STD.SAE B92.1-ENGL 1996 ■ 7943725 0584669 220 ■

STANDARD

ANSI B92.1b-1996

Addendum to ANSI B92.1-1970
(including ANSI B92.1a-1976)

Approved by the American
National Standards Institute

Involute Splines

Published by:
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Warrendale, PA 15096-0001
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STD.SAE B92.1-ENGL 1996 ■ 7943725 0584670 T42 ■

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FOREWORD

The B92.1 inch and companion metric converted spline standards were first released in 1970. Addendum B92.1a was released in 1976 where the only change was to add a definition paragraph 2.1.1 "Effective Spline." Editorial and mathematical corrections to tabular dimensions have been made several times since that first printing without affecting interchangeability with previous versions and without change to the original dimensioning and tolerancing concepts. The converted metric version is no longer available due to the release of the B92.2M Metric Module Spline Standard in 1980.

This B92.1b addendum has been developed by a subcommittee of the B92 SAE Involute Spline Committee to provide guidance for application of four classes of effective fit patterned after the B92.2M Metric Module Spline Standard. Additional application oriented tolerancing and dimensioning concepts have been added in order to allow dimensioning and tolerancing practices consistent with the more modern B92.2M standard. The B92.1b addendum will be maintained only in a U.S. non-metric version.

The effect of the B92.1b addendum is to provide splines that can have different and sometimes wider tolerances than those provided with the B92.1 standard. It is not intended for these changes to affect interchangeability with the B92.1 standard, but if interchangeability is required, the user should verify that interchangeability will not be affected. Splines conforming to B92.1 dimensions are presumed to be used unless both the user and the supplier specifically agree that dimensions are to be according to B92.1b.

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I. SPLINES

1.1 GENERAL

The requirements for an involute spline are described in ANSI B92.1 as published by the Society of Automotive Engineers, Inc. This addendum lists all dimensions and tolerances as formulas, and includes several modifications required to bring it into technical equivalence with its metric counterpart, ANSI B92.2M.

1.2 PURPOSE

The purpose of this addendum to B92.1 is to expand the capability of the standard. All numbers are connected to a formula to enable an easier use of the standard. Minimum effective clearance is defined. Form clearance is controlled by tooth size and minimum fillet radius is specified for a flat root spline. Some drawing callouts are added for clarification and the tolerances are limited for splines with a large number of teeth.

1.3 SCOPE

1.3.1 This document is an extension of the current B92.1 standard. It does not supersede the B92.1 standard. All splines currently meeting the requirements of the B92.1 standard are still in compliance with that standard. A table of the variables and the formula that calculates its value is included. Splines conforming to B92.1 will mate with splines conforming to B92.1b. Splines conforming to B92.1 shall be used unless B92.1b is specified or otherwise agreed to by the purchaser and the supplier. This addendum does not apply to major diameter fit splines.

1.3.2 Units of Measurement Linear dimensions are expressed in inches, and angular dimensions are expressed in degrees.

II. REFERENCE

ANSI B92.1-1970(R1992)	U.S. Standard	Involute Splines and Inspection
ANSI B92.2M-1980(R1989)	U.S. Standard	Metric Module Involute Splines

III. SPLINE TERMS AND DEFINITIONS

3.1 Definitions for an involute spline are given in the ANSI B92.1 standard. The following definitions are added to clarify terms which are not covered by B92.1. For comparison to international standards, follow the metric national standard ANSI B92.2M.

3.2	backlash	a term used for gearing (for splines see effective clearance definition in B92.1)
3.3	basic dimension	a numerical value to describe the theoretically exact size, shape, profile, orientation, or location of a feature or datum
3.4	tooth flank or side	that surface of the tooth limited by the major diameter and the form diameter on the external spline, and the minor diameter and form diameter on the internal spline and having an involute profile for the specified spline length

IV. SYMBOLS

Symbols for an involute spline are given in the ANSI B92.1 standard. The following symbols are added to clarify terms which are not covered by B92.1. For comparison to international standards, follow the metric national standard B92.2M.

F_{β}	maximum allowable lead variation
F_{fp}	maximum allowable positive profile variation
F_{fm}	maximum allowable negative profile variation

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F_p	maximum allowable total index variation
rfe	minimum fillet radius, external spline
rfi	minimum fillet radius, internal spline
T_{DEE}	tolerance of the major diameter, external spline
T_{DII}	tolerance of the minor diameter, internal spline
f	tolerance factor for spline classes
es	minimum effective clearance
ΔD_{re}	change in diameter from adjustment for spline tooth tolerances, external spline
ΔD_{ri}	change in diameter from adjustment for spline space tolerances, internal spline
CO_e	maximum centerline offset caused by runout of the external spline with its datum
CO_i	maximum centerline offset caused by runout of the internal spline with its datum

V. DIMENSIONING

5.1 Principles of tooth thickness, space width, and minimum effective clearance (see Figure 1).

5.1.1 Minimum effective space width is basic.

5.1.2 Maximum effective tooth thickness is determined by using the minimum effective space width minus the minimum effective clearance (es).

5.1.3 Maximum actual space width is the value of the minimum effective space width plus the manufacturing variations for lead, profile, and spacing (λ) plus the machining tolerance (m).

$$s\ max = s_v min + (\lambda + m)$$

5.1.4 Minimum actual tooth thickness is the value of the maximum effective tooth thickness minus the manufacturing variations for lead, profile, and spacing (λ) minus the machining tolerance (m).

$$t\ min = t_v max - (\lambda + m)$$

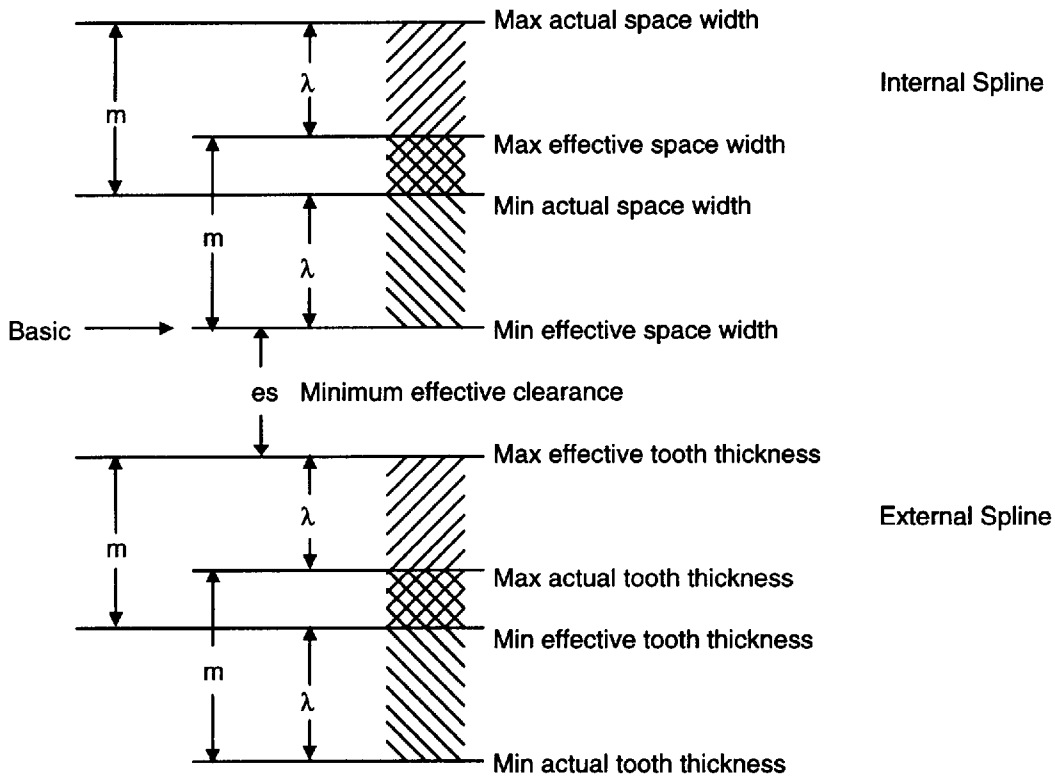


Figure 1. Tooth thickness, space width, and minimum effective clearance

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5.2 Spline tolerances are the allowable variations from basic dimensions. Values calculated in section 5.2 are in ten thousandths of an inch (20 = 0.0020 in.).

5.2.1 Variation allowance is the combined effect that the total index variation, positive profile variation, and the lead variation have on the effective clearance of mating splines. The effect of these individual spline variations on clearance is less than the sum of allowable variations, because areas of more than minimum clearance can have profile, index, or lead variations without changing the clearance. The lead variation allowance is based on a spline length equal to half the pitch diameter. This is done so only one spline gage is required. Reference Table 106 in B92.1 for the source of these formulas. See section 5.2.7 for splines with a large number of teeth.

Spline Pitch P/P_s	λ
2.5/5 and 3/6	0.35N + 20
4/8 and 5/10	0.23N + 18
6/12 and 8/16	0.20N + 15
10/20 and 12/24	0.17N + 14
16/32 and 20/40	0.12N + 13
24/48 thru 48/96	0.12N + 11
64/128 and 80/160	0.10N + 10
128/256	0.08N + 9

5.2.2 Lead variation is the total tolerance on tooth misalignment from design position, measured in a plane normal to the datum axis for the full length of the spline. Reference Table 3 in B92.1 for the derivation of this formula. The formula for the maximum allowable lead variation is:

$$F_\beta = Lg + 3 \qquad (\text{for } Lg \geq 1)$$
$$F_\beta = 2.7\,Lg + 1.4 \qquad (\text{for } Lg < 1)$$

5.2.3 Profile variation is the variation, positive or negative, of the flank surface irregularities. This means the amount the actual profile departs from the design profile. A positive variation is in the direction of more material and a negative variation is in the direction of less material. Reference Table 3 in B92.1 for the derivation of this formula. The formulas for the allowable profile variations are:

$$F_{fp} = 2.2 + \frac{14.7}{P} \qquad F_{fm} = -\left(4 + \frac{17}{P}\right)$$

5.2.4 Total index variation is the cumulative pitch variation between the two greatest opposite pitch variations over any sector. The formula for the allowable index variation is:

$$F_p = \frac{\lambda}{0.6} - 2F_{fp} - F_\beta$$

5.2.5 Machining variation is the variation in actual circular tooth thickness for external splines, or the variation in actual circular space width for internal splines. Reference Table 106 in B92.1 for the source of the formulas. See section 5.2.7 for splines with a large number of teeth.

Spline Pitch P/P_s	m
2.5/5 and 3/6	0.18N + 14
4/8 and 5/10	0.15N + 13
6/12 and 8/16	0.15N + 11
10/20 and 12/24	0.10N + 11
16/32 and 20/40	0.07N + 11
24/48 thru 48/96	0.07N + 11
64/128 and 80/160	0.06N + 9
128/256	0.05N + 9

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5.2.6 The major diameter tolerance of external splines and the minor diameter tolerance of internal splines is a function of the size of the tooth. The calculated basic number per Table 105 in B92.1 is a maximum material condition and the following tolerance allows for less material on the outer diameter/inner diameter. The formula for this tolerance is:

$$T_{DEE} = T_{DII} = \frac{360}{P^{0.667}}$$

5.2.7 Splines with a large number of teeth have a problem in the ANSI B92.1 system with their individual tolerances becoming too large. To avoid this problem a maximum variation of each tolerance component is set at the tolerance of 100 teeth. This means that the tolerances increase in accordance with the formulas up to 100 teeth. All splines of a specific pitch and class have the same tolerance for 100 teeth or greater.

5.2.8 Spline tolerance classes are used to define spline accuracy. There are four classes of splines: 4, 5, 6, and 7. The formulas for allowable variations are based on class 5 splines. To find the allowable variations for the other class splines, change the calculated tolerance by a multiplier. Such dimensions as minimums and specified clearances (i.e., the minimum fillet radius or the form clearance) are not changed by this multiplier. Tolerances are adjusted (i.e., machining variation, variation allowance, and O.D. tolerance) by the following multipliers.

Spline Tolerance Class	Multiplier, f
4	0.71
5	1.00
6	1.40
7	2.00

5.3 Spline dimensions are in accordance with Table I. This table is a modification of Table 105 in B92.1. The following sections describe modifications to Table 105. Values calculated in section 5.3 are in inches.

