ASME B29.8-2010

[Revision of ASME B29.8-2002 (R2008)]

Leaf Chains, Clevises, and Sheaves

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

INTENTIONALLY LEFT BLANK

ASME B29.8-2010

[Revision of ASME B29.8-2002 (R2008)]

Leaf Chains, Clevises, and Sheaves

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

Three Park Avenue • New York, NY • 10016 USA

Date of Issuance: March 31, 2011

The next edition of this Standard is scheduled for publication in 2016. There will be no addenda issued to this edition.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Periodically certain actions of the ASME B29 Committee may be published as Code Cases. Code Cases and interpretations are published on the ASME Web site under the Committee Pages at http://cstools.asme.org as they are issued.

The American Society of Mechanical Engineers
Three Park Avenue, New York, NY 10016-5990

CONTENTS

FOREWORD

For many years, roller chain manufacturers have furnished a substantial volume of chains consisting of link plates assembled on pins without the use of bushings and rollers. These chains provide relatively high strength per unit of weight and have found wide usage where sprockets are not required and high-speed power transmission characteristics are not needed.

Previously, variation in link plate thickness, link plate contour, diameter of pins, and the method of lacing limited its interchangeability and restricted its use. For these reasons the Association of Roller and Silent Chain Manufacturers appointed a task subcommittee on September 21, 1951 to develop this Standard.

The scope of the resultant Standard covers the lacing, pin diameter, diameter of link plate holes, link plate contour and thickness, chain widths, and minimum ultimate tensile strengths. The Standard also recommends clevis and sheave design. Supplementary information to guide users in the application of these chains appeared in the 1958 edition and was deleted in 1960.

The 1971 reaffirmation was approved by the American National Standards Institute on September 10, 1971.

Prior to 1975, all B29.8 leaf chain standards included both Type A and Type B leaf chain designs. Type A, the lighter series, was characterized by even or balanced lacing, while Type B, the heavier series, was shown only with uneven or unbalanced lacing of chain links.

During the decade preceding 1975, it became increasingly apparent that the use of Type A leaf chain was declining and that it was being used primarily for replacement. Most new design applications used the heavier Type B design either with the standard uneven lacing or with even lacing, which was shown as standard only for Type A leaf chain. The increased use of Type B chain and the desire to simplify chain standards led the American Chain Association to undertake a revision of B29.8 to:

(a) eliminate Type A leaf chain from the standard;

(b) add even lacing (balanced) to the Type B chain series;

(c) include a 2½ in. pitch chain to the list of Type B chain.

These revisions were subsequently included in ANSI B29.8-1977 and approved by the American National Standards Institute on May 4, 1977.

In tabulating dimensional information in this Standard, customary inch-pound units have been used. Additionally, companion tabulations have been included that provide metric (S.I.) unit conversions of these values in accordance with SI-1, ASME Orientation and Guide for Use of SI (Metric) Units. Certain formulas and relationships have intentionally been presented only in customary units to eliminate ambiguity between them and the tabulated values.

Revisions incorporated in ANSI/ASME B29.8M-1985 provided additional information on clevises, clevis pins, minimum sheave size, and lubrication.

Revisions incorporated in ASME B29.8M-1993 included changes in format, restatement of the definition of Minimum Ultimate Tensile Strength and, most notably, minor changes in the standard values for maximum pin diameter and the minimum hole diameter. The dimensional changes were required to allow a direct, error-free conversion between conventional units (inches) and metric units (millimeters).

Revisions incorporated in ASME B29.8-2002 include the elimination of 8×8 lacing. Tables 1 and 2 were revised to show minimum width between outside plates (L_m) and Tables 4 and 5 were revised to show the dimensions for an inside clevis. An appendix was added containing information on lubrication and maintenance, connect and disconnect, and general inspection criteria. Preload and manufacturer's identification marking were added in compliance with the requirements of ISO 4347.

Revisions incorporated in ASME B29.8-2010 include upside down rotation of Fig. 1, deletion of the L_m term and its definition in para. 1.3 and Fig. 3. Also changed is the final sentence of para. 1.4 concerning manufacturers' responsibility for ensuring that their chains are properly connected; deletion of columns headed "L_m" from Tables 1 and 2; and in Table 1 correcting the W_{max} values from the BL-5xx chains (the prior values were identical to those for BL-4xx chains).

This Standard was approved by the American National Standards Institute on November 18, 2010.

ASME B29 COMMITTEE
Chains, Attachments, and Sprockets for Power Transmission and Conveying

(The following is the roster of the Committee at the time of approval of this Standard.)

STANDARDS COMMITTEE OFFICERS

C. G. Springman, *Chair*
E. Pawlicki, *Vice Chair*
G. Osolsobe, *Secretary*

STANDARDS COMMITTEE PERSONNEL

A. J. Binford, IWIS Drive System
L. Carrier, Daido Corporation of America
D. W. Egbert, Hitachi Maxco Ltd.
R. V. Dickey, *Alternate,* Hitachi Maxco
D. G. Fannin, Emerson Power Transmission
D. Lindsay, *Alternate,* Emerson Power Transmission
W. C. Hall, Ramsey Products Corp.
M. Manickam, Webster Industries
C. A. Norwood, Martin Sprocket & Gear, Inc.
G. Osolsobe, The American Society of Mechanical Engineers
E. Pawlicki, Drives LLC
J. R. Wilbur, *Alternate,* Drives LLC
V. D. Petershack, Consultant

R. A. Reinfried, Conveyor Equipment Manufacturers Association
K. J. Smith, Ken Smith & Associates
J. A. Spencer, Jeffrey Corp.
C. G. Springman, Diamond Chain Co.
R. Brandon, *Alternate,* Diamond Chain Co.
J. L. Wright, Consultant

CORRESPONDENCE WITH THE B29 COMMITTEE

General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions, and attending Committee meetings. Correspondence should be addressed to:

Secretary, B29 Standards Committee
The American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990
http://go.asme.org/Inquiry

Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

Proposing a Case. Cases may be issued for the purpose of providing alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee Web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the Standard, the paragraph, figure or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the Standard to which the proposed Case applies.

Interpretations. Upon request, the B29 Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B29 Standards Committee.

The request for interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his/her request in the following format:

Subject:	Cite the applicable paragraph number(s) and the topic of the inquiry.
Edition:	Cite the applicable edition of the Standard for which the interpretation is being requested.
Question:	Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings, that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

Attending Committee Meetings. The B29 Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B29 Standards Committee.

LEAF CHAINS, CLEVISES, AND SHEAVES

1 LEAF CHAINS

1.1 Description

A leaf chain consists of a series of link plates alternately assembled with pins in such a way that the joint is free to articulate between adjoining pitches. Typical assemblies are depicted in Figs. 1 and 2.

1.2 Numbering and Marking System

The chain described in this Standard shall carry the prefix BL. The last two digits of the number following the prefix denote the lacing. The right-hand digit designates the number of link plates in the articulating pitch. The digit to the left of this designates the number of plates in the pin link pitch. The digits to the left of those two digits denote the number of eighths of an inch in the chain pitch.

EXAMPLE: BL523 indicates Type BL leaf chain, $\frac{5}{8}$ in. pitch with a 2 × 3 lacing; that is, two plates in the pin link pitch and three plates in the articulating link pitch.

Chains shall be marked with the manufacturer's name or trademark.

1.3 Assemblies and General Proportions

Various assemblies and general proportions for leaf chains are depicted in Fig. 3. Dimensions used in the figures are as follows:

CL = clearance
D = pin diameter
D_{max} = maximum pin diameter
H = link plate height
H_{max} = $0.95P$
P = chain pitch
S = hole diameter of articulating link plates
S_{min} = approximately D_{max} + 0.0012 in.
T = link plate thickness
T_{max} = maximum link plate thickness (based on normal steel tolerance). (See Table 1 or 2 for values or T_{max}.)
W = width of chain over pin ends
W_{max} = $w_{max} + 0.5D_{max}$
w = width over pin link plates
w_{max} = $(T_{max} + CL)$ × number of link plates across width of chain

NOTE: Style of heading pins is optional with the manufacturer.

