

ASME B29.400-2001

COMBINATION, "H" TYPE MILL CHAINS, AND SPROCKETS

Incorporating ASME B29.11M and ASME B29.14M

AN AMERICAN NATIONAL STANDARD



The American Society of
Mechanical Engineers

A N A M E R I C A N N A T I O N A L S T A N D A R D

COMBINATION, "H" TYPE MILL CHAINS, AND SPROCKETS

Incorporating ASME B29.11M and ASME B29.14M

ASME B29.400-2001

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FOREWORD

This Standard is a consolidation of two ASME standards, ASME B29.11M-1994 (Combination Chains, Attachments, and Sprocket Teeth) and ASME B29.14M-1996 ("H" Type Mill Chains, Attachments, and Sprocket Teeth). These two standards were combined into one because of the similarity of construction and the unusual applications for the two types of chains.

B29.11M — Combination Chains, Attachments, and Sprocket Teeth

In 1886 a patent was granted for a chain comprised of cast metal block links, fitted with bronze bushings, and connected with wrought steel sidebars and removable pins. This chain was the forerunner of the present combination chain (B29.11M), later placed on the market around 1900. Many sizes and types of combination chains were developed and marketed in the next several years.

During World War I, the War Industries Board insisted that chain manufacture be confined to the necessary sizes. This caused elimination of several types and sizes, and planted the seed for future standardization. Following World War I, the Malleable Chain Manufacturers Institute was formed, and this group did considerable work on standardization of chain and sprocket dimensions for combination chains of the more popular sizes. There were still dimensional variations that would not permit universal intercoupling of chains of different manufacture, necessitating repairs made with chains of the original manufacturer.

The ASCMA (now the American Chain Association), recognizing the need for a complete standard providing intercoupling and direct replacement of chains of different manufacture, established this Standard utilizing the minimum number of chains to meet requirements of industry for the chains widely used in conveyor and elevator applications.

To facilitate the use of this Standard in the international market, the metric equivalents of all dimensions are given.

This Standard was presented to the USASI (now the American National Standards Institute) B29 Committee in December 1963 and, upon approval by the USASI on May 24, 1968, was adopted and published.

The 1974 revision included minor changes in metric units and change from ultimate strengths to proof test loads with the corresponding explanatory and caution notes.

The American National Standards Institute approved the previous revision in 1984.

The 1994 revision defines the proof test loads as "minimum" in Table 1 and adds minimum attachment hole diameters to Tables 4 through 9. The information in Fig. 4 was modified to strengthen the recommendation for undersized root diameters and pocket radii.

B29.14M — "H" Type Mill Chains, Attachments, and Sprocket Teeth

The "H" type mill chains (B29.14M) are a derivative of the malleable detachable chains and were developed to meet the demands of heavier duty service.

These chains were developed principally for the lumber and pulp and paper industries for drives, transfer, and drag conveyors. They are also well adapted to elevator service of moderate speeds and loads.

Interchangeability between chains of various manufacturers is important with the widespread usage of these chains.

In September 1967, a subcommittee of American National Standards Committee B29 was appointed with members from the malleable chain industry to develop a standard for the "H" type mill chains, attachments, and sprocket teeth.

The standard developed by this committee restricts only those dimensions that affect interchangeability.

To promote the use of this Standard in the International Market, the metric equivalent of all dimensions is given.

The document was approved as an American National Standard on December 17, 1971.

The revision was approved by the American National Standards Institute on July 16, 1996.

Added to the 1996 revision is the minimum bolt hole diameter required for bolt diameter given for the particular attachments.

The 2001 revisions of both ASME B29.11M and ASME B29.14M have been incorporated to form the ASME B29.400-2001 standard. This Standard was approved as an American National Standard on November 27, 2001.

ASME STANDARDS COMMITTEE B29

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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Secretary, B29 Main Committee
The American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990

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.

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 Main 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 which are necessary to explain the question; however, they should not contain proprietary names or information.

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

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

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COMBINATION CHAINS, ATTACHMENTS, AND SPROCKET TEETH

1 DEFINITION

combination chains: a series of block links having barrels to contact the sprocket teeth, alternating with links composed of sidebars and pins that articulate in the barrels of the block link.

Pins are fixed against rotation in sidebar pitch holes by mechanical locks, such as flats, or by interference fits, or both. Assembly of pins may be from either side or alternated, at the manufacturer's option.

Figures 1, 2, and 3 illustrate a typical chain and the principal dimensions of a chain.

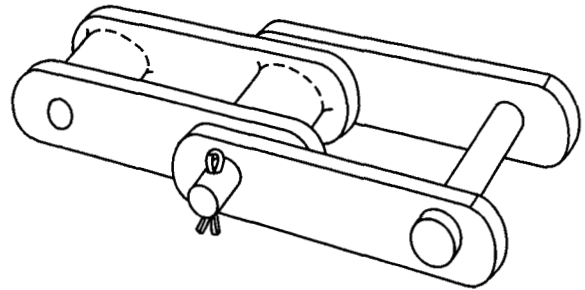


Fig. 1 Assembled Chain

2 GENERAL CHAIN PROPORTIONS AND DESIGNATIONS

2.1 Proof Test Load

The proof test load is the tensile load in pounds (or kilonewtons) the chain has withstood at the time of assembly at the factory.

All chains must be subjected to this test.

WARNING: DO NOT USE THESE PROOF TEST LOADS FOR CHAIN APPLICATION. FOR APPLICATION GUIDE CONSULT MANUFACTURERS' CATALOG.

The values listed in Table 1 cover the two most common materials used in the links:

(a) Class M — Malleable Iron (ASTM Specification A 47-68, Grade 32510 or Grade 35018)

(b) Class P — Pearlitic Malleable Iron (ASTM Specification A 220-68, Grade 60004)

Class P chains are approximately 25% stronger than Class M chains.

2.2 Measuring Load

Measuring load is approximately 6% of proof test load as listed in Table 1. This is the load under which a dry or lightly lubricated chain should be measured for length.

2.3 Strand Length Tolerance

New chains under measuring load may be over theoretical length up to 0.75 in. in 120 in. (19.05 mm in 3048 mm), but must not be under theoretical length.

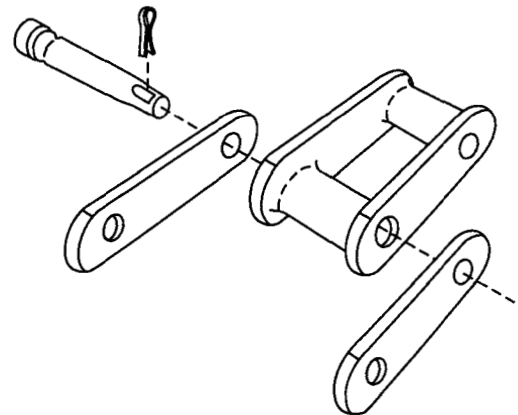
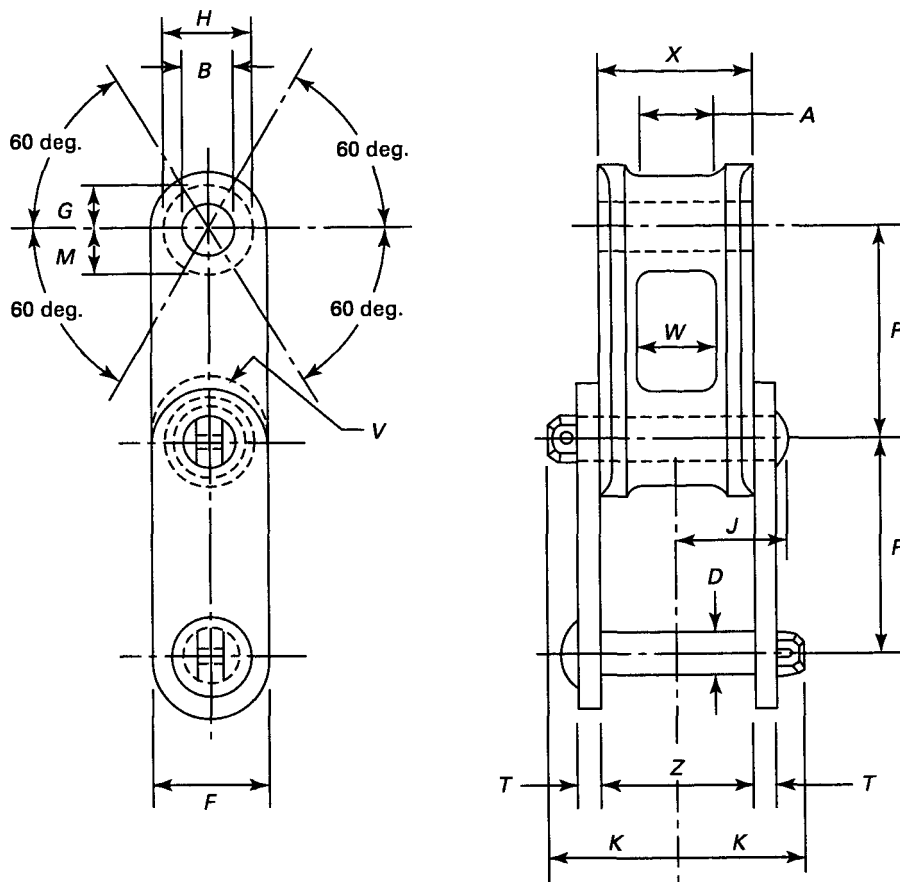


Fig. 2 Disassembled Chain

2.4 Dimensions for Chain Links

To assure interchangeability of links as produced by different makers of chain, standard maximum and minimum dimensions are adopted. They are not actual dimensions used in manufacturing, but limiting dimensions, maximum or minimum, required to assure the desired interchangeability.

