-like fitting mounted on a ship, through which mooring lines pass to moor a ship.

3.1.3 *mooring ring or pipe*—a chock mounted in the bulwark and conforming to Type II and IV.

3.1.4 *rope contact area*—that part of the fitting in contact with the mooring line in normal mooring operations.

4. Classification

4.1 The size of the chocks will be identified by the nominal size “L” and “H” of the opening as shown in Table 1 and Table 2.

4.2 Chocks are furnished in types as follows:

4.2.1 *Type I*—Deck mounted as shown in Fig. 1 and conforming to all dimensions in Table 1.

4.2.2 *Type II*—Bulwark mounted as shown in Fig. 2 and conforming to all dimensions in Table 2.

4.2.3 *Type III*—Deck mounted, conforming only to dimensions “L” and “H” of Table 1 and is of adequate strength to at least meet 7.2 requirement and the requirements of Sections 6 to 10.

4.2.4 *Type IV*—Bulwark mounted, conforming only to dimensions “L” and “H” of Table 2 and is of adequate strength to at least meet 7.2 requirement and the requirements of Sections 6 to 10.

4.3 Chocks shall be furnished in either of the following grades:

4.3.1 *Grade 1*—Surface finish shall be in the as cast condition.

4.3.2 *Grade 2*—Surface finish in way of rope contact shall be in accordance with 8.2.

5. Ordering Information

5.1 Orders for chocks under this specification shall include this standard, date, and the following:

5.1.1 Descriptive information (size, material, etc.) of mooring lines,

5.1.2 Quantity (number) of chocks required,

5.1.3 Size (opening, $L \times H$),

5.1.4 Type and grade,

5.1.5 Primer and coating, if any (see 8.3), and

5.1.6 Marking.

6. Materials and Manufacture

6.1 Material shall be cast steel in accordance with Specification A27/A27M, Grade 60-30.

6.2 For Types III and IV the manufacturer shall certify that strength of the chock will at least meet 7.2 requirement, and that it is suitable for the mooring lines specified in the ordering information.

6.3 Casting shall be smooth, fine grain, and free of cracks, hot tears, and blow holes, detrimental to end use. Defects having an area larger than 25 by 25 mm² and a depth of more than 10 % of the thickness in way thereof will be cause for rejection. Smaller defects in way of rope contact shall be

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

TABLE 1 Dimension Requirements (see Fig. 1)
(Units: mm)

Nominal size L×H×D	I ₁	I ₂	I ₃	I ₄	H ₁	H ₂	H ₃	R	R ₁	R ₂	R ₃
250×200×214	488	453	76	265	427	368	108	100	219	160	108
300×250×286	614	565	89	330	551	481	144	125	282	212	144
350×250×333	716	660	114	403	601	525	168	125	308	232	168
400×250×381	820	754	139	475	652	553	192	125	335	236	192
450×250×381	870	804	164	524	652	553	192	125	335	236	192
500×250×381	920	854	189	574	652	553	192	125	335	236	192
400×250×428	870	796	139	500	701	609	216	125	360	268	216
450×250×428	920	846	164	550	701	609	216	125	360	268	216
500×250×428	970	896	189	600	701	609	216	125	360	268	216
500×400×428	970	896	176	600	851	759	216	200	435	343	216
500×250×525 ^A	1068	1000	190	652	798	675	264	125	409	286	264
500×400×525 ^A	1068	1000	193	652	948	825	264	200	484	361	264
500×250×525 ^B	1074	1000	176	652	801	680	264	125	412	291	264
500×400×525 ^B	1 074	1 000	179	652	951	830	264	200	487	366	264

Nominal size L×H×D	R ₄	R ₅	R ₆	d ₁	T	Welding leg length		SWL		Rope diameter (Recommend)	Calculated weight (kg) ^C
						z ₁		kN	ton		
250×200×214	86	150	128	108	22	6		226	23	18	73
300×250×286	118	180	154	144	26	6.5		422	40	24	142
350×250×333	138	200	170	168	30	7.5		549	56	28	222
400×250×381	156	250	214	192	36	9		687	70	32	310
450×250×381	156	250	214	192	36	9		706	72	32	322
500×250×381	156	250	214	192	36	9		765	78	32	337
400×250×428	178	250	212	216	38	9.5		883	90	36	434
450×250×428	178	250	212	216	38	9.5		912	93	36	452
500×250×428	178	250	212	216	38	9.5		932	95	36	472
500×400×428	178	250	212	216	38	9.5		893	91	36	528
500×250×525 ^A	224	320	280	264	40	10		1148	117	44	657
500×400×525 ^A	224	320	280	264	40	10		1158	118	44	724
500×250×525 ^B	218	320	274	264	46	11.5		1413	144	44	753
500×400×525 ^B	218	320	274	264	46	11.5		1383	141	44	825