1.4 General Chain Dimensions for Interchangeability

The dimensions given in Tables 1 and 2 provide guidance that will ensure interchangeability and compatibility with standard design clevises. It is recommended that these dimensions be considered for actual minimum and maximum limits. Manufacturers are responsible for ensuring that their chains properly connect to the corresponding standard clevises.

NOTE: Chains from different manufacturers must never be placed together within the same application.

1.5 Minimum Ultimate Tensile Strength (MUTS)

Minimum ultimate tensile strength (MUTS), for chain covered by this Standard, is the minimum force at which an unused, undamaged chain could fail when subjected to a single tensile loading test.

WARNING: The MUTS is *not* a "working load." The MUTS greatly exceeds the maximum force that may be safely applied to the chain.

(a) Test Procedure. A tensile force is slowly applied, in a uniaxial direction, to the ends of the chain sample.

(b) The tensile test is a destructive test. Even though the chain may not visibly fail when subjected to the MUTS, it will have been damaged and will be unfit for service.

1.6 Tolerance for Chain Length

New chains may have a tolerance of ±0.031 in./ft (2.58 mm/m) when measured under standard measuring load as outlined in para. 1.7.

1.7 Measuring Load

This is the load under which a chain is to be measured for length. It is equal to 1% of the MUTS. Length measurements are to be taken over a length of at least 12 in. (300 mm).

1.8 Preload

All chains shall be preloaded by applying a tensile force equivalent to at least 30% of the MUTS given in Table 3.

2 CLEVISES

This section gives recommended design dimensions of terminal clevises for use with Type B leaf chains. Limiting dimensions herein established are for the purpose of ensuring acceptance of chains built in accordance with foregoing standards.

2.1 Design Considerations

Care must be exercised in the manufacture and attachment of clevises to ensure equal load distribution across the chain. Failure to do so will seriously reduce the chain load-carrying capacity.

It is recommended that the material used for the construction of clevises be through-hardening steel.

The clevises and pins used to anchor the chain shall be of adequate strength to withstand at least the breaking load of the chain.

2.2 Clevis Types

The clevis may be designed so that the clevis block fits inside the end plates of the chain, or so that the clevis block fits outside the end plates of the chain, as illustrated in Fig. 4.

The required chain end configuration must be specified when ordering cut lengths of chain.

2.3 General Proportions

General proportions for clevises are shown in Fig. 5. Dimensions used in the figures are as follows:

B = fillet radius
CL = clearance
= 0.0015 in. for $\frac{5}{8}$ in. pitch and smaller, or 0.002 in. for $\frac{3}{4}$ in. pitch or larger
P = chain pitch
R = end radius
= $0.5P$
S = minimum hole diameter
T = T_{max} $-0.005P$
T_{max} = maximum link plate thickness
t = minimum thickness of outside flange (outside clevis)
= T_{max}
U = minimum depth of slot for clearance
= $0.50P$

2.4 Dimensions of Anchor Clevises

Clevis dimensions are given in Tables 4 and 5. Lacing for A, G, K, L, M, N, and O in Fig. 5 is as follows:

Lacing	Dimensions
2 × 2	$G = 2 \times T_{max} + 4CL + 0.008P$
	$L = 2 \times T$
2 × 3	$G = 3 \times T_{max} + 5CL + 0.008P$
	$L = 3 \times T$
3 × 4	$K = 3\ (T_{max} + CL)$
	$G = 2 \times T_{max} + 3CL + 0.004P$
	$A = K + G$
	$M = T_{max} + 2CL + 0.004P$
	$L = 2 \times T$
	$N = (K + L) \times 0.98$
4 × 4	$K = 4(T_{max} + CL)$
	$G = 2 \times T_{max} + 4CL + 0.008P$
	$A = K + G$
	$M = G$
	$L = 2 \times T$
	$N = (K + L) \times 0.97$
4 × 6	$K = 5(T_{max} + CL)$
	$G = 3 \times T_{max} + 5CL + 0.008P$
	$A = K + G$
	$M = 2 \times T_{max} + 4CL + 0.008P$
	$L = 3 \times T$
	$N = (K + L) \times 0.98$
6 × 6	$K = 4(T_{max} + CL)$
	$G = 2 \times T_{max} + 4CL + 0.008P$
	$A = K + G$
	$M = G$
	$L = 2 \times T$
	$N = 6 \times T_{max} + 4CL - 0.008P$
	$O = (10 \times T_{max} + 8CL - 0.008P) \times 0.96$

NOTE: Tolerance on A, G, M, and N = + (0.002P + 0.004) / −0.

3 SHEAVES

General sheave proportions are depicted in Fig. 6. Dimensions used are as follows:

F_D = flange diameter
= $SD + H_{max}$ (see Note)
H_{max} = $0.95P$ (see Table 1)
L = minimum distance between flanges
= $1.05W_{max}$ (see Table 1)
S_D = minimum recommended sheave diameter
= $5P$ (see Note)

NOTE: Smaller diameters may be used where such practice is supported by testing.

4 LUBRICATION

Chain must be lubricated periodically to give maximum wear life and inhibit corrosion. Motor oil is an excellent chain lubricant and must be applied copiously to reach the chain joints.

5 ADDITIONAL INFORMATION

For further information, see American Chain Association Bulletin, "Identification, Inspection, Maintenance, and Replacement of B29.8 Leaf Chain."

Fig. 1 Assembly Showing 4 × 6 Lacing

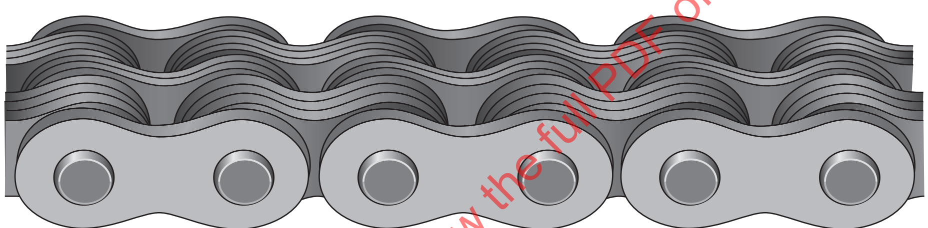


Fig. 2 Assembly Showing 4 × 6 Lacing and Parts

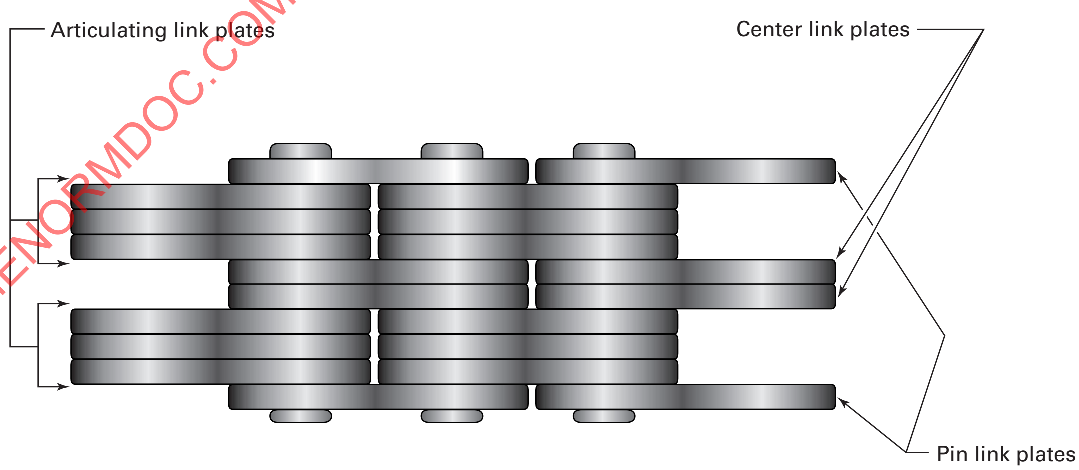
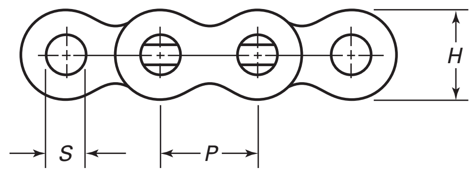
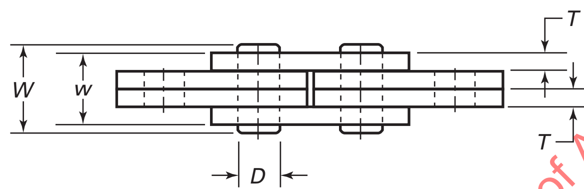
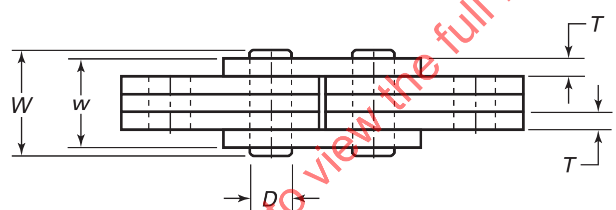


