
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

Second edition — 1985-12-01

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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.

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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 4347 was prepared by Technical Committee ISO/TC 100, *Chains and chain wheels for power transmission and conveyors*.

This second edition cancels and replaces the first edition (ISO 4347:1977), which has been technically revised as follows:

an increased range for LH chains (2 × 2, 4 × 4, 6 × 6 and 8 × 8 lacings) has been included;

sub-clause 3.4 "Minimum ultimate tensile strength" has been expanded with regard to the previous sub-clause 3.4 "Breaking loads".

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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 606. 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 606, suffix 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 ultimate tensile loads.

2 References

ISO 286, *ISO system for limits and fits*.¹⁾

ISO 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 tables 1, 1M, 2 and 2M.

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

3.2 Designation

Leaf chains shall be designated by the same numerical components, taken from the standardized ISO chain number, as laid down in ISO 606 for chains with the same pitch, i.e. two digits expressing the pitch in sixteenths of an inch, preceded by the prefix LH for chains from ANSI B29-8 and LL for chains from ISO 606, suffix B, and followed by the two numbers indicating the number of plates on pin links and articulating links, respectively.

Examples:

Designation of a chain with nominal pitch of 12,7 mm derived from chain 08B, consisting of pin links and articulating links, each including two plates:

LL 0822

Designation of a chain with nominal pitch of 19,05 mm, consisting of pin links including three plates and articulating links including four plates:

LH 1234

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 Minimum ultimate tensile strength

3.4.1 The minimum tensile strength is the minimum strength of samples tested to destruction in tensile loading, as defined in 3.4.2. This strength is not a working load. It is intended primarily as a comparative figure between chains of various constructions. For application information, the manufacturers or their published data should be consulted.

1) At present at the stage of draft. (Revision of ISO/R 286-1962.)

3.4.2 A tensile load, not less than that specified in tables 1, 1M, 2 or 2M, is applied slowly to the ends of a chain length, containing at least five free pitches, by means of shackles permitting free movement on both sides of the chain centreline, in the normal plane of articulation.

Failure shall be considered to have occurred at the first point where increasing extension is no longer accompanied by increasing load, i.e. the summit of the load/extension diagram.

Tests in which failures occur adjacent to the shackles should be disregarded.

3.4.3 The tensile test shall be considered as a destructive test. Even though a chain may not visibly fail when subjected to the minimum ultimate tensile load, it will have been stressed beyond the yield point and will be unfit for service.

3.5 Proof loading

All chains shall be proof loaded to at least one-third of the minimum ultimate tensile 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 with an identical link at each end.

The chain shall be supported throughout its entire length and a measuring load equal to 1/100 of the ultimate tensile load given in tables 1, 1M, 2 or 2M shall be applied.