^ASWLs shown in the Table are for reference only. "SWL" may be adjusted depending on the actual loading conditions, and the actual marking is to be per the agreement between the user and the manufacturer.

^BRope diameter (Recommend) is only for reference based on bending ratio of rope through the chock is 12 times.

^CCalculated weight is for reference only.

welded and finished smooth. Where applicable, welding shall be in accordance with code requirements, such as ABS, AWS, and so on, and may require post weld heat treatment (PWHT).

6.4 All excess material, vents, and gates shall be removed and finished smooth to match the surrounding surface.

6.5 Limber or drain holes shall be 25 mm in diameter and provided in webs and brackets to prevent water entrapment.

6.6 Type I shall be in accordance with Fig. 1 and Table 1.

6.7 Type II shall be in accordance with Fig. 2 and Table 2.

7. Strength Requirements

7.1 The closed chocks are to be designed to withstand the horizontal and vertical load cases. Horizontal and vertical loadings were considered individually; both loadings were not considered simultaneously.

7.1.1 *Case 1*—Horizontal loading (see Fig. 3).

7.1.2 *Case 2*—Vertical loading (see Figs. 4-6).

7.2 The combined stress is limited to 85 % of the yield stress of the material.

8. Workmanship, Finish, and Appearance

8.1 Casting shall be sand, grit, or shot blasted to a gray metal finish to remove all loose scale. All mold flashing shall be removed and radii shall be fair so as to present an even surface.

8.2 The surface of Grade 2 chocks shall have a line contact surface of average surface roughness of 3 µm or less, in

accordance with ANSI standard B 46.1 so as to reduce abrasive damage to fiber and synthetic ropes.

8.3 The manufacturer shall provide surface preparation and coating as specified by the ordering information. In the absence of such requirements surface preparation shall remain as required by 8.1.

9. Inspection

9.1 The manufacturer shall visually inspect the chock for dimensions, workmanship, finish, and appearance after the preparation required in 8.1 to ascertain that it meets the intent of this specification.

10. Product Marketing

10.1 Each chock shall be marked with purchase order, item number, and stamped on the top exposed web using letters at least 12 mm high designating the ASTM standard number, type, and grade. Other markings may be in paint or a waterproof tag.

11. Packaging and Package Marking

11.1 If shipment is required, chocks shall be crated or attached to a pallet in a manner acceptable for shipment by a common carrier.

TABLE 2 Dimensions Requirement (see Fig. 2)
(Units: mm)

