

ASME-B29.1M

ADOPTION NOTICE

ASME-B29.1M, "Precision Power Transmission Roller Chains, Attachments and Sprockets," was adopted on October 3, 1994 for use by the Department of Defense (DoD). Proposed changes by DoD activities must be submitted to the DoD Adopting Activity: Commanding Officer, Naval Construction Battalion Center, Code 156, 1000 23rd Avenue, Port Hueneme, CA 93043-4301. DoD activities may obtain copies of this standard from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094. The private sector and other Government agencies may purchase copies from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017.

Custodians:

Army - ME

Navy - YD-1

Air Force - 99

DLA - CS

Adopting Activity

Navy - YD-1

FSC 3020

DISTRIBUTION STATEMENT A. Approved for public release;
distribution is unlimited.

ASME B29.1M-1993

(REVISION OF ASME/ANSI B29.1M-1986)

Precision Power Transmission Roller Chains, Attachments, and Sprockets

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

AN AMERICAN NATIONAL STANDARD

Precision Power Transmission Roller Chains, Attachments, and Sprockets

ASME B29.1M-1993

(REVISION OF ASME/ANSI B29.1M-1986)



The American Society of
Mechanical Engineers

345 East 47th Street, New York, N.Y. 10017

Date of Issuance: December 30, 1993

This Standard will be revised when the Society approves the issuance of a new edition. There will be no addenda or written interpretations of the requirements of this Standard issued to this Edition.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Consensus Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment which provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable Letters Patent, nor assume any such liability. Users of a code or standard are expressly advised that the determination of the validity of any such patent rights, and the risk of the infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations issued in accordance with governing ASME procedures and policies which preclude the issuance of interpretations by individual volunteers.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

Copyright © 1993 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All Rights Reserved
Printed in U.S.A.

FOREWORD

(This Foreword is not part of ASME B29.1M-1993.)

The original design of precision roller chain dates back to the late 1890s, although various types of drive chains have been in use for centuries. The early automobiles used roller chain extensively as the final drive. The industrial use for roller chain grew substantially, resulting in the desirability of standardization. The perfected American Standard Chain of today has evolved to meet the demand for ever increasing horsepower and higher speeds as well as accurate timing.

In 1913 the Society of Automotive Engineers published formulas for calculating the roller chain length, sprocket tooth profiles, and other important design criteria. Recommendations from the Roller Chain Committee of the American Society of Mechanical Engineers followed in 1917 with dimensional standards for the various components and assemblies. Early in 1920, through the cooperation of these two groups, roller chain standards were formulated and recommended for acceptance by industry. The progress was followed in 1921 by organization of a sprocket committee of the American Gear Manufacturers Association.

ASA Sectional Committee B29 Transmission Chain, Sprockets, and Cutters was organized in 1924 by the American Standards Association with ASME, AGMA, and SAE as sponsors. A subcommittee on roller chain was established to study modern practices of roller chain manufacture and use. Its recommendations on standards were approved by the Sectional Committee in May 1929 and approved by the American Standards Association in July 1930. They were published as B29a-1930, Roller Chain, Sprockets, and Cutters. This roller chain standard assured interchangeability and optional sources of supply.

In 1934 the Association of Roller and Silent Chain Manufacturers (ARSCM) was founded. The objectives of the Association were to cooperate in developing standards of sound engineering and manufacturing practice, to foster improvements in chain performances, and to extend the use of roller chain. This association was subsequently dissolved in 1960 and its members became part of the American Sprocket Chain Manufacturers Association (ASCMA), which was organized to bring together manufacturers of all types of sprocket driven chain. The name of this group was changed later to American Chain Association.

As a result of combined industry research programs sponsored by ARSCM, starting in 1946 and continuing under ASCMA, greater predictability of roller chain drive service life has been achieved. These studies provided greater knowledge of such roller chain characteristics as link plate endurance strengths, roller impact forces, dynamic tension forces, operating efficiency, wear life of well-lubricated drives at various speeds and loads, pin-bushing interaction at high speeds, and the phenomenon of chain joint galling. This scientific exploration produced such vast gains in the technical knowledge of capabilities of roller chain that increases in horsepower ratings were possible. The wear studies, for example, have shown that a separating film of lubricant is formed in chain joints in a manner similar to that found in journal bearings. These studies thus opened a region of chain application at high speeds which had previously been thought to be impractical. The direct result of this research has been the continual increase in chain horsepower ratings contained in the Supplementary Information section. The Supplementary Information also contains suggestions concerning the application and use of the chains covered by this Standard.

This Standard covers transmission roller chains, attachments, and sprockets. It is intended to facilitate fulfillment of the needs of users, distributors, and manufacturers of chain sprocket drives on a sound economic basis and in a manner consistent with sound engineering and manufacturing practices.

Control dimensions are given in this Standard to assure interchangeability between chains, sprockets, and chain links as supplied by different manufacturers. Information for the guidance of users in the application of these drives is also included.

In addition to its customary usage as a power transmission medium, precision roller chain has also been adapted for use in conveying, elevating, indexing, and timing operations. Modifications of standard chain parts to perform these functions are known as *attachments*. To assure interchangeability of the more commonly used attachments, standardization of certain principal dimensions was initiated in 1947. This information, formerly published as a separate standard, has been incorporated into this precision roller chain Standard.

In tabulating dimensional information in this Standard, customary inch-pound units have been used. Additionally, companion tabulations have been included in order to provide translations of these values into metric (SI) units in accordance with ASME Guide SI-1, ASME Orientation and Guide for Use of SI (Metric) Units. For this reason, certain formulas and relationships have been intentionally presented only in customary units so as to preclude any ambiguity between them and the tabulated values.

ASME/ANSI B29.1M-1986 was approved by the American National Standards Institute on January 9, 1986.

The current Standard, ASME B29.1M-1993, includes two significant modifications. The first is a revision to the definition of "Minimum Ultimate Tensile Strength" that clarifies the meaning and use of the term. The second is a revision to the listed values for "maximum pin diameter" and "minimum hole in bushing." These changes will not affect the interchangeability of the chains. The values were changed to provide a rational basis for conversion between conventional (inch) and SI (metric) dimensions. With concurrent changes in the related ISO standards a long-standing area of potential discrepancies will be eliminated. ASME B29.1M-1993 was approved by the American National Standards Institute on August 10, 1993.

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.)

OFFICERS

C. B. Norberg, *Chairman*
R. H. Uttke, *Vice Chairman*
J. L. Wright, *Vice Chairman*
E. W. McLaren, *Secretary*

COMMITTEE PERSONNEL

E. B. Beardslee, Beardslee Transmission Equipment Co., Long Island City, New York
L. E. Hampel, Moline Corp., St. Charles, Illinois
J. M. Lewis, Webster Industries, Inc., Tiffin, Ohio
C. B. Norberg, Ithaca, New York
V. D. Petershack, U. S. Tsubaki, Inc., Sandusky, Ohio
R. A. Reinfried, Conveyor Equipment Manufacturers Association, Rockville, Maryland
R. H. Uttke, Rexnord, Inc., Milwaukee, Wisconsin
G. G. Worsley, Drives, Inc., Fulton, Illinois
J. L. Wright, Diamond Chain Co., Indianapolis, Indiana
D. N. Zwiep, Worcester Polytechnic Institute, Worcester, Massachusetts
J. Kane, *Alternate*, U. S. Tsubaki, Inc., Sandusky, Ohio
C. McDonald, *Alternate*, Jervis B. Webb Co., New Hudson, Michigan

CONTENTS

Foreword.....	iii
Standards Committee Roster	v

1 Roller Chain.....	1
2 Attachments	9
3 Sprockets.....	10

Figures

1 Precision Power Transmission Roller Chain and Components.....	2
2 Offset Link Plate	3
3 Attachments	9
4 Types of Sprockets	10
5 Sprocket Flange Location and Thickness.....	15
6 Theoretical Tooth Form	18
7 Sprocket Diameters	21

Tables

1A, B General Chain Dimensions, in. and mm	4
2A, B Maximum Chain Dimensions, in. and mm	6
3A, B Dimensional Limits for Interchangeable Chain Links, in. and mm.....	7
4A, B Straight Link Plate Extension Dimensions, in. and mm	11
5A, B Bent Link Plate Extension Dimensions, in. and mm	11
6A, B Extended Pin Dimensions, in. and mm	12
7A, B Sprocket Tooth Section Profile Dimensions of Commercial and Precision Sprockets, in. and mm	13
8A, B Maximum Eccentricity and Face Runout Tolerances for Commercial Sprockets (Measured as Total Indicator Reading), in. and mm	16
8C, D Maximum Eccentricity and Face Runout Tolerances for Precision Sprockets (Measured as Total Indicator Reading), in. and mm.....	16
9A, B Sprocket Flange Thickness, in. and mm	17
10A, B Seating Curve Dimensions and Tolerances, in. and mm	20
11A, B Minus Tolerances on the Caliper Diameters of Commercial Sprockets for Various Numbers of Teeth, in. and mm	22
11C, D Minus Tolerances on the Caliper Diameters of Precision Sprockets for Various Numbers of Teeth, in. and mm	23
12 Pitch Diameter, Outside Diameter, and Measuring Dimension Factor for Chain of Unity Pitch	24
13A, B Whole Depth of Topping Hob Cut <i>WD</i> for Each Pitch and Range, in. and mm	27

Supplementary Information	S-1
---------------------------------	-----

PRECISION POWER TRANSMISSION ROLLER CHAINS,¹ ATTACHMENTS, AND SPROCKETS

1 ROLLER CHAIN

1.1 Nomenclature

The following definitions are illustrated in Fig. 1. *connecting link* (cotter pin type) — an outside link consisting of a pin link plate *E*, two assembled pins *G-G*, a detachable pin link plate *D*, and two cotters *H-H*. Three types of detachable pin link plates are available; one with a slip fit, one with a degree of press fit (drive fit), and one with a full press fit (as in conventional chain construction).

connecting link (spring clip type) — a connecting link generally as described above, except that the detachable link plate is retained by a one piece spring clip *K* which engages grooves cut in the ends of the pins

offset link — a link consisting of two offset link plates *I-I*, a bushing *B*, a roller *C*, a removable pin *J*, and cotter *H*

offset section — a two link section consisting of a roller link and an offset link, which are connected by a riveted press fit pin

pin link — an outside link consisting of two pin link plates *E-E* assembled with two pins *F-F*

roller chain — a series of alternately assembled roller links and pin links in which the pins articulate inside the bushings and the rollers are free to turn on the bushings. Pins and bushings are press fit in their respective link plates. Roller chain may be *single strand*, having one row of roller links, or *multiple strand*, having more than one row of roller links, and in which center plates *L* are located between the strands of roller links. Center plates may be slip fit or press fit on the pin as agreed between the chain supplier and purchaser.

roller link — an inside link consisting of two roller link plates *A-A*, two bushings *B-B*, and two rollers *C-C*

1.2 General Proportions

- (a) The roller diameter is approximately $\frac{5}{8} \times$ pitch.
- (b) The *chain width* is defined as the distance between roller link plates and equals approximately $\frac{5}{8} \times$ chain pitch.
- (c) The pin diameter is approximately $\frac{5}{16} \times$ pitch or $\frac{1}{2}$ roller diameter.
- (d) The thickness of link plates for the standard series is approximately $\frac{1}{8} \times$ pitch.
- (e) The thickness of link plates for the heavy series chain of any pitch is approximately that of the next larger pitch standard series chain.
- (f) The maximum height of roller link plates is $0.95 \times$ pitch.
- (g) The maximum height of pin link plates is $0.82 \times$ pitch.
- (h) Although chamfers are shown on the link plates illustrated, chamfering is not a requirement and is done at the option of the manufacturer.

1.3 Numbering System — Standard Chain Numbers

For the chains shown in this Standard, the right-hand digit in the chain designation is zero for roller chains of the usual proportions, 1 for a lightweight chain, and 5 for a rollerless bushing chain. The numbers to the left of the right-hand digit denote the number of $\frac{1}{8}$ in. in the pitch. The letter *H* following the chain number denotes the heavy series. The hyphenated number 2 suffixed to the chain number denotes a double strand, 3 a triple strand, 4 a quadruple strand chain, etc.

Heavy series chains made in $\frac{3}{4}$ in. and larger pitches differ from the standard series in thickness of link plates. Their value is only in the acceptance of higher loads during operation at lower speeds.

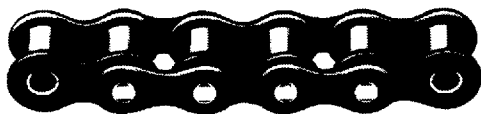
1.4 Minimum Ultimate Strength

- (a) *Single Strand Chain*. Standard series single strand chain meeting the requirements of this Standard will have a minimum ultimate tensile or

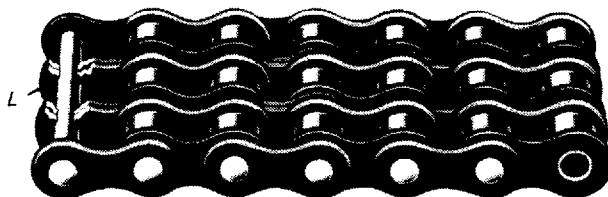
¹ CAUTION: The standardized chains listed in this Standard are intended primarily for power transmission and conveying purposes, and should not be used as replacements for chains used on overhead hoists. See ASME/ANSI B29.24M, Roller Load Chains for Overhead Hoists, for information relating to roller chains specifically intended for overhead hoisting duty.

ASME B29.1M-1993

PRECISION POWER TRANSMISSION ROLLER CHAINS, ATTACHMENTS, AND SPROCKETS

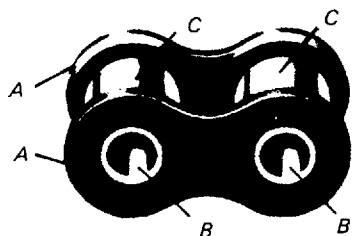


SINGLE STRAND ROLLER CHAIN

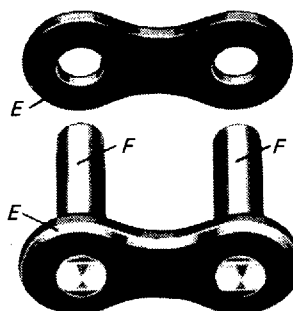


MULTIPLE STRAND ROLLER CHAIN

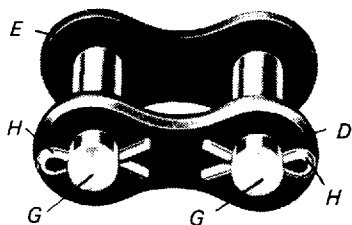
roller chain — a series of alternately assembled roller links and pin links in which the pins articulate inside the bushings and the rollers are free to turn on the bushings. Pins and bushings are press fit in their respective link plates. Roller chain may be *single strand*, having one row of roller links, or *multiple strand*, having more than one row of roller links, and in which center plates *L* are located between the strands of roller links. Center plates may be slip fit or press fit on the pin as agreed between the chain supplier and purchaser.



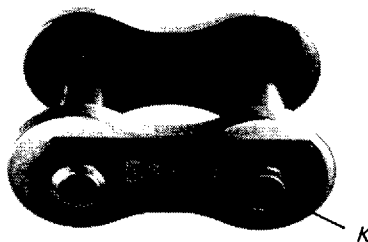
roller link — an inside link consisting of two roller link plates *A-A*, two bushings *B-B*, and two rollers *C-C*



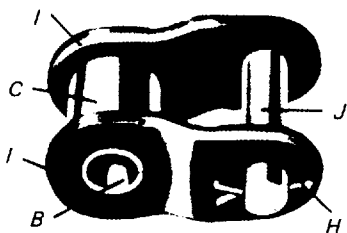
pin link — an outside link consisting of two pin link plates *E-E* assembled with two pins *F-F*



connecting link (cotter pin type) — an outside link consisting of a pin link plate *E*, two assembled pins *G-G*, a detachable pin link plate *D*, and two cotters *H-H*. Two types of detachable pin link plates are available; one with a slip-fit and one with a degree of press-fit (drive-fit) detachable pin link plate.



connecting link (spring clip type) — a connecting link generally as described above, except that the detachable link plate is retained by a one piece spring clip *K* which engages grooves cut in the ends of the pins



offset link — a link consisting of two offset link plates *I-I*, a bushing *B*, a roller *C*, a removable pin *J*, and cotter *H*



offset section — a two link section consisting of a roller link and an offset link, which are connected by a riveted press-fit pin

FIG. 1 PRECISION POWER TRANSMISSION ROLLER CHAIN AND COMPONENTS

breaking strength equal to or greater than the values listed in Tables 1A and 1B.

(b) *Multiple Strand Chain.* For multiple strand chain, the minimum ultimate tensile or breaking strength equals that of a single strand multiplied by the number of strands.

(c) *Lightweight Chain.* Lightweight chain, designated as No. 41, does not conform to the general chain proportions. The minimum ultimate tensile or breaking strength is 1500 lb.

(d) *Minimum Ultimate Tensile Strength (M.U.T.S.)* for chain covered by this Standard is the minimum force at which an unused, undamaged chain could fail when subjected to a single tensile loading test.

(1) **WARNING:** *The Minimum Ultimate Tensile Strength is NOT a "working load."* The M.U.T.S. greatly exceeds the maximum force that may be safely applied to the chain.

(2) *Test Procedure.* A tensile force is slowly applied at a rate not to exceed 2.0 in. per min., in a uniaxial direction, to the ends of the chain sample.

(3) *The tensile test is a destructive test.* Even though the chain may not visibly fail when subjected to the "Minimum Tensile Force," it will have been damaged and will be unfit for service.

1.5 Tolerance for Chain Length

(a) New chains, under standard measuring load, must not be underlength.

(b) Overlength tolerance is $0.001/(\text{pitch in inches})^2 + 0.015$ in.

See para. 2.3 for tolerance of chain with attachments.

1.6 Measuring Load

Measuring load is the load under which the chain is to be measured for length. It is equal to 1% of the minimum ultimate tensile strength, with a minimum of 18 lb and a maximum of 1000 lb, for both single and multiple strand chain.

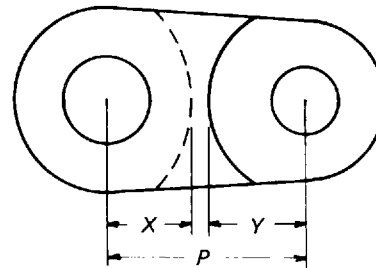
Length measurements are to be taken over a length of at least 12 in. (300 mm).

1.7 General Chain Dimensions

See Tables 1A and 1B.

1.8 Maximum Chain Dimensions

See Tables 2A and 2B.



P = chain pitch

$X \text{ min.} = 0.41P + \text{clearance}$

$Y \text{ min.} = 0.475P + \text{clearance}$

clearance = $0.001 + 0.004P$

GENERAL NOTE:

Clearance shall never be less than 0.002 in. (0.05 mm) nor more than 0.008 in. (0.20 mm), regardless of formula.

FIG. 2 OFFSET LINK PLATE

1.9 Dimensional Limits for Interchangeability of Links

See Tables 3A and 3B.

To assure interchangeability of links produced by different makers of chain, the following standard maximum or minimum limits are adopted.

(a) The minimum distance between roller link plates is the nominal width of the chain minus the quantity $(0.002 + 0.003 \times \text{pitch})$.

(b) Maximum pin diameter. See Tables 3A and 3B.

(c) Minimum hole in bushing. See Tables 3A and 3B.

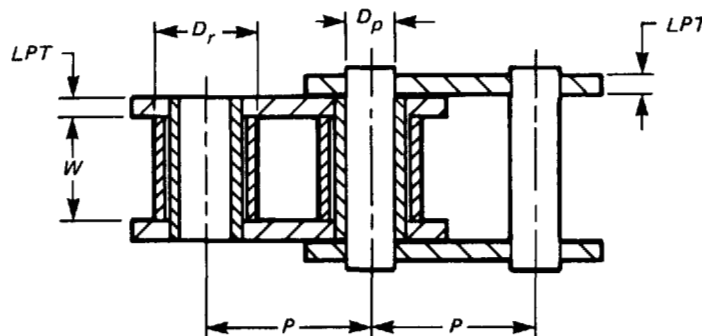
(d) Maximum width of roller link = nominal width of chain + (nominal link plate thickness $\times 2.12$).

(e) Minimum distance between pin link plates = maximum width of roller link + 0.002 in.

(f) *Transverse pitch of multiple strand chain.* Nominal transverse pitch = nominal width of chain + (nominal link plate thickness $\times 4.22$).

(g) Standard offset links are made to accommodate chains having roller link plates with a maximum height equal to 0.95 of the pitch, and pin link plates with a maximum height equal to 0.82 of the pitch. Therefore, the standard minimum values of X and Y are shown in Fig. 2.

(h) Lightweight chain, designated as No. 41, does not conform to the general chain proportions. Roller link plates have a maximum height of 0.390 in. (9.91 mm) and pin link plates have a maximum height of 0.335 in. (8.51 mm).



P = chain pitch
 D_r = roller diameter
 LPT = link plate thickness
 W = chain width between roller link plates
 D_p = pin diameter

TABLE 1A GENERAL CHAIN DIMENSIONS, in.

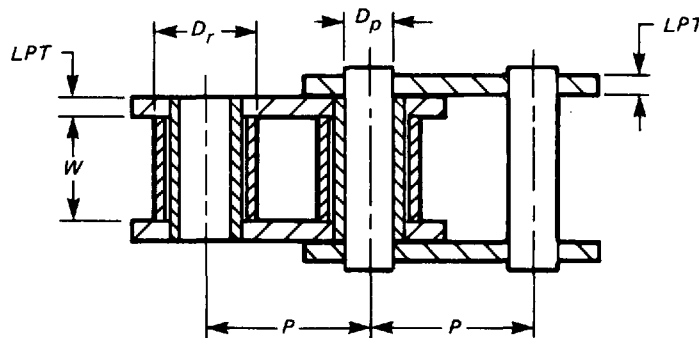
Standard Chain No.	Pitch P	Max. Roller Diam. D_r	Nominal Width W (1)	Nominal Pin Diam. D_p	Link Plate Thickness LPT		Measuring Load, lb (2)	Length Tolerance, in./ft	Min. Ultimate Tensile Strength, Standard and Heavy Series, lb (3)
					Standard Series	Heavy Series			
25	0.250	0.130 (4)	0.125	0.0905	0.030	...	18	0.031	780
35	0.375	0.200 (4)	0.188	0.141	0.050	...	18	0.022	1,760
41	0.500	0.306	0.250	0.141	0.050	...	18	0.019	1,500
40	0.500	0.312	0.312	0.156	0.060	...	31	0.019	3,125
50	0.625	0.400	0.375	0.200	0.080	...	49	0.018	4,880
60	0.750	0.469	0.500	0.234	0.094	0.125	70	0.017	7,030
80	1.000	0.625	0.625	0.312	0.125	0.156	125	0.016	12,500
100	1.250	0.750	0.750	0.375	0.156	0.187	195	0.016	19,530
120	1.500	0.875	1.000	0.437	0.187	0.219	281	0.015	28,125
140	1.750	1.000	1.000	0.500	0.219	0.250	383	0.015	38,280
160	2.000	1.125	1.250	0.562	0.250	0.281	500	0.015	50,000
180	2.250	1.406	1.406	0.687	0.281	0.312	633	0.015	63,280
200	2.500	1.562	1.500	0.781	0.312	0.375	781	0.015	78,125
240	3.000	1.875	1.875	0.937	0.375	0.500	1000	0.015	112,500

NOTES:

- (1) See Table 3A for decimal minimum dimensions.
 (2) For single strand chain.
 (3) See footnote 1, p. 1.
 (4) Bushing diameter, as these chains have no rollers.

