ASME B29.17M-1998
[Revision of ANSI/ASME B29.17M-1983 (R1995)]

# HINGE TYPE FLAT TOP CONVEYOR CHAINS AND SPROCKET TEETH

AN AMERICAN NATIONAL STANDARD

**REAFFIRMED 2004**

FOR CURRENT COMMITTEE PERSONNEL
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# FOREWORD

(This Foreword is not part of ASME B29.17M-1998.)

Steel chains of the type covered by this Standard were first introduced in the late 1930s. These chains met with considerable success on material conveying applications.

In 1973, a subcommittee of American National Standards Committee B29 was appointed to draft a standard for these hinge type flat top conveyor chains. This Committee was composed of interested members of the American Chain Association.

The standard developed by this Committee covered only those dimensions that affect interchangeability and interconnectability.

To promote the use of this Standard in international trade, metric equivalents of all dimensions and capacities are given.

The American National Standards Institute approved the previous edition of this Standard on June 21, 1983, and it was reaffirmed in 1995.

The Standard was modified in 1997 to include two straight running nonmetallic chains (24P26 and 24P86). This edition received ANSI approval on September 9, 1998.



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# Chains, Attachments, and Sprockets for Power Transmission and Conveying

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

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# HINGE TYPE FLAT TOP CONVEYOR CHAINS AND SPROCKET TEETH

## 1 CHAIN NOMENCLATURE

*steel hinge type flat top conveyor chains:* a series of steel (carbon or stainless) flat surfaces of various widths as specified herein made integral with hinge-like barrels on each side. These barrels are designed to interlace so that pins inserted through the holes formed by the barrels connect adjacent links, thus forming a continuous length of flat top conveyor chain free to flex in one direction. Pins are retained by press fit and/or heading with respect to the barrels of one link while being a free or slip fit with respect to the interlaced barrels of the adjacent link. The chain so formed is driven by meshing the curl outside diameters with sprocket teeth.

*plastic hinge type flat top conveyor chains:* similar to steel type flat top chains except that the chain links are molded of plastic material. Pins are usually made of stainless steel and may be retained by press fit or knurls.

See also Figs. 1 through 6.

## 2 GENERAL CHAIN PROPORTIONS AND DESIGNATIONS

### 2.1 Minimum Ultimate Tensile Strength (M.U.T.S.)

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.

*(a)* **WARNING:** The M.U.T.S. is not a "working load". The M.U.T.S. greatly exceeds the maximum force that may be applied to the chain.

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

*(c) The tensile test is a destructive test.* Even though the chain may not visibly fail when subjected to the M.U.T.S., it will have been damaged and will be unfit for service.

### 2.2 Measuring Load

The measuring load as listed in Table 1 is approximately 2% of the minimum ultimate tensile strength. This is the load under which a chain should be measured for length.

### 2.3 Chain Length Tolerance

New chains may exceed theoretical length by 0.38 in. in 120 in. (9.7 mm in 3048 mm) but must not be under the theoretical length.

### 2.4 Dimensions for Chain Components

To allow chain from one manufacturer to interconnect with that of another, certain limiting dimensions have been adopted. These are not dimensions used in manufacturing chain, but have been chosen, maximum and minimum, to define an envelope within which components must fit to achieve the desired interchangeability.

All dimensions are based on the decimal inch system. The metric equivalent dimensions are for reference only.

## 3 EXPLANATION OF THE CHAIN NUMBERING SYSTEM

Chain numbers for this Standard consist of two pairs of digits separated by a letter. The first two digits are the number of sixteenths of an inch in one pitch. The letter designates material.

A = austenitic stainless steel, link and pin
C = carbon or alloy steel, link and pin
P = plastic

The last two digits are equal to the hinge width in sixteenths of an inch. For example, 24A26 designates an austenitic stainless steel chain of 1.5 in. pitch having a nominal hinge width of 1.625 in.

The chains are available with various top plate widths, which must be specified independently from the chain part number.

## 4 CHAIN DIMENSIONS

Refer to Tables 1 through 3.

## 5 SPROCKET TOOTH FORM — GENERAL

To reflect common usage, two separate tooth forms



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are recorded in this Standard:

*(a) Type A — Radius Tooth Form:* one tooth form cutter used for a full range of teeth. See Fig. 7 and Table 4.

*(b) Type B — Straight Face Tooth Form:* optimizes load absorption and chain elongation allowable. Requires more than one cutter for a full range of teeth. Five cutters could cut the 12 through 41 teeth shown in this Standard. See Fig. 8 and Table 5.

For other sprocket data, see Fig. 9 and Table 6.

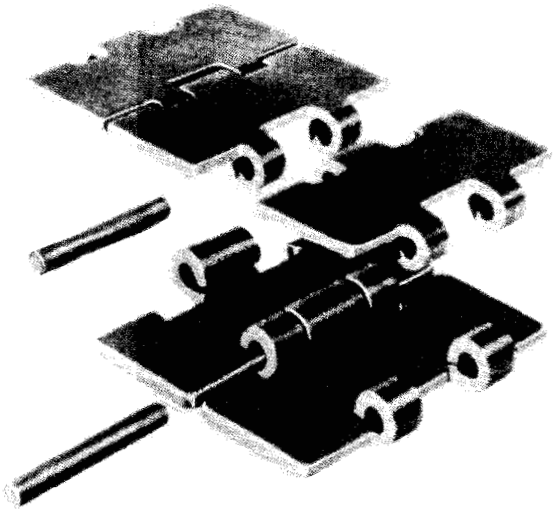


**FIG. 1 STEEL HINGE TYPE FLAT TOP CONVEYOR CHAIN**



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$A$ = pin body diameter
$B$ = slip fit curl inside diameter
$C$ = center curl width
$D$ = center curl clearance width
$E_1$ = width over press fit curls
$E_2$ = assembled pin length
$F$ = press fit curl clearance width
$G$ = top plate width
$H$ = curl outside diameter
$J$ = press fit curl clearance radius
$K$ = clearance — slip fit curl center line to top plate edge
$L$ = slip fit clearance radius
$M$ = clearance — press fit curl center line to top plate edge
$P$ = chain pitch
$T$ = top plate thickness