5.3.1 The minimum fillet radius of the spline is controlled in the spline data and the maximum fillet radius by the root diameter and form diameter. Specifying the minimum fillet radius for the flat root splines is necessary where the spline is on a highly stressed shaft and a fillet radius spline is not practical. See Table 108 in B92.1 for the derivation of the exact minimum fillet radius for fillet root splines. The formula used in this standard is:

$$rfe = rfi = \frac{0.15}{P} \text{ for flat root splines}$$

$$rfe = rfi = \frac{0.25}{P} \text{ for fillet root splines}$$

5.3.2 The form clearance in the B92.1 standard is based on the pitch diameter. The form clearance in this standard is based on the size of the tooth. The formula for the form clearance is:

$$c_f = \frac{0.10}{P}$$

5.3.3 Fixed splines need clearance because of eccentricity between the spline and the mounting datums. With no clearance, the spline teeth can be assembled in a binding condition. Working splines also need a minimum amount of clearance. This clearance between teeth allows the spline to move in a misaligned condition. It also allows space for the lubricant to flow. Minimum effective clearance is the minimum clearance the mating external and internal splines will have when they are concentric; ANSI B92.2M addresses this in Table 4 by creating four different fit classes. These fit classes are different than the four tolerance classes and are labeled d, e, f, and h. Class d provides the most clearance and class h the least. For B92.1b splines, the value of this minimum effective clearance is calculated by the following formulas:

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$$\text{Fit Class d: } es = \frac{D^{0.44}}{380}$$

$$\text{Fit Class e: } es = \frac{D^{0.41}}{610}$$

$$\text{Fit Class f: } es = \frac{D^{0.41}}{1220}$$

$$\text{Fit Class h: } es = 0$$

The minimum clearance required to accommodate the runout of the splines to their datums, is:

$$es = \frac{2(CO_e + CO_i)}{\cos\phi_D}$$

Select the fit class that is greater than this requirement.

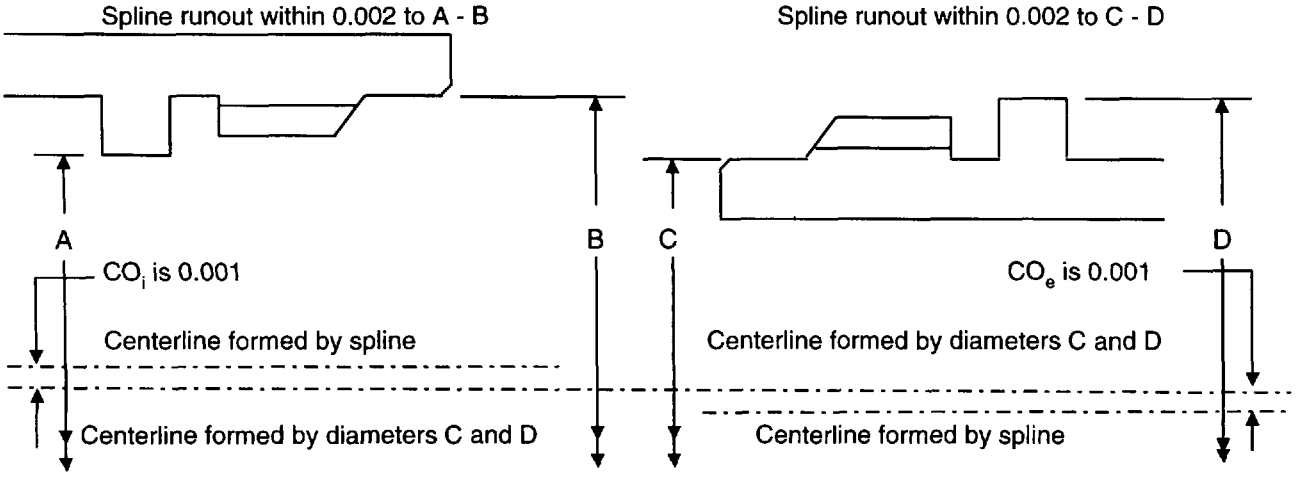


Figure 2. Sample calculation for eccentricity

5.3.4 Many of the dimensions calculated by the formulas in B92.1 must be adjusted when a minimum effective clearance is used. Since the required minimum effective clearance is always subtracted from the external spline tooth thickness, only the external spline dimensions are changed, see Figure 1. The major and minor diameters of the external spline are reduced by the amount:

$$\frac{es}{\tan\phi_D}$$

5.4 This section shows the ways to present spline data on an engineering drawing. There are four methods. The standard method controls the minimum effective clearance and the maximum clearance. This is the simplest way of defining a spline and should be used for most splines, see section 5.4.1. Methods A and B control clearances, see sections 5.4.2 and 5.4.3. These methods should be used when the necessary effective clearance needs to be closer than standard spline tolerances would allow. Method C controls only the actual tooth dimensions. This method is used when spline gages are not practical such as for prototype parts, see section 5.4.4. Individual spline tolerances must be specified in this case.

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5.4.1 The standard dimensioning method controls the minimum effective clearance and the maximum actual clearance.

INTERNAL INVOLUTE SPLINE DATA	
NUMBER OF TEETH	xx
DIAMETRAL PITCH	xx/xx
PRESSURE ANGLE	xx deg
BASE DIAMETER	x.xxxxxx ref
PITCH DIAMETER	x.xxxxxx ref
MAJOR DIAMETER	x.xxx max
FORM DIAMETER	x.xxx
MINOR DIAMETER	x.xxx/x.xxx
CIRCULAR SPACE WIDTH	
MIN EFFECTIVE	.xxxx
MAX ACTUAL	.xxxx
MAX MEASUREMENT BETWEEN TWO PINS	x.xxxx ref
PIN DIAMETER	.xxxx

EXTERNAL INVOLUTE SPLINE DATA	
NUMBER OF TEETH	xx
DIAMETRAL PITCH	xx/xx
PRESSURE ANGLE	xx deg
BASE DIAMETER	x.xxxxxx ref
PITCH DIAMETER	x.xxxxxx ref
MAJOR DIAMETER	x.xxx/x.xxx
FORM DIAMETER	x.xxx
MINOR DIAMETER	x.xxx min
CIRCULAR TOOTH THICKNESS	
MAX EFFECTIVE	.xxxx
MIN ACTUAL	.xxxx
MIN MEASUREMENT OVER TWO PINS	x.xxxx ref
PIN DIAMETER	.xxxx

5.4.2 Dimensioning method A is used to control both the minimum and maximum effective clearance and to control the maximum stress.

INTERNAL INVOLUTE SPLINE DATA	
NUMBER OF TEETH	xx
DIAMETRAL PITCH	xx/xx
PRESSURE ANGLE	xx deg
BASE DIAMETER	x.xxxxxx ref
PITCH DIAMETER	x.xxxxxx ref
MAJOR DIAMETER	x.xxx max
FORM DIAMETER	x.xxx
MINOR DIAMETER	x.xxx/x.xxx
CIRCULAR SPACE WIDTH	
MIN EFFECTIVE	.xxxx
MAX EFFECTIVE	.xxxx
MAX ACTUAL	.xxxx
MAX MEASUREMENT BETWEEN TWO PINS	x.xxxx ref
PIN DIAMETER	.xxxx

EXTERNAL INVOLUTE SPLINE DATA	
NUMBER OF TEETH	xx
DIAMETRAL PITCH	xx/xx
PRESSURE ANGLE	xx deg
BASE DIAMETER	x.xxxxxx ref
PITCH DIAMETER	x.xxxxxx ref
MAJOR DIAMETER	x.xxx/x.xxx
FORM DIAMETER	x.xxx
MINOR DIAMETER	x.xxx min
CIRCULAR TOOTH THICKNESS	
MAX EFFECTIVE	.xxxx
MIN EFFECTIVE	.xxxx
MIN ACTUAL	.xxxx
MIN MEASUREMENT OVER TWO PINS	x.xxxx ref
PIN DIAMETER	.xxxx

5.4.3 Dimensioning method B is used to control the minimum and the maximum effective clearance.

INTERNAL INVOLUTE SPLINE DATA	
NUMBER OF TEETH	xx
DIAMETRAL PITCH	xx/xx
PRESSURE ANGLE	xx deg
BASE DIAMETER	x.xxxxxx ref
PITCH DIAMETER	x.xxxxxx ref
MAJOR DIAMETER	x.xxx max
FORM DIAMETER	x.xxx
MINOR DIAMETER	x.xxx/x.xxx
CIRCULAR SPACE WIDTH	
MIN EFFECTIVE	.xxxx
MAX EFFECTIVE	.xxxx

EXTERNAL INVOLUTE SPLINE DATA	
NUMBER OF TEETH	xx
DIAMETRAL PITCH	xx/xx
PRESSURE ANGLE	xx deg
BASE DIAMETER	x.xxxxxx ref
PITCH DIAMETER	x.xxxxxx ref
MAJOR DIAMETER	x.xxx/x.xxx
FORM DIAMETER	x.xxx
MINOR DIAMETER	x.xxx min
CIRCULAR TOOTH THICKNESS	
MAX EFFECTIVE	.xxxx
MIN EFFECTIVE	.xxxx

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5.4.4 Dimensioning method C is used to control both the minimum and the maximum actual space width or tooth thickness. It does not directly control the effective clearance, and is **NOT RECOMMENDED**.

INTERNAL INVOLUTE SPLINE DATA	
NUMBER OF TEETH	xx
DIAMETRAL PITCH	xx/xx
PRESSURE ANGLE	xx deg
BASE DIAMETER	x.xxxxxx ref
PITCH DIAMETER	x.xxxxxx ref
MAJOR DIAMETER	x.xxx max
FORM DIAMETER	x.xxx
MINOR DIAMETER	x.xxx/x.xxx
CIRCULAR SPACE WIDTH	
MIN EFFECTIVE	.xxxx ref
MIN ACTUAL	.xxxx
MAX ACTUAL	.xxxx
MEASUREMENT BETWEEN TWO PINS	x.xxxx ref/x.xxxx ref
PIN DIAMETER	.xxxx
INVOLUTE PROFILE	
POSITIVE TOLERANCE	.xxxx
INVOLUTE PROFILE	
NEGATIVE TOLERANCE	.xxxx
INDEX TOLERANCE	.xxxx
LEAD TOLERANCE	.xxxx

EXTERNAL INVOLUTE SPLINE DATA	
NUMBER OF TEETH	xx
DIAMETRAL PITCH	xx/xx
PRESSURE ANGLE	xx deg
BASE DIAMETER	x.xxxxxx ref
PITCH DIAMETER	x.xxxxxx ref
MAJOR DIAMETER	x.xxx/x.xxx
FORM DIAMETER	x.xxx
MINOR DIAMETER	x.xxx min
CIRCULAR TOOTH THICKNESS	
MAX EFFECTIVE	.xxxx ref
MAX ACTUAL	.xxxx
MIN ACTUAL	.xxxx
MEASUREMENT OVER TWO PINS	x.xxxx ref/x.xxxx ref
PIN DIAMETER	.xxxx
INVOLUTE PROFILE	
POSITIVE TOLERANCE	.xxxx
INVOLUTE PROFILE	
NEGATIVE TOLERANCE	.xxxx
INDEX TOLERANCE	.xxxx
LEAD TOLERANCE	.xxxx

5.5 Other notes are sometimes required to define the spline.

5.5.1 This note should be on all splines, since it describes the spline gaging system required and the spline class

SPLINE IN ACCORDANCE WITH ANSI B92.1b - CLASS XY

where: X is the tolerance class, see section 5.2.8
Y is the fit class, see section 5.3.3
Y is H for internal splines
Y is d, e, f, or h for external splines

5.5.2 This note should be used if some portion of the spline is modified from a B92.1 spline

SPLINE IN ACCORDANCE WITH ANSI B92.1b - CLASS XY (MODIFIED)

5.5.3 This note should be used with all flat root, side fit splines

FLAT ROOT SIDE FIT

5.5.4 This note should be used with all fillet root, side fit splines

FILLET ROOT SIDE FIT

5.5.5 This note should be used for all splines where the minimum fillet radius must be controlled. It shall be included with all fillet root splines

FILLET RADIUS .xxx min

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5.5.6 The following notes are to be used when the individual tolerance elements need to be identified for the manufacture of the spline.

INVOLUTE PROFILE	
POSITIVE TOLERANCE	.xxxx ref
INVOLUTE PROFILE	
NEGATIVE TOLERANCE	.xxxx ref
INDEX TOLERANCE	.xxxx ref
LEAD TOLERANCE	.xxxx ref

5.5.7 The following notes are to be used when both the minimum and maximum actual tooth thickness or space width need to be controlled. These notes would typically appear on the drawing when the 5.4.4 notes are also used.

MEASUREMENT BETWEEN/OVER TWO PINS	x.xxxx ref/x.xxxx ref
PIN DIAMETER	.xxxx

5.5.8 The following notes are to be used when the other tooth thickness and space widths need to be identified for the manufacture of the spline.

