

ASME B29.2M-2007
[Revision of ANSI B29.2M-1982 (R2004)]

Inverted Tooth (Silent) Chains and Sprockets

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FOREWORD

Preparatory work during the late 1930s and early 1940s by the Silent Chain Division of the Association of Roller and Silent Chain Manufacturers (ARSCM, now the American Chain Association) resulted in agreement on standardization of silent chain primarily on the basis of standardized sprocket tooth design. Since individual chain manufacturers employed various chain joint designs, it was agreed that standards on chain detail would be limited to ensure interchangeability of chains on sprockets of any number of teeth. At a meeting of representatives of all major American silent chain manufacturers in September 1944, under the auspices of the ARSCM, recommended "Engineering Standards for Industrial Silent Chain and Sprockets" were agreed upon. Formulas for sprocket design were expanded into tables, which were approved and adopted by the ARSCM in April 1945. Supplementary information on sprocket tooth cutters was added, and all of the data were incorporated in a comprehensive report, *Industrial Standards for Industrial Silent Chains, Sprockets, and Cutters*. This report, with further refinements by minor revisions in 1949 and 1950, was then submitted to the Sectional Committee for review and approval as an American Standard.

The Sectional Committee accepted the recommendations with some minor revisions in 1950 and referred it to ASME and The Society of Automotive Engineers (SAE) for their approval as sponsors of the Committee, with subsequent transmission to the American Standards Association (ASA) for final acceptance as an American Standard. After approval by ASME and SAE, it was accepted by ASA on November 9, 1950 as American Standard B29.2.

In 1956, the Sectional Committee authorized a revision to the standard to bring it up to date. The revised standard was approved by the American Standards Association on July 11, 1957. This revision was in use for many years and was reaffirmed by ANSI on January 4, 1971. (ASA became ANSI in 1969.)

In 1945, the formulation of a recommended standard for "small pitch" silent chain (pitch sizes less than $\frac{3}{8}$ in.) and sprocket tooth form became a matter of consideration by ARSCM's Silent Chain Division. As in the case of the larger chain series, the objective was to provide interchangeability of chains on sprockets and the development of recommended practices for power transmission ratings and selection procedure. After a number of years of usage as an ARSCM Industrial Standard, the recommendations became American Standard B29.9 in 1958. Although it was originally anticipated that there might be a need for two or three pitch sizes of the miniature silent chains, only one, the $\frac{3}{16}$ in. size, has been developed. The information that has heretofore been published as B29.9 was incorporated in the basic Silent Chain Standard, B29.2, as part of the 1982 revision.

In 2006, the B29 Committee undertook a review of the B29.2M Standard and adjusted the contents consistent with developments in industry since the standard had been most recently revised. The list of chain widths was modified to eliminate the $1\frac{1}{4}$ in. pitch and some uncommon chain sizes. The illustrations of the side guide silent chain and center guide silent chains were revised; tables of service factors and horsepower rating per inch of chain width were revised, with the $1\frac{1}{4}$ in. pitch deleted in the latter listing; and the errata sheet of the previous revision was corrected in the formula for G (max.).

This Standard was approved by ANSI on February 12, 2007.

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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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.

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

INVERTED TOOTH (SILENT) CHAINS AND SPROCKETS

1 SILENT CHAINS

1.1 Nomenclature

(a) Silent chain is a series of toothed links alternately assembled with pins or a combination of joint components in such a way that the joint articulates between adjoining pitches. As shown in Fig. 1, illustration (a), side guide silent chain has guide links which straddle the sprocket sides to control the chain laterally. As shown in Fig. 1, illustration (b), center guide silent chain has guide links which run within a circumferential groove or grooves for lateral control.

(b) *Typical Links.* Since joint components, connectors, and offset sections vary with each manufacturer, these items are not included in this Standard. See Fig. 2 for examples of typical links.

1.2 General Configuration

Link contour may vary but must engage standard sprocket teeth so that joint centers lie on sprocket pitch circle.

(a) $\frac{3}{8}$ in. *Pitch Chain and Larger.* Chain widths equal to, or exceeding, two times the pitch have center guides. Narrower chains may be side guide or center guide. Chain widths exceeding 16 times the pitch are not recommended.

(b) $\frac{3}{16}$ in. *Pitch Chain.* Chain may be side guide or center guide as indicated in para. 1.8.

(c) *Maximum Chain Width.* Maximum chain width should be limited to approximately eight times the pitch.

1.3 Numbering System

(a) $\frac{3}{8}$ in. *Pitch Chain and Larger.* Two letters (SC) as a prefix, one or two numerals indicating pitch in eighths of an inch, and two or three numerals indicating nominal chain width in quarters of an inch. Thus, SC302 designates a silent chain, $\frac{3}{8}$ in. pitch by $\frac{1}{2}$ in. nominal width, and SC1012 designates a silent chain, $1\frac{1}{4}$ in. pitch by 3 in. nominal width.

(b) $\frac{3}{16}$ in. *Pitch Chain.* Two letters (SC) as a prefix, a zero followed by a numeral indicating pitch in sixteenths of an inch, and two numerals indicating nominal width of chain in thirty-seconds of an inch. Thus, SC0309 designates a silent chain, $\frac{3}{16}$ in. pitch by $\frac{9}{32}$ in. nominal width.

NOTE: Where links are all of equal thickness 0.03 in. (0.76 mm), it is understood that the width indication also designates the total number of links across the width of the chain.

1.4 Tolerance for Chain Length

(a) $\frac{3}{8}$ in. *Pitch Chain and Larger.* Chains will be designed and manufactured to fit gage sprockets. Tolerance for chain length for new chains may be over nominal length 0.03 in./ft (0.76 mm/m) but must not be underlength.

(b) $\frac{3}{16}$ in. *Pitch Chain.* Chain length tolerance is 0.02 in./ft (0.51 mm/m) over nominal length but must not be underlength.

1.5 Measuring Loads

(a) $\frac{3}{8}$ in. *Pitch Chain and Larger.* Chain should be measured under load of 25 lb $\times$ pitch in inches $\times$ width in inches + 20 lb (0.1724 N $\times$ pitch in mm $\times$ width in mm + 89 N). Length measurements are to be taken over a length of at least 12 in. (300 mm).

(b) $\frac{3}{16}$ in. *Pitch Chain.* The measuring load for $\frac{3}{16}$ in. pitch silent chain shall be approximately equal to 1 lb (4.45 N) for each link in the total chain width, i.e., the load for SC0315 would be 15 lb (67 N). Length measurements are to be taken over a length of at least 12 in. (300 mm).

1.6 General Chain Dimensions for $\frac{3}{8}$ in. Pitch Chain and Larger

See Fig. 3 and Tables 1 and 2.

1.7 Chain Widths and Sprocket Face Profiles for $\frac{3}{8}$ in. Pitch Chain and Larger

See Fig. 4 and Tables 3 and 4.

1.8 Chain Widths and Sprocket Face Profile for $\frac{3}{16}$ in. Pitch Chain

See Fig. 5 and Tables 5 and 6.

2 SPROCKETS

2.1 Tooth Form Dimensions for $\frac{3}{8}$ in. Pitch Chain and Larger

See Fig. 6.

2.2 Tooth Form Dimensions for $\frac{3}{16}$ in. Pitch Chain

See Fig. 7.

2.3 Diameters and Measuring Dimensions for $\frac{3}{8}$ in. Pitch Chain and Larger

The following dimensions apply to Fig. 8:

$$PD = \frac{P}{\sin \frac{180 \text{ deg}}{N}}$$

$$D_p = 0.625P$$

$$\begin{aligned} OPD \text{ (even number of teeth)} = \\ PD - 0.125P \csc \left(30 \text{ deg} - \frac{180 \text{ deg}}{N} \right) + 0.625P \end{aligned}$$

$$\begin{aligned} OPD \text{ (odd number of teeth)} = \cos \frac{90 \text{ deg}}{N} \\ \times \left[PD - 0.125P \csc \left(30 \text{ deg} - \frac{180 \text{ deg}}{N} \right) \right] + 0.625P \end{aligned}$$

$$O.D. \text{ (rounded teeth)} = P \left(\cot \frac{180 \text{ deg}}{N} + 0.08 \right)$$

$$O.D. \text{ (square teeth)} = 2\sqrt{X^2 + L^2 - 2XL \cos \alpha}$$

where

$$L = Y + E/2 \text{ (see Fig. 6 for } E\text{)}$$

$$X = Y \cos \alpha - \sqrt{(0.15P)^2 - (Y \sin \alpha)^2}$$

$$Y = P(0.500 - 0.375 \sec \alpha) \cot \alpha + 0.11P$$

$$\alpha = 30 \text{ deg} - 360 \text{ deg}/N$$

$$G \text{ (max.)} = P \left(\cot \frac{180 \text{ deg}}{N} - 1.16 \right)$$

2.4 Diameters and Measuring Dimensions for $\frac{3}{16}$ in. Pitch Chain

The following measurements apply to Fig. 9:

$$D_p = 0.667P$$

$$OPD \text{ (even number of teeth)} =$$

$$PD - 0.160P \csc \left(35 \text{ deg} - \frac{180 \text{ deg}}{N} \right) + 0.667P$$

$$OPD \text{ (odd number of teeth)} = \cos \frac{90 \text{ deg}}{N}$$

$$\times \left[PD - 0.160P \csc \left(35 \text{ deg} - \frac{180 \text{ deg}}{N} \right) \right] + 0.667P$$

$$O.D. \text{ (nominal rounded teeth)} = P \left(\cot \frac{180 \text{ deg}}{N} - 0.032 \right)$$

$$G \text{ (max.)} = P \left(\cot \frac{180 \text{ deg}}{N} - 1.20 \right)$$

2.5 Tolerances for Diameters, Over Pin Dimensions, and Eccentricity for $\frac{3}{8}$ in. Pitch Chain and Larger

See Tables 7 and 8.

2.6 Tolerances for Diameters, Over Pin Dimensions, and Eccentricity for $\frac{3}{16}$ in. Pitch Chain

See Tables 9 and 10.

2.7 Hub Diameters for $\frac{3}{8}$ in. Pitch Chain and Larger

See Table 11. [For other pitches ($\frac{3}{8}$ in. pitch and larger), multiply these values by pitch.]

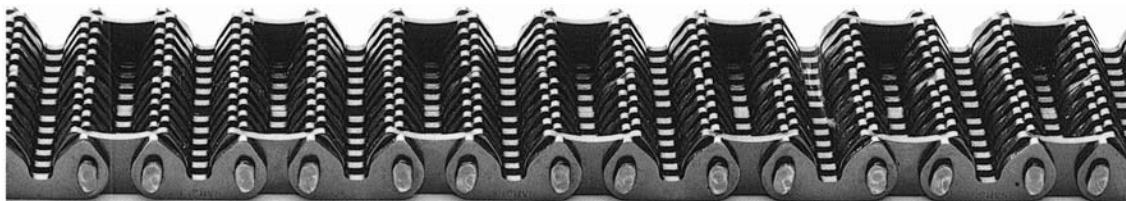
2.8 Tabulation of Pitch Diameter, Outside Diameter, Over Pin Dimensions, and Guide Groove Diameter for Chain of Unity Pitch (Applicable to $\frac{3}{8}$ in. Pitch Chain and Larger)

See Table 12. [For other pitches ($\frac{3}{8}$ in. pitch and larger), multiply these values by pitch.]

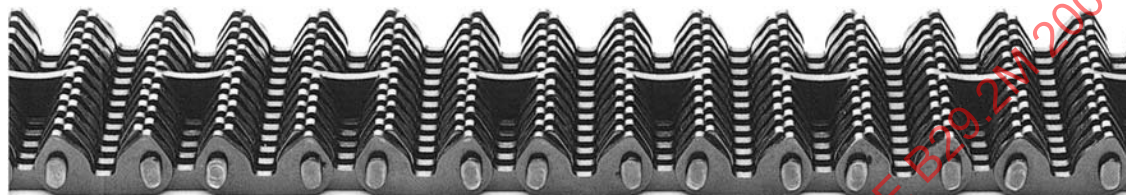
2.9 Tabulation of Pitch Diameter, Outside Diameter, Over Pin Dimensions, and Guide Groove Diameter for $\frac{3}{16}$ in. Pitch Chain

See Tables 13 and 14.