PRECISION POWER TRANSMISSION
ROLLER CHAINS, ATTACHMENTS, AND SPROCKETS

ASME B29.1M-1993



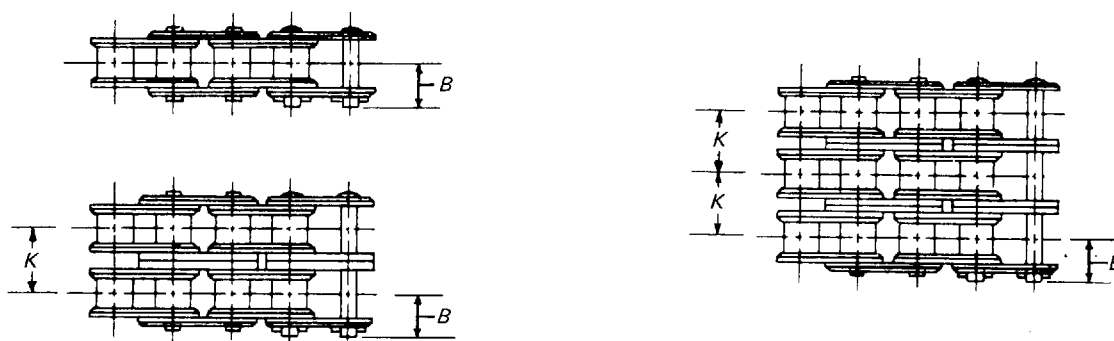
P = chain pitch
 D_r = roller diameter
 LPT = link plate thickness
 W = chain width between roller link plates
 D_p = pin diameter

TABLE 1B GENERAL CHAIN DIMENSIONS, mm

Standard Chain No.	Pitch P	Max. Roller Diam. D_r	Nominal Width W (1)	Nominal Pin Diam. D_p	Link Plate Thickness LPT		Measuring Load, N (2)	Length Tolerance, mm/m	Min. Ultimate Tensile Strength, Standard and Heavy Series, N (3)
					Standard Series	Heavy Series			
25	6.35	3.30 (4)	3.18	2.30	0.76	...	80.1	2.58	3 470
35	9.52	5.08 (4)	4.78	3.58	1.27	...	80.1	1.83	7 825
41	12.70	7.77	6.35	3.58	1.27	...	80.1	1.58	6 672
40	12.70	7.92	7.92	3.96	1.52	...	137.9	1.58	13 900
50	15.88	10.16	9.52	5.08	2.03	...	218.0	1.50	21 710
60	19.05	11.91	12.70	5.94	2.39	3.18	311.4	1.42	31 270
80	25.40	15.87	15.88	7.92	3.18	3.96	556.0	1.33	55 600
100	31.75	19.05	19.05	9.52	3.96	4.75	867.4	1.33	86 870
120	38.10	22.22	25.40	11.10	4.75	5.56	1250.0	1.25	125 100
140	44.45	25.40	25.40	12.70	5.56	6.35	1704.0	1.25	170 270
160	50.80	28.57	31.75	14.27	6.35	7.14	2224.0	1.25	222 400
180	57.15	35.71	35.71	17.45	7.14	7.92	2816.0	1.25	281 470
200	63.50	39.67	38.10	19.84	7.92	9.52	3474.0	1.25	347 500
240	76.20	47.62	47.62	23.80	9.52	12.70	5004.0	1.25	520 400

NOTES:

- (1) See Table 3B for decimal minimum dimensions.
 (2) For single strand chain.
 (3) See footnote 1, p. 1.
 (4) Bushing diameter, as these chains have no rollers.



B = maximum half width of outboard chain strand
 K = nominal transverse pitch (from Table 7A or 7B)
 N = number of strands

SINGLE AND MULTIPLE STRAND CHAINS

TABLE 2A MAXIMUM CHAIN
DIMENSIONS, in.

Standard Chain No.	$(N - 1)K + 2B$					
	Number of Chain Strands					
	1	2	3	4	6	8
25	0.38	0.63	0.88	1.14	1.64	2.14
35	0.68	1.08	1.48	1.88	2.67	3.47
41	0.74	...	...	...	...	...
40	0.84	1.36	1.94	2.50	3.65	4.75
50	0.96	1.68	2.40	3.10	4.54	5.95
60	1.28	2.14	3.04	3.94	5.78	7.55
80	1.58	2.74	3.90	5.04	7.37	9.70
100	1.90	3.30	4.72	6.12	9.00	11.80
120	2.30	4.10	5.88	7.68	11.30	14.85
140	2.54	4.46	6.38	8.30	12.25	16.15
160	2.94	5.26	7.56	9.86	14.55	19.10
180	3.54	6.00	8.60	11.18	16.45	21.55
200	3.82	6.62	9.60	12.30	18.00	23.52
240	4.40	7.85	11.31	14.77	21.69	...
60H	1.41	2.39	3.42	4.44	6.53	8.55
80H	1.71	2.99	4.28	5.54	8.12	10.70
100H	2.03	3.55	5.10	6.62	9.75	12.80
120H	2.43	4.35	6.26	8.18	12.05	15.85
140H	2.67	4.71	6.76	8.80	13.00	17.15
160H	3.07	5.51	7.94	10.36	15.30	20.10
180H	3.67	6.25	8.98	11.68	17.20	22.55
200H	4.07	7.12	10.35	13.30	19.50	25.52
240H	4.90	8.85	12.81	16.77	24.69	...

TABLE 2B MAXIMUM CHAIN
DIMENSIONS, mm

Standard Chain No.	$(N - 1)K + 2B$					
	Number of Chain Strands					
	1	2	3	4	6	8
25	9.6	16.0	22.3	28.9	41.6	54.3
35	17.2	27.4	37.5	47.7	67.8	88.1
41	18.7	...	...	...	...	...
40	21.3	34.5	49.2	63.5	92.7	120.6
50	24.3	42.6	60.9	78.7	115.3	151.1
60	32.5	54.3	77.2	100.0	146.8	191.7
80	40.1	69.5	99.0	128.0	187.1	246.3
100	48.2	83.8	119.8	155.4	228.6	299.7
120	58.4	104.1	149.3	195.0	287.0	377.1
140	64.5	113.2	162.0	210.8	311.1	410.2
160	74.6	133.6	192.0	250.4	369.5	485.1
180	89.9	152.4	218.4	283.9	417.8	547.3
200	97.0	168.1	243.8	312.4	457.2	597.4
240	111.7	199.3	287.2	375.1	550.9	...
60H	35.8	60.7	86.8	112.7	165.8	217.1
80H	43.4	75.9	108.7	140.7	206.2	271.7
100H	51.5	90.1	129.5	168.1	247.6	325.1
120H	61.7	110.4	159.0	206.5	306.0	402.5
140H	67.8	119.6	171.7	223.5	330.2	435.6
160H	77.9	139.9	201.6	263.1	388.6	510.5
180H	93.2	158.7	228.0	296.6	436.8	572.7
200H	103.3	180.8	262.8	337.8	495.3	648.2
240H	124.4	224.7	325.3	425.9	627.1	...

GENERAL NOTES:

- (a) Values for transverse pitch K are listed in Tables 7A and 7B.
 (b) Maximum diameter over chain on sprockets = sprocket pitch diameter + $(0.95 \times \text{chain pitch})$.

TABLE 3A DIMENSIONAL LIMITS FOR INTERCHANGEABLE CHAIN LINKS, in.

Standard Chain No. Chain Pitch	25 0.250	35 0.375	41 0.500	40 0.500	50 0.625	60 0.750	80 1.000	100 1.250	120 1.500	140 1.750	160 2.000	180 2.250	200 2.500	240 3.000
Min. distance between roller link plates	0.122	0.184	0.246	0.309	0.370	0.495	0.620	0.744	0.993	0.993	1.242	1.397	1.490	1.864
Max. width of roller link, standard series	0.189	0.294	0.357	0.440	0.545	0.699	0.890	1.081	1.396	1.464	1.780	2.002	2.161	2.670
Max. width of roller link, heavy series	...	...	...	...	...	0.765	0.956	1.146	1.464	1.530	1.846	2.067	2.295	2.935
Min. distance between pin link plates, standard series	0.191	0.296	0.359	0.442	0.547	0.701	0.892	1.083	1.398	1.466	1.782	2.004	2.163	2.672
Min. distance between pin link plates, heavy series	...	...	...	...	...	0.767	0.958	1.148	1.466	1.532	1.848	2.069	2.297	2.937
Max. pin diameter (Note 1)	0.0909	0.1417	0.1417	0.1567	0.2004	0.2346	0.3126	0.3756	0.4374	0.5004	0.5626	0.6874	0.7815	0.9374
Min. hole in bushing (Note 1)	0.0921	0.1425	0.1425	0.1575	0.2016	0.2354	0.3134	0.3764	0.4386	0.5016	0.5634	0.6886	0.7823	0.9386
Min. value of X for offset link plates (see Fig. 2)	0.104	0.156	0.171	0.208	0.260	0.311	0.415	0.518	0.622	0.725	0.828	0.931	1.033	1.238
Min. value of Y for offset link plates (see Fig. 2)	0.121	0.181	0.198	0.240	0.300	0.360	0.480	0.600	0.719	0.839	0.958	1.077	1.195	1.433

NOTE:

(1) In recognition of the fact that these dimensions vary from previous issues of this Standard, it will not be necessary to be in full compliance until 5 years from the effective date of this Standard.

TABLE 3B DIMENSIONAL LIMITS FOR INTERCHANGEABLE CHAIN LINKS, mm

Standard Chain No. Chain Pitch	25 6.35	35 9.52	41 12.70	40 12.70	50 15.88	60 19.05	80 25.40	100 31.75	120 38.10	140 44.45	160 50.80	180 57.15	200 63.50	240 76.20
Min. distance between roller link plates	3.10	4.68	6.25	7.85	9.40	12.58	15.75	18.90	25.23	25.23	31.55	35.49	37.85	47.35
Max. width of roller link, standard series	4.80	7.46	9.06	11.17	13.84	17.75	22.60	27.45	35.45	37.18	45.21	50.85	54.88	67.81
Max. width of roller link, heavy series	...	...	...	...	...	19.43	24.28	29.10	37.18	38.86	46.88	52.50	58.29	74.54
Min. distance between pin link plates, standard series	4.85	7.52	9.12	11.23	13.89	17.81	22.66	27.51	35.51	37.24	45.26	50.90	54.94	67.87
Min. distance between pin link plates, heavy series	...	...	...	...	...	19.48	24.33	29.16	37.24	38.91	46.94	52.55	58.34	74.60
Max. pin diameter (Note 1)	2.31	3.60	3.60	3.98	5.09	5.96	7.94	9.54	11.11	12.71	14.29	17.46	19.85	23.81
Min. hole in bushing (Note 1)	2.34	3.62	3.62	4.00	5.12	5.98	7.96	9.56	11.14	12.74	14.31	17.49	19.87	23.84
Min. value of X for offset link plates (see Fig. 2)	2.65	3.97	4.35	5.29	6.61	7.90	10.55	13.16	15.80	18.42	21.04	23.65	26.24	31.45
Min. value of Y for offset link plates (see Fig. 2)	3.08	4.60	5.03	6.10	7.62	9.15	12.20	15.24	18.27	21.32	24.34	27.36	30.36	36.40

NOTE:

(1) In recognition of the fact that these dimensions vary from previous issues of this Standard, it will not be necessary to be in full compliance until 5 years from the effective date of this Standard.

2 ATTACHMENTS

2.1 Nomenclature

attachments — modifications to standard chain components to adapt the chains for use in conveying, elevating, and timing operations. The components commonly modified are the link plates, which are provided with extended lugs, and the chain pins, which are extended in length so as to project substantially beyond the outer surface of the pin link plates (see Fig. 3).

2.2 General Proportions

Standardized attachments are available for transmission roller chain, $\frac{3}{8}$ in. through 2 in. pitch inclusive, and $2\frac{1}{2}$ in. pitch. The standardized dimensions conform approximately to the following formulas. It is recommended that these formulas be applied when extending these standards to additional sizes of chain.

(a) Distance from center line of hole in straight link plate extension to pitch line

$$D = 1 \times \text{chain pitch}$$

(b) Distance from center line of hole in bent link plate extension to chain center line

$$D = 1 \times \text{chain pitch}$$

(c) Distance from top of bent link plate extension to pitch line

$$C = 0.625 \times \text{chain pitch}$$

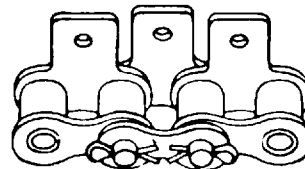
(d) Angle of bend of link plate extension equals 90 deg.

(e) Diameter of pin extension

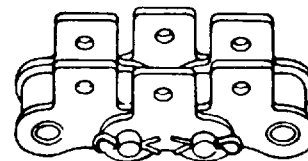
$$D_p = \text{nominal diameter of chain pin}$$

(f) Length of pin extension

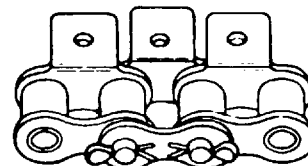
$$L = 0.750 \times \text{chain pitch}$$



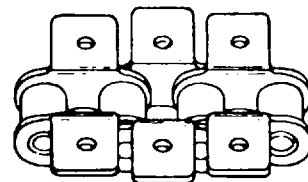
Straight Link Plate Extension, One Side of Chain



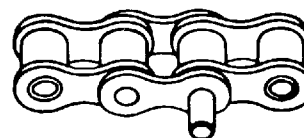
Straight Link Plate Extension, Both Sides of Chain



Bent Link Plate Extension, One Side of Chain



Bent Link Plate Extension, Both Sides of Chain



Extended Pin, One Side of Chain

FIG. 3 ATTACHMENTS

2.3 Tolerance for Chain Length

New chains with attachments, under standard measuring load, must not be underlength.

ASME B29.1M-1993

Overlength tolerance equals $0.002/(\text{pitch in inches})^2 + 0.030 \text{ in./ft.}$ Length tolerance shall conform to the tabulation below.

Standard Chain No.	Length Tolerance	
	in./ft	mm/m
35	0.044	3.67
40	0.038	3.17
50	0.035	2.92
60	0.034	2.83
80	0.032	2.67
100	0.031	2.58
120	0.031	2.58
140	0.031	2.58
160	0.031	2.58
200	0.030	2.50

2.4 Straight Link Plate Extension Dimensions

See Tables 4A and 4B.

2.5 Bent Link Plate Extension Dimensions

See Tables 5A and 5B.

2.6 Extended Pin Dimensions

See Tables 6A and 6B.

3 SPROCKETS

3.1 Types of Sprockets

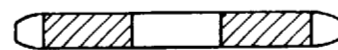
The four principal types of sprockets are designated in Fig. 4.

3.2 Classes of Sprockets

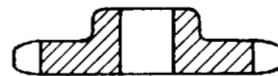
This Standard provides for two classes of sprockets — commercial and precision. Use of commercial or precision sprockets is a matter of drive application judgment. The usual moderate to slow speed commercial drive is adequately served by commercial sprockets. Where extreme high speed in combination with high load is involved, or where the drive involves fixed centers, critical timing or register problems, or close clearance with outside interference, then the use of precision sprockets may be more appropriate.

As a general guide, drives requiring Type A or Type B lubrication would be served by commercial sprockets. Drives requiring Type C lubrication may require

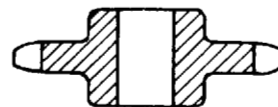
PRECISION POWER TRANSMISSION ROLLER CHAINS, ATTACHMENTS, AND SPROCKETS



Type A — Plain Plate



Type B — Hub on One Side Only



Type C — Hub on Both Sides



Type D — Hub Detachable

FIG. 4 TYPES OF SPROCKETS

precision sprockets, although even here commercial may be satisfactory. Consult the manufacturer. Types of lubrication are shown in the horsepower ratings tables (Tables A4 through A17) provided in the Supplementary Information section.

3.3 Tooth Section Profile

The tooth section profile, Sections A and B of Tables 7A and 7B, shows the recommended chamfering of sprocket teeth for roller chains. All sprocket flanges are to be chamfered to provide guidance of the chain onto the sprocket in case of misalignment due to sprocket misalignment or permissible flange weave. Flange chamfer may be as in Section A or B or anything in between.

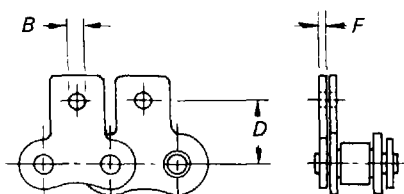
The sprocket chamfer dimensions R_C , g , and h are noncritical and are given only as a guide for general design proportions.

3.4 Sprocket Flange Location and Thickness

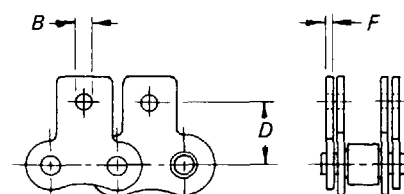
See Fig. 5 and Tables 8A, 8B, 8C, 8D, 9A, and 9B.

PRECISION POWER TRANSMISSION
ROLLER CHAINS, ATTACHMENTS, AND SPROCKETS

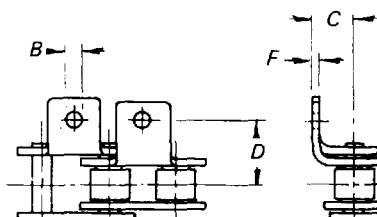
ASME B29.1M-1993



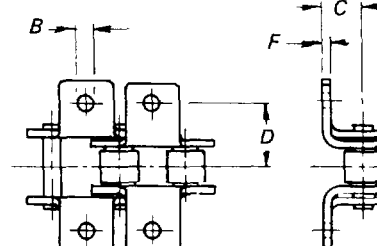
Straight Link Plate Extension, One Side of Chain



Straight Link Plate Extension, Both Sides of Chain



Bent Link Plate Extension, One Side of Chain



Bent Link Plate Extension, Both Sides of Chain

TABLE 4A STRAIGHT LINK PLATE EXTENSION
DIMENSIONS, in.

Standard Chain No.	B, min.	D	F
35	0.102	0.375	0.050
40	0.131	0.500	0.060
50	0.200	0.625	0.080
60	0.200	0.719	0.094
80	0.261	0.969	0.125
100	0.323	1.250	0.156
120	0.386	1.438	0.188
140	0.448	1.750	0.219
160	0.516	2.000	0.250
200	0.641	2.500	0.312

TABLE 5A BENT LINK PLATE EXTENSION
DIMENSIONS, in.

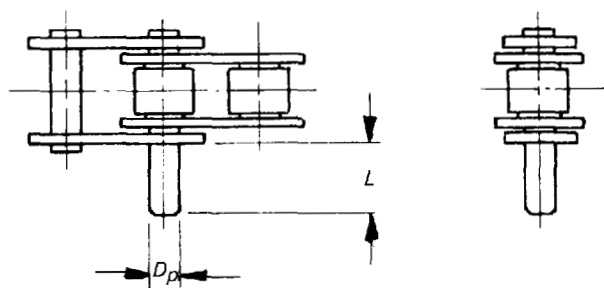
Standard Chain No.	B, min.	C	D	F
35	0.102	0.250	0.375	0.050
40	0.131	0.312	0.500	0.060
50	0.200	0.406	0.625	0.080
60	0.200	0.469	0.750	0.094
80	0.261	0.625	1.000	0.125
100	0.323	0.781	1.250	0.156
120	0.386	0.906	1.500	0.188
140	0.448	1.125	1.750	0.219
160	0.516	1.250	2.000	0.250
200	0.641	1.688	2.500	0.312

TABLE 4B STRAIGHT LINK PLATE EXTENSION
DIMENSIONS, mm

Standard Chain No.	B, min.	D	F
35	2.60	9.52	1.27
40	3.33	12.70	1.52
50	5.08	15.88	2.03
60	5.08	18.26	2.39
80	6.63	24.61	3.18
100	8.21	31.75	3.96
120	9.81	36.53	4.78
140	11.38	44.45	5.56
160	13.11	50.80	6.35
200	16.29	63.50	7.92

TABLE 5B BENT LINK PLATE EXTENSION
DIMENSIONS, mm

Standard Chain No.	B, min.	C	D	F
35	2.60	6.35	9.52	1.27
40	3.33	7.92	12.70	1.52
50	5.08	10.31	15.88	2.03
60	5.08	11.91	19.05	2.39
80	6.63	15.88	25.40	3.18
100	8.21	19.84	31.75	3.96
120	9.81	23.01	38.10	4.78
140	11.38	28.58	44.45	5.56
160	13.11	31.75	50.80	6.35
200	16.29	42.88	63.50	7.92



Extended Pin, One Side of Chain

TABLE 6A EXTENDED PIN DIMENSIONS, in.

Standard Chain No.	D_p , Nominal	L
35	0.141	0.375
40	0.156	0.375
50	0.200	0.469
60	0.234	0.562
80	0.312	0.750
100	0.375	0.938
120	0.437	1.125
140	0.500	1.312
160	0.562	1.500
200	0.781	1.875

TABLE 6B EXTENDED PIN DIMENSIONS, mm

Standard Chain No.	D_p , Nominal	L
35	3.58	9.52
40	3.96	9.52
50	5.08	11.91
60	5.94	14.27
80	7.92	19.05
100	9.52	23.83
120	11.10	28.58
140	12.70	33.32
160	14.27	38.10
200	19.84	47.62

3.5 Tooth Form Dimensions

The tooth form shown in Fig. 6 is a theoretical form for the specific number of teeth N and is designed so

that the chain, as it wears and elongates, will ride out toward the tips of the teeth. Because of the variety of ways to produce sprocket teeth, the actual teeth may not exactly match the theoretical form. In the case of space cutters or milling cutters, it is common practice to design cutters to cut a form for an intermediate number of teeth for one of five ranges. This results in the cutter, the sprocket, and the theoretical form matching only at 56 teeth. In the case of hobs or shapers, the generated sprocket tooth form comes very close to the theoretical form for all numbers of teeth but actually matches only where and if the cutting tool design is based on a specific whole number of teeth. Cast, powder metal, or plastic molded teeth may or may not match the theoretical form depending on how their pattern, die, or mold was designed and formed. All of these forms have proved to be acceptable in service. The important thing is that the seating curve diameter, bottom diameter, flange width, and chordal pitch be such as to accept the meshing chain without wedging or binding so as to minimize chain loading and impact. (For additional information on cutting tools, see the Supplementary Information.)

3.6 Seating Curve Dimensions and Tolerances

See Tables 10A and 10B.

3.7 Sprocket Diameters, Measuring Dimensions, and Tolerances

See Fig. 7 and Tables 11A, 11B, 11C, and 11D.

3.8 Pitch Diameter, Outside Diameter, and Measuring Dimension Factor for Chain of Unity Pitch

See Tables 12, 13A, and 13B. For chain pitches other than those shown in Table 12, use the following formulas.