CIRCULAR SPACE WIDTH		CIRCULAR TOOTH THICKNESS	
MAX EFFECTIVE	.xxxx ref	MIN EFFECTIVE	.xxxx ref
MIN ACTUAL	.xxxx ref	MAX ACTUAL	.xxxx ref

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Table 1
Equations for Spline Dimensions

Number for Tables 5 to 63 in B92.1	Symbol	Description	Formula
2	D	pitch diameter	$\frac{N}{P}$
3.1	D_b	base diameter 30 deg spline	D cos 30°
3.2	D_b	base diameter 37.5 deg spline	D cos 37.5°
3.3	D_b	base diameter 45 deg spline	D cos 45°
4.1	D_{ri} max	major diameter, internal 30 deg spline, flat root, side fit	$\frac{N+1.35}{P} + 0.004 + \Delta D_{ri}$
4.2	D_{ri} max	major diameter, internal 30 deg spline, fillet root, side fit	$\frac{N+1.90}{P} + \Delta D_{ri}$
4.4	D_{ri} max	major diameter, internal 37.5 deg spline, fillet root, side fit	$\frac{N+1.70}{P} + \Delta D_{ri}$
4.5	D_{ri} max	major diameter, internal 45 deg spline, fillet root, side fit	$\frac{N+1.50}{P} + \Delta D_{ri}$
5.1	D_{Fi}	form diameter, internal, side fit splines	$\frac{N+1}{P} + 2c_f$
6.1	D_i min	minimum minor diameter, internal 30 deg spline	$\frac{N-1}{P}$ (Note2)
6.2	D_i min	minimum minor diameter, internal 37.5 deg spline	$\frac{N-0.80}{P}$
6.3	D_i min	minimum minor diameter, internal 45 deg spline	$\frac{N-0.60}{P}$
	D_i max	maximum minor diameter, internal splines	D_i min + T_{DII}
8	s_v min	minimum effective space width 30 deg spline	$\frac{\pi}{2P}$
8	s_v min	minimum effective space width 37.5 deg spline	$\frac{0.5\pi + 0.10}{P}$
8	s_v min	minimum effective space width 45 deg spline	$\frac{0.5\pi + 0.20}{P}$
8.7	s_7 max	maximum actual space width	s_v min + f (m + λ) (Note 5)
8.6	s_6 max	maximum actual space width	s_v min + f (m + λ) (Note 5)

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Table 1
Equations for Spline Dimensions
Continued

Number for Tables 5 to 63 in B92.1	Symbol	Description	Formula
8.5	s_5 max	maximum actual space width	s_v min + f (m + λ) (Note 5)
8.4	s_4 max	maximum actual space width	s_v min + f (m + λ) (Note 5)
11	t_v max	maximum effective tooth thickness, 30 deg splines	$\frac{\pi}{2P} - es$
11	t_v max	maximum effective tooth thickness, 37.5 deg splines	$\frac{0.5\pi + 0.10}{P} - es$
11	t_v max	maximum effective tooth thickness, 45 deg splines	$\frac{0.5\pi + 0.20}{P} - es$
11.4	t_4 min	minimum actual tooth thickness	t_v max - f (m + λ) (Note 5)
11.5	t_5 min	minimum actual tooth thickness	t_v max - f (m + λ) (Note 5)
11.6	t_6 min	minimum actual tooth thickness	t_v max - f (m + λ) (Note 5)
11.7	t_7 min	minimum actual tooth thickness	t_v max - f (m + λ) (Note 5)
14.1	D_o max	maximum major diameter, side fit splines	$\frac{N+1}{P} - \frac{es}{\tan \phi_D}$
	D_o min	minimum major diameter	D_o max - T_{DEE}
17.1	D_{Fe}	form diameter, external 30 deg splines	D_i min - $2c_f$ - es cos 30° (Notes 3 and 4)
17.2	D_{Fe}	form diameter, external 37.5 deg splines	D_i min - $2c_f$ - es cos 37.5° (Notes 3 and 4)
17.3	D_{Fe}	form diameter, external 45 deg splines	D_i min - $2c_f$ - es cos 45° (Notes 3 and 4)
18.1	D_{re}	minor diameter, external, flat root, 30 deg splines	$\frac{N-1.35}{P} - 0.004 - \Delta D_{re} - \frac{es}{\tan 30°}$
18.2	D_{re}	minor diameter, external, 30 deg, 2.5/5 thru 12/24	$\frac{N-1.90}{P} - \Delta D_{re} - \frac{es}{\tan 30°}$
18.2	D_{re}	minor diameter, external, 30 deg, 16/32 thru 48/96	$\frac{N-2.10}{P} - \Delta D_{re} - \frac{es}{\tan 30°}$
18.3	D_{re}	minor diameter, external, fillet root, 37.5 deg splines	$\frac{N-1.40}{P} - \Delta D_{re} - \frac{es}{\tan 37.5°}$
18.4	D_{re}	minor diameter, external, fillet root, 45 deg splines	$\frac{N-1.10}{P} - \Delta D_{re} - \frac{es}{\tan 45°}$

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Table 1
Equations for Spline Dimensions
Continued

Number for Tables 5 to 63 in B92.1	Symbol	Description		Formula
105	ΔD_{re}	change in root diameter for total tolerances		$\frac{m+\lambda}{\tan \phi_D}$ (Note 1)
105	ΔD_{ri}	change in root diameter for total tolerances		$\frac{m+\lambda}{\tan \phi_D}$ (Note 1)
	c_f	form clearance		$\frac{0.1}{P}$
	es	minimum effective clearance	Class Fit d	$\frac{D^{0.44}}{380}$
			Fit Class e	$\frac{D^{0.41}}{610}$
			Fit Class f	$\frac{D^{0.41}}{1220}$
			Fit Class h	0
	rfe = rfi	minimum fillet radius, flat root splines		$\frac{0.15}{P}$
	rfe = rfi	minimum fillet radius, fillet root splines		$\frac{0.25}{P}$

Notes:

1. $(m + \lambda)$ for tolerance class 7.
2. See paragraph 25.2 in B92.1.
3. See paragraph 25.1.1 in B92.1.
4. See paragraph 25.1.2 in B92.1.
5. Values obtained by the formulas for clearances, tolerances, and variation allowances are rounded off to the ten thousandth below when the value of the hundred thousandth is less than 5, and to the ten thousandth above when the value of the hundred thousandth is 5 or more. All diameter values are rounded in the direction of increased clearance.

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Table 2
Equations for Spline Variations
Values for tolerance class 5.
Values in ten thousandths of an inch (20=.0020)

References in B92.1	Symbol	Description		Formula
Table 3	F_β	maximum allowable lead variation		$L_g + 3$ (for $L_g \geq 1$) $2.7\ L_g + 1.4$ (for $L_g < 1$)
Table 3	F_{fp}	maximum allowable positive profile variation		$2.2 + \frac{14.7}{P}$
Table 3	F_{fm}	maximum allowable negative profile variation		$-\left(4 + \frac{17}{P}\right)$
Table 106	λ	variation allowance	2.5/5 and 3/6 4/8 and 5/10 6/12 and 8/16 10/20 and 12/24 16/32 and 20/40 24/48 thru 48/96 64/128 and 80/160 128/256	0.35N + 20 0.23N + 18 0.20N + 15 0.17N + 14 0.12N + 13 0.12N + 11 0.10N + 10 0.08N + 9
Section 9	F_p	maximum allowable total index variation		$\frac{\lambda}{0.6} - 2F_{fp} - F_\beta$
Table 106	m	machining variation	2.5/5 and 3/6 4/8 and 5/10 6/12 and 8/16 10/20 and 12/24 16/32 and 20/40 24/48 thru 48/96 64/128 and 80/160 128/256	0.18N + 14 0.15N + 13 0.15N + 11 0.10N + 11 0.07N + 11 0.07N + 11 0.06N + 9 0.05N + 9
14.1	T_{DEE}	major diameter tolerance, side fit splines		$\frac{360}{P^{0.667}}$
6.1, 6.2, 6.3	T_{DII}	minor diameter tolerance, internal splines		$\frac{360}{P^{0.667}}$
Table 3	f	multiplying factor for spline tolerance class 4		0.71
Table 3	f	multiplying factor for spline tolerance class 5		1.00
Table 3	f	multiplying factor for spline tolerance class 6		1.40
Table 3	f	multiplying factor for spline tolerance class 7		2.00

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VI. Sample Problem

Design Problem:

Using the SAE B92.1b Spline Standard System, define a Tolerance Class 6 Full Fillet root 30° spline with 25 teeth, 8/16 pitch, 0.900" long. The external part will be manufactured to 0.001" diametral runout to the part datums and the internal part will be manufactured to 0.002" diametral runout to the part datums.

Known Data:

N	=	25	ϕ_D	=	30°	P	= 8
L_g	=	0.900	tolerance class = 6				
CO_e	=	0.0005	CO_i	=	0.0010		

Required Data:

λ	=	@ Variation allowance	see table 106
F_β	=	@ Max allowable lead variation	$(2.7 * L_g) + 1.4$
F_{fp}	=	Maximum allowable positive profile variation	2.2 + (14.7 / P)
F_{fm}	=	Maximum allowable negative profile variation	- (4 + (17 / P))
F_p	=	Total index variation	$(\lambda / 0.6) - (2 * F_{fp}) - F_\beta$
m	=	@ Machining variation	see table 106
T_{DEE}	=	@ Major Diameter tolerance, side fit	$360 / P^{0.667}$
T_{DII}	=	@ Minor Diameter tolerance, internal splines	$360 / P^{0.667}$
rfe	=	Minimum fillet radius, fillet root splines	0.25 / P
rfi	=	Minimum fillet radius, fillet root splines	0.25 / P
c_f	=	Form Clearance	0.10 / P
es	=	@ Minimum Effective Clearance	See effective class fit calculations
D	=	Pitch Diameter	N / P
D_b	=	Base Diameter	$D * \cos \phi_D$
D_{ri}	=	@ Major Diameter	$((N + 1.90) / P + \Delta D_{ri})$
ΔD_{ri}	=	@ Change in root Diameter for total tolerance	$(m + \lambda) / \tan \phi_D$
D_{Fi}	=	@ Form Diameter, internal side fit	$((N + 1) / P) + (2 * c_f)$
D_i min	=	@ Minimum Minor Diameter	(N - 1) / P
D_i max	=	@ Maximum Minor Diameter	D_i min + T_{DII}
f	=	@ Multiplier for Tolerance Class 4, 5, 6, or 7	0.71, 1.00, 1.40, 2.00
s_v min	=	@ Minimum effective space width	$\pi / 2 * P$
s_6 max	=	Maximum actual space width, tolerance class 6	s_v min + (f * (m + λ))
t_v max	=	@ Maximum effective tooth thickness	$(\pi / 2 * P)$ - es
t_6 min	=	Minimum actual tooth thickness, tolerance class 6	t_v max - (f* (m + λ))
D_o max	=	Maximum Major Diameter	$((N + 1) / P) - (es / \tan \phi_D)$
D_o min	=	Minimum Major Diameter	D_o max - T_{DEE}
D_{Fe}	=	@ Form Diameter	D_i min - $(2 * c_f)$ - $(es * \cos \phi_D)$
D_{re}	=	@ Minor Diameter	$((N - 1.90) / P) - \Delta D_{re} - (es / \tan \phi_D)$
ΔD_{re}	=	@ Change in root Diameter for total tolerance	$(m + \lambda) / \tan \phi_D$

NOTE: All comments with @ require reference to the B92.1 Standard. The values calculated for clearances, tolerances, and variation allowances are rounded to the nearest .0001" by rounding up for values of 5 to 9 in the 5th place of decimals. For calculated diameters all values are rounded in the direction of increased clearance.

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Calculations:

Variation Allowance is:

$\lambda = (0.20 * N) + 15$
$= (0.20 * 25) + 15$
$= 20 =$ **0.0020"**

Lead Variation is:

$F_\beta = (2.70 * L_g) + 1.40$
$= (2.70 * 0.90) + 1.4$
$= 3.8 =$ **0.0004"**

Positive Profile Variation is:

$F_{fp} = 2.20 + (14.7 / P)$
$= 2.2 + (14.7 * 8)$
$= 4.0 =$ **0.0004"**

Negative Profile Variation is:

$F_{fm} = -(4 + (17 / P))$
$= -(4 + (17 / 8))$
$= -6.1 =$ **-0.0006"**

Total Index Variation is:

$F_P = (\lambda / 0.60) - (2 * F_{fp}) - F_b$
$= (20 / 0.60) - (2 * 4) - 3.8$
$= (33.3) - 8 - 3.8$
$= 21.5 =$ **0.0022"**

Machine Variation is:

$m = (0.15 * N) + 11$
$= (0.15 * 25) + 11$
$= 14.8 =$ **0.0015"**

Outside Diameter Tolerance is:

$T_{DEE} = 360 / P^{0.667}$
$= 360 / 8^{0.667}$
$= 89.9 =$ **0.0090"**

Inside Diameter Tolerance is:

$T_{DII} = 360 / P^{0.667}$
$= 360 / 8^{0.667}$
$= 89.9 =$ **0.0090"**

Since the spline has less than 100 teeth the above tolerances do not require modification Ref. 5.2.7.