Fig. 3 Leaf Chain Assemblies and Proportions

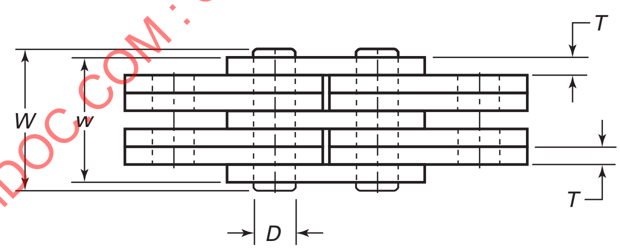




2 × 2 Lacing

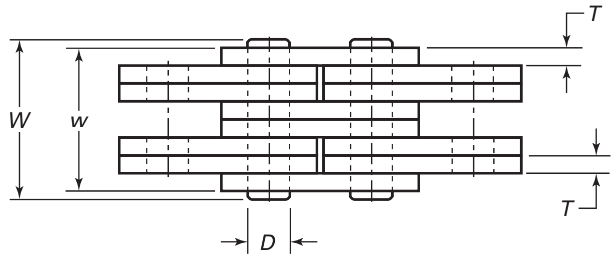


2 × 3 Lacing

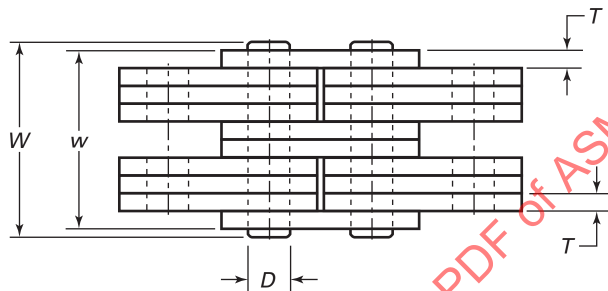


3 × 4 Lacing

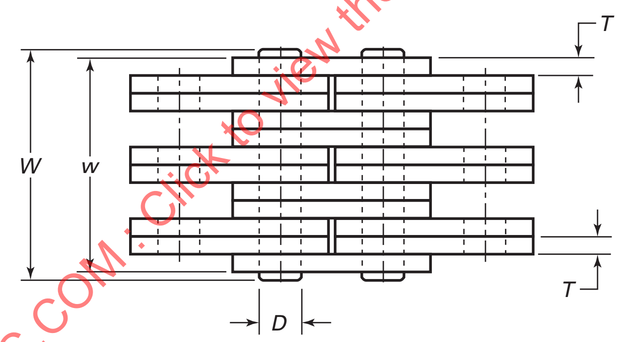
Fig. 3 Leaf Chain Assemblies and Proportions (Cont'd)



4 × 4 Lacing

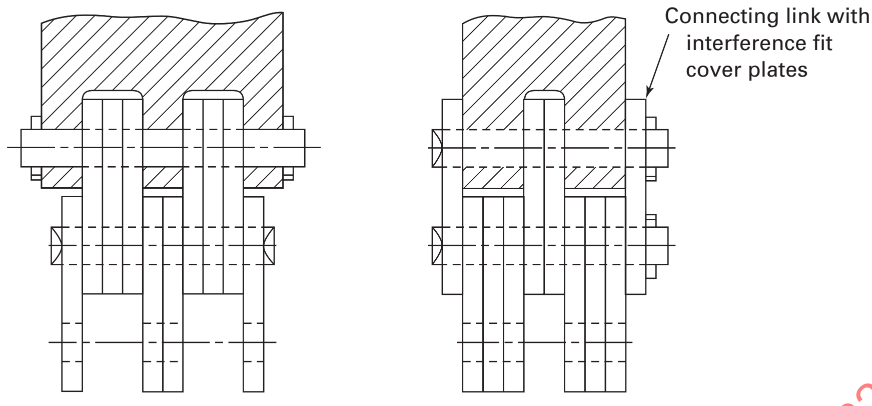


4 × 6 Lacing



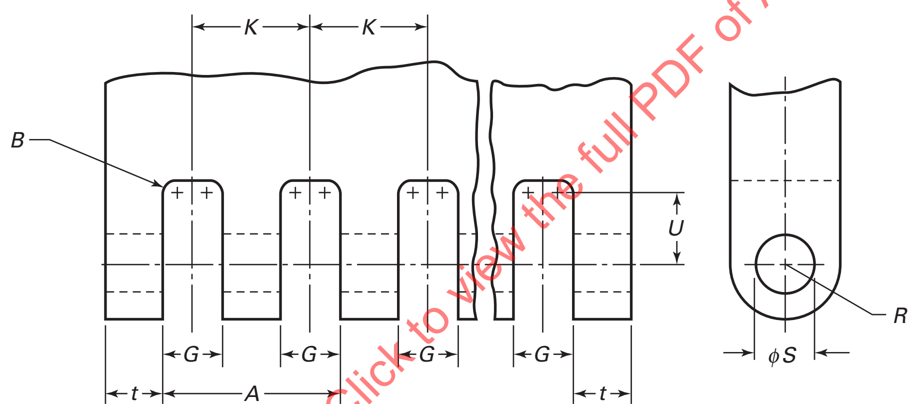
6 × 6 Lacing

Fig. 4 Clevis Types

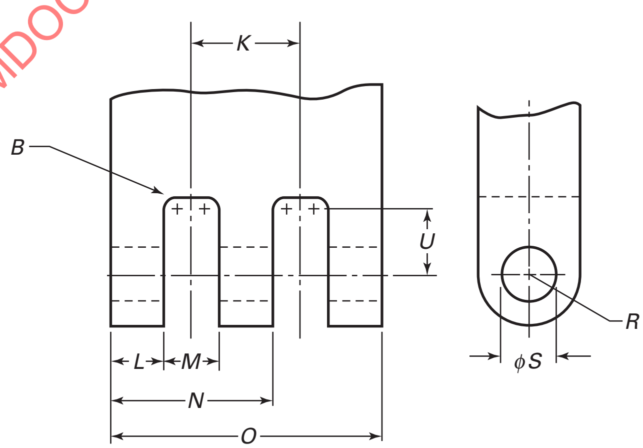


Outside Clevis **Inside Clevis**

Fig. 5 General Clevis Proportions



Outside Clevis



Inside Clevis

Fig. 6 General Sheave Proportions

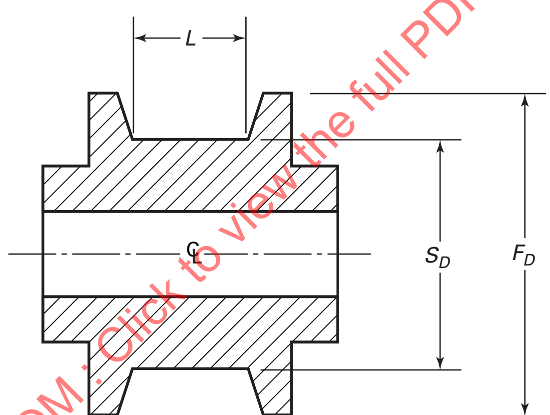


Table 1 General Chain Dimensions, in.