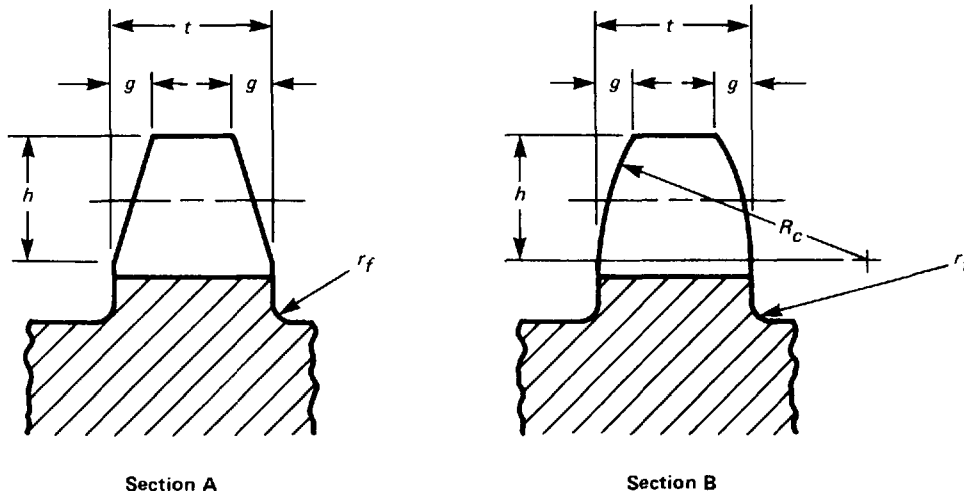
(a) Pitch diameter equals pitch diameter from Table 12 $\times$ chain pitch

(b) Outside diameter equals outside diameter from Table 12 $\times$ chain pitch

(c) Caliper diameter factor equals $PD \cos (90 \text{ deg.}/N)$

(d) Caliper diameter (odd teeth) equals (caliper diameter factor from Table 12 $\times$ chain pitch) – roller diameter

(e) Caliper diameter (even teeth) equals pitch diameter – roller diameter



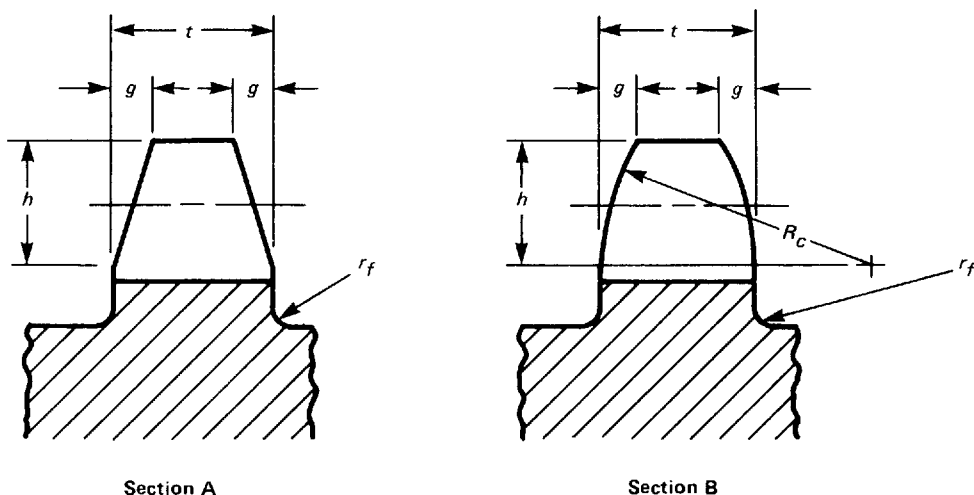
- h = approximately $0.5P$ = depth of chamfer
 g = approximately $1/8P$ (but not to exceed $W/3$)
 R_c = $1.063P$ (approximately tangent to side) = chamfer radius
 r_f max. = $0.04P$ for maximum hub diameter = fillet radius
 t = thickness

GENERAL NOTE:

The sprocket chamfer dimensions (R_c , g , and h) are noncritical and are given only as a guide for general design proportions.

TABLE 7A SPROCKET TOOTH SECTION PROFILE DIMENSIONS OF COMMERCIAL AND PRECISION SPROCKETS, in.

Standard Chain No.	Chain Pitch P	Depth of Chamfer h	Width of Chamfer g	Radius R_c	Transverse Pitch K	
					Standard Series	Heavy Series
25	0.250	0.125	0.031	0.265	0.252	...
35	0.375	0.188	0.047	0.398	0.399	...
41	0.500	0.250	0.062	0.531	...	...
40	0.500	0.250	0.062	0.531	0.566	...
50	0.625	0.312	0.078	0.664	0.713	...
60	0.750	0.375	0.094	0.796	0.897	1.028
80	1.000	0.500	0.125	1.062	1.153	1.283
100	1.250	0.625	0.156	1.327	1.408	1.539
120	1.500	0.750	0.188	1.593	1.789	1.924
140	1.750	0.875	0.219	1.858	1.924	2.055
160	2.000	1.000	0.250	2.124	2.305	2.437
180	2.250	1.125	0.281	2.392	2.592	2.723
200	2.500	1.250	0.312	2.654	2.817	3.083
240	3.000	1.500	0.375	3.187	3.458	3.985



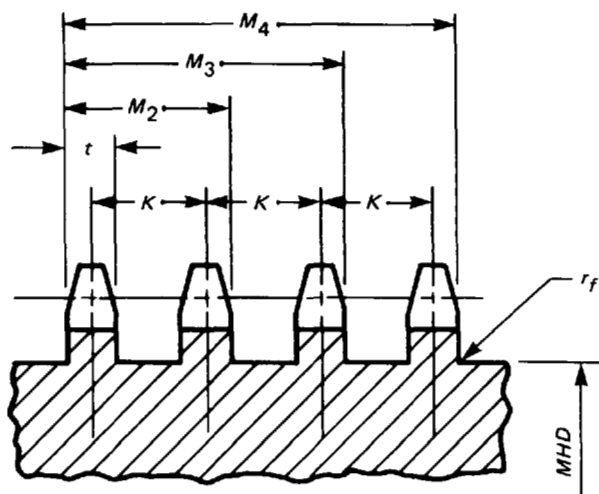
h = approximately $0.5P$ = depth of chamfer
 g = approximately $1/8P$ (but not to exceed $W/3$)
 R_c = $1.063P$ (approximately tangent to side) = chamfer radius
 $r_{f \text{ max.}}$ = $0.04P$ for maximum hub diameter = fillet radius
 t = thickness

GENERAL NOTE:

The sprocket chamfer dimensions (R_c , g , and h)
 are noncritical and are given only as a guide for
 general design proportions.

**TABLE 7B SPROCKET TOOTH SECTION PROFILE DIMENSIONS OF
COMMERCIAL AND PRECISION SPROCKETS, mm**

Standard Chain No.	Chain Pitch P	Depth of Chamfer h	Width of Chamfer g	Radius R_c	Transverse Pitch K	
					Standard Series	Heavy Series
25	6.35	3.18	0.787	6.73	6.40	...
35	9.52	4.78	1.19	10.11	10.13	...
41	12.70	6.35	1.57	13.49	...	...
40	12.70	6.35	1.57	13.49	14.38	...
50	15.88	7.92	1.98	16.87	18.11	...
60	19.05	9.52	2.39	20.22	22.78	26.11
80	25.40	12.70	3.18	26.97	29.29	32.59
100	31.75	15.88	3.96	33.71	35.76	39.09
120	38.10	19.05	4.78	40.46	45.44	48.87
140	44.45	22.22	5.56	47.19	48.87	52.20
160	50.80	25.40	6.35	53.95	58.55	61.90
180	57.15	28.58	7.14	60.76	65.84	69.16
200	63.50	31.75	7.92	67.41	71.55	78.31
240	76.20	38.10	9.52	80.95	87.83	101.22



- P = chain pitch
 W = nominal chain width (see Table 9A or 9B)
 LPT = nominal thickness of link plates
 MHD = maximum hub and groove diameter
 $r_f \text{ max.} = 0.04P$ for maximum hub diameter = fillet radius
 t_1 = maximum thickness for single strand chain, in.
 $\quad = 0.93W - 0.006$
 t_2 = maximum thickness for double and triple strand chain, in.
 $\quad = 0.90W - 0.006$
 t_4 = maximum thickness for quadruple strand chain and over, in.
 $\quad = 0.86W - 0.012$
 K = transverse pitch for multiple strand chain
 $\quad = W + 4.22 (LPT)$
 $M_2, M_3,$
 $M_4, \text{ etc.} = K (\text{strand multiple} - 1) + t$

Tolerance on t and $M_2, M_3, M_4, \text{ etc.}$:

Commercial Sprockets

t = plus zero, minus AISI weight tolerance for hot rolled plate converted to linear measure. See Table 9A (in.) or 9B (mm).

M = plus or minus $(0.01W + 0.006)$, in.

Precision Sprockets

t, M = plus zero, minus $(0.01W + 0.006)$, in.

Maximum variation in thickness of any individual flange

Commercial = total tolerance

Precision = one-half total tolerance

FIG. 5 SPROCKET FLANGE LOCATION AND THICKNESS

**TABLE 8A MAXIMUM ECCENTRICITY
AND FACE RUNOUT TOLERANCES FOR
COMMERCIAL SPROCKETS (MEASURED
AS TOTAL INDICATOR READING), in.**

Sprocket Bottom Diam. <i>BD</i>	Maximum Eccentricity	Maximum Face Runout
0 – 7.000	$0.010 + 0.001(BD)$	0.020
7.001 – 20.000	$0.010 + 0.001(BD)$	$0.003(BD)$
20.001 – 30.000	0.030	$0.003(BD)$
30.001 and over	0.030	0.090

**TABLE 8B MAXIMUM ECCENTRICITY
AND FACE RUNOUT TOLERANCES FOR
COMMERCIAL SPROCKETS (MEASURED
AS TOTAL INDICATOR READING), mm**

Sprocket Bottom Diam. <i>BD</i>	Maximum Eccentricity	Maximum Face Runout
0 – 177.80	$0.25 + 0.001(BD)$	0.51
177.81 – 508.00	$0.25 + 0.001(BD)$	$0.003(BD)$
508.01 – 762.00	0.76	$0.003(BD)$
762.01 and over	0.76	2.29

**TABLE 8C MAXIMUM ECCENTRICITY
AND FACE RUNOUT TOLERANCES FOR
PRECISION SPROCKETS (MEASURED AS
TOTAL INDICATOR READING), in.**

Sprocket Bottom Diam. <i>BD</i>	Maximum Eccentricity	Maximum Face Runout
0 – 4.000	0.006	0.010
4.001 – 6.000	0.008	0.010
6.001 – 10.000	0.010	0.010
10.001 – 26.000	$0.001(BD)$	$0.001(BD)$
26.001 – 40.000	0.026	$0.001(BD)$
40.001 and over	0.026	0.040

**TABLE 8D MAXIMUM ECCENTRICITY
AND FACE RUNOUT TOLERANCES FOR
PRECISION SPROCKETS (MEASURED AS
TOTAL INDICATOR READING), mm**

Sprocket Bottom Diam. <i>BD</i>	Maximum Eccentricity	Maximum Face Runout
0 – 101.60	0.15	0.25
101.61 – 152.40	0.20	0.25
152.41 – 254.00	0.25	0.25
254.01 – 660.40	$0.001(BD)$	$0.001(BD)$
660.41 – 1016.00	0.66	$0.001(BD)$
1016.01 and over	0.66	1.02

TABLE 9A SPROCKET FLANGE THICKNESS, in.

Standard Chain No.	Width of Chain <i>W</i>	Maximum Sprocket Flange Thickness <i>t</i>			Tolerance on <i>t</i>		Tolerance on <i>M</i>		Max. Variation of <i>t</i> on Each Flange	
		Single	Double and Triple	Quad. and Over	Minus Tolerance on <i>t</i>		Commercial, Plus or Minus	Precision, Minus Only	Commercial	Precision
					Commercial	Precision				
25	0.125	0.110	0.106	0.096	0.021	0.007	0.007	0.007	0.021	0.004
35	0.188	0.169	0.163	0.150	0.027	0.008	0.008	0.008	0.027	0.004
41	0.250	0.226	...	...	0.032	0.009	...	...	0.032	0.004
40	0.312	0.284	0.275	0.256	0.035	0.009	0.009	0.009	0.035	0.004
50	0.375	0.343	0.332	0.310	0.036	0.010	0.010	0.010	0.036	0.005
60	0.500	0.459	0.444	0.418	0.036	0.011	0.011	0.011	0.036	0.006
80	0.625	0.575	0.556	0.526	0.040	0.012	0.012	0.012	0.040	0.006
100	0.750	0.692	0.669	0.633	0.046	0.014	0.014	0.014	0.046	0.007
120	1.000	0.924	0.894	0.848	0.057	0.016	0.016	0.016	0.057	0.008
140	1.000	0.924	0.894	0.848	0.057	0.016	0.016	0.016	0.057	0.008
160	1.250	1.156	1.119	1.063	0.062	0.018	0.018	0.018	0.062	0.009
180	1.406	1.302	1.259	1.198	0.068	0.020	0.020	0.020	0.068	0.010
200	1.500	1.389	1.344	1.278	0.072	0.021	0.021	0.021	0.072	0.010
240	1.875	1.738	1.682	1.602	0.087	0.025	0.025	0.025	0.087	0.012

TABLE 9B SPROCKET FLANGE THICKNESS, mm

Standard Chain No.	Width of Chain <i>W</i>	Maximum Sprocket Flange Thickness <i>t</i>			Tolerance on <i>t</i>		Tolerance on <i>M</i>		Max. Variation of <i>t</i> on Each Flange	
		Single	Double and Triple	Quad. and Over	Minus Tolerance on <i>t</i>		Commercial, Plus or Minus	Precision, Minus Only	Commercial	Precision
					Commercial	Precision				
25	3.18	2.79	2.69	2.44	0.53	0.18	0.18	0.18	0.53	0.10
35	4.78	4.29	4.14	3.81	0.69	0.20	0.20	0.20	0.69	0.10
41	6.35	5.74	...	...	0.81	0.23	...	...	0.81	0.10
40	7.92	7.21	6.98	6.50	0.89	0.23	0.23	0.23	0.89	0.10
50	9.52	8.71	8.43	7.87	0.91	0.25	0.25	0.25	0.91	0.13
60	12.70	11.66	11.28	10.62	0.91	0.28	0.28	0.28	0.91	0.15
80	15.88	14.60	14.12	13.36	1.02	0.30	0.30	0.30	1.02	0.15
100	19.05	17.58	16.99	16.08	1.17	0.36	0.36	0.36	1.17	0.18
120	25.40	23.47	22.71	21.54	1.45	0.41	0.41	0.41	1.45	0.20
140	25.40	23.47	22.71	21.54	1.45	0.41	0.41	0.41	1.45	0.20
160	31.75	29.36	28.42	27.00	1.57	0.46	0.46	0.46	1.57	0.23
180	35.71	33.07	31.98	30.43	1.73	0.51	0.51	0.51	1.73	0.25
200	38.10	35.28	34.14	32.46	1.83	0.53	0.53	0.53	1.83	0.25
240	47.62	44.15	42.72	40.69	2.21	0.64	0.64	0.64	2.21	0.30

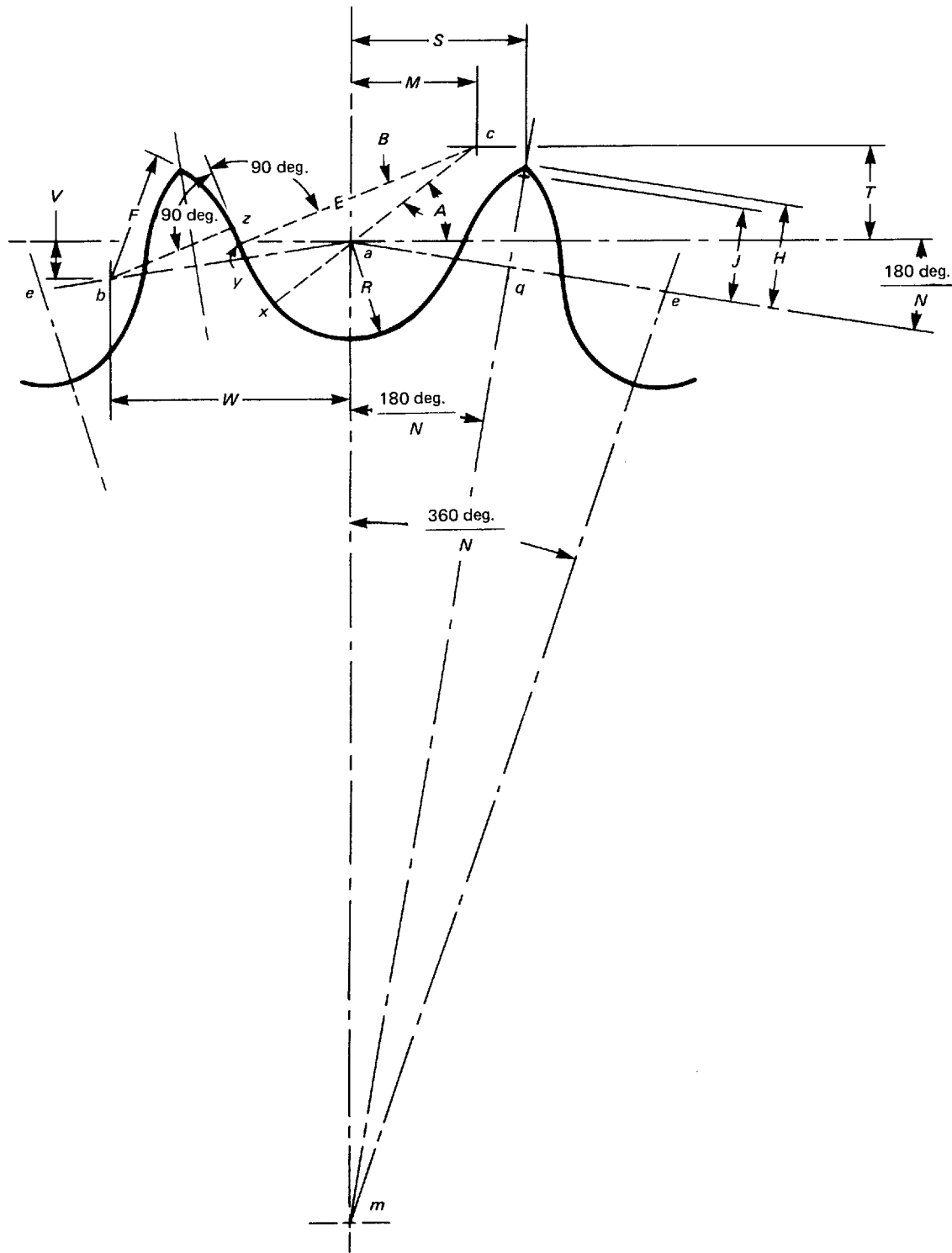


FIG. 6 THEORETICAL TOOTH FORM

P = chain pitch (ae) N = number of teeth D_r = roller diameter D_s = seating curve diameter
= $1.005 D_r + 0.003$, in.

$$R = \frac{D_s}{2} = 0.5025 D_r + 0.0015, \text{ in.}$$

$$A = 35 \text{ deg.} + \frac{60 \text{ deg.}}{N}$$

$$B = 18 \text{ deg.} - \frac{56 \text{ deg.}}{N}$$

$$ac = 0.8 D_r$$

$$M = 0.8 D_r \cos \left(35 \text{ deg.} + \frac{60 \text{ deg.}}{N} \right)$$

$$T = 0.8 D_r \sin \left(35 \text{ deg.} + \frac{60 \text{ deg.}}{N} \right)$$

$$E = 1.3025 D_r + 0.0015, \text{ in.}$$

Chordal length of arc xy

$$= (2.605 D_r + 0.003) \sin \left(9 \text{ deg.} - \frac{28 \text{ deg.}}{N} \right), \text{ in.}$$

Chord yz

$$= D_r \left[1.4 \sin \left(17 \text{ deg.} - \frac{64 \text{ deg.}}{N} \right) - 0.8 \sin \left(18 \text{ deg.} - \frac{56 \text{ deg.}}{N} \right) \right]$$

$$ab = 1.4 D_r$$

$$W = 1.4 D_r \cos \frac{180 \text{ deg.}}{N}$$

$$V = 1.4 D_r \sin \frac{180 \text{ deg.}}{N}$$

$$F = D_r \left[0.8 \cos \left(18 \text{ deg.} - \frac{56 \text{ deg.}}{N} \right) + 1.4 \cos \left(17 \text{ deg.} - \frac{64 \text{ deg.}}{N} \right) - 1.3025 \right] - 0.0015, \text{ in.}$$

$$H = \sqrt{F^2 - \left(1.4 D_r - \frac{P}{2} \right)^2}$$

$$S = \frac{P}{2} \cos \frac{180 \text{ deg.}}{N} + H \sin \frac{180 \text{ deg.}}{N}$$

Approximate outside diameter of sprocket when J is $0.3P$

$$= P \left(0.6 + \cot \frac{180 \text{ deg.}}{N} \right)$$

Outside diameter of sprocket when tooth is pointed

$$= P \cot \frac{180 \text{ deg.}}{N} + \cos \frac{180 \text{ deg.}}{N} (D_s - D_r) + 2H$$

The pressure angle for a new chain is Xab

$$= 35 \text{ deg.} - \frac{120 \text{ deg.}}{N}$$

The minimum pressure angle is $Xab - B$

$$= 17 \text{ deg.} - \frac{64 \text{ deg.}}{N}$$

The average pressure angle

$$= 26 \text{ deg.} - \frac{92 \text{ deg.}}{N}$$

 Ht = circular addendum = $J - (ma - mq)$

$$= P \left(0.3 - \frac{\tan \frac{90 \text{ deg.}}{N_a}}{2} \right)$$

 N_a = intermediate number of teeth for topping hob range WD = whole depth of topping hob cut

$$= \frac{D_r}{2} + Ht = \frac{D_r}{2} + P \left(0.3 - \frac{\tan \frac{90 \text{ deg.}}{N_a}}{2} \right)$$

FIG. 6 THEORETICAL TOOTH FORM (CONT'D)

**TABLE 10A SEATING CURVE DIMENSIONS
AND TOLERANCES, in.**

Chain Pitch <i>P</i>	Roller Diam. <i>D_r</i>	Minimum Seating Curve Radius <i>R</i>	Minimum Seating Curve Diam. <i>D_s</i>	Plus Tolerance on <i>D_s</i> (1)
0.250	0.130	0.0670	0.134	0.0055
0.375	0.200	0.1020	0.204	0.0055
0.500	0.306, 0.312	0.1585	0.317	0.0060
0.625	0.400	0.2025	0.405	0.0060
0.750	0.469	0.2370	0.474	0.0065
1.000	0.625	0.3155	0.631	0.0070
1.250	0.750	0.3785	0.757	0.0070
1.500	0.875	0.4410	0.882	0.0075
1.750	1.000	0.5040	1.008	0.0080
2.000	1.125	0.5670	1.134	0.0085
2.250	1.406	0.7080	1.416	0.0090
2.500	1.562	0.7870	1.573	0.0095
3.000	1.875	0.9435	1.887	0.0105

NOTE:

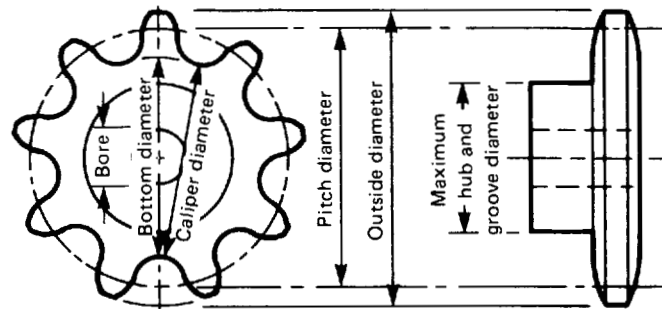
(1) Plus only; no minus tolerance.

**TABLE 10B SEATING CURVE DIMENSIONS
AND TOLERANCES, mm**

Chain Pitch <i>P</i>	Roller Diam. <i>D_r</i>	Minimum Seating Curve Radius <i>R</i>	Minimum Seating Curve Diam. <i>D_s</i>	Plus Tolerance on <i>D_s</i> (1)
6.35	3.30	1.70	3.40	0.14
9.52	5.08	2.59	5.18	0.14
12.70	7.77, 7.92	4.03	8.05	0.15
15.88	10.16	5.14	10.29	0.15
19.05	11.91	6.02	12.04	0.17
25.40	15.88	8.01	16.03	0.18
31.75	19.05	9.61	19.23	0.18
38.10	22.22	11.20	22.40	0.19
44.45	25.40	12.80	25.60	0.20
50.80	28.58	14.40	28.80	0.22
57.15	35.71	17.98	35.97	0.23
63.50	39.67	19.99	39.95	0.24
76.20	47.62	23.96	47.93	0.27

NOTE:

(1) Plus only; no minus tolerance.