All dimensions are given in a decimal inch system. The metric equivalent dimensions are for reference only.



- A** = inside width for sprocket contact, between corner fillets and 60 deg. both sides of vertical line as shown
B = inside diameter of barrel
D = pin diameter
F = overall chain height
G = barrel dimension pitchwise
H = barrel height
J = pin head to center line
K = pin end to center line
M = barrel dimension pitchwise
P = assembled chain pitch (this is a theoretical reference dimension used for basic calculations)
T = sidebar thickness
V = sidebar end clearance radius
W = inside width
X = block link width
Z = width between outer sidebars

Fig. 3 Dimensions of Chain

Table 1 General Chain Dimensions, Proof Test Load, Strand Length, and Measuring Load for Checking Chain Lengths

CAUTION: The numerical values set forth in this Table must be read in connection with the definitions and explanatory notes appearing in Section 2 and in Tables 2 and 3. The proof test load values do not afford a sufficient or appropriate basis for determining chain application.

Dimensions, in.							
Chain No.	C 55	C 102 B	C 110	C 111	C 131	C 132	C 188
P = chain pitch	1.631	4.000	6.000	4.760	3.075	6.050	2.609
D = pin diameter	0.375	0.625	0.625	0.750	0.625	1.000	0.500
F = overall chain height	0.75	1.50	1.50	1.75	1.50	2.00	1.12
H = barrel height	0.72	0.98	1.26	1.44	1.22	1.74	0.88
T = sidebar thickness	0.19	0.38	0.38	0.38	0.38	0.50	0.25
Proof test loads, lb (min.)							
Class M	3600	9600	9600	14400	9600	20000	5600
Class P	4500	12000	12000	18000	12000	25000	7000
No. of pitches/nominal 120 in. strand	74	30	20	26	40	20	46
Maximum measuring length of nominal 120 in. strand	121.44	120.75	120.75	124.51	123.75	121.75	120.76
Minimum measuring length of nominal 120 in. strand	120.69	120.00	120.00	123.76	123.00	121.00	120.01
Measuring load	100	300	300	500	300	700	200

Dimensions, mm							
Chain No.	C 55	C 102 B	C 110	C 111	C 131	C 132	C 188
P = chain pitch	41.43	101.60	152.40	120.90	78.11	153.67	66.27
D = pin diameter	9.52	15.88	15.88	19.05	15.88	25.40	12.70
F = overall chain height	19.0	38.1	38.1	44.5	38.1	50.8	28.4
H = barrel height	18.3	24.9	32.0	36.6	31.0	44.2	22.4
J = sidebar thickness	4.8	9.7	9.7	9.7	9.7	12.7	6.4
Proof test loads, kN (min.)							
Class M	16.00	42.70	42.70	64.00	42.70	89.00	24.90
Class P	20.00	53.40	53.40	80.00	53.40	111.20	31.10
No. of pitches/nominal 3048 mm strand	74	30	20	26	40	20	46
Maximum measuring length of nominal 3048 mm strand	3084.6	3067.0	3067.0	3162.6	3143.2	3092.4	3067.0
Minimum measuring length of nominal 3048 mm strand	3065.5	3048.0	3048.0	3143.5	3124.2	3073.4	3048.3
Measuring load, N	450	1340	1340	2230	1340	3120	900

Table 2 Maximum and Minimum Controlling Dimensions for Interchangeable Chain Links

Dimensions, in.							
Chain No.	C 55	C 102 B	C 110	C 111	C 131	C 132	C 188
<i>P</i> (Ref.) = chain pitch	1.631	4.000	6.000	4.760	3.075	6.050	2.609
<i>D</i> = pin diameter (max.)	0.378	0.628	0.628	0.753	0.628	1.003	0.503
<i>B</i> = inside diameter of barrel (min.)	0.383	0.633	0.633	0.758	0.633	1.008	0.508
<i>G</i> = barrel dimension pitchwise (max.)	0.38	0.68	0.77	0.91	0.75	1.05	0.52
<i>M</i> = barrel dimension pitchwise (max.)	0.38	0.50	0.64	0.74	0.63	0.88	0.46
<i>H</i> = barrel height (max.)	0.76	1.00	1.28	1.48	1.26	1.76	0.92
<i>W</i> = inside width (min.)	0.80	2.06	2.06	2.56	1.24	3.24	1.04
<i>A</i> = inside width of barrel for sprocket contact (min.)	0.72	1.92	1.92	2.42	1.14	3.04	0.94
<i>X</i> = block link width (max.)	1.20	2.92	2.92	3.42	2.08	4.38	1.60
<i>Z</i> = inside width between outer sidebars (min.)	1.22	2.94	2.94	3.44	2.10	4.40	1.62

Dimensions, mm							
Chain No.	C 55	C 102 B	C 110	C 111	C 131	C 132	C 188
<i>P</i> (Ref.) = chain pitch	41.43	101.60	152.40	120.90	78.10	153.67	66.27
<i>D</i> = pin diameter (max.)	9.60	15.95	15.95	19.16	15.95	25.48	12.78
<i>B</i> = inside diameter of barrel (min.)	9.73	16.07	16.07	19.25	16.08	25.60	12.90
<i>G</i> = barrel dimension pitchwise (max.)	9.7	17.3	19.6	23.1	19.0	26.7	13.2
<i>M</i> = barrel dimension pitchwise (max.)	9.7	12.7	16.3	18.8	16.0	22.4	11.7
<i>H</i> = barrel height (max.)	19.3	25.4	32.5	37.6	32.0	44.7	23.4
<i>W</i> = inside width (min.)	20.3	52.3	52.3	65.0	31.5	82.3	26.4
<i>A</i> = inside width of barrel for sprocket contact (min.)	8.3	48.8	48.8	61.5	29.0	77.2	23.9
<i>X</i> = block link width (max.)	30.5	74.2	74.2	86.9	52.8	111.3	40.6
<i>Z</i> = inside width between outer sidebars (min.)	31.0	74.7	74.7	87.4	53.3	111.8	41.1

Table 3 Chain Clearance Dimensions

Dimensions, in.							
Chain No.	C 55	C 102 B	C 110	C 111	C 131	C 132	C 188
<i>F</i> = chain height (max.)	0.80	1.56	1.56	1.82	1.56	2.06	1.18
<i>V</i> = sidebar end clearance radius (max.)	0.48	0.94	0.94	1.10	0.94	1.20	0.67
<i>R</i> = attachment clearance radius (min.)	0.50	0.96	0.94	1.12	0.96	1.22	0.69
<i>K</i> = pin end to center line (max.)	1.22	2.31	2.31	2.72	1.91	3.38	1.44

Dimensions, mm							
Chain No.	C 55	C 102 B	C 110	C 111	C 131	C 132	C 188
<i>F</i> = chain height (max.)	20.3	39.6	39.6	46.2	39.6	52.3	30.5
<i>V</i> = sidebar end clearance radius (max.)	12.2	23.9	23.9	27.9	23.9	30.5	17.0
<i>R</i> = attachment clearance radius (min.)	12.7	24.4	24.4	28.4	24.4	31.0	17.5
<i>K</i> = pin end to center line (max.)	31.0	58.6	58.6	69.1	48.5	85.8	36.6

