

INTERNATIONAL STANDARD



4347

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Leaf chains, clevises and sheaves

Chaînes de levage à mailles jointives, chapes et tourteaux de renvoi

First edition — 1977-09-01

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UDC 621.855

Ref. No. ISO 4347-1977 (E)

Descriptors : chain drives, chains, conveyor chains, clevises, chain centre-bosses, specifications, dimensions, measuring loads, breaking loads.

Price based on 12 pages

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4347 was developed by Technical Committee ISO/TC 100, *Chains and chain wheels for power transmission and conveyors*, and was circulated to the member bodies in January 1976.

It has been approved by the member bodies of the following countries :

Australia	India	Spain
Austria	Italy	Sweden
Belgium	Japan	Turkey
Chile	Korea, Dem. P. Rep. of	United Kingdom
Czechoslovakia	Mexico	U.S.A.
Finland	Netherlands	U.S.S.R.
France	Romania	
Germany	South Africa, Rep. of	

No member body expressed disapproval of the document.

Leaf chains, clevises and sheaves

0 INTRODUCTION

This International Standard has been prepared after examining the possibility of having one single series of chains derived directly from the short pitch precision chains defined in ISO/R 606 (July 1967). However, in order to be realistic, it has become clear that standardization of chains of the BL series, from American Standard ANSI B29-8, which are universally used, would also be desirable.

Consequently, this International Standard includes two series of chains, the one derived from the American Standard being designated by the symbol LH, and the one from ISO/R 606 Series B designated by the symbol LL. The dimensions are shown in inches and millimetres; the latter are conversions of the basic inch dimensions.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies characteristics of chains used for general lifting purposes together with the rim profiles of sheaves and the chain attachment ends of clevises. It covers dimensions, limits for interchangeability, measuring loads and minimum breaking loads.

2 REFERENCES

ISO/R 286, *ISO system for limits and fits — Part 1: General, tolerances and deviations*.

ISO/R 606, *Short pitch transmission precision roller chains and chain wheels*.

3 CHAINS

3.1 Nomenclature

The nomenclature of chains is indicated in figure 1 and the key to tables 1, 1M, 2 or 2M.

The illustrations in figure 1 do not necessarily define the actual form of the chain plates.

3.2 Designation

Leaf chains are designated by the same numerical symbols as chains of ISO/R 606 with the same pitch, i.e. two figures

expressing the pitch in 1/16 in preceded by the prefix LH for chains from ANSI B29-8, and LL for chains from ISO/R 606 Series B, and followed by the two numbers indicating the number of plates, link pins and articulating links respectively.

Example :

LL 0822 — Chain with nominal pitch of 12,7 mm derived from chain 08B consisting of pin links and articulating links each including two plates.

LH 1234 — Chain with nominal pitch of 19,05 mm consisting of pin links including three plates and articulating links including four plates.

3.3 Dimensions

Chains shall conform to the dimensions given in tables 1, 1M, 2 or 2M. Maximum and minimum dimensions are specified to ensure interchangeability of complete chains in clevises. They represent limits for interchangeability but are not the actual tolerances that should be used in manufacture.

NOTE — Chains from different manufacturers should not be placed together within the same application.

3.4 Breaking loads

The test chain shall have a minimum length of five free pitches. The chain ends shall be attached to the testing machine shackles by a pin through the plate holes. The shackles shall be so designed as to allow universal movement; the actual method to be used is left to the discretion of the manufacturer.

Tests in which failure occurs adjacent to the shackles shall be disregarded.

The minimum tensile breaking loads shall be those given in tables 1, 1M, 2 or 2M.

3.5 Proof loading

All chains shall be proof loaded to at least one-third of the minimum breaking load given in tables 1, 1M, 2 or 2M.

3.6 Length accuracy

As LL leaf chains are normally constructed from plates also used for short pitch transmission roller chains, the actual

pitch of the chain does not necessarily equal its nominal pitch but depends upon each manufacturer. For the specific chain length consult the manufacturer.

Finished chains shall be measured after proof loading but before lubricating.

The standard length of chain for measurement shall be 49 pitches or 1 524 mm, whichever is less, and shall terminate each end in an identical link.