P = chain pitch

PD = pitch diameter

D_r = roller diameter

N = number of teeth

Pitch diameter of sprocket

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

Bottom diameter of sprocket

$$= PD - D_r$$

Caliper diameter for even number of teeth

$$= \text{bottom diameter}$$

Caliper diameter for odd number of teeth

$$= PD \left(\cos \frac{90 \text{ deg.}}{N} \right) - D_r$$

Tolerances on Caliper Diameter of Sprockets

Plus Tolerance = 0.000

Minus Tolerances

Commercial = $0.002 P \sqrt{N} + 0.006$, in.

Precision = $0.001 P \sqrt{N} + 0.003$, in.

Approximate outside diameter of turned sprocket

$$= P \left(0.6 + \cot \frac{180 \text{ deg.}}{N} \right)$$

Outside diameter of topping hob cut sprocket [Note (1)]

$$= PD - D_r + 2WD$$

Maximum hub and groove diameter (MHD) of sprockets

$$= P \left(\cot \frac{180 \text{ deg.}}{N} - 1 \right) - 0.030, \text{ in.}$$

NOTE:

(1) This dimension was added to this Standard in 1984 as a desirable goal for the future. It should in no way obsolete existing tools or sprockets.

FIG. 7 SPROCKET DIAMETERS

TABLE 11A MINUS TOLERANCES¹ ON THE CALIPER DIAMETERS OF COMMERCIAL SPROCKETS FOR VARIOUS NUMBERS OF TEETH, in.

Chain Pitch <i>P</i>	Number of Teeth									
	Up to 15	16-24	25-35	36-48	49-63	64-80	81-99	100-120	121-143	144 and Over
0.250	0.008	0.008	0.008	0.010	0.010	0.010	0.010	0.012	0.012	0.012
0.375	0.008	0.008	0.008	0.010	0.010	0.012	0.012	0.012	0.014	0.014
0.500	0.008	0.010	0.011	0.012	0.013	0.014	0.015	0.016	0.017	0.018
0.625	0.010	0.011	0.012	0.014	0.016	0.018	0.018	0.018	0.020	0.022
0.750	0.010	0.012	0.014	0.016	0.018	0.020	0.020	0.022	0.024	0.026
1.000	0.012	0.014	0.016	0.018	0.020	0.022	0.024	0.026	0.028	0.030
1.250	0.014	0.016	0.018	0.020	0.024	0.026	0.028	0.032	0.034	0.036
1.500	0.014	0.018	0.021	0.024	0.026	0.030	0.032	0.036	0.038	0.042
1.750	0.016	0.020	0.024	0.026	0.030	0.034	0.038	0.040	0.044	0.048
2.000	0.018	0.022	0.026	0.030	0.034	0.038	0.042	0.046	0.050	0.054
2.250	0.020	0.024	0.028	0.032	0.036	0.042	0.046	0.050	0.056	0.060
2.500	0.020	0.026	0.030	0.036	0.040	0.046	0.050	0.056	0.060	0.066
3.000	0.024	0.030	0.036	0.042	0.048	0.054	0.060	0.066	0.072	0.078

NOTE:

(1) No plus tolerance.

TABLE 11B MINUS TOLERANCES¹ ON THE CALIPER DIAMETERS OF COMMERCIAL SPROCKETS FOR VARIOUS NUMBERS OF TEETH, mm

Chain Pitch <i>P</i>	Number of Teeth									
	Up to 15	16-24	25-35	36-48	49-63	64-80	81-99	100-120	121-143	144 and Over
6.35	0.20	0.20	0.20	0.25	0.25	0.25	0.25	0.30	0.30	0.30
9.52	0.20	0.20	0.20	0.25	0.25	0.30	0.30	0.30	0.36	0.36
12.70	0.20	0.25	0.28	0.30	0.33	0.36	0.38	0.41	0.43	0.46
15.88	0.25	0.28	0.30	0.36	0.41	0.46	0.46	0.46	0.51	0.56
19.05	0.25	0.30	0.36	0.41	0.46	0.51	0.51	0.56	0.61	0.66
25.40	0.30	0.36	0.41	0.46	0.51	0.56	0.61	0.66	0.71	0.76
31.75	0.36	0.41	0.46	0.51	0.61	0.66	0.71	0.81	0.86	0.91
38.10	0.36	0.46	0.53	0.61	0.66	0.76	0.81	0.91	0.97	1.07
44.45	0.41	0.51	0.61	0.66	0.76	0.86	0.97	1.02	1.12	1.22
50.80	0.46	0.56	0.66	0.76	0.86	0.97	1.07	1.17	1.27	1.37
57.15	0.51	0.61	0.71	0.81	0.91	1.07	1.17	1.27	1.42	1.52
63.50	0.51	0.66	0.76	0.91	1.02	1.17	1.27	1.42	1.52	1.68
76.20	0.61	0.76	0.91	1.07	1.22	1.37	1.52	1.68	1.83	1.98

NOTE:

(1) No plus tolerance.

TABLE 11C MINUS TOLERANCES¹ ON THE CALIPER DIAMETERS OF PRECISION SPROCKETS FOR VARIOUS NUMBERS OF TEETH, in.

Chain Pitch <i>P</i>	Number of Teeth									
	Up to 15	16-24	25-35	36-48	49-63	64-80	81-99	100-120	121-143	144 and Over
0.250	0.004	0.004	0.004	0.005	0.005	0.005	0.005	0.006	0.006	0.006
0.375	0.004	0.004	0.004	0.005	0.005	0.006	0.006	0.006	0.007	0.007
0.500	0.004	0.005	0.0055	0.006	0.0065	0.007	0.0075	0.008	0.0085	0.009
0.625	0.005	0.0055	0.006	0.007	0.008	0.009	0.009	0.009	0.010	0.011
0.750	0.005	0.006	0.007	0.008	0.009	0.010	0.010	0.011	0.012	0.013
1.000	0.006	0.007	0.008	0.009	0.010	0.011	0.012	0.013	0.014	0.015
1.250	0.007	0.008	0.009	0.010	0.012	0.013	0.014	0.016	0.017	0.018
1.500	0.007	0.009	0.0105	0.012	0.013	0.015	0.016	0.018	0.019	0.021
1.750	0.008	0.010	0.012	0.013	0.015	0.017	0.019	0.020	0.022	0.024
2.000	0.009	0.011	0.013	0.015	0.017	0.019	0.021	0.023	0.025	0.027
2.250	0.010	0.012	0.014	0.016	0.018	0.021	0.023	0.025	0.028	0.030
2.500	0.010	0.013	0.015	0.018	0.020	0.023	0.025	0.028	0.030	0.033
3.000	0.012	0.015	0.018	0.021	0.024	0.027	0.030	0.033	0.036	0.039

NOTE:

(1) No plus tolerance.

TABLE 11D MINUS TOLERANCES¹ ON THE CALIPER DIAMETERS OF PRECISION SPROCKETS FOR VARIOUS NUMBERS OF TEETH, mm

Chain Pitch <i>P</i>	Number of Teeth									
	Up to 15	16-24	25-35	36-48	49-63	64-80	81-99	100-120	121-143	144 and Over
6.35	0.10	0.10	0.10	0.13	0.13	0.13	0.13	0.15	0.15	0.15
9.52	0.10	0.10	0.10	0.13	0.13	0.15	0.15	0.15	0.18	0.18
12.70	0.10	0.13	0.14	0.15	0.17	0.18	0.19	0.20	0.22	0.23
15.88	0.13	0.14	0.15	0.18	0.20	0.23	0.23	0.23	0.25	0.28
19.05	0.13	0.15	0.18	0.20	0.23	0.25	0.25	0.28	0.30	0.33
25.40	0.15	0.18	0.20	0.23	0.25	0.28	0.30	0.33	0.36	0.38
31.75	0.18	0.20	0.23	0.25	0.30	0.33	0.36	0.41	0.43	0.46
38.10	0.18	0.23	0.27	0.30	0.33	0.38	0.41	0.46	0.48	0.53
44.45	0.20	0.25	0.30	0.33	0.38	0.43	0.48	0.51	0.56	0.61
50.80	0.23	0.28	0.33	0.38	0.43	0.48	0.53	0.58	0.64	0.69
57.15	0.25	0.30	0.36	0.41	0.46	0.53	0.58	0.64	0.71	0.76
63.50	0.25	0.33	0.38	0.46	0.51	0.58	0.64	0.71	0.76	0.84
76.20	0.30	0.38	0.46	0.53	0.61	0.69	0.76	0.84	0.91	0.99

NOTE:

(1) No plus tolerance.

**TABLE 12 PITCH DIAMETER, OUTSIDE DIAMETER, AND MEASURING DIMENSION FACTOR
FOR CHAIN OF UNITY PITCH**

Number of Teeth	Pitch Diameter	Turned Outside Diameter	Topping Hob Cut Outside Diameter	Caliper Diameter Factor	Number of Teeth	Pitch Diameter	Turned Outside Diameter	Topping Hob Cut Outside Diameter	Caliper Diameter Factor
5	1.7013	1.976	1.976	1.6180	49	15.6079	16.176	16.180	15.5999
6	2.0000	2.332	2.332	...	50	15.9260	16.495	16.498	...
7	2.3048	2.676	2.691	2.2470	51	16.2441	16.813	16.816	16.2364
8	2.6131	3.014	3.000	...	52	16.5622	17.132	17.134	...
9	2.9238	3.348	3.364	2.8794	53	16.8803	17.451	17.452	16.8729
10	3.2361	3.678	3.676	...	54	17.1984	17.769	17.770	...
11	3.5495	4.006	3.990	3.5133	55	17.5165	18.088	18.089	17.5094
12	3.8637	4.332	4.352	...	56	17.8347	18.407	18.407	...
13	4.1786	4.657	4.666	4.1481	57	18.1528	18.725	18.725	18.1459
14	4.4940	4.981	4.982	...	58	18.4710	19.044	19.043	...
15	4.8097	5.304	5.298	4.7834	59	18.7892	19.363	19.361	18.7825
16	5.1258	5.627	5.614	...	60	19.1073	19.681	19.680	...
17	5.4422	5.949	5.930	5.4190	61	19.4255	20.000	19.998	19.4190
18	5.7588	6.271	6.292	...	62	19.7437	20.318	20.316	...
19	6.0755	6.593	6.609	6.0548	63	20.0618	20.637	20.634	20.0556
20	6.3924	6.914	6.926	...	64	20.3800	20.956	20.952	...
21	6.7095	7.235	7.243	6.6907	65	20.6982	21.274	21.270	20.6921
22	7.0267	7.555	7.560	...	66	21.0164	21.593	21.588	...
23	7.3439	7.876	7.877	7.3268	67	21.3346	21.911	21.907	21.3287
24	7.6613	8.196	8.195	...	68	21.6528	22.230	22.225	...
25	7.9787	8.516	8.512	7.9630	69	21.9710	22.548	22.543	21.9653
26	8.2962	8.836	8.829	...	70	22.2892	22.867	22.861	...
27	8.6138	9.156	9.147	8.5992	71	22.6074	23.185	23.179	22.6018
28	8.9314	9.475	9.465	...	72	22.9256	23.504	23.498	...
29	9.2491	9.795	9.782	9.2355	73	23.2438	23.822	23.816	23.2384
30	9.5668	10.114	10.100	...	74	23.5620	24.141	24.134	...
31	9.8845	10.434	10.418	9.8718	75	23.8802	24.459	24.452	23.8750
32	10.2023	10.753	10.736	...	76	24.1984	24.778	24.770	...
33	10.5201	11.073	11.053	10.5082	77	24.5166	25.096	25.089	24.5116
34	10.8379	11.392	11.371	...	78	24.8349	25.415	25.407	...
35	11.1558	11.711	11.728	11.1446	79	25.1531	25.733	25.725	25.1481
36	11.4737	12.030	12.046	...	80	25.4713	26.052	26.043	...
37	11.7916	12.349	12.364	11.7810	81	25.7896	26.370	26.362	25.7847
38	12.1095	12.668	12.682	...	82	26.1078	26.689	26.680	...
39	12.4275	12.987	13.000	12.4174	83	26.4260	27.007	26.998	26.4213
40	12.7455	13.306	13.318	...	84	26.7443	27.326	27.316	...
41	13.0635	13.625	13.636	13.0539	85	27.0625	27.644	27.635	27.0579
42	13.3815	13.944	13.954	...	86	27.3807	27.962	27.953	...
43	13.6995	14.263	14.272	13.6904	87	27.6990	28.281	28.271	27.6945
44	14.0175	14.582	14.590	...	88	28.0172	28.599	28.589	...
45	14.3355	14.901	14.908	14.3269	89	28.3354	28.918	28.907	28.3310
46	14.6536	15.219	15.226	...	90	28.6537	29.236	29.226	...
47	14.9717	15.538	15.544	14.9634	91	28.9719	29.555	29.544	28.9676
48	15.2898	15.857	15.862	...	92	29.2902	29.873	29.862	...

(Table 12 continues on next page)

**TABLE 12 PITCH DIAMETER, OUTSIDE DIAMETER, AND MEASURING DIMENSION FACTOR
FOR CHAIN OF UNITY PITCH (CONT'D)**

Number of Teeth	Pitch Diameter	Turned Outside Diameter	Topping Hob Cut Outside Diameter	Caliper Diameter Factor	Number of Teeth	Pitch Diameter	Turned Outside Diameter	Topping Hob Cut Outside Diameter	Caliper Diameter Factor
93	29.6081	30.192	30.180	29.6042	137	43.6123	44.201	44.184	43.6094
94	29.9267	30.510	30.499	...	138	43.9306	44.519	44.503	...
95	30.2449	30.828	30.817	30.2408	139	44.2488	44.838	44.821	44.2460
96	30.5632	31.147	31.135	...	140	44.5671	45.156	45.139	...
97	30.8815	31.465	31.454	30.8774	141	44.8854	45.474	45.457	44.8826
98	31.1997	31.784	31.772	...	142	45.2037	45.793	45.776	...
99	31.5180	32.102	32.090	31.5140	143	45.5220	46.111	46.094	45.5192
100	31.8362	32.421	32.408	...	144	45.8402	46.429	46.412	...
101	32.1545	32.739	32.727	32.1506	145	46.1585	46.748	46.731	46.1558
102	32.4727	33.057	33.045	...	146	46.4768	47.066	47.049	...
103	32.7910	33.376	33.363	32.7872	147	46.7951	47.384	47.367	46.7924
104	33.1093	33.694	33.681	...	148	47.1134	47.703	47.685	...
105	33.4275	34.013	34.000	33.4238	149	47.4317	48.021	48.004	47.4290
106	33.7458	34.331	34.318	...	150	47.7500	48.340	48.322	...
107	34.0641	34.649	34.636	34.0604	151	48.0683	48.658	48.640	48.0657
108	34.3823	34.968	34.954	...	152	48.3865	48.976	48.959	...
109	34.7006	35.286	35.273	34.6970	153	48.7048	49.295	49.277	48.7023
110	35.0188	35.605	35.591	...	154	49.0231	49.613	49.595	...
111	35.3371	35.923	35.909	35.3336	155	49.3414	49.931	49.913	49.3389
112	35.6554	36.241	36.227	...	156	49.6597	50.250	50.232	...
113	35.9736	36.560	36.546	35.9702	157	49.9780	50.568	50.550	49.9755
114	36.2919	36.878	36.864	...	158	50.2963	50.886	50.868	...
115	36.6102	37.197	37.182	36.6068	159	50.6146	51.205	51.187	50.6121
116	36.9285	37.515	37.501	...	160	50.9329	51.523	51.505	...
117	37.2467	37.833	37.819	37.2434	161	51.2511	51.841	51.823	51.2487
118	37.5650	38.152	38.137	...	162	51.5694	52.160	52.141	...
119	37.8833	38.470	38.455	37.8800	163	51.8877	52.478	52.460	51.8853
120	38.2015	38.788	38.774	...	164	52.2060	52.796	52.778	...
121	38.5198	39.107	39.092	38.5166	165	52.5243	53.115	53.096	52.5219
122	38.8381	39.425	39.410	...	166	52.8426	53.433	53.415	...
123	39.1564	39.744	39.728	39.1532	167	53.1609	53.752	53.733	53.1585
124	39.4746	40.062	40.047	...	168	53.4792	54.070	54.051	...
125	39.7929	40.380	40.365	39.7898	169	53.7975	54.388	54.370	53.7951
126	40.1112	40.699	40.683	...	170	54.1157	54.707	54.688	...
127	40.4295	41.017	41.002	40.4264	171	54.4340	55.025	55.006	54.4317
128	40.7477	41.335	41.320	...	172	54.7523	55.343	55.324	...
129	41.0660	41.654	41.638	41.0630	173	55.0706	55.662	55.643	55.0684
130	41.3843	41.972	41.956	...	174	55.3889	55.980	55.961	...
131	41.7026	42.291	42.275	41.6996	175	55.7072	56.298	56.279	55.7050
132	42.0209	42.609	42.593	...	176	56.0255	56.617	56.598	...
133	42.3392	42.927	42.911	42.3362	177	56.3438	56.935	56.916	56.3416
134	42.6574	43.246	43.229	...	178	56.6621	57.253	57.234	...
135	42.9757	43.564	43.548	42.9728	179	56.9804	57.572	57.552	56.9782
136	43.2940	43.882	43.866	...	180	57.2987	57.890	57.871	...

(Table 12 continues on next page)

ASME B29.1M-1993

PRECISION POWER TRANSMISSION
ROLLER CHAINS, ATTACHMENTS, AND SPROCKETS**TABLE 12 PITCH DIAMETER, OUTSIDE DIAMETER, AND MEASURING DIMENSION FACTOR
FOR CHAIN OF UNITY PITCH (CONT'D)**

Number of Teeth	Pitch Diameter	Turned Outside Diameter	Topping Hob Cut Outside Diameter	Caliper Diameter Factor	Number of Teeth	Pitch Diameter	Turned Outside Diameter	Topping Hob Cut Outside Diameter	Caliper Diameter Factor
181	57.6170	58.208	58.189	57.6148	191	60.7999	61.392	61.372	60.7979
182	57.9353	58.527	58.507	...	192	61.1182	61.710	61.690	...
183	58.2536	58.845	58.826	58.2514	193	61.4365	62.028	62.009	61.4345
184	58.5719	59.163	59.144	...	194	61.7548	62.347	62.327	...
185	58.8901	59.482	59.462	58.8880	195	62.0731	62.665	62.645	62.0711
186	59.2084	59.800	59.780	...	196	62.3914	62.983	62.963	...
187	59.5267	60.118	60.099	59.5246	197	62.7097	63.302	63.282	62.7077
188	59.8450	60.437	60.417	...	198	63.0280	63.620	63.600	...
189	60.1633	60.755	60.735	60.1612	199	63.3463	63.938	63.918	63.3443
190	60.4816	61.073	61.054	...	200	63.6646	64.257	64.237	...

TABLE 13A WHOLE DEPTH OF TOPPING HOB CUT *WD* FOR EACH PITCH AND RANGE, in.

Teeth Range	Number of Teeth N_a	Chain Pitch P												
		0.250	0.375	0.500 (1)	0.625	0.750	1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.00
5	5	0.0994	0.1516	0.2248	0.2860	0.3377	0.4500	0.5469	0.6438	0.7407	0.8376	1.0125	1.1253	1.3501
6	6	0.1065	0.1623	0.2390	0.3038	0.3590	0.4785	0.5825	0.6865	0.7905	0.8945	1.0766	1.1966	1.4356
7 – 8	7.47	0.1133	0.1725	0.2526	0.3208	0.3795	0.5058	0.6166	0.7274	0.8382	0.9491	1.1379	1.2647	1.5173
9 – 11	9.9	0.1200	0.1825	0.2660	0.3375	0.3995	0.5325	0.6500	0.7675	0.8850	1.0025	1.1980	1.3315	1.5975
12 – 17	14.07	0.1260	0.1915	0.2780	0.3525	0.4175	0.5564	0.6799	0.8034	0.9269	1.0504	1.2519	1.3914	1.6693
18 – 34	23.54	0.1316	0.2000	0.2890	0.3666	0.4344	0.5791	0.7082	0.8374	0.9665	1.0957	1.3028	1.4480	1.7373
35 and over	56	0.1365	0.2072	0.2990	0.3787	0.4490	0.5985	0.7325	0.8665	1.0004	1.1344	1.3464	1.4964	1.7954

NOTE:

(1) Roller diameter 0.312 in.

TABLE 13B WHOLE DEPTH OF TOPPING HOB CUT *WD* FOR EACH PITCH AND RANGE, mm

Teeth Range	Number of Teeth N_d	Chain Pitch P												
		6.35	9.52	12.70 (1)	15.88	19.05	25.4	31.75	38.10	44.45	50.80	57.15	63.50	76.20
5	5	2.525	3.851	5.710	7.264	8.578	11.430	13.891	16.353	18.814	21.275	25.718	28.583	34.293
6	6	2.705	4.122	6.071	7.717	9.119	12.154	14.796	17.437	20.079	22.720	27.346	30.394	36.464
7 – 8	7.47	2.878	4.382	6.416	8.148	9.639	12.847	15.662	18.476	21.290	24.107	28.903	32.123	38.539
9 – 11	9.9	3.048	4.636	6.756	8.573	10.147	13.526	16.510	19.495	22.479	25.464	30.429	33.820	40.577
12 – 17	14.07	3.200	4.864	7.061	8.954	10.605	14.133	17.269	20.406	23.543	26.680	31.798	35.342	42.400
18 – 34	23.54	3.343	5.080	7.341	9.312	11.034	14.709	17.988	21.270	24.549	27.831	33.091	36.779	44.127
35 and over	56	3.467	5.263	7.595	9.619	11.405	15.202	18.606	22.009	25.410	28.814	34.199	38.009	45.603

NOTE:

(1) Roller diameter 7.925 mm.

SUPPLEMENTARY INFORMATION

The material that follows is for informational purposes only. It is not, and should not be considered to be, part of ASME B29.1M-1993.

A1 Chain Selection	S-3
A1.1 Design Factors	S-3
A1.2 Service Factors	S-3
A1.3 Multiple Strand Factors	S-3
A1.4 Lubrication	S-3
A1.5 Sprockets	S-4
A1.6 Center Distance	S-4
A1.7 Alignment	S-5
A1.8 Horsepower Ratings Tables	S-5
A2 Sprocket Cutting Tools	S-5
A2.1 Standard Roller Chain Sprocket Cutter Designs	S-5
A2.2 Space Cutters	S-5
A2.3 Hobs	S-5
A2.4 Shaper Cutters	S-5

SUPPLEMENTARY INFORMATION¹

(The material in this section is not part of ASME B29.1M-1993, and is included for information purposes only.)

A1 CHAIN SELECTION

A1.1 Design Factors

A1.1.1 General. The horsepower ratings in Tables A4 through A17 generally apply to lubricated single pitch, single strand roller chains, both American National standard and heavy series. For horsepower ratings of multiple strand chains, refer to Table A2. The horsepower ratings reflect a service factor of 1, a chain length of approximately 100 pitches, the use of interference-fit connecting links and interference-fit offset sections, use of recommended lubrication methods, and a drive arrangement where two aligned sprockets are mounted on parallel shafts in a horizontal plane. Under these conditions, approximately 15,000 hr of service life at full load operation may generally be expected.

Substantial increases in rated speed loads can be utilized, as when a service life of less than 15,000 hr is satisfactory, or when full load operation is encountered only during a portion of the required service life.

It is beyond the scope of this publication to present selection procedures for all conditions. Consult chain manufacturers for assistance with any special application requirements.

A.1.1.2 Drive Selection. The horsepower ratings relate to the speed of the smaller sprocket and drive selections are made on this basis, whether the drive is speed reducing or speed increasing.

Drives with more than two sprockets, idlers, composite duty cycles, or other unusual conditions often require special consideration. It is advisable to consult chain manufacturers for selections of this nature.