3 ATTACHMENTS

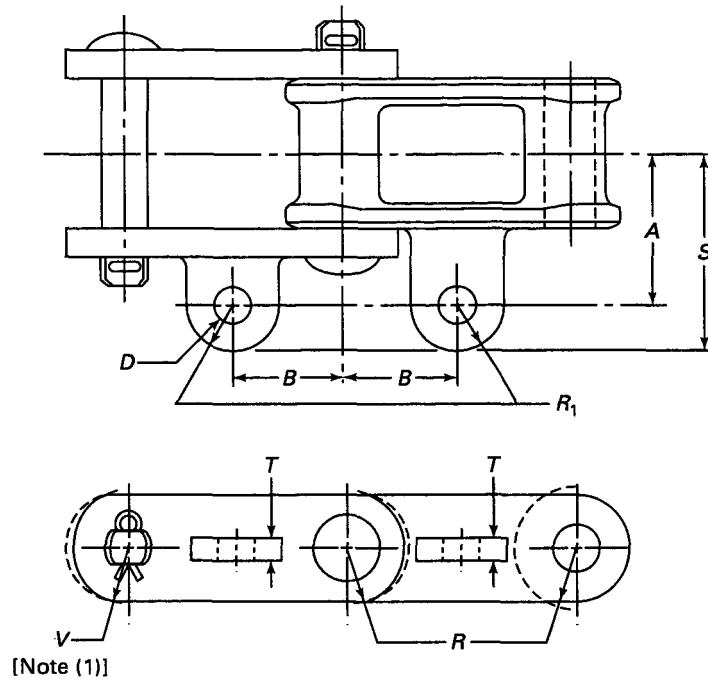


Table 4 A22 Attachment

Dimensions, in.								
Chain No.	A	B	S Max.	T Max.	R Min.	R Max.	D	
							Bolt Size	Min. Hole
C 55	1.50	0.82	2.00	0.28	0.50	0.50	0.31	0.34
C 188	1.44	1.30	2.41	0.41	0.69	0.97	0.38	0.40
Dimensions, mm								
Chain No.	A	B	S Max.	T Max.	R Min.	R Max.	D	
							Bolt Size	Min. Hole
C 55	38.1	20.7	50.8	7.1	12.7	12.7	7.9	8.6
C 188	36.6	33.1	61.2	10.4	17.5	24.6	9.7	10.2

NOTE:

(1) For V dimension, see Table 3.

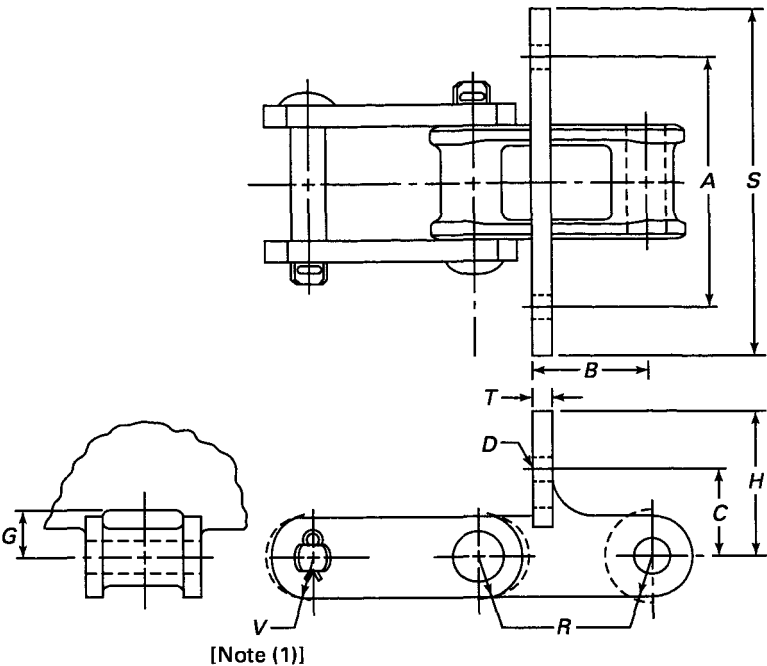
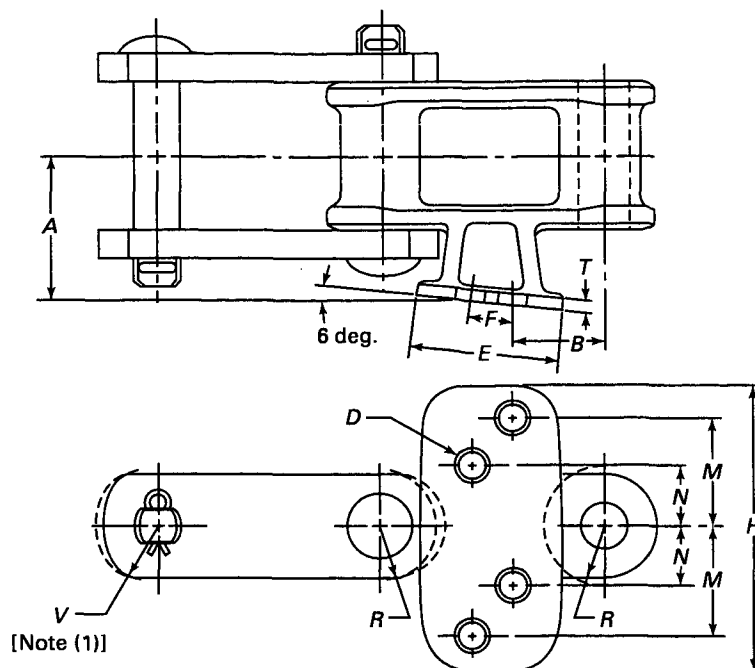


Table 5 F2 Attachment

Dimensions, in.										
Chain No.	A	B	C	H Max.	S Max.	T Max.	R Min.	G	D	
									Bolt Size	Min. Hole
C 111	6.38	3.00	2.00	3.03	7.82	0.41	1.12	1.03	0.38	0.40
C 131	4.69	2.14	1.69	2.78	6.50	0.34	0.96	0.90	0.38	0.40
C 188	2.00	1.38	1.50	2.21	2.82	0.34	0.69	0.71	0.31	0.34
Dimensions, mm										
Chain No.	A	B	C	H Max.	S Max.	T Max.	R Min.	G	D	
									Bolt Size	Min. Hole
C 111	162.1	76.2	50.8	77.0	198.6	10.4	28.4	26.1	9.7	10.2
C 131	119.1	54.4	42.9	70.6	165.1	8.6	24.4	22.9	9.7	10.2
C 188	50.8	35.1	38.1	56.1	71.6	8.6	17.5	18.0	7.9	8.6

NOTE:
(1) For V dimension, see Table 3.

**Table 6 G6 Attachment**

Dimensions, in.											
Chain No.	A	B	E Max.	F	H Max.	M	N	T Max.	R Min.	D	
										Bolt Size	Min. Hole
C 131	2.06	1.25	2.06	0.56	4.30	1.53	0.86	0.34	0.96	0.38	0.40
C 188	1.50	1.03	1.41	0.56	3.94	1.53	0.86	0.34	0.96	0.25	0.28
Dimensions, mm											
Chain No.	A	B	E Max.	F	H Max.	M	N	T Max.	R Min.	D	
										Bolt Size	Min. Hole
C 131	52.3	31.8	52.3	14.2	109.2	38.9	21.8	8.6	24.4	9.7	10.2
C 188	38.1	26.2	35.8	14.2	100.1	38.9	21.8	8.6	17.5	6.4	7.1

NOTE:

(1) For V dimension, see Table 3.

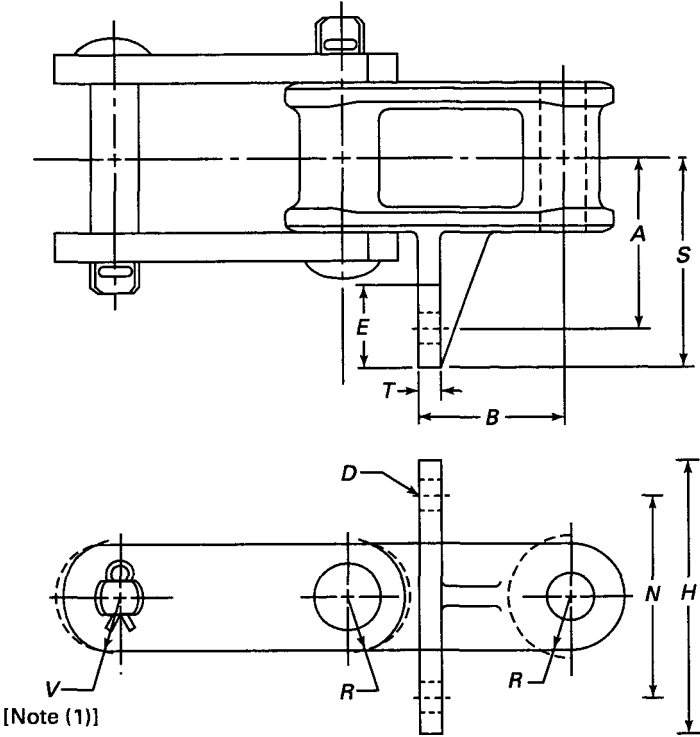
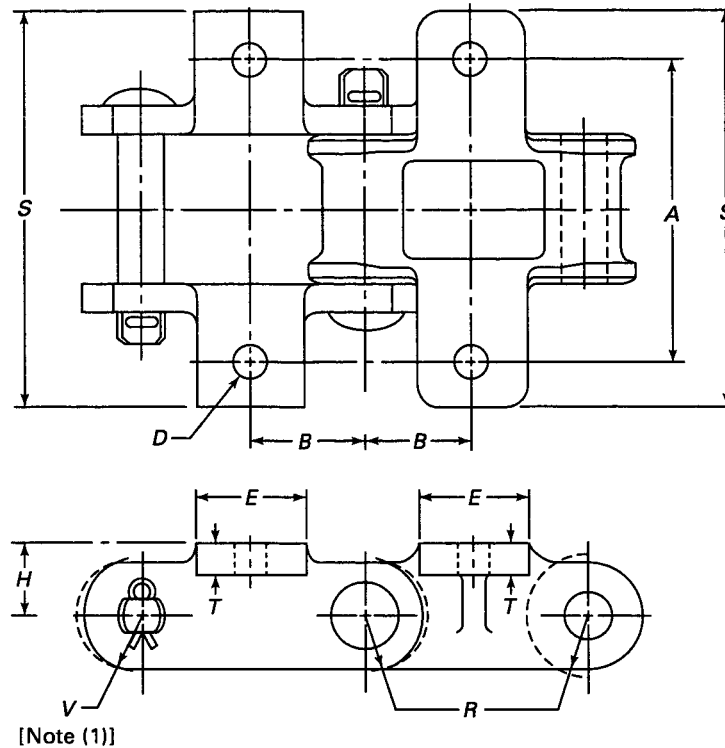