Chain No.	Pitch	Lacing	w_{max}	W_{max}	D_{max}	S_{min}	H_{max}	T_{max}
BL-422	. . .	2 × 2	0.334	0.434	. . .	. . .	. . .	. . .
BL-423	. . .	2 × 3	0.418	0.518	. . .	. . .	. . .	. . .
BL-434	. . .	3 × 4	0.585	0.685	. . .	. . .	. . .	. . .
BL-444	0.500	4 × 4	0.668	0.768	0.2004	0.2016	0.475	0.082
BL-446	. . .	4 × 6	0.835	0.935	. . .	. . .	. . .	. . .
BL-466	. . .	6 × 6	1.002	1.102	. . .	. . .	. . .	. . .
BL-522	. . .	2 × 2	0.390	0.507	. . .	. . .	. . .	. . .
BL-523	. . .	2 × 3	0.488	0.605	. . .	. . .	. . .	. . .
BL-534	. . .	3 × 4	0.683	0.800				
BL-544	0.625	4 × 4	0.780	0.897	0.2346	0.2358	0.594	0.098
BL-546	. . .	4 × 6	0.975	1.092	. . .	. . .	. . .	. . .
BL-566	. . .	6 × 6	1.170	1.287	. . .	. . .	. . .	. . .
BL-622	. . .	2 × 2	0.528	0.684	. . .	. . .	. . .	. . .
BL-623	. . .	2 × 3	0.660	0.816	. . .	. . .	. . .	. . .
BL-634	. . .	3 × 4	0.924	1.080	. . .	. . .	. . .	. . .
BL-644	0.750	4 × 4	1.056	1.212	0.3126	0.3134	0.713	0.130
BL-646	. . .	4 × 6	1.320	1.476	. . .	. . .	. . .	. . .
BL-666	. . .	6 × 6	1.584	1.740	. . .	. . .	. . .	. . .
BL-822	. . .	2 × 2	0.652	0.840	. . .	. . .	. . .	. . .
BL-823	. . .	2 × 3	0.815	1.003	. . .	. . .	. . .	. . .
BL-834	. . .	3 × 4	1.141	1.329	. . .	. . .	. . .	. . .
BL-844	1.000	4 × 4	1.304	1.492	0.376	0.376	0.950	0.161
BL-846	. . .	4 × 6	1.630	1.818	. . .	. . .	. . .	. . .
BL-866	. . .	6 × 6	1.956	2.144	. . .	. . .	. . .	. . .
BL-1022	. . .	2 × 2	0.780	0.999	. . .	. . .	. . .	. . .
BL-1023	. . .	2 × 3	0.975	1.194	. . .	. . .	. . .	. . .
BL-1034	. . .	3 × 4	1.365	1.584	. . .	. . .	. . .	. . .
BL-1044	1.250	4 × 4	1.560	1.779	0.4374	0.4386	1.188	0.193
BL-1046	. . .	4 × 6	1.950	2.169	. . .	. . .	. . .	. . .
BL-1066	. . .	6 × 6	2.340	2.559	. . .	. . .	. . .	. . .
BL-1222	. . .	2 × 2	0.916	1.166	. . .	. . .	. . .	. . .
BL-1223	. . .	2 × 3	1.145	1.395	. . .	. . .	. . .	. . .
BL-1234	. . .	3 × 4	1.603	1.853	. . .	. . .	. . .	. . .
BL-1244	1.500	4 × 4	1.832	2.082	0.5004	0.5016	1.425	0.227
BL-1246	. . .	4 × 6	2.290	2.540	. . .	. . .	. . .	. . .
BL-1266	. . .	6 × 6	2.748	2.998	. . .	. . .	. . .	. . .
BL-1422	. . .	2 × 2	1.040	1.321	. . .	. . .	. . .	. . .
BL-1423	. . .	2 × 3	1.300	1.581	. . .	. . .	. . .	. . .
BL-1434	. . .	3 × 4	1.820	2.101	. . .	. . .	. . .	. . .
BL-1444	1.750	4 × 4	2.080	2.361	0.5626	0.5634	1.663	0.260
BL-1446	. . .	4 × 6	2.600	2.881	. . .	. . .	. . .	. . .
BL-1466	. . .	6 × 6	3.120	3.401	. . .	. . .	. . .	. . .
BL-1622	. . .	2 × 2	1.192	1.536	. . .	. . .	. . .	. . .
BL-1623	. . .	2 × 3	1.490	1.834	. . .	. . .	. . .	. . .
BL-1634	. . .	3 × 4	2.086	2.430	. . .	. . .	. . .	. . .
BL-1644	2.000	4 × 4	2.384	2.728	0.6874	0.6886	1.900	0.296
BL-1646	. . .	4 × 6	2.980	3.324	. . .	. . .	. . .	. . .
BL-1666	. . .	6 × 6	3.576	3.920	. . .	. . .	. . .	. . .
BL-2022	. . .	2 × 2	1.568	2.037	. . .	. . .	. . .	. . .
BL-2023	. . .	2 × 3	1.960	2.429	. . .	. . .	. . .	. . .
BL-2034	. . .	3 × 4	2.744	3.213	. . .	. . .	. . .	. . .
BL-2044	2.500	4 × 4	3.136	3.605	0.9374	0.9386	2.375	0.390
BL-2046	. . .	4 × 6	3.920	4.389	. . .	. . .	. . .	. . .
BL-2066	. . .	6 × 6	4.704	5.173	. . .	. . .	. . .	. . .

Table 2 General Chain Dimensions, mm

Chain No.	Pitch	Lacing	w_{max}	W_{max}	D_{max}	S_{min}	H_{max}	T_{max}
BL-422	. . .	2 × 2	8.48	11.1	. . .	. . .	. . .	. . .
BL-423	. . .	2 × 3	10.62	13.2	. . .	. . .	. . .	. . .
BL-434	. . .	3 × 4	14.86	17.4	. . .	. . .	. . .	. . .
BL-444	12.70	4 × 4	16.97	19.6	5.09	5.11	12.07	2.08
BL-446	. . .	4 × 6	21.21	23.8	. . .	. . .	. . .	. . .
BL-466	. . .	6 × 6	25.45	28.0	. . .	. . .	. . .	. . .
BL-522	. . .	2 × 2	9.91	12.9	. . .	. . .	. . .	. . .
BL-523	. . .	2 × 3	12.40	15.4	. . .	. . .	. . .	. . .
BL-534	. . .	3 × 4	17.35	20.4	. . .	. . .	. . .	. . .
BL-544	15.88	4 × 4	19.81	22.8	5.96	5.98	15.09	2.48
BL-546	. . .	4 × 6	24.77	27.7	. . .	. . .	. . .	. . .
BL-566	. . .	6 × 6	29.72	32.7	. . .	. . .	. . .	. . .
BL-622	. . .	2 × 2	13.41	17.4	. . .	. . .	. . .	. . .
BL-623	. . .	2 × 3	16.76	20.8	. . .	. . .	. . .	. . .
BL-634	. . .	3 × 4	23.47	27.5	. . .	. . .	. . .	. . .
BL-644	19.05	4 × 4	26.82	30.8	7.94	7.96	18.11	3.30
BL-646	. . .	4 × 6	33.53	37.5	. . .	. . .	. . .	. . .
BL-666	. . .	6 × 6	40.23	44.2	. . .	. . .	. . .	. . .
BL-822	. . .	2 × 2	16.56	21.4	. . .	. . .	. . .	. . .
BL-823	. . .	2 × 3	20.70	25.5	. . .	. . .	. . .	. . .
BL-834	. . .	3 × 4	28.98	33.8	. . .	. . .	. . .	. . .
BL-844	25.40	4 × 4	33.12	37.9	9.54	9.56	24.13	4.09
BL-846	. . .	4 × 6	41.40	46.2	. . .	. . .	. . .	. . .
BL-866	. . .	6 × 6	49.68	54.5	. . .	. . .	. . .	. . .
BL-1022	. . .	2 × 2	19.81	25.4	. . .	. . .	. . .	. . .
BL-1023	. . .	2 × 3	24.77	30.4	. . .	. . .	. . .	. . .
BL-1034	. . .	3 × 4	34.57	40.3	. . .	. . .	. . .	. . .
BL-1044	31.75	4 × 4	39.62	45.2	11.11	11.14	30.18	4.90
BL-1046	. . .	4 × 6	49.53	55.1	. . .	. . .	. . .	. . .
BL-1066	. . .	6 × 6	59.44	65.0	. . .	. . .	. . .	. . .
BL-1222	. . .	2 × 2	23.27	29.7	. . .	. . .	. . .	. . .
BL-1223	. . .	2 × 3	29.08	35.5	. . .	. . .	. . .	. . .
BL-1234	. . .	3 × 4	40.72	47.1	. . .	. . .	. . .	. . .
BL-1244	38.10	4 × 4	46.53	52.9	12.71	12.74	36.20	5.77
BL-1246	. . .	4 × 6	58.17	64.6	. . .	. . .	. . .	. . .
BL-1266	. . .	6 × 6	69.80	76.2	. . .	. . .	. . .	. . .
BL-1422	. . .	2 × 2	26.42	33.6	. . .	. . .	. . .	. . .
BL-1423	. . .	2 × 3	33.02	40.2	. . .	. . .	. . .	. . .
BL-1434	. . .	3 × 4	46.23	53.4	. . .	. . .	. . .	. . .
BL-1444	44.45	4 × 4	52.83	60.0	14.29	14.31	42.24	6.6
BL-1446	. . .	4 × 6	66.04	73.2	. . .	. . .	. . .	. . .
BL-1466	. . .	6 × 6	79.25	86.4	. . .	. . .	. . .	. . .
BL-1622	. . .	2 × 2	30.28	40.0	. . .	. . .	. . .	. . .
BL-1623	. . .	2 × 3	37.05	46.6	. . .	. . .	. . .	. . .
BL-1634	. . .	3 × 4	52.98	61.8	. . .	. . .	. . .	. . .
BL-1644	50.80	4 × 4	60.55	69.3	17.46	17.49	48.26	7.52
BL-1646	. . .	4 × 6	75.69	84.5	. . .	. . .	. . .	. . .
BL-1666	. . .	6 × 6	90.83	100.0	. . .	. . .	. . .	. . .
BL-2022	. . .	2 × 2	39.83	51.8	. . .	. . .	. . .	. . .
BL-2023	. . .	2 × 3	49.78	61.7	. . .	. . .	. . .	. . .
BL-2034	. . .	3 × 4	69.70	81.7	. . .	. . .	. . .	. . .
BL-2044	63.50	4 × 4	81.61	91.6	23.81	23.84	60.33	9.91
BL-2046	. . .	4 × 6	91.57	111.5	. . .	. . .	. . .	. . .
BL-2066	. . .	6 × 6	111.48	131.4	. . .	. . .	. . .	. . .