Where quietness or extra smooth operation are of special importance, a small pitch chain operating over large diameter sprockets will minimize noise and vibration.

TABLE A1 SERVICE FACTORS

Type of Driven Load	Type of Input Power		
	Internal Combustion Engine With Hydraulic Drive	Electric Motor or Turbine	Internal Combustion Engine With Mechanical Drive
Smooth	1.0	1.0	1.2
Moderate shock	1.2	1.3	1.4
Heavy shock	1.4	1.5	1.7

When making drive selections, consideration is given to the loads imposed on the chain by the type of input power and the type of equipment to be driven. Service factors are used to compensate for these loads, and the required horsepower rating of the chain is determined by the following equation:

$$\text{Required hp} = \frac{\text{hp to be transmitted} \times \text{service factor}}{\text{table rating} \times \text{multiple strand factor}}$$

A1.2 Service Factors

The service factors in Table A1 are for normal chain loading. For unusual or extremely severe operating conditions not shown in this table, it is desirable to use larger service factors.

A1.3 Multiple Strand Factors

Horsepower ratings for single strand chains are shown in Tables A4 through A17. The horsepower ratings for multiple strand chains equal single strand ratings multiplied by the factors shown in Table A2.

A1.4 Lubrication

It has been shown that a separating wedge of fluid lubricant is formed in operating chain joints much like

¹Made available through the cooperation of the American Chain Association.

that formed in journal bearings. Therefore, fluid lubricant must be applied to assure an oil supply to the joints and minimize metal-to-metal contact. Lubrication, if supplied in sufficient volume, also provides effective cooling and impact damping at the higher speeds. For this reason, it is important that the lubrication recommendations be followed. *The horsepower rating tables apply only to drives lubricated in the manner specified in the tables.*

NOTE: Zero values in the horsepower rating tables indicate speeds beyond the maximum recommended. Operation at these speeds may result in excessive chain joint galling, regardless of the volume of lubricant applied.

Chain drives should be protected against dirt and moisture and the oil supply kept free of contamination. Periodic oil change is desirable. A good grade of nondetergent petroleum base oil is recommended. Heavy oils and greases are generally too stiff to enter and fill the chain joints. Table A3 indicates the proper lubricant viscosity for various surrounding temperatures.

There are three basic types of lubrication for chain drives. The recommended type shown in the horsepower rating tables is influenced by chain speed and the amount of power transmitted. These are *minimum* lubrication requirements, and the use of a better type (e.g., Type C instead of Type B) is acceptable and may be beneficial. Chain life can vary appreciably depending upon the way the drive is lubricated. The better the lubrication, the longer the chain life. For this reason, it is important that the lubrication recommendations be followed when using the ratings given in these tables.

(a) Type A — Manual or Drip Lubrication

(1) For manual lubrication, oil is applied copiously with a brush or spout can at least once every 8 hr of operation. Volume and frequency should be sufficient to prevent overheating of the chain or discoloration in the chain joints.

(2) For drip lubrication, oil drops are directed between the link plate edges from a drip lubricator. Volume and frequency should be sufficient to prevent discoloration of lubricant in the chain joints. Precaution must be taken against misdirection of the drops by windage.

(b) Type B — Bath or Disc Lubrication

(1) For bath lubrication, the lower strand of chain runs through a sump of oil in the drive housing. The oil level should reach the pitch line of the chain at its lowest point while operating.

(2) For disc lubrication, the chain operates above the oil level. The disc picks up oil from the sump and deposits it onto the chain, usually by means

TABLE A2 MULTIPLE STRAND FACTORS

Number of Strands	Multiple Strand Factor
2	1.7
3	2.5
4	3.3

TABLE A3 LUBRICANT VISCOSITY

Temperature, °F	Recommended Lubricant
20–40	SAE 20
40–100	SAE 30
100–120	SAE 40
120–140	SAE 50

of a trough. The diameter of the disc should be such as to produce rim speeds between 600 ft/min minimum and 8000 ft/min maximum.

(c) Type C — Oil Stream Lubrication. The lubricant is usually supplied by a circulating pump capable of supplying each chain drive with a continuous stream of oil. The oil should be directed at the slack strand and applied inside the chain loop and evenly across the chain width.

Consult chain manufacturers when it appears desirable to use a type of lubrication other than that recommended.

A1.5 Sprockets

Sprockets should have tooth form, thickness, profile, and diameters conforming to this Standard. For maximum service life, small sprockets operating at moderate to high speeds, or near the rated horsepower, should have hardened teeth. Normally, large sprockets should not exceed 120 teeth.

A1.6 Center Distance

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

Drives may be installed with either adjustable or fixed center distances. Adjustable centers simplify the control of chain slack.

For drives on fixed centers, an idler or shoe may be used to provide slack adjustment. These devices may

also be used to control backlash, or to assure 120 deg. minimum chain wrap on the smaller sprocket. *Sufficient housing clearance must always be provided for the slack chain to obtain full chain life.*

A1.7 Alignment

Accurate alignment of shafts and sprocket tooth faces provides uniform distribution of the load across the entire chain width and contributes substantially to optimum drive life. Shafting, bearings, and foundations should be suitable to maintain the initial alignment. Periodic maintenance should include an inspection of alignment to insure optimum chain life.

A1.8 Horsepower Ratings Tables

To properly use the horsepower ratings (Tables A4 through A17), the following factors must be taken into consideration:

- (a) service factors of Table A1;
- (b) multiple strand factors of Table A2;
- (c) 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.

NOTE: The horsepower ratings permit the use of interference-fit connecting links and interference-fit offset sections. Chain using slip-fit connecting links or slip-fit offset links may not meet these ratings.

A2 SPROCKET CUTTING TOOLS

A2.1 Standard Roller Chain Sprocket Cutter Designs

The following three kinds of sprocket cutters are used:

- (a) *space cutters*, of which five will be required to cut 7 or more teeth for any given roller diameter. The ranges of teeth are, respectively, 7-8, 9-11, 12-17, 18-34, and 35 and over. Single purpose cutters of this type are necessary for fewer than 7 teeth. (See para. A2.2.)
- (b) *hobs*, of which only one will be required if of the nontopping type, to cut any number of teeth for a given pitch and roller diameter. Refer to Fig. A1 for topping hob tooth form.
- (c) *shaper cutters*, for use on gear shaping equipment, of which only one will be required if of the non-

topping type, to cut 12 or more teeth for a given pitch and roller diameter. When sprockets of less than 12 teeth are to be produced on gear shaping equipment, consult the cutter manufacturer.

A2.2 Space Cutters

Space cutters are made for the following ranges of teeth: 7-8, 9-11, 12-17, 18-34, and 35 and over. The lowest number of teeth in any group is designated by N_1 and the highest by N_2 .

The cutters are based on an intermediate number of teeth N_a equal to $2N_1N_2/(N_1 + N_2)$, but the topping curve radius F is designed to produce adequate tooth height on a sprocket of N_2 teeth. The values of N_a for the cutters are 7.47, 9.9, 14.07, 23.54, and 56.

The angle Xab is $180/N$ when the cutter is made for a specific number of teeth. For design of cutters covering a range of teeth, angle Xab was determined by layout to assure chain roller clearance and to avoid pointed teeth on the larger sprockets of each range. It has values as given in Table A18A or A18B for cutters covering a range of teeth as here designed. The formulas of Tables A18A and A18B are especially for cutters covering the standard ranges of teeth (N_a = intermediate values from above). For other points use the value of N_a for N in the standard formulas for standard tooth form.

Mark all space cutters with pitch, roller diameter, and range of teeth to be cut.

A2.3 Hobs

A2.3.1 General. Hobs (see Fig. A1) designed for a given roller diameter D_r and chain pitch P will cut any number of teeth if of the nontopping type. For topping hobs, five will be required to cut seven or more teeth for any given roller diameter (see Tables A20A and A20B). The ranges of teeth are, respectively, 7-8, 9-11, 12-17, 18-34, and 35 and over.

A2.3.2 Marking of Hobs. All hobs are to be marked with chain pitch, roller diameter, lead angle, flute lead, "TOP" if of the topping type or "NON-TOP" if of the nontopping type, and the range of teeth cut if of the topping type.

A2.4 Shaper Cutters

Refer to the cutter manufacturer for the cutter form design for cutters to be used in the manufacture of sprockets on gear shaping equipment.

TABLE A4 HORSEPOWER RATINGS, STANDARD SINGLE STRAND ROLLER CHAIN — NO. 25

No. of Teeth in Small Spkt.	1/4 in. Pitch Revolutions Per Minute — Small Sprocket																								
	50	100	300	500	700	900	1200	1500	1800	2100	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	10,000
11	0.03	0.05	0.14	0.23	0.31	0.39	0.50	0.62	0.73	0.83	0.98	1.15	1.32	1.38	1.16	0.99	0.86	0.75	0.67	0.60	0.54	0.49	0.45	0.41	0.35
12	0.03	0.06	0.16	0.25	0.34	0.43	0.55	0.68	0.80	0.92	1.07	1.26	1.45	1.57	1.32	1.12	0.97	0.86	0.76	0.68	0.61	0.56	0.51	0.47	0.40
13	0.04	0.06	0.17	0.27	0.37	0.47	0.60	0.74	0.87	1.00	1.17	1.38	1.58	1.77	1.49	1.27	1.10	0.96	0.86	0.77	0.69	0.63	0.57	0.53	0.45
14	0.04	0.07	0.19	0.30	0.40	0.50	0.65	0.80	0.94	1.08	1.27	1.49	1.71	1.93	1.66	1.42	1.23	1.08	0.96	0.86	0.77	0.70	0.64	0.59	0.50
15	0.04	0.08	0.20	0.32	0.43	0.54	0.70	0.86	1.01	1.17	1.36	1.61	1.85	2.08	1.84	1.57	1.36	1.20	1.06	0.95	0.86	0.78	0.71	0.65	0.56
16	0.04	0.08	0.22	0.34	0.47	0.58	0.76	0.92	1.09	1.25	1.46	1.72	1.98	2.23	2.03	1.73	1.50	1.32	1.17	1.05	0.94	0.86	0.78	0.72	0.61
17	0.05	0.09	0.23	0.37	0.50	0.62	0.81	0.99	1.16	1.33	1.56	1.84	2.11	2.38	2.22	1.90	1.64	1.44	1.28	1.14	1.03	0.94	0.86	0.79	0.67
18	0.05	0.09	0.25	0.39	0.53	0.66	0.86	1.05	1.24	1.42	1.66	1.96	2.25	2.53	2.42	2.07	1.79	1.57	1.39	1.25	1.12	1.02	0.93	0.86	0.73
19	0.05	0.10	0.26	0.41	0.56	0.70	0.91	1.11	1.31	1.50	1.76	2.07	2.38	2.69	2.62	2.24	1.94	1.70	1.51	1.35	1.22	1.11	1.01	0.93	0.79
20	0.06	0.10	0.28	0.44	0.59	0.74	0.96	1.17	1.38	1.59	1.86	2.19	2.52	2.84	2.83	2.42	2.10	1.84	1.63	1.46	1.32	1.20	1.09	1.00	0.86
21	0.06	0.11	0.29	0.46	0.62	0.78	1.01	1.24	1.46	1.68	1.96	2.31	2.66	2.99	3.05	2.60	2.26	1.98	1.76	1.57	1.42	1.29	1.17	1.08	0.92
22	0.06	0.11	0.31	0.48	0.66	0.82	1.07	1.30	1.53	1.76	2.06	2.43	2.79	3.15	3.27	2.79	2.42	2.12	1.88	1.69	1.52	1.38	1.26	1.16	0.99
23	0.06	0.12	0.32	0.51	0.69	0.86	1.12	1.37	1.61	1.85	2.16	2.55	2.93	3.30	3.50	2.98	2.59	2.27	2.01	1.80	1.62	1.47	1.35	1.24	1.06
24	0.07	0.13	0.34	0.53	0.72	0.90	1.17	1.43	1.69	1.94	2.27	2.67	3.07	3.46	3.73	3.18	2.76	2.42	2.15	1.92	1.73	1.57	1.44	1.32	1.12
25	0.07	0.13	0.35	0.56	0.75	0.94	1.22	1.50	1.76	2.02	2.37	2.79	3.21	3.61	3.96	3.38	2.93	2.57	2.28	2.04	1.84	1.67	1.53	1.40	1.20
26	0.07	0.14	0.37	0.58	0.79	0.98	1.28	1.56	1.84	2.11	2.47	2.91	3.34	3.77	4.19	3.59	3.11	2.73	2.42	2.17	1.95	1.77	1.62	1.49	1.27
28	0.08	0.15	0.40	0.63	0.85	1.07	1.38	1.69	1.99	2.29	2.68	3.15	3.62	4.09	4.54	4.01	3.47	3.05	2.70	2.42	2.18	1.98	1.81	1.66	1.42
30	0.08	0.16	0.43	0.68	0.92	1.15	1.49	1.82	2.15	2.46	2.88	3.40	3.90	4.40	4.89	4.45	3.85	3.38	3.00	2.68	2.42	2.20	2.01	1.84	1.57
32	0.09	0.17	0.46	0.73	0.98	1.23	1.60	1.95	2.30	2.64	3.09	3.64	4.18	4.72	5.25	4.90	4.25	3.73	3.30	2.96	2.67	2.42	2.21	2.03	1.73
35	0.10	0.19	0.51	0.80	1.08	1.36	1.76	2.15	2.53	2.91	3.41	4.01	4.61	5.20	5.78	5.60	4.86	4.26	3.78	3.38	3.05	2.77	2.53	2.32	1.98
40	0.12	0.22	0.58	0.92	1.25	1.57	2.03	2.48	2.93	3.36	3.93	4.64	5.32	6.00	6.68	6.85	5.93	5.21	4.62	4.13	3.73	3.38	3.09	2.83	2.42
45	0.13	0.25	0.66	1.05	1.42	1.78	2.31	2.82	3.32	3.82	4.47	5.26	6.05	6.82	7.58	8.17	7.08	6.21	5.51	4.93	4.45	4.04	3.69	3.38	2.89
	Type A					Type B										Type C									

Type A: Manual or drip lubrication

Type B: Bath or disc lubrication

Type C: Oil stream lubrication

GENERAL NOTES:

(a) The limiting RPM for each lubrication type is read from the column to the left of the boundary line shown.

(b) The horsepower ratings of multiple strand chains are greater than those of single strand chain. See Table A2 for multiple strand factors.

(c) See para. A1.4 for a detailed description of lubrication types.

TABLE A5 HORSEPOWER RATINGS, STANDARD SINGLE STRAND ROLLER CHAIN — NO. 35

No. of Teeth in Small Spkt.																									
--------------------------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Type A

Type B

Type C

Type A: Manual or drip lubrication

Type B: Bath or disc lubrication

Type C: Oil stream lubrication

GENERAL NOTES:

(a) The limiting RPM for each lubrication type is read from the column to the left of the boundary line shown.

(b) The horsepower ratings of multiple strand chains are greater than those of single strand chain. See Table A2 for multiple strand factors.

(c) See para. A1.4 for a detailed description of lubrication types.

TABLE A6 HORSEPOWER RATINGS, STANDARD SINGLE STRAND ROLLER CHAIN — NO. 40

No. of Teeth in Small Spkt.	1/2 in. Pitch Revolutions Per Minute — Small Sprocket																											
	10	25	50	100	200	300	400	500	700	900	1000	1200	1400	1600	1800	2100	2400	2700	3000	3500	4000	5000	6000	7000	8000			
11	0.05	0.12	0.23	0.43	0.80	1.16	1.50	1.83	2.48	3.11	3.42	4.03	4.63	5.22	4.66	3.70	3.03	2.54	2.17	1.72	1.41	1.01	0.77	0.61	0.50			
12	0.06	0.14	0.25	0.47	0.88	1.27	1.65	2.01	2.73	3.42	3.76	4.43	5.09	5.74	5.31	4.22	3.45	2.89	2.47	1.96	1.60	1.15	0.87	0.69	0.57			
13	0.06	0.15	0.28	0.52	0.96	1.39	1.80	2.20	2.97	3.73	4.10	4.83	5.55	6.26	5.99	4.76	3.89	3.26	2.79	2.21	1.81	1.29	0.98	0.78	0.64			
14	0.07	0.16	0.30	0.56	1.04	1.50	1.95	2.38	3.22	4.04	4.44	5.23	6.01	6.78	6.70	5.31	4.35	3.65	3.11	2.47	2.02	1.45	1.10	0.87	0.71			
15	0.07	0.17	0.32	0.60	1.12	1.62	2.10	2.56	3.47	4.35	4.78	5.64	6.47	7.30	7.43	5.89	4.82	4.04	3.45	2.74	2.24	1.60	1.22	0.97	0.79			
16	0.08	0.19	0.35	0.65	1.20	1.74	2.25	2.75	3.72	4.66	5.13	6.04	6.94	7.83	8.18	6.49	5.31	4.45	3.80	3.02	2.47	1.77	1.34	1.07	0.87			
17	0.08	0.20	0.37	0.69	1.29	1.85	2.40	2.93	3.97	4.98	5.48	6.45	7.41	8.36	8.96	7.11	5.82	4.88	4.17	3.31	2.71	1.94	1.47	1.17	0.96			
18	0.09	0.21	0.39	0.73	1.37	1.97	2.55	3.12	4.22	5.30	5.82	6.86	7.88	8.89	9.76	7.75	6.34	5.31	4.54	3.60	2.95	2.11	1.60	1.27	0			
19	0.09	0.22	0.42	0.78	1.45	2.09	2.71	3.31	4.48	5.62	6.17	7.27	8.36	9.42	10.5	8.40	6.88	5.76	4.92	3.91	3.20	2.29	1.74	1.38	0			
20	0.10	0.24	0.44	0.82	1.53	2.21	2.86	3.50	4.73	5.94	6.53	7.69	8.83	9.96	11.1	9.07	7.43	6.22	5.31	4.22	3.45	2.47	1.88	1.49	0			
21	0.11	0.25	0.46	0.87	1.62	2.33	3.02	3.69	4.99	6.26	6.88	8.11	9.31	10.5	11.7	9.76	7.99	6.70	5.72	4.54	3.71	2.66	2.02	1.60	0			
22	0.11	0.26	0.49	0.91	1.70	2.45	3.17	3.88	5.25	6.58	7.23	8.52	9.79	11.0	12.3	10.5	8.57	7.18	6.13	4.87	3.98	2.85	2.17	1.72	0			
23	0.12	0.27	0.51	0.96	1.78	2.57	3.33	4.07	5.51	6.90	7.59	8.94	10.3	11.6	12.9	11.2	9.16	7.68	6.55	5.20	4.26	3.05	2.32	1.84	0			
24	0.13	0.29	0.54	1.00	1.87	2.69	3.48	4.26	5.76	7.23	7.95	9.36	10.8	12.1	13.5	11.9	9.76	8.18	6.99	5.54	4.54	3.25	2.47	1.96	0			
25	0.13	0.30	0.56	1.05	1.95	2.81	3.64	4.45	6.02	7.55	8.30	9.78	11.2	12.7	14.1	12.7	10.4	8.70	7.43	5.89	4.82	3.45	2.63	0	0			
26	0.14	0.31	0.58	1.09	2.04	2.93	3.80	4.64	6.28	7.88	8.66	10.2	11.7	13.2	14.7	13.5	11.0	9.23	7.88	6.25	5.12	3.66	2.79	0	0			
28	0.15	0.34	0.63	1.18	2.20	3.18	4.11	5.03	6.81	8.54	9.39	11.1	12.7	14.3	15.9	15.0	12.3	10.3	8.80	6.99	5.72	4.09	3.11	0	0			
30	0.16	0.37	0.68	1.27	2.38	3.42	4.43	5.42	7.33	9.20	10.1	11.9	13.7	15.4	17.2	16.7	13.6	11.4	9.76	7.75	6.34	4.54	3.45	0	0			
32	0.17	0.39	0.73	1.36	2.55	3.67	4.75	5.81	7.86	9.86	10.8	12.8	14.7	16.5	18.4	18.4	15.0	12.6	10.8	8.54	6.99	5.00	0	0	0			
35	0.19	0.43	0.81	1.50	2.81	4.04	5.24	6.40	8.66	10.9	11.9	14.1	16.2	18.2	20.3	21.0	17.2	14.4	12.3	9.76	7.99	5.72	0	0	0			
40	0.22	0.50	0.93	1.74	3.24	4.67	6.05	7.39	10.0	12.5	13.8	16.3	18.7	21.1	23.4	25.7	21.0	17.6	15.0	11.9	9.76	6.99	0	0	0			
45	0.25	0.57	1.06	1.97	3.68	5.30	6.87	8.40	11.4	14.2	15.7	18.5	21.2	23.9	26.6	30.5	25.1	21.0	17.9	14.2	11.7	0	0	0	0			
Type A					Type B										Type C													

Type A

Type B

Type C

Type A: Manual or drip lubrication

Type B: Bath or disc lubrication

Type C: Oil stream lubrication

GENERAL NOTES:

(a) The limiting RPM for each lubrication type is read from the column to the left of the boundary line shown.

(b) The horsepower ratings of multiple strand chains are greater than those of single strand chain. See Table A2 for multiple strand factors.

(c) See para. A1.4 for a detailed description of lubrication types.