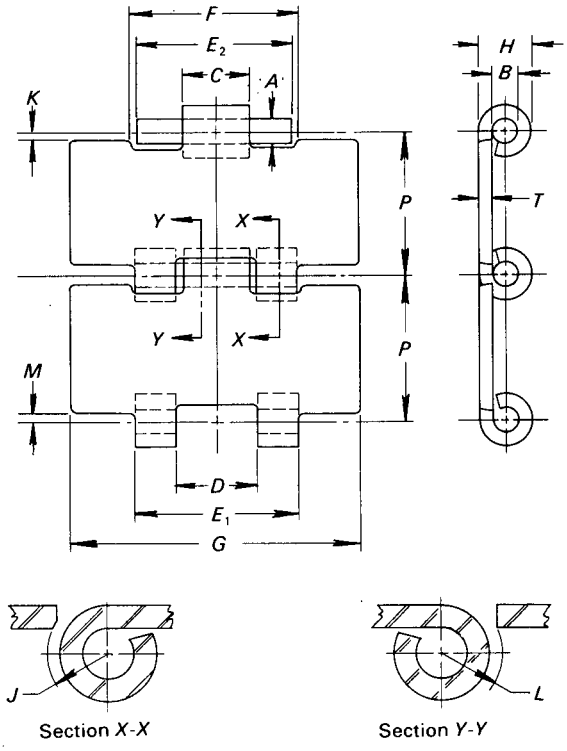



**FIG. 2 STEEL HINGE TYPE FLAT TOP CONVEYOR CHAIN NOMENCLATURE**

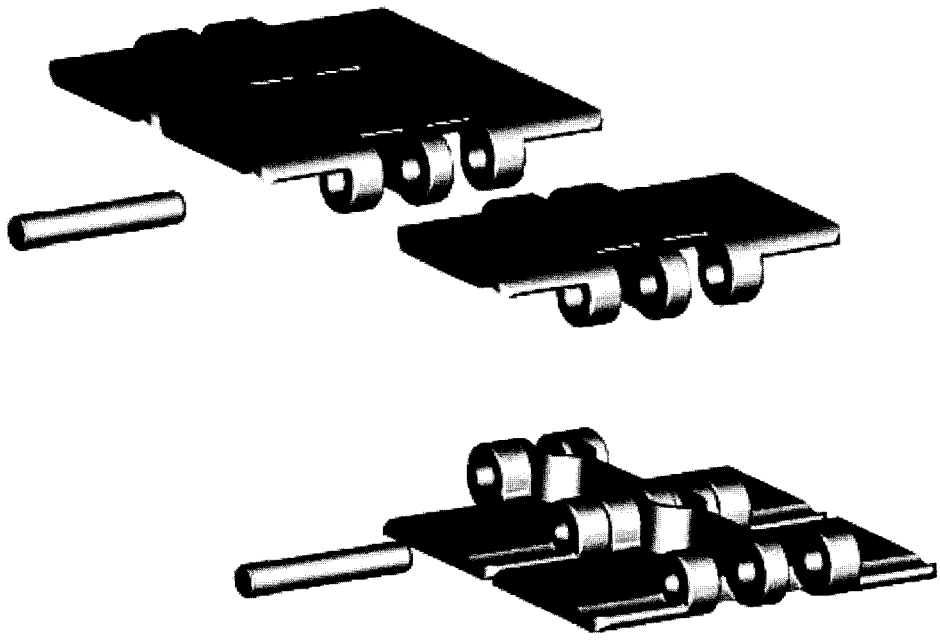


**FIG. 3 PLASTIC HINGE TYPE FLAT TOP CONVEYOR CHAIN — 24P26**



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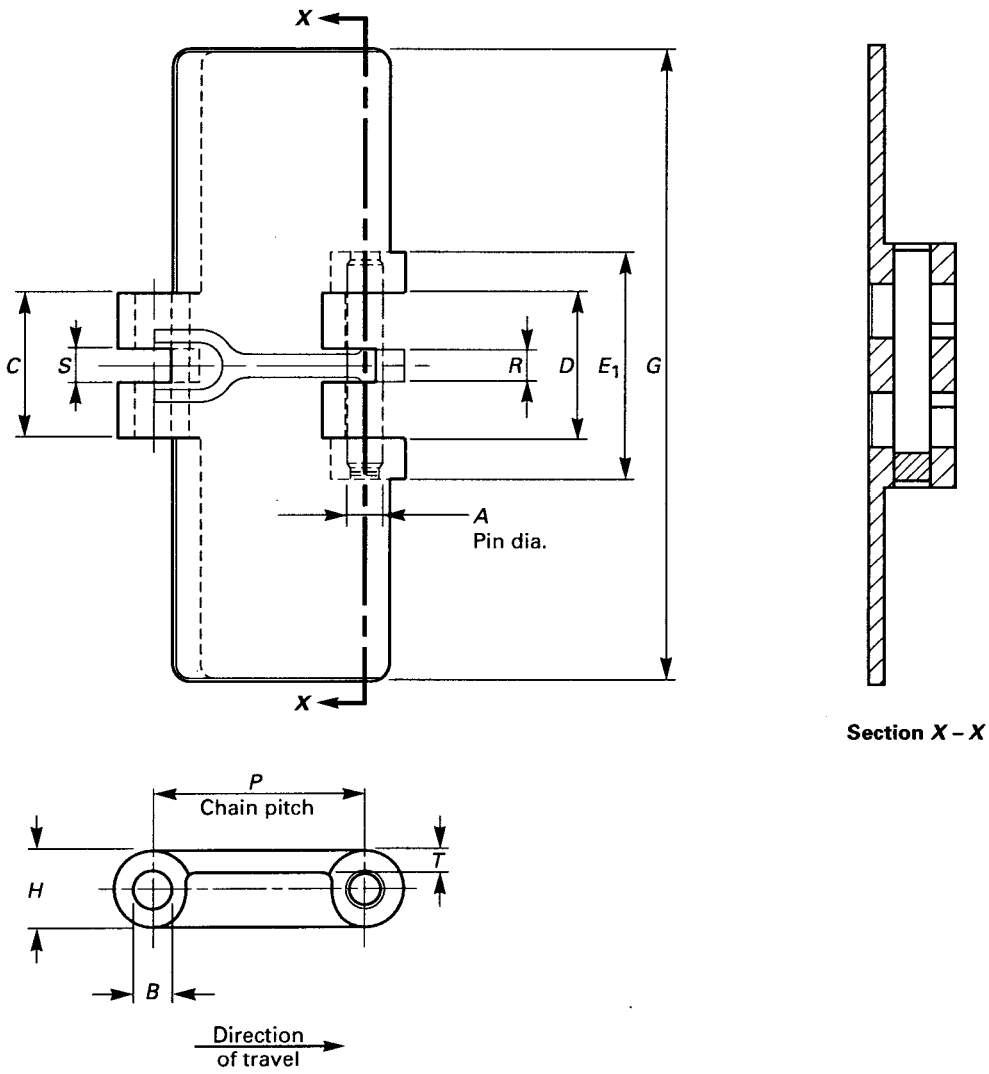