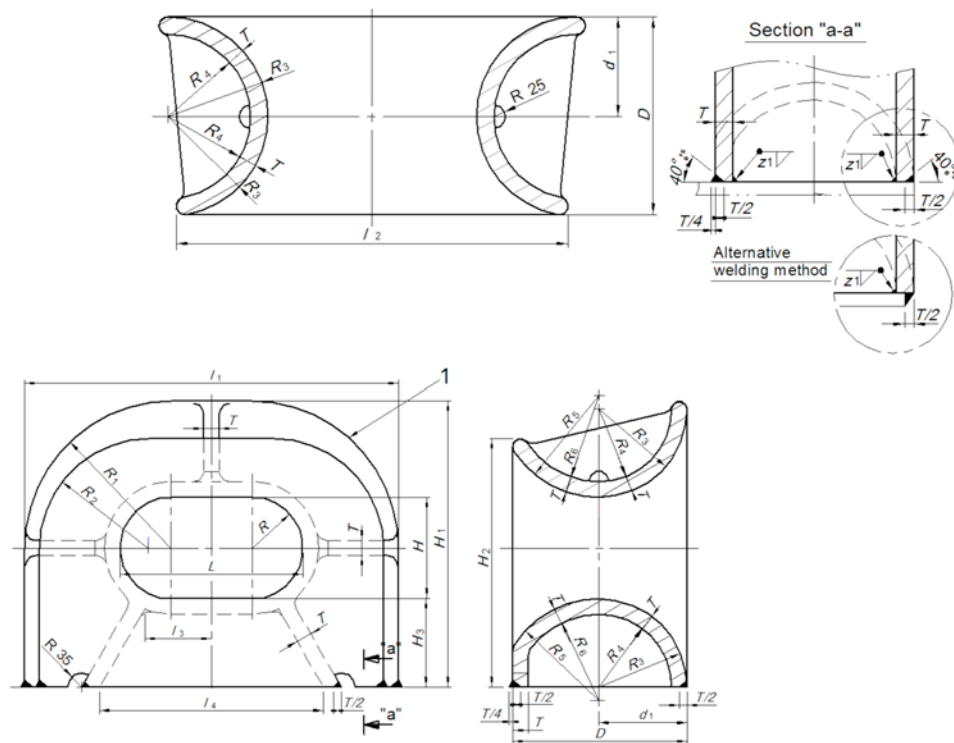
Nominal size L×H×D	I ₁	I ₂	H ₁	H ₂	R	R ₁	R ₂	R ₃	R ₄	R ₅
250×200×214	516	441	466	306	100	233	153	108	96	150
300×250×286	638	554	588	410	125	294	205	144	128	180
350×250×333	736	646	636	449	125	318	224.5	168	150	200
400×250×381	834	736	684	450	125	342	225	192	172	250
450×250×381	884	786	684	450	125	342	225	192	172	250
500×250×381	934	836	684	450	125	342	225	192	172	250
400×250×428	882	778	732	515	125	366	257.5	216	194	250
450×250×428	932	828	732	515	125	366	257.5	216	194	250
500×250×428	982	878	732	515	125	366	257.5	216	194	250
500×400×428	982	878	882	665	200	441	332.5	216	194	250
500×250×525	1078	976	828	551	125	414	275.5	264	240	320
500×400×525	1078	978	701	701	200	489	350.6	264	240	320
500×250×525	1078	976	828	554	125	414	277	264	238	320
500×400×525	1078	978	978	704	200	489	352	264	238	320

Nominal size L×H×D	R ₆	d ₁	d ₂	T	θ	Welding leg length		SWL		Rope diameter (Recommend)	Calculated weight (kg) ^A
						z ₁	z ₂	kN	ton		
250×200×214	138	108	80	12	44°	6	5	226	23	18	49
300×250×286	164	144	100	16	44°	8	6.5	422	40	24	100
350×250×333	182	168	120	18	55°	9	7	549	56	28	141
400×250×381	230	192	120	20	47°	10	8	687	70	32	184
450×250×381	230	192	120	20	47°	10	8	706	72	32	194
500×250×381	230	192	120	20	47°	10	8	765	78	32	202
400×250×428	228	216	120	22	56°	11	9	883	90	36	264
450×250×428	228	216	120	22	56°	11	9	912	93	36	276
500×250×428	228	216	120	22	56°	11	9	932	95	36	288
500×400×428	228	216	120	22	56°	11	9	893	91	36	311
500×250×525 ^B	296	264	120	24	53°	12	9.5	1148	117	44	379
500×400×525 ^C	296	264	120	24	53°	12	9.5	1158	118	44	408

^ACalculated weight is for reference only.

^BSWLs shown in the Table are for reference only. "SWL" may be adjusted depending on the actual loading conditions, and the actual marking is to be per the agreement between the user and the manufacturer.