Table 7 G19 Attachment

Dimensions, in.										
Chain No.	A	B	E	H Max.	N	S Max.	T Max.	R Min.	D	
									Bolt Size	Min. Hole
C 131	2.38	2.00	1.12	4.00	2.88	3.15	0.34	0.96	0.38	0.40
C 188	1.94	1.86	1.50	3.68	1.50	2.72	0.34	0.96	0.31	0.34

Dimensions, mm										
Chain No.	A	B	E	H Max.	N	S Max.	T Max.	R Min.	D	
									Bolt Size	Min. Hole
C 131	60.5	50.8	28.4	101.6	73.2	80.0	8.6	24.4	9.7	10.2
C 188	49.3	47.2	38.1	93.5	38.1	69.1	8.6	17.5	7.9	8.6

NOTE:
(1) For V dimension, see Table 3.

**Table 8 K1 Attachment**

Dimensions, in.

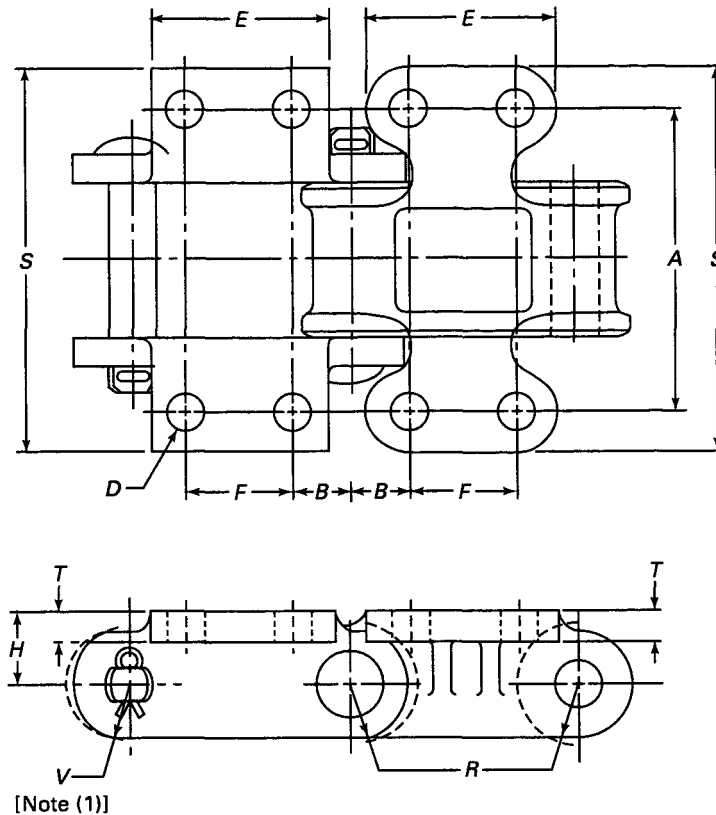
Chain No.	A	B	E Max.	H	S Max.	T Max.	R Min.	D	
								Bolt Size	Min. Hole
C 55	2.04	0.82	0.84	0.50	3.00	0.19	0.50	0.25	0.28
C 102 B	4.75	2.00	3.03	1.00	7.12	0.14	0.96	0.38	0.40
C 131	4.12	1.54	2.91	1.00	6.18	0.41	0.96	0.50	0.53
C 188	3.75	1.30	2.15	0.81	5.18	0.28	0.69	0.38	0.40

Dimensions, mm

Chain No.	A	B	E Max.	H	S Max.	T Max.	R Min.	D	
								Bolt Size	Min. Hole
C 55	51.8	20.7	21.3	12.7	76.2	4.8	12.7	6.4	7.1
C 102 B	120.6	50.8	76.9	25.4	180.9	10.4	24.4	9.7	10.2
C 131	104.6	39.1	73.9	25.4	157.0	10.4	24.4	12.7	13.5
C 188	95.2	33.1	54.6	20.6	131.6	7.1	17.5	9.7	10.2

NOTE:

(1) For V dimension, see Table 3.

**Table 9 K2 Attachment**

Dimensions, in.										
Chain No.	A	B	E Max.	F	H	S Max.	T Max.	R Min.	D	
									Bolt Size	Min. Hole
C 102 B	5.31	1.12	3.03	1.75	1.00	7.12	0.41	0.96	0.38	0.40
C 110	5.31	2.12	3.53	1.75	1.00	7.12	0.41	0.96	0.38	0.40
C 111	6.25	1.22	3.65	2.31	1.12	8.30	0.41	1.12	0.50	0.53
C 131	4.12	0.79	2.91	1.50	1.00	6.18	0.41	0.96	0.50	0.53
C 132	7.50	1.65	4.28	2.75	1.25	9.68	0.53	1.22	0.50	0.53
C 188	4.19	0.68	2.15	1.25	0.81	5.18	0.28	0.69	0.31	0.34

Dimensions, mm										
Chain No.	A	B	E Max.	F	H	S Max.	T Max.	R Min.	D	
									Bolt Size	Min. Hole
C 102 B	134.9	28.4	76.9	44.5	25.4	180.8	10.4	24.4	9.7	10.2
C 110	134.9	53.8	89.6	44.5	25.4	180.8	10.4	24.4	9.7	10.2
C 111	158.8	31.0	92.7	58.7	28.4	210.8	10.4	28.4	12.7	13.5
C 131	104.6	20.1	73.9	38.1	25.4	157.0	10.4	24.4	12.7	13.5
C 132	190.5	41.9	108.7	69.9	31.8	245.9	13.5	31.0	12.7	13.5
C 188	106.4	17.3	54.6	31.8	20.6	131.6	7.1	17.5	7.9	8.6

NOTE:

(1) For V dimension, see Table 3.

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“H” TYPE MILL CHAINS, ATTACHMENTS, AND SPROCKET TEETH

1 DEFINITION

“H” type mill chains: a series of identical cast offset links having barrels to contact the sprocket teeth and pins that articulate in the barrels of the links.

Pins are fixed in the sidebar pitch holes by either press fits and/or mechanical locks, such as flats, to prevent rotation of the pins in the sidebar pitch holes.

Figures 1 and 2 illustrate a typical chain and the chain nomenclature.

2 GENERAL CHAIN PROPORTIONS AND DESIGNATIONS

2.1 Proof Test Load

The minimum proof test load listed in Table 1 is the load in pounds (or kilonewtons) that the chain has withstood at the time of assembly at the factory. Maximum proof test loads may be determined by the manufacturer provided they do not cause damage or distortion to the chain parts.

WARNING: DO NOT USE THESE PROOF TEST LOADS FOR CHAIN APPLICATION. FOR APPLICATION GUIDE CONSULT MANUFACTURERS’ CATALOGS.

The values listed in Table 1 cover the two most common materials used in the links:

(a) Class M — Malleable Iron (ASTM Specification A 47-68, Grade 32510 or Grade 35018)

(b) Class P — Pearlitic Malleable Iron (ASTM Specification A 220-68, Grade 60004)

Class P chains are approximately 25% stronger than Class M chains.

2.2 Measuring Load

The measuring load, in pounds or kilonewtons, listed in Table 1, is the load under which a dry or lightly lubricated chain should be measured for length.

2.3 Strand Length Tolerance

New chains under measuring load may be over length up to 0.75 in. in 120 in. (19.05 mm in 3048 mm), but must not be under minimum length.

Maximum and minimum strand lengths for each chain are listed in Table 1.

2.4 Dimensions for Chain Links

To assure interchangeability of links as produced by different makers of chain, standard minimum and maximum dimensions are adopted. They are not actual dimensions used in manufacturing but limiting dimensions, minimum or maximum, required to assure the desired interchangeability.

All dimensions are given in a decimal inch system. The metric equivalent dimensions are for reference only.