The chain shall be supported throughout its entire length and a measuring load equal to 1/100 of the breaking load

given in tables 1, 1M, 2 or 2M applied.

The length tolerance of $\pm 0,25\%$ shall be applied to the specific length of the chain.

3.7 Cranked links

Cranked links shall not be used in leaf chain.

3.8 Marking

The chains should be marked with the manufacturer's name or trade mark.

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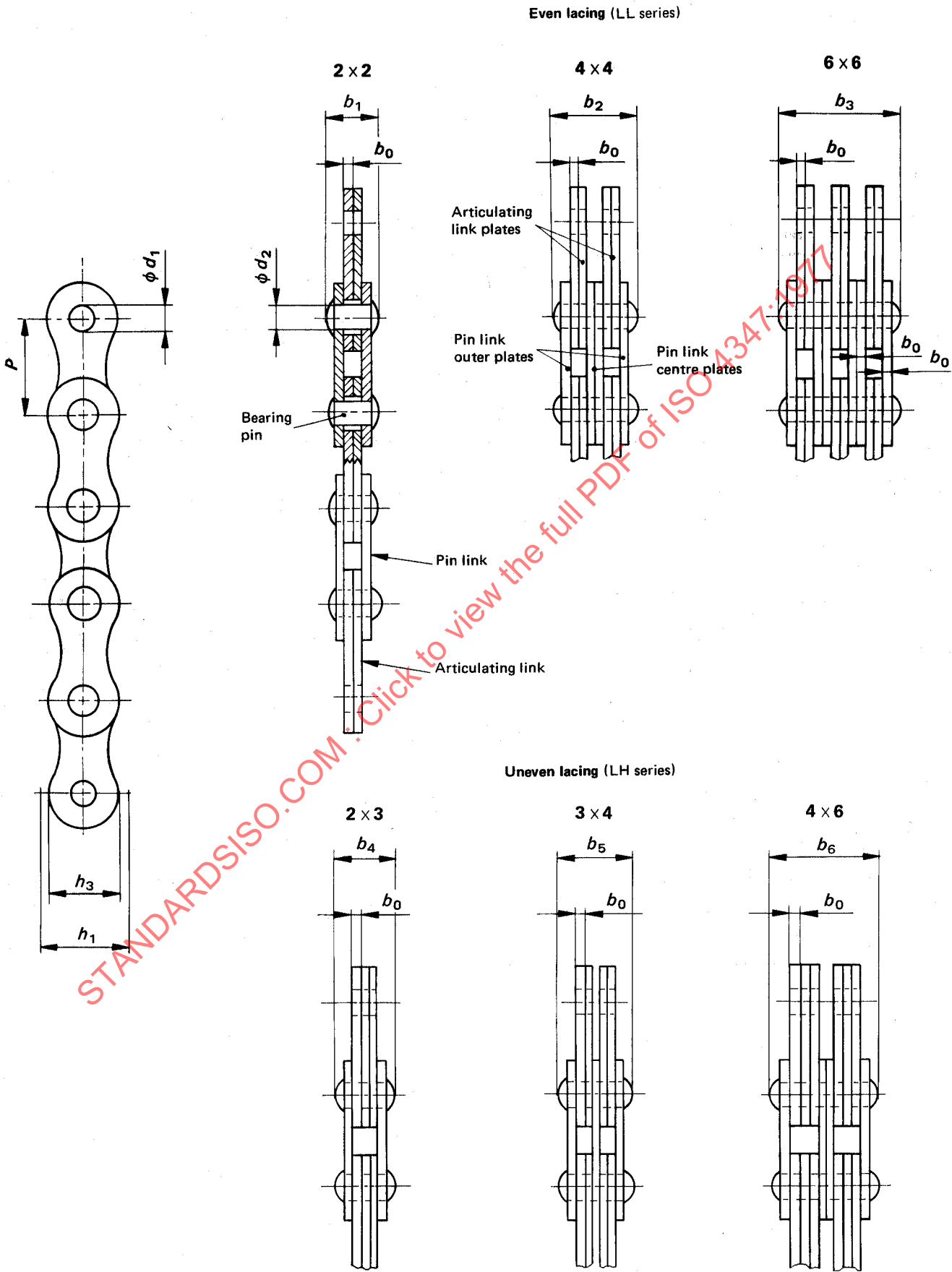