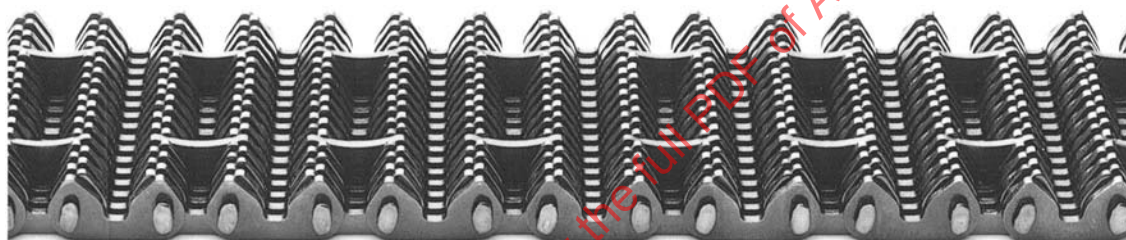
Fig. 1 Silent Chain



(a) Side Guide Silent Chain



(b) Center Guide Silent Chain

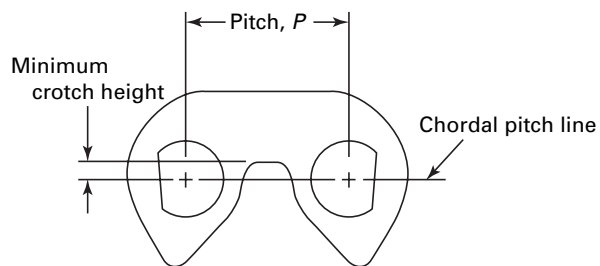


(c) Two Center Guide Silent Chain

Fig. 2 Typical Links



Fig. 3 Link Form



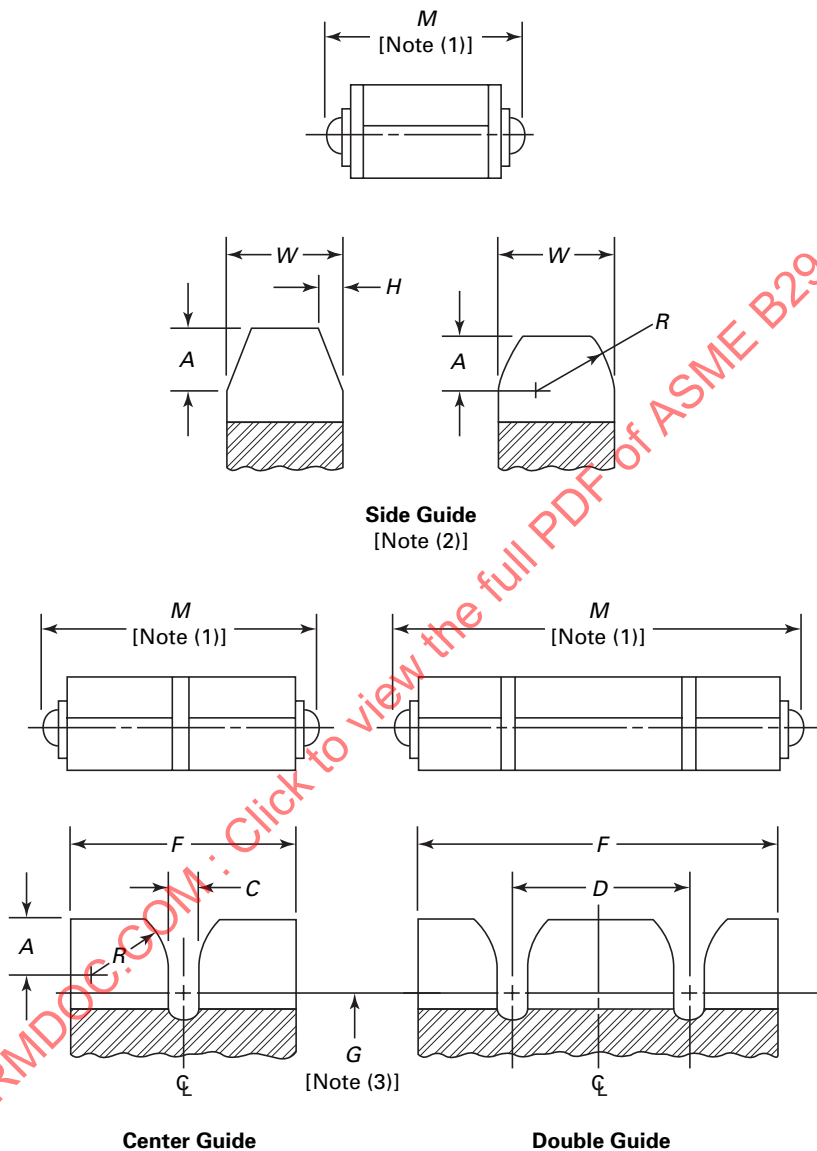
GENERAL NOTE: Minimum crotch height = $0.062 \times \text{chain pitch}$.

Table 1 Chain Link Data, in.

Chain Number (Width in $\frac{1}{4}$ in.)	Chain Pitch	Stamp	Minimum Crotch Height
SC3	0.375	SC3 or 3	0.0232
SC4	0.500	SC4 or 4	0.0310
SC5	0.625	SC5 or 5	0.0388
SC6	0.750	SC6 or 6	0.0465
SC8	1.000	SC8 or 8	0.0620
SC10	1.250	SC10 or 10	0.0775
SC12	1.500	SC12 or 12	0.0930
SC16	2.000	SC16 or 16	0.1240

Table 2 Chain Link Data, mm

Chain Number (Width in $\frac{1}{4}$ in.)	Chain Pitch	Stamp	Minimum Crotch Height
SC3	9.52	SC3 or 3	0.589
SC4	12.70	SC4 or 4	0.787
SC5	15.88	SC5 or 5	0.985
SC6	19.05	SC6 or 6	1.181
SC8	25.40	SC8 or 8	1.574
SC10	31.76	SC10 or 10	1.968
SC12	38.10	SC12 or 12	2.302
SC16	50.80	SC16 or 16	3.149

Fig. 4 Chain Widths and Sprocket Profiles for $\frac{3}{8}$ in. Pitch and Larger**GENERAL NOTES:**

- All sprockets should be marked with complete chain number and number of teeth. Example: SC304-25.
- The maximum radius over a new chain engaged on a sprocket will not exceed the sprocket pitch radius plus 75% of the chain pitch.

NOTES:

- M = maximum overall width of chain.
- Side guide chains have single outside guides of same thickness as toothed links.
- Grooving tool may be either square end or round end, but groove must be full width down to diameter G . For values of G , see Table 12.

Table 3 Chain Widths and Sprocket Face Dimensions for $\frac{3}{8}$ in. Pitch and Larger, in.

Chain Number [Note (1)]	Chain Pitch	Type	Maximum <i>M</i> [Note (2)]	<i>A</i>	<i>C</i> ±0.005	<i>D</i> ±0.010	<i>F</i> +0.125 −0.000	<i>H</i> ±0.003	<i>R</i> ±0.003	<i>W</i> +0.010 −0.000
SC302	0.375	Side guide [Note (3)]	0.780	0.133	...	...	...	0.051	0.200	0.410
SC303	0.375	Center guide	0.905	0.133	0.100	...	0.750	...	0.200	...
SC304	0.375	Center guide	1.160	0.133	0.100	...	1.000	...	0.200	...
SC305	0.375	Center guide	1.410	0.133	0.100	...	1.250	...	0.200	...
SC306	0.375	Center guide	1.665	0.133	0.100	...	1.500	...	0.200	...
SC307	0.375	Center guide	1.915	0.133	0.100	...	1.750	...	0.200	...
SC308	0.375	Center guide	2.165	0.133	0.100	...	2.000	...	0.200	...
SC309	0.375	Center guide	2.420	0.133	0.100	...	2.250	...	0.200	...
SC310	0.375	Center guide	2.665	0.133	0.100	...	2.500	...	0.200	...
SC312	0.375	Double guide	3.165	0.133	0.100	1.000	3.000	...	0.200	...
SC316	0.375	Double guide	4.165	0.133	0.100	1.000	4.000	...	0.200	...
SC320	0.375	Double guide	5.165	0.133	0.100	1.000	5.000	...	0.200	...
SC324	0.375	Double guide	6.165	0.133	0.100	1.000	6.000	...	0.200	...
SC402	0.500	Side guide [Note (3)]	0.780	0.133	...	...	...	0.051	0.200	0.410
SC403	0.500	Center guide	0.950	0.133	0.100	...	0.750	...	0.200	...
SC404	0.500	Center guide	1.190	0.133	0.100	...	1.000	...	0.200	...
SC405	0.500	Center guide	1.440	0.133	0.100	...	1.250	...	0.200	...
SC406	0.500	Center guide	1.690	0.133	0.100	...	1.500	...	0.200	...
SC407	0.500	Center guide	1.940	0.133	0.100	...	1.750	...	0.200	...
SC408	0.500	Center guide	2.190	0.133	0.100	...	2.000	...	0.200	...
SC409	0.500	Center guide	2.440	0.133	0.100	...	2.250	...	0.200	...
SC410	0.500	Center guide	2.690	0.133	0.100	...	2.500	...	0.200	...
SC411	0.500	Center guide	2.940	0.133	0.100	...	2.750	...	0.200	...
SC412	0.500	Center guide	3.230	0.133	0.100	...	3.000	...	0.200	...
SC414	0.500	Center guide	3.700	0.133	0.100	...	3.500	...	0.200	...
SC416	0.500	Double guide	4.200	0.133	0.100	1.000	4.000	...	0.200	...
SC420	0.500	Double guide	5.210	0.133	0.100	1.000	5.000	...	0.200	...
SC424	0.500	Double guide	6.210	0.133	0.100	1.000	6.000	...	0.200	...
SC428	0.500	Double guide	7.210	0.133	0.100	1.000	7.000	...	0.200	...
SC504	0.625	Center guide	1.330	0.177	0.125	...	1.000	...	0.250	...
SC505	0.625	Center guide	1.490	0.177	0.125	...	1.250	...	0.250	...
SC506	0.625	Center guide	1.830	0.177	0.125	...	1.500	...	0.250	...
SC507	0.625	Center guide	1.990	0.177	0.125	...	1.750	...	0.250	...
SC508	0.625	Center guide	2.310	0.177	0.125	...	2.000	...	0.250	...
SC510	0.625	Center guide	2.770	0.177	0.125	...	2.500	...	0.250	...
SC512	0.625	Center guide	3.260	0.177	0.125	...	3.000	...	0.250	...
SC516	0.625	Center guide	4.230	0.177	0.125	...	4.000	...	0.250	...
SC520	0.625	Double guide	5.190	0.177	0.125	2.000	5.000	...	0.250	...
SC524	0.625	Double guide	6.190	0.177	0.125	2.000	6.000	...	0.250	...
SC528	0.625	Double guide	7.190	0.177	0.125	2.000	7.000	...	0.250	...
SC532	0.625	Double guide	8.190	0.177	0.125	2.000	8.000	...	0.250	...
SC604	0.750	Center guide	1.330	0.274	0.180	...	1.000	...	0.360	...
SC605	0.750	Center guide	1.540	0.274	0.180	...	1.250	...	0.360	...
SC606	0.750	Center guide	1.830	0.274	0.180	...	1.500	...	0.360	...
SC608	0.750	Center guide	2.310	0.274	0.180	...	2.000	...	0.360	...
SC610	0.750	Center guide	2.810	0.274	0.180	...	2.500	...	0.360	...
SC612	0.750	Center guide	3.210	0.274	0.180	...	3.000	...	0.360	...
SC614	0.750	Center guide	3.710	0.274	0.180	...	3.500	...	0.360	...
SC616	0.750	Center guide	4.210	0.274	0.180	...	4.000	...	0.360	...
SC620	0.750	Center guide	5.210	0.274	0.180	...	5.000	...	0.360	...
SC624	0.750	Center guide	6.270	0.274	0.180	...	6.000	...	0.360	...
SC628	0.750	Double guide	7.270	0.274	0.180	4.000	7.000	...	0.360	...
SC632	0.750	Double guide	8.210	0.274	0.180	4.000	8.000	...	0.360	...
SC636	0.750	Double guide	9.210	0.274	0.180	4.000	9.000	...	0.360	...
SC640	0.750	Double guide	10.210	0.274	0.180	4.000	10.000	...	0.360	...
SC648	0.750	Double guide	12.210	0.274	0.180	4.000	12.000	...	0.360	...

