

Annex

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 170

SHIPBUILDING DETAILS
ANCHOR CHAINS, STUD LINKS
(COMMON LINKS, ENLARGED LINKS, END LINKS AND JOINING SHACKLES)

1st EDITION
December 1960

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BRIEF HISTORY

The ISO Recommendation R 170, *Anchor Chains, Stud Links (Common Links, Enlarged Links, End Links and Joining Shackles)*, was drawn up by Technical Committee ISO/TC 8, *Shipbuilding Details*, the Secretariat of which is held by the Stichting Nederlands Normalisatie-instituut (NNI).

A draft proposal was drawn up for the standardization of details of anchor chains, stud links, based on studies of former International Federation of the National Standardizing Associations (ISA).

At its third meeting, held in Genoa, in 1956, the Technical Committee decided to accept this proposal, subject only to one modification concerning the dimension *C* of the end link. The draft so revised was submitted by correspondence to the members of the Technical Committee. As no objections were received within the given time limit, the draft proposal was adopted as a draft ISO Recommendation.

On 22 May 1959, the Draft ISO Recommendation (No. 285) was distributed to all the ISO Member Bodies and was approved by the following Member Bodies:

Belgium	Israel	Romania
Burma	Italy	Spain
Chile	Japan	Sweden
Finland	Netherlands	Switzerland
Germany	Poland	Turkey
Greece	Portugal	United Kingdom

One Member Body opposed the approval of the Draft: U.S.S.R.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in December 1960, to accept it as an ISO RECOMMENDATION.

SHIPBUILDING DETAILS

ANCHOR CHAINS, STUD LINKS

(COMMON LINKS, ENLARGED LINKS, END LINKS AND JOINING SHACKLES)

1. GENERAL REMARKS

1.1 Shape and dimensions

The recommended shape and dimensions for anchor chains, stud links, are specified in the following sections:

Common link	section 2, page 4,
Enlarged link	section 3, page 6,
End link	section 4, page 8,
Joining shackle with shackle pin	section 5, page 10.

1.1.1 All links and shackles should be of uniform shape and the inside radii of common and enlarged links should be sufficient to allow each link to bed properly and work freely. The inside radius of end links should be equal to half the inside width and their sides should be parallel.

1.1.2 All dimensions specified in this ISO Recommendation are *after* the cables and shackles have been subjected to the statutory proof loads.

1.2 Tolerance

The allowable manufacturing tolerance for the dimensions B , B_1 and C is ± 2 per cent.

1.3 Material

The quality of the material used for the manufacture of the links and the joining shackle should not be inferior in any respect to that of the material used for the manufacture of the other assembling parts forming the anchor cable.

The design, material and tests of the complete anchor cables are subject to the legal requirements of the countries concerned and of the recognized approving authorities.

1.4 References

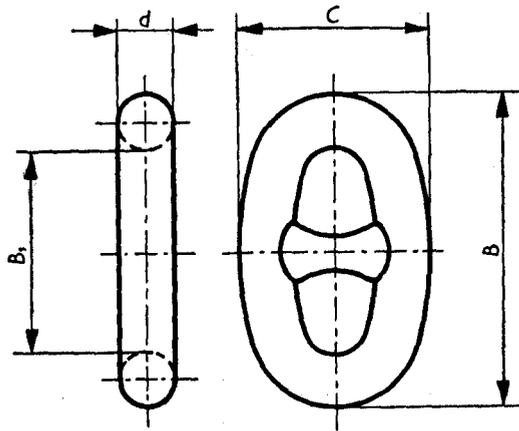
For links of other types, see

ISO Recommendation R 39, *Anchor Chains - Lugless Joining Shackles, Kenter Type*,
and

ISO Recommendation R 40, *Anchor Chains - Studless Links*.

2. COMMON LINK

2.1 Dimensions



A = nominal dimension of common link = d

d = diameter of material of common link
 2 values: d' = millimetre value of d
 d'' = inch value of d , transposed into rounded off millimetre value

$$B = 6 \frac{d' + d''}{2}$$

$$B_1 = B - 2d$$

$$C = 3.6 \frac{d' + d''}{2}$$

Example for $A = 20.5$ mm or $13/16$ in:

$$B = 6 \frac{20.5 + 20.6}{2} = 123 \text{ mm (rounded off)}$$

$$B_1 = 123 - 2 \times 20.5 = 82 \text{ mm}$$

$$C = 3.6 \frac{20.5 + 20.6}{2} = 74 \text{ mm (rounded off)}$$

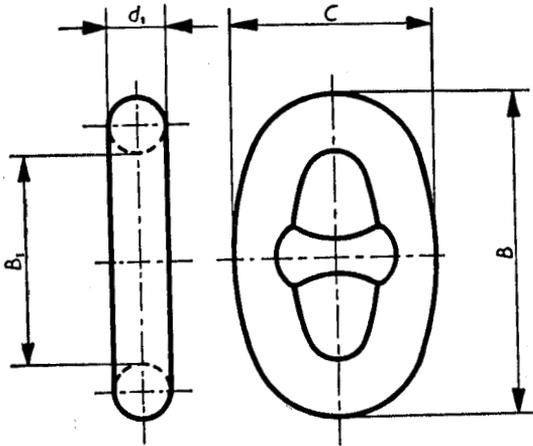
A		d		B	B ₁	C
		d'	d''			
mm	in	mm	mm	mm	mm	mm
11	7/16	11	11.1	66	44	40
12.5	1/2	12.5	12.7	76	51	45
14.5	9/16	14.5	14.3	86	57	52
16	5/8	16	15.9	96	64	57
17.5	11/16	17.5	17.5	105	70	63
19	3/4	19	19.1	114	76	69
20.5	13/16	20.5	20.6	123	82	74
22	7/8	22	22.2	133	89	80
24	15/16	24	23.8	143	95	86
25.5	1	25.5	25.4	153	102	92
27	1 1/16	27	27.0	162	108	97
28.5	1 1/8	28.5	28.6	171	114	103
30	1 3/16	30	30.2	181	121	108
32	1 1/4	32	31.8	191	127	115
33	1 5/16	33	33.3	199	133	119
35	1 3/8	35	34.9	210	140	126
37	1 7/16	37	36.5	220	146	132
38	1 1/2	38	38.1	228	152	137
40	1 9/16	40	39.7	239	159	143
41	1 5/8	41	41.3	247	165	148

2.1 Dimensions (continued)

A		d		B	B _i	C
		d'	d''			
mm	in	mm	mm	mm	mm	mm
43	1 ¹¹ / ₁₆	43	42.9	258	172	155
44	1 ³ / ₄	44	44.5	266	178	159
46	1 ¹³ / ₁₆	46	46.0	276	184	166
48	1 ⁷ / ₈	48	47.6	287	191	172
49	1 ¹⁵ / ₁₆	49	49.2	295	197	177
51	2	51	50.8	305	203	183
52	2 ¹ / ₁₆	52	52.4	313	209	188
54	2 ¹ / ₈	54	54.0	324	216	194
56	2 ³ / ₁₆	56	55.6	335	223	201
57	2 ¹ / ₄	57	57.2	343	229	206
59	2 ⁵ / ₁₆	59	58.7	353	235	212
60	2 ³ / ₈	60	60.3	361	241	217
62	2 ⁷ / ₁₆	62	61.9	372	248	223
64	2 ¹ / ₂	64	63.5	382	254	230
65	2 ⁹ / ₁₆	65	65.1	390	260	234
67	2 ⁵ / ₈	67	66.7	401	267	241
68	2 ¹¹ / ₁₆	68	68.3	409	273	245
70	2 ³ / ₄	70	69.9	420	280	252
71	2 ¹³ / ₁₆	71	71.4	427	285	256
73	2 ⁷ / ₈	73	73.0	438	292	263
75	2 ¹⁵ / ₁₆	75	74.6	449	299	269
76	3	76	76.2	457	305	274
78	3 ¹ / ₁₆	78	77.8	467	311	280
80	3 ¹ / ₈	80	79.4	478	318	287
82	3 ¹ / ₄	82	82.6	494	330	296
85	3 ³ / ₈	85	85.7	512	342	307
88	3 ⁷ / ₁₆	88	87.3	526	350	316
90	3 ⁹ / ₁₆	90	90.5	542	362	325
92	3 ⁵ / ₈	92	92.1	552	368	331
95	3 ³ / ₄	95	95.3	571	381	343
98	3 ⁷ / ₈	98	98.4	589	393	354
100	3 ¹⁵ / ₁₆	100	100.0	600	400	360

3. ENLARGED LINK

3.1 Dimensions



A = nominal dimension of enlarged link = d
 d = diameter of material of common link
 2 values: d' = millimetre value of d
 d'' = inch value of d , transposed into rounded off millimetre value

d_1 = diameter of material of enlarged link
 $= 1.1 \frac{d' + d''}{2}$

$B = 6.5 \frac{d' + d''}{2}$

$B_1 = B - 2d_1$

$C = 4 \frac{d' + d''}{2}$

Example for $A = 20.5$ mm or $19/16$ in:

$d_1 = 1.1 \frac{20.5 + 20.6}{2} = 22.5$ mm (rounded off)

$B = 6.5 \frac{20.5 + 20.6}{2} = 134$ mm (rounded off)

$B_1 = 134 - 2 \times 22.5 = 89$ mm

$C = 4 \frac{20.5 + 20.6}{2} = 82$ mm (rounded off)