FIGURE 1 — Key to tables 1, 1M, 2 and 2M

TABLE 1 — Chain dimensions and breaking loads, series LH (inch/pound units)

ISO chain number	Nominal pitch P	Lacing	Thickness of plates b_0 max.	Hole diameter of articulating link plates ϕd_1 min.	Bearing pin diameter ϕd_2 max.	Chain path depth ¹⁾ h_1 min.	Plate depth h_3 max.	Width over riveted bearing pins b_4 b_5 } max. b_6	Breaking load min.
	in		in	in	in	in	in	in	lbf
LH 0823 LH 0834 LH 0846	0.500	2 X 3 3 X 4 4 X 6	0.082	0.201 5	0.200 5	0.485	0.475	0.518 0.685 0.935	5 000 7 500 10 000
LH 1023 LH 1034 LH 1046	0.625	2 X 3 3 X 4 4 X 6	0.096	0.235 5	0.234 5	0.604	0.594	0.605 0.800 1.092	7 500 11 000 15 000
LH 1223 LH 1234 LH 1246	0.750	2 X 3 3 X 4 4 X 6	0.130	0.313 5	0.312 5	0.722	0.713	0.816 1.080 1.476	11 000 17 000 22 000
LH 1623 LH 1634 LH 1646	1.000	2 X 3 3 X 4 4 X 6	0.161	0.376 5	0.375 5	0.960	0.950	1.003 1.329 1.818	19 000 29 000 38 000
LH 2023 LH 2034 LH 2046	1.250	2 X 3 3 X 4 4 X 6	0.193	0.438 5	0.437 5	1.200	1.188	1.194 1.584 2.169	26 000 41 000 52 000
LH 2423 LH 2434 LH 2446	1.500	2 X 3 3 X 4 4 X 6	0.227	0.501 5	0.500 5	1.439	1.425	1.395 1.853 2.540	34 000 55 000 68 000
LH 2823 LH 2834 LH 2846	1.750	2 X 3 3 X 4 4 X 6	0.258	0.563 5	0.562 5	1.680	1.663	1.581 2.101 2.881	43 000 71 000 86 000
LH 3223 LH 3234 LH 3246	2.000	2 X 3 3 X 4 4 X 6	0.296	0.688 5	0.687 5	1.919	1.900	1.834 2.430 3.324	65 000 99 000 130 000

1) Chain path depth = minimum depth of channel through which the assembled chain will pass.

TABLE 1M – Chain dimensions and breaking loads, series LH (metric units)

ISO chain number	Nominal pitch p	Lacing	Thickness of plates b_0 max.	Hole diameter of articulating link plates ϕd_1 min.	Bearing pin diameter ϕd_2 max.	Chain path depth ¹⁾ h_1 min.	Plate depth h_3 max.	Width over riveted bearing pins b_4 b_5 b_6 } max.	Breaking load min.
	mm		mm	mm	mm	mm	mm	mm	daN
LH 0823 LH 0834 LH 0846	12,700	2 × 3 3 × 4 4 × 6	2,08	5,12	5,09	12,32	12,07	13,16 17,40 23,75	2 220 3 340 4 450
LH 1023 LH 1034 LH 1046	15,875	2 × 3 3 × 4 4 × 6	2,44	5,98	5,96	15,34	15,09	15,37 20,32 27,74	3 340 4 890 6 670
LH 1223 LH 1234 LH 1246	19,050	2 × 3 3 × 4 4 × 6	3,30	7,96	7,94	18,34	18,11	20,73 27,43 37,49	4 890 7 560 9 790
LH 1623 LH 1634 LH 1646	25,400	2 × 3 3 × 4 4 × 6	4,09	9,56	9,54	24,38	24,13	25,48 33,76 46,18	8 450 12 900 16 900
LH 2023 LH 2034 LH 2046	31,750	2 × 3 3 × 4 4 × 6	4,90	11,14	11,11	30,48	30,18	30,33 40,23 55,09	11 570 18 240 23 130
LH 2423 LH 2434 LH 2446	38,100	2 × 3 3 × 4 4 × 6	5,77	12,74	12,71	36,55	36,20	35,43 47,07 64,52	15 120 24 470 30 250
LH 2823 LH 2834 LH 2846	44,450	2 × 3 3 × 4 4 × 6	6,55	14,31	14,29	42,67	42,24	40,16 53,37 73,18	19 130 31 580 38 250
LH 3223 LH 3234 LH 3246	50,800	2 × 3 3 × 4 4 × 6	7,52	17,49	17,46	48,74	48,26	46,58 61,72 84,43	28 910 44 040 57 830