Minimum Fillet Radius for an External Spline is:

$rfe = 0.25 / P$
$= 0.25 / 8$
$=$ **0.031"**

Form Clearance is:

$c_f = 0.10 / P$
$= 0.10 / 8$
$=$ **0.0125"**

To determine the clearance required to accommodate the runout specified calculate **es** using the formula:

$es = 2*(CO_e + CO_i) / \cos \phi_D$
$= 2 * (0.001/2 + 0.002/2) / \cos 30°$
$=$ **0.0035"**

Now by calculating the fit classes it can be determined what class fit can be used to meet the designer's needs.

Fit class d:

$es = D^{0.44} / 380$
$= 3.125^{0.44}/380$
$= 0.0043"$

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Fit class e: $es = D^{0.41} / 610$
$= 3.125^{0.41} / 610$
$= 0.0026"$

Fit class f: $es = D^{0.41} / 1220$
$= 3.125^{0.41} / 1220$
$= 0.0013"$

Fit class h: $es = 0.0000"$

If no interference fit is necessary, then a fit class of **d** should be chosen making **es = 0.0043"**

Determination of the basic geometry of the spline:

Spline Pitch Diameter: $D = N / P$
$= 25 / 8$
$= \mathbf{3.125"}$

Base Diameter: $D_b = D * \cos \phi_D$
$= 3.125 * \cos 30°$
$= \mathbf{2.706329}$

Major Diameter of the Internal Spline is:
$D_{ri} = ((N + 1.90) / P) + (f * (m + \lambda) / \tan \phi_D)$
$= (25 + 1.9) / 8 + (2.00 * (0.0015 + .0020) / \tan 30°$
$= 3.37462$
$= \mathbf{3.375"}$

Form Diameter for the Internal Spline is:
$D_{Fi} = (N + 1) / P + (2 * c_f)$
$= (25 + 1) / 8 + (2 * 0.0125)$
$= \mathbf{3.275"}$

Minimum Minor Diameter is:
$D_i \min = (N - 1) / P$
$= (25 - 1) / 8$
$= \mathbf{3.000"}$

Maximum Minor Diameter is:
$D_i \max = D_i \min + T_{DII}$
$= 3.000 + 0.0090$
$= \mathbf{3.009"}$

Minimum Effective Space Width of the Internal Spline is:
$S_v \min = \pi / (2 * P)$
$= 3.142159 / (2 * 8)$
$= \mathbf{0.1963"}$

Maximum Actual Space Width for class 6 Internal Spline is:
$S_6 \max = S_v \min + (f * (m + \lambda))$
$= 0.1963 + (1.40 * (0.0015 + 0.0020))$
$= \mathbf{0.2012"}$

Maximum Effective Tooth Thickness of the External Spline is:
$t_v \max = \pi / (2 * P) - es$
$= 3.14159 / (2 * 8) - 0.0043$
$= \mathbf{0.1920"}$

Minimum Actual Tooth Thickness for a class 6 External Spline is:
$t_6 \min = t_v \max - (f * (m + \lambda))$
$= 0.1920 - (1.40 * (.0015 + .0020))$
$= \mathbf{0.1871"}$

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Maximum Major Diameter of the External Spline is:

$D_o max = (N + 1) / P - (es / \tan \phi_D)$
$= (25 + 1) / 8 - (.0043 / \tan 30°)$
$= 3.242552$
$=$ **3.242"**

Minimum Major Diameter of the External Spline is:

$D_o min = D_o max - T_{DEE}$
$= 3.2426 - 0.0090$
$= 3.2336$
$=$ **3.233"**

Form Diameter of the External Spline is:

$D_{Fe} = D_i min - (2 * c_f) - (es * \cos \phi_D)$
$= 3.000 - (2 * 0.0125) - (0.0043 * \cos 30°)$
$= 2.971276$
$=$ **2.971"**

The Minor Diameter of the External Spline is:

$D_{re} = ((N - 1.9) / P) - \Delta D_{re} - (es / \tan \phi_D)$
$= ((N - 1.9) / P) - (f * (m + \lambda) / \tan \phi_D) - (es / \tan \phi_D)$
$= ((25 - 1.9) / 8) - (2.0 * (0.0015 + .0020) / \tan 30°) - (0.0043 / \tan 30°)$
$= 2.86793$
$=$ **2.867**

Dimension between Two Pins for maximum actual space width:

$\text{inv } \phi_D = \tan \phi_D - \phi_D$

Pin Diameter $d_i = 1.7280 / P = 1.728 / 8$
$=$ **0.216"**

$\text{inv } \phi_i = (S_c max / D) + (\text{inv } \phi_D - (d_i / D_b)) = (0.2012 / 3.125) + (\text{inv } 30° - (0.216 / 2.706329))$
$= 0.064384 + 0.053751 - 0.079813$
$= 0.038323 = 27.008035°$

$M_i = (D_b * \cos (90 / N) * \sec \phi_i) - d_i = (2.706329 * \cos 3.6° * \sec 27.008035°) - 0.216$
$= 2.706329 * 0.998027 * 1.122406) - 0.216$
$= 2.815608 =$ **2.8156"**

Dimension over two pins for minimum actual tooth thickness:

Pin Diameter $d_e = 1.9200 / P = 1.9200 / 8$
$=$ **0.2400"**

$\text{inv } \phi_e = (t_6 min / D) + (\text{inv } \phi_D + (d_e / D_b) - (\pi / N)) = (0.1871 / 3.125) + (\text{inv } 30° + (0.2400 / 2.706329) - (\pi / 25))$
$= 0.059872 + 0.053751 + 0.088681 - 0.125664$
$= 0.082761 = 34.190798°$

$M_e = (D_b * (\cos (90° / N) * \sec \phi_e) + d_e = (2.706329 * \cos 3.6° * \sec 34.190798°) + .240$
$= (2.706329 * 0.998027 * 1.208940) + 0.240$
$= 3.505334 =$ **3.5053"**

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DEDICATION

This document is dedicated to the memory of Albert S. Beam. It was Mr. Beam who evolved the concept of effective specification for spline fit control. This standard is based on that concept.

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METHOD OF ROUNDING

Symbol	Method of Rounding	
	Inches	Millimetres
D D_b	7 significant figures, simply rounded.	7 significant figures, converted from calculated inch value, then simply rounded.
D_{ri} All values except Major Dia Fit	3 places to right of decimal to and including 48/96 spline pitch. 4 places to right of decimal above 48/96 spline pitch. Simply rounded.	2 places to right of decimal, converted from rounded inch value, then rounded in direction of additional clearance.
D_{ri} Major Dia Fit	4 places to right of decimal, simply rounded.	3 places to right of decimal, converted from rounded inch value, then rounded in direction of additional clearance.
D_{Fi} and D_i	3 places to right of decimal to and including 48/96 spline pitch. 4 places to right of decimal above 48/96 spline pitch. Rounded in direction of clearance.	2 places to right of decimal, converted from rounded inch value, then rounded in direction of additional clearance.
s_n max[a]	Calculated from rounded s_v 4 places to right of decimal, simply rounded.	3 places to right of decimal, converted from rounded inch value, then rounded in direction of clearance.
s_v min t_v max	4 places to right of decimal, simply rounded.	3 places to right of decimal, converted from rounded inch value, then rounded in direction of clearance.
t_n min[a]	Calculated from rounded t_v 4 places to right of decimal, simply rounded.	3 places to right of decimal, converted from rounded inch value, then rounded in direction of clearance.
D_o All values except Major Dia Fit	3 places to right of decimal to and including 48/96 spline pitch. 4 places to right of decimal above 48/96 spline pitch. Simply rounded.	2 places to right of decimal, converted from rounded inch value, then rounded in direction of additional clearance.
D_o Major Dia Fit	4 places to right of decimal, simply rounded.	3 places to right of decimal, converted from rounded inch value, then rounded in direction of clearance.
D_{Fe}	3 places to right of decimal to and including 48/96 spline pitch. 4 places to right of decimal above 48/96 spline pitch. Rounded in direction of clearance.	2 places to right of decimal, converted from rounded inch value, then rounded in direction of clearance.
D_{re}	3 places to right of decimal to and including 48/96 spline pitch. 4 places to right of decimal above 48/96 spline pitch. Simply rounded.	2 places to right of decimal, converted from rounded inch value, then rounded in direction of clearance.

[a] Subscript n designates tolerance class.

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FOREWORD

This standard is the result of a joint effort by SAE Involute Splines, Serrations and Inspection Committee and ANSI Standards Committee B92, Involute Splines and Inspection, to update ASA B5.15-1960 previously written by the former Technical Committee No. 13 of Sectional Committee B5 on the Standardization of Small Tools and Machine Tool Elements. This Committee was organized in September 1922 under the procedure of the American Standards Association and sponsored by the Society of Automotive Engineers, National Machine Tool Institute, and the American Society of Mechanical Engineers.

ASA B5.15-1960 was essentially a revision and consolidation of ASA B5.15-1950, American Standard on Involute Splines; ASA B5.26-1950, American Standard for Involute Serrations; and ASA B5.31-1953, American Standard for Involute Splines and Serrations Gages and Gaging.

Most of the features of the 1960 standard are retained; plus the addition of three tolerance classes, for a total of four. The term "involute serration," formerly applied to involute splines with 45 deg pressure angle, has been deleted and the standard now includes involute splines with 30, 37.5, and 45 deg pressure angle. Tables for these splines have been rearranged accordingly. The term "serration" will no longer apply to splines covered by this standard.

The revised standard now has only one fit class for all side fit splines; the former Class 2 fit. Class 1 fit has been deleted because of its infrequent use. The major diameter of the flat root side fit spline has been changed and a tolerance applied to include the range of the 1950 and the 1960 standards. **Note the interchangeability limitations when used with internal splines made to previous standards (see Appendix A, Section 26).** Each of the three types of splines is preceded by drawing instructions and explanatory data.

There have been no tolerance **nor** fit changes to the major diameter fit section. **A survey indicated limited interest in major diameter fit splines and for this reason additional tolerance classes were not tabulated as they were for side fit splines.**

This revision recognizes the fact that proper assembly between mating splines is dependent only on the spline being within effective specifications from the tip of the tooth to the form diameter. Therefore, on side fit splines, the internal component major diameter now is shown as a maximum dimension and the external component minor diameter is shown as a minimum dimension. The minimum internal major diameter and the maximum external minor diameter must clear the specified form diameter and thus do not need any additional control.

The spline specification tables now include a greater number of tolerance level selections. These new tolerance classes were added for greater selection to suit end product needs. The selections differ only in the tolerance as applied to space width and tooth thickness. The tolerance class which was used in ASA B5.15-1960 is the basis and is now designated as tolerance Class 5. The new tolerance classes are based on the following formulas:

Tolerance Class 4 = Tolerance Class 5 × 0.71
Tolerance Class 6 = Tolerance Class 5 × 1.40
Tolerance Class 7 = Tolerance Class 5 × 2.00

All dimensions, listed in this standard, are for the finished part. Therefore, any compensation that must be made for operations which take place during processing, such as heat treatment, must be taken into account when selecting the tolerance level for manufacturing.

The standard has the same internal minimum effective space width and external maximum effective tooth thickness for all tolerance classes and has two types of fit. For tooth side fits, the minimum effective space width and the maximum effective tooth thickness are of equal value. This basic concept makes it possible to have interchangeable assembly between mating splines where made to this standard regardless of the tolerance class of the individual members. This allows a tolerance class "mix" of mating members which often is an advantage where one member is considerably less difficult to produce than its mate, and the "average" tolerance applied to the two units is such that it satisfies the design need. For instance, this can be the result of specification of Class 5 tolerance to one member and Class 7 to its mate, thus providing an assembly tolerance in the Class 6 range. The maximum effective tooth thickness is less than the minimum effective space width for major diameter fits to allow for eccentricity variations. The table values have been changed as follows:

1. Pitch diameter and base diameter are shown to seven significant digits in order to be correct to the number of places used in all calculations.
2. All other diameter values, other than major diameters for major diameter fit, have been reduced to three places to the right of the decimal point and rounded toward the direction of more clearance.

In the event the fit as provided in this standard does not satisfy a particular design need and a specific amount of effective clearance or press fit is desired, the change should be made only to the external spline by a reduction or an increase in effective tooth thickness and a like change in actual tooth thickness. The minimum effective space width, in this standard, is always basic. This basic minimum effective space width should always be retained when special designs are derived from the concept of this standard.

A revision was approved by SAE in June 1969 and was submitted to the American National Standards Institute for adoption as an ANSI Standard under the existing standards procedures. This was granted on August 18, 1969.