GENERAL NOTE: Millimeters are converted from inches.

Table 3 Minimum Ultimate Tensile Strength

Chain No.	Minimum Ultimate Tensile Strength, lb (kN)	Chain No.	Minimum Ultimate Tensile Strength, lb (kN)
BL-422	5,000 (22.2)	BL-1044	52,000 (231.3)
BL-423	5,000 (22.2)	BL-1046	52,000 (231.3)
BL-434	7,500 (33.4)	BL-1066	78,000 (347.0)
BL-444	10,000 (44.5)		
BL-446	10,000 (44.5)	BL-1222	34,000 (151.2)
BL-466	15,000 (66.7)	BL-1223	34,000 (151.2)
		BL-1234	55,000 (244.6)
BL-522	7,500 (33.4)	BL-1244	68,000 (302.5)
BL-523	7,500 (33.4)	BL-1246	68,000 (302.5)
BL-534	11,000 (48.9)	BL-1266	102,000 (453.7)
BL-544	15,000 (66.7)		
BL-546	15,000 (66.7)	BL-1422	43,000 (191.3)
BL-566	22,500 (100.1)	BL-1423	43,000 (191.3)
		BL-1434	71,000 (315.8)
BL-622	11,000 (48.9)	BL-1444	86,000 (382.6)
BL-623	11,000 (48.9)	BL-1446	86,000 (382.6)
BL-634	17,000 (75.6)	BL-1466	130,000 (578.3)
BL-644	22,000 (97.9)		
BL-646	22,000 (97.9)	BL-1622	65,000 (289.1)
BL-666	33,000 (146.8)	BL-1623	65,000 (289.1)
		BL-1634	99,000 (440.4)
BL-822	19,000 (84.5)	BL-1644	130,000 (578.3)
BL-823	19,000 (84.5)	BL-1646	130,000 (578.3)
BL-834	29,000 (129.0)	BL-1666	195,000 (867.4)
BL-844	38,000 (169.0)		
BL-846	38,000 (169.0)	BL-2022	97,500 (433.7)
BL-866	57,000 (253.6)	BL-2023	97,500 (433.7)
		BL-2034	146,000 (649.4)
BL-1022	26,000 (115.6)	BL-2044	195,000 (867.4)
BL-1023	26,000 (115.6)	BL-2046	195,000 (867.4)
BL-1034	41,000 (182.4)	BL-2066	292,500 (1 301.1)

Table 4 Dimensions for Anchor Clevises — Type B Leaf Chain, in.

Chain No.	Pitch	Lacing	t_{min}	*CL*	*A*	R_{max}	S_{min}	U_{min}	B_{min}	*K*	*G*	*L*	*M*	*N*	*O*
BL-422		2 × 2			. . .					. . .	0.174	0.159	. . .	. . .	. . .
BL-423		2 × 3			. . .					. . .	0.258	0.239	. . .	. . .	. . .
BL-434		3 × 4			0.421					0.251	0.171	0.159	0.087	0.401	. . .
BL-444	0.500	4 × 4	0.080	0.0015	0.508	0.250	0.2016	0.250	0.03	0.334	0.174	0.160	0.174	0.478	. . .
BL-446		4 × 6			0.675					0.418	0.258	0.239	0.174	0.643	. . .
BL-466		6 × 6			0.508					0.334	0.174	0.159	0.174	0.494	0.795
BL-522		2 × 2			. . .					. . .	0.203	0.186	. . .	. . .	. . .
BL-523		2 × 3			. . .					. . .	0.301	0.279	. . .	. . .	. . .
BL-534		3 × 4			0.421					0.251	0.199	0.186	0.102	0.469	. . .
BL-544	0.625	4 × 4	0.094	0.0015	0.508	0.312	0.2358	0.312	0.03	0.334	0.204	0.186	0.204	0.558	. . .
BL-546		4 × 6			0.788					0.488	0.301	0.279	0.204	0.751	. . .
BL-566		6 × 6			0.593					0.390	0.203	0.186	0.203	0.577	0.928
BL-622		2 × 2			. . .					. . .	0.274	0.253	. . .	. . .	. . .
BL-623		2 × 3			. . .					. . .	0.406	0.379	. . .	. . .	. . .
BL-634		3 × 4			0.665					0.396	0.269	0.253	0.137	0.636	. . .
BL-644	0.750	4 × 4	0.127	0.002	0.804	0.375	0.3134	0.375	0.06	0.528	0.276	0.253	0.276	0.757	. . .
BL-646		4 × 6			1.066					0.660	0.406	0.379	0.276	1.018	. . .
BL-666		6 × 6			0.802					0.528	0.274	0.253	0.274	0.782	1.258
BL-822		2 × 2			. . .					. . .	0.338	0.312	. . .	. . .	. . .
BL-823		2 × 3			. . .					. . .	0.501	0.468	. . .	. . .	. . .
BL-834		3 × 4			0.821					0.489	0.332	0.312	0.169	0.785	. . .
BL-844	1.000	4 × 4	0.157	0.002	0.992	0.500	0.3764	0.500	0.06	0.652	0.340	0.312	0.340	0.935	. . .
BL-846		4 × 6			1.316					0.815	0.501	0.468	0.340	1.257	. . .
BL-866		6 × 6			0.990					0.652	0.338	0.312	0.338	0.966	1.553
BL-1022		2 × 2			. . .					. . .	0.404	0.374	. . .	. . .	. . .
BL-1023		2 × 3			. . .					. . .	0.599	0.599	. . .	. . .	. . .
BL-1034		3 × 4			0.982					0.585	0.397	0.374	0.202	0.939	. . .
BL-1044	1.250	4 × 4	0.188	0.002	1.186	0.625	0.4386	0.625	0.06	0.780	0.406	0.374	0.406	1.119	. . .
BL-1046		4 × 6			1.574					0.975	0.599	0.560	0.406	1.505	. . .
BL-1066		6 × 6			1.184					0.780	0.404	0.374	0.404	1.156	1.859