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

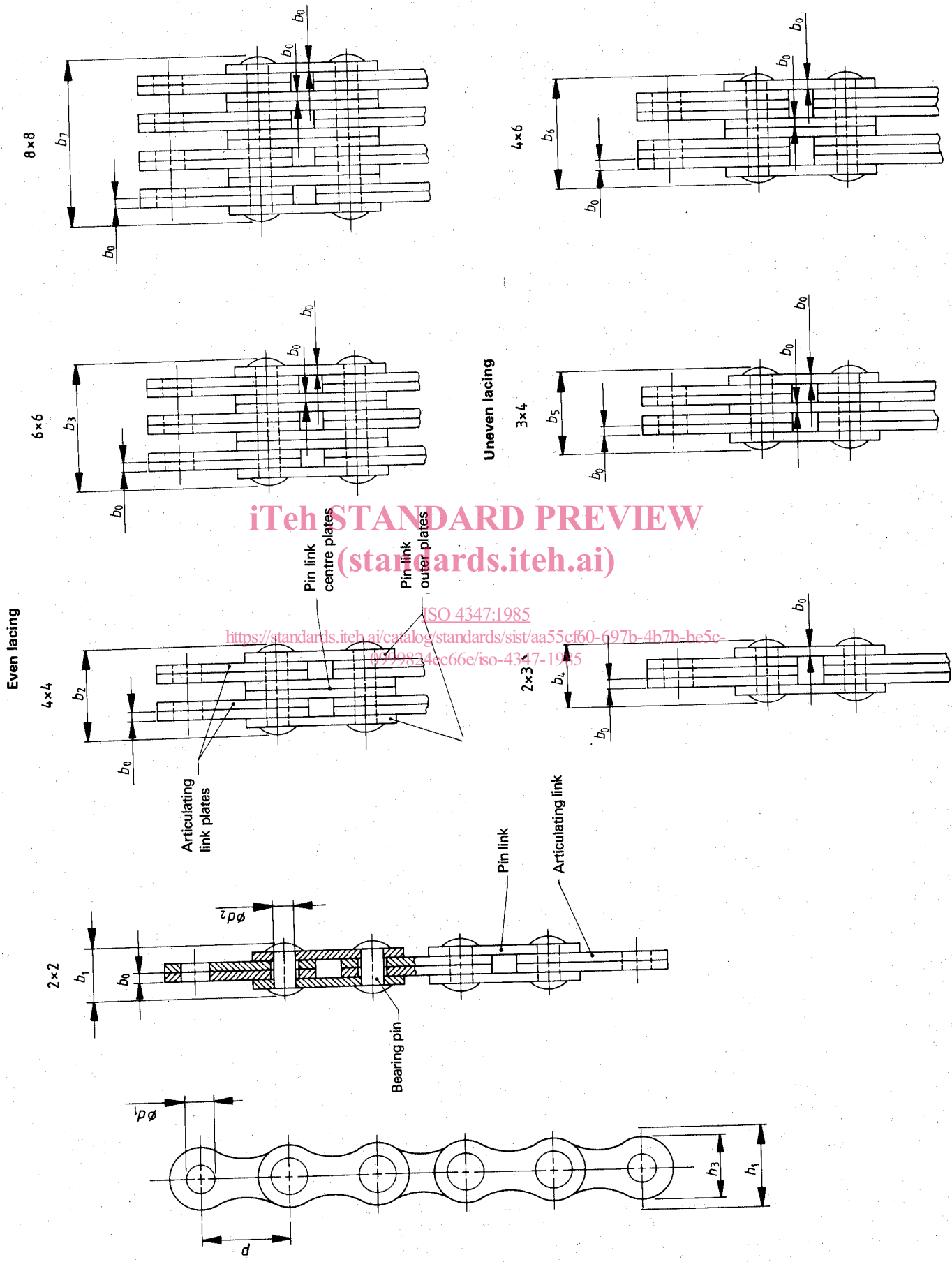
3.7 Cranked links

Cranked links shall not be used in leaf chains.

3.8 Marking

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

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Figure 1 — Symbols related to tables 1, 1M, 2 and 2M

Table 1 — Chain dimensions and ultimate tensile loads, LH series (Inch/pound units)