Table 3 Chain Widths and Sprocket Face Dimensions for $\frac{3}{8}$ in. Pitch and Larger, in. (Cont'd)

Chain Number [Note (1)]	Chain Pitch	Type	Maximum		<i>C</i> ±0.005	<i>D</i> ±0.010	<i>F</i>		<i>H</i> ±0.003	<i>R</i> ±0.003	<i>W</i> +0.010 −0.000
			<i>M</i> [Note (2)]	<i>A</i>			+0.125 −0.000				
SC808	1.000	Center guide	2.270	0.274	0.180	...	2.000	...	0.360	...	
SC810	1.000	Center guide	2.760	0.274	0.180	...	2.500	...	0.360	...	
SC812	1.000	Center guide	3.245	0.274	0.180	...	3.000	...	0.360	...	
SC816	1.000	Center guide	4.245	0.274	0.180	...	4.000	...	0.360	...	
SC820	1.000	Center guide	5.245	0.274	0.180	...	5.000	...	0.360	...	
SC824	1.000	Center guide	6.245	0.274	0.180	...	6.000	...	0.360	...	
SC828	1.000	Double guide	7.440	0.274	0.180	4.000	7.000	...	0.360	...	
SC832	1.000	Double guide	8.420	0.274	0.180	4.000	8.000	...	0.360	...	
SC836	1.000	Double guide	9.250	0.274	0.180	4.000	9.000	...	0.360	...	
SC840	1.000	Double guide	10.390	0.274	0.180	4.000	10.000	...	0.360	...	
SC848	1.000	Double guide	12.450	0.274	0.180	4.000	12.000	...	0.360	...	
SC1212	1.500	Center guide	3.385	0.274	0.180	...	3.000	...	0.360	...	
SC1216	1.500	Center guide	4.385	0.274	0.180	...	4.000	...	0.360	...	
SC1220	1.500	Center guide	5.385	0.274	0.180	...	5.000	...	0.360	...	
SC1224	1.500	Center guide	6.385	0.274	0.180	...	6.000	...	0.360	...	
SC1228	1.500	Center guide	7.385	0.274	0.180	...	7.000	...	0.360	...	
SC1232	1.500	Double guide	8.385	0.274	0.180	4.000	8.000	...	0.360	...	
SC1236	1.500	Double guide	9.385	0.274	0.180	4.000	9.000	...	0.360	...	
SC1240	1.500	Double guide	10.430	0.274	0.180	4.000	10.000	...	0.360	...	
SC1248	1.500	Double guide	12.430	0.274	0.180	4.000	12.000	...	0.360	...	
SC1256	1.500	Double guide	14.430	0.274	0.180	4.000	14.000	...	0.360	...	
SC1264	1.500	Double guide	16.430	0.274	0.180	4.000	16.000	...	0.360	...	
SC1272	1.500	Double guide	18.430	0.274	0.180	4.000	18.000	...	0.360	...	
SC1280	1.500	Double guide	20.430	0.274	0.180	4.000	20.000	...	0.360	...	
SC1288	1.500	Double guide	22.430	0.274	0.180	4.000	22.000	...	0.360	...	
SC1296	1.500	Double guide	24.430	0.274	0.180	4.000	24.000	...	0.360	...	
SC1616	2.000	Center guide	4.360	0.274	0.218	...	4.000	...	0.360	...	
SC1620	2.000	Center guide	5.360	0.274	0.218	...	5.000	...	0.360	...	
SC1624	2.000	Center guide	6.360	0.274	0.218	...	6.000	...	0.360	...	
SC1628	2.000	Center guide	7.360	0.274	0.218	...	7.000	...	0.360	...	
SC1632	2.000	Double guide	8.360	0.274	0.218	4.000	8.000	...	0.360	...	
SC1640	2.000	Double guide	10.360	0.274	0.218	4.000	10.000	...	0.360	...	
SC1648	2.000	Double guide	12.360	0.274	0.218	4.000	12.000	...	0.360	...	
SC1656	2.000	Double guide	14.610	0.274	0.218	4.000	14.000	...	0.360	...	
SC1664	2.000	Double guide	16.610	0.274	0.218	4.000	16.000	...	0.360	...	
SC1672	2.000	Double guide	18.610	0.274	0.218	4.000	18.000	...	0.360	...	
SC1680	2.000	Double guide	20.610	0.274	0.218	4.000	20.000	...	0.360	...	
SC1688	2.000	Double guide	22.610	0.274	0.218	4.000	22.000	...	0.360	...	

NOTES:

- (1) Consult manufacturers' catalogs for available widths.
- (2) *M* = maximum overall width of chain.
- (3) Side guide chains have single outside guides of same thickness as toothed links.

Table 4 Chain Widths and Sprocket Face Dimensions for $\frac{3}{8}$ in. Pitch and Larger, mm

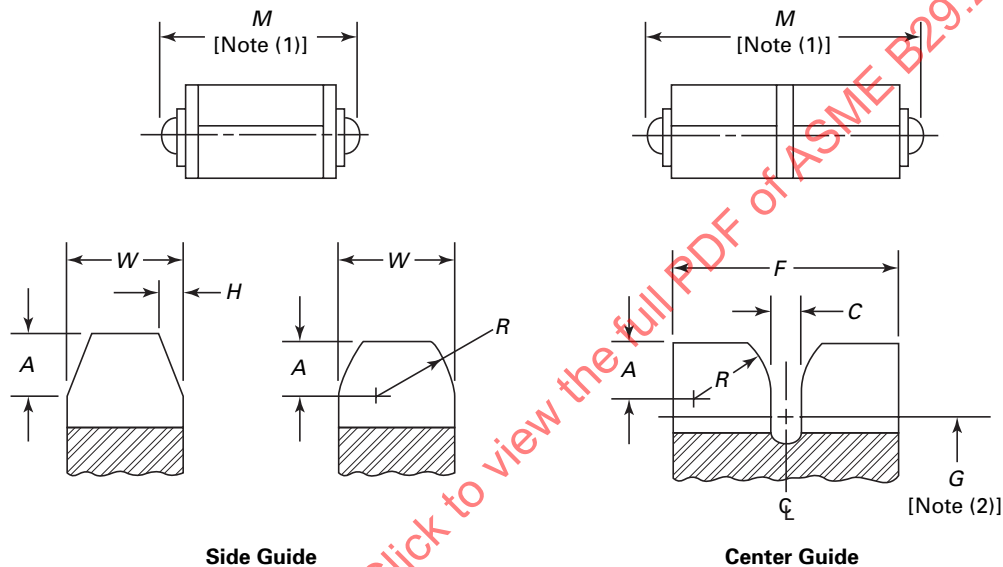
Chain Number [Note (1)]	Chain Pitch	Type	Maximum <i>M</i> [Note (2)]	<i>A</i>	<i>C</i> ± 0.13	<i>D</i> ± 0.25	<i>F</i> $+3.18$ -0.00	<i>H</i> ± 0.08	<i>R</i> ± 0.08	<i>W</i> $+0.25$ -0.00
SC302	9.52	Side guide [Note (3)]	19.81	3.38	...	...	...	1.30	5.08	10.41
SC303	9.52	Center guide	22.99	3.38	2.54	...	19.05	...	5.08	...
SC304	9.52	Center guide	29.46	3.38	2.54	...	25.40	...	5.08	...
SC305	9.52	Center guide	35.81	3.38	2.54	...	31.75	...	5.08	...
SC306	9.52	Center guide	42.29	3.38	2.54	...	38.10	...	5.08	...
SC307	9.52	Center guide	48.64	3.38	2.54	...	44.45	...	5.08	...
SC308	9.52	Center guide	54.99	3.38	2.54	...	50.80	...	5.08	...
SC309	9.52	Center guide	61.47	3.38	2.54	...	57.15	...	5.08	...
SC310	9.52	Center guide	67.69	3.38	2.54	...	63.50	...	5.08	...
SC312	9.52	Double guide	80.39	3.38	2.54	25.40	76.20	...	5.08	...
SC316	9.52	Double guide	105.79	3.38	2.54	25.40	101.60	...	5.08	...
SC320	9.52	Double guide	131.19	3.38	2.54	25.40	127.00	...	5.08	...
SC324	9.52	Double guide	156.59	3.38	2.54	25.40	152.40	...	5.08	...
SC402	12.70	Side guide [Note (3)]	19.81	3.38	...	...	...	1.30	5.08	10.41
SC403	12.70	Center guide	24.13	3.38	2.54	...	19.05	...	5.08	...
SC404	12.70	Center guide	30.23	3.38	2.54	...	25.40	...	5.08	...
SC405	12.70	Center guide	36.58	3.38	2.54	...	31.75	...	5.08	...
SC406	12.70	Center guide	42.93	3.38	2.54	...	38.10	...	5.08	...
SC407	12.70	Center guide	49.28	3.38	2.54	...	44.45	...	5.08	...
SC408	12.70	Center guide	55.63	3.38	2.54	...	50.80	...	5.08	...
SC409	12.70	Center guide	61.98	3.38	2.54	...	57.15	...	5.08	...
SC410	12.70	Center guide	68.33	3.38	2.54	...	63.50	...	5.08	...
SC411	12.70	Center guide	74.68	3.38	2.54	...	69.85	...	5.08	...
SC412	12.70	Center guide	82.04	3.38	2.54	...	76.20	...	5.08	...
SC414	12.70	Center guide	93.98	3.38	2.54	...	88.90	...	5.08	...
SC416	12.70	Double guide	106.68	3.38	2.54	25.40	101.60	...	5.08	...
SC420	12.70	Double guide	132.33	3.38	2.54	25.40	127.00	...	5.08	...
SC424	12.70	Double guide	157.73	3.38	2.54	25.40	152.40	...	5.08	...
SC428	12.70	Double guide	183.13	3.38	2.54	25.40	177.80	...	5.08	...
SC504	15.88	Center guide	33.78	4.50	3.18	...	25.40	...	6.35	...
SC505	15.88	Center guide	37.85	4.50	3.18	...	31.75	...	6.35	...
SC506	15.88	Center guide	46.48	4.50	3.18	...	38.10	...	6.35	...
SC507	15.88	Center guide	50.55	4.50	3.18	...	44.45	...	6.35	...
SC508	15.88	Center guide	58.67	4.50	3.18	...	50.80	...	6.35	...
SC510	15.88	Center guide	70.36	4.50	3.18	...	63.50	...	6.35	...
SC512	15.88	Center guide	82.80	4.50	3.18	...	76.20	...	6.35	...
SC516	15.88	Center guide	107.44	4.50	3.18	...	101.60	...	6.35	...
SC520	15.88	Double guide	131.83	4.50	3.18	50.80	127.00	...	6.35	...
SC524	15.88	Double guide	157.23	4.50	3.18	50.80	152.40	...	6.35	...
SC528	15.88	Double guide	182.63	4.50	3.18	50.80	177.80	...	6.35	...
SC532	15.88	Double guide	208.03	4.50	3.18	50.80	203.20	...	6.35	...
SC604	19.05	Center guide	33.78	6.96	4.57	...	25.40	...	9.14	...
SC605	19.05	Center guide	39.12	6.96	4.57	...	31.75	...	9.14	...
SC606	19.05	Center guide	46.48	6.96	4.57	...	38.10	...	9.14	...
SC608	19.05	Center guide	58.67	6.96	4.57	...	50.80	...	9.14	...
SC610	19.05	Center guide	71.37	6.96	4.57	...	63.50	...	9.14	...
SC612	19.05	Center guide	81.53	6.96	4.57	...	76.20	...	9.14	...
SC614	19.05	Center guide	94.23	6.96	4.57	...	88.90	...	9.14	...
SC616	19.05	Center guide	106.93	6.96	4.57	...	101.60	...	9.14	...
SC620	19.05	Center guide	132.33	6.96	4.57	...	127.00	...	9.14	...
SC624	19.05	Center guide	159.26	6.96	4.57	...	152.40	...	9.14	...
SC628	19.05	Double guide	184.66	6.96	4.57	101.60	177.80	...	9.14	...
SC632	19.05	Double guide	208.53	6.96	4.57	101.60	203.20	...	9.14	...
SC636	19.05	Double guide	233.93	6.96	4.57	101.60	228.60	...	9.14	...
SC640	19.05	Double guide	259.33	6.96	4.57	101.60	254.00	...	9.14	...
SC648	19.05	Double guide	310.13	6.96	4.57	101.60	304.80	...	9.14	...

Table 4 Chain Widths and Sprocket Face Dimensions for $\frac{3}{8}$ in. Pitch and Larger, mm (Cont'd)

