INTERNATIONAL STANDARD

ISO 1704

Third edition
2008-03-01

Ships and marine technology — Stud-link anchor chains

Navires et technologie maritime — Chaînes d'ancre à mailles étançonnées

Reference number
ISO 1704:2008(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 1704 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 4, *Outfitting and deck machinery*.

This third edition cancels and replaces the second edition (ISO 1704:1991) which has been technically revised as follows.

— Tolerances on the nominal diameter of the links remain the same, but tolerances on other parts of the links have been appropriately adjusted.

— Lengths and tolerances of the combined links have been increased.

— The allowable manufacturing tolerance of all other dimensions has been increased.

— The nominal diameter of a common stud link is shown by d and the diameter of other links, shackles and swivels given as multiples of d.

— The swivel type and a series of its dimensions have been added for the convenience of the user. The patented swivel or the swivel with a particular function can be used as a substitute if this is possible in harmony with this International Standard.

Ships and marine technology — Stud-link anchor chains

1 Scope

This International Standard specifies the shape, proportions, dimensions and tolerances of the component parts of stud-link anchor chains.

Any statutory requirements, rules and regulations applicable to the individual ship concerned also apply.

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 2093:1986, *Electroplated coatings of tin — Specification and test methods*

ISO 2339:1986, *Taper pins, unhardened*

ISO 3828:1984, *Shipbuilding and marine structures — Deck machinery — Vocabulary*

3 Terms and definitions

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

3.1
chain-shot
component of an anchor chain consisting of common stud links and joining shackles with a given nominal length (27,5 m or 25 m) in accordance with ISO 3828

3.2
common stud link
basic link of which chain-shot consists

3.3
enlarged stud link
strengthened link that connects a common stud link and the end link, in the case of connecting chain-shots, with a “D” type joining shackle, or connects a common stud link and swivel

3.4
end link
strengthened link that is attached to the ends of chain-shots, in the case of connecting chain-shots, with “D” type joining shackles or the outboard chain-shot with an end shackle

3.5
joining shackle
“D” type joining shackle or Kenter type joining shackle used for connecting chain-shots

3.6
end shackle
enlarged shackle used for connecting the outboard chain-shot to the anchor

3.7
swivel
movable component of the outboard chain-shot which prevents excessive twisting of the chain cable

3.8
outboard chain-shot
additional short chain-shot fastened to the anchor shackle

3.9
nominal size
nominal diameter of the common stud link

4 Shape and dimensions

4.1 Shape

The stud links, shackles and component parts shall be of the shapes and proportions shown in Figures 1 to 9.

4.2 Dimensions

4.2.1 General

The dimensions of stud links, shackles and component parts shall be in accordance with the values given in Tables 1 to 7.

The nominal diameter, d, is a design diameter measured at the crown of a common stud link as an average value of two measurements perpendicular to each other. See Figure 1 and Table 1.

All dimensions, based on the nominal diameters, d, of the common stud links, shall be measured after the chain and shackles have been subjected to the statutory proof loads.

4.2.2 Enlarged stud links

The proportions of the enlarged stud links are the same as those of the common stud links. The nominal diameter of the enlarged stud link is 10 % larger than the nominal diameter of the common stud link: d_1 = 1,1 d, the calculated values are rounded to the nearest nominal diameter of the common link.

4.2.3 Common stud links and enlarged stud links

The inside diameter of common stud links and enlarged stud links shall be sufficient to allow each link to bed properly and work freely. See Figures 1 and 2.

4.2.4 End links

The inside diameter of end links shall be sufficient to allow the shackle link to bed properly and work freely. See Figure 3. The nominal diameter of the end link is 20 % larger than the nominal diameter of the common stud link: d_2 = 1,2 d, the calculated values are rounded to the nearest nominal diameter of the common link.

4.2.5 Shackle retaining pin

The retaining pin used in “D” type joining shackles and end shackles shall be a taper pin having a taper of not less than 1:50 and not more than 1:16 on the diameter.

The retaining pin used in Kenter type shackles shall be a taper pin having a taper of not less than 1:50 and not more than 1:32 on the diameter. The nominal diameter of the taper pin shall be 0,37 × d, the calculated values are rounded to the nearest standardized nominal diameter in accordance with ISO 2339. The nominal length of the taper pin shall be (w_4 − 2) × nominal diameter to taper pin (see Figure 5), the calculated values are rounded to the nearest standardized nominal length in accordance with ISO 2339.

Nominal sizes and lengths required are given in Tables 4, 5 and 6. Other details of the taper pins, e.g. end radius, cone tolerance and surface finish, shall be in accordance with ISO 2339.