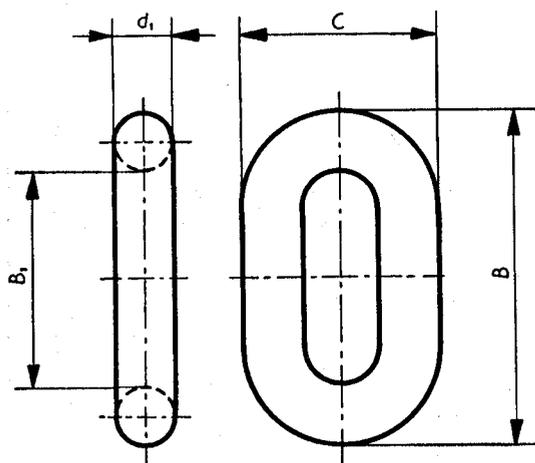
A		d (common link)		d_1	B	B_1	C
		d'	d''				
mm	in	mm	mm	mm	mm	mm	mm
11	7/16	11	11.1	12	72	48	44
12.5	1/2	12.5	12.7	14	82	54	50
14.5	9/16	14.5	14.3	16	94	62	58
16	5/8	16	15.9	17.5	104	69	64
17.5	11/16	17.5	17.5	19	114	76	70
19	3/4	19	19.1	21	124	82	76
20.5	13/16	20.5	20.6	22.5	134	89	82
22	7/8	22	22.2	24.5	144	95	88
24	15/16	24	23.8	26.5	155	102	96
25.5	1	25.5	25.4	28	165	109	102
27	1 1/16	27	27.0	29.5	176	117	108
28.5	1 1/8	28.5	28.6	31	186	124	114
30	1 3/16	30	30.2	33	196	130	120
32	1 1/4	32	31.8	35	207	137	128
33	1 5/16	33	33.3	36	215	143	133

3.1 Dimensions (continued)

A		d (common link)		d ₁	B	B ₁	C
		d'	d''				
mm	in	mm	mm	mm	mm	mm	mm
35	1 ³ / ₈	35	34.9	38	227	151	140
37	1 ⁷ / ₁₆	37	36.5	40	239	159	147
38	1 ¹ / ₂	38	38.1	42	247	163	152
40	1 ⁹ / ₁₆	40	39.7	44	259	171	159
41	1 ⁵ / ₈	41	41.3	45	267	177	165
43	1 ¹¹ / ₁₆	43	42.9	47	279	185	172
44	1 ³ / ₄	44	44.5	49	288	190	177
46	1 ¹³ / ₁₆	46	46.0	51	299	197	184
48	1 ⁷ / ₈	48	47.6	53	311	205	191
49	1 ¹⁵ / ₁₆	49	49.2	54	319	211	196
51	2	51	50.8	56	331	219	204
52	2 ¹ / ₁₆	52	52.4	57	339	225	209
54	2 ¹ / ₈	54	54.0	59	351	233	216
56	2 ³ / ₁₆	56	55.6	61	363	241	223
57	2 ¹ / ₄	57	57.2	63	371	245	228
59	2 ⁵ / ₁₆	59	58.7	65	383	253	235
60	2 ³ / ₈	60	60.3	66	391	259	241
62	2 ⁷ / ₁₆	62	61.9	68	403	267	248
64	2 ¹ / ₂	64	63.5	70	414	274	255
65	2 ⁹ / ₁₆	65	65.1	72	423	279	260
67	2 ⁵ / ₈	67	66.7	74	435	287	267
68	2 ¹¹ / ₁₆	68	68.3	75	443	293	273
70	2 ³ / ₄	70	69.9	77	455	301	280
71	2 ¹³ / ₁₆	71	71.4	78	463	307	285
73	2 ⁷ / ₈	73	73.0	80	474	314	292
75	2 ¹⁵ / ₁₆	75	74.6	82	486	322	299
76	3	76	76.2	84	495	327	304
78	3 ¹ / ₁₆	78	77.8	86	506	334	312
80	3 ¹ / ₈	80	79.4	88	518	342	319
82	3 ¹ / ₄	82	82.6	91	535	353	329
85	3 ³ / ₈	85	85.7	94	555	367	341
88	3 ⁷ / ₁₆	88	87.3	96	570	378	351
90	3 ⁹ / ₁₆	90	90.5	99	587	389	361
92	3 ⁵ / ₈	92	92.1	101	598	396	368
95	3 ³ / ₄	95	95.3	105	618	408	381
98	3 ⁷ / ₈	98	98.4	108	638	422	393
100	3 ¹⁵ / ₁₆	100	100.0	110	650	430	400