This standard was reaffirmed by committee vote in 1996 and includes the following corrections and verifications:

1. Table 107a was created to provide values for minimum effective clearance used for Major Diameter Fit as referenced in Table 106.
2. Table 105 was revised to show proper symbols for minimum effective space width and maximum effective tooth thickness.
3. Table 64 was revised to show values for machining tolerances to 5 decimal places.
4. Tables 53 through 63 were revised to incorporate correct form clearance values in the calculations for internal and external form diameters.
5. Changes of 0.001 were made to 38 internal minor diameter values scattered throughout the 30 and 37.5 degree dimensional tables to correct computer rounding.

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INVOLUTE SPLINES

1. Splines

1.1 General—The requirement for a positive rotational connection between shafts and related members is provided by involute splines. The involute splines in this standard are straight (nonhelical) along their axes. The term spline is defined as the entire configuration of the component which includes all of the teeth and is bounded by the major circle and minor circle of the teeth. This standard is based on a stub pitch design and includes involute splines with 30, 37.5, and 45 deg pressure angles. Involute splines with 45 deg pressure angle are generally used in spline pitches of 10/20 and finer. They can be used for delivery of torque if bursting forces are not detrimental (as in cases of thin wall tubing) but should be avoided in assemblies which require axial shift under load.

1.2 Purpose—It is the purpose of this portion of the standard to provide guidance and data for the design of straight (nonhelical) involute spline teeth. This includes the dimensions for splines of recommended spline pitches, the tolerances for the various spline elements, tooth thickness and space width tolerances which may be selected to suit design needs, as well as a methodical treatment of manufacturing variations and their effect on the fit between mating splined parts.

1.3 Scope

1.3.1 SPLINE TOOTH DIMENSIONS — Tabulated dimensions for both 30 and 37.5 deg pressure angle splines cover a range from 2.5/5 to 48/96 spline pitch and from 6 to 60 teeth. Tabulated dimensions for 45 deg pressure angle splines cover the full range from 6 to 100 teeth for 10/20 through 48/96 spline pitch; and a more limited range of teeth for 64/128 through 128/256 spline pitch.

1.3.2 UNITS OF MEASUREMENT — Linear dimensions are expressed in inches and angular dimensions in degrees.

2. Spline Terms and Definitions

2.1 Spline—A machine element consisting of integral keys (spline teeth) or keyways (spaces) equally spaced around a circle or portion thereof.

2.1.1 EFFECTIVE SPLINE—An imaginary perfect mating spline is fitted to the given spline without looseness or interference considering engagement along the entire length of the spline. The effective spline is the surface bounded by this perfect mating spline. The axis of the effective spline is identical to the axis of the perfect mating spline.

2.2 Internal Spline—A spline formed on the inner surface of a cylinder.

2.3 External Spline—A spline formed on the outer surface of a cylinder.

2.4 Involute Spline—A spline having teeth with involute profiles.

2.5 Fillet—The concave portion of the tooth profile which joins the sides to the bottom of the space.

2.6 Fillet Root Spline—A spline in which a single fillet in the general form of an arc joins the sides of adjacent teeth.

2.7 Flat Root Spline—A spline in which fillets join the arcs of major or minor circles to the tooth sides.

2.8 Diametral Pitch, *P*—The number of spline teeth per inch of pitch diameter. The diametral pitch determines the circular pitch and basic space width or tooth thickness. In conjunction with the number of teeth, it also determines the pitch diameter.

2.9 Stub Pitch, P_s—A number used to denote the radial distance from the pitch circle to the major circle of the external spline and from the pitch circle to the minor circle of the internal spline. The stub pitch for splines in this standard is twice the diametral pitch.

2.10 Spline Pitch, P/P_s—A combination number of a one to two ratio indicating the spline proportions; the upper or first number is the diametral pitch, the lower or second number is the stub pitch and denotes the basic radial length of engagement, both above and below the pitch circle.

2.11 Pitch Circle—The reference circle from which all circular spline tooth dimensions are constructed. Its diameter is determined as the ratio of the number of teeth to the diametral pitch.

2.12 Pitch Diameter, *D*—The diameter of the pitch circle.

2.13 Pitch Point—The intersection of the spline tooth profile with the pitch circle.

2.14 Circular Pitch, *p*—The distance along the pitch circle between corresponding points of adjacent spline teeth.

2.15 Pressure Angle, ϕ—The angle between a line tangent to an involute and a radial line through the point of tangency. Unless otherwise specified, it is the standard pressure angle.

2.16 Standard (Main) Pressure Angle, ϕ_D—The pressure angle at the specified pitch diameter.

2.17 Base Circle—The circle from which involute spline tooth profiles are constructed.

2.18 Base Diameter, D_b—The diameter of the base circle.

2.19 Major Circle—The circle formed by the outermost surface of the spline. It is the outside circle (tooth tip circle) of the external spline or the root circle of the internal spline.

2.20 Major Diameter, D_o, D_{ri}—The diameter of the major circle.

2.21 Minor Circle—The circle formed by the innermost surface of the spline. It is the root circle of the external spline or the inside circle (tooth tip circle) of the internal spline.

2.22 Minor Diameter, D_{re}, D_i—The diameter of the minor circle.

2.23 Form Circle—The circle which defines the deepest points of involute form control of the tooth profile. This circle along with the tooth tip circle (or start of chamfer circle) determines the limits of tooth profile requiring control. It is located near the major circle on the internal spline and near the minor circle on the external spline.

2.24 Form Diameter, D_{Fe}, D_{Fi}—The diameter of the form circle.

2.25 Depth of Engagement—The radial distance from the minor circle of the internal spline to the major circle of the external spline, minus corner clearance and/or chamfer depth.

2.26 Basic Space Width — The basic space width for 30 deg pressure angle splines is half the circular pitch. The basic space width for 37.5 and 45 deg pressure angle splines, however, is greater than half the circular pitch. The teeth are proportioned so that the external tooth, at its base, has about the same thickness as the internal tooth at the form diameter. This results in greater minor diameters than those of

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comparable involute splines of 30 deg pressure angle.

2.27 Actual Space Width, s — The circular width on the pitch circle of any single space considering an infinitely thin increment of axial spline length.

2.28 Effective Space Width, s_v—The effective space width of an internal spline is equal to the circular tooth thickness on the pitch circle of an imaginary perfect external spline which would fit the internal spline without looseness or interference considering engagement of the entire axial length of the spline. The minimum effective space width of the internal spline is always basic, as shown in Table 1. Fit variations may be obtained by adjusting the tooth thickness of the external spline.

2.29 Actual Tooth Thickness, t—The circular thickness on the pitch circle of any single tooth considering an infinitely thin increment of axial spline length.

2.30 Effective Tooth Thickness, t_v—The effective tooth thickness of an external spline is equal to the circular space width on the pitch circle of an imaginary perfect internal spline which would fit the external spline without looseness or interference, considering engagement of the entire axial length of the spline.

2.31 Effective Clearance, c_v—The effective space width of the internal spline minus the effective tooth thickness of the mating external spline.

2.32 Theoretical Maximum Clearance—The actual space width of an internal spline minus the actual tooth thickness of the mating external spline. It does not define the fit between mating members, because of the effect of variations.

2.33 Form Clearance, c_F—The radial depth of involute profile beyond the depth of engagement with the mating part. It allows for looseness between mating splines and for eccentricities between the minor circle (internal), the major circle (external), and their respective pitch circles.

2.34 Total Index Variation—The greatest difference in any two teeth (adjacent or otherwise) between the actual and the perfect spacing of the tooth profiles.

2.35 Profile Variation—Any variation from the specified tooth profile normal to the flank.

2.36 Lead Variation—The variation of the direction of the spline tooth from its intended direction parallel to the reference axis, also including parallelism and alignment variations. See Fig. 1. Note: Straight (nonhelical) splines have an infinite lead.

2.37 Parallelism Variation—The variation of parallelism of a single spline tooth with respect to any other single spline tooth. See Fig. 1.

2.38 Alignment Variation—The variation of the effective spline axis with respect to the reference axis. See Fig. 1.

2.39 Out of Roundness—The variation of the spline from a true circular configuration.

2.40 Effective Variation—The accumulated effect of the spline variations on the fit with the mating part.

2.41 Variation Allowance, λ—The permissible effective variation.

2.42 Machining Tolerance, m—The permissible variation in actual space width or actual tooth thickness.

2.43 Total Tolerance, $m + \lambda$—The total tolerance is the machining tolerance plus the variation allowance.

2.44 Length of Engagement, L_g—The axial length of contact between mating splines.

2.45 Active Spline Length, L_a—The length of spline which contacts the mating spline. On sliding splines it exceeds the length of engagement.

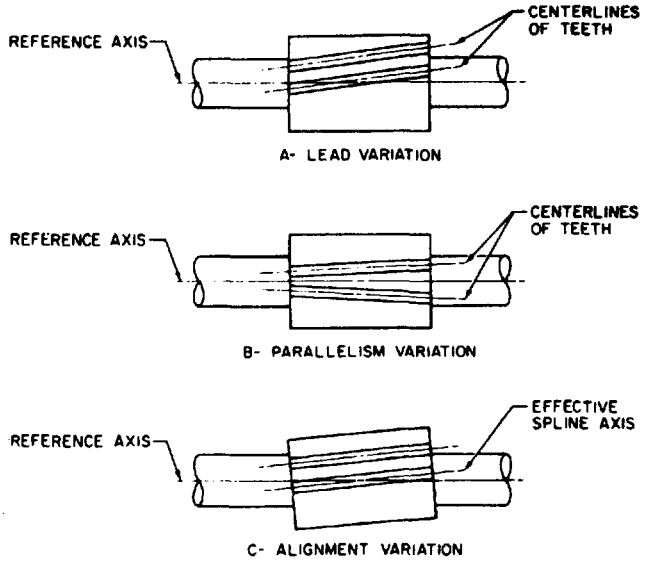


FIG. 1—LEAD VARIATIONS

2.46 Reference—As used in this standard, reference is an added notation or modifier to a dimension, specification, or note when that dimension, specification, or note is:

1. Repeated for drawing clarification.
2. Needed to define a nonfeature datum or basis from which a form or feature is generated.
3. Needed to define a nonfeature dimension from which other specifications or dimensions are developed.
4. Needed to define a nonfeature dimension at which toleranced sizes of a feature are specified.
5. Needed to define a nonfeature dimension from which control tolerances or sizes are developed or added as useful information.

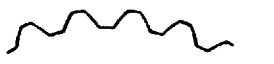
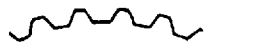
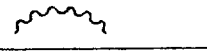
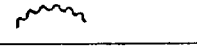
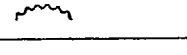
Any dimension, specification, or note that is noted "REF" shall not be used as a criterion for part acceptance or rejection.

3. Symbols—The general symbols used to designate the various spline terms and dimensions are given below. See Figs. 5-9.

c_v	=	effective clearance
c_F	=	form clearance
D	=	pitch diameter
D_b	=	base diameter
D_{ci}	=	pin contact diameter, internal spline
D_{ce}	=	pin contact diameter, external spline
D_{Fe}	=	form diameter, external spline
D_{Fi}	=	form diameter, internal spline
D_i	=	minor diameter, internal spline
D_o	=	major diameter, external spline
D_{re}	=	minor diameter, external spline (root)
D_{ri}	=	major diameter, internal spline (root)
d_e	=	diameter of measuring pin for external spline
d_i	=	diameter of measuring pin for internal spline
λ	=	variation allowance
ε	=	involute roll angle
K_e	=	change factor for external spline
K_i	=	change factor for internal spline
L	=	spline length

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TABLE 1—BASIC DIMENSIONS FOR SPLINES

30 deg ϕ Teeth[a]	Spline Pitch, P/P_s	Circular Pitch, P	Min Effective Space Width BASIC, S_v min		
			30 deg ϕ	37.5 deg ϕ	45 deg ϕ
	2.5/5	1.2566	0.6283	0.6683	—
	3/6	1.0472	0.5236	0.5569	—
	4/8	0.7854	0.3927	0.4177	—
	5/10	0.6283	0.3142	0.3342	—
	6/12	0.5236	0.2618	0.2785	—
	8/16	0.3927	0.1963	0.2088	—
	10/20	0.3142	0.1571	0.1671	0.1771
	12/24	0.2618	0.1309	0.1392	0.1476
	16/32	0.1963	0.0982	0.1044	0.1107
	20/40	0.1571	0.0785	0.0835	0.0885
	24/48	0.1309	0.0654	0.0696	0.0738
	32/64	0.0982	0.0491	0.0522	0.0553
	40/80	0.0785	0.0393	0.0418	0.0443
	48/96	0.0654	0.0327	0.0348	0.0369
	64/128	0.0491	—	—	0.0277
	80/160	0.0393	—	—	0.0221
	128/256	0.0246	—	—	0.0138

[a]Shown to illustrate the relative tooth sizes for the various spline pitches.