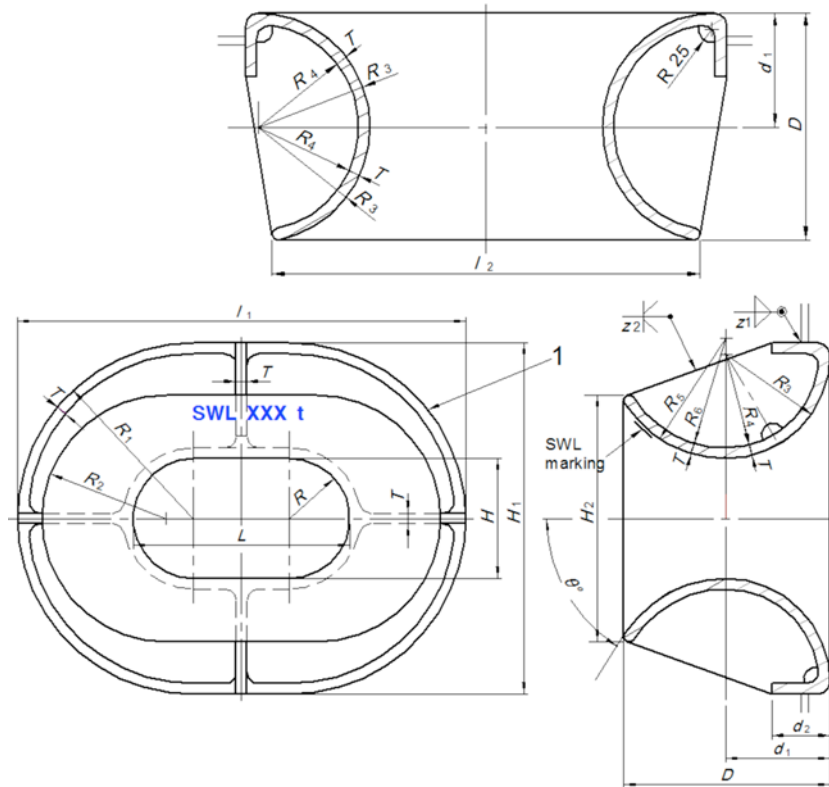
^CRope diameter (Recommend) is only for reference based on bending ratio of rope through the chock is 12 times.



NOTE 1—All fillet radii to be equal to "t₁".

NOTE 2—All final products must have a thickness no less than "T".

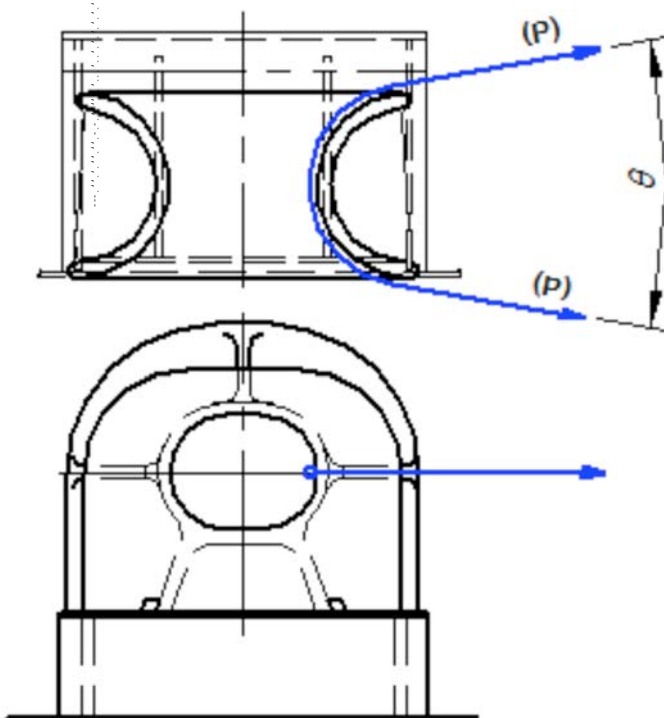
FIG. 1 Configuration of Deck Mounted Chocks



NOTE 1—All fillet radii to be equal to “ t_1 ”.

NOTE 2—All final products must have a thickness no less than “ T ”.