ISO chain number	Pitch p	Lacing	Thickness of plates b_0	Hole diameter of articulating link plates d_1	Bearing pin diameter d_2	Chain path depth ¹⁾ h_1	Plate depth h_3	Width over riveted bearing pins b_1 to b_7	Ultimate tensile load
	nom.		max.	min.	max.	min.	max.	max.	min.
	in		in	in	in	in	in	in	lbf
LH 0822 ²⁾ LH 0823 LH 0834 LH 0844 ²⁾ LH 0846 LH 0866 ²⁾ LH 0888 ²⁾	0.500	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	0.082	0.201 5	0.200 5	0.485	0.475	0.435 0.518 0.685 0.768 0.935 1.102 1.435	5 000 5 000 7 500 10 000 10 000 15 000 20 000
LH 1022 ²⁾ LH 1023 LH 1034 LH 1044 ²⁾ LH 1046 LH 1066 ²⁾ LH 1088 ²⁾	0.625	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	0.096	0.235 5	0.234 5	0.604	0.594	0.508 0.605 0.800 0.897 1.092 1.287 1.676	7 500 7 500 11 000 15 000 15 000 22 500 30 000
LH 1222 ²⁾ LH 1223 LH 1234 LH 1244 ²⁾ LH 1246 LH 1266 ²⁾ LH 1288 ²⁾	0.750	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	0.130	0.313 5	0.312 5	0.722	0.713	0.684 0.816 1.080 1.212 1.476 1.740 2.268	11 000 11 000 17 000 22 000 22 000 33 000 44 000
LH 1622 ²⁾ LH 1623 LH 1634 LH 1644 ²⁾ LH 1646 LH 1666 ²⁾ LH 1688 ²⁾	1.000	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	0.161	0.376 5	0.375 5	0.960	0.950	0.840 1.003 1.329 1.492 1.818 2.144 2.796	19 000 19 000 29 000 38 000 38 000 57 000 76 000
LH 2022 ²⁾ LH 2023 LH 2034 LH 2044 ²⁾ LH 2046 LH 2066 ²⁾ LH 2088 ²⁾	1.250	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	0.193	0.438 5	0.437 5	1.200	1.188	0.999 1.194 1.584 1.779 2.169 2.559 3.339	26 000 26 000 41 000 52 000 52 000 78 000 104 000
LH 2422 ²⁾ LH 2423 LH 2434 LH 2444 ²⁾ LH 2446 LH 2466 ²⁾ LH 2488 ²⁾	1.500	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	0.227	0.501 5	0.500 5	1.439	1.425	1.166 1.395 1.853 2.082 2.540 2.998 3.914	34 000 34 000 55 000 68 000 68 000 102 000 136 000
LH 2822 ²⁾ LH 2823 LH 2834 LH 2844 ²⁾ LH 2846 LH 2866 ²⁾ LH 2888 ²⁾	1.750	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	0.258	0.563 5	0.562 5	1.680	1.663	1.321 1.581 2.101 2.361 2.881 3.401 4.441	43 000 43 000 71 000 86 000 86 000 130 000 172 000
LH 3222 ²⁾ LH 3223 LH 3234 LH 3244 ²⁾ LH 3246 LH 3266 ²⁾ LH 3288 ²⁾	2.000	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	0.296	0.688 5	0.687 5	1.919	1.900	1.536 1.834 2.430 2.728 3.324 3.920 5.112	65 000 65 000 99 000 130 000 130 000 195 000 260 000
LH 4022 ²⁾ LH 4023 LH 4034 LH 4044 ²⁾ LH 4046 LH 4066 ²⁾ LH 4088 ²⁾	2.500	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	0.390	0.938 5	0.937 5	2.397	2.375	2.037 2.429 3.213 3.605 4.389 5.173 6.741	97 500 97 500 146 000 195 000 195 000 292 500 390 000

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

2) These chains have reduced fatigue strength and wear life compared with uneven lacings of the same pitch and ultimate tensile load. This should be taken into account when selecting a chain for a particular application.

Table 1M — Chain dimensions and ultimate tensile loads, LH series (Metric units)