1) Chain path depth = minimum depth of channel through which the assembled chain will pass.

TABLE 2 — Chain dimensions and breaking loads, series LL (inch/pound units)

ISO chain number	Nominal pitch P	Lacing	Thickness of plates ¹⁾ b_0 max.	Hole diameter of articulating link plates ϕd_1 min.	Bearing pin diameter ϕd_2 max.	Chain path depth ²⁾ h_1 min.	Plate depth h_3 max.	Width over riveted bearing pins b_1 b_2 b_3 } max.	Breaking load min.
	in		in	in	in.	in.	in.	in.	lbf
LL 0822 LL 0844 LL 0866	0.500	2 × 2 4 × 4 6 × 6	0.051	0.175 5	0.175 0	0.440	0.430	0.300 0.510 0.725	4 000 7 000 10 000
LL 1022 LL 1044 LL 1066	0.625	2 × 2 4 × 4 6 × 6	0.065	0.200 5	0.200 0	0.550	0.540	0.365 0.635 0.900	5 000 10 000 15 000
LL 1222 LL 1244 LL 1266	0.750	2 × 2 4 × 4 6 × 6	0.075	0.225 5	0.225 0	0.645	0.635	0.420 0.730 1.035	6 500 13 000 19 500
LL 1622 LL 1644 LL 1666	1.000	2 × 2 4 × 4 6 × 6	0.126	0.327 0	0.326 0	0.840	0.830	0.675 1.190 1.700	9 500 19 000 28 500
LL 2022 LL 2044 LL 2066	1.250	2 × 2 4 × 4 6 × 6	0.146	0.402 0	0.401 0	1.050	1.040	0.790 1.380 1.970	14 500 29 000 43 500
LL 2422 LL 2444 LL 2466	1.500	2 × 2 4 × 4 6 × 6	0.205	0.577 0	0.576 0	1.328	1.315	1.120 1.945 2.770	22 000 44 000 66 000
LL 2822 LL 2844 LL 2866	1.750	2 × 2 4 × 4 6 × 6	0.254	0.627 0	0.626 0	1.475	1.460	1.340 2.360 3.385	29 000 58 000 87 000
LL 3222 LL 3244 LL 3266	2.000	2 × 2 4 × 4 6 × 6	0.254	0.702 0	0.701 0	1.682	1.665	1.380 2.400 3.425	38 000 76 000 114 000
LL 4022 LL 4044 LL 4066	2.500	2 × 2 4 × 4 6 × 6	0.325	0.902 0	0.901 0	2.106	2.085	1.760 3.065 4.374	59 000 118 000 177 000
LL 4822 LL 4844 LL 4866	3.000	2 × 2 4 × 4 6 × 6	0.406	1.152 0	1.151 0	2.540	2.515	2.210 3.835 5.470	90 000 180 000 270 000

1) This dimension is for clevis calculations only, it is not an agreed plate thickness.

2) Chain path depth = minimum depth of channel through which the assembled chain will pass.