Chain Number [Note (1)]	Chain Pitch	Type	Maximum <i>M</i> [Note (2)]	<i>A</i>	<i>C</i> ± 0.13	<i>D</i> ± 0.25	<i>F</i> $+3.18$ -0.00	<i>H</i> ± 0.08	<i>R</i> ± 0.08	<i>W</i> $+0.25$ -0.00
SC808	25.40	Center guide	57.66	6.96	4.57	...	50.80	...	9.14	...
SC810	25.40	Center guide	70.10	6.96	4.57	...	63.50	...	9.14	...
SC812	25.40	Center guide	82.42	6.96	4.57	...	76.20	...	9.14	...
SC816	25.40	Center guide	107.82	6.96	4.57	...	101.60	...	9.14	...
SC820	25.40	Center guide	133.22	6.96	4.57	...	127.00	...	9.14	...
SC824	25.40	Center guide	158.62	6.96	4.57	...	152.40	...	9.14	...
SC828	25.40	Double guide	188.98	6.96	4.57	101.60	177.80	...	9.14	...
SC832	25.40	Double guide	213.87	6.96	4.57	101.60	203.20	...	9.14	...
SC836	25.40	Double guide	234.95	6.96	4.57	101.60	228.60	...	9.14	...
SC840	25.40	Double guide	263.91	6.96	4.57	101.60	254.00	...	9.14	...
SC848	25.40	Double guide	316.23	6.96	4.57	101.60	304.80	...	9.14	...
SC1212	38.10	Center guide	85.98	6.96	4.57	...	76.20	...	9.14	...
SC1216	38.10	Center guide	111.38	6.96	4.57	...	101.60	...	9.14	...
SC1220	38.10	Center guide	136.78	6.96	4.57	...	127.00	...	9.14	...
SC1224	38.10	Center guide	162.18	6.96	4.57	...	152.40	...	9.14	...
SC1228	38.10	Center guide	187.58	6.96	4.57	...	177.80	...	9.14	...
SC1232	38.10	Double guide	212.98	6.96	4.57	101.60	203.20	...	9.14	...
SC1236	38.10	Double guide	238.38	6.96	4.57	101.60	228.60	...	9.14	...
SC1240	38.10	Double guide	264.92	6.96	4.57	101.60	254.00	...	9.14	...
SC1248	38.10	Double guide	315.72	6.96	4.57	101.60	304.80	...	9.14	...
SC1256	38.10	Double guide	366.52	6.96	4.57	101.60	355.60	...	9.14	...
SC1264	38.10	Double guide	417.32	6.96	4.57	101.60	406.40	...	9.14	...
SC1272	38.10	Double guide	468.12	6.96	4.57	101.60	457.20	...	9.14	...
SC1280	38.10	Double guide	518.92	6.96	4.57	101.60	508.00	...	9.14	...
SC1288	38.10	Double guide	569.72	6.96	4.57	101.60	558.80	...	9.14	...
SC1296	38.10	Double guide	620.52	6.96	4.57	101.60	609.60	...	9.14	...
SC1616	50.80	Center guide	110.74	6.96	5.54	...	101.60	...	9.14	...
SC1620	50.80	Center guide	136.14	6.96	5.54	...	127.00	...	9.14	...
SC1624	50.80	Center guide	161.54	6.96	5.54	...	152.40	...	9.14	...
SC1628	50.80	Center guide	186.94	6.96	5.54	...	177.80	...	9.14	...
SC1632	50.80	Double guide	212.34	6.96	5.54	101.60	203.20	...	9.14	...
SC1640	50.80	Double guide	263.14	6.96	5.54	101.60	254.00	...	9.14	...
SC1648	50.80	Double guide	313.94	6.96	5.54	101.60	304.80	...	9.14	...
SC1656	50.80	Double guide	371.09	6.96	5.54	101.60	355.60	...	9.14	...
SC1664	50.80	Double guide	421.89	6.96	5.54	101.60	406.40	...	9.14	...
SC1672	50.80	Double guide	472.69	6.96	5.54	101.60	457.20	...	9.14	...
SC1680	50.80	Double guide	523.49	6.96	5.54	101.60	508.00	...	9.14	...
SC1688	50.80	Double guide	574.29	6.96	5.54	101.60	558.80	...	9.14	...

NOTES:

- (1) Consult manufacturers' catalogs for available widths.
- (2) *M* = maximum overall width of chain.
- (3) Side guide chains have single outside guides of same thickness as toothed links.

Fig. 5 Chain Widths and Sprocket Profiles for $\frac{3}{16}$ in. Pitch**GENERAL NOTES:**

- (a) Sprocket face widths are established:

$$W = 0.0315 \text{ in. } (N-2) - 0.020 \text{ in.}$$

$$W = 0.8001 \text{ mm } (N-2) - 0.51 \text{ mm}$$

where

 N = the total number of links wide

- (b) Face width tolerance is
- ± 0.003
- in. (
- ± 0.08
- mm).

NOTES:

- (1) M = maximum overall width of chain.
- (2) Grooving tool may be either square or round end, but groove must be full width down to diameter G . For values of G , see Tables 13 and 14.

Table 5 Chain Widths and Sprocket Face Dimensions for $\frac{3}{16}$ in. Pitch, in.

Chain Number	Chain Pitch	Type	Maximum M [Note (1)]	A	Maximum C	Minimum F	H	R	W ± 0.003
SC0305	0.1875	Side guide	0.216	0.06	...	...	0.025	0.09	0.075
SC0307	0.1875	Side guide	0.278	0.06	...	...	0.025	0.09	0.138
SC0309	0.1875	Side guide	0.341	0.06	...	...	0.025	0.09	0.201
SC0311	0.1875	Side guide/ center guide	0.403	0.06	0.050	0.334	0.025	0.09	0.264
[Note (2)]									
SC0313	0.1875	Side guide/ center guide	0.466	0.06	0.050	0.396	0.025	0.09	0.327
[Note (2)]									
SC0315	0.1875	Side guide/ center guide	0.528	0.06	0.050	0.459	0.025	0.09	0.390
[Note (2)]									
SC0317	0.1875	Center guide	0.591	0.06	0.050	0.521	...	0.09	...
SC0319	0.1875	Center guide	0.653	0.06	0.050	0.584	...	0.09	...
SC0321	0.1875	Center guide	0.716	0.06	0.050	0.646	...	0.09	...
SC0323	0.1875	Center guide	0.778	0.06	0.050	0.709	...	0.09	...
SC0325	0.1875	Center guide	0.850	0.06	0.050	0.771	...	0.09	...
SC0327	0.1875	Center guide	0.903	0.06	0.050	0.834	...	0.09	...
SC0329	0.1875	Center guide	0.966	0.06	0.050	0.896	...	0.09	...
SC0331	0.1875	Center guide	1.028	0.06	0.050	0.959	...	0.09	...

NOTES:

(1) M = maximum overall width of chain.

(2) Specify side guide or center guide type.

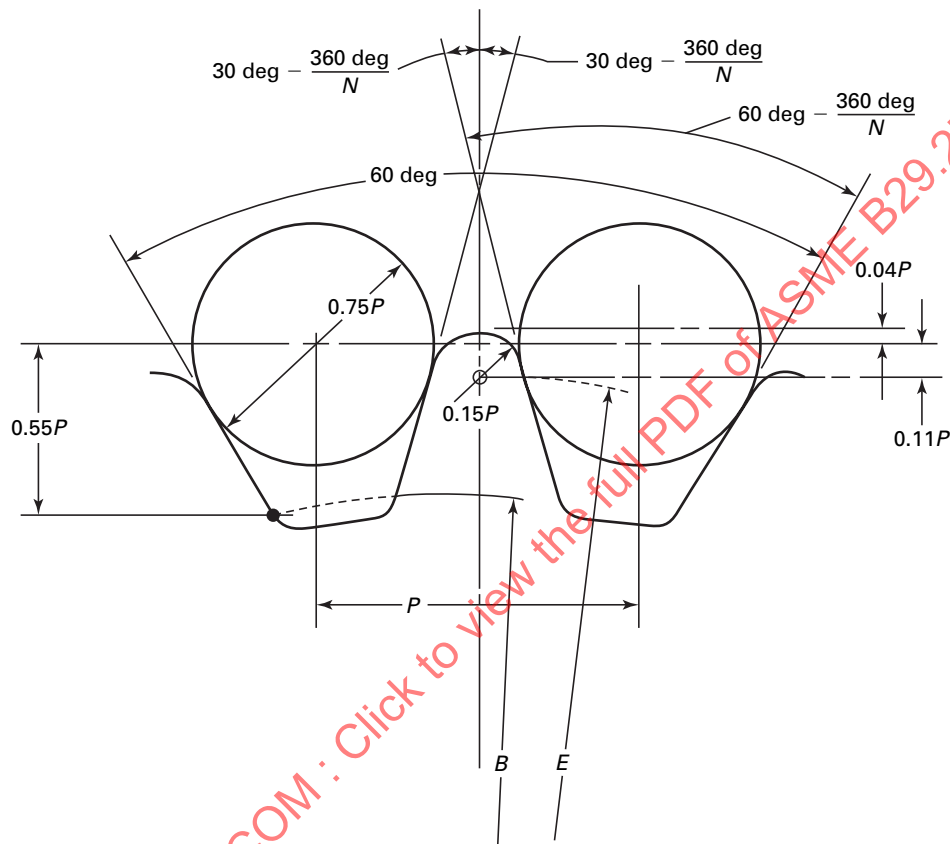
Table 6 Chain Widths and Sprocket Face Dimensions for $\frac{3}{16}$ in. Pitch, mm

Chain Number	Chain Pitch	Type	Maximum M [Note (1)]	A	Maximum C	Minimum F	H	R	W ± 0.08
SC0305	4.76	Side guide	5.49	1.5	...	...	0.64	2.3	1.91
SC0307	4.76	Side guide	7.06	1.5	...	...	0.64	2.3	3.51
SC0309	4.76	Side guide	8.66	1.5	...	...	0.64	2.3	5.11
SC0311	4.76	Side guide/ center guide	10.24	1.5	1.27	8.48	0.64	2.3	6.71
[Note (2)]									
SC0313	4.76	Side guide/ center guide	11.84	1.5	1.27	10.06	0.64	2.3	8.31
[Note (2)]									
SC0315	4.76	Side guide/ center guide	13.41	1.5	1.27	11.66	0.64	2.3	9.91
[Note (2)]									
SC0317	4.76	Center guide	15.01	1.5	1.27	13.23	...	2.3	...
SC0319	4.76	Center guide	16.59	1.5	1.27	14.83	...	2.3	...
SC0321	4.76	Center guide	18.19	1.5	1.27	16.41	...	2.3	...
SC0323	4.76	Center guide	19.76	1.5	1.27	18.01	...	2.3	...
SC0325	4.76	Center guide	21.59	1.5	1.27	19.58	...	2.3	...
SC0327	4.76	Center guide	22.94	1.5	1.27	21.18	...	2.3	...
SC0329	4.76	Center guide	24.54	1.5	1.27	22.76	...	2.3	...
SC0331	4.76	Center guide	26.11	1.5	1.27	24.36	...	2.3	...

NOTES:

(1) M = maximum overall width of chain.

(2) Specify side guide or center guide type.

Fig. 6 Sprocket Tooth Form for $\frac{3}{8}$ in. Pitch and Larger

$$B = \text{diameter to base of working face}$$

$$= P \sqrt{1.515213 + \left(\cot \frac{180 \text{ deg}}{N} - 1.1\right)^2}$$

$$E = \text{diameter to center of topping curve}$$

$$= P \left(\cot \frac{180 \text{ deg}}{N} - 0.22\right)$$

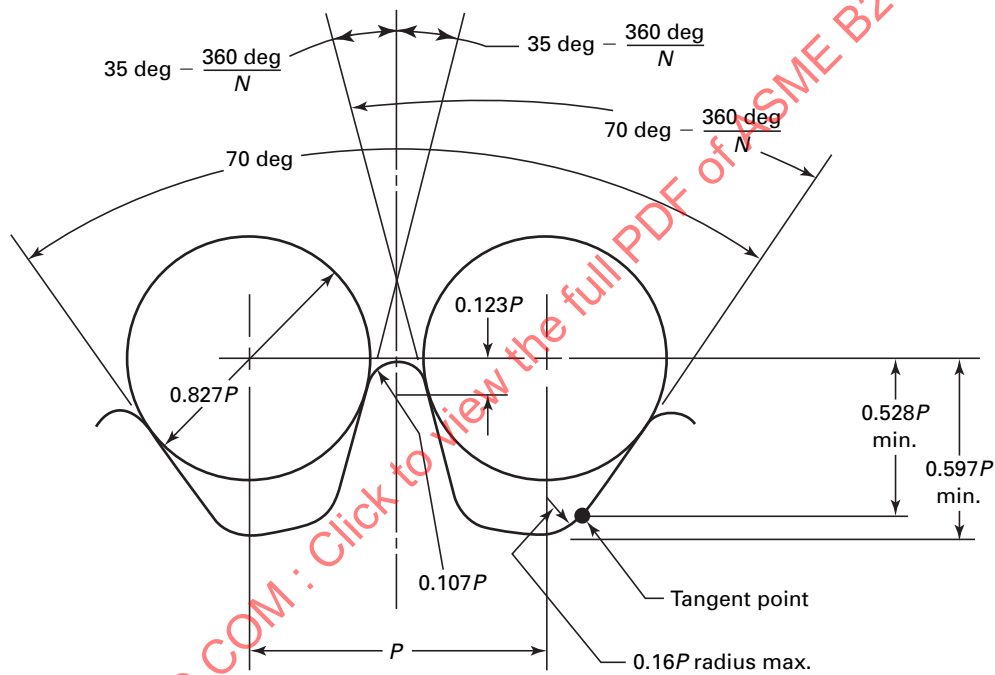
N = number of teeth

P = chain pitch

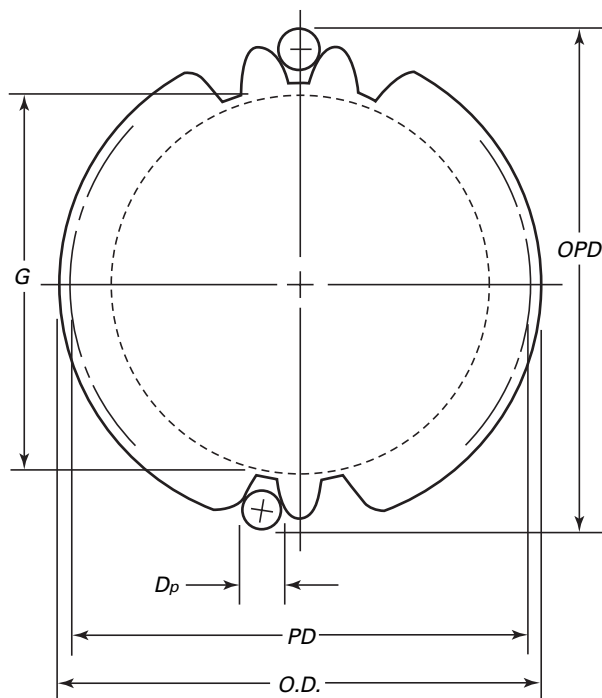
GENERAL NOTES:

- (a) Teeth may be either rounded (topped) or square (turned).
- (b) Shape of root line below working face may vary with type of cutter.