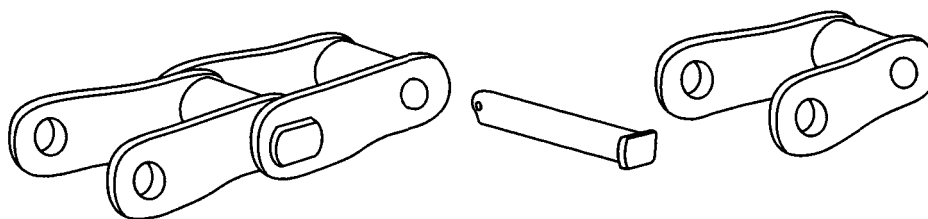
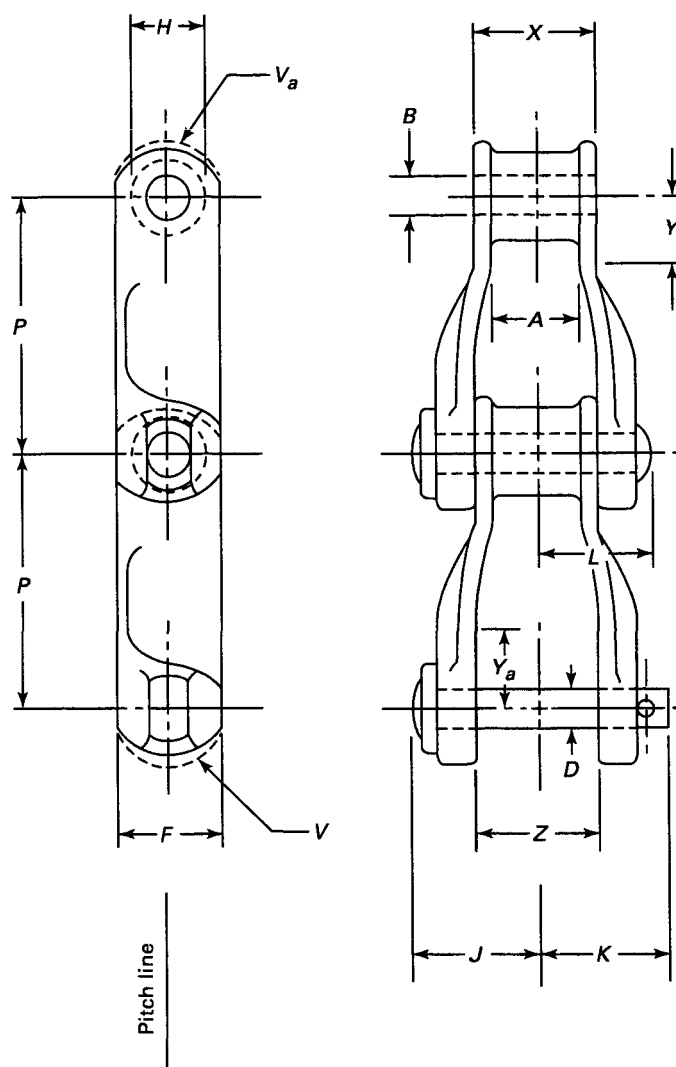


Fig. 1 “H” Type Mill Chain



- A = inside width for sprocket contact
- B = inside diameter of barrel
- D = pin diameter
- F = chain height
- H = barrel outside diameter
- J = pin head to center line
- K = pin end to center line
- L = riveted head to center line
- P = chain pitch (This is a theoretical reference dimension used for basic calculations.)
- V = sidebar end clearance radius — pin end
- V_a = sidebar end clearance radius — barrel end
- X = width of link at barrel end extending to a point on the pitch line Y inches from the center line as shown
- Y = straight before bend — barrel end
- Y_a = straight before bend — pin end
- Z = width between sidebars at pin end extending to a point on the pitch line Y_a inches from the center line as shown

Fig. 2 "H" Type Mill Chain Nomenclature

Table 1 General Chain Dimensions, Proof Test Load, Strand Length, and Measuring Load for Checking Chain Lengths

	Chain No.				
	H60	H74	H78	H82	H124
Dimensions, in.					
P = chain pitch	2.308	2.609	2.609	3.075	4.000
D = pin diameter	0.312	0.375	0.500	0.562	0.750
F = chain height	0.75	1.00	1.12	1.25	1.56
H = barrel outside diameter	0.75	0.88	0.88	1.19	1.44
Proof test load, lb, minimum					
Class M	2800	4000	6400	8000	12,000
Class P	3500	5000	8000	10,000	15,000
Number of pitches/nominal	52	46	46	39	30
120 in. strand					
Maximum measuring length of nominal	120.77	120.76	120.76	120.67	120.75
120 in. strand					
Minimum measuring length of nominal	120.02	120.01	120.01	119.92	120.00
120 in. strand					
Measuring load, lb	100	200	200	300	400
Dimensions, mm					
P = chain pitch	58.62	66.27	66.27	78.10	101.60
D = pin diameter	7.92	9.52	12.70	14.27	19.05
F = chain height	19.0	25.4	28.4	31.75	39.62
H = barrel outside diameter	19.0	22.3	22.3	30.2	36.6
Proof test load, kN, minimum					
Class M	12.50	17.80	28.50	35.60	53.40
Class P	15.60	22.20	35.60	44.50	66.80
Number of pitches/nominal	52	46	46	39	30
3048 mm strand					
Maximum measuring length of nominal	3067.6	3067.3	3067.3	3065.0	3067.0
3048 mm strand					
Minimum measuring length of nominal	3048.5	3048.2	3048.2	3046.0	3048.0
3048 mm strand					
Measuring load, kN	450	900	900	1340	1790

GENERAL NOTE:

CAUTION — The numerical values in this Table do not afford a sufficient or appropriate basis for determining chain application and must be read in conjunction with the definitions and explanatory notes on page 13.

Table 2 Minimum and Maximum Controlling Dimensions for Interchangeable Chain Links

	Chain No.				
	H60	H74	H78	H82	H124
Dimensions, in.					
P = chain pitch	2.308	2.609	2.609	3.075	4.000
D = pin diameter (max.)	0.315	0.378	0.503	0.565	0.753
B = inside diameter of barrel (min.)	0.32	0.383	0.508	0.570	0.758
A = inside width of barrel for sprocket contact (min.)	0.75	1.00	1.12	1.25	1.62
H = barrel height (max.)	0.78	0.92	0.92	1.26	1.48
Y = straight before bend — barrel end (min.)	0.42	0.52	0.60	0.66	0.82
Y_a = straight before bend — pin end (min.)	0.42	0.52	0.60	0.66	0.82
V = sidebar end clearance radius — pin end (max.) [Note (1)]	0.42	0.52	0.60	0.66	0.82
V_a = sidebar end clearance radius — barrel end (max.) [Note (1)]	0.42	0.52	0.60	0.66	0.82
X = width of link, barrel end (max.)	1.53	1.66	1.91	2.22	2.80
Z = width between sidebars, pin end (min.)	1.55	1.68	1.93	2.24	2.82
Dimensions, mm					
P = chain pitch	58.62	66.27	66.27	78.11	101.60
D = pin diameter (max.)	8.00	9.60	12.78	14.35	19.13
B = inside diameter of barrel (min.)	8.13	9.73	12.90	14.48	19.25
A = inside width of barrel for sprocket contact (min.)	19.0	25.4	28.4	31.8	41.2
H = barrel height (max.)	19.8	23.4	23.4	32.0	37.6
Y = straight before bend — barrel end (min.)	10.7	13.2	15.2	16.8	20.8
Y_a = straight before bend — pin end (min.)	10.7	13.2	15.2	16.8	20.8
V = sidebar end clearance radius — pin end (max.) [Note (1)]	10.7	13.2	15.2	16.8	20.8
V_a = sidebar end clearance radius — barrel end (max.) [Note (1)]	10.7	13.2	15.2	16.8	20.8
X = width of link, barrel end (max.)	38.9	42.2	48.5	56.4	71.1
Z = width between sidebars, pin end (min.)	39.8	42.7	49.0	56.9	71.6

NOTE:

- (1) V max and V_a max can be exceeded provided the extension beyond V max and V_a max shown is relieved to avoid interference with the sidebar.