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TABLE 2—FORMULAS FOR BASIC DIMENSIONS

Term		Symbol	Formula				
			30 deg $_D$			37.5 deg $_D$	45 deg $_D$
			Flat Root Side Fit 2.5/5 thru 32/64 Spline Pitch	Flat Root Major Dia Fit 3/6 thru 16/32 Spline Pitch	Fillet Root Side Fit 2.5/5 thru 48/96 Spline Pitch	Fillet Root Side Fit 2.5/5 thru 48/96 Spline Pitch	Fillet Root Side Fit 10/20 thru 128/256 Spline Pitch
Stub Pitch		P_s	$2P$	$2P$	$2P$	$2P$	$2P$
Pitch Diameter		D	$\frac{N}{P}$	$\frac{N}{P}$	$\frac{N}{P}$	$\frac{N}{P}$	$\frac{N}{P}$
Base Diameter		D_b	$D \cos \phi_D$	$D \cos \phi_D$	$D \cos \phi_D$	$D \cos \phi_D$	$D \cos \phi_D$
Circular Pitch		p	$\frac{\pi}{P}$	$\frac{\pi}{P}$	$\frac{\pi}{P}$	$\frac{\pi}{P}$	$\frac{\pi}{P}$
Minimum Effective Space Width		s_v	$\frac{\pi}{2P}$	$\frac{\pi}{2P}$	$\frac{\pi}{2P}$	$\frac{0.5\pi + 0.1}{P}$	$\frac{0.5\pi + 0.2}{P}$
Major Diameter, Internal		D_{ri}	$\frac{N + 1.35}{P}$	$\frac{N + 1}{P}$	$\frac{N + 1.8}{P}$	$\frac{N + 1.6}{P}$	$\frac{N + 1.4}{P}$
Major Diameter, External		D_o	$\frac{N + 1}{P}$	$\frac{N + 1}{P}$	$\frac{N + 1}{P}$	$\frac{N + 1}{P}$	$\frac{N + 1}{P}$
Minor Diameter, Internal		D_i	$\frac{N - 1}{P}$	$\frac{N - 1}{P}$	$\frac{N - 1}{P}$	$\frac{N - 0.8}{P}$	$\frac{N - 0.6}{P}$
Minor Diameter, External	2.5/5 thru 12/24 spline pitch	D_{re}	$\frac{N - 1.35}{P}$		$\frac{N - 1.8}{P}$	$\frac{N - 1.3}{P}$	
	16/32 spline pitch, and finer				$\frac{N - 2}{P}$		
	10/20 spline pitch, and finer						$\frac{N - 1}{P}$
Form Diameter, Internal		D_{Fi}	$\frac{N + 1}{P} + 2c_F$	$\frac{N + 0.8}{P} - 0.004 + 2c_F$	$\frac{N + 1}{P} + 2c_F$	$\frac{N + 1}{P} + 2c_F$	$\frac{N + 1}{P} + 2c_F$
Form Diameter, External		D_{Fe}	$\frac{N - 1}{P} - 2c_F$	$\frac{N - 1}{P} - 2c_F$	$\frac{N - 1}{P} - 2c_F$	$\frac{N - 0.8}{P} - 2c_F$	$\frac{N - 0.6}{P} - 2c_F$
Form Clearance (Radial)		c_F	0.001D, with max of 0.010, min of 0.002				

$\pi = 3.1415927$.

NOTE: All spline specification table dimensions are derived from these basic formulas by application of tolerances.

L_a = active spline length
L_g = length of engagement
m = machining tolerance
M_e = measurement over pins, external spline
M_i = measurement between pins, internal spline
N = number of teeth
P = diametral pitch
P_s = stub pitch
P/P_s = spline pitch
p = circular pitch
r_f = fillet radius
s = actual space width, circular
s_v = effective space width, circular
t = actual tooth thickness, circular
t_v = effective tooth thickness, circular
ϕ = pressure angle
ϕ_D = standard pressure angle
ϕ_{ci} = pressure angle at pin contact diameter, internal spline
ϕ_{ce} = pressure angle at pin contact diameter, external spline
ϕ_i = pressure angle at pin center, internal spline
ϕ_e = pressure angle at pin center, external spline
ϕ_F = pressure angle at form diameter

3.1 Subscripts.—The following subscripts are used in conjunction with the above symbols to designate relative conditions or locations:

b = at base circle, base
c = at contact diameter, compressive

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e = external
f = pertaining to a fillet
F = pertaining to form diameter
G = pertaining to gages
i = internal
r = root
v = effective
z = any assumed condition (ϕ_z, D_z)

4. Pressure Angle (Standard)—Standard pressure angles included in this standard for involute splines are 30, 37.5, and 45 deg.

5. Types of Fit—This standard deals with two types of fit, side fit and major diameter fit, for 30 deg pressure angle splines; and only one type of fit, the side fit, for 37.5 and 45 deg pressure angle splines. Formulas for the basic dimensions of these fits are shown in Table 2.

5.1 Side Fit—In this fit the mating members contact on the sides of the teeth only; major and minor diameters are clearance dimensions. The tooth sides act as drivers and centralize mating splines.

5.2 Major Diameter Fit—In this fit the mating members contact at the major diameter for centralizing. The sides of the teeth act as drivers. The minor diameters are clearance dimensions.

The major diameter fit provides a minimum effective clearance that will allow for contact and location at the major diameter with a minimum amount of location or centralizing effect by the sides of the teeth. The major diameter fit has only one space width and tooth thickness tolerance which is the same as side fit Class 5. Tooth thickness dimensions, however, are smaller than the Class 5 side fit to allow for eccentricity variations. Therefore, a specific table for measurement over pins (Table 84) has been provided for external major diameter fit splines.

5.2.1 A fillet root may be specified for an external spline, even though it is otherwise designed to the flat root side fit or major diameter fit standard. An internal spline with a fillet root can be used only for the side fit.

6. Classes of Tolerances—This standard includes four classes of tolerances on space width and tooth thickness. This has been done to provide a range of tolerances for selection to suit a design need. The classes are variations of the former single tolerance which is now Class 5 and are based on the formulas shown in Table 3. All tolerance classes have the same minimum effective space width and maximum effective tooth thickness limits so that a mix of classes between mating parts is possible.

7. Fillets and Chamfers

7.1 Internal Splines with Flat Root—Internal splines are normally designed with a flat root because their broad bases and high pressure angles at the major diameter provide a stronger tooth than that of the mating external spline.

7.2 Fillets on 30 deg Pressure Angle Flat Root Splines—These fillets, if generated, have a varying radius of curvature. They are controlled by the form diameter and specification is usually not required. Flat root splines are suitable for most applications.

7.3 Fillets on 30 deg Pressure Angle Fillet Root Splines—Highly stressed splines or specific manufacturing methods may require the use of a fillet root design.

External splines may be produced by generating with a pinion type shaper cutter or with a hob, or by cutting with no generating motion using a tool formed to the contour of a tooth space. External splines are also made by cold forming and in these cases are usually of the fillet root design. Internal splines are usually produced by broaching, by form cutting, or by generating with a shaper cutter. Even when full tip radius tools are used, each of these cutting methods produces a fillet contour with individual characteristics. Generated spline fillets are curves related to the prolate epicycloid for external splines and the prolate hypocycloid for internal splines. These fillets have a minimum radius of curvature at the point where the fillet is tangent to the external spline minor diameter circle or the internal spline major diameter circle and a rapidly increasing radius of curvature up to the point where the fillet comes tangent to the involute profile.

Fillets produced by formed cutting tools are usually true circular arcs tangent to the external spline minor diameter or the internal spline major diameter and

TABLE 3—MAXIMUM TOLERANCES FOR SPACE WIDTH AND TOOTH THICKNESS OF TOLERANCE CLASS 5[a] SPLINES
Values shown in ten thousandths (20 = 0.0020)

P/P_s	2.5/5 and 3/6	4/8 and 5/10	6/12 and 8/16	10/20 and 12/24	16/32 and 20/40	24/48 thru 48/96	64/128 and 80/160	128/256
N	Machining Tolerance, m (Summary of Table 106)							
10	15.8	14.5	12.5	12.0	11.7	11.7	9.6	9.5
20	17.6	16.0	14.0	13.0	12.4	12.4	10.2	10.0
30	18.4	17.5	15.5	14.0	13.1	13.1	10.8	10.5
40	21.8	19.0	17.0	15.0	13.8	13.8	11.4	—
50	23.0	20.5	18.5	16.0	14.5	14.5	—	—
60	24.8	22.0	20.0	17.0	15.2	15.2	—	—
70	—	—	—	18.0	15.9	15.9	—	—
80	—	—	—	19.0	16.6	16.6	—	—
90	—	—	—	20.0	17.3	17.3	—	—
100	—	—	—	21.0	18.0	18.0	—	—
N	Variation Allowance, λ (Summary of Table 106)							
10	23.5	20.3	17.0	15.7	14.2	12.2	11.0	9.8
20	27.0	22.6	19.0	17.4	15.4	13.4	12.0	10.6
30	30.5	24.9	21.0	19.1	16.6	14.6	13.0	11.4
40	34.0	27.2	23.0	21.6	17.8	15.8	14.0	—
50	37.5	29.5	25.0	22.5	19.0	17.0	—	—
60	41.0	31.8	27.0	24.2	20.2	18.2	—	—
70	—	—	—	25.9	21.4	19.4	—	—
80	—	—	—	27.6	22.6	20.6	—	—
90	—	—	—	29.3	23.8	21.8	—	—
100	—	—	—	31.0	25.0	23.0	—	—
N	Total Index Variation							
10	20	17	15	15	14	12	11	10
20	24	20	18	17	15	13	12	11
30	28	22	20	19	16	15	14	13
40	32	25	22	20	18	16	15	—
50	36	27	25	22	19	17	—	—
60	40	30	27	24	20	18	—	—
70	—	—	—	26	21	20	—	—
80	—	—	—	28	22	21	—	—
90	—	—	—	29	24	23	—	—
100	—	—	—	31	25	24	—	—
N	Profile Variation							
All	+7 −10	+6 −8	+5 −7	+4 −6	+3 −5	+2 −4	+2 −4	+2 −4

Lead Variation

L_g, in	0.3	0.5	1	2	3	4	5	6	7	8	9	10
Variation	2	3	4	5	6	7	8	9	10	11	12	13

[a]For other tolerance classes:
Class 4 = 0.71 × Tabulated value
Class 5 = As tabulated in table
Class 6 = 1.40 × Tabulated value
Class 7 = 2.00 × Tabulated value

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tangent to the adjacent involute profiles. Fillets whose minimum radius of curvature is equal to or larger than the minimum fillet radius values tabulated in Table 108 can be produced with full tip radius tools by any of the cutting methods.

The values in Table 108 may be used as minimum radii of curvature for stress calculations and they may be specified as "minimum fillet radii."

7.3.1. Tabulated dimensions for 37.5 and 45 deg pressure angle splines are based on the fillet root design.

7.4 Corner Clearance—Corner clearance is mandatory for major diameter fits. This is usually accomplished by providing chamfers on the external spline as specified in the tables. If chamfers cannot be conveniently provided on the external spline, see Appendix A, Section 23, for providing corner clearance on the internal spline.

7.4.1. Standard internal involute splines have no chamfer at the minor diameter. Where design requirements permit, and a chamfer is necessary, special tooling or a secondary operation is required.

8. Spline Variations—The maximum allowable variations for involute splines are listed in Table 3.

8.1 Profile Variation—The reference profile, from which variations occur, passes through the point which is used to determine the actual space width or tooth thickness. This is either the pitch point or the contact point of the standard measuring pins.

Profile variation is positive in the direction of the space and negative in the direction of the tooth, as shown in Fig. 2. Profile variations which may occur at any point on the profile for establishing effective fits are shown in Table 3.

8.2 Lead Variations—The lead tolerance for the total spline length applies also to any portion thereof unless otherwise specified.

8.3 Out of Roundness—This condition may appear merely as a result of index and profile variations given in Table 3 and requires no further allowance. However, heat treatment and deflection of thin sections may cause out of roundness, which increases index and profile variations. Tolerances for such conditions depend on many variables and are therefore not tabulated. Additional tooth and/or space width tolerance must allow for such conditions.

8.4 Eccentricity

8.4.1 Eccentricity of major and minor diameters, in relation to the effective diameter of side fit splines, should not cause contact beyond the form diameters of the mating splines, even under conditions of maxium effective clearance. This standard does not establish specific tolerances.

8.4.2 Eccentricity of major diameters in relation to the effective diameters of major diameter fit splines should be absorbed within the maximum material limits established by the tolerances on major diameter and effective space width or effective tooth thickness.

8.4.3 If the alignment of mating splines is affected by eccentricity of locating surfaces relative to each other and/or the splines, it may be necessary to decrease the effective and actual tooth thickness of the external splines in order to maintain the desired fit condition. This standard does not include allowances for eccentric location.