**FIG. 4 PLASTIC HINGE TYPE FLAT TOP CONVEYOR CHAIN — 24P26**



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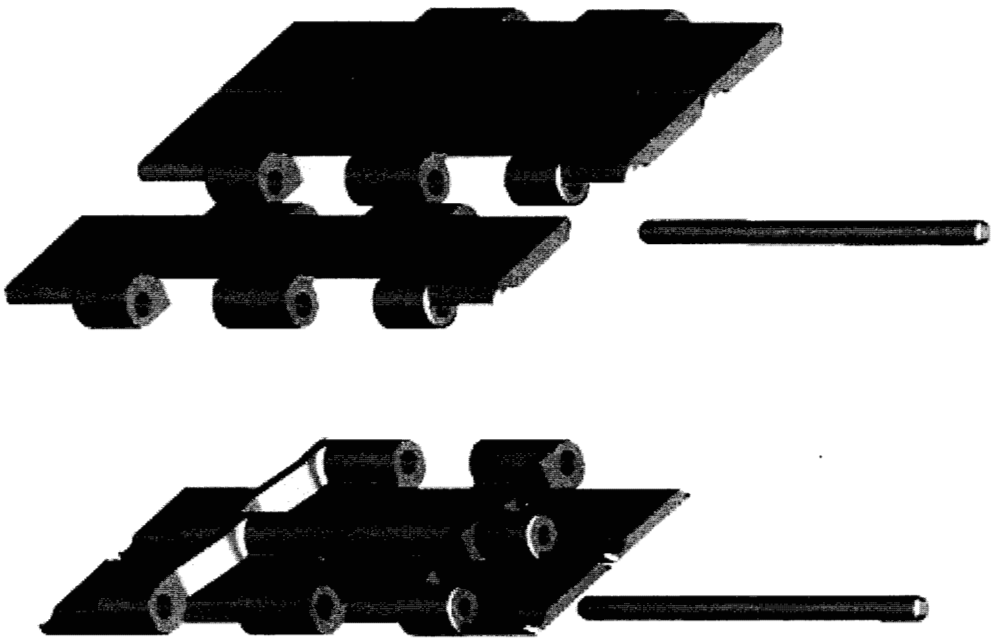


**FIG. 5 PLASTIC HINGE TYPE FLAT TOP CONVEYOR CHAIN — 24P86**

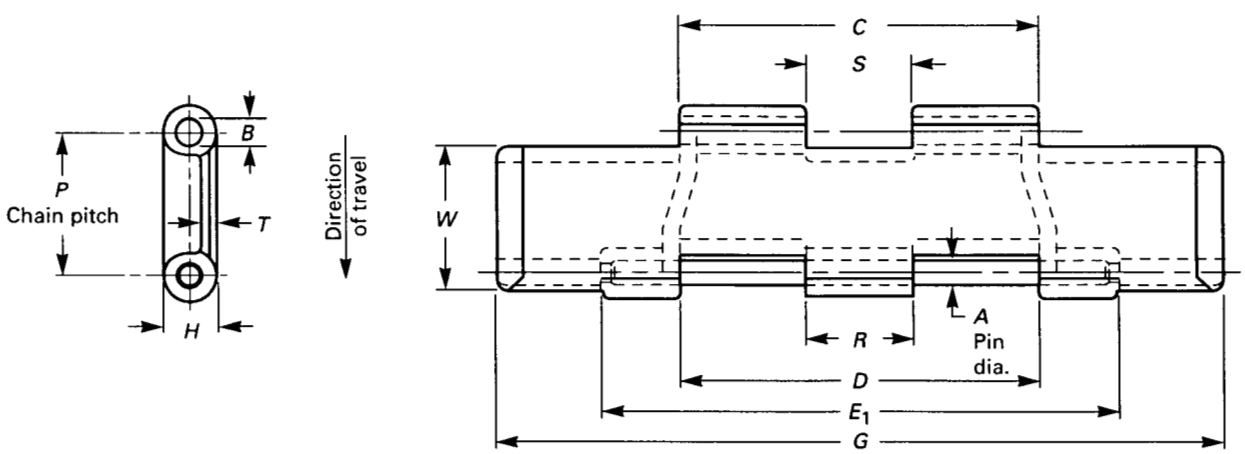



**FIG. 6 PLASTIC HINGE TYPE FLAT TOP CONVEYOR CHAIN — 24P86**



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## TABLE 1 GENERAL CHAIN DIMENSIONS, M.U.T.S. RATING, AND MEASURING LOAD FOR CHECKING CHAIN LENGTH