TABLE 2M — Chain dimensions and breaking loads, series LL (metric units)

ISO chain number	Nominal pitch P	Lacing	Thickness of plates ¹⁾ b_0 max.	Hole diameter of articulating link plates ϕd_1 min.	Bearing pin diameter ϕd_2 max.	Chain path depth ²⁾ h_1 min.	Plate depth h_3 max.	Width over riveted bearing pins $\left. \begin{matrix} b_1 \\ b_2 \\ b_3 \end{matrix} \right\} \text{max.}$	Breaking load min. daN
	mm		mm	mm	mm	mm	mm	mm	daN
LL 0822 LL 0844 LL 0866	12,700	2 × 2 4 × 4 6 × 6	1,30	4,46	4,45	11,18	10,92	7,60 13,00 18,40	1 780 3 110 4 450
LL 1022 LL 1044 LL 1066	15,875	2 × 2 4 × 4 6 × 6	1,65	5,09	5,08	13,98	13,72	9,30 16,10 22,90	2 220 4 450 6 670
LL 1222 LL 1244 LL 1266	19,050	2 × 2 4 × 4 6 × 6	1,90	5,73	5,72	16,39	16,13	10,70 18,50 26,30	2 890 5 780 8 670
LL 1622 LL 1644 LL 1666	25,400	2 × 2 4 × 4 6 × 6	3,20	8,30	8,28	21,34	21,08	17,20 30,20 43,20	4 230 8 450 12 680
LL 2022 LL 2044 LL 2066	31,750	2 × 2 4 × 4 6 × 6	3,70	10,21	10,19	26,68	26,42	20,10 35,10 50,10	6 450 12 900 19 350
LL 2422 LL 2444 LL 2466	38,100	2 × 2 4 × 4 6 × 6	5,20	14,65	14,63	33,73	33,40	28,40 49,40 70,40	9 790 19 570 29 360
LL 2822 LL 2844 LL 2866	44,450	2 × 2 4 × 4 6 × 6	6,45	15,92	15,90	37,46	37,08	34,00 60,00 86,00	12 900 25 800 38 700
LL 3222 LL 3244 LL 3266	50,800	2 × 2 4 × 4 6 × 6	6,45	17,83	17,81	42,72	42,29	35,00 61,00 87,00	16 900 33 810 50 720
LL 4022 LL 4044 LL 4066	63,500	2 × 2 4 × 4 6 × 6	8,25	22,91	22,89	53,49	52,96	44,70 77,90 111,10	26 240 52 490 78 730
LL 4822 LL 4844 LL 4866	76 200	2 × 2 4 × 4 6 × 6	10,30	29,26	29,24	64,52	63,88	56,10 97,40 138,90	40 030 80 070 120 100

1) This dimension is for clevis calculations only, it is not an agreed plate thickness.

2) Chain path depth = minimum depth of channel through which the assembled chain will pass.

4 CLEVISES

4.1 Dimensions

The dimensions of terminal clevises for use with series LH and LL leaf chains shall be as given in tables 3, 3M, 4 or 4M. Limiting dimensions therein established are for the purpose of assuring acceptance of chains built in accordance with the foregoing standards.

4.2 Breaking strength

The clevises and the pins used to anchor chain shall be of

adequate strength to withstand at least the breaking load of the chain.

4.3 Length adjustment

In multi-strand applications, where it becomes necessary within the chain assembly to compensate for small length differences between strands it is always desirable to provide within the anchoring device a length adjustment at least equal to one pitch of the chain.