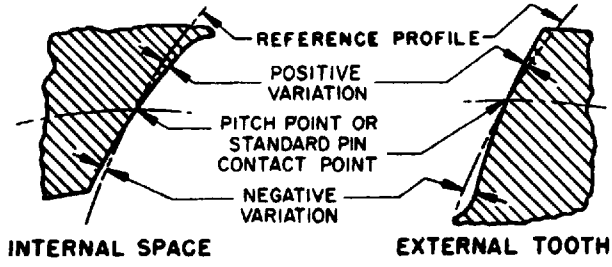


FIG. 2—PROFILE VARIATIONS

9. Effect of Spline Variations

9.1 Index Variations—These variations cause the clearance to vary from one set of mating tooth sides to another. Since the fit depends on the areas with minimum clearance, index variations reduce the effective clearance.

9.2 Profile Variations—Positive profile variations affect the fit by reducing effective clearance. Negative profile variations do not affect the fit but reduce the contact area.

9.3 Lead variations—These variations will cause clearance variations and therefore reduce the effective clearance.

9.4 Variation Allowance—The effect of individual spline variations on the fit (effective variation) is less than their total, because areas of more than minimum clearance can be altered without changing the fit. The variation allowance is 60% of the sum of twice the positive profile variation, the total index variation and the lead variation for the length of engagement. The variation allowances in Table 3 are based on a lead variation for an assumed length of engagement equal to one-half the pitch diameter. Adjustment may be required for a greater length of engagement.

10. Effective and Actual Dimensions

10.1 Effective and Actual Space Width—Fig. 3A illustrates an internal spline with variations of index and profile. Fig. 3B shows that a perfect external spline contour (without variations) does not fit, even though each tooth has the same width as the mating space. To allow the perfect external spline to fit in any position, all spaces of the internal spline must be widened by the amount of interference. This width as shown in Fig. 3C is the actual space width of the internal spline. The effective space width is the tooth thickness of the perfect mating spline.

10.2 Effective and Actual Tooth Thickness—The same reasoning applied to the external spline leads to the concept of effective tooth thickness which exceeds the actual tooth thickness by the effective variation. See Fig. 4.

10.3 Effective Clearance—The effective space width of the internal spline minus the effective tooth thickness of the external spline is the effective clearance, which defines the fit of mating parts. (This is strictly true only if high points of mating parts come into contact.) Positive effective clearance represents looseness or backlash, negative effective clearance represents tightness or interference.

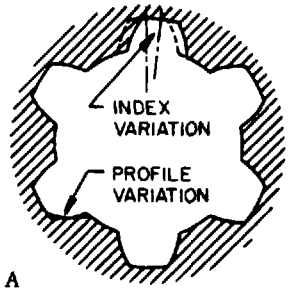
10.4 Space Width and Tooth Thickness Limits—The variation of actual space width and actual tooth thickness within the machining tolerance causes corresponding vari-

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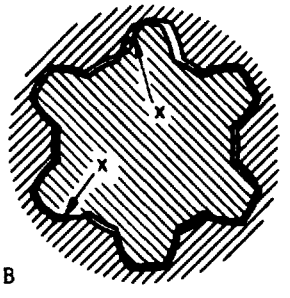
TABLE 4—SPECIFICATION GUIDE FOR SPACE WIDTH AND TOOTH THICKNESS

Disposition of Allowances, Clearances and Tolerances on Part			Dimensioning Method		
				Alternatives	
Dimension	Effective	Actual	Standard	A (Sect. 11.4.1)	Sect. (11.4.2)
Space Width of Internal Spline		Max	Required	Required	REF
		Min	REF	REF	REF
	Max		REF	Required	Required
(Basic)	$\left(\frac{\pi}{2P}\right)$		Required	Required	Required
	Min		REF	Required	Required
Tooth Thickness of External Spline	Max	Max	REF	REF	REF
	c_v Min = 0	Min	Required	Required	REF

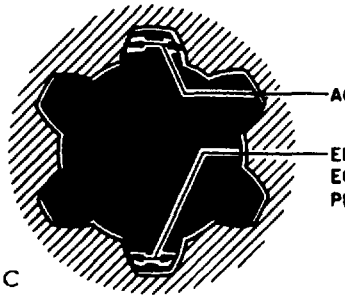
Note: The minimum effective clearance, c_v min, is greater than zero for major diameter fits. The maximum effective tooth thickness is less than the minimum effective space width for major diameter fits to allow for eccentricity variations.



EACH SPACE IS BASIC WIDTH.

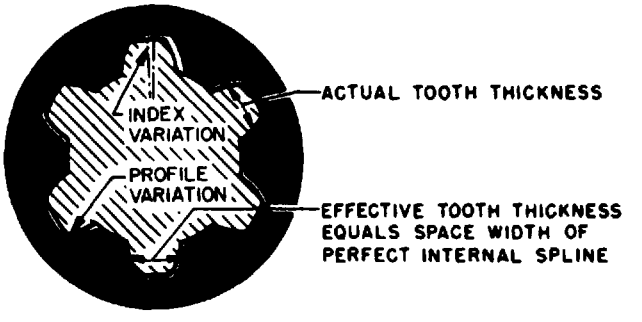


THE PERFECT EXTERNAL SPLINE WITH BASIC TOOTH THICKNESS INTERFERES AT X.



THE PERFECT EXTERNAL SPLINE FITS IN ANY POSITION, IF ALL SPACES ARE WIDENED BY THE AMOUNT OF THE INTERFERENCE.

FIG. 3—EFFECT OF VARIATIONS ON INTERNAL SPLINE



THE PERFECT INTERNAL SPLINE FITS IN ANY POSITION, IF ALL TEETH OF THE EXTERNAL ARE NARROWED BY THE AMOUNT OF THE INTERFERENCE.

FIG. 4—EFFECT OF VARIATIONS ON EXTERNAL SPLINE

ations of effective dimensions, so that there are four limit dimensions for each component part, as illustrated in Table 4.

10.4.1 The minimum effective space width is always basic. The maximum effective tooth thickness is the same as the minimum effective space width except for the major diameter fit. The major diameter fit maximum effective tooth thickness is less than the minimum effective space width by an amount which allows for eccentricity between the effective spline and the major diameter. The permissible variation of the effective clearance is divided between the internal and external splines to arrive at the maximum effective space width and the minimum effective tooth thickness. Limits of the actual space width and actual tooth thickness are constructed from suitable variation allowances.

11. Use of Effective and Actual Dimensions—Table 4 presents four dimensions for space width and for tooth thickness. Each of these has a definite function.

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11.1 Minimum Effective Space Width and Maximum Effective Tooth Thickness—These dimensions control the minimum effective clearance, and must always be specified.

11.2 Minimum Actual Space Width and Maximum Actual Tooth Thickness—These dimensions cannot be used for acceptance or rejection of parts. If the actual space width is less than the minimum without causing the effective space width to be undersize, or if the actual tooth thickness is more than the maximum without causing the effective tooth thickness to be oversize, the effective variation is less than anticipated; such parts are desirable and not defective. The specification of these actual dimensions as processing reference dimensions is optional. They are also used to analyze undersize effective space width or oversize effective tooth thickness conditions to determine whether or not they are caused by excessive effective variation.

11.2.1 The machining tolerance includes an allowance for taper. Any taper will affect a lead or parallelism reading.

11.3 Maximum Actual Space Width and Minimum Actual Tooth Thickness—These dimensions control machining tolerance and also limit the effective variation. The spread between these dimensions, reduced by the effective variation of the internal and external spline, is the maximum effective clearance. Where the effective variation obtained in machining is appreciably less than the variation allowance, these dimensions must be adjusted in order to maintain the desired fit.

11.4 Maximum Effective Space Width and Minimum Effective Tooth Thickness—These dimensions define the maximum effective clearance, but they do not limit the effective variation.

11.4.1 They may be used, in addition to the limits of paragraph 11.3, in order to prevent the increase of maximum effective clearance, due to reduction of effective variations. See Table 4, Alternate Method A. The notation "inspection optional" may be added where maximum effective clearance is an assembly requirement, but does not need absolute control. It will indicate, without necessarily adding inspection time and equipment, that the actual space width of the internal spline must be held below the maximum, or the actual tooth thickness of the external spline above the minimum, if machining methods result in less than the allowable variations.

11.4.2 Where effective variation requires no control, Alternate Method B shown in Table 4 shall be used. When Alternate Method B is used and it is necessary to control the effective variations by laboratory inspection, the following data shall be added to the spline specifications:

(a) INVOLUTE PROFILE VARIATION (ZERO AT POINT OF ACTUAL MEASUREMENT)	+X.XXXX −X.XXXX
(b) TOTAL INDEX VARIATION, MAX	X.XXXX
(c) LEAD VARIATION	X.XXXX

12. Spline Tables—Tables 5-38 give dimensions for 30 deg pressure angle flat root side fit, flat root major diameter fit, and fillet root side fit splines; and include tolerance Classes 4, 5, 6, and 7, except for the major diameter fit, which is Class 5 only.

Tables 39-52 give dimensions for 37.5 deg pressure angle fillet root side fit splines and include tolerance Classes 4, 5, 6, and 7.

Tables 53-63 give dimensions for 45 deg pressure angle fillet root side fit splines and include tolerance Classes 4, 5, 6, and 7.

12.1 Dimensions and Tolerances—The dimensions and tolerances listed in Tables 5-63 are derived from the formulas listed in Table 105. Some dimensions are modified as explained in Section 25. Space width and tooth thickness tolerances for tolerance Class 5 are based on Tables 3 and 64.

13. Drawing Data—It is important that uniform specifications be used to show complete information on detail drawings of splines. Much misunderstanding will be avoided by following the suggested arrangement of dimensions and data, as shown on data sheets. The number of x's indicates the number of decimal places normally used. With this charted type of spline specifications, it is usually not necessary to show a graphic illustration of the spline teeth.

13.1 Spline Data and Reference Dimensions—Spline data are used for engineering and manufacturing purposes. Pitch and pressure angle are not subject to individual inspection. Reference dimensions are defined in paragraph 2.46.

13.2 Combinations of Types

13.2.1 Flat root side fit internal splines may be used with fillet root external splines where the larger radius is desired on the external spline for control of stress concentrations. This combination of fits may also be permitted as a design option by specifying for the minimum root diameter of the external, the value of the minimum root diameter of the fillet root external spline and noting this as "optional root."

13.2.2 A design option may also be permitted to provide either flat root internal or fillet root internal by specifying for the maximum major diameter, the value of the maximum major diameter of the fillet root internal spline and noting this as "optional root."

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30 DEG PRESSURE ANGLE

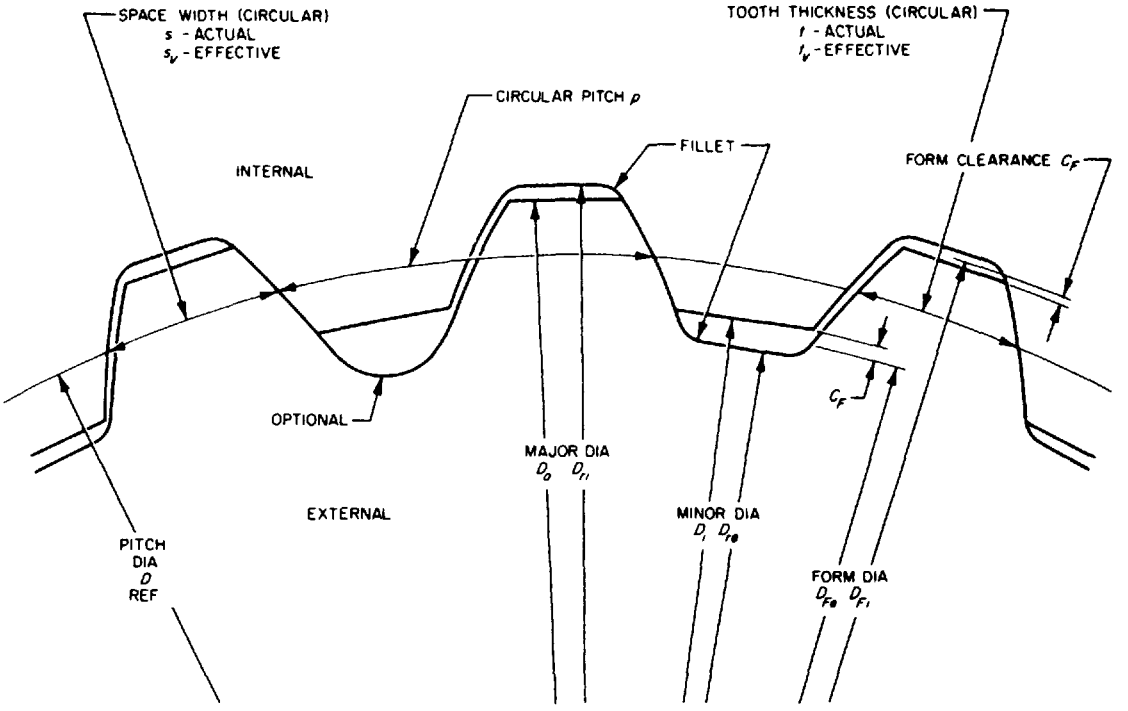


FIG. 5—SPLINE TERMS, SYMBOLS AND DRAWING DATA, 30 DEG PRESSURE ANGLE, FLAT ROOT SIDE FIT

This fit is used in restricted areas (as with tubular parts with wall thickness too small to permit use of fillet roots, and to allow hobbing closer to shoulders, etc.) and for economy (when hobbing, shaping, etc. and shorter broaches for the internal member).