TABLE A7 HORSEPOWER RATINGS, STANDARD SINGLE STRAND ROLLER CHAIN — NO. 41

No. of Teeth in Small Spkt.	$\frac{1}{2}$ in. Pitch Lightweight Machinery Chain Revolutions Per Minute — Small Sprocket																											
	10	25	50	100	200	300	400	500	700	900	1000	1200	1400	1600	1800	2100	2400	2700	3000	3500	4000	5000	6000	7000	8000			
11	0.03	0.07	0.13	0.24	0.44	0.64	0.82	1.01	1.37	1.71	1.88	1.71	1.36	1.11	0.93	0.74	0.61	0.51	0.43	0.34	0.28	0.20	0.15	0.12	0.10			
12	0.03	0.07	0.14	0.26	0.49	0.70	0.91	1.11	1.50	1.88	2.07	1.95	1.55	1.27	1.06	0.84	0.69	0.58	0.49	0.39	0.32	0.23	0.17	0.14	0.11			
13	0.04	0.08	0.15	0.28	0.53	0.76	0.99	1.21	1.63	2.05	2.25	2.20	1.75	1.43	1.20	0.95	0.78	0.65	0.56	0.44	0.36	0.26	0.20	0.16	0.13			
14	0.04	0.09	0.16	0.31	0.57	0.83	1.07	1.31	1.77	2.22	2.44	2.46	1.95	1.60	1.34	1.06	0.87	0.73	0.62	0.49	0.40	0.29	0.22	0.17	0.14			
15	0.04	0.09	0.18	0.33	0.62	0.89	1.15	1.41	1.91	2.39	2.63	2.73	2.17	1.77	1.49	1.18	0.96	0.81	0.69	0.55	0.45	0.32	0.24	0.19	0.16			
16	0.04	0.10	0.19	0.36	0.66	0.95	1.24	1.51	2.05	2.57	2.82	3.01	2.39	1.95	1.64	1.30	1.06	0.89	0.76	0.60	0.49	0.35	0.27	0.21	0.17			
17	0.05	0.11	0.20	0.38	0.71	1.02	1.32	1.61	2.18	2.74	3.01	3.29	2.61	2.14	1.79	1.42	1.16	0.98	0.83	0.66	0.54	0.39	0.29	0.23	0.19			
18	0.05	0.12	0.22	0.40	0.75	1.08	1.40	1.72	2.32	2.91	3.20	3.59	2.85	2.33	1.95	1.55	1.27	1.06	0.91	0.72	0.59	0.42	0.32	0.25	0			
19	0.05	0.12	0.23	0.43	0.80	1.15	1.49	1.82	2.46	3.09	3.40	3.89	3.09	2.53	2.12	1.68	1.38	1.15	0.98	0.78	0.64	0.46	0.35	0.28	0			
20	0.06	0.13	0.24	0.45	0.84	1.21	1.57	1.92	2.60	3.26	3.59	4.20	3.33	2.73	2.29	1.81	1.49	1.24	1.06	0.84	0.69	0.49	0.38	0.30	0			
21	0.06	0.14	0.26	0.48	0.89	1.28	1.66	2.03	2.74	3.44	3.78	4.46	3.59	2.94	2.46	1.95	1.60	1.34	1.14	0.91	0.74	0.53	0.40	0.32	0			
22	0.06	0.14	0.27	0.50	0.93	1.35	1.74	2.13	2.89	3.62	3.98	4.69	3.85	3.15	2.64	2.09	1.71	1.44	1.23	0.97	0.80	0.57	0.43	0.34	0			
23	0.06	0.15	0.28	0.53	0.98	1.41	1.83	2.24	3.03	3.80	4.17	4.92	4.11	3.37	2.82	2.24	1.83	1.54	1.31	1.04	0.85	0.61	0.46	0.37	0			
24	0.07	0.16	0.29	0.55	1.03	1.48	1.92	2.34	3.17	3.97	4.37	5.15	4.38	3.59	3.01	2.39	1.95	1.64	1.40	1.11	0.91	0.65	0.49	0.39	0			
25	0.07	0.17	0.31	0.57	1.07	1.55	2.00	2.45	3.31	4.15	4.57	5.38	4.66	3.81	3.20	2.54	2.08	1.74	1.49	1.18	0.96	0.69	0.53	0	0			
26	0.07	0.17	0.32	0.60	1.12	1.61	2.09	2.55	3.46	4.33	4.76	5.61	4.94	4.05	3.39	2.69	2.20	1.85	1.58	1.25	1.02	0.73	0.56	0	0			
28	0.08	0.19	0.35	0.65	1.21	1.75	2.26	2.77	3.74	4.69	5.16	6.08	5.52	4.52	3.79	3.01	2.46	2.06	1.76	1.40	1.14	0.82	0.62	0	0			
30	0.08	0.20	0.38	0.70	1.31	1.88	2.44	2.98	4.03	5.06	5.56	6.55	6.13	5.01	4.20	3.33	2.73	2.29	1.95	1.55	1.27	0.91	0.69	0	0			
32	0.09	0.22	0.40	0.75	1.40	2.02	2.61	3.20	4.33	5.42	5.96	7.03	6.75	5.52	4.63	3.67	3.01	2.52	2.15	1.71	1.40	1.00	0	0	0			
35	0.10	0.24	0.44	0.83	1.54	2.22	2.88	3.52	4.76	5.97	6.57	7.74	7.72	6.32	5.29	4.20	3.44	2.88	2.46	1.95	1.60	1.14	0	0	0			
40	0.12	0.27	0.51	0.96	1.78	2.57	3.33	4.07	5.50	6.90	7.59	8.94	9.43	7.72	6.47	5.13	4.20	3.52	3.01	2.39	1.95	1.40	0	0	0			
45	0.14	0.31	0.58	1.08	2.02	2.92	3.78	4.62	6.25	7.84	8.62	10.2	11.3	9.21	7.72	6.13	5.01	4.20	3.59	2.85	2.33	0	0	0	0			
Type A				Type B										Type C														

Type A: Manual or drip lubrication
Type B: Bath or disc lubrication
Type C: Oil stream lubrication

GENERAL NOTES:

- The limiting RPM for each lubrication type is read from the column to the left of the boundary line shown.
- The horsepower ratings of multiple strand chains are greater than those of single strand chain. See Table A2 for multiple strand factors.
- See para. A1.4 for a detailed description of lubrication types.

TABLE A8 HORSEPOWER RATINGS, STANDARD SINGLE STRAND ROLLER CHAIN — NO. 50

	No. of Teeth in Small Spkt.	5/8 in. Pitch Revolutions Per Minute — Small Sprocket																									
		10	25	50	100	200	300	400	500	700	900	1000	1200	1400	1600	1800	2100	2400	2700	3000	3500	4000	4500	5000	5500	6000	
S-10	11	0.11	0.24	0.45	0.84	1.56	2.25	2.92	3.57	4.83	6.06	6.66	7.85	8.13	6.65	5.58	4.42	3.62	3.04	2.59	2.06	1.68	1.41	1.20	1.04	0.92	
	12	0.12	0.26	0.49	0.92	1.72	2.47	3.21	3.92	5.31	6.65	7.31	8.62	9.26	7.58	6.35	5.04	4.13	3.46	2.95	2.34	1.92	1.61	1.37	1.19	1.04	
	13	0.13	0.29	0.54	1.00	1.87	2.70	3.50	4.27	5.78	7.25	7.97	9.40	10.4	8.55	7.16	5.69	4.65	3.90	3.33	2.64	2.16	1.81	1.55	1.34	0	
	14	0.14	0.31	0.58	1.09	2.03	2.92	3.79	4.63	6.27	7.86	8.64	10.2	11.7	9.55	8.01	6.35	5.20	4.36	3.72	2.95	2.42	2.03	1.73	1.50	0	
	15	0.15	0.34	0.63	1.17	2.19	3.15	4.08	4.99	6.75	8.47	9.31	11.0	12.6	10.6	8.88	7.05	5.77	4.83	4.13	3.27	2.68	2.25	1.92	1.66	0	
	16	0.16	0.36	0.67	1.26	2.34	3.38	4.37	5.35	7.24	9.08	9.98	11.8	13.5	11.7	9.78	7.76	6.35	5.32	4.55	3.61	2.95	2.47	2.11	1.83	0	
	17	0.17	0.39	0.72	1.34	2.50	3.61	4.67	5.71	7.73	9.69	10.7	12.6	14.4	12.8	10.7	8.50	6.96	5.83	4.98	3.95	3.23	2.71	2.31	2.01	0	
	18	0.18	0.41	0.76	1.43	2.66	3.83	4.97	6.07	8.22	10.3	11.3	13.4	15.3	13.9	11.7	9.26	7.58	6.35	5.42	4.30	3.52	2.95	2.52	0		
	19	0.19	0.43	0.81	1.51	2.82	4.07	5.27	6.44	8.72	10.9	12.0	14.2	16.3	15.1	12.7	10.0	8.22	6.89	5.88	4.67	3.82	3.20	2.73	0		
	20	0.20	0.46	0.86	1.60	2.98	4.30	5.57	6.80	9.21	11.5	12.7	15.0	17.2	16.3	13.7	10.8	8.88	7.44	6.35	5.04	4.13	3.46	2.95	0		
	21	0.21	0.48	0.90	1.69	3.14	4.53	5.87	7.17	9.71	12.2	13.4	15.8	18.1	17.6	14.7	11.7	9.55	8.01	6.84	5.42	4.44	3.72	3.18	0		
	22	0.22	0.51	0.95	1.77	3.31	4.76	6.17	7.54	10.2	12.8	14.1	16.6	19.1	18.8	15.8	12.5	10.2	8.59	7.33	5.82	4.76	3.99	3.41	0		
	23	0.23	0.53	1.00	1.86	3.47	5.00	6.47	7.91	10.7	13.4	14.8	17.4	20.0	20.1	16.9	13.4	11.0	9.18	7.84	6.22	5.09	4.27	0			
	24	0.25	0.56	1.04	1.95	3.63	5.23	6.78	8.29	11.2	14.1	15.5	18.2	20.9	21.4	18.0	14.3	11.7	9.78	8.35	6.63	5.42	4.55	0			
	25	0.26	0.58	1.09	2.03	3.80	5.47	7.08	8.66	11.7	14.7	16.2	19.0	21.9	22.8	19.1	15.2	12.4	10.4	8.88	7.05	5.77	4.83	0			
	26	0.27	0.61	1.14	2.12	3.96	5.70	7.39	9.03	12.2	15.3	16.9	19.9	22.8	24.2	20.3	16.1	13.2	11.0	9.42	7.47	6.12	5.13	0			
	28	0.29	0.66	1.23	2.30	4.29	6.18	8.01	9.79	13.2	16.6	18.3	21.5	24.7	27.0	22.6	18.0	14.7	12.3	10.5	8.35	6.84	5.73	0			
	30	0.31	0.71	1.33	2.48	4.62	6.66	8.63	10.5	14.3	17.9	19.7	23.2	26.6	30.0	25.1	19.9	16.3	13.7	11.7	9.26	7.58	0				
	32	0.33	0.76	1.42	2.66	4.96	7.14	9.25	11.3	15.3	19.2	21.1	24.9	28.6	32.2	27.7	22.0	18.0	15.1	12.9	10.2	8.35	0				
	35	0.37	0.84	1.57	2.93	5.46	7.86	10.2	12.5	16.9	21.1	23.2	27.4	31.5	35.5	31.6	25.1	20.6	17.2	14.7	11.7	9.55	0				
40	0.43	0.97	1.81	3.38	6.31	9.08	11.8	14.4	19.5	24.4	26.8	31.6	36.3	41.0	38.7	30.7	25.1	21.0	18.0	14.3	0						
45	0.48	1.10	2.06	3.84	7.16	10.3	13.4	16.3	22.1	27.7	30.5	35.9	41.3	46.5	46.1	36.6	30.0	25.1	21.4	0							
	Type A				Type B					Type C																	

Type A: Manual or drip lubrication
 Type B: Bath or disc lubrication
 Type C: Oil stream lubrication

GENERAL NOTES:

- The limiting RPM for each lubrication type is read from the column to the left of the boundary line shown.
- The horsepower ratings of multiple strand chains are greater than those of single strand chain. See Table A2 for multiple strand factors.
- See para. A1.4 for a detailed description of lubrication types.

TABLE A9 HORSEPOWER RATINGS, STANDARD SINGLE STRAND ROLLER CHAIN — NO. 60

No. of Teeth in Small Spkt.	$\frac{3}{4}$ in. Pitch Revolutions Per Minute — Small Sprocket																								
	10	25	50	100	150	200	300	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2500	3000	3500	4000	4500
11	0.18	0.41	0.77	1.44	2.07	2.69	3.87	5.02	6.13	7.23	8.30	9.36	10.4	11.4	12.5	11.9	9.41	7.70	6.45	5.51	3.94	3.00	2.38	1.95	1.63
12	0.20	0.45	0.85	1.58	2.28	2.95	4.25	5.51	6.74	7.94	9.12	10.3	11.4	12.6	13.7	13.5	10.7	8.77	7.35	6.28	4.49	3.42	2.71	2.22	1.86
13	0.22	0.50	0.92	1.73	2.49	3.22	4.64	6.01	7.34	8.65	9.94	11.2	12.5	13.7	14.9	15.2	12.1	9.89	8.29	7.08	5.06	3.85	3.06	2.50	0
14	0.24	0.54	1.00	1.87	2.69	3.49	5.02	6.51	7.96	9.37	10.8	12.1	13.5	14.8	16.2	17.0	13.5	11.1	9.26	7.91	5.66	4.31	3.42	2.80	0
15	0.25	0.58	1.08	2.01	2.90	3.76	5.41	7.01	8.57	10.1	11.6	13.1	14.5	16.0	17.4	18.8	15.0	12.3	10.3	8.77	6.28	4.77	3.79	3.10	0
16	0.27	0.62	1.16	2.16	3.11	4.03	5.80	7.52	9.19	10.8	12.4	14.0	15.6	17.1	18.7	20.2	16.5	13.5	11.3	9.66	6.91	5.26	4.17	3.42	0
17	0.29	0.66	1.24	2.31	3.32	4.30	6.20	8.03	9.81	11.6	13.3	15.0	16.7	18.3	19.9	21.6	18.1	14.8	12.4	10.6	7.57	5.76	4.57	3.74	0
18	0.31	0.70	1.31	2.45	3.53	4.58	6.59	8.54	10.4	12.3	14.1	15.9	17.7	19.5	21.2	22.9	19.7	16.1	13.5	11.5	8.25	6.28	4.98	4.08	0
19	0.33	0.75	1.39	2.60	3.74	4.85	6.99	9.05	11.1	13.0	15.0	16.9	18.8	20.6	22.5	24.3	21.4	17.5	14.6	12.5	8.95	6.81	5.40	4.42	0
20	0.35	0.79	1.47	2.75	3.96	5.13	7.38	9.57	11.7	13.8	15.8	17.9	19.8	21.8	23.8	25.7	23.1	18.9	15.8	13.5	9.66	7.35	5.83	0	
21	0.36	0.83	1.55	2.90	4.17	5.40	7.78	10.1	12.3	14.5	16.7	18.8	20.9	23.0	25.1	27.1	24.8	20.3	17.0	14.5	10.4	7.91	6.28	0	
22	0.38	0.87	1.63	3.05	4.39	5.68	8.19	10.6	13.0	15.3	17.5	19.8	22.0	24.2	26.4	28.5	26.6	21.8	18.2	15.6	11.1	8.48	6.73	0	
23	0.40	0.92	1.71	3.19	4.60	5.96	8.59	11.1	13.6	16.0	18.4	20.8	23.1	25.4	27.7	29.9	28.4	23.3	19.5	16.7	11.9	9.07	7.19	0	
24	0.42	0.96	1.79	3.35	4.82	6.24	8.99	11.6	14.2	16.8	19.3	21.7	24.2	26.6	29.0	31.3	30.3	24.8	20.8	17.8	12.7	9.66	7.67	0	
25	0.44	1.00	1.87	3.50	5.04	6.52	9.40	12.2	14.9	17.5	20.1	22.7	25.3	27.8	30.3	32.7	32.2	26.4	22.1	18.9	13.5	10.3	8.15	0	
26	0.46	1.05	1.95	3.65	5.25	6.81	9.80	12.7	15.5	18.3	21.0	23.7	26.4	29.0	31.6	34.1	34.2	28.0	23.4	20.0	14.3	10.9	8.65	0	
28	0.50	1.13	2.12	3.95	5.69	7.37	10.6	13.8	16.8	19.8	22.8	25.7	28.5	31.4	34.2	37.0	38.2	31.3	26.2	22.4	16.0	12.2	0		
30	0.54	1.22	2.28	4.26	6.13	7.94	11.4	14.8	18.1	21.4	24.5	27.7	30.8	33.8	36.8	39.8	42.4	34.7	29.1	24.8	17.8	13.5	0		
32	0.57	1.31	2.45	4.56	6.57	8.52	12.3	15.9	19.4	22.9	26.3	29.7	33.0	36.3	39.5	42.7	46.7	38.2	32.0	27.3	19.6	14.9	0		
35	0.63	1.44	2.69	5.03	7.24	9.38	13.5	17.5	21.4	25.2	29.0	32.7	36.3	39.9	43.5	47.1	53.4	43.7	36.6	31.3	22.4	17.0	0		
40	0.73	1.67	3.11	5.81	8.37	10.8	15.6	20.2	24.7	29.1	33.5	37.7	42.0	46.1	50.3	54.4	62.5	53.4	44.7	38.2	27.3	0			
45	0.83	1.89	3.53	6.60	9.50	12.3	17.7	23.0	28.1	33.1	38.0	42.9	47.7	52.4	57.1	61.7	70.9	63.7	53.4	45.6	32.6	0			
Type A				Type B								Type C													

Type A: Manual or drip lubrication

Type B: Bath or disc lubrication

Type C: Oil stream lubrication

GENERAL NOTES:

(a) The limiting RPM for each lubrication type is read from the column to the left of the boundary line shown.

(b) The horsepower ratings of multiple strand chains are greater than those of single strand chain. See Table A2 for multiple strand factors.

(c) See para. A1.4 for a detailed description of lubrication types.

TABLE A10 HORSEPOWER RATINGS, STANDARD SINGLE STRAND ROLLER CHAIN — NO. 80

No. of Teeth in Small Spkt.	1 in. Pitch Revolutions Per Minute — Small Sprocket																											
	10	25	50	100	150	200	300	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2700	3000	3400			
11	0.42	0.97	1.80	3.36	4.84	6.28	9.04	11.7	14.3	16.9	19.4	21.9	23.0	19.6	17.0	14.9	11.8	9.69	8.12	6.93	6.01	5.27	4.42	3.77	1.70			
12	0.47	1.06	1.98	3.69	5.32	6.89	9.93	12.9	15.7	18.5	21.3	24.0	26.2	22.3	19.4	17.0	13.5	11.0	9.25	7.90	6.85	6.01	5.04	4.30	0			
13	0.51	1.16	2.16	4.03	5.80	7.52	10.8	14.0	17.1	20.2	23.2	26.2	29.1	25.2	21.8	19.2	15.2	12.5	10.4	8.91	7.72	6.78	5.68	4.85	0			
14	0.55	1.25	2.34	4.36	6.29	8.14	11.7	15.2	18.6	21.9	25.1	28.4	31.5	28.2	24.4	21.4	17.0	13.9	11.7	9.96	8.63	7.57	6.35	5.42	0			
15	0.59	1.35	2.52	4.70	6.77	8.77	12.6	16.4	20.0	23.6	27.1	30.6	34.0	31.2	27.1	23.8	18.9	15.4	12.9	11.0	9.57	8.40	7.04	6.01	0			
16	0.63	1.45	2.70	5.04	7.26	9.41	13.5	17.6	21.5	25.3	29.0	32.8	36.4	34.4	29.8	26.2	20.8	17.0	14.2	12.2	10.5	9.25	7.76	6.62	0			
17	0.68	1.55	2.88	5.38	7.75	10.0	14.5	18.7	22.9	27.0	31.0	35.0	38.9	37.7	32.7	28.7	22.7	18.6	15.6	13.3	11.5	10.1	8.49	7.25	0			
18	0.72	1.64	3.07	5.72	8.25	10.7	15.4	19.9	24.4	28.7	33.0	37.2	41.4	41.1	35.6	31.2	24.8	20.3	17.0	14.5	12.6	11.0	9.25	7.90	0			
19	0.76	1.74	3.25	6.07	8.74	11.3	16.3	21.1	25.8	30.4	35.0	39.4	43.8	44.5	38.6	33.9	26.9	22.0	18.4	15.7	13.6	12.0	10.0	8.57	0			
20	0.81	1.84	3.44	6.41	9.24	12.0	17.2	22.3	27.3	32.2	37.0	41.7	46.3	48.1	41.7	36.6	29.0	23.8	19.9	17.0	14.7	12.9	10.8	0				
21	0.85	1.94	3.62	6.76	9.74	12.6	18.2	23.5	28.8	33.9	39.0	43.9	48.9	51.7	44.8	39.4	31.2	25.6	21.4	18.3	15.9	13.9	11.7	0				
22	0.90	2.04	3.81	7.11	10.2	13.3	19.1	24.8	30.3	35.7	41.0	46.2	51.4	55.5	48.1	42.2	33.5	27.4	23.0	19.6	17.0	14.9	12.5	0				
23	0.94	2.14	4.00	7.46	10.7	13.9	20.1	26.0	31.8	37.4	43.0	48.5	53.9	59.3	51.4	45.1	35.8	29.3	24.6	21.0	18.2	15.9	13.4	0				
24	0.98	2.24	4.19	7.81	11.3	14.6	21.0	27.2	33.2	39.2	45.0	50.8	56.4	62.0	54.8	48.1	38.2	31.2	26.2	22.3	19.4	17.0	14.2	0				
25	1.03	2.34	4.37	8.16	11.8	15.2	21.9	28.4	34.7	40.9	47.0	53.0	59.0	64.8	58.2	51.1	40.6	33.2	27.8	23.8	20.6	18.1	15.1	0				
26	1.07	2.45	4.56	8.52	12.3	15.9	22.9	29.7	36.2	42.7	49.1	55.3	61.5	67.6	61.8	54.2	43.0	35.2	29.5	25.2	21.8	19.2	16.1	0				
28	1.16	2.65	4.94	9.23	13.3	17.2	24.8	32.1	39.3	46.3	53.2	59.9	66.7	73.3	69.0	60.6	48.1	39.4	33.0	28.2	24.4	21.4	0					
30	1.25	2.85	5.33	9.94	14.3	18.5	26.7	34.6	42.3	49.9	57.3	64.6	71.8	78.9	76.6	67.2	53.3	43.6	36.6	31.2	27.1	23.8	0					
32	1.34	3.06	5.71	10.7	15.3	19.9	28.6	37.1	45.4	53.5	61.4	69.2	77.0	84.6	84.3	74.0	58.7	48.1	40.3	34.4	29.8	26.2	0					
35	1.48	3.37	6.29	11.7	16.9	21.9	31.6	40.9	50.0	58.9	67.6	76.3	84.8	93.3	96.5	84.7	67.2	55.0	46.1	39.4	34.1	0						
40	1.71	3.89	7.27	13.6	19.5	25.3	36.4	47.2	57.7	68.0	78.1	88.1	99.0	108	117	103	82.1	67.2	56.3	48.1	20.0	0						
45	1.94	4.42	8.25	15.4	22.2	28.7	41.4	53.6	65.6	77.2	88.7	100	111	122	133	123	98.0	80.2	67.2	54.1	0							
Type A			Type B							Type C																		

Type A: Manual or drip lubrication

Type B: Bath or disc lubrication

Type C: Oil stream lubrication

GENERAL NOTES:

- The limiting RPM for each lubrication type is read from the column to the left of the boundary line shown.
- The horsepower ratings of multiple strand chains are greater than those of single strand chain. See Table A2 for multiple strand factors.
- See para. A1.4 for a detailed description of lubrication types.
- For optimum results, it is recommended that the roller chain manufacturer be given the opportunity to evaluate the conditions of operation of chains in the shaded (galling range) speed area.