Taper pins shall be either of stainless steel or tin-coated carbon steel. If tin-coated, this shall be either by a hot-dip process or electroplating in accordance with ISO 2093:1986, 7.1, service condition 4.

5 Tolerances

5.1 Nominal diameter of common stud links

The allowable manufacturing tolerances on the nominal diameter d of the common stud links, measured at the crown, are

— $^{0}_{-1}$ mm for $d \leqslant 40$ mm;

— $^{0}_{-2}$ mm for 40 mm $< d \leqslant$ 84 mm;

— $^{0}_{-3}$ mm for 84 mm $< d \leqslant$ 122 mm;

— $^{0}_{-4}$ mm for $d >$ 122 mm.

The cross-sectional area at the crown of the link shall be not less than the area of a circle of the nominal diameter.

The allowable manufacturing tolerance on the nominal diameter measured elsewhere on the link is $^{+5}_{0}$ %.

The tolerance on the stud-link welded parts is +15 %.

The allowable manufacturing tolerance of the link except for the requirements specified above is ± 2,5 %, taking into account the fact that all components of the anchor chain shall fit in with each other.

5.2 Length of five links

The length of five links is defined as 5 × p + 2 d = 22 d. The measurement is taken from the outside.

The allowable manufacturing tolerance on a length of five links is $^{+2,5}_{0}$ %.

5.3 All other dimensions

The tolerances of the diameter: $^{+5}_{0}$ %

The tolerances other than diameter: ± 2,5 %.

6 Range of sizes of links and shackles

The range of nominal diameter, d, is that specified by the classification societies associated in the International Association of Classification Societies (IACS).

7 Designation of size

The nominal size of a common stud link is designated its nominal diameter, d.

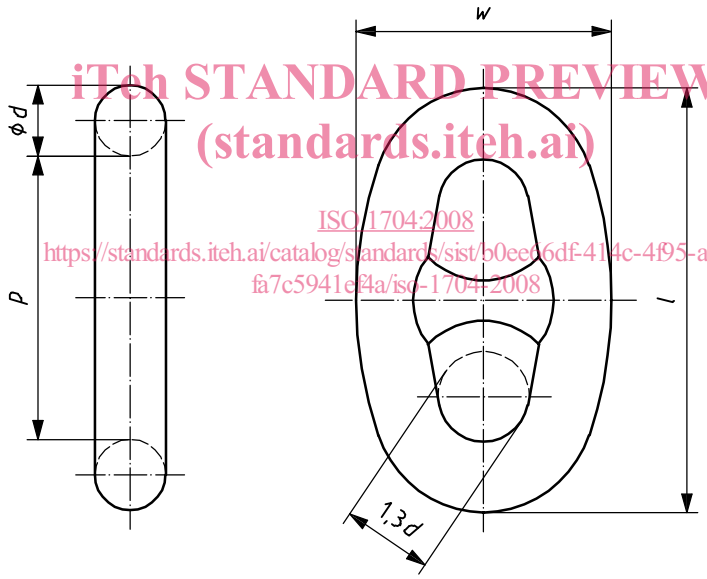
The nominal size of other links, shackles and swivels is designated by the nominal diameter, d, of the common stud link.

The nominal size of a stud-link anchor chain is designated by the nominal diameter of the common stud link.

8 Connections

Examples in the use of connecting chain-shots with joining shackle are shown in Figure 8.

Examples in the use of connecting chain outboard shot to anchor is shown in Figure 9.



Key

d = nominal diameter of common stud link

$l = 6\ d$

$p = 4\ d$

$w = 3{,}6\ d$

NOTE For nominal dimensions, see Table 1.