| Chain Number | 24A26 | 24C26 | 24P26 | 24P86 |
|---|---|---|---|---|
| **Dimensions, in.** | | | | |
| $P$ = Chain pitch | 1.50 | 1.50 | 1.50 | 1.50 |
| $A$ = Pin body diameter | 0.25 | 0.25 | 0.25 | 0.25 |
| $H$ = Outside diameter/overall height | 0.525 | 0.525 | 0.565 | 0.565 |
| $E_1$ = Width over press fit barrels | 1.625 | 1.625 | 1.64 | 5.37 |
| $T$ = Top plate thickness | 0.12 | 0.12 | 0.16 | 0.19 |
| $G$ = Top plate widths | 3.25 | 3.25 | 3.25 | 7.50 |
| | 4.00 | 4.00 | 4.00 | 10.00 |
| | 4.50 | 4.50 | 4.50 | 12.00 |
| | 6.00 | 6.00 | 6.00 | . . . |
| | 7.50 | 7.50 | 7.50 | . . . |
| M.U.T.S., lb (see para. 2.1) | 2000 | 2400 | 850 | 1570 |
| Number of pitches/nominal 120 in. | 80 | 80 | 80 | 80 |
| Theoretical length in nominal 120 in. strand | 120.0 | 120.0 | 120.0 | 120.0 |
| Measuring load, lb | 40 | 40 | 20 | 20 |
| **Dimensions, mm** | | | | |
| $P$ = Chain pitch | 38.1 | 38.1 | 38.1 | 38.1 |
| $A$ = Pin body diameter | 6.4 | 6.4 | 6.4 | 6.4 |
| $H$ = Outside diameter/overall height | 13.3 | 13.3 | 14.35 | 14.35 |
| $E_1$ = Width over press fit barrels | 41.28 | 41.28 | 41.6 | 136.4 |
| $T$ = Top plate thickness | 3.0 | 3.0 | 4.1 | 4.8 |
| $G$ = Top plate widths | 82.6 | 82.6 | 82.6 | 190.5 |
| | 101.6 | 101.6 | 101.6 | 254.0 |
| | 114.3 | 114.3 | 114.3 | 304.8 |
| | 152.4 | 152.4 | 152.4 | . . . |
| | 190.5 | 190.5 | 190.5 | . . . |
| M.U.T.S., kN (see para. 2.1) | 8.896 | 10.676 | 3.78 | 6.98 |
| Number of pitches/nominal 3048 mm strand | 80 | 80 | 80 | 80 |
| Theoretical length in nominal 3048 mm strand | 3048 | 3048 | 3048 | 3048 |
| Measuring load, kN | 0.178 | 0.178 | 0.089 | 0.089 |

CAUTION: The numerical values set forth in this Table do not afford a sufficient or appropriate basis for determining chain application and must be read in conjunction with the definitions and explanatory notes appearing in paras. 2 and 3 and Fig. 1.



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## TABLE 2 MAXIMUM AND MINIMUM CONTROLLING DIMENSIONS FOR INTERCHANGEABLE LINKS

| Chain Number | 24A26 | 24C26 | 24P26 | 24P86 |
|---|---|---|---|---|
| **Dimensions, in.** | | | | |
| $A$ = Pin body diameter (max.) | 0.251 | 0.251 | 0.251 | 0.251 |
| $B$ = Slip fit barrel inside diameter (min.) | 0.252 | 0.252 | 0.252 | 0.252 |
| $C$ = Center barrel width (max.) | 0.781 | 0.781 | 1.021 | 3.696 |
| $D$ = Center barrel clearance width (min.) | 0.790 | 0.790 | 1.035 | 3.725 |
| $E_1$ = Width over press fit barrels (max.) | 1.655 | 1.655 | 1.655 | 5.388 |
| $F$ = Press fit barrel clearance width (min.) | 1.656 | 1.656 | ... | ... |
| $L$ = Slip fit barrel clearance radius (min.) | 0.264 | 0.264 | ... | ... |
| $J$ = Press fit barrel clearance radius (min.) | 0.264 | 0.264 | ... | ... |
| $K$ = Clearance — slip fit barrel center line to top plate edge (min.) | 0.016 | 0.016 | ... | ... |
| $M$ = Clearance — press fit barrel center line to top plate edge (min.) | 0.016 | 0.016 | ... | ... |
| $R$ = Center barrel width (max.) | ... | ... | 0.231 | 1.131 |
| $S$ = Center barrel clearance width (min.) | ... | ... | 0.238 | 1.140 |
| **Dimensions, mm** | | | | |
| $A$ = Pin body diameter (max.) | 6.38 | 6.38 | 6.38 | 6.38 |
| $B$ = Slip fit barrel inside diameter (min.) | 6.40 | 6.40 | 6.40 | 6.40 |
| $C$ = Center barrel width (max.) | 19.84 | 19.84 | 25.93 | 93.88 |
| $D$ = Center barrel clearance width (min.) | 20.07 | 20.07 | 26.29 | 94.62 |
| $E_1$ = Width over press fit barrels (max.) | 42.04 | 42.04 | 42.04 | 136.86 |
| $F$ = Press fit barrel clearance width (min.) | 42.06 | 42.06 | ... | ... |
| $L$ = Slip fit barrel clearance radius (min.) | 6.70 | 6.70 | ... | ... |
| $J$ = Press fit barrel clearance radius (min.) | 6.70 | 6.70 | ... | ... |
| $K$ = Clearance — slip fit barrel center line to top plate edge (min.) | 0.41 | 0.41 | ... | ... |
| $M$ = Clearance — press fit barrel center line to top plate edge (min.) | 0.41 | 0.41 | ... | ... |
| $R$ = Center barrel width (max.) | ... | ... | 5.87 | 28.73 |
| $S$ = Center barrel clearance width (min.) | ... | ... | 6.05 | 28.96 |