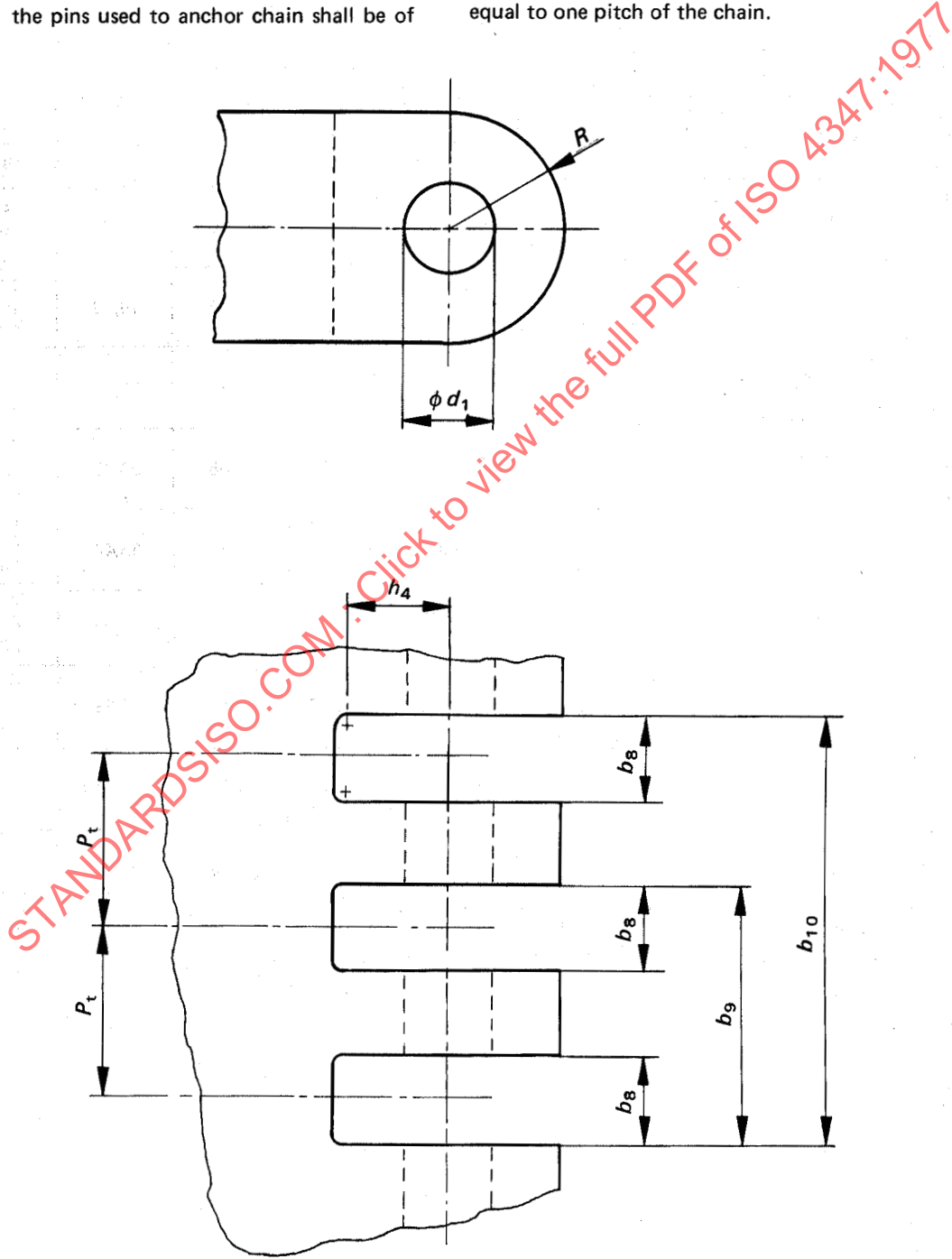


FIGURE 2 — Dimensions of terminal clevises

TABLE 3 — Clevis dimensions, series LH (inch units)

ISO chain number	b_8 tol. H11 ¹⁾	b_9 tol. H11 ¹⁾	P_t nom.	ϕd_1 min.	h_4 min.	R max.
	in	in	in	in	in	in
LH 0823	0.258	—	—	—	—	—
LH 0834	0.171	0.421	0.250	0.201 5	0.250	0.250
LH 0846	0.258	0.676	0.418	—	—	—
LH 1023	0.301	—	—	—	—	—
LH 1034	0.199	0.492	0.293	0.235 5	0.312	0.312
LH 1046	0.301	0.789	0.488	—	—	—
LH 1223	0.406	—	—	—	—	—
LH 1234	0.269	0.665	0.396	0.313 5	0.375	0.375
LH 1246	0.406	1.066	0.660	—	—	—
LH 1623	0.501	—	—	—	—	—
LH 1634	0.332	0.821	0.489	0.376 5	0.500	0.500
LH 1646	0.501	1.316	0.815	—	—	—
LH 2023	0.599	—	—	—	—	—
LH 2034	0.397	0.982	0.585	0.438 5	0.625	0.625
LH 2046	0.599	1.574	0.975	—	—	—
LH 2423	0.703	—	—	—	—	—
LH 2434	0.466	1.153	0.687	0.501 5	0.750	0.750
LH 2446	0.703	1.848	1.145	—	—	—
LH 2823	0.798	—	—	—	—	—
LH 2834	0.529	1.309	0.780	0.563 5	0.875	0.875
LH 2846	0.798	2.098	1.300	—	—	—
LH 3223	0.914	—	—	—	—	—
LH 3234	0.606	1.500	0.894	0.688 5	1.000	1.000
LH 3246	0.914	2.404	1.490	—	—	—