Table 4 Dimensions for Anchor Clevises — Type B Leaf Chain, in. (Cont'd)

Chain No.	Pitch	Lacing	t_{min}	CL	A	R_{max}	S_{min}	U_{min}	B_{min}	K	G	L	M	N	O
BL-1222		2 × 2			. . .					. . .	0.474	0.439	. . .	. . .	. . .
BL-1223		2 × 3			. . .					. . .	0.703	0.659	. . .	. . .	. . .
BL-1234		3 × 4			1.153					0.687	0.466	0.439	0.237	1.103	. . .
BL-1244	1.500	4 × 4	0.227	0.002	1.392	0.750	0.5016	0.750	0.09	0.916	0.476	0.439	0.474	1.314	. . .
BL-1246		4 × 6			1.848					1.145	0.703	0.659	0.474	1.767	. . .
BL-1266		6 × 6			1.390					0.916	0.474	0.439	0.474	1.358	2.183
BL-1422		2 × 2			. . .					. . .	0.538	0.499	. . .	. . .	. . .
BL-1423		2 × 3			. . .					. . .	0.798	0.748	. . .	. . .	. . .
BL-1434		3 × 4			1.319					0.786	0.533	0.502	0.271	1.262	. . .
BL-1444	1.750	4 × 4	0.260	0.002	1.592	0.875	0.5634	0.875	0.09	1.048	0.544	0.502	0.542	1.503	. . .
BL-1446		4 × 6			2.114					1.310	0.804	0.753	0.542	2.022	. . .
BL-1466		6 × 6			1.590					1.048	0.542	0.502	0.542	1.554	2.497
BL-1622		2 × 2			. . .					. . .	0.616	0.572	. . .	. . .	. . .
BL-1623		2 × 3			. . .					. . .	0.914	0.858	. . .	. . .	. . .
BL-1634		3 × 4			1.500					0.894	0.606	0.572	0.308	1.437	. . .
BL-1644	2.000	4 × 4	0.296	0.002	1.812	1.000	0.6886	1.000	0.12	1.192	0.620	0.572	0.616	1.711	. . .
BL-1646		4 × 6			2.404					1.490	0.914	0.858	0.616	2.301	. . .
BL-1666		6 × 6			1.808					1.192	0.616	0.572	0.616	1.768	2.842
BL-2022		2 × 2			. . .					. . .	0.808	0.755	. . .	. . .	. . .
BL-2023		2 × 3			. . .					. . .	1.200	1.133	. . .	. . .	. . .
BL-2034		3 × 4			1.972					1.176	0.796	0.755	0.404	1.892	. . .
BL-2044	2.500	4 × 4	0.390	0.002	2.356	1.250	0.9386	1.250	0.15	1.568	0.788	0.755	0.808	2.253	. . .
BL-2046		4 × 6			3.160					1.960	1.200	1.133	0.808	3.031	. . .
BL-2066		6 × 6			2.376					1.568	0.808	0.755	0.808	2.328	3.740

Table 5 Dimensions for Anchor Clevises — Type B Leaf Chain, mm

Chain No.	Pitch	Lacing	t_{min}	*CL*	*A*	R_{max}	S_{min}	U_{min}	B_{min}	*K*	*G*	*L*	*M*	*N*	*O*
BL-422		2 x 2			. . .					. . .	4.41	4.03	. . .	. . .	. . .
BL-423		2 x 3			. . .					. . .	6.53	6.05	. . .	. . .	. . .
BL-434		3 x 4			10.68					6.35	4.33	4.03	2.21	10.18	. . .
BL-444	12.70	4 x 4	2.08	0.038	12.89	6.35	5.11	6.35	0.76	8.47	4.41	4.03	4.41	12.13	. . .
BL-446		4 x 6			17.12					10.59	6.53	6.05	4.41	16.31	. . .
BL-466		6 x 6			12.89					8.47	4.41	4.03	4.41	12.53	20.16
BL-522		2 x 2			. . .					. . .	5.24	4.80	. . .	. . .	. . .
BL-523		2 x 3			. . .					. . .	7.76	7.20	. . .	. . .	. . .
BL-534		3 x 4			12.49					7.55	5.14	4.80	2.62	12.11	. . .
BL-544	15.88	4 x 4	2.48	0.038	15.31	7.92	5.98	7.92	0.76	10.07	5.24	4.80	5.24	14.43	. . .
BL-546		4 x 6			20.35					12.59	7.76	7.20	5.24	19.40	. . .
BL-566		6 x 6			15.31					10.07	5.24	4.80	5.24	14.91	23.98
BL-622		2 x 2			. . .					. . .	6.96	6.41	. . .	. . .	. . .
BL-623		2 x 3			. . .					. . .	10.31	9.61	. . .	. . .	. . .
BL-634		3 x 4			16.88					10.05	6.83	6.41	3.48	16.13	. . .
BL-644	19.05	4 x 4	3.30	0.051	20.41	9.53	7.96	9.53	1.52	13.40	7.01	6.41	6.96	19.22	. . .
BL-646		4 x 6			27.06					16.75	10.31	9.61	6.96	25.84	. . .
BL-666		6 x 6			20.36					13.40	6.96	6.41	6.96	19.85	31.92
BL-822		2 x 2			. . .					. . .	8.59	7.93	. . .	. . .	. . .
BL-823		2 x 3			. . .					. . .	12.73	11.89	. . .	. . .	. . .
BL-834		3 x 4			20.86					12.42	8.43	7.93	4.29	19.94	. . .
BL-844	25.40	4 x 4	4.09	0.051	25.20	12.70	9.56	12.70	1.52	16.56	8.64	7.93	8.59	23.75	. . .
BL-846		4 x 6			33.43					20.70	12.73	11.89	8.59	31.94	. . .
BL-866		6 x 6			25.15					16.56	8.59	7.93	8.59	24.54	39.46
BL-1022		2 x 2			. . .					. . .	10.26	9.48	. . .	. . .	. . .
BL-1023		2 x 3			. . .					. . .	15.21	14.22	. . .	. . .	. . .
BL-1034		3 x 4			24.93					14.85	10.08	9.48	5.13	23.85	. . .
BL-1044	31.75	4 x 4	4.90	0.051	30.11	15.88	11.14	15.88	1.52	19.80	10.31	9.48	10.26	28.41	. . .
BL-1046		4 x 6			39.96					24.75	15.21	14.22	10.26	38.20	. . .
BL-1066		6 x 6			30.06					19.80	10.26	9.48	10.26	29.35	47.19

Table 5 Dimensions for Anchor Clevises — Type B Leaf Chain, mm (Cont'd)