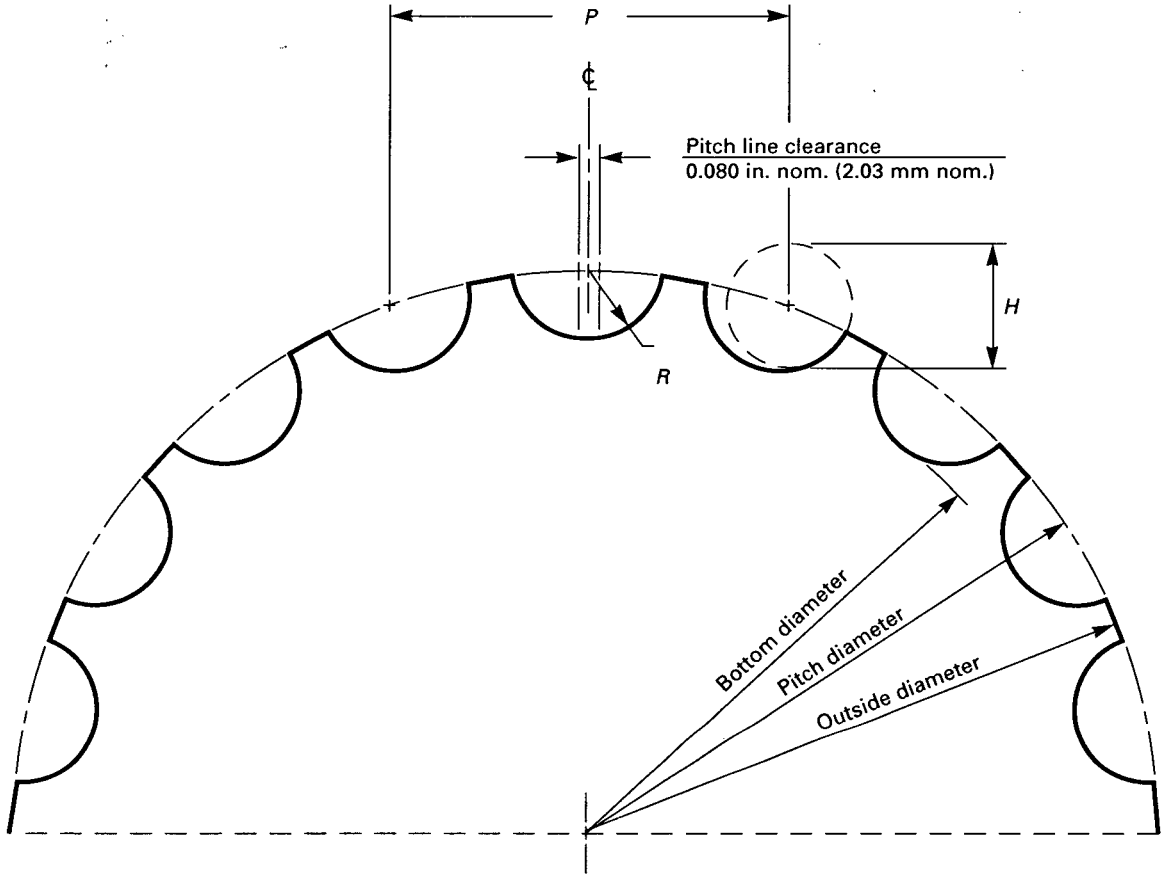
## TABLE 3 CHAIN CLEARANCE DIMENSIONS

| Chain Number | 24A26 | 24C26 | 24P26 | 24P86 |
|---|---|---|---|---|
| **Dimensions, in.** | | | | |
| $H$ = Overall height (max.) | 0.525 | 0.525 | 0.575 | 0.575 |
| $G$ = Top plate width (max.) | 3.250 | 3.250 | 3.250 | 7.500 |
| | 4.000 | 4.000 | 4.000 | 10.000 |
| | 4.500 | 4.500 | 4.500 | 12.000 |
| | 6.000 | 6.000 | 6.000 | ... |
| | 7.500 | 7.500 | 7.500 | ... |
| $E_2$ = Assembled pin length (max.) | 1.676 | 1.676 | ... | ... |
| **Dimensions, mm** | | | | |
| $H$ = Overall height (max.) | 13.34 | 13.34 | 14.61 | 14.61 |
| $G$ = Top plate width (max.) | 82.55 | 82.55 | 82.6 | 190.5 |
| | 101.60 | 101.60 | 101.6 | 254.0 |
| | 114.30 | 114.30 | 114.3 | 304.8 |
| | 152.40 | 152.40 | 152.4 | ... |
| | 190.50 | 190.50 | 190.5 | ... |
| $E_2$ = Assembled pin length (max.) | 42.57 | 42.57 | ... | ... |



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| | | in. | mm |
|---|---|---|---|
| *P* | = pitch | 1.5 | 38.1 |
| *H* | = max. curl diameter | 0.525 | 13.34 |
| *R* | = pocket radius (max.) | 0.265 | 6.73 |

GENERAL NOTE:
All numbers of teeth may be made with one cutter if non-topping.

**FIG. 7 SPROCKET TOOTH FORM, TYPE A — RADIUS TOOTH FORM**



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## TABLE 4 PITCH DIAMETER AND MAXIMUM OUTSIDE AND BOTTOM DIAMETER FOR NORMAL RANGE OF SPROCKET TEETH AVAILABLE WITH TYPE A TOOTH FORM SPROCKETS (See Fig. 7)