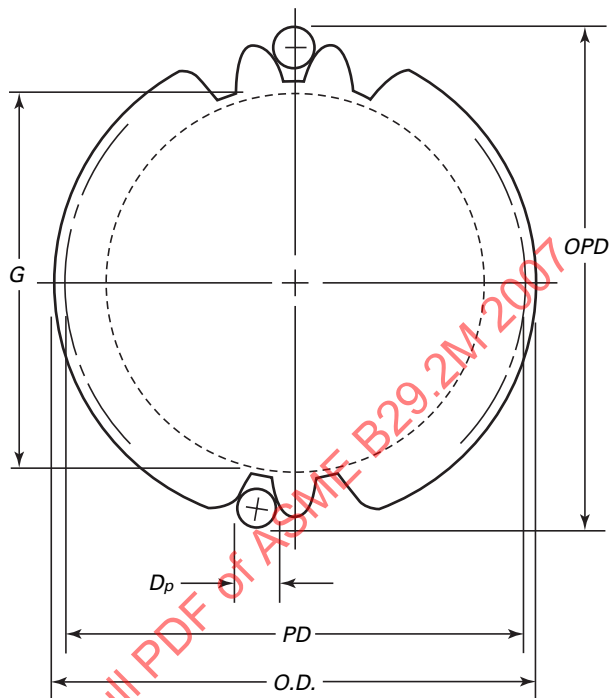
Fig. 7 Sprocket Tooth Form for $\frac{3}{16}$ in. Pitch



N = number of teeth
 P = chain pitch

Fig. 8 Sprocket Diameters for $\frac{3}{8}$ in. Pitch and Larger

- D_p = gage pin diameter
 E = diameter to center of topping curve
 G = maximum guide groove diameter
 N = number of teeth
 $O.D.$ = outside diameter
 OPD = over pin diameter
 P = chain pitch
 PD = pitch diameter

Fig. 9 Sprocket Diameters for $\frac{3}{16}$ in. Pitch

- D_p = gage pin diameter
 E = diameter to center of topping curve
 G = maximum guide groove diameter
 N = number of teeth
 $O.D.$ = outside diameter
 OPD = over pin diameter
 P = chain pitch
 PD = pitch diameter

Table 7 Over Pin Diameter Tolerances for $\frac{3}{8}$ in. Pitch and Larger, in.

Pitch	Number of Teeth									
	Up to 15	16–24	25–35	36–48	49–63	64–80	81–99	100–120	121–143	144 Up
0.375	0.005	0.005	0.005	0.006	0.006	0.007	0.007	0.007	0.008	0.008
0.500	0.005	0.006	0.006	0.007	0.007	0.008	0.008	0.009	0.009	0.010
0.625	0.006	0.006	0.007	0.008	0.009	0.010	0.010	0.010	0.011	0.012
0.750	0.006	0.007	0.008	0.009	0.010	0.011	0.011	0.012	0.013	0.014
1.000	0.007	0.008	0.009	0.010	0.011	0.012	0.013	0.014	0.015	0.016
1.250	0.008	0.009	0.010	0.011	0.013	0.014	0.015	0.017	0.018	0.019
1.500	0.008	0.010	0.011	0.013	0.014	0.016	0.017	0.019	0.020	0.022
2.000	0.010	0.012	0.014	0.016	0.018	0.020	0.022	0.024	0.026	0.028

GENERAL NOTES:

- (a) Tolerance for outside diameters of sprockets with square top teeth = $+0.000$; $-0.050 \times \text{pitch}$, in.
 (b) Tolerance for outside diameters of sprockets with rounded top teeth is the same as over pin diameter tolerance.
 (c) Tolerance for guide groove diameter $G = +0.000$; -0.030 in. (0.76 mm).
 (d) Tolerance for maximum eccentricity (total indicator reading) pitch diameter with respect to bore = $0.001 \times PD$, in., but not less than 0.006 nor more than 0.032.
 (e) All tolerances are negative. Tolerance = $(0.004 + 0.001P\sqrt{N})$ in., where P = chain pitch, N = number of teeth.

Table 8 Over Pin Diameter Tolerances for $\frac{3}{8}$ in. Pitch and Larger, mm

Pitch	Number of Teeth									
	Up to 15	16–24	25–35	36–48	49–63	64–80	81–99	100–120	121–143	144 Up
9.52	0.13	0.13	0.13	0.15	0.15	0.18	0.18	0.18	0.20	0.20
12.70	0.13	0.15	0.15	0.18	0.18	0.20	0.20	0.23	0.23	0.25
15.88	0.15	0.15	0.18	0.20	0.23	0.25	0.25	0.25	0.28	0.30
19.05	0.15	0.18	0.20	0.23	0.25	0.28	0.28	0.30	0.33	0.36
25.40	0.18	0.20	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.40
31.75	0.20	0.23	0.25	0.28	0.33	0.36	0.38	0.43	0.46	0.48
38.10	0.20	0.25	0.28	0.33	0.36	0.40	0.43	0.48	0.51	0.56
50.80	0.25	0.30	0.36	0.40	0.46	0.51	0.56	0.61	0.66	0.71

GENERAL NOTES:

- (a) Tolerance for outside diameters of sprockets with square top teeth = $+0.000$; $-0.050 \times \text{pitch}$, in.
 (b) Tolerance for outside diameters of sprockets with rounded top teeth is the same as over pin diameter tolerance.
 (c) Tolerance for guide groove diameter $G = +0.000$; -0.030 in. (0.76 mm).
 (d) Tolerance for maximum eccentricity (total indicator reading) pitch diameter with respect to bore = $0.001 \times PD$, in., but not less than 0.006 nor more than 0.032.
 (e) All tolerances are negative. Tolerance = $(0.004 + 0.001P\sqrt{N})$ in., where P = chain pitch, N = number of teeth.

Table 9 Over Pin Diameter Tolerances for $\frac{3}{16}$ in. Pitch, in.

Pitch	Number of Teeth									
	Up to 15	16–24	25–35	36–48	49–63	64–80	81–99	100–120	121–143	144 Up
0.1875	0.004	0.004	0.004	0.004	0.004	0.005	0.005	0.005	0.005	0.005

GENERAL NOTES:

- (a) Tolerance for guide groove diameter $G = +0.000$ in.; -0.015 in. (0.38 mm).
 (b) Tolerance for maximum eccentricity (total indicator reading) pitch diameter with respect to bore is 0.004 in., up to and including 4 in. diameter, and 0.008 in., over 4 in. diameter.
 (c) All tolerances are negative.

Table 10 Over Pin Diameter Tolerances for $\frac{3}{16}$ in. Pitch, mm

Pitch	Number of Teeth									
	Up to 15	16–24	25–35	36–48	49–63	64–80	81–99	100–120	121–143	144 Up
4.76	0.10	0.10	0.10	0.10	0.10	0.13	0.13	0.13	0.13	0.13

GENERAL NOTES:

- (a) Tolerance for guide groove diameter $G = +0.000$ in.; -0.015 in. (0.38 mm).
 (b) Tolerance for maximum eccentricity (total indicator reading) pitch diameter with respect to bore is 0.004 in., up to and including 4 in. diameter, and 0.008 in., over 4 in. diameter.
 (c) All tolerances are negative.

Table 11 Maximum Hub Diameter for Sprocket of Unity Pitch

Number of Teeth	Hob Cut	Straddle Cut
17	4.019	4.099
18	4.341	4.421
19	4.662	4.742
20	4.983	5.063
21	5.304	5.384
22	5.626	5.706
23	5.946	6.026
24	6.265	6.345
25	6.586	6.666
26	6.905	6.985
27	7.226	7.306
28	7.546	7.626
29	7.865	7.945
30	8.185	8.265
31	8.503	8.583

GENERAL NOTES:

- (a) Equations for calculating maximum hub diameters (MHD):

$$MHD \text{ (hobbed teeth)} = P \left(\cot \frac{180 \text{ deg}}{N} - 1.33 \right)$$

$$MHD \text{ (straddle cut teeth)} = P \left(\cot \frac{180 \text{ deg}}{N} - 1.25 \right)$$

MHD for other methods of cutting teeth may differ from the above.

- (b) Good practice indicates that teeth of sprockets up to and including 31 teeth should have a minimum Rockwell hardness of C50.

Table 12 Sprocket Dimensions for Unity Pitch, in.

Number of Teeth	Pitch Diameter	Outside Diameter		Over Pin Diam. [Note (1)]	G Max. Guide Groove Diam. [Note (1)]	Gage Pin Diameter
		Rounded Teeth	Square Teeth [Note (1)]			
17	5.442	5.429	5.298	5.669	4.189	0.6250
18	5.759	5.751	5.623	6.018	4.511	0.6250
19	6.076	6.072	5.947	6.324	4.832	0.6250
20	6.393	6.393	6.271	6.669	5.153	0.6250
21	6.710	6.714	6.595	6.974	5.474	0.6250
22	7.027	7.036	6.919	7.315	5.796	0.6250
23	7.344	7.356	7.243	7.621	6.116	0.6250
24	7.661	7.675	7.568	7.960	6.435	0.6250
25	7.979	7.996	7.890	8.266	6.756	0.6250
26	8.296	8.315	8.213	8.602	7.075	0.6250
27	8.614	8.636	8.536	8.909	7.396	0.6250
28	8.932	8.956	8.859	9.244	7.716	0.6250
29	9.249	9.275	9.181	9.551	8.035	0.6250
30	9.567	9.595	9.504	9.884	8.355	0.6250
31	9.885	9.913	9.828	10.192	8.673	0.6250
32	10.202	10.233	10.150	10.524	8.993	0.6250
33	10.520	10.553	10.471	10.833	9.313	0.6250
34	10.838	10.872	10.793	11.164	9.632	0.6250
35	11.156	11.191	11.115	11.472	9.951	0.6250
36	11.474	11.510	11.437	11.803	10.270	0.6250
37	11.792	11.829	11.757	12.112	10.589	0.6250
38	12.110	12.149	12.077	12.442	10.909	0.6250
39	12.428	12.468	12.397	12.751	11.228	0.6250
40	12.746	12.787	12.717	13.080	11.547	0.6250
41	13.064	13.106	13.037	13.390	11.866	0.6250
42	13.382	13.425	13.357	13.718	12.185	0.6250
43	13.700	13.743	13.677	14.028	12.503	0.6250
44	14.018	14.062	13.997	14.356	12.822	0.6250
45	14.336	14.381	14.317	14.667	13.141	0.6250
46	14.654	14.700	14.637	14.994	13.460	0.6250
47	14.972	15.018	14.957	15.305	13.778	0.6250
48	15.290	15.337	15.277	15.632	14.097	0.6250
49	15.608	15.656	15.597	15.943	14.416	0.6250
50	15.926	15.975	15.917	16.270	14.735	0.6250
51	16.244	16.293	16.236	16.581	15.053	0.6250
52	16.562	16.612	16.556	16.907	15.372	0.6250
53	16.880	16.930	16.876	17.218	15.690	0.6250
54	17.198	17.249	17.196	17.544	16.009	0.6250
55	17.517	17.568	17.515	17.857	16.328	0.6250
56	17.835	17.887	17.834	18.183	16.647	0.6250
57	18.153	18.205	18.154	18.494	16.965	0.6250
58	18.471	18.524	18.473	18.820	17.284	0.6250
59	18.789	18.842	18.793	19.131	17.602	0.6250
60	19.107	19.161	19.112	19.457	17.921	0.6250
61	19.426	19.480	19.431	19.769	18.240	0.6250
62	19.744	19.799	19.750	20.095	18.559	0.6250
63	20.062	20.117	20.070	20.407	18.877	0.6250
64	20.380	20.435	20.388	20.731	19.195	0.6250

Table 12 Sprocket Dimensions for Unity Pitch, in. (Cont'd)