Chain No.	Pitch	Lacing	t_{min}	*CL*	*A*	R_{max}	S_{min}	U_{min}	B_{min}	*K*	*G*	*L*	*M*	*N*	*O*
BL-1222		2 x 2			. . .					. . .	12.05	11.16	. . .	. . .	. . .
BL-1223		2 x 3			. . .					. . .	17.87	16.74	. . .	. . .	. . .
BL-1234		3 x 4			29.31					17.46	11.84	11.16	6.02	28.05	. . .
BL-1244	38.10	4 x 4	5.77	0.051	35.38	19.05	12.74	19.05	2.29	23.28	12.10	11.16	12.05	31.41	. . .
BL-1246		4 x 6			46.97					29.10	17.87	16.74	12.05	44.93	. . .
BL-1266		6 x 6			35.33					23.28	12.05	11.16	12.05	34.52	55.49
BL-1422		2 x 2			. . .					. . .	13.66	12.66	. . .	. . .	. . .
BL-1423		2 x 3			. . .					. . .	20.26	18.98	. . .	. . .	. . .
BL-1434		3 x 4			33.25					19.80	13.43	12.66	6.83	31.81	. . .
BL-1444	44.45	4 x 4	6.55	0.051	40.11	22.23	14.31	22.23	2.29	26.40	13.71	12.66	13.76	37.89	. . .
BL-1446		4 x 6			53.26					33.00	20.26	18.98	13.76	50.95	. . .
BL-1466		6 x 6			40.06					26.40	13.66	12.66	13.76	39.15	62.93
BL-1622		2 x 2			. . .					. . .	15.65	14.53	. . .	. . .	. . .
BL-1623		2 x 3			. . .					. . .	23.22	21.80	. . .	. . .	. . .
BL-1634		3 x 4			38.11					22.71	15.40	14.53	7.82	36.50	. . .
BL-1644	50.80	4 x 4	7.52	0.051	46.03	25.40	17.49	25.40	3.05	30.28	15.75	14.53	15.65	43.47	. . .
BL-1646		4 x 6			61.07					37.85	23.22	21.80	15.65	58.46	. . .
BL-1666		6 x 6			45.93					30.28	15.65	14.53	15.65	44.92	72.19
BL-2022		2 x 2			. . .					. . .	20.53	19.19	. . .	. . .	. . .
BL-2023		2 x 3			. . .					. . .	30.49	28.78	. . .	. . .	. . .
BL-2034		3 x 4			50.11					29.88	20.23	19.19	10.27	48.09	. . .
BL-2044	63.50	4 x 4	9.91	0.051	59.87	31.75	23.84	31.75	3.81	39.84	20.02	19.19	20.53	57.26	. . .
BL-2046		4 x 6			80.30					49.80	30.49	28.78	20.53	77.01	. . .
BL-2066		6 x 6			60.37					39.84	20.53	19.19	20.53	59.16	95.04

GENERAL NOTE: Metric dimensions are the same as ISO 4347.

NONMANDATORY APPENDIX A
SUPPLEMENTARY INFORMATION: LUBRICATION AND MAINTENANCE

Using good maintenance practices along with regular inspection should provide satisfactory chain service provided the correct product has been selected.

This Nonmandatory Appendix provides valuable information that will assist end users in evaluating the condition of their application and in making adjustments to the maintenance schedule when necessary.

A-1 GENERAL CAUTIONS

(a) Use lengths of factory-assembled chain. Do not build lengths from individual components.

(b) Do not attempt to rework damaged chains by replacing only the components that are obviously faulty. The entire chain may be compromised and should be discarded.

(c) Never electroplate assembled leaf chain or its components. Plating will result in failure from hydrogen embrittlement. Plated chains are assembled from modified, individually plated components.

(d) Welding should not be performed on any chain or component. Welding spatter should never be allowed to come in contact with chain or components.

(e) Leaf chains are manufactured exclusively from heat-treated steels and therefore must not be annealed. If heating a chain with a cutting torch is absolutely necessary for its removal, the chain must not be reused.

(f) The practice of joining chain lengths is not recommended, and chains from different manufacturers should not be placed together within the same application.

(g) The MUTS of a chain means the minimum load at which it may break when subjected to a destructive tensile test. *It does not mean working load.*

A-2 LUBRICATION

An important consideration in field maintenance of leaf chain is lubrication. In order to get satisfactory service life, periodic lubrication must be provided. Like all bearing surfaces, the precision-manufactured, hardened-steel, joint-wearing surfaces of leaf chain require a film of oil between mating parts to prevent accelerated wear.

Maintaining a lubricant film on all chain surfaces should achieve the following:

(a) minimize joint wear

(b) improve corrosion resistance

(c) reduce the possibility of pin turning

(d) minimize tight joints

(e) promote smooth, quiet chain action

(f) lower chain tension by reducing internal friction in the chain system

Laboratory wear tests show #40 oil to have greater ability to prevent wear than #10 oil. Generally, the heaviest (highest viscosity) oil that will penetrate the joint is best.

Whatever method is used, the oil must penetrate the chain joint to prevent wear. Applying oil to external surfaces will prevent rust, but oil must flow into the live bearing surfaces for maximum wear life.

To prepare the chain for oiling, the leaf chain plates should be brushed with a stiff brush or wire brush to clear the space between the plates so that oil may penetrate the live bearing area.

Oil may be applied with a narrow paint brush or directly poured on, but the chain should be well flooded to ensure that the oil penetrates into the joints.

In locations that are difficult to reach, it may be necessary to use a good-quality oil under pressure, such as an aerosol can or pump pressure spray.

A-3 INSTALLATION

A-3.1 Chain Movement

Ascertain that the chain operating path is clear and that the chain articulates freely through its full range of operation.

A-3.2 Lubrication

Ensure that the chain is well lubricated with the heaviest oil that will penetrate the void between the link plate apertures and the pins.

A-3.3 Paint

Make sure that the chain does not get painted over at any time.

A-3.4 Protection

The chain may be covered with a layer of grease, where necessary, as a protection from atmosphere or sliding wear. It should be noted, however, that the grease will have to be removed at a later date before chain inspection and relubrication.

A-3.5 Chain Mountings

Double check to be sure that all chain fastening devices are secured and that all adjustments have been made to ensure uniform loading of multiple chain applications. Check chain anchors and pins for wear, breakage, and misalignment. Damaged anchors and pins should be replaced.

A-3.6 Sheaves

Sheaves with badly worn flanges and outside diameter should be replaced. This wear may be due to chain misalignment or seized bearings.

A-4 ENVIRONMENTAL CONDITIONS

A-4.1 Effects of Environment

Environments in which material handling and lifting mechanisms operate can vary widely, from outdoor moisture to mildly corrosive or highly corrosive industrial atmospheres, in addition to abrasive exposures such as sand and grit. Some effects can be as follows:

(a) Moisture. Corrosive rusting reduces chain strength by pitting and cracking.

(b) Temperature. Low temperature reduces chain strength by embrittlement. Going in and out of cold storage results in moisture from condensation.

(c) Chemical Solutions or Vapors. Corrosives attach on the chain components and/or the mechanical connections between the chain components. Cracking can be (and often is) microscopic. Propagation to complete failure can be either abrupt or may require an extended period of time.

(d) Abrasives. Accelerated wearing and scoring of the articulating members of the chain (pins and plates), with a corresponding reduction in chain strength. Due to the inaccessibility of the bearing surfaces (pin surfaces and plate apertures), wear and scoring are not readily visible to the naked eye.

A-4.2 Inspection for Chain Damage

Each specific application should be evaluated, based on the degree of exposure and the areas of possible operation, and to prevent chain failure, a chain replacement schedule should be established. This schedule can be determined through inspection, and the frequency of inspection can be changed, based on the observations. This inspection procedure should continue until a projected time of replacement can be predicted.

A chain by its very nature and exposure should be considered an expendable item. It is further recommended that chain exposed to very low temperatures or chain used in corrosive atmospheres receive frequent and very thorough inspections until a reliable replacement cycle can be determined and a safe chain replacement schedule can be established.

A-5 DYNAMIC IMPULSE/SHOCK LOADS

The following are examples of dynamic shock loading that can impose abnormal loads above the endurance limit of leaf chain:

(a) high velocity movement of load, followed by sudden, abrupt stops

(b) carrying loads in suspension over irregular surfaces such as railroad tracks, potholes, and rough terrain

(c) attempting to "inch" loads that are beyond the rated capacity of the handling or lifting mechanism

The above load cycles and environmental conditions make it impossible to predict chain life. It is therefore necessary to conduct frequent inspections until replacement life can be predicted.

A-6 PERIODIC INSPECTION

After each 30 days of operation (more frequently in hostile environments), leaf chains should be inspected and lubricated. Inspection details are described in Table A-1. The inspection should focus on the details described in paras. A-6.1 through A-6.4.

A-6.1 Elongation

When a theoretical length of 12.00 in. of new chain has elongated from wear to a length of 12.360 in., it should be discarded and replaced. Maximum recommended span measurements, in mm, are shown in Table A-2. It is important to measure the chain in the section that moves over the sheaves because it receives the most frequent articulation. Measuring the chain near its clevis terminals could give an erroneous reading, for it would not have flexed there as frequently, if at all, as it would near the middle of the assembly.

A-6.2 Edge Wear

Check the chain for wear on the link plate edges, caused by running back and forth over the sheave. The maximum reduction of material should not exceed 5%. This can be compared to a normal link plate height by measuring a portion of chain that does not run over the sheave; see Fig. A-1.