4. END LINK

4.1 Dimensions



A = nominal dimension of end link = d

d = diameter of material of common link

2 values: d' = millimetre value of d

d'' = inch value of d , transposed into rounded off millimetre value

d_1 = diameter of material of end link

$$= 1.2 \frac{d' + d''}{2}$$

$$B = 6.75 \frac{d' + d''}{2}$$

$$B_1 = B - 2d_1$$

$$C = 4 \frac{d' + d''}{2}$$

Example for $A = 20.5$ mm or $13/16$ in:

$$d_1 = 1.2 \frac{20.5 + 20.6}{2} = 24.5 \text{ mm (rounded off)}$$

$$B = 6.75 \frac{20.5 + 20.6}{2} = 139 \text{ mm (rounded off)}$$

$$B_1 = 139 - 2 \times 24.5 = 90 \text{ mm}$$

$$C = 4 \frac{20.5 + 20.6}{2} = 82 \text{ mm (rounded off)}$$

A		d (common link)		d_1	B	B_1	C
		d'	d''				
mm	in	mm	mm	mm	mm	mm	mm
11	$7/16$	11	11.1	13.5	75	48	44
12.5	$1/2$	12.5	12.7	15	85	55	50
14.5	$9/16$	14.5	14.3	17.5	97	62	58
16	$5/8$	16	15.9	19	108	70	64
17.5	$11/16$	17.5	17.5	21	118	76	70
19	$3/4$	19	19.1	23	129	83	76
20.5	$13/16$	20.5	20.6	24.5	139	90	82
22	$7/8$	22	22.2	26.5	149	96	88
24	$15/16$	24	23.8	28.5	161	104	96
25.5	1	25.5	25.4	31	172	110	102
27	$1 \frac{1}{16}$	27	27.0	32	182	118	108
28.5	$1 \frac{1}{8}$	28.5	28.6	34	193	125	114
30	$1 \frac{3}{16}$	30	30.2	36	203	131	120
32	$1 \frac{1}{4}$	32	31.8	38	215	139	128
33	$1 \frac{5}{16}$	33	33.3	40	224	144	133

4.1 Dimensions (continued)

A		d (common link)		d_1	B	B_1	C
		d'	d''				
mm	in	mm	in	mm	mm	mm	mm
35	1 ³ / ₈	35	34.9	42	236	152	140
37	1 ⁷ / ₁₆	37	36.5	44	248	160	147
38	1 ¹ / ₂	38	38.1	46	257	165	152
40	1 ⁹ / ₁₆	40	39.7	48	269	173	159
41	1 ⁵ / ₈	41	41.3	49	278	180	165
43	1 ¹¹ / ₁₆	43	42.9	52	290	186	172
44	1 ³ / ₄	44	44.5	53	299	193	177
46	1 ¹³ / ₁₆	46	46.0	55	310	200	184
48	1 ⁷ / ₈	48	47.6	57	323	209	191
49	1 ¹⁵ / ₁₆	49	49.2	59	331	213	196
51	2	51	50.8	61	344	222	204
52	2 ¹ / ₁₆	52	52.4	63	352	226	209
54	2 ¹ / ₈	54	54.0	65	364	234	216
56	2 ³ / ₁₆	56	55.6	67	377	243	223
57	2 ¹ / ₄	57	57.2	69	385	247	228
59	2 ⁵ / ₁₆	59	58.7	71	397	255	235
60	2 ³ / ₈	60	60.3	72	406	262	241
62	2 ⁷ / ₁₆	62	61.9	74	418	270	248
64	2 ¹ / ₂	64	63.5	76	430	278	255
65	2 ⁹ / ₁₆	65	65.1	78	439	283	260
67	2 ⁵ / ₈	67	66.7	80	451	291	267
68	2 ¹¹ / ₁₆	68	68.3	82	460	296	273
70	2 ³ / ₄	70	69.9	84	472	304	280
71	2 ¹³ / ₁₆	71	71.4	85	481	311	285
73	2 ⁷ / ₈	73	73.0	88	493	317	292
75	2 ¹⁵ / ₁₆	75	74.6	90	505	325	299
76	3	76	76.2	91	514	332	304
78	3 ¹ / ₁₆	78	77.8	93	526	340	312
80	3 ¹ / ₈	80	79.4	96	538	346	319
82	3 ¹ / ₄	82	82.6	99	556	358	329
85	3 ³ / ₈	85	85.7	102	576	372	341
88	3 ⁷ / ₁₆	88	87.3	105	592	382	351
90	3 ⁹ / ₁₆	90	90.5	108	609	393	361
92	3 ⁵ / ₈	92	92.1	110	621	401	368
95	3 ³ / ₄	95	95.3	114	642	414	381
98	3 ⁷ / ₈	98	98.4	118	663	427	393
100	3 ¹⁵ / ₁₆	100	100.0	120	675	435	400