Number of Teeth	Pitch Diameter	Outside Diameter		Over Pin Diam. [Note (1)]	G Max. Guide Groove Diam. [Note (1)]	Gage Pin Diameter
		Rounded Teeth	Square Teeth [Note (1)]			
65	20.698	20.754	20.708	21.044	19.514	0.6250
66	21.016	21.072	21.027	21.368	19.832	0.6250
67	21.335	21.391	21.346	21.682	20.151	0.6250
68	21.653	21.710	21.665	22.006	20.470	0.6250
69	21.971	22.028	21.984	22.319	20.788	0.6250
70	22.289	22.347	22.303	22.643	21.107	0.6250
71	22.607	22.665	22.622	22.955	21.425	0.6250
72	22.926	22.984	22.941	23.280	21.744	0.6250
73	23.244	23.302	23.259	23.593	22.062	0.6250
74	23.562	23.621	23.578	23.917	22.381	0.6250
75	23.880	23.939	23.897	24.230	22.699	0.6250
76	24.198	24.257	24.216	24.553	23.017	0.6250
77	24.517	24.577	24.535	24.868	23.337	0.6250
78	24.835	24.895	24.853	25.191	23.655	0.6250
79	25.153	25.213	25.172	25.504	23.973	0.6250
80	25.471	25.531	25.491	25.828	24.291	0.6250
81	25.790	25.851	25.809	26.141	24.611	0.6250
82	26.108	26.169	26.128	26.465	24.929	0.6250
83	26.426	26.487	26.447	26.778	25.247	0.6250
84	26.744	26.805	26.766	27.101	25.565	0.6250
85	27.063	27.125	27.084	27.415	25.885	0.6250
86	27.381	27.443	27.403	27.739	26.203	0.6250
87	27.699	27.761	27.722	28.052	26.521	0.6250
88	28.017	28.079	28.040	28.375	26.839	0.6250
89	28.335	28.397	28.359	28.689	27.157	0.6250
90	28.654	28.716	28.678	29.013	27.476	0.6250
91	28.972	29.035	28.997	29.327	27.795	0.6250
92	29.290	29.353	29.315	29.649	28.113	0.6250
93	29.608	29.671	29.634	29.963	28.431	0.6250
94	29.926	29.989	29.953	30.285	28.749	0.6250
95	30.245	30.308	30.271	30.601	29.068	0.6250
96	30.563	30.627	30.590	30.923	29.387	0.6250
97	30.881	30.945	30.909	31.237	29.705	0.6250
98	31.199	31.263	31.228	31.559	30.023	0.6250
99	31.518	31.582	31.546	31.874	30.342	0.6250
100	31.836	31.900	31.865	32.196	30.660	0.6250
101	32.154	32.218	32.183	32.511	30.978	0.6250
102	32.473	32.537	32.502	32.834	31.297	0.6250
103	32.791	32.856	32.820	33.148	31.616	0.6250
104	33.109	33.174	33.139	33.470	31.934	0.6250
105	33.427	33.492	33.457	33.784	32.252	0.6250
106	33.746	33.811	33.776	34.107	32.571	0.6250
107	34.064	34.129	34.094	34.422	32.889	0.6250
108	34.382	34.447	34.413	34.744	33.207	0.6250
109	34.701	34.767	34.731	35.059	33.527	0.6250
110	35.019	35.084	35.050	35.381	33.844	0.6250
111	35.337	35.403	35.368	35.695	34.163	0.6250
112	35.655	35.721	35.687	36.017	34.481	0.6250
113	35.974	36.040	36.005	36.333	34.800	0.6250
114	36.292	36.358	36.324	36.654	35.118	0.6250

Table 12 Sprocket Dimensions for Unity Pitch, in. (Cont'd)

Number of Teeth	Pitch Diameter	Outside Diameter		Over Pin Diam. [Note (1)]	G Max. Guide Groove Diam. [Note (1)]	Gage Pin Diameter
		Rounded Teeth	Square Teeth [Note (1)]			
115	36.610	36.676	36.642	36.969	35.436	0.6250
116	36.929	36.995	36.961	37.292	35.755	0.6250
117	37.247	37.313	37.279	37.606	36.073	0.6250
118	37.565	37.632	37.598	37.928	36.392	0.6250
119	37.883	37.950	37.916	38.243	36.710	0.6250
120	38.201	38.268	38.235	38.564	37.028	0.6250
121	38.519	38.586	38.553	38.879	37.346	0.6250
122	38.837	38.904	38.872	39.200	37.664	0.6250
123	39.156	39.223	39.190	39.516	37.983	0.6250
124	39.475	39.542	39.508	39.839	38.302	0.6250
125	39.794	39.861	39.827	40.154	38.621	0.6250
126	40.112	40.180	40.145	40.476	38.940	0.6250
127	40.430	40.497	40.464	40.790	39.257	0.6250
128	40.748	40.816	40.782	41.112	39.576	0.6250
129	41.066	41.134	41.100	41.427	39.894	0.6250
130	41.384	41.452	41.419	41.748	40.212	0.6250
131	41.702	41.770	41.738	42.063	40.530	0.6250
132	42.020	42.088	42.056	42.384	40.848	0.6250
133	42.338	42.406	42.374	42.699	41.166	0.6250
134	42.656	42.724	42.693	43.020	41.484	0.6250
135	42.975	43.043	43.011	43.336	41.803	0.6250
136	43.293	43.362	43.329	43.657	42.122	0.6250
137	43.611	43.679	43.647	43.972	42.439	0.6250
138	43.930	43.998	43.966	44.295	42.758	0.6250
139	44.249	44.317	44.284	44.611	43.077	0.6250
140	44.567	44.636	44.603	44.932	43.396	0.6250
141	44.885	44.954	44.922	45.247	43.714	0.6250
142	45.203	45.271	45.240	45.568	44.031	0.6250
143	45.521	45.590	45.558	45.883	44.350	0.6250
144	45.840	45.909	45.877	46.205	44.669	0.6250
145	46.158	46.227	46.195	46.520	44.987	0.6250
146	46.477	46.546	46.514	46.842	45.306	0.6250
147	46.796	46.865	46.832	47.159	45.625	0.6250
148	47.114	47.183	47.151	47.479	45.943	0.6250
149	47.432	47.501	47.469	47.795	46.261	0.6250
150	47.750	47.819	47.787	48.116	46.579	0.6250

GENERAL NOTE: For tolerances, see Tables 7 and 8.

NOTE:

(1) Diameters given are maximum; all tolerances must be negative.

Table 13 Sprocket Dimensions for $\frac{3}{16}$ in. Pitch, in.

Number of Teeth	Pitch Diam.	Outside Diam. [Notes (1), (2)]	Over Pin Diam. [Notes (1), (3)]	Max. Groove Diameter [Note (1)]	Number of Teeth	Pitch Diam.	Outside Diam. [Notes (1), (2)]	Over Pin Diam. [Notes (1), (3)]	Max. Groove Diameter [Note (1)]
11	0.665	0.632	0.691	0.413	61	3.642	3.630	3.709	3.413
12	0.724	0.694	0.761	0.429	62	3.702	3.690	3.771	3.472
13	0.783	0.755	0.821	0.536	63	3.762	3.750	3.830	3.532
14	0.843	0.815	0.888	0.596	64	3.821	3.809	3.890	3.592
15	0.902	0.876	0.946	0.657	65	3.881	3.869	3.949	3.651
16	0.961	0.937	1.012	0.718	66	3.941	3.930	4.010	3.711
17	1.020	0.996	1.069	0.778	67	4.000	3.989	4.068	3.771
18	1.080	1.057	1.134	0.838	68	4.060	4.049	4.129	3.831
19	1.139	1.116	1.191	0.899	69	4.120	4.109	4.188	3.890
20	1.199	1.177	1.256	0.959	70	4.179	4.168	4.248	3.950
21	1.258	1.237	1.312	1.019	71	4.239	4.228	4.307	4.010
22	1.318	1.298	1.377	1.079	72	4.299	4.288	4.368	4.070
23	1.377	1.357	1.433	1.139	73	4.358	4.347	4.426	4.129
24	1.436	1.417	1.497	1.199	74	4.418	4.407	4.487	4.189
25	1.496	1.477	1.554	1.259	75	4.478	4.467	4.546	4.249
26	1.556	1.538	1.617	1.319	76	4.537	4.526	4.606	4.308
27	1.615	1.597	1.674	1.379	77	4.597	4.586	4.665	4.368
28	1.675	1.657	1.737	1.439	78	4.657	4.646	4.726	4.428
29	1.734	1.717	1.795	1.499	79	4.716	4.705	4.785	4.487
30	1.794	1.777	1.857	1.559	80	4.776	4.765	4.846	4.547
31	1.853	1.836	1.914	1.619	81	4.836	4.825	4.905	4.607
32	1.913	1.897	1.977	1.679	82	4.895	4.884	4.965	4.667
33	1.973	1.957	2.035	1.739	83	4.955	4.944	5.024	4.726
34	2.032	2.016	2.096	1.799	84	5.015	5.004	5.085	4.786
35	2.092	2.077	2.155	1.858	85	5.074	5.063	5.143	4.846
36	2.151	2.136	2.216	1.918	86	5.134	5.124	5.204	4.906
37	2.211	2.196	2.274	1.978	87	5.194	5.184	5.263	4.965
38	2.271	2.256	2.336	2.038	88	5.253	5.243	5.323	5.045
39	2.330	2.315	2.394	2.098	89	5.313	5.303	5.382	5.084
40	2.390	2.376	2.456	2.158	90	5.373	5.363	5.443	5.144
41	2.449	2.435	2.513	2.217	91	5.432	5.422	5.501	5.204
42	2.509	2.495	2.575	2.277	92	5.492	5.482	5.562	5.264
43	2.569	2.555	2.633	2.337	93	5.552	5.542	5.621	5.323
44	2.628	2.614	2.695	2.397	94	5.611	5.601	5.681	5.383
45	2.688	2.674	2.753	2.456	95	5.671	5.661	5.740	5.443
46	2.748	2.735	2.815	2.516	96	5.731	5.721	5.801	5.503
47	2.807	2.794	2.872	2.576	97	5.790	5.780	5.859	5.562
48	2.867	2.854	2.934	2.636	98	5.850	5.840	5.920	5.622
49	2.926	2.913	2.992	2.696	99	5.910	5.900	5.979	5.682
50	2.986	2.973	3.053	2.755	100	5.969	5.959	6.039	5.741
51	3.046	3.033	3.111	2.815	101	6.029	6.019	6.098	5.801
52	3.105	3.092	3.173	2.875	102	6.089	6.079	6.159	5.861
53	3.165	3.152	3.231	2.934	103	6.148	6.138	6.217	5.921
54	3.225	3.213	3.293	2.993	104	6.207	6.197	6.277	5.980
55	3.284	3.272	3.351	3.054	105	6.268	6.258	6.337	6.040
56	3.344	3.332	3.412	3.114	106	6.328	6.318	6.398	6.100
57	3.404	3.392	3.471	3.173	107	6.388	6.378	6.457	6.159
58	3.463	3.451	3.531	3.233	108	6.447	6.437	6.518	6.219
59	3.523	3.511	3.590	3.293	109	6.508	6.498	6.576	6.279
60	3.583	3.571	3.651	3.353	110	6.566	6.556	6.637	6.338

Table 13 Sprocket Dimensions for $\frac{3}{16}$ in. Pitch, in. (Cont'd)

Number of Teeth	Pitch Diam.	Outside Diam. [Notes (1), (2)]	Over Pin Diam. [Notes (1), (3)]	Max. Groove Diameter [Note (1)]	Number of Teeth	Pitch Diam.	Outside Diam. [Notes (1), (2)]	Over Pin Diam. [Notes (1), (3)]	Max. Groove Diameter [Note (1)]
111	6.625	6.615	6.695	6.398	116	6.924	6.914	6.995	6.697
112	6.685	6.675	6.755	6.458	117	6.984	6.974	7.054	6.756
113	6.745	6.735	6.815	6.518	118	7.044	7.034	7.114	6.816
114	6.805	6.795	6.876	6.577	119	7.103	7.094	7.174	6.876
115	6.866	6.856	6.935	6.637	120	7.162	7.153	7.233	6.935

NOTES:

- (1) Diameters given are maximum; all tolerances must be negative.
 (2) For rounded teeth.
 (3) Gage pin diameter = 0.1250 in.

