ASME B29.8-2010
[Revision of ASME B29.8-2002 (R2008)]

Leaf Chains, Clevises, and Sheaves

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AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

Three Park Avenue • New York, NY • 10016 USA

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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
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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 strength. 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.)

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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, 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.