Table 3 Chain Clearance Dimensions

	Chain No.				
	H60	H74	H78	H82	H124
Dimensions, in.					
F = chain height (max.)	0.82	1.06	1.18	1.32	1.62
J = pin head to center line of chain (max.)	1.37	1.53	1.71	2.00	2.50
K = pin end to center line of chain (max.)	1.53	1.65	1.97	2.16	2.69
L = riveted head to center line of chain (max.)	1.42	1.53	1.68	2.00	2.45
Dimensions, mm					
F = chain height (max.)	20.8	26.9	30.0	33.5	41.2
J = pin head to center line of chain (max.)	34.8	38.9	43.4	50.8	63.5
K = pin end to center line of chain (max.)	38.9	41.9	50.0	54.9	68.3
L = riveted head to center line of chain (max.)	36.1	38.9	42.7	50.8	62.2

3 ATTACHMENTS

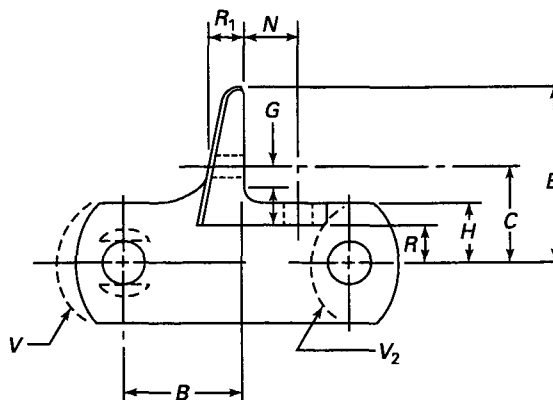
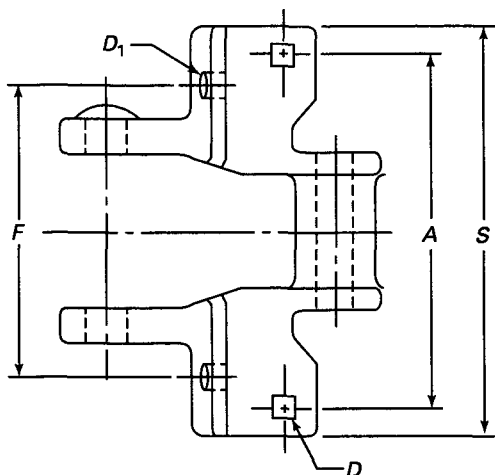
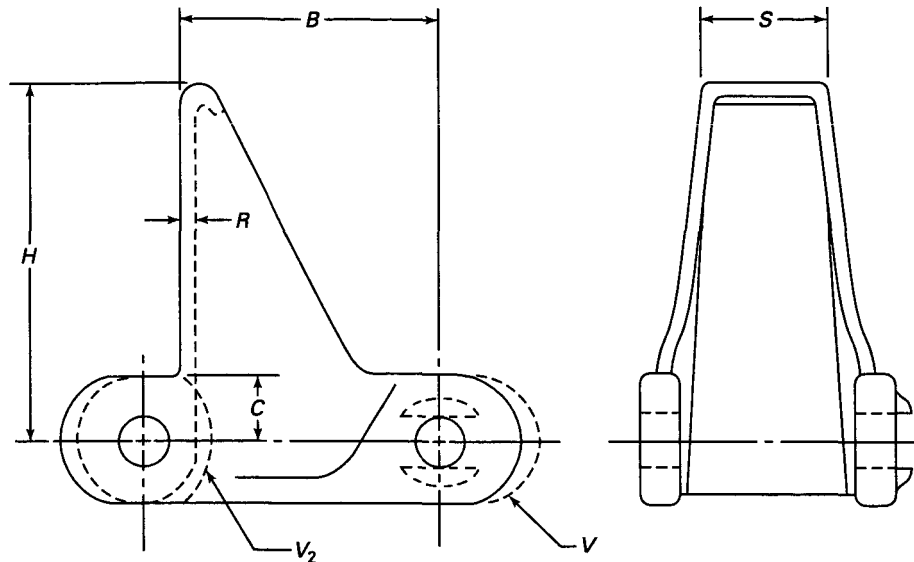


Table 4 F4 Attachment

Chain No.	D															
	A	B	C	Bolt Size	Min. Hole (Square)	D ₁ Bolt Size	E Max.	F	G Min. Flat	H Max.	N	R	R ₁	S Max.	V Max.	V ₂ Min.
Dimensions, in.																
H60	3.94	0.88	1.25	0.31	0.34	0.38	2.19	3.06	0.78	0.38	0.75	0.22	0.31	4.75	0.42	0.44
H74	4.12	1.18	1.38	0.31	0.34	0.38	2.31	3.25	0.72	0.50	0.75	0.25	0.38	5.03	0.52	0.54
H78	4.50	1.00	1.44	0.38	0.40	0.38	2.38	3.76	0.72	0.56	0.94	0.25	0.38	5.56	0.60	0.62
H82	5.00	1.26	1.50	0.38	0.40	0.38	2.44	4.12	0.78	0.62	0.88	0.28	0.38	6.06	0.66	0.68
H124	5.26	1.50	1.66	0.38	0.40	0.38	2.88	4.38	0.75	0.78	1.06	0.31	0.50	6.32	0.82	0.84
Dimensions, mm																
H60	100.1	22.4	31.8	7.9	8.6	9.7	55.6	77.7	19.8	9.7	19.1	5.6	7.9	120.7	10.7	11.2
H74	104.6	30.0	35.1	7.9	8.6	9.7	68.7	82.6	18.3	12.7	19.1	6.4	9.7	127.8	13.2	13.7
H78	114.3	25.4	36.6	9.7	10.2	9.7	60.5	95.5	18.3	14.2	23.9	6.4	9.7	141.2	15.2	15.7
H82	127.0	32.0	38.1	9.7	10.2	9.7	62.0	104.6	19.8	15.7	22.4	7.1	9.7	153.9	16.8	17.3
H124	133.6	38.1	42.2	9.7	10.2	9.7	73.2	111.3	19.1	19.8	26.9	7.9	12.7	160.5	20.8	21.3

GENERAL NOTE: Pin head side location at manufacturer's option.

**Table 5 H2 Attachment**

Chain No.	B	C	H Max.	R	S Max.	V Max.	V_2 Min.
Dimensions, in.							
H60	2.12	0.38	2.50	0.09	1.00	0.42	0.44
H78	2.30	0.56	3.56	0.12	1.19	0.60	0.62
Dimensions, mm							
H60	53.8	9.7	63.5	2.3	25.4	10.7	11.2
H78	58.4	14.2	90.4	3.0	30.2	15.2	15.7

GENERAL NOTE: Pin head side location at manufacturer's option.

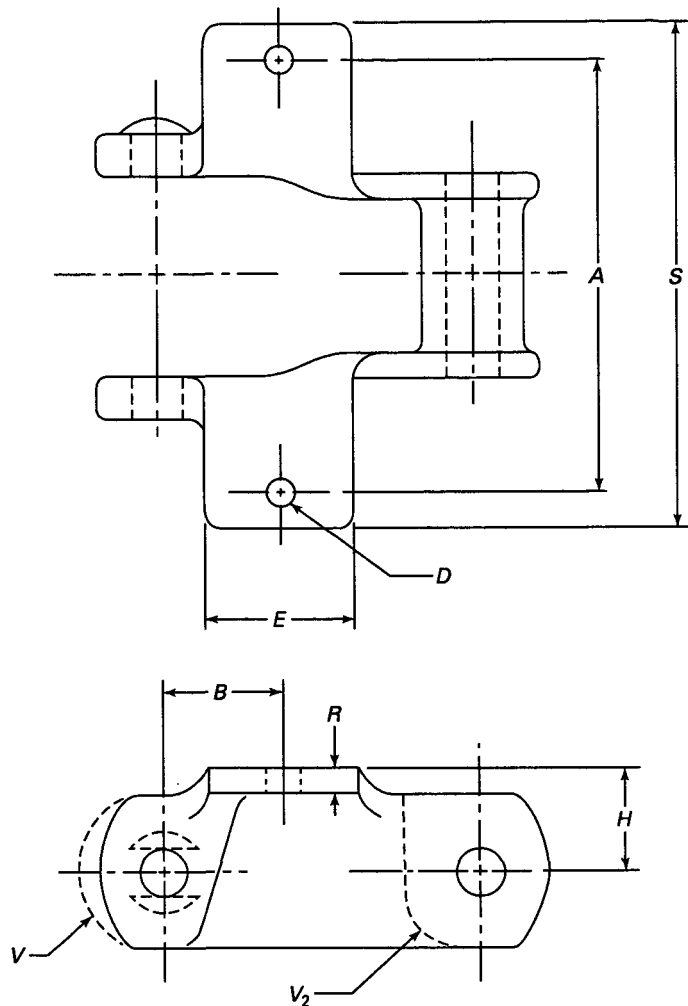


Table 6 K1 Attachment

Chain 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GENERAL NOTE: Pin head side location at manufacturer's option.