Table 14 Sprocket Dimensions for $\frac{3}{16}$ in. Pitch, mm

Number of Teeth	Pitch Diam.	Outside Diam. [Notes (1), (2)]	Over Pin Diam. [Notes (1), (3)]	Max. Groove Diameter [Note (1)]	Number of Teeth	Pitch Diam.	Outside Diam. [Notes (1), (2)]	Over Pin Diam. [Notes (1), (3)]	Max. Groove Diameter [Note (1)]
11	16.89	16.05	17.55	10.50	61	92.51	92.20	94.21	86.69
12	18.39	17.63	19.33	10.89	62	94.03	93.73	95.78	88.19
13	19.89	19.18	20.85	13.61	63	95.55	95.25	97.28	89.71
14	21.41	20.70	22.56	15.15	64	97.05	96.75	98.81	91.24
15	22.91	22.25	24.03	16.69	65	98.58	98.27	100.30	92.74
16	24.41	23.80	25.70	18.23	66	100.10	99.82	101.85	94.26
17	25.91	25.30	27.15	19.76	67	101.60	101.32	103.33	95.78
18	27.43	26.85	28.80	21.29	68	103.12	102.84	104.88	97.31
19	28.93	28.35	30.25	22.82	69	104.65	104.37	106.38	98.81
20	30.45	29.90	31.90	24.35	70	106.15	105.87	107.90	100.33
21	31.95	31.42	33.32	25.88	71	107.67	107.39	109.40	101.85
22	33.48	32.97	34.98	27.41	72	109.19	108.92	110.95	103.38
23	34.98	34.47	36.40	28.94	73	110.69	110.41	112.42	104.88
24	36.47	35.99	38.02	30.36	74	112.22	111.94	113.97	106.40
25	38.00	37.52	39.47	31.98	75	113.74	113.46	115.47	107.92
26	39.52	39.07	41.07	33.50	76	115.24	114.96	116.99	109.42
27	41.02	40.56	42.52	35.03	77	116.76	116.48	118.49	110.95
28	42.54	42.09	44.12	36.55	78	118.29	118.01	120.04	112.47
29	44.04	43.61	45.59	38.01	79	119.79	119.51	121.54	113.97
30	45.57	45.14	47.17	39.60	80	121.31	121.03	123.09	115.49
31	47.07	46.63	48.62	41.12	81	122.83	122.56	124.59	117.02
32	48.59	48.18	50.22	42.65	82	124.33	124.05	126.11	118.54
33	50.11	49.71	51.69	44.17	83	125.86	125.58	127.61	120.04
34	51.61	51.21	53.24	45.69	84	127.38	127.10	129.16	121.56
35	53.14	52.76	54.74	47.19	85	128.88	128.60	130.63	123.09
36	54.64	54.25	56.29	48.72	86	130.40	130.15	132.18	124.61
37	56.16	55.78	57.76	50.24	87	131.93	131.67	133.68	126.11
38	57.68	57.30	59.33	51.77	88	133.43	133.17	135.20	128.14
39	59.18	58.80	60.81	53.29	89	134.95	134.70	136.70	129.13
40	60.71	60.35	62.38	54.81	90	136.47	136.22	138.25	130.66
41	62.20	61.85	63.83	56.31	91	137.97	137.72	139.73	132.18
42	63.73	63.37	65.40	57.84	92	139.50	139.24	141.27	133.71
43	65.25	64.90	66.88	59.36	93	141.02	140.77	142.77	135.20
44	66.75	66.40	68.45	60.88	94	142.52	142.27	144.30	136.73
45	68.28	67.92	69.93	62.38	95	144.04	143.79	145.80	138.25
46	69.80	69.47	71.50	63.91	96	145.57	145.31	147.35	139.78
47	71.30	70.97	72.95	65.43	97	147.07	146.81	148.82	141.27
48	72.82	72.49	74.52	66.95	98	148.59	148.34	150.37	142.80
49	74.32	73.99	76.00	68.48	99	150.11	149.86	151.87	144.32
50	75.84	75.51	77.55	69.98	100	151.61	151.36	153.39	145.82
51	77.37	77.04	79.02	71.50	101	153.14	152.88	154.89	147.35
52	78.87	78.54	80.59	73.03	102	154.66	154.41	156.44	148.87
53	80.39	80.06	82.07	74.52	103	156.15x	155.91	157.91	150.39
54	81.92	81.61	83.64	76.02	104	157.66	157.40	159.44	151.89
55	83.41	83.11	85.12	77.57	105	159.21	158.95	160.96	153.42
56	84.94	84.63	86.66	79.10	106	160.73	160.48	162.51	154.94
57	86.46	86.16	88.16	80.59	107	162.26	162.00	164.01	156.44
58	87.96	87.66	89.69	82.12	108	163.75	163.50	165.56	157.96
59	89.48	89.18	91.19	83.64	109	165.30	165.05	167.03	159.49
60	91.01	90.70	92.74	85.17	110	166.78	166.52	168.58	160.99

Table 14 Sprocket Dimensions for $\frac{3}{16}$ in. Pitch, mm (Cont'd)

Number of Teeth	Pitch Diam.	Outside Diam. [Notes (1), (2)]	Over Pin Diam. [Notes (1), (3)]	Max. Groove Diameter [Note (1)]	Number of Teeth	Pitch Diam.	Outside Diam. [Notes (1), (2)]	Over Pin Diam. [Notes (1), (3)]	Max. Groove Diameter [Note (1)]
111	168.28	168.02	170.05	162.51	116	175.87	175.62	177.67	170.10
112	169.80	169.54	171.58	164.03	117	177.39	177.14	179.17	171.60
113	171.32	171.07	173.10	165.56	118	178.92	178.66	180.70	173.13
114	172.85	172.59	174.65	167.06	119	180.42	180.19	182.22	174.65
115	174.40	174.14	176.15	168.58	120	181.91	181.69	183.72	176.15

NOTES:

- (1) Diameters given are maximum; all tolerances must be negative.
 (2) For rounded teeth.
 (3) Gage pin diameter = 3.175 mm.

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NONMANDATORY APPENDIX A SUPPLEMENTARY INFORMATION

A-1 CHAIN SELECTION

A-1.1 Design Factors

The horsepower ratings in the following tables apply to lubricated standard silent chains and are based on a width of 1 in. For chain ratings of other widths, multiply the table rating by the actual chain width. Also, the ratings are based on a service factor of 1, the use of recommended lubrication methods, and a drive arrangement where two aligned sprockets are mounted on parallel shafts in a horizontal plane. In some instances, when full load operation is encountered only during a portion of the drive's duty cycle, speeds and loads that exceed ratings can be utilized. Drives with more than two sprockets, idlers, composite duty cycles, or other unusual conditions often require special consideration. It is beyond the scope of this Standard to present selection procedures for all conditions, and it is advisable to consult chain manufacturers for selections of this nature.

A-1.1.1 Drive Selection. Drive selection consists of choosing the appropriate chain and sprockets for the space, loads, and speeds involved. Often, more than one pitch and width will work in a given situation. Where minimal noise or extra-smooth operation is desired, a smaller pitch chain and larger diameter sprockets may be beneficial.

When making drive selections, it is important to consider the load characteristics of the power source and the specific application. This is done by sizing components based on the drive's design power, which is obtained as follows:

$$\text{design power} = \text{power to be transmitted} \times \text{service factor}$$

Next, consult the power tables, and find the chain power capacity per inch of width, based on the size and speed of the smaller sprocket. From this, calculate the required chain width.

$$\text{required chain width} = \frac{\text{design power}}{\text{power capacity}}$$

A-1.2 Lubrication

Proper drive lubrication is essential for a long service life. When used in sufficient quantities, lubricants protect against corrosion, dissipate heat, cushion impact, and flush away debris. The horsepower rating tables presume that adequate lubrication is used.

For most applications, a good grade of nondetergent, petroleum-based oil is recommended. Multiviscosity oils are not recommended. Generally, greases and high-viscosity oils are too thick to penetrate chain joints and should be avoided. Chain drives should also be protected against dirt and moisture, and the oil supply should be kept free of contamination. The following table shows recommended lubricant viscosities for a variety of temperatures:

Ambient Temperature, °F	Recommended Lubricant
<40	SAE 5 [Note (1)]
40–90	SAE 10 [Note (1)]
>90	SAE 20

NOTE:

(1) Type A or B automatic transmission fluid may be substituted.

Systems for applying chain lubricant are grouped into three categories: Types I, II, and III. Oil stream lubrication, Type III, is optimum. Type I or II lubrication may be acceptable, depending on chain speed. The horsepower rating tables show the minimum lubrication requirements for various sprocket and speed combinations. In general, the better the lubrication, the longer the chain life. For this reason, the best available method of lubrication should be used whenever possible.

A-1.2.1 Type I — Drip and Manual Lubrication. There are two different kinds of Type I lubrication: drip and manual.

drip lubrication: oil drops are applied, preferably to the inside surface of the chain, using a drip lubricator. The volume and frequency should be sufficient to prevent discoloration of lubricant in the chain joints. Care should be taken to prevent oil drops from being misdirected by chain windage.

manual lubrication: oil is applied with a brush or spout. The volume and frequency of application should be sufficient to prevent overheating of the chain or discoloration in the chain joints.

A-1.2.2 Type II — Bath or Disk Lubrication. There are two different kinds of Type II lubrication: bath and disk.

bath lubrication: the lower strand of chain runs through a bath of oil. When the chain is operating, the oil level should reach the pitch line of the chain at its lowest point.

disk lubrication: a rotating disk picks up oil from a sump and deposits it onto the chain, usually by means of a trough. The diameter of the disk should be sized to produce rim speeds between 600 ft/min minimum and 8,000 ft/min maximum. The chain operates above the oil level.

A-1.2.3 Type III — Oil Stream Lubrication. A continuous stream of oil is applied to the chain, usually by means of an oil pump. Lubricant is typically recirculated and filtered. The oil should preferably be directed at the slack strand and applied evenly across the chain's inside surface.

A-1.3 Sprockets, Installation, and Alignment

A-1.3.1 Sprockets. The dimensions and tooth form of sprockets operating with standard chain should conform to this Standard. For maximum service life, sprockets should have hardened teeth. In cases where speeds are low, large diameter sprockets with unhardened teeth may provide satisfactory life. Normally, large sprockets should not exceed 120 teeth.

A-1.3.2 Center Distance. In general, a center distance of 30 to 50 chain pitches is most desirable. The distance between sprocket centers should provide at least 120 degrees of chain wrap on the smaller sprocket.

A-1.3.3 Center Distance Adjustment. Drives may be installed with either adjustable or fixed center distances. Adjustable centers simplify the control of chain slack and may prolong chain life. Some fixed center drives employ an adjustable idler or shoe to control chain slack. These devices may also be used to control backlash or ensure adequate chain wrap around sprockets. Chain enclosures should be designed to provide adequate clearance for chain slack that may develop over time.

A-1.3.4 Alignment. Proper alignment of shafts and sprocket tooth faces provides for uniform load distribution across the entire chain width and is important for

prolonging drive life. Periodic maintenance should include inspections to ensure that alignment is maintained.

A-1.4 Service Factors

The service factors in Table A-1 are for normal chain loading. For unusual or severe operating conditions, it is desirable to use larger service factors.

A-1.5 Horsepower Tables

To properly use the horsepower ratings, the following factors must be taken into consideration:

(a) *Service Factors.* See Table A-1.

(b) *Lubrication.* The horsepower established from the sprocket and speed combination of the drive under consideration will indicate a method of lubrication. This method or a better one must be used to obtain optimum chain life. Types of lubrication as indicated on Tables A-2 through A-9 are as follows:

- (1) *Type I:* manual, brush, or oil cup
- (2) *Type II:* bath or disk
- (3) *Type III:* circulating pump

A-2 SPROCKET-CUTTING TOOLS FOR $\frac{3}{8}$ in. PITCH CHAIN AND LARGER

A-2.1 Straddle Cutters for $\frac{3}{8}$ in. Pitch Chain and Larger

Basic data on straddle cutters are included in Fig. A-1 and Tables A-10 and A-11.

A-2.2 Hobs for $\frac{3}{8}$ in. Pitch Chain and Larger

Basic hob-generating data are included in Figs. A-2 and A-3 and Table A-12. When sprockets are cut, the over pin diameters in Table 12 must be used.

Table A-1 Service Factors

Equipment	Power Source		Equipment	Power Source	
	A [Note (1)]	B [Note (2)]		A [Note (1)]	B [Note (2)]
Agitators			Crushing Machinery (Cont'd)		
Liquid	1.1	1.3	Linseed crushers	1.4	1.6
Semi-liquid	1.1	1.3	Rod mills	1.6	1.8
Semi-liquid, variable density	1.2	1.4	Tube mills	1.6	1.8
Bakery Machinery			Dredges		
Dough mixer	1.2	1.4	Conveyors, pumps, stackers	1.4	1.6
Brewing and Distilling Equipment			Jigs, screens	1.6	1.8
Bottling machinery	1.0	1.2	Elevators		
Kettles, cookers, mash tubs	1.0	1.2	Bucket (uniformly fed)	1.2	1.4
Scale hopper (frequent starts)	1.2	1.4	Bucket (heavy duty)	1.4	1.6
Brick and Clay Machinery			Fans and Blowers		
Auger machines	1.3	1.5	Centrifugal (fans and blowers)	1.3	1.5
Brick machines	1.4	1.6	Exhausters	1.3	1.5
Cutting table	1.3	1.5	Fans (miscellaneous)	1.2	1.4
Dry press	1.4	1.6	Induced draft	1.2	1.4
De-airing machines	1.3	1.5	Mine fans	1.4	1.6
Granulator	1.4	1.6	Positive blowers	1.5	1.7
Mixer	1.4	1.6	Propeller	1.3	1.5
Pug mill	1.4	1.6	Vane	1.3	1.5
Rolls	1.4	1.6	Flour, Feed, Cereal Mill Machinery		
Centrifuges	1.4	1.6	Bolters and sifters	1.1	1.3
Compressors			Grinders and hammer mills	1.2	1.4
Centrifugal	1.1	1.3	Lifter legs	1.0	1.2
Rotary	1.1	1.3	Purifiers and reels	1.1	1.3
Reciprocating (one or two cycles)	1.6	1.8	Roller mills	1.3	1.5
Reciprocating (three or more cycles)	1.3	1.5	Separator	1.1	1.3
Conveyor			Main line shaft drives	1.4	1.6
Apron	1.4	1.6	Generators and Exciters	1.2	1.4
Belt (ore, coal, sand)	1.2	1.4	Ice Machines	1.5	1.7
Belt (light package)	1.0	1.2	Laundry Machinery		
Oven	1.0	1.2	Dampeners	1.1	1.3
Screw	1.6	1.8	Extractors	1.1	1.3
Bucket	1.4	1.6	Flat work ironers	1.1	1.3
Pan	1.4	1.6	Tumblers	1.2	1.4
Flight	1.6	1.8	Washers	1.1	1.3
Elevator	1.4	1.6	Drum dryers	1.3	1.5
Cotton Oil Plants			Line Shafts		
Linters	1.4	1.6	Brick plants	1.6	1.8
Cookers	1.4	1.6	Coal-handling plants	1.2	1.4
Cranes and Hoists			Cotton gins	1.1	1.3
Main hoist (medium duty)	1.2	1.4	Cotton oil plants	1.1	1.3
Main hoist (heavy duty)	1.4	1.6	Grain elevators	1.0	1.2
Skip hoist	1.4	1.6	Miscellaneous	1.2	1.4
Crushing Machinery			Paper mills	1.3	1.5
Ball mills	1.6	1.8	Rubber plants	1.4	1.6
Coal breakers	1.4	1.6	Steel mills	1.4	1.6
Coal pulverizers	1.4	1.6	Machine Tools		
Cone crushers	1.6	1.8	Boring mills	1.1	1.3
Crushing rolls	1.6	1.8	Cam cutters	1.1	1.3
Gyratory crushers	1.6	1.8	Punch press and shears	1.4	1.6
Hardinge mills	1.6	1.8	Drill presses	1.0	1.2
Jaw crushers	1.6	1.8	Drop hammers	1.1	1.3