| Number of Teeth | | Pitch Diameter | | Maximum Outside Diameter | | Maximum Bottom Diameter | |
|---|---|---|---|---|---|---|---|
| Actual | Effective | in. | mm | in. | mm | in. | mm |
| 12 | 6 | 3.000 | 76.20 | 2.848 | 72.34 | 2.475 | 62.87 |
| 13 | 6½ | 3.228 | 81.99 | 3.108 | 78.94 | 2.703 | 68.66 |
| 14 | 7 | 3.457 | 87.81 | 3.365 | 85.47 | 2.932 | 74.47 |
| 15 | 7½ | 3.688 | 93.68 | 3.619 | 91.92 | 3.163 | 80.34 |
| 16 | 8 | 3.920 | 99.57 | 3.871 | 98.32 | 3.395 | 86.23 |
| 17 | 8½ | 4.152 | 105.46 | 4.122 | 104.70 | 3.627 | 92.13 |
| 18 | 9 | 4.386 | 111.40 | 4.371 | 111.02 | 3.861 | 98.07 |
| 19 | 9½ | 4.620 | 117.35 | 4.620 | 117.35 | 4.095 | 104.01 |
| 20 | 10 | 4.854 | 123.29 | 4.854 | 123.29 | 4.329 | 109.96 |
| 21 | 10½ | 5.089 | 129.26 | 5.089 | 129.26 | 4.564 | 115.93 |
| 22 | 11 | 5.324 | 135.23 | 5.324 | 153.23 | 4.799 | 121.89 |
| 23 | 11½ | 5.560 | 141.22 | 5.560 | 141.22 | 5.035 | 127.89 |
| 24 | 12 | 5.796 | 147.22 | 5.786 | 147.22 | 5.271 | 133.88 |
| 25 | 12½ | 6.032 | 153.21 | 6.032 | 153.21 | 5.507 | 139.88 |
| 26 | 13 | 6.268 | 159.21 | 6.268 | 159.21 | 5.743 | 145.87 |
| 27 | 13½ | 6.504 | 165.20 | 6.504 | 165.20 | 5.979 | 151.87 |
| 28 | 14 | 6.741 | 171.22 | 6.741 | 171.22 | 6.216 | 157.89 |
| 29 | 14½ | 6.978 | 177.24 | 6.978 | 177.24 | 6.453 | 163.91 |
| 30 | 15 | 7.215 | 183.26 | 7.215 | 183.26 | 6.690 | 169.93 |
| 31 | 15½ | 7.452 | 189.28 | 7.452 | 189.28 | 6.927 | 175.95 |
| 32 | 16 | 7.689 | 195.30 | 7.689 | 195.30 | 7.164 | 181.97 |
| 33 | 16½ | 7.926 | 201.32 | 7.926 | 201.32 | 7.401 | 187.99 |
| 34 | 17 | 8.163 | 207.34 | 8.163 | 207.34 | 7.638 | 194.01 |
| 35 | 17½ | 8.401 | 213.39 | 8.401 | 213.39 | 7.876 | 200.05 |
| 36 | 18 | 8.638 | 219.41 | 8.638 | 219.41 | 8.113 | 206.07 |
| 37 | 18½ | 8.876 | 225.45 | 8.876 | 225.45 | 8.351 | 212.12 |
| 38 | 19 | 9.113 | 231.47 | 9.113 | 231.47 | 8.588 | 218.14 |
| 39 | 19½ | 9.351 | 237.52 | 9.351 | 237.52 | 8.826 | 224.18 |
| 40 | 20 | 9.589 | 243.56 | 9.589 | 243.56 | 9.064 | 230.23 |
| 41 | 20½ | 9.826 | 249.60 | 9.826 | 249.60 | 9.301 | 236.25 |



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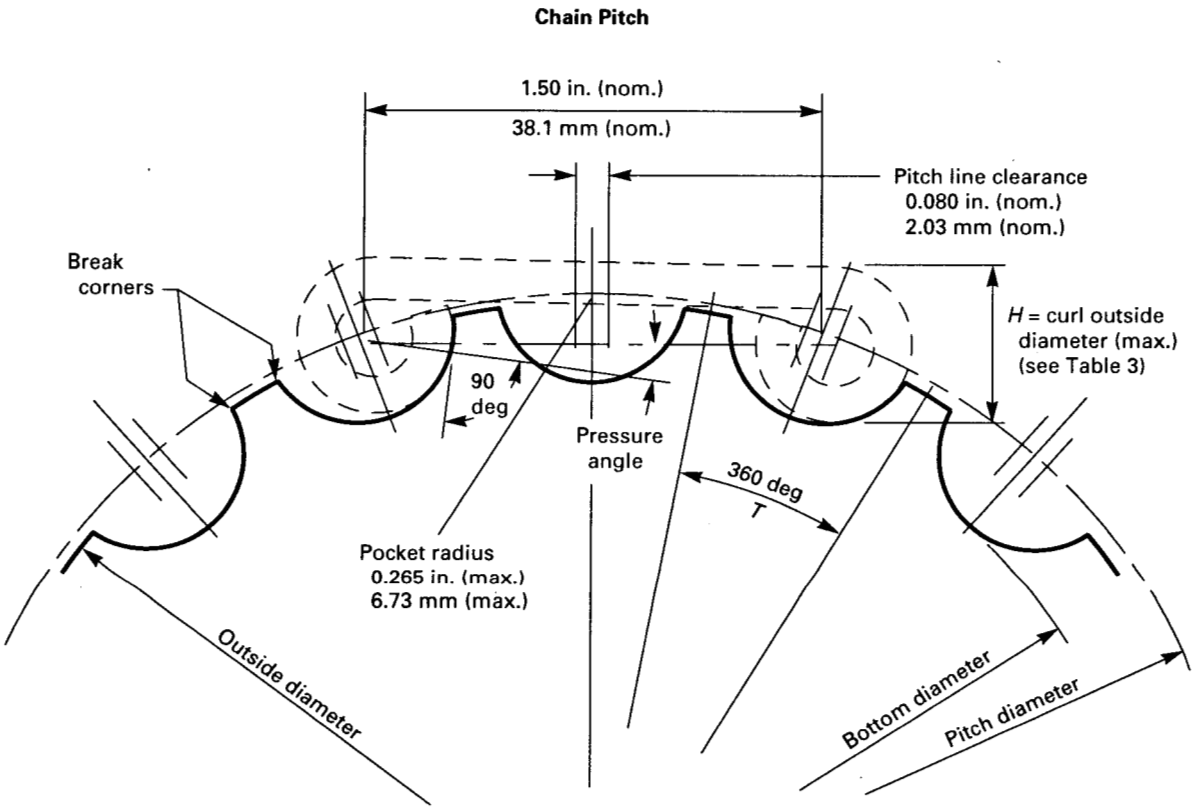