1) Tolerance grade H11 in accordance with ISO/R 286.

TABLE 3M — Clevis dimensions, series LH (metric units)

ISO chain number	b_8 tol. H11 ¹⁾	b_9 tol. H11 ¹⁾	P_t nom.	ϕd_1 min.	h_4 min.	R max.
	mm	mm	mm	mm	mm	mm
LH 0823	6,55	—	—	—	—	—
LH 0834	4,34	10,69	6,35	5,12	6,35	6,35
LH 0846	6,55	17,17	10,62	—	—	—
LH 1023	7,65	—	—	—	—	—
LH 1034	5,05	12,50	7,44	5,98	7,92	7,92
LH 1046	7,65	20,04	12,40	—	—	—
LH 1223	10,31	—	—	—	—	—
LH 1234	6,83	16,89	10,06	7,96	9,53	9,53
LH 1246	10,31	27,08	16,76	—	—	—
LH 1623	12,73	—	—	—	—	—
LH 1634	8,43	20,85	12,42	9,56	12,70	12,70
LH 1646	12,73	33,43	20,70	—	—	—
LH 2023	15,21	—	—	—	—	—
LH 2034	10,08	24,94	14,86	11,14	15,88	15,88
LH 2046	15,21	39,98	24,77	—	—	—
LH 2423	17,86	—	—	—	—	—
LH 2434	11,84	29,29	17,45	12,74	19,05	19,05
LH 2446	17,86	46,94	29,08	—	—	—
LH 2823	20,27	—	—	—	—	—
LH 2834	13,44	33,25	19,81	14,31	22,23	22,23
LH 2846	20,27	53,29	33,02	—	—	—
LH 3223	23,22	—	—	—	—	—
LH 3234	15,39	38,10	22,71	17,49	25,40	25,40
LH 3246	23,22	61,06	37,85	—	—	—

1) Tolerance grade H11 in accordance with ISO/R 286.

TABLE 4 — Clevis dimensions, series LL (inch units)

ISO chain number	b_8 tol. H11 ¹⁾	b_9 tol. H11 ¹⁾	b_{10} tol. H11 ¹⁾	P_t nom.	ϕd_1 min.	h_4 min.	R max.
	in	in	in	in	in	in	in
LL 0822 LL 0844 LL 0866	0.106	0.317	0.528	0.211	0.175 5	0.236	0.250
LL 1022 LL 1044 LL 1066	0.134	0.400	0.666	0.266	0.200 5	0.315	0.312
LL 1222 LL 1244 LL 1266	0.154	0.459	0.765	0.305	0.225 5	0.394	0.375
LL 1622 LL 1644 LL 1666	0.256	0.768	1.280	0.512	0.327 0	0.472	0.500
LL 2022 LL 2044 LL 2066	0.295	0.886	1.476	0.591	0.402 0	0.551	0.625
LL 2422 LL 2444 LL 2466	0.413	1.240	2.067	0.827	0.577 0	0.709	0.750
LL 2822 LL 2844 LL 2866	0.512	1.535	2.559	1.024	0.627 0	0.787	0.875
LL 3222 LL 3244 LL 3266	0.512	1.535	2.559	1.023	0.702 0	0.906	1.000
LL 4022 LL 4044 LL 4066	0.654	1.961	3.268	1.307	0.902 0	1.102	1.250
LL 4822 LL 4844 LL 4866	0.815	2.445	4.075	1.630	1.152 0	1.339	1.500

1) Tolerance grade H11 in accordance with ISO/R 286.