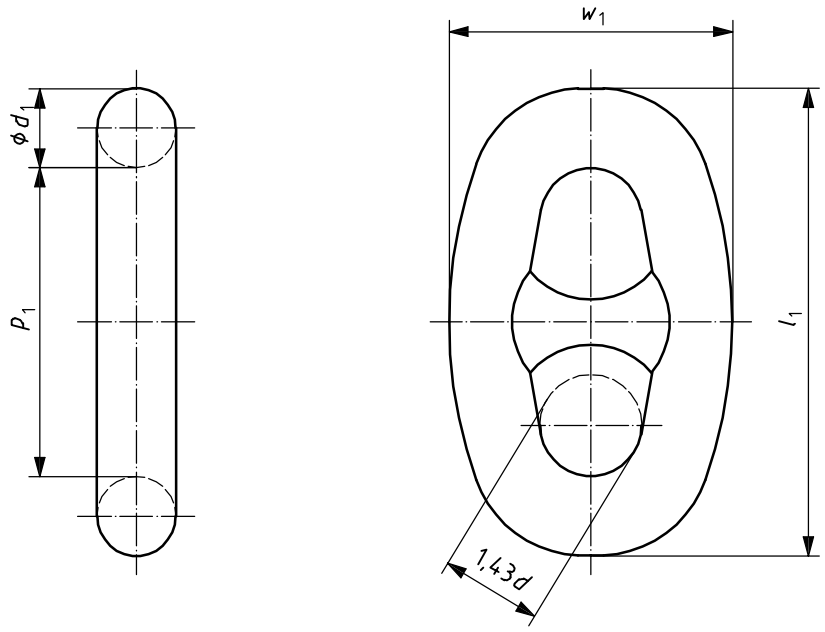
Figure 1 — Common stud link

Table 1 — Nominal dimensions of common stud link

Dimensions in millimetres

Nominal size *d*	*l*	*p*	*w*
12,5	75	50	45
14	84	56	50
16	96	64	58
17,5	105	70	63
19	114	76	68
20,5	123	82	74
22	132	88	79
24	144	96	86
26	156	104	94
28	168	112	101
30	180	120	108
32	192	128	115
34	204	136	122
36	216	144	130
38	228	152	137
40	240	160	144
42	252	168	151
44	264	176	158
46	276	184	166
48	288	192	173
50	300	200	180
52	312	208	187
54	324	216	194
56	336	224	202
58	348	232	209
60	360	240	216
62	372	248	223
64	384	256	230
66	396	264	238
68	408	272	245

Nominal size *d*	*l*	*p*	*w*
70	420	280	252
73	438	292	263
76	456	304	274
78	468	312	281
81	486	324	292
84	504	336	302
87	522	348	313
90	540	360	324
92	552	368	331
95	570	380	342
97	582	388	349
100	600	400	360
102	612	408	367
105	630	420	378
107	642	428	385
111	666	444	400
114	684	456	410
117	702	468	421
120	720	480	432
122	732	488	439
124	744	496	446
127	762	508	457
130	780	520	468
132	792	528	475
137	822	548	493
142	852	568	511
147	882	588	529
152	912	608	547
157	942	628	565
162	972	648	583



Key

d = nominal diameter of common stud link

d_1 = nominal diameter of enlarged stud link = 1,1 d

$l_1 = 6\ d_1 \approx 6{,}6\ d$

$p_1 = 4\ d_1 \approx 4{,}4\ d$

$w_1 = 3{,}6\ d_1 \approx 3{,}96\ d$

NOTE For nominal dimensions, see Table 2.

Figure 2 — Enlarged stud link

Table 2 — Nominal dimensions of enlarged stud link

Dimensions in millimetres

Nominal size (d, common stud link)	d_1	l_1	p_1	w_1
12,5	14	84	56	50
14	16	96	64	58
16	17.5	105	70	63
17,5	19	114	76	68
19	20.5	123	82	74
20,5	22	132	88	79
22	24	144	96	86
24	26	156	104	94
26	28	168	112	101
28	30	180	120	108
30	34	204	136	122
32	36	216	144	130
34	38	228	152	137
36	40	240	160	144
38	42	252	168	151
40	44	264	176	158
42	46	276	184	166
44	48	288	192	173
46	50	300	200	180
48	54	324	216	194
50	56	336	224	202
52	58	348	232	209
54	60	360	240	216
56	62	372	248	223
58	64	384	256	230
60	66	396	264	238
62	68	408	272	245
64	70	420	280	252
66	73	438	292	263
68	76	456	304	274

Nominal size (d, common stud link)	d_1	l_1	p_1	w_1
70	78	468	312	281
73	81	486	324	292
76	84	504	336	302
78	87	510	340	306
81	90	540	360	324
84	92	552	368	331
87	97	582	388	349
90	100	600	400	360
92	102	612	408	367
95	105	630	420	378
97	107	642	428	385
100	111	666	444	400
102	111	672	448	403
105	114	684	456	410
107	117	702	468	421
111	122	732	488	439
114	124	744	496	446
117	130	780	520	468
120	132	792	528	475
122	137	822	548	493
124	137	822	548	493
127	142	852	568	511
130	142	852	568	511
132	147	882	588	529
137	152	912	608	547
142	157	942	628	565
147	162	972	648	583
152	167	1 002	668	601
157	173	1 038	692	623
162	178	1 068	712	641