Table A-1 Service Factors (Cont'd)

Equipment	Power Source		Equipment	Power Source	
	A [Note (1)]	B [Note (2)]		A [Note (1)]	B [Note (2)]
Machine Tools (Cont'd)			Pumps		
Grinders	1.0	1.2	Centrifugal (pumps)	1.2	1.4
Lathes	1.0	1.2	Dredge	1.6	1.8
Milling machines	1.1	1.3	Gear	1.2	1.4
Mills			Lobe and vane	1.2	1.4
Ball	1.5	1.7	Miscellaneous (pumps)	1.5	1.7
Flaking	1.5	1.7	Pipe line	1.4	1.6
Forming machines	1.6	1.8	Rotary	1.1	1.3
Hardinge	1.5	1.7	Reciprocating (one or two cycles)	1.6	1.8
Pebble	1.5	1.7	Reciprocating (three or more cycles)	1.3	1.5
Rod	1.5	1.7	Rubber Mill Equipment		
Roller	1.5	1.7	Mixers, sheeters, mills	1.6	1.8
Tube	1.5	1.7	Calenders, rolls	1.5	1.7
Tumbling barrels	1.6	1.8	Tubers, tire building	1.5	1.7
Dryers, kilns	1.6	1.8	Extruders	1.5	1.7
Draw bench carriage and main drive			Rubber Plant Machinery		
Mixers			Banbury mills	1.5	1.7
Concrete	1.6	1.8	Calenders (rubber plant)	1.5	1.7
Liquid and semi-liquid	1.1	1.3	Mixers	1.6	1.8
Oil Field Machinery			Rolls (rubber plant)	1.5	1.7
Slush pumps	1.5	1.7	Screens		
Compounding units	1.1	1.3	Air-washing, traveling	1.0	1.2
Pipe line pumps	1.4	1.6	Conical	1.2	1.4
Draw works	1.8	2.0	Rotary, gravel, stone	1.5	1.7
Oil Refinery Equipment			Revolving	1.2	1.4
Chillers, paraffin-filter	1.5	1.7	Vibrating	1.5	1.7
Presses, rotary kilns	1.5	1.7	Steel Plants		
Paper Machinery			Rolling mills	1.3	1.5
Agitators, bleachers	1.1	1.3	Wire benches	1.2	1.4
Beaters	1.3	1.5	Stokers	1.1	1.3
Calenders	1.2	1.4	Textile Machinery		
Chippers	1.5	1.7	Batchers, calenders	1.1	1.3
Dryers	1.2	1.4	Looms	1.1	1.3
Jordan engines	1.2	1.4	Spinning frames	1.0	1.2
Nash engines	1.4	1.6	Twisters	1.0	1.2
Paper machines	1.2	1.4	Wrappers	1.0	1.2
Washers (paper machinery)	1.4	1.6	Reels	1.0	1.2
Winder drums	1.5	1.7	Vehicles		
Yankee dryer	1.3	1.5	Crane	1.5	1.7
Barker, mechanical	1.6	1.8	Mower	1.0	1.2
Printing Machinery			Road equipment (crawler)	1.5	1.7
Embossing press	1.2	1.4	Snow blower	1.0	1.2
Flat bed press	1.2	1.4	Tractor (farm)	1.3	1.5
Folders	1.2	1.4	Truck (load carrier)	1.2	1.4
Linotype machines	1.1	1.3	Truck (snow plow)	1.5	1.7
Magazine presses	1.5	1.7	Truck (pulling road grader)	1.5	1.7
Newspaper presses	1.5	1.7			
Paper cutters	1.1	1.3			
Rotary press	1.1	1.3			

NOTES:

(1) Power Source A: internal combustion engine with hydraulic coupling or torque converter, electric motor, turbine, or hydraulic motor.

(2) Power Source B: internal combustion engine with mechanical coupling.

Table A-2 Horsepower Rating per Inch of Chain Width — $\frac{3}{16}$ in. Pitch

No. of Teeth Small Sprocket	Revolutions per Minute — Small Sprocket											
	500	600	700	800	900	1,200	1,800	2,000	3,500	5,000	7,000	9,000
15	0.28	0.33	0.38	0.43	0.47	0.60	0.80	0.90	1.33	1.66	1.94	1.96
17	0.33	0.39	0.44	0.50	0.55	0.70	0.96	1.05	1.60	2.00	2.40	2.52
19	0.37	0.43	0.50	0.55	0.61	0.80	1.10	1.20	1.80	2.30	2.76	2.92
21	0.41	0.48	0.55	0.62	0.68	0.87	1.22	1.33	2.03	2.58	3.12	3.35
23	0.45	0.53	0.60	0.68	0.75	0.96	1.35	1.47	2.25	2.88	3.50	3.78
25	0.49	0.58	0.66	0.74	0.82	1.05	1.47	1.60	2.45	3.13	3.80	4.10
27	0.53	0.62	0.71	0.80	0.88	1.15	1.58	1.72	2.63	3.35	4.06	4.37
29	0.57	0.67	0.76	0.86	0.95	1.21	1.70	1.85	2.83	3.61	4.40	4.72
31	0.60	0.72	0.81	0.91	1.01	1.30	1.81	1.97	3.02	3.84	4.66	5.00
33	0.64	0.75	0.86	0.97	1.07	1.37	1.90	2.08	3.17	4.02	4.85	...
35	0.68	0.80	0.92	1.03	1.14	1.45	2.03	2.21	3.41	4.27	5.16	...
37	0.71	0.84	0.96	1.08	1.19	1.52	2.11	2.30	3.48	4.39	5.24	...
40	0.77	0.91	1.04	1.16	1.29	1.64	2.28	2.50	3.77	4.76	...	...
45	0.86	1.02	1.15	1.30	1.43	1.83	2.53	2.75	4.15	5.21	...	...
50	0.95	1.12	1.27	1.37	1.58	2.00	2.78	3.02	4.52	5.65	...	...
Lubrication	Type I						Type II			Type III		

GENERAL NOTES:

- (a) Type I: manual or drip feed, less than 1,000 fpm; Type II: bath or slinger disk, less than 2,500 fpm; Type III: forced feed, greater than 2,500 fpm.
 (b) Smooth drive operation is promoted by using sprockets with 21 or more teeth.
 (c) Lubrication methods indicated in the table represent minimal requirements.

Table A-3 Horsepower Rating per Inch of Chain Width — $\frac{3}{8}$ in. Pitch

No. of Teeth Small Sprocket	Revolutions per Minute — Small Sprocket														
	100	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	6,000	7,000	8,000	8,500
17	0.8	4.1	8.2	12.3	16.2	20	24	27	31	34	37	42	46	49	49
19	0.9	4.6	9.2	13.7	18.1	22	26	30	34	37	40	45	48	50	49
21	1.0	5.1	10.1	15.0	19.9	24	29	33	37	40	43	47	49	49	47
23	1.1	5.6	11.1	16.5	22.0	27	31	35	39	43	45	49	49	46	43
25	1.2	6.0	12.0	17.8	23.0	29	33	38	42	45	47	50	48	42	37
27	1.3	6.5	13.0	19.2	25.0	31	36	40	44	47	49	49	45	35	...
29	1.4	7.0	13.9	21.0	27.0	33	38	42	46	48	49	48	41	...	...
31	1.5	7.5	15.0	22.0	28.0	34	40	44	47	49	50	46	35	...	...
33	1.6	8.0	15.8	23.0	30.0	36	41	45	48	49	49	43	...	...	...
35	1.7	8.5	16.7	24.0	32.0	38	43	47	49	50	48	38	...	...	...
37	1.8	8.9	17.6	26.0	33.0	39	44	48	49	49	46	...	...	...	...
40	1.9	9.6	19.0	28.0	35.0	42	46	49	49	47	42	...	...	...	...
45	2.2	10.8	21.0	31.0	39.0	45	49	50	47	41	...	...	...	...	...
50	2.4	12.0	23.0	33.0	42.0	47	50	48	42	...	...	...	...	...	...
Lubrication	Type I		Type II			Type III									

GENERAL NOTES:

- (a) Type I: manual or drip feed, less than 1,000 fpm; Type II: bath or slinger disk, less than 2,500 fpm; Type III: forced feed, greater than 2,500 fpm.
 (b) Smooth drive operation is promoted by using sprockets with 21 or more teeth.
 (c) Lubrication methods indicated in the table represent minimal requirements.

Table A-4 Horsepower Rating per Inch of Chain Width — $\frac{1}{2}$ in. Pitch

No. of Teeth Small Sprocket	Revolutions per Minute — Small Sprocket														
	100	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
17	1.6	7.9	15.8	23	31	38	45	51	57	62	66	70	72	74	75
19	1.8	8.9	17.6	26	34	42	49	56	62	66	70	73	74	75	73
21	2.0	9.8	19.4	29	38	46	53	60	66	70	73	75	74	72	68
23	2.2	10.7	21.0	31	41	50	57	64	69	73	74	74	72	67	60
25	2.3	11.6	23.0	34	44	53	61	67	72	74	74	72	67	59	47
27	2.5	12.6	25.0	36	47	56	64	70	74	75	73	68	59	47	...
29	2.7	13.5	27.0	39	50	60	67	72	75	74	69	61	48	31	...
31	2.9	14.4	28.0	41	53	62	69	74	75	71	64	52	34	...	...
33	3.1	15.3	30.0	44	55	65	71	75	73	68	57	40	...	...	...
35	3.3	16.3	32.0	46	58	67	73	75	71	62	47	...	...	...	...
37	3.5	17.2	34.0	48	60	69	74	74	68	55	...	...	...	...	...
40	3.7	18.5	36.0	51	64	72	75	71	61	42	...	...	...	...	...
45	4.2	21.0	40.0	56	68	74	73	62	42	...	...	...	...	...	...
50	4.7	23.0	44.0	61	72	74	67	47	...	...	...	...	...	...	...
Lubrication	Type I	Type II			Type III										

GENERAL NOTES:

- (a) Type I: manual or drip feed, less than 1,000 fpm; Type II: bath or slinger disk, less than 2,500 fpm; Type III: forced feed, greater than 2,500 fpm.
- (b) Smooth drive operation is promoted by using sprockets with 21 or more teeth.
- (c) Lubrication methods indicated in the table represent minimal requirements.

Table A-5 Horsepower Rating per Inch of Chain Width — $\frac{5}{8}$ in. Pitch

No. of Teeth Small Sprocket	Revolutions per Minute — Small Sprocket												
	100	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000
17	2.5	12.4	25	36	48	58	67	76	83	88	92	93	93
19	2.8	13.8	27	40	53	64	73	82	88	92	93	92	...
21	3.1	15.3	30	44	57	69	79	86	91	93	92	...	...
23	3.4	16.7	33	48	62	74	83	90	93	92	...	...	...
25	3.7	18.2	36	52	66	78	87	92	93	89	...	...	...
27	3.9	19.6	38	56	71	82	90	93	91	...	...	...	...
29	4.2	21.0	41	59	74	86	92	93	87	...	...	...	...
31	4.5	22.0	44	63	78	89	93	91	...	...	...	...	...
33	4.8	24.0	46	66	81	91	93	87	...	...	...	...	...
35	5.1	25.0	49	69	84	92	92	...	...	...	...	...	...
37	5.4	27.0	51	72	87	93	90	...	...	...	...	...	...
40	5.8	29.0	55	76	90	93	84	...	...	...	...	...	...
45	6.6	32.0	61	82	93	89	...	...	...	...	...	...	...
50	7.3	36.0	66	87	93	79	...	...	...	...	...	...	...
Lubrication	Type I	Type II			Type III								

GENERAL NOTES:

- (a) Type I: manual or drip feed, less than 1,000 fpm; Type II: bath or slinger disk, less than 2,500 fpm; Type III: forced feed, greater than 2,500 fpm.
- (b) Smooth drive operation is promoted by using sprockets with 21 or more teeth.
- (c) Lubrication methods indicated in the table represent minimal requirements.