**FIG. 8 SPROCKET TOOTH FORM, TYPE B — STRAIGHT FACE TOOTH FORM**



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## TABLE 5 STANDARD PITCH DIAMETER, MAXIMUM OUTSIDE AND BOTTOM DIAMETER, AND PRESSURE ANGLE LIMITS FOR NORMAL RANGE OF SPROCKET TEETH AVAILABLE WITH TYPE B TOOTH FORM SPROCKETS
(See Fig. 8)

| Number of Teeth [Note (1)] | | Pitch Diameter | | Maximum Outside Diameter | | Maximum Bottom Diameter | | Maximum Pressure Angle, deg [Note (2)] |
|---|---|---|---|---|---|---|---|---|
| Act. | Eff. | in. | mm | in. | mm | in. | mm | |
| 12 | 6 | 3.000 | 76.20 | 2.850 | 72.39 | 2.475 | 62.87 | 10 |
| 13 | 6½ | 3.228 | 81.99 | 2.110 | 78.99 | 2.703 | 68.66 | 12 |
| 14 | 7 | 3.457 | 87.81 | 3.370 | 85.60 | 2.932 | 74.47 | 13 |
| 15 | 7½ | 3.688 | 93.68 | 3.630 | 92.20 | 3.163 | 80.34 | 13 |
| 16 | 8 | 3.920 | 99.57 | 3.860 | 98.04 | 3.395 | 86.23 | 14 |
| 17 | 8½ | 4.152 | 105.46 | 4.120 | 104.65 | 3.627 | 92.13 | 15 |
| 18 | 9 | 4.386 | 111.40 | 4.370 | 111.00 | 3.861 | 98.07 | 15 |
| 19 | 9½ | 4.620 | 117.35 | 4.610 | 117.09 | 4.095 | 104.01 | 16 |
| 20 | 10 | 4.854 | 123.29 | 4.861 | 123.47 | 4.329 | 109.96 | 16 |
| 21 | 10½ | 5.089 | 129.26 | 5.120 | 130.05 | 4.564 | 115.93 | 17 |
| 22 | 11 | 5.324 | 135.23 | 5.349 | 135.86 | 4.799 | 121.89 | 17 |
| 23 | 11½ | 5.560 | 141.22 | 5.590 | 141.99 | 5.035 | 127.89 | 18 |
| 24 | 12 | 5.796 | 147.22 | 5.830 | 148.08 | 5.271 | 133.88 | 18 |
| 25 | 12½ | 6.032 | 153.21 | 6.070 | 154.18 | 5.507 | 139.88 | 18 |
| 26 | 13 | 6.268 | 159.21 | 6.311 | 160.30 | 5.743 | 145.87 | 19 |
| 27 | 13½ | 6.504 | 165.20 | 6.560 | 166.62 | 5.979 | 151.87 | 19 |
| 28 | 14 | 6.741 | 171.22 | 6.804 | 172.82 | 6.216 | 157.89 | 19 |
| 29 | 14½ | 6.978 | 177.24 | 7.050 | 179.07 | 6.453 | 163.91 | 19 |
| 30 | 15 | 7.215 | 183.26 | 7.285 | 185.04 | 6.690 | 169.93 | 19 |
| 31 | 15½ | 7.452 | 189.28 | 7.530 | 191.26 | 6.927 | 175.95 | 20 |
| 32 | 16 | 7.689 | 195.30 | 7.749 | 196.82 | 7.164 | 181.97 | 20 |
| 33 | 16½ | 7.926 | 201.32 | 7.986 | 202.84 | 7.401 | 187.99 | 20 |
| 34 | 17 | 8.163 | 207.34 | 8.223 | 208.86 | 7.638 | 194.01 | 20 |
| 35 | 17½ | 8.401 | 213.39 | 8.460 | 214.88 | 7.876 | 200.05 | 20 |
| 36 | 18 | 8.638 | 219.41 | 8.698 | 220.93 | 8.113 | 206.07 | 20 |
| 37 | 18½ | 8.876 | 225.45 | 8.935 | 226.95 | 8.351 | 212.12 | 21 |
| 38 | 19 | 9.113 | 231.47 | 9.173 | 232.99 | 8.588 | 218.14 | 21 |
| 39 | 19½ | 9.351 | 237.52 | 9.451 | 240.06 | 8.826 | 224.18 | 21 |
| 40 | 20 | 9.589 | 243.56 | 9.689 | 246.10 | 9.064 | 230.23 | 21 |
| 41 | 20½ | 9.826 | 249.60 | 9.926 | 252.12 | 9.301 | 236.25 | 22 |

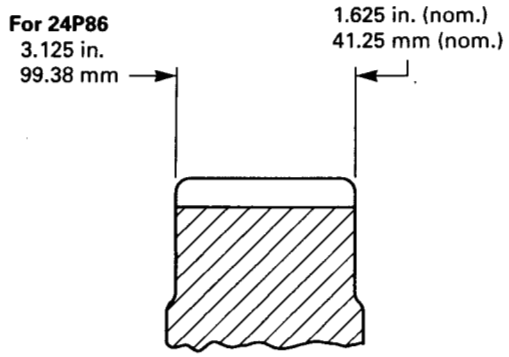
NOTES:
(1) Since 1.50 pitch chain is used in 0.75 in. pitch sprockets, the chain makes contact with every other sprocket tooth.

$$\text{Effective no. of teeth} = \frac{\text{Actual no. of teeth}}{2}$$

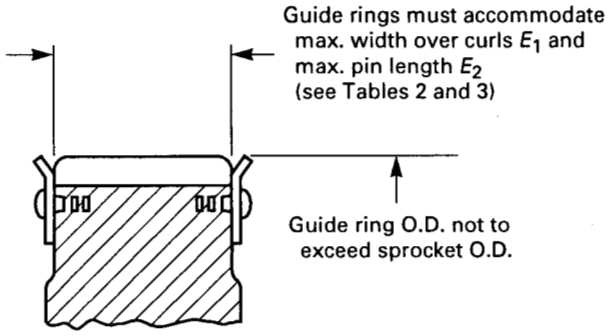
(2) Pressure angle shall not be less than 0 deg.