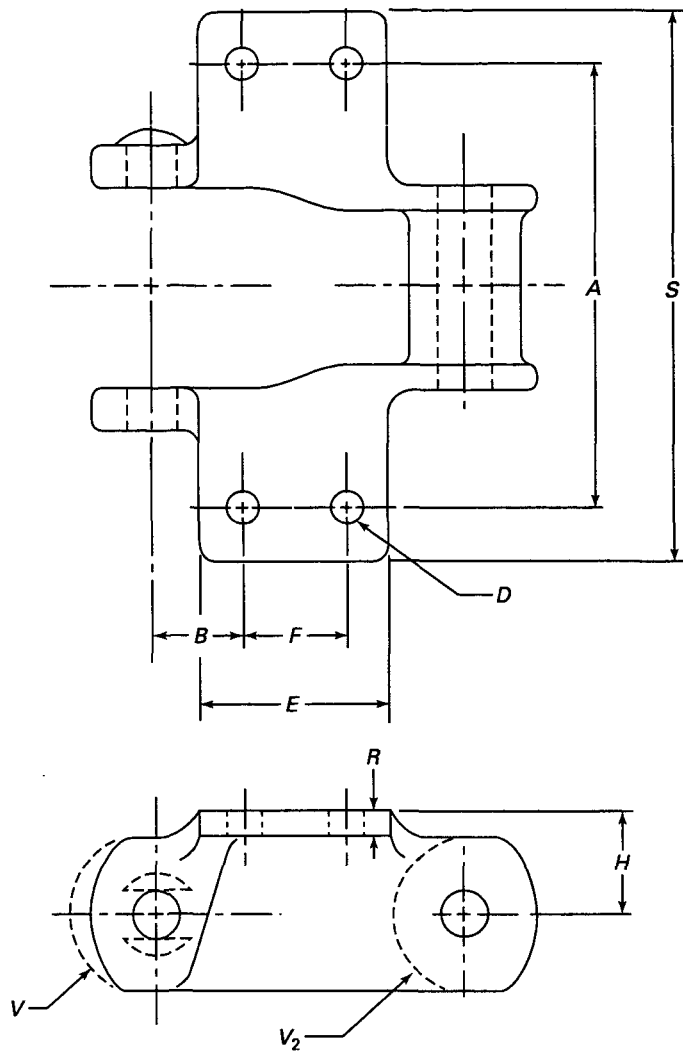


Table 7 K2 Attachment

Chain No.	<i>D</i>				<i>E</i> Max.	<i>F</i>	<i>H</i> Max.	<i>R</i>	<i>S</i> Max.	<i>V</i> Max.	<i>V</i> ₂ Max.
	<i>A</i>	<i>B</i>	Bolt Size	Min. Hole							
Dimensions, in.											
H78	4.00	0.41	0.38	0.40	2.19	1.12	0.88	0.25	5.06	0.60	0.62
H82	4.25	0.75	0.38	0.40	2.38	1.31	0.94	0.31	5.56	0.66	0.68
H124	5.25	0.88	0.38	0.40	3.00	1.94	1.25	0.31	6.50	0.82	0.84
Dimensions, mm											
H78	101.6	10.4	9.7	10.2	55.6	28.4	22.4	6.4	128.5	15.2	15.7
H82	108.0	19.1	9.7	10.2	60.5	33.3	23.9	7.9	141.2	16.8	17.3
H124	133.4	22.4	9.7	10.2	76.2	49.3	31.8	7.9	165.1	20.8	21.3

GENERAL NOTE: Pin head side location at manufacturer's option.

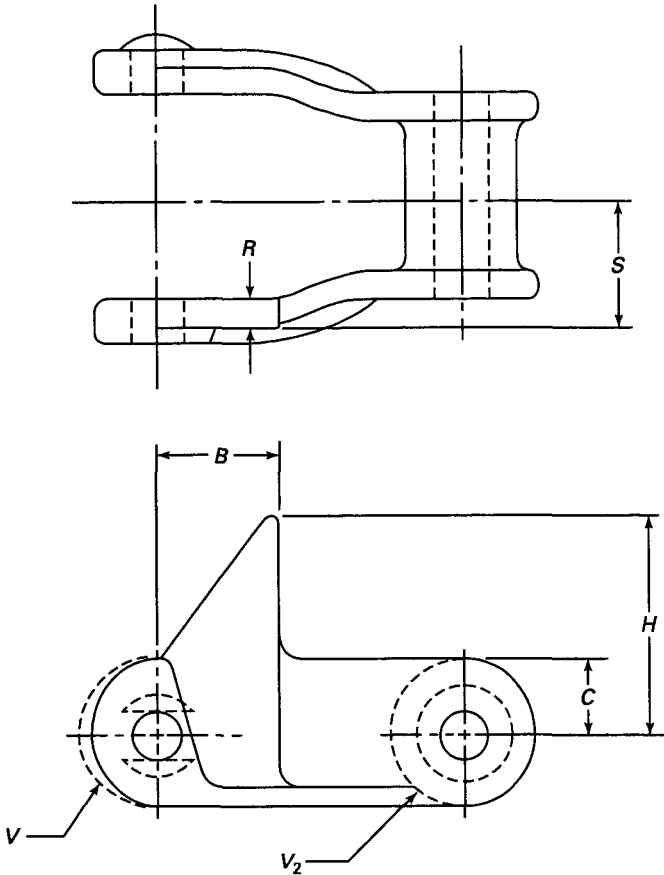
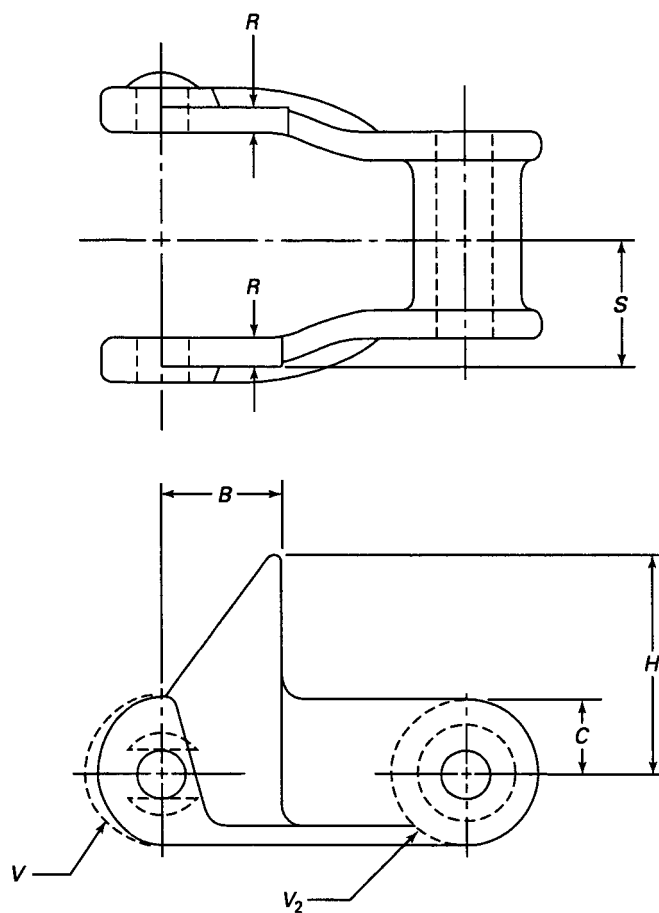


Table 8 R1 Attachment

Chain No.	B	C	H Max.	R	S Max.	V Max.	V ₂ Max.
Dimensions, in.							
H74	1.12	0.50	1.56	0.25	1.14	0.52	0.54
H78	1.15	0.56	1.62	0.31	1.31	0.60	0.62
Dimensions, mm							
H74	28.4	12.7	39.6	6.4	29.0	13.2	13.7
H78	29.2	14.2	41.1	7.9	33.3	15.2	15.7

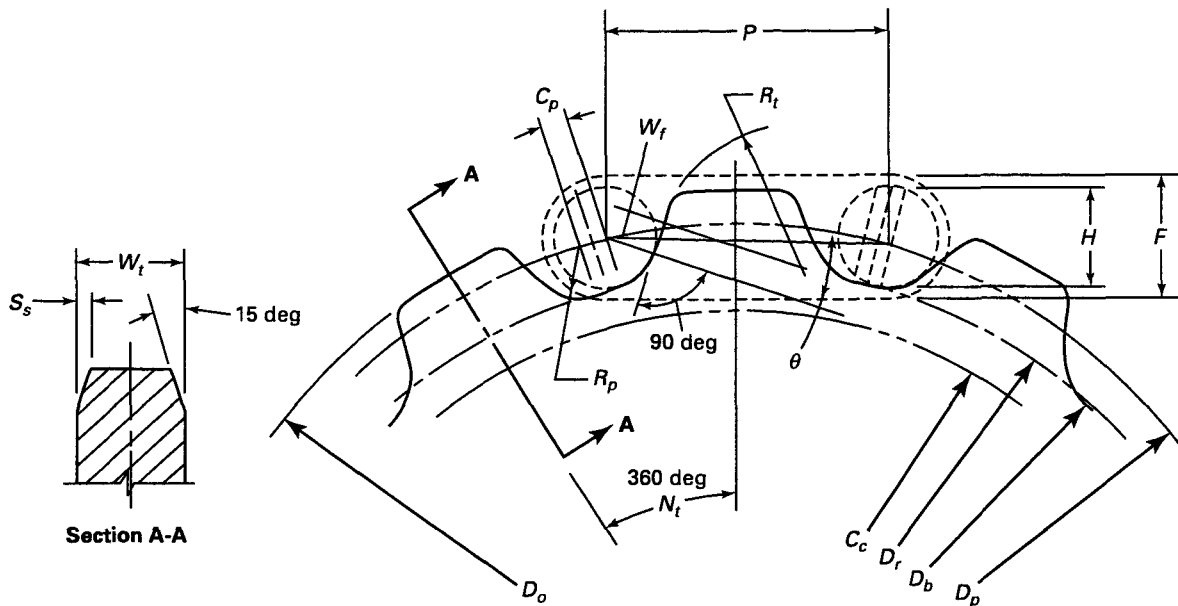
GENERAL NOTE: Pin head side location at manufacturer's option.

