# 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

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ISO 1704:2008 https://standards.iteh.ai/catalog/standards/sist/b0ee66df-414c-4f95-af3a-fa7c5941ef4a/iso-1704-2008



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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.

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.

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- Tolerances on the nominal diameter of the links remain the same, but tolerances on other parts of the links have been appropriately adjusted.
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- 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 ndards.iteh.ai)

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

<u>ISO 1704:2008</u>

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fa7c5941ef4a/iso-1704-2008

#### 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

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#### 4.2.1 General

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

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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  $0.37 \times d$ , 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  $(w_4 - 2) \times$  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.

#### **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

- $0 \text{ mm for } d \leq 40 \text{ mm};$
- $\binom{0}{2}$  mm for 40 mm <  $d \le 84$  mm;

- $_{-3}^{0}$  mm for 84 mm  $< d \le 122$  mm; (standards.iteh.ai)
- \_\_\_ 0 mm for d > 122 mm.

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The cross-sectional area at the crown of the link shall be not less than the area of a circle of the nominal fa7c5941ef4a/iso-1704-2008 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  $\pm 2.5$  %. 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  $5 \times p + 2$  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:  $\pm$  2,5 %.

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#### 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*.

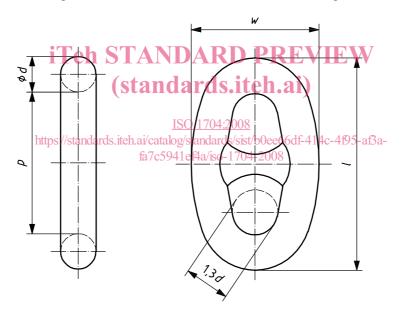
The nominal size of other links, shackles and swivels is designated by the nominal diameter, d, of the common stud link.

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.

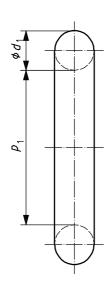
Figure 1 — Common stud link

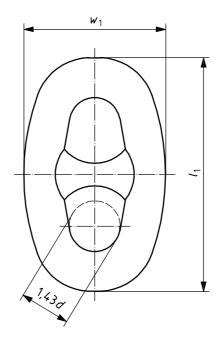
Table 1 — Nominal dimensions of common stud link

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	en <sub>136</sub> 1 A	122A
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36	216	144	130
38	228 https://	standards.iteh.a	/catalog/standar
40	240	160 f	17c59 <b>444</b> f4a/iso
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

$\begin{array}{c} \textbf{Nominal size} \\ d \end{array}$	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	
PR97VI	582	388	349	
ch 100)	600	400	360	
102	612	408	367	
105	630	420	378	
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<del></del>				
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

NOTE

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

$$l_1 = 6 \ d_1 \approx 6.6 \ d$$

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

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

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For nominal dimensions, see Table 2 https://standards.fich.ai/catalog/standards/sist/b0ee66df-414c-4f95-af3afa7c5941ef4a/iso-1704-2008

Figure 2 — Enlarged stud link

Table 2 — Nominal dimensions of enlarged stud link

Dimensions in millimetres

Nominal size (d, common stud link)	<i>d</i> <sub>1</sub>	<i>l</i> <sub>1</sub>	<i>p</i> <sub>1</sub>	<sup>w</sup> 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	S 144	130	RD
34	38	228	152	137	a it
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36	40	240	160	<u>ISU44704</u>	:2008
38	42 http	os:// <b>252</b> darc	ls.ite <mark>l68</mark> /cat	alog <b>/st</b> andar	ds/sist
40	44	264	176	158	<b>)</b> -1704
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	

(d, common stud link)         d1         l1         P1         w1           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           Prof. 107         642         428         385           611         666         444         400           102         111         672         448         403           105         114         165         448         456         410           100         117         702         468         421           111         122         732	Nominal size	7	,		
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         PRF       107       642       428       385         61       408       367       360       420       378         95       105       630       420       378         107       642       428       385         61       444       400       400       400         102       111       672       448       403         105       114       468       456       410         100       117       702       468       421         111       122       732       488       439		<sup>a</sup> 1	<sup>1</sup> 1	<i>p</i> <sub>1</sub>	<sup>W</sup> 1
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           100         111         666         444         400           102         111         672         448         403           102         111         672         448         403           100         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	70	78	468	312	281
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           PR97         107         642         428         385           105         630         420         378           105         630         420         378           105         630         420         378           105         630         420         378           105         630         420         378           105         630         420         378           105         630         420         378           105         642         428         385           61         107         642         428         385           107         707         642         428 <t< td=""><td>73</td><td>81</td><td>486</td><td>324</td><td>292</td></t<>	73	81	486	324	292
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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       1002       668       601         157       173       1038       692       623	105 160ee66df-414c	114 405-af3a-	684	456	410
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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       1002       668       601         157       173       1038       692       623					
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     1002     668     601       157     173     1038     692     623	111	122	732	488	439
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     1002     668     601       157     173     1038     692     623	114	124	744	496	446
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     1002     668     601       157     173     1038     692     623	117	130	780	520	468
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     1002     668     601       157     173     1038     692     623	120	132	792	528	475
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     1002     668     601       157     173     1038     692     623					
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     1002     668     601       157     173     1038     692     623	122	137	822	548	493
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     1002     668     601       157     173     1038     692     623	124	137	822	548	493
132     147     882     588     529       137     152     912     608     547       142     157     942     628     565       147     162     972     648     583       152     167     1002     668     601       157     173     1038     692     623	127	142	852	568	511
137     152     912     608     547       142     157     942     628     565       147     162     972     648     583       152     167     1002     668     601       157     173     1038     692     623	130	142	852	568	511
142     157     942     628     565       147     162     972     648     583       152     167     1 002     668     601       157     173     1 038     692     623	132	147	882	588	529
142     157     942     628     565       147     162     972     648     583       152     167     1 002     668     601       157     173     1 038     692     623					
147     162     972     648     583       152     167     1 002     668     601       157     173     1 038     692     623	137	152	912	608	547
152     167     1 002     668     601       157     173     1 038     692     623	142	157	942	628	565
157 173 1 038 692 623	147	162	972	648	583
	152	167	1 002	668	601
162 178 1 068 712 641	157	173	1 038	692	623
	162	178	1 068	712	641