ISO chain number	Pitch p nom. mm	Lacing	Thickness of plates b_0	Hole diameter of articulating link plates d_1	Bearing pin diameter d_2	Chain path depth ¹⁾ h_1	Plate depth h_3	Width over riveted bearing pins b_1 to b_7	Ultimate tensile load
			max.	min.	max.	min.	max.	max.	min.
			mm	mm	mm	mm	mm	mm	daN
LH 0822 ²⁾ LH 0823 LH 0834 LH 0844 ²⁾ LH 0846 LH 0866 ²⁾ LH 0888 ²⁾	12,700	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	2,08	5,12	5,09	12,32	12,07	11,05 13,16 17,40 19,51 23,75 27,99 36,45	2 220 2 220 3 340 4 450 4 450 6 670 8 900
LH 1022 ²⁾ LH 1023 LH 1034 LH 1044 ²⁾ LH 1046 LH 1066 ²⁾ LH 1088 ²⁾	15,875	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	2,44	5,98	5,96	15,34	15,09	12,90 15,37 20,32 22,78 27,74 32,18 42,57	3 340 3 340 4 890 6 670 6 670 10 010 13 340
LH 1222 ²⁾ LH 1223 LH 1234 LH 1244 ²⁾ LH 1246 LH 1266 ²⁾ LH 1288 ²⁾	19,050	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	3,30	7,96	7,94	18,34	18,11	17,37 20,73 27,43 30,78 37,49 44,20 57,61	4 890 4 890 7 560 9 790 9 790 14 680 19 570
LH 1622 ²⁾ LH 1623 LH 1634 LH 1644 ²⁾ LH 1646 LH 1666 ²⁾ LH 1688 ²⁾	25,400	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	4,09	9,56	9,54	24,38	24,13	21,34 25,48 33,76 37,90 46,18 54,46 71,02	8 450 8 450 12 900 16 900 16 900 25 360 33 810
LH 2022 ²⁾ LH 2023 LH 2034 LH 2044 ²⁾ LH 2046 LH 2066 ²⁾ LH 2088 ²⁾	31,750	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	4,90	11,14	11,11	30,48	30,18	25,37 30,33 40,23 45,19 55,09 65,00 84,81	11 560 11 560 18 240 23 130 23 130 34 700 46 260
LH 2422 ²⁾ LH 2423 LH 2434 LH 2444 ²⁾ LH 2446 LH 2466 ²⁾ LH 2488 ²⁾	38,100	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	5,77	12,74	12,71	36,55	36,20	29,62 35,43 47,07 52,88 64,52 76,15 99,42	15 120 15 120 24 460 30 250 30 250 45 370 60 500
LH 2822 ²⁾ LH 2823 LH 2834 LH 2844 ²⁾ LH 2846 LH 2866 ²⁾ LH 2888 ²⁾	44,450	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	6,55	14,31	14,29	42,67	42,24	33,55 40,16 53,37 59,97 73,18 86,39 112,80	19 130 19 130 31 580 38 260 38 260 57 830 76 510
LH 3222 ²⁾ LH 3223 LH 3234 LH 3244 ²⁾ LH 3246 LH 3266 ²⁾ LH 3288 ²⁾	50,800	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	7,52	17,49	17,46	48,74	48,26	39,01 46,58 61,72 69,29 84,43 99,57 129,84	28 910 28 910 44 040 57 830 57 830 86 740 115 650
LH 4022 ²⁾ LH 4023 LH 4034 LH 4044 ²⁾ LH 4046 LH 4066 ²⁾ LH 4088 ²⁾	63,500	2 × 2 2 × 3 3 × 4 4 × 4 4 × 6 6 × 6 8 × 8	9,91	23,84	23,81	60,88	60,33	51,74 61,70 81,61 91,57 111,48 131,39 171,22	43 370 43 370 64 940 86 740 86 740 130 110 173 480

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

2) These chains have reduced fatigue strength and wear life compared with uneven lacings of the same pitch and ultimate tensile load. This should be taken into account when selecting a chain for a particular application.

Table 2 — Chain dimensions and ultimate tensile loads, LL series (Inch/pound units)

ISO chain number	Pitch p	Lacing	Thickness of plates b_0	Hole diameter of articulating link plates d_1	Bearing pin diameter d_2	Chain path depth ¹⁾ h_1	Plate depth h_3	Width over riveted bearing pins b_1, b_2, b_3	Ultimate tensile load
	nom.		max.	min.	max.	min.	max.	max.	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) Chain path depth = minimum depth of channel through which the assembled chain will pass.

Table 2M – Chain dimensions and ultimate tensile loads, LL series (Metric units)

ISO chain number	Pitch p	Lacing	Thickness of plates b_0	Hole diameter of articulating link plates d_1	Bearing pin diameter d_2	Chain path depth ¹⁾ h_1	Plate depth h_3	Width over riveted bearing pins b_1, b_2, b_3	Ultimate tensile load
	nom.		max.	min.	max.	min.	max.	max.	min.
	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) Chain path depth = minimum depth of channel through which the assembled chain will pass.