**Table 9 RR Attachment**

Chain No.	<i>B</i>	<i>C</i>	<i>H</i> Max.	<i>R</i>	<i>S</i> Max.	<i>V</i> Max.	<i>V</i> ₂ Max.
Dimensions, in.							
H78	1.15	0.56	1.62	0.31	2.68	0.60	0.62
Dimensions, mm							
H78	29.2	14.2	41.1	7.9	68.1	15.2	15.7

GENERAL NOTE: Pin head side location at manufacturer's option.

4 SPROCKET TOOTH FORM



The elements of a chain sprocket and a tooth form may be determined by the following:

C_c = chain clearance circle [Note (1)] = $P(C_{cf} - 0.05) - F$ max.

C_p = pitch line clearance = $P \times 0.10$ to $P \times 0.15$

D_b = bottom diameter = $D_r - C_b$

D_o = outside diameter [Note (2)] = $(P \times C_{cf}) + F$ max.

D_p = pitch diameter = $P \times D_{pf}$

D_r = root diameter (max.) [Note (3)] = $(P \times D_{pf}) - H$ max.

F = chain height max. (see Table 3)

H = chain barrel height max. (see Table 2)

N_t = number of teeth

P = chain pitch

R_p = pocket radius (max.) [Note (3)] = $H/2$

R_t = topping radius = $0.5 \times P$

S_s = side slope = approx. $0.12 \times W_t$ not to exceed 0.38 in. (9.6 mm)

W_f = working face [Note (4)] = $0.01 \times P \times N_t$

W_t = tooth width (max.) = $0.95A$ min. width of chain A (Table 2)

θ = pressure angle (see Table 11)

Additional variables not shown on drawing represent:

A = inside width for sprocket contact

C_b = undersize compensation (typically 0.06 in.)

C_{cf} = clearance circle and outside diameter factor (see Table 11) = $\cot(180/N_t)$

D_{pf} = pitch diameter factor (see Table 11) = $\csc(180/N_t)$

NOTES:

- (1) No portion of hub, beads, lugs, or fillets shall extend beyond this circle in the sidebar zone.
- (2) Limitation on the length of working face: The working face shall not extend beyond the line through the adjacent pitch point which is perpendicular to the working face.
- (3) Root diameters and pocket radii must not exceed the maximums obtained from these formulae. Oversize dimensions cause improper chain and sprocket action and excessive chain loads.
- (4) Outside diameter may be increased to give a full height tooth when the top of the chain is clear of flights, pans, buckets, etc. Tooth working face length provides for approximately 6% chain pitch elongation.

Fig. 3 Sprocket Tooth Form

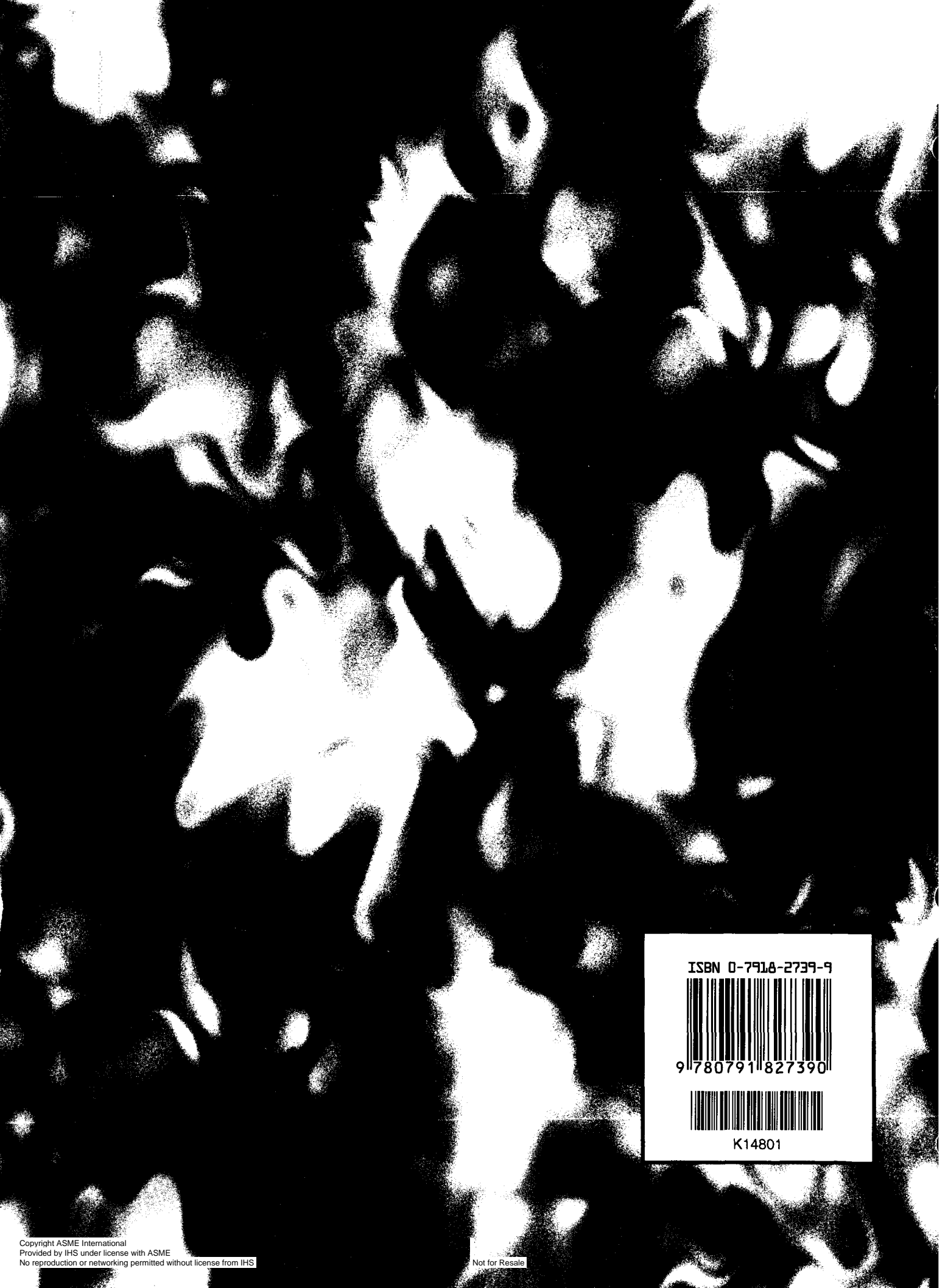
5 SPROCKET DESIGN DATA

Table 10 Sprockets — Maximum Eccentricity and Face Runout at Root Diameter

Pitch Diameter						Max. Face Runout TIR		Max. Eccentricity TIR	
in.			mm.						
Over	Including		Over	Including		in.	mm	in.	mm
0	up to	12	0	up to	305	0.06	1.52	0.09	2.29
12	up to	24	305	up to	610	0.12	3.05	0.15	3.81
24	up to	36	610	up to	915	0.20	5.08	0.21	5.33
	Over 36			Over 915		Consult Mfg.		Consult Mfg.	

Table 11 Sprocket Factors

N_t	C_{pf}	θ_3 deg.	C_{cf}	N_t
6	2.000	9	1.73	6
7	2.304	10	2.07	7
8	2.613	11	2.41	8
9	2.923	12	2.74	9
10	3.236	13	3.07	10
11	3.549	14	3.40	11
12	3.863	15	3.73	12
13	4.178	16	4.05	13
14	4.494	17	4.38	14
15	4.809	18	4.70	15
16	5.125	19	5.03	16
17	5.442	20	5.35	17
18	5.758	20	5.67	18
19	6.075	21	5.99	19
20	6.392	21	6.31	20
21	6.709	22	6.63	21
22	7.026	22	6.95	22
23	7.343	22	7.27	23
24	7.661	23	7.59	24
25	7.978	23	7.91	25
26	8.296	23	8.23	26
27	8.613	23	8.55	27
28	8.931	24	8.87	28
29	9.249	24	9.19	29
30	9.566	24	9.51	30
31	9.884	24	9.83	31
32	10.202	24	10.15	32
33	10.520	25	10.47	33
34	10.837	25	10.79	34
35	11.155	25	11.11	35
36	11.473	25	11.43	36



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