TABLE A11 HORSEPOWER RATINGS, STANDARD SINGLE STRAND ROLLER CHAIN — NO. 100

No. of Teeth in Small Spkt.	1 1/4 in. Pitch Revolutions Per Minute — Small Sprocket																										
	10	25	50	100	150	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1600	1800	2000	2200	2400	2600	2700		
11	0.81	1.85	3.45	6.44	9.28	12.0	17.3	22.4	27.4	32.3	37.1	32.8	27.5	23.4	20.3	17.8	15.8	14.2	11.6	9.71	8.29	7.19	6.31	1.29	0		
12	0.89	2.03	3.79	7.08	10.2	13.2	19.0	24.6	30.1	35.5	40.8	37.3	31.3	26.7	23.2	20.3	18.0	16.1	13.2	11.1	9.45	8.19	7.19	0			
13	0.97	2.22	4.13	7.72	11.1	14.4	20.7	26.9	32.8	38.7	44.5	42.1	35.3	30.1	26.1	22.9	20.3	18.2	14.9	12.5	10.6	9.23	8.10	0			
14	1.05	2.40	4.48	8.36	12.0	15.6	22.5	29.1	35.6	41.9	48.2	47.0	39.4	33.7	29.2	25.6	22.7	20.3	16.6	13.9	11.9	10.3	9.05	0			
15	1.13	2.59	4.83	9.01	13.0	16.8	24.2	31.4	38.3	45.2	51.9	52.2	43.7	37.3	32.4	28.4	25.2	22.5	18.4	15.5	13.2	11.4	10.0	0			
16	1.22	2.77	5.17	9.66	13.9	18.0	26.0	33.6	41.1	48.4	55.6	57.5	48.2	41.1	35.7	31.3	27.7	24.8	20.3	17.0	14.5	12.6	11.1	0			
17	1.30	2.96	5.52	10.3	14.8	19.2	27.7	35.9	43.9	51.7	59.4	63.0	52.8	45.0	39.0	34.3	30.4	27.2	22.3	18.7	15.9	13.8	0.79	0			
18	1.38	3.15	5.88	11.0	15.8	20.5	29.5	38.2	46.7	55.0	63.2	68.6	57.5	49.1	42.5	37.3	33.1	29.6	24.2	20.3	17.4	15.0	0				
19	1.46	3.34	6.23	11.6	16.7	21.7	31.2	40.5	49.5	58.3	67.0	74.4	62.3	53.2	46.1	40.5	35.9	32.1	26.3	22.0	18.8	16.3	0				
20	1.55	3.53	6.58	12.3	17.7	22.9	33.0	42.8	52.3	61.6	70.8	79.8	67.3	57.5	49.8	43.7	38.8	34.7	28.4	23.8	20.3	17.6	0				
21	1.63	3.72	6.94	13.0	18.7	24.2	34.8	45.1	55.1	65.0	74.6	84.2	72.4	61.8	53.6	47.0	41.7	37.3	30.6	25.6	21.9	19.0	0				
22	1.71	3.91	7.30	13.6	19.6	25.4	36.6	47.4	58.0	68.3	78.5	88.5	77.7	66.3	57.5	50.4	44.7	40.0	32.8	27.5	23.4	20.3	0				
23	1.80	4.10	7.66	14.3	20.6	26.7	38.4	49.8	60.8	71.7	82.3	92.8	83.0	70.9	61.4	53.9	47.8	42.8	35.0	29.4	25.1	7.74	0				
24	1.88	4.30	8.02	15.0	21.5	27.9	40.2	52.1	63.7	75.0	86.2	97.2	88.5	75.6	65.5	57.5	51.0	45.6	37.3	31.3	26.7	0					
25	1.97	4.49	8.38	15.6	22.5	29.2	42.0	54.4	66.6	78.4	90.1	102	94.1	80.3	69.6	61.1	54.2	48.5	39.7	33.3	28.4	0					
26	2.05	4.68	8.74	16.3	23.5	30.4	43.8	56.8	69.4	81.8	94.0	106	99.8	85.2	73.8	64.8	57.5	51.4	42.1	35.3	30.1	0					
28	2.22	5.07	9.47	17.7	25.5	33.0	47.5	61.5	75.2	88.6	102	115	112	95.2	82.5	72.4	64.2	57.5	47.0	39.4	33.7	0					
30	2.40	5.47	10.2	19.0	27.4	35.5	51.2	66.3	81.0	95.5	110	124	124	106	91.5	80.3	71.2	63.7	52.2	43.7	10.0	0					
32	2.57	5.86	10.9	20.4	29.4	38.1	54.9	71.1	86.9	102	118	133	136	116	101	88.5	78.5	70.2	57.5	45.2	0						
35	2.83	6.46	12.0	22.5	32.4	42.0	60.4	78.3	95.7	113	130	146	156	133	115	101	89.8	80.3	65.8	55.1	0						
40	3.27	7.46	13.9	26.0	37.4	48.5	69.8	90.4	111	130	150	169	188	163	141	124	110	98.1	80.3	0							
45	3.71	8.47	15.8	29.5	42.5	55.0	79.3	103	126	148	170	192	213	194	168	148	131	117	45.3	0							
Type A			Type B			Type C																					

Type A: Manual or drip lubrication

Type B: Bath or disc lubrication

Type C: Oil stream lubrication

GENERAL NOTES:

- The limiting RPM for each lubrication type is read from the column to the left of the boundary line shown.
- The horsepower ratings of multiple strand chains are greater than those of single strand chain. See Table A2 for multiple strand factors.
- See para. A1.4 for a detailed description of lubrication types.
- For optimum results, it is recommended that the roller chain manufacturer be given the opportunity to evaluate the conditions of operation of chains in the shaded (galling range) speed area.

TABLE A12 HORSEPOWER RATINGS, STANDARD SINGLE STRAND ROLLER CHAIN — NO. 120

No. of Teeth in Small Spkt.	1½ in. Pitch Revolutions Per Minute — Small Sprocket																								
	10	25	50	100	150	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100
11	1.37	3.12	5.83	10.9	15.7	20.3	29.2	37.9	46.3	54.6	46.3	37.9	31.8	27.1	23.5	20.6	18.3	16.4	14.8	13.4	12.2	11.2	10.4	9.59	0
12	1.50	3.43	6.40	11.9	17.2	22.3	32.1	41.6	50.9	59.9	52.8	43.2	36.2	30.9	26.8	23.5	20.9	18.7	16.8	15.3	13.9	12.8	11.8	10.9	0
13	1.64	3.74	6.98	13.0	18.8	24.3	35.0	45.4	55.5	65.3	59.5	48.7	40.8	34.9	30.2	26.5	23.5	21.0	19.0	17.2	15.7	14.4	13.3	12.3	0
14	1.78	4.05	7.56	14.1	20.3	26.3	37.9	49.1	60.1	70.8	66.5	54.4	45.6	39.0	33.8	29.6	26.3	23.5	21.2	19.2	17.6	16.1	14.9	8.94	0
15	1.91	4.37	8.15	15.2	21.9	28.4	40.9	53.0	64.7	76.3	73.8	60.4	50.6	43.2	37.4	32.9	29.1	26.1	23.5	21.3	19.5	17.9	16.5	0	
16	2.05	4.68	8.74	16.3	23.5	30.4	43.8	56.8	69.4	81.8	81.3	66.5	55.7	47.6	41.2	36.2	32.1	28.7	25.9	23.5	21.5	19.7	18.2	0	
17	2.19	5.00	9.33	17.4	25.1	32.5	46.8	60.6	74.1	87.3	89.0	72.8	61.0	52.1	45.2	39.6	35.2	31.5	28.4	25.8	23.5	21.6	19.9	0	
18	2.33	5.32	9.92	18.5	26.7	34.6	49.8	64.5	78.8	92.9	97.0	79.4	66.5	56.8	49.2	43.2	38.3	34.3	30.9	28.1	25.6	23.5	11.3	0	
19	2.47	5.64	10.5	19.6	28.3	36.6	52.8	68.4	83.6	98.5	105	86.1	72.1	61.6	53.4	46.8	41.5	37.2	33.5	30.4	27.8	25.5	0	0	
20	2.61	5.96	11.1	20.7	29.9	38.7	55.8	72.7	88.3	104	114	92.9	77.9	66.5	57.6	50.6	44.9	40.1	36.2	32.9	30.0	27.5	0	0	
21	2.75	6.28	11.7	21.9	31.5	40.8	58.8	76.2	93.1	110	122	100	83.8	71.6	62.0	54.4	48.3	43.2	39.0	35.4	32.3	29.6	0	0	
22	2.90	6.60	12.3	23.0	33.1	42.9	61.8	80.1	97.9	115	131	107	89.9	76.7	66.5	58.4	51.8	46.3	41.8	37.9	34.6	16.6	0	0	
23	3.04	6.93	12.9	24.1	34.8	45.0	64.9	84.0	103	121	139	115	96.1	82.0	71.1	62.4	55.3	49.5	44.6	40.5	37.0	0	0	0	
24	3.18	7.25	13.5	25.3	36.4	47.1	67.9	88.0	108	127	146	122	102	87.4	75.8	66.5	59.0	52.8	47.6	43.2	39.4	0	0	0	
25	3.32	7.58	14.1	26.4	38.0	49.3	71.0	91.9	112	132	152	130	109	92.9	80.6	70.7	62.7	56.1	50.6	45.9	41.3	0	0	0	
26	3.47	7.91	14.8	27.5	39.7	51.4	74.0	95.9	117	138	159	138	115	98.6	85.4	75.0	66.5	59.5	53.7	48.7	26.6	0	0	0	
28	3.76	8.57	16.0	29.8	43.0	55.7	80.2	104	127	150	172	154	129	110	95.5	83.8	74.3	66.5	60.0	54.4	0	0	0	0	
30	4.05	9.23	17.2	32.1	46.3	60.0	86.4	112	137	161	185	171	143	122	106	92.9	82.4	73.8	66.5	42.4	0	0	0	0	
32	4.34	9.90	18.5	34.5	49.6	64.3	92.6	120	147	173	199	188	158	135	117	102	90.8	81.3	73.3	0	0	0	0	0	
35	4.78	10.9	20.3	38.0	54.7	70.9	102	132	162	190	219	215	180	154	133	117	104	92.9	47.7	0	0	0	0	0	
40	5.52	12.6	23.5	43.9	63.2	81.8	118	153	187	220	253	263	220	188	163	143	127	59.5	0	0	0	0	0	0	
45	6.27	14.3	26.7	49.8	71.7	92.9	134	173	212	250	287	314	263	224	195	171	80.0	0	0	0	0	0	0	0	
Type A		Type B						Type C																	

Type A: Manual or drip lubrication

Type B: Bath or disc lubrication

Type C: Oil stream lubrication

GENERAL NOTES:

- (a) The limiting RPM for each lubrication type is read from the column to the left of the boundary line shown.
- (b) The horsepower ratings of multiple strand chains are greater than those of single strand chain. See Table A2 for multiple strand factors.
- (c) See para. A1.4 for a detailed description of lubrication types.
- (d) For optimum results, it is recommended that the roller chain manufacturer be given the opportunity to evaluate the conditions of operation of chains in the shaded (galling range) speed area.

TABLE A13 HORSEPOWER RATINGS, STANDARD SINGLE STRAND ROLLER CHAIN — NO. 140

No. of Teeth in Small Spkt.	1 3/4 in. Pitch Revolutions Per Minute — Small Sprocket																										
	10	25	50	100	150	200	250	300	350	400	450	500	550	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700		
11	2.12	4.83	9.02	16.8	24.2	31.4	38.4	45.2	52.0	58.6	65.2	71.6	75.2	66.0	52.4	42.9	35.9	30.7	26.6	23.3	20.7	18.5	16.7	15.2	0		
12	2.33	5.31	9.91	18.5	26.6	34.5	42.2	49.7	57.1	64.4	71.6	78.7	85.7	75.2	59.7	48.9	41.0	35.0	30.3	26.6	23.6	21.1	19.0	17.3	0		
13	2.54	5.79	10.8	20.2	29.0	37.6	46.0	54.2	62.2	70.2	78.0	85.8	93.5	84.8	67.3	55.1	46.2	39.4	34.2	30.0	26.6	23.8	21.5	19.5	0		
14	2.75	6.27	11.7	21.8	31.5	40.8	49.8	58.7	67.4	76.0	84.5	93.0	101	94.8	75.2	61.6	51.6	44.1	38.2	33.5	29.7	26.6	24.0	21.8			
15	2.96	6.76	12.6	23.5	33.9	43.9	53.7	63.2	72.7	81.9	91.1	100	109	105	83.4	68.3	57.2	48.9	42.4	37.2	33.0	29.5	26.6	0			
16	3.18	7.24	13.5	25.2	36.3	47.1	57.5	67.8	77.9	87.8	97.7	107	117	116	91.9	75.2	63.1	53.8	46.7	41.0	36.3	32.5	29.3	0			
17	3.39	7.73	14.4	26.9	38.8	50.3	61.4	72.4	83.2	93.8	104	115	125	127	101	82.4	69.1	59.0	51.1	44.9	39.8	35.6	32.1	0			
18	3.61	8.23	15.4	28.6	41.3	53.5	65.3	77.0	88.5	99.8	111	122	133	138	110	89.8	75.2	64.2	55.7	48.9	43.3	38.8	35.0	0			
19	3.82	8.72	16.3	30.4	43.7	56.7	69.3	81.6	93.8	106	118	129	141	150	119	97.4	81.6	69.7	60.4	53.0	47.0	42.1	37.9	0			
20	4.04	9.22	17.2	32.1	46.2	59.9	73.2	86.3	99.1	112	124	137	149	161	128	105	88.1	75.2	65.2	57.2	50.8	45.4	0				
21	4.26	9.72	18.1	33.8	48.7	63.1	77.2	91.0	104	118	131	144	157	170	138	113	94.8	80.9	70.2	61.6	54.6	48.9	0				
22	4.48	10.2	19.1	35.6	51.3	66.4	81.2	95.6	110	124	138	151	165	178	148	121	102	86.8	75.2	66.0	58.6	52.4	0				
23	4.70	10.7	20.0	37.3	53.8	69.7	85.2	100	115	130	145	159	173	187	158	130	109	92.8	80.4	70.6	62.6	56.0	0				
24	4.92	11.2	20.9	39.1	56.3	72.9	89.2	105	121	136	151	166	181	196	169	138	116	98.9	85.7	75.2	66.7	59.7	0				
25	5.14	11.7	21.9	40.8	58.8	76.2	93.2	110	126	142	158	174	189	205	180	147	123	105	91.1	80.0	70.9	63.5	0				
26	5.37	12.2	22.8	42.6	61.4	79.5	97.2	115	132	148	165	181	198	214	190	156	131	112	96.7	84.8	75.2	0					
28	5.81	13.3	24.7	46.2	66.5	86.2	105	124	143	161	179	197	214	232	213	174	146	125	108	94.8	84.1	0					
30	6.26	14.3	26.7	49.7	71.6	92.8	113	134	154	173	193	212	231	249	236	193	162	138	120	105	93.2	0					
32	6.71	15.3	28.6	53.3	76.8	99.5	122	143	165	186	206	227	247	267	260	213	178	152	132	116	0						
35	7.40	16.9	31.5	58.7	84.6	110	134	158	181	205	227	250	272	295	297	243	204	174	151	130	0						
40	8.54	19.5	36.4	67.9	97.7	127	155	182	210	236	263	289	315	340	363	297	249	213	178	0							
45	9.70	22.1	41.3	77.1	111	144	176	207	238	268	298	328	357	387	434	355	297	237	92.7	0							
Type A		Type B					Type C																				

Type A: Manual or drip lubrication

Type B: Bath or disc lubrication

Type C: Oil stream lubrication

GENERAL NOTES:

- (a) The limiting RPM for each lubrication type is read from the column to the left of the boundary line shown.
- (b) The horsepower ratings of multiple strand chains are greater than those of single strand chain. See Table A2 for multiple strand factors.
- (c) See para. A1.4 for a detailed description of lubrication types.
- (d) For optimum results, it is recommended that the roller chain manufacturer be given the opportunity to evaluate the conditions of operation of chains in the shaded (galling range) speed area.

TABLE A14 HORSEPOWER RATINGS, STANDARD SINGLE STRAND ROLLER CHAIN — NO. 160

No. of Teeth in Small Spkt.	2 in. Pitch Revolutions Per Minute — Small Sprocket																											
	10	25	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	1000	1100	1200	1300	1400			
11	3.07	7.01	13.1	24.4	35.2	45.6	55.7	65.6	75.4	85.0	94.5	96.6	83.7	73.5	65.2	58.3	52.6	47.7	43.6	40.0	34.1	29.6	26.0	23.0	0			
12	3.38	7.70	14.4	26.8	38.6	50.1	61.2	72.1	82.8	93.4	104	110	95.4	83.7	74.2	66.4	59.9	54.4	49.6	45.6	38.9	33.7	29.6	26.3	0			
13	3.68	8.40	15.7	29.2	42.1	54.6	66.7	78.6	90.3	102	113	124	108	94.4	83.7	74.9	67.5	61.3	56.0	51.4	43.9	38.0	33.4	29.6	0			
14	3.99	9.10	17.0	31.7	45.6	59.1	72.3	85.2	97.8	110	123	135	120	105	93.6	83.7	75.5	68.5	62.6	57.4	49.0	42.5	37.3	33.1	0			
15	4.30	9.80	18.3	34.1	49.2	63.7	77.9	91.7	105	119	132	145	133	117	104	92.8	83.7	76.0	69.4	63.7	54.4	47.1	41.4	0				
16	4.61	10.5	19.6	36.6	52.7	68.3	83.5	98.4	113	127	142	156	147	129	114	102	92.2	83.7	76.4	70.2	59.9	51.9	45.6	0				
17	4.92	11.2	20.9	39.1	56.3	72.9	89.1	105	121	136	151	166	161	141	125	112	101	91.7	83.7	76.8	65.6	56.9	49.9	0				
18	5.23	11.9	22.3	41.6	59.9	77.6	94.8	112	128	145	161	177	175	154	136	122	110	99.9	91.2	83.7	71.5	62.0	54.4	0				
19	5.55	12.7	23.6	44.1	63.5	82.2	101	118	136	153	171	188	190	167	148	132	119	108	98.9	90.8	77.5	67.2	59.0	0				
20	5.86	13.4	25.0	46.6	67.1	86.9	106	125	144	162	180	198	205	180	160	143	129	117	107	98.1	83.7	72.6	63.7	0				
21	6.18	14.1	26.3	49.1	70.7	91.6	112	132	152	171	190	209	221	194	172	154	139	126	115	105	90.1	78.1	68.5	0				
22	6.50	14.8	27.7	51.6	74.4	96.3	118	139	159	180	200	220	237	208	184	165	149	135	123	113	96.6	83.7	0					
23	6.82	15.6	29.0	54.2	78.0	101	124	146	167	189	210	231	251	222	197	176	159	144	132	121	103	89.5	0					
24	7.14	16.3	30.4	56.7	81.7	106	129	152	175	197	220	241	263	237	210	188	169	154	140	129	110	95.4	0					
25	7.46	17.0	31.8	59.3	85.4	111	135	159	183	206	229	252	275	252	223	200	180	164	149	137	117	101	0					
26	7.78	17.8	33.1	61.8	89.1	115	141	166	191	215	239	263	287	267	237	212	191	173	158	145	124	108	0					
28	8.43	19.2	35.9	67.0	96.5	125	153	180	207	233	259	285	311	298	265	237	214	194	177	162	139	120	0					
30	9.08	20.7	38.7	72.2	104	135	165	194	223	251	279	307	336	331	293	263	237	215	196	180	154	0						
32	9.74	22.2	41.5	77.4	111	144	176	208	239	269	300	329	359	365	323	289	261	237	216	198	169	0						
35	10.7	24.5	45.7	85.2	123	159	194	229	263	297	330	363	395	417	370	331	298	271	247	227	180	0						
40	12.4	28.3	52.8	98.5	142	184	225	265	304	343	381	419	457	494	452	404	365	331	302	257	0							
45	14.1	32.1	59.9	112	161	209	255	301	345	389	433	476	519	561	539	482	418	348	271	189	0							
Type A	Type B			Type C																								

Type A: Manual or drip lubrication

Type B: Bath or disc lubrication

Type C: Oil stream lubrication

GENERAL NOTES:

- (a) The limiting RPM for each lubrication type is read from the column to the left of the boundary line shown.
- (b) The horsepower ratings of multiple strand chains are greater than those of single strand chain. See Table A2 for multiple strand factors.
- (c) See para. A1.4 for a detailed description of lubrication types.
- (d) For optimum results, it is recommended that the roller chain manufacturer be given the opportunity to evaluate the conditions of operation of chains in the shaded (galling range) speed area.

TABLE A15 HORSEPOWER RATINGS, STANDARD SINGLE STRAND ROLLER CHAIN — NO. 180

No. of Teeth in Small Spkt.	2 1/4 in. Pitch Revolutions Per Minute — Small Sprocket																								
	10	25	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150
11	4.24	9.68	18.1	33.7	48.6	62.9	76.9	90.6	104	117	124	106	92.0	80.7	71.6	64.1	57.8	52.4	47.9	46.9	40.5	37.5	34.9	32.5	0
12	4.66	10.6	19.8	37.0	53.4	69.1	84.5	99.6	114	129	142	121	105	92.0	81.6	73.0	65.8	59.7	54.6	50.1	46.2	42.8	39.7	37.1	0
13	5.08	11.6	21.6	40.4	58.2	75.4	92.1	109	125	141	156	136	118	104	92.0	82.3	74.2	67.4	61.5	56.5	52.1	48.2	44.8	0	
14	5.51	12.6	23.4	43.7	63.0	81.6	99.8	118	135	152	169	152	132	116	103	92.0	82.9	75.3	68.7	63.1	58.2	53.9	50.1	0	
15	5.93	13.5	25.3	47.1	67.9	88.0	108	127	146	164	182	169	146	129	114	102	92.0	83.5	76.2	70.0	64.5	59.7	55.5	0	
16	6.36	14.5	27.1	50.5	72.8	94.3	115	136	156	176	196	186	161	142	126	112	101	92.0	84.0	77.1	71.1	65.8	61.2	0	
17	6.79	15.5	28.9	54.0	77.7	101	123	145	167	188	209	204	177	155	138	123	111	101	92.0	84.4	77.9	72.1	0		
18	7.22	16.5	30.8	57.4	82.7	107	131	154	177	200	222	222	193	169	150	134	121	110	100	92.0	84.8	78.5	0		
19	7.66	17.5	32.6	60.8	87.6	114	139	164	188	212	236	241	209	183	163	145	131	119	109	99.8	92.0	85.2	0		
20	8.10	18.5	34.5	64.3	92.6	120	147	173	199	224	249	260	226	198	176	157	142	129	117	108	99.3	92.0	0		
21	8.53	19.5	36.3	67.8	97.6	126	155	182	209	236	262	280	243	213	189	169	152	138	126	116	107	99.0	0		
22	8.97	20.5	38.2	71.3	103	133	163	192	220	248	276	300	260	228	203	181	163	148	135	124	115	0			
23	9.41	21.5	40.1	74.8	108	140	171	201	231	260	290	318	278	244	216	194	175	159	145	133	123	0			
24	9.86	22.5	42.0	78.3	113	146	179	210	242	273	303	333	296	260	231	206	186	169	154	142	131	0			
25	10.3	23.5	43.9	81.8	118	153	187	220	253	285	317	348	315	277	245	220	198	180	164	151	139	0			
26	10.7	24.5	45.7	85.4	123	159	195	229	264	297	331	363	334	293	260	233	210	191	174	160	0				
28	11.6	26.6	49.6	92.5	133	173	211	249	286	322	358	394	374	328	291	260	235	213	194	178	0				
30	12.5	28.6	53.4	99.6	144	186	227	268	308	347	386	424	414	364	322	289	260	236	216	198	0				
32	13.4	30.7	57.2	107	154	199	244	287	330	372	414	455	456	401	355	318	287	260	238	0					
35	14.8	33.8	63.1	118	170	220	268	316	363	410	456	501	522	458	406	364	328	291	220	0					
40	17.1	39.0	72.9	136	196	254	310	365	420	473	526	579	575	524	465	398	324	244	0						
45	19.4	44.3	82.7	154	222	288	352	415	477	538	598	631	578	514	441	360	271	0							
Type A	Type B		Type C																						

Type A: Manual or drip lubrication
 Type B: Bath or disc lubrication
 Type C: Oil stream lubrication

GENERAL NOTES:

- The limiting RPM for each lubrication type is read from the column to the left of the boundary line shown.
- The horsepower ratings of multiple strand chains are greater than those of single strand chain. See Table A2 for multiple strand factors.
- See para. A1.4 for a detailed description of lubrication types.
- For optimum results, it is recommended that the roller chain manufacturer be given the opportunity to evaluate the conditions of operation of chains in the shaded (galling range) speed area.