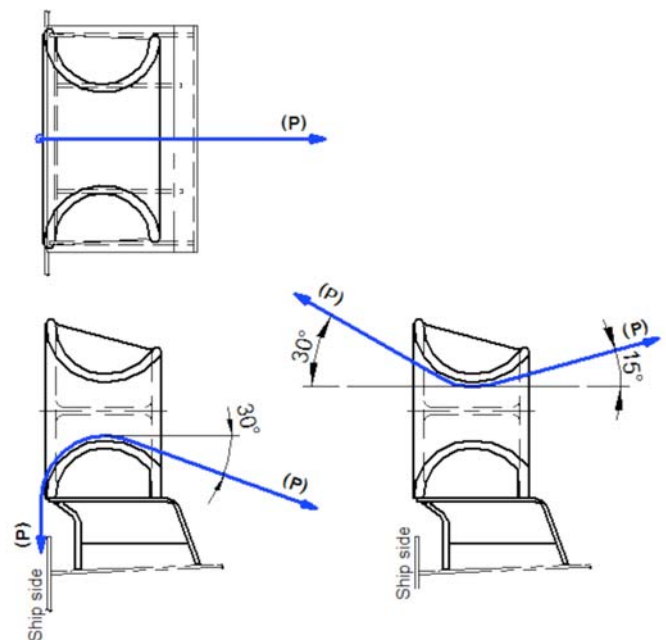
FIG. 2 Configuration of Bulwark Mounted Chocks



NOTE 1—The loads were considered for a mooring or towing line deflected 180° ($\theta = 0^\circ$) through the closed chock.

NOTE 2—P means mooring force or towing force.

FIG. 3 Horizontal Loading



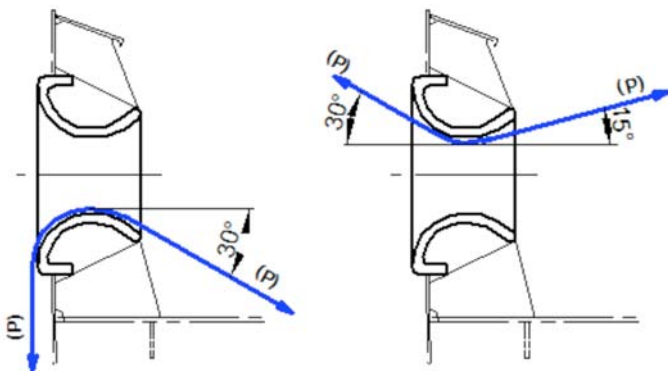
NOTE 1—The loads were considered for a mooring or towing line deflected as above figures through the closed chock.

Vertical down side: Outboard down 90° , Inboard down 30°

Vertical up side: Outboard up 30° , Inboard up 15°

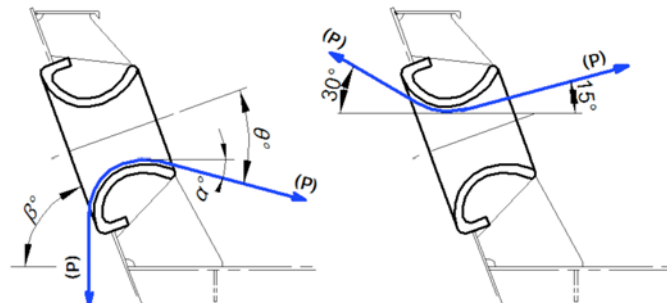
NOTE 2—P means mooring force or towing force.

FIG. 4 Vertical loading for Type A—Deck-mounted closed chocks



NOTE 1—The loads were considered for a mooring or towing line deflected as above figures through the closed chock.
Vertical down side: Outboard down 90°, Inboard down 30°
Vertical up side: Outboard up 30°, Inboard up 15°
NOTE 2—P means mooring force or towing force.

FIG. 5 Vertical loading for Type B—Bulwark-mounted closed chocks without bulwark inclination



NOTE 1—The loads were considered for a mooring or towing line deflected as above figures through the closed chock.
Vertical down side: Outboard down 90°, Inboard down θ° is not to over the figures in Table 2.
(α° : Refer to the examples below for instance, at the design bulwark angle of $\beta = 60^\circ$)

Nominal size (L × H × D)	α° (Maximum available angle)
250 × 200 × 214	14
300 × 250 × 286	14
350 × 250 × 333	25
400 × 250 × 381	17
450 × 250 × 381	17
500 × 250 × 381	17
400 × 250 × 428	26
450 × 250 × 428	26
500 × 250 × 428	26
500 × 400 × 428	26
500 × 250 × 525	23
500 × 400 × 525	23
500 × 250 × 525	23
500 × 400 × 525	23

Vertical up side: Outboard up 30°, Inboard up 15°

NOTE 2—P means mooring force or towing force.

FIG. 6 Vertical Loading for Type B— Bulwark-mounted Closed Chocks with Bulwark Inclination

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