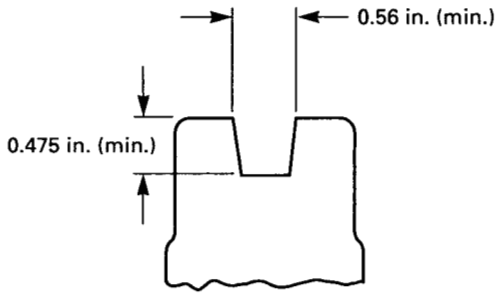
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**Sprocket Width (Nominal)**




**Typical Dimensions for Guide Rings Used With Sprockets**




**Groove Req'd. for 24P26**

Sprocket Design Data

Pitch diameter = Chain pitch sin $\frac{360 \text{ deg}}{T}$

Bottom diameter = Pitch diameter — $H$

Pocket radius = $\frac{1.005H + 0.003}{2}$, in.

$T$ = actual number of teeth

GENERAL NOTE: Values for pitch diameter, outside diameter, and bottom diameter for sprocket sizes ranging from 12 teeth through 41 teeth are shown in Table 5.

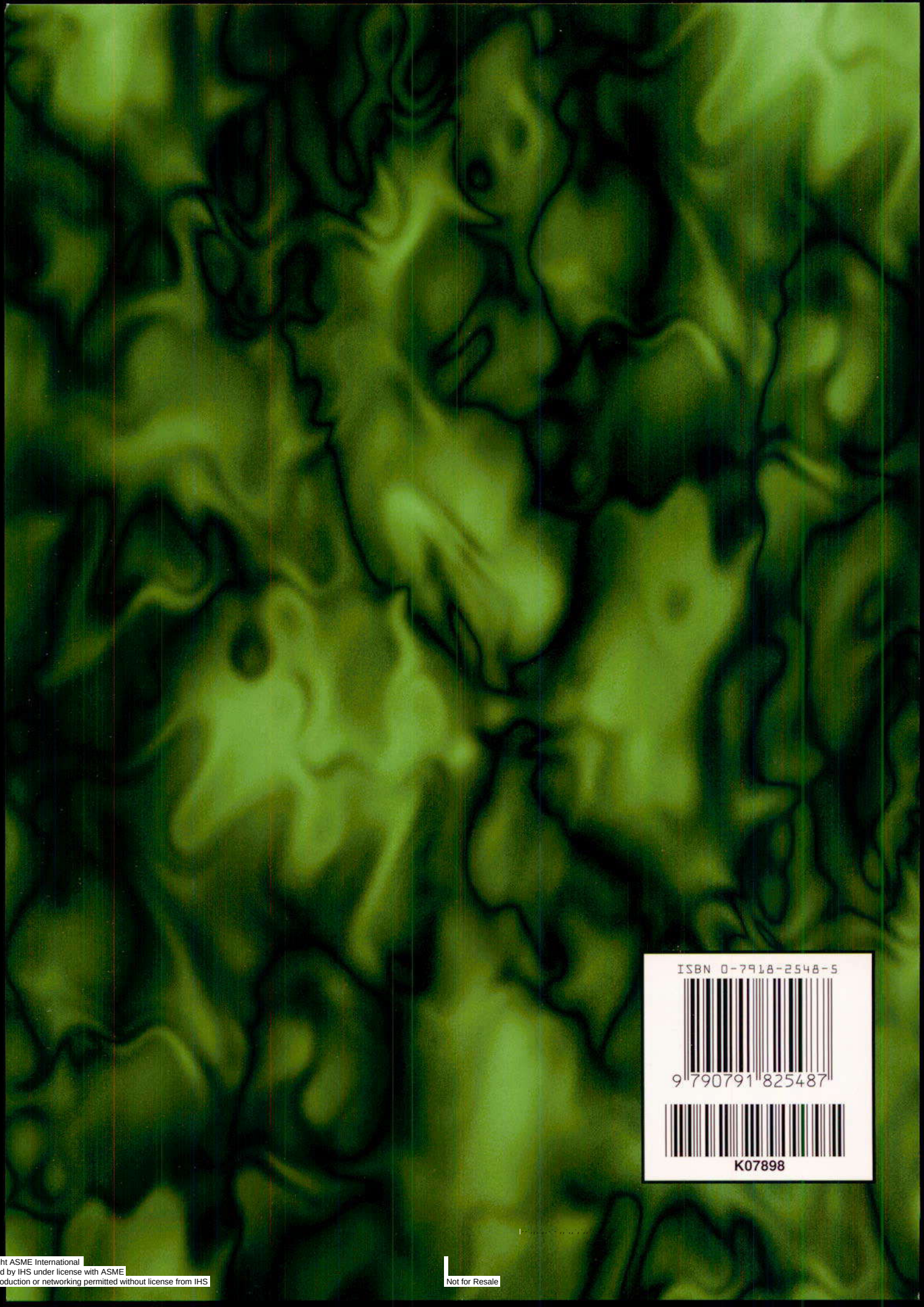
**FIG. 9 SPROCKET TOOTH DIMENSIONS**

**TABLE 6 MAXIMUM ECCENTRICITY AND FACE RUNOUT TOLERANCES OF SPROCKET TEETH**

| Dimensions, in. | | |
|---|---|---|
| **Bottom Diameter** | **Maximum Eccentricity** | **Maximum Face Runout** |
| 0–7.00 | 0.010 + 0.001 (B.D.) | 0.020 |
| 7.001–20.000 | 0.010 + 0.001 (B.D.) | 0.003 (B.D.) |
| 20.001–30.000 | 0.030 | 0.003 (B.D.) |
| 30.001 and up | 0.030 | 0.090 |
| **Dimensions, mm** | | |
| 0–177.80 | 0.25 + 0.001 (B.D.) | 0.51 |
| 177.81–508.00 | 0.25 + 0.001 (B.D.) | 0.003 (B.D.) |
| 508.01–762.00 | 0.76 | 0.003 (B.D.) |
| 762.01 and up | 0.76 | 2:29 |



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