TABLE A16 HORSEPOWER RATINGS, STANDARD SINGLE STRAND ROLLER CHAIN — NO. 200

No. of Teeth in Small Spkt.	2½ in. Pitch Revolutions Per Minute — Small Sprocket																			
	10	15	20	30	40	50	70	100	150	200	250	300	350	400	450	500	550	600	650	700
11	5.64	8.12	10.5	15.1	19.6	24.0	32.5	44.8	64.5	83.5	102	120	138	156	135	115	100	87.8	77.9	0
12	6.19	8.92	11.6	16.6	21.6	26.4	35.7	49.2	70.8	91.8	112	132	152	171	154	132	114	100	0	0
13	6.75	9.72	12.6	18.1	23.5	28.7	38.9	53.6	77.2	100	122	144	166	187	174	148	129	113	0	0
14	7.31	10.5	13.6	19.7	25.5	31.1	42.1	58.1	83.7	108	132	156	179	202	194	166	144	126	0	0
15	7.88	11.3	14.7	21.2	27.4	33.5	45.4	62.6	90.1	117	143	168	193	218	215	184	159	140	0	0
16	8.45	12.2	15.8	22.7	29.4	36.0	48.7	67.1	96.6	125	153	180	207	234	237	203	176	154	0	0
17	9.02	13.0	16.8	24.2	31.4	38.4	52.0	71.6	103	134	163	193	221	249	260	222	192	169	0	0
18	9.59	13.8	17.9	25.8	33.4	40.8	55.3	76.2	110	142	174	205	235	265	283	242	209	184	0	0
19	10.2	14.6	19.0	27.3	35.4	43.3	58.6	80.8	116	151	184	217	249	281	307	262	227	199	0	0
20	10.7	15.5	20.1	28.9	37.4	45.8	61.9	85.4	123	159	195	229	264	297	331	283	245	0	0	0
21	11.3	16.3	21.1	30.5	39.5	48.2	65.3	90.0	130	168	205	242	278	313	348	305	264	0	0	0
22	11.9	17.2	22.2	32.0	41.5	50.7	68.7	94.6	136	177	216	254	292	330	366	327	283	0	0	0
23	12.5	18.0	23.3	33.6	43.5	53.2	72.0	99.3	143	185	226	267	307	346	384	349	303	0	0	0
24	13.1	18.9	24.4	35.2	45.6	55.7	75.4	104	150	194	237	279	321	362	402	372	323	0	0	0
25	13.7	19.7	25.5	36.8	47.6	58.2	78.8	109	156	203	248	292	335	378	421	396	343	0	0	0
26	14.3	20.6	26.6	38.4	49.7	60.7	82.2	113	163	212	259	305	350	395	439	420	364	0	0	0
Type A			Type B								Type C									

Type A: Manual or drip lubrication

Type B: Bath or disc lubrication

Type C: Oil stream lubrication

GENERAL NOTES:

- (a) The limiting RPM for each lubrication type is read from the column to the left of the boundary line shown.
- (b) The horsepower ratings of multiple strand chains are greater than those of single strand chain. See Table A2 for multiple strand factors.
- (c) See para. A1.4 for a detailed description of lubrication types.
- (d) For optimum results, it is recommended that the roller chain manufacturer be given the opportunity to evaluate the conditions of operation of chains in the shaded (galling range) speed area.

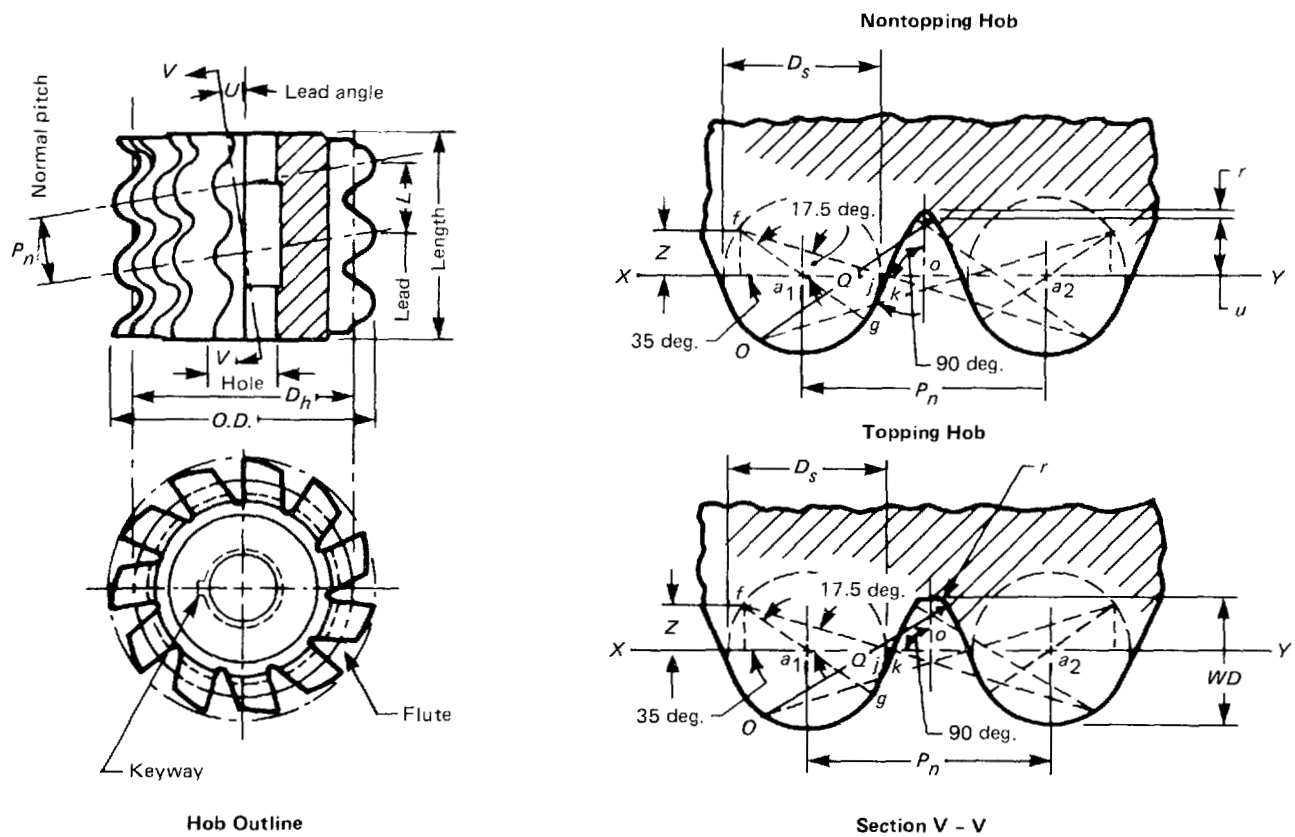
TABLE A17 HORSEPOWER RATINGS, STANDARD SINGLE STRAND ROLLER CHAIN — NO. 240

No. of Teeth in Small Spkt.	3 in. Pitch Revolutions Per Minute — Small Sprocket																				
	5	10	15	20	25	30	40	50	60	80	100	125	150	175	200	250	300	350	400	450	500
11	4.86	9.08	13.1	16.9	20.7	24.4	31.6	38.6	45.5	59.0	72.1	88.1	104	119	135	164	194	223	187	156	0
12	5.34	9.97	14.4	18.6	22.7	26.8	34.7	42.4	50.0	64.8	79.2	96.8	114	131	148	181	213	245	213	0	
13	5.83	10.9	15.7	20.3	24.8	29.2	37.9	46.3	54.5	70.6	86.4	106	124	143	161	197	232	267	240	0	
14	6.31	11.8	17.0	22.0	26.9	31.7	41.0	50.1	59.1	76.5	93.6	114	135	155	175	213	251	289	268	0	
15	6.80	12.7	18.3	23.7	28.9	34.1	44.2	54.0	63.6	82.4	101	123	145	167	188	230	271	311	297	0	
16	7.29	13.6	19.6	25.4	31.0	36.6	47.4	57.9	68.2	88.4	108	132	156	179	202	247	290	334	328	0	
17	7.78	14.5	20.9	27.1	33.1	39.0	50.6	61.8	72.9	94.4	115	141	166	191	215	263	310	356	359	0	
18	8.28	15.4	22.3	28.8	35.2	41.5	53.8	65.8	77.5	100	123	150	177	203	229	280	330	379	377	0	
19	8.78	16.4	23.6	30.6	37.4	44.0	57.0	69.7	82.2	106	130	159	187	215	243	297	350	402	393	0	
20	9.28	17.3	24.9	32.3	39.5	46.5	60.3	73.7	86.8	112	138	168	198	228	257	314	370	423	407	0	
21	9.78	18.2	26.3	34.1	41.6	49.0	63.5	77.7	91.5	119	145	177	209	240	270	331	390	439	421	0	
22	10.3	19.2	27.6	35.8	43.8	51.6	66.8	81.7	96.2	125	152	186	220	252	284	348	410	454	435	0	
23	10.8	20.1	29.0	37.6	45.9	54.1	70.1	85.7	101	131	160	195	230	265	298	365	430	469	448	0	
24	11.3	21.1	30.4	39.3	48.1	56.7	73.4	89.7	106	137	167	205	241	277	312	382	450	483	0		
25	11.8	22.0	31.7	41.1	50.3	59.2	76.7	93.8	110	143	175	214	252	290	327	399	470	496	0		
26	12.3	23.0	33.1	42.9	52.4	61.8	80.0	97.8	115	149	183	223	263	302	341	416	491	509	0		
Type A			Type B										Type C								

Type A: Manual or drip lubrication
 Type B: Bath or disc lubrication
 Type C: Oil stream lubrication

GENERAL NOTES:

- The limiting RPM for each lubrication type is read from the column to the left of the boundary line shown.
- The horsepower ratings of multiple strand chains are greater than those of single strand chain. See Table A2 for multiple strand factors.
- See para. A1.4 for a detailed description of lubrication types.
- For optimum results, it is recommended that the roller chain manufacturer be given the opportunity to evaluate the conditions of operation of chains in the shaded (galling range) speed area.



$$D_h = O.D. - D_s$$

$$D_r = \text{roller diameter}$$

$$D_s = \text{minimum diameter of seating curve} \\ = 1.005D_r + 0.003, \text{ in.}$$

$$F = D_r \left[0.8 \cos \left(18 \text{ deg.} - \frac{56 \text{ deg.}}{N_a} \right) \right. \\ \left. + 1.4 \cos \left(17 \text{ deg.} + \frac{116 \text{ deg.}}{N_a} \right) - Xab \right] - 1.3025 \\ - 0.0015, \text{ in.}$$

$$L = \text{lead} = \frac{P_n}{\cos U}$$

$$O = \text{located on line passing through } f \text{ and } j$$

$$O.D. = 1.7 (\text{hole} + D_r + 0.7P) \text{ approximately}$$

$$P = \text{chain pitch}$$

$$P_n = \text{normal pitch of hob} = 1.011P$$

$$Q = \text{found by trial and is tangent to arc } kg \text{ at } k \text{ and to fillet radius}$$

$$U = \sin^{-1} \frac{P_n}{\pi D_h}$$

$$V = 1.4D_r \sin Xab$$

$$W = 1.4D_r \cos Xab$$

$$WD = \frac{D_r}{2} + P \left(0.3 - \frac{\tan \frac{90 \text{ deg.}}{N_a}}{2} \right)$$

$$Z = 0.287D_s$$

$$a_1o = oa_2 = P_n/2$$

$$f = \text{radius center for arc } gk$$

$$j = \text{point of intersection of line } XY \text{ with circle of diameter } D_s$$

$$r = \text{radius of fillet circle} = 0.03P$$

$$u = 0.27P$$

$$yz = D_r \left[1.4 \sin \left(17 \text{ deg.} + \frac{116 \text{ deg.}}{N_a} - Xab \right) \right. \\ \left. - 0.8 \sin \left(18 \text{ deg.} - \frac{56 \text{ deg.}}{N_a} \right) \right]$$

$$\text{length} = \text{not less than two times bore, or } 6D_r, \text{ or } 3.2P$$

FIG. A1 HOB OUTLINE AND TOOTH FORM

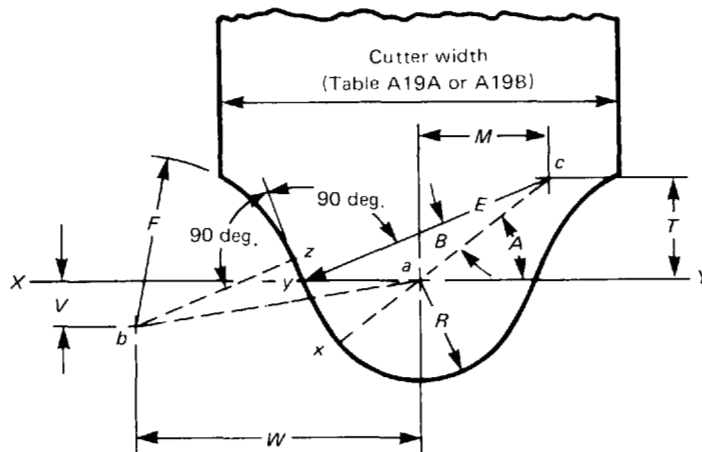


TABLE A18A CONSTRUCTION DATA FOR SPACE CUTTER LAYOUT, in.

Teeth Range	M	W	V	T	F	Chord xy	yz	Angle Xab
7-8	$0.5848D_r$	$1.2790D_r$	$0.5694D_r$	$0.5459D_r$	$0.8686D_r$ -0.0015	$0.2384D_r$ $+0.0003$	$0.0618D_r$	24 deg.
9-11	$0.6032D_r$	$1.3302D_r$	$0.4365D_r$	$0.5255D_r$	$0.8554D_r$ -0.0015	$0.28D_r$ $+0.0003$	$0.0853D_r$	18 deg., 10 min
12-17	$0.6194D_r$	$1.3694D_r$	$0.2911D_r$	$0.5063D_r$	$0.8364D_r$ -0.0015	$0.3181D_r$ $+0.0004$	$0.1269D_r$	12 deg.
18-34	$0.6343D_r$	$1.3947D_r$	$0.1220D_r$	$0.4875D_r$	$0.8073D_r$ -0.0015	$0.354D_r$ $+0.0004$	$0.1922D_r$	5 deg.
35 and over	$0.6466D_r$	$1.4000D_r$	0	$0.4710D_r$	$0.7857D_r$ -0.0015	$0.385D_r$ $+0.0004$	$0.2235D_r$	0 deg.

GENERAL NOTES:

(a) E (same for all ranges) = $1.3025D_r + 0.0015$ (b) ab (same for all ranges) = $1.4D_r$

TABLE A18B CONSTRUCTION DATA FOR SPACE CUTTER LAYOUT, mm

Teeth Range	M	W	V	T	F	Chord xy	yz	Angle Xab
7-8	$0.5848D_r$	$1.2790D_r$	$0.5694D_r$	$0.5459D_r$	$0.8686D_r$ -0.038	$0.2384D_r$ $+0.008$	$0.0618D_r$	24 deg.
9-11	$0.6032D_r$	$1.3302D_r$	$0.4365D_r$	$0.5255D_r$	$0.8554D_r$ -0.038	$0.28D_r$ $+0.008$	$0.0853D_r$	18 deg., 10 min
12-17	$0.6194D_r$	$1.3694D_r$	$0.2911D_r$	$0.5063D_r$	$0.8364D_r$ -0.038	$0.3181D_r$ $+0.010$	$0.1269D_r$	12 deg.
18-34	$0.6343D_r$	$1.3947D_r$	$0.1220D_r$	$0.4875D_r$	$0.8073D_r$ -0.038	$0.354D_r$ $+0.010$	$0.1922D_r$	5 deg.
35 and over	$0.6466D_r$	$1.4000D_r$	0	$0.4710D_r$	$0.7857D_r$ -0.038	$0.385D_r$ $+0.010$	$0.2235D_r$	0 deg.

GENERAL NOTES:

(a) E (same for all ranges) = $1.3025D_r + 0.038$ (b) ab (same for all ranges) = $1.4D_r$

TABLE A19A RECOMMENDED SPACE CUTTER SIZES FOR ROLLER CHAIN SPROCKETS, in.

Standard Chain No.	Chain Pitch <i>P</i>	Roller Diam.	Cutter Diameter						Cutter Width						Diam. of Hole
			6T	7-8T	9-11T	12-17T	18-34T	35T and Over	6T	7-8T	9-11T	12-17T	18-34T	35T and Over	
25	0.250	0.130	2.75	2.75	2.75	2.75	2.75	2.75	0.31	0.31	0.31	0.31	0.28	0.28	1.000
35	0.375	0.200	2.75	2.75	2.75	2.75	2.75	2.75	0.47	0.47	0.47	0.44	0.44	0.41	1.000
40	0.500	0.312	3.00	3.00	3.12	3.12	3.12	3.12	0.75	0.75	0.75	0.75	0.72	0.69	1.000
50	0.625	0.400	3.12	3.12	3.25	3.25	3.25	3.25	0.75	0.75	0.75	0.75	0.72	0.69	1.000
60	0.750	0.469	3.25	3.25	3.38	3.38	3.38	3.38	0.91	0.91	0.91	0.88	0.84	0.81	1.000
80	1.000	0.625	3.88	4.00	4.12	4.12	4.25	4.25	1.50	1.50	1.47	1.47	1.41	1.34	1.250
100	1.250	0.750	4.25	4.38	4.50	4.50	4.62	4.62	1.81	1.81	1.78	1.75	1.69	1.62	1.250
120	1.500	0.875	4.38	4.50	4.62	4.62	4.75	4.75	1.81	1.81	1.78	1.75	1.69	1.62	1.250
140	1.750	1.000	5.00	5.12	5.25	5.38	5.50	5.50	2.09	2.09	2.06	2.03	1.97	1.88	1.500
160	2.000	1.125	5.38	5.50	5.62	5.75	5.88	5.88	2.41	2.41	2.38	2.31	2.25	2.16	1.500
180	2.250	1.406	5.88	6.00	6.25	6.38	6.50	6.50	2.69	2.69	2.66	2.59	2.47	2.41	1.500
200	2.500	1.563	6.38	6.62	6.75	6.88	7.00	7.12	3.00	3.00	2.94	2.91	2.75	2.69	1.750
240	3.000	1.875	7.50	7.75	7.88	8.00	8.00	8.25	3.59	3.59	3.53	3.47	3.34	3.22	2.000

TABLE A19B RECOMMENDED SPACE CUTTER SIZES FOR ROLLER CHAIN SPROCKETS, mm

Standard Chain No.	Chain Pitch <i>P</i>	Roller Diam.	Cutter Diameter						Cutter Width						Diam. of Hole
			6T	7-8T	9-11T	12-17T	18-34T	35T and Over	6T	7-8T	9-11T	12-17T	18-34T	35T and Over	
25	6.35	3.30	69.8	69.8	69.8	69.8	69.8	69.8	7.9	7.9	7.9	7.9	7.1	7.1	25.40
35	9.52	5.08	69.8	69.8	69.8	69.8	69.8	69.8	11.9	11.9	11.9	11.2	11.2	10.4	25.40
40	12.70	7.92	76.2	76.2	79.2	79.2	79.2	79.2	19.0	19.0	19.0	19.0	18.3	17.6	25.40
50	15.88	10.16	79.2	79.2	82.6	82.6	82.6	82.6	19.0	19.0	19.0	19.0	18.3	17.6	25.40
60	19.05	11.91	82.6	82.6	85.9	85.9	85.9	85.9	23.1	23.1	23.1	22.4	21.3	20.6	25.40
80	25.40	15.88	98.6	101.6	104.6	104.6	108.0	108.0	38.1	38.1	37.3	37.3	35.8	34.0	31.75
100	31.75	19.05	108.0	111.3	114.3	114.3	117.3	117.3	46.0	46.0	45.2	44.4	42.9	41.1	31.75
120	38.10	22.22	111.3	114.3	117.3	117.3	120.6	120.6	46.0	46.0	45.2	44.4	42.9	41.1	31.75
140	44.45	25.40	127.0	130.0	133.4	136.7	139.7	139.7	53.1	53.1	52.3	51.6	50.0	47.8	38.10
160	50.80	28.58	136.7	139.7	142.7	146.0	149.4	149.4	61.2	61.2	60.5	58.7	57.2	54.9	38.10
180	57.15	35.71	149.4	152.4	158.8	162.1	165.1	165.1	68.3	68.3	67.6	65.8	62.7	61.2	38.10
200	63.50	39.67	162.1	168.1	171.4	174.8	177.8	180.8	76.2	76.2	74.7	73.9	69.8	68.3	44.45
240	76.20	47.62	190.5	196.8	200.2	203.2	203.2	209.6	91.2	91.2	89.7	88.1	84.8	81.8	50.80

**TABLE A20A RECOMMENDED HOB SIZES FOR
ROLLER CHAIN SPROCKETS, in.**

Standard Chain No.	Chain Pitch P	Roller Diam.	Hob Diam.	Hob Length	Hole Diam.
25	0.250	0.130	2.62	2.50	1.250
35	0.375	0.200	3.12	2.50	1.250
40	0.500	0.312	3.38	2.50	1.250
50	0.625	0.400	3.62	2.50	1.250
60	0.750	0.469	3.75	2.88	1.250
80	1.000	0.625	4.38	3.75	1.250
100	1.250	0.750	4.75	4.50	1.250
120	1.500	0.875	5.38	5.25	1.250
140	1.750	1.000	6.38	6.00	1.500
160	2.000	1.125	6.88	6.75	1.500
180	2.250	1.406	8.00	8.50	1.750
200	2.500	1.563	8.62	9.38	1.750
240	3.000	1.875	9.75	11.25	2.000

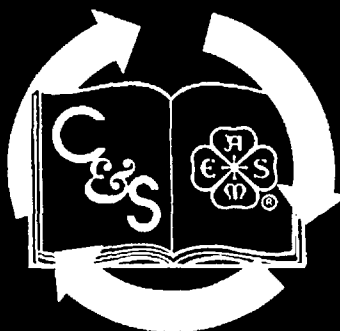
**TABLE A20B RECOMMENDED HOB SIZES FOR
ROLLER CHAIN SPROCKETS, mm**

Standard Chain No.	Chain Pitch P	Roller Diam.	Hob Diam.	Hob Length	Hole Diam.
25	6.35	3.30	66.5	63.5	31.75
35	9.52	5.08	79.2	63.5	31.75
40	12.70	7.92	85.9	63.5	31.75
50	15.88	10.16	91.9	63.5	31.75
60	19.05	11.91	95.2	73.2	31.75
80	25.40	15.88	111.3	95.2	31.75
100	31.75	19.05	120.6	114.3	31.75
120	38.10	22.22	136.7	133.4	31.75
140	44.45	25.40	162.1	152.4	38.10
160	50.80	28.58	174.8	171.4	38.10
180	57.15	35.71	203.2	215.9	44.45
200	63.50	39.67	218.9	238.3	44.45
240	76.20	47.62	247.6	285.8	50.80

AMERICAN NATIONAL STANDARDS – CHAINS, ATTACHMENTS, AND SPROCKETS FOR POWER TRANSMISSION AND CONVEYING

Precision Power Transmission Roller Chains, Attachments, and Sprockets	B29.1M-1993
Inverted Tooth (Silent) Chains and Sprockets	B29.2M-1982(R1987)
Double-Pitch Power Transmission Roller Chains and Sprockets	B29.3M-1985
Double-Pitch Conveyor Roller Chains, Attachments, and Sprockets	B29.4M-1986
Steel Detachable Link Chains, Attachments, and Sprockets	B29.6M-1983(R1988)
Leaf Chains, Clevises, and Sheaves	B29.8M-1993
Heavy Duty Offset Sidebar Power Transmission Roller Chains and Sprocket Teeth	B29.10M-1981(R1987)
Combination Chains, Attachments, and Sprocket Teeth	B29.11M-1984
Steel Bushed Rollerless Chains, Attachments, and Sprocket Teeth	B29.12M-1983(R1988)
"H" Type Mill Chains, Attachments, and Sprocket Teeth	B29.14M-1984
Heavy Duty Roller Type Conveyor Chains and Sprocket Teeth	B29.15-1973(R1987)
Welded Steel Type Mill Chains, Attachments, and Sprocket Teeth	B29.16M-1981(R1987)
Hinge Type Flat Top Conveyor Chains and Sprocket Teeth	B29.17M-1983(R1988)
Welded Steel-Type Drag Chains, Attachments, and Sprocket Teeth	B29.18M-1981(R1987)
A and CA550 and 620 Roller Chains, Attachments, and Sprockets	B29.19-1976(R1987)
700 Class Welded Steel and Cast Chains, Attachments, and Sprockets for Water and Sewage Treatment Plants	B29.21M-1981(R1987)
Drop Forged Rivetless Chains, Sprocket Teeth Drive Chain/Drive Dogs	B29.22M-1980(R1987)
Flexible Chain Couplings	B29.23M-1985
Roller Load Chains for Overhead Hoists	B29.24M-1989
Open Barrel Steel Pintle Type Conveyor Chains, Attachments, and Sprockets	B29.25M-1987

The ASME Publications Catalog shows a complete list of all the Standards published by the Society. For a complimentary catalog, or the latest information about our publications, call 1-800-THE-ASME (1-800-843-2763).



This document is printed
on 50% recycled paper.