A-6.3 Turning or Protruding Pins

Highly loaded chain, operating with inadequate lubrication, can generate abnormal frictional forces between pin and link plates. In extreme instances, the torque could surpass the press fit force between the pins and the outside plates, resulting in pin rotation.

Table A-1 Periodic Inspection Addenda

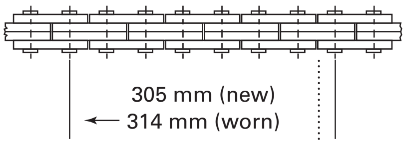
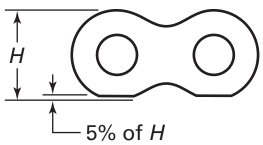
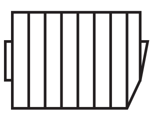
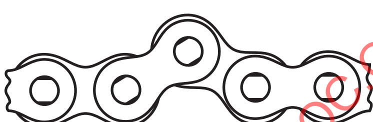
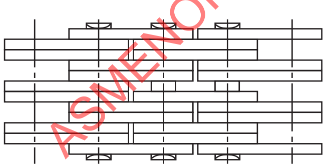
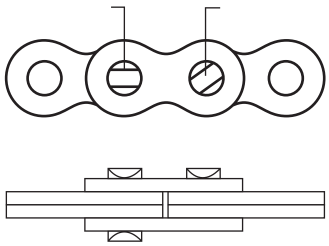
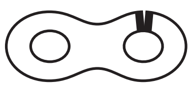
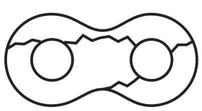
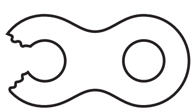
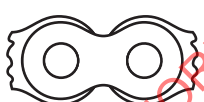
Appearance or Symptom	Probable Cause	Correction
Excessive length  Measure section of chain that runs over sheaves 3% wear elongation is normal maximum (refer to Table A-2)	Wear between pin and link plate apertures Permanent deformation (stretch) from overload	Replace chain [Note (1)] 3% wear elongation can reduce chain tensile strength by as much as 18% Chain wear life can be improved by proper lubrication Replace chain
Worn link plate contour  	Normal wear against sheave Abnormal wear against guide	Replace chain when wear reaches 5% of height Correct alignment Increase clearance Replace chain
Worn edges of outside links or pin ends 	Misalignment, rubbing on guides	Correct alignment Increase clearance Replace chain
Tight joints 	Dirt or foreign matter packed in joints or Corrosion and rust or Bent pins	Clean and relubricate Replace chain Replace chain
Missing parts 	Missing at original assembly	Replace chain

Table A-1 Periodic Inspection Addenda (Cont'd)

Appearance or Symptom	Probable Cause	Correction
Abnormal protrusion or turned pins 	Excessive friction from heavy loading or inadequate lubrication	Eliminate overload Improve lubrication Replace chain
Cracked plates (fatigue)  Crack from aperture to edge of link plate, approximately 90 deg to pitch line	Load exceeded chain's dynamic capacity	Eliminate cause of overloading and replace chain with chain of greater dynamic capacity
Cracked plates (stress corrosion)  Arclike cracks from apertures to edge of link plate	Severe rusting, or exposure to acidic or caustic medium, plus static stress from press fit	Replace chain and protect from hostile environment
Fractured plates (tensile) 	Extreme overload	Eliminate cause of overload and replace chain
Enlarged plate holes 	High overload	Eliminate cause of overload and replace chain
Corrosion pitting	Exposure to corrosive environment (often salt or chlorides)	Replace chain and protect from hostile environment
Worn connecting clevis or clevis pins	Normal wear	Replace all worn components and realign as in original installation

NOTE:
(1) Chain tensile strength diminishes as the chain elongates from wear.

Table A-2 Wear Elongation

Chain Series	Chain Pitch, mm	Number of Pins in Span	Recommended Measuring Force, N [Note (1)]	Maximum Recommended Span Measurement, mm
BL 4 LL08	12.70	25	222 1 180	314
BL 5 LL10	15.87	21	334 222	327
BL 6 LL12	19.05	17	489 290	314
BL 8 LL16	25.40	13	845 600	314
BL 10 LL20	31.75	11	1 156 950	327
BL 12 LL24	38.10	9	1 512 1 700	314
BL 14 LL28	44.45	8	1 913 2 000	320
BL 16 LL32	50.80	7	2 891 2 600	314
BL 20 LL40	63.50	6	4 337 3 600	327
LL48	76.20	5	5 600	314

GENERAL NOTE: This table is based on a maximum wear elongation of 3%. The span measurement is from pin center to pin center for the number of pins indicated. Chains exceeding the maximum recommended span measurement should be replaced.

NOTE:

(1) The recommended measuring force is for 2 × 2 lacing. That force must be multiplied by a lacing factor to obtain the actual measuring force.

Lacing	Lacing Factor
2 × 2	1.0
2 × 3	1.0
3 × 4	1.5
4 × 4	2.0
4 × 6	2.0
6 × 6	3.0

Fig. A-1 Distorted or Battered Plates on Leaf Chain Can Cause Tight Joints and Prevent Flexing

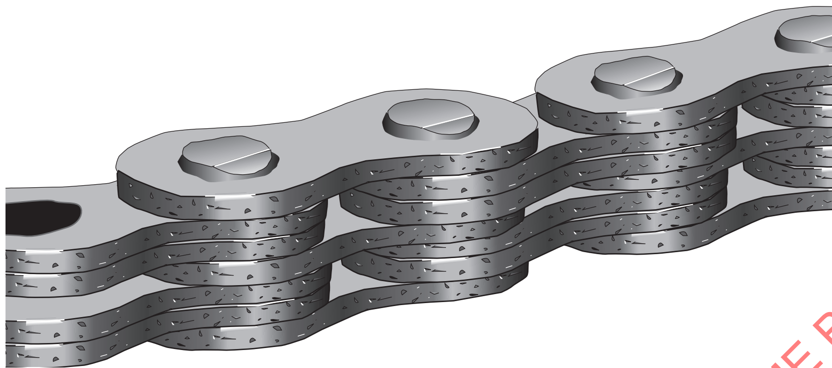


Fig. A-2 Out-of-Line Flats on V Heads and Protruding Heads: Indication That Pins May Have Turned in Plates

When chain is allowed to operate in this condition, a pin, or series of pins, can begin to twist out of a chain, resulting in failure. The pin head rivets should be examined to determine if the "V" flats are still in correct alignment. Chain with rotated/displaced head or abnormal pin protrusion should be replaced immediately. Do not attempt to repair the chain by welding or driving the pin(s) back into the chain. Once the press fit integrity between outside plates and pins has been altered, it cannot be restored.

Any wear pattern on the pin heads or the sides of the link plates indicates misalignment in the system. This condition damages the chain as well as increases frictional loading, and should be corrected; see Fig. A-2.

A-6.4 Cracked Plates

Chains should periodically be inspected very carefully, front and back as well as side to side, for any evidence of cracked plates. If any crack is discovered, the chain(s) should be replaced in its entirety. It is important, however, to determine the cause of the crack before installing new chain so the condition does not repeat itself.

A-6.4.1 Fatigue Cracking. Fatigue cracks are a result of repeated cyclic loading beyond the chain's endurance limit. The magnitude of the load and frequency of its occurrence are factors that determine when fatigue failure will occur. The loading can be continuous or intermittent (impulse load).

Fatigue cracks almost always start at the link plate aperture (point of highest stress) and perpendicular to the chain pitch line.

They are often microscopic in their early stage. Unlike a pure tensile failure, there is no noticeable yielding (stretch) of the material; see Fig. A-3.

A-6.4.2 Stress Corrosion Cracking. The outside link plates, which are heavily press-fitted to the pins, are particularly susceptible to stress corrosion cracking. Like fatigue cracks, these originate at the point of highest stress (aperture) but tend to extend in an arclike path between the holes in the pin plate.

More than one crack can often appear on a link plate. This condition, like rusting, can be caused by exposure to an acidic or caustic medium or atmosphere.