Press fits are not tabulated because their design depends on the degree of tightness desired and must allow for such factors as the shape of the blank, wall thickness, material, hardness, thermal expansion, etc. Close tolerances or selective size grouping may be required to limit fit variations.

See Tables 5-16.

DRAWING DATA

INTERNAL INVOLUTE SPLINE DATA		EXTERNAL INVOLUTE SPLINE DATA	
FLAT ROOT SIDE FIT		FLAT ROOT SIDE FIT	
NUMBER OF TEETH	xx	NUMBER OF TEETH	xx
SPLINE PITCH	xx/xx	SPLINE PITCH	xx/xx
PRESSURE ANGLE	30°	PRESSURE ANGLE	30°
BASE DIAMETER	x.xxxxxx REF	BASE DIAMETER	x.xxxxxx REF
PITCH DIAMETER	x.xxxxxx REF	PITCH DIAMETER	x.xxxxxx REF
MAJOR DIAMETER	x.xxx MAX	MAJOR DIAMETER	x.xxx/x.xxx
FORM DIAMETER	x.xxx	FORM DIAMETER	x.xxx
MINOR DIAMETER	x.xxx/x.xxx	MINOR DIAMETER	x.xxx MIN
CIRCULAR SPACE WIDTH		CIRCULAR TOOTH THICKNESS	
MAX ACTUAL	x.xxxx	MAX EFFECTIVE	x.xxxx
MIN EFFECTIVE	x.xxxx	MIN ACTUAL	x.xxxx
The following information may be added as required:		The following information may be added as required:	
MAX MEASUREMENT BETWEEN PINS	x.xxxx REF	MIN MEASUREMENT OVER PINS	x.xxxx REF
PIN DIAMETER	x.xxxx	PIN DIAMETER	x.xxxx

The above drawing data is required for the spline specifications. The standard system is shown; for alternate systems, see Table 4 and paragraphs 11.4.1, 11.4.2 and 13.

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30 DEG PRESSURE ANGLE

TABLE 5—30 DEG PRESSURE ANGLE, FLAT ROOT SIDE FIT, 2.5/5 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	S_v Min. Eff. Circ. Space Width = 0.6283 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.6283 Notes c & d				D_o	D_{Fe}	D_{re}
						S Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						S_7	S_6	S_5	S_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.1	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.1
					Note e	Notes a & b								Note g	Note e	
Tolerance in Ten Thousandths					+200 -0									+0 -1050		
6	2.400000	2.078461	2.944	2.805	**2.104**	0.6357	0.6335	0.6320	0.6309	0.6257	0.6246	0.6231	0.6209	2.800	**2.098**	1.843
7	2.800000	2.424871	3.344	3.206	**2.480**	0.6358	0.6336	0.6321	0.6310	0.6256	0.6245	0.6230	0.6208	3.200	**2.474**	2.243
8	3.200000	2.771281	3.744	3.607	**2.863**	0.6359	0.6337	0.6321	0.6310	0.6256	0.6245	0.6229	0.6207	3.600	**2.856**	2.643
9	3.600000	3.117691	4.144	4.008	**3.250**	0.6361	0.6337	0.6322	0.6311	0.6255	0.6244	0.6229	0.6205	4.000	**3.242**	3.043
10	4.000000	3.464102	4.544	4.408	**3.641**	0.6362	0.6338	0.6322	0.6311	0.6255	0.6244	0.6228	0.6204	4.400	**3.632**	3.442
11	4.400000	3.810512	4.944	4.809	**4.033**	0.6363	0.6339	0.6323	0.6311	0.6255	0.6243	0.6227	0.6203	4.800	**4.023**	3.842
12	4.800000	4.156922	5.344	5.210	**4.427**	0.6364	0.6340	0.6323	0.6312	0.6254	0.6243	0.6226	0.6202	5.200	**4.416**	4.242
13	5.200000	4.503332	5.744	5.611	**4.822**	0.6365	0.6340	0.6324	0.6312	0.6254	0.6242	0.6226	0.6201	5.600	**4.810**	4.642
14	5.600000	4.849742	6.144	6.012	**5.217**	0.6366	0.6341	0.6324	0.6312	0.6254	0.6242	0.6225	0.6200	6.000	**5.205**	5.042
15	6.000000	5.196152	6.544	6.412	**5.614**	0.6367	0.6342	0.6325	0.6313	0.6253	0.6241	0.6224	0.6199	6.400	**5.601**	5.441
16	6.400000	5.542563	6.944	6.813	**6.011**	0.6368	0.6342	0.6325	0.6313	0.6253	0.6241	0.6224	0.6198	6.800	**5.997**	5.841
17	6.800000	5.888973	7.344	7.214	**6.409**	0.6369	0.6343	0.6326	0.6314	0.6252	0.6240	0.6223	0.6197	7.200	**6.394**	6.241
18	7.200000	6.235383	7.744	7.615	**6.807**	0.6370	0.6344	0.6327	0.6314	0.6252	0.6239	0.6222	0.6196	7.600	**6.791**	6.641
19	7.600000	6.581793	8.144	8.016	**7.205**	0.6371	0.6345	0.6327	0.6314	0.6252	0.6239	0.6221	0.6195	8.000	**7.189**	7.041
20	8.000000	6.928203	8.544	8.416	**7.603**	0.6372	0.6345	0.6328	0.6315	0.6251	0.6238	0.6221	0.6194	8.400	**7.586**	7.441
21	8.400000	7.274613	8.944	8.817	**8.002**	0.6373	0.6346	0.6328	0.6315	0.6251	0.6238	0.6220	0.6193	8.800	**7.984**	7.840
22	8.800000	7.621024	9.344	9.218	**8.401**	0.6374	0.6347	0.6329	0.6315	0.6251	0.6237	0.6219	0.6192	9.200	**8.382**	8.240
23	9.200000	7.967434	9.744	9.619	**8.800**	0.6375	0.6348	0.6329	0.6316	0.6250	0.6237	0.6218	0.6191	9.600	**8.781**	8.640
24	9.600000	8.313844	10.144	10.020	9.200	0.6376	0.6348	0.6330	0.6316	0.6250	0.6236	0.6218	0.6190	10.000	9.180	9.040
25	10.00000	8.660254	10.544	10.420	9.600	0.6378	0.6349	0.6330	0.6317	0.6249	0.6236	0.6217	0.6189	10.400	9.580	9.440
26	10.40000	9.006664	10.944	10.820	10.000	0.6379	0.6350	0.6331	0.6317	0.6249	0.6235	0.6216	0.6187	10.800	9.980	9.839
27	10.80000	9.353074	11.344	11.220	10.400	0.6380	0.6351	0.6331	0.6317	0.6249	0.6235	0.6215	0.6186	11.200	10.380	10.239
28	11.20000	9.699484	11.744	11.620	10.800	0.6381	0.6351	0.6332	0.6318	0.6248	0.6234	0.6215	0.6185	11.600	10.780	10.639
29	11.60000	10.04589	12.144	12.020	11.200	0.6382	0.6352	0.6332	0.6318	0.6248	0.6234	0.6214	0.6184	12.000	11.180	11.039
30	12.00000	10.39230	12.544	12.420	11.600	0.6383	0.6353	0.6333	0.6318	0.6248	0.6233	0.6213	0.6183	12.400	11.580	11.439
31	12.40000	10.73871	12.944	12.820	12.000	0.6384	0.6354	0.6333	0.6319	0.6247	0.6233	0.6212	0.6182	12.800	11.980	11.839
32	12.80000	11.08513	13.344	13.220	12.400	0.6385	0.6354	0.6334	0.6319	0.6247	0.6232	0.6212	0.6181	13.200	12.380	12.238
33	13.20000	11.43154	13.744	13.620	12.800	0.6386	0.6355	0.6334	0.6320	0.6246	0.6232	0.6211	0.6180	13.600	12.780	12.638
34	13.60000	11.77795	14.144	14.020	13.200	0.6387	0.6356	0.6335	0.6320	0.6246	0.6231	0.6210	0.6179	14.000	13.180	13.038
35	14.00000	12.12436	14.544	14.420	13.600	0.6388	0.6357	0.6336	0.6320	0.6246	0.6230	0.6209	0.6178	14.400	13.580	13.438
36	14.40000	12.47077	14.944	14.820	14.000	0.6389	0.6357	0.6336	0.6321	0.6245	0.6230	0.6209	0.6177	14.800	13.980	13.838
37	14.80000	12.81718	15.344	15.220	14.400	0.6390	0.6358	0.6337	0.6321	0.6245	0.6229	0.6208	0.6176	15.200	14.380	14.237
38	15.20000	13.16359	15.744	15.620	14.800	0.6391	0.6359	0.6337	0.6321	0.6245	0.6229	0.6207	0.6175	15.600	14.780	14.637
39	15.60000	13.51000	16.144	16.020	15.200	0.6392	0.6360	0.6338	0.6322	0.6244	0.6228	0.6206	0.6174	16.000	15.180	15.037
40	16.00000	13.85641	16.544	16.420	15.600	0.6393	0.6360	0.6338	0.6322	0.6244	0.6228	0.6206	0.6173	16.400	15.580	15.437
41	16.40000	14.20282	16.944	16.820	16.000	0.6394	0.6361	0.6339	0.6323	0.6243	0.6227	0.6205	0.6172	16.800	15.980	15.837
42	16.80000	14.54923	17.344	17.220	16.400	0.6396	0.6362	0.6339	0.6323	0.6243	0.6227	0.6204	0.6170	17.200	16.380	16.237
43	17.20000	14.89564	17.744	17.620	16.800	0.6397	0.6363	0.6340	0.6323	0.6243	0.6226	0.6203	0.6169	17.600	16.780	16.636
44	17.60000	15.24205	18.144	18.020	17.200	0.6398	0.6363	0.6340	0.6324	0.6242	0.6226	0.6203	0.6168	18.000	17.180	17.036
45	18.00000	15.58846	18.544	18.420	17.600	0.6399	0.6364	0.6341	0.6324	0.6242	0.6225	0.6202	0.6167	18.400	17.580	17.436
46	18.40000	15.93487	18.944	18.820	18.000	0.6400	0.6365	0.6341	0.6324	0.6242	0.6225	0.6201	0.6166	18.800	17.980	17.836
47	18.80000	16.28128	19.344	19.220	18.400	0.6401	0.6365	0.6342	0.6325	0.6241	0.6224	0.6201	0.6165	19.200	18.380	18.236
48	19.20000	16.62769	19.744	19.620	18.800	0.6402	0.6366	0.6342	0.6325	0.6241	0.6224	0.6200	0.6164	19.600	18.780	18.635
49	19.60000	16.97410	20.144	20.020	19.200	0.6403	0.6367	0.6343	0.6326	0.6240	0.6223	0.6199	0.6163	20.000	19.180	19.035
50	20.00000	17.32051	20.544	20.420	19.600	0.6404	0.6368	0.6344	0.6326	0.6240	0.6223	0.6198	0.6162	20.400	19.580	19.435
51	20.40000	17.66692	20.944	20.820	20.000	0.6405	0.6368	0.6344	0.6326	0.6240	0.6222	0.6198	0.6161	20.800	19.980	19.835
52	20.80000	18.01333	21.344	21.220	20.400	0.6406	0.6369	0.6345	0.6327	0.6239	0.6221	0.6197	0.6160	21.200	20.380	20.235
53	21.20000	18.35974	21.744	21.620	20.800	0.6407	0.6370	0.6345	0.6327	0.6239	0.6221	0.6196	0.6159	21.600	20.780	20.634
54	21.60000	18.70615	22.144	22.020	21.200	0.6408	0.6371	0.6346	0.6327	0.6239	0.6220	0.6195	0.6158	22.000	21.180	21.034
55	22.00000	19.05256	22.544	22.420	21.600	0.6409	0.6371	0.6346	0.6328	0.6238	0.6220	0.6195	0.6157	22.400	21.580	21.434
56	22.40000	19.39897	22.944	22.820	22.000	0.6410	0.6372	0.6347	0.6328	0.6238	0.6219	0.6194	0.6156	22.800	21.980	21.834
57	22.80000	19.74538	23.344	23.220	22.400	0.6411	0.6373	0.6347	0.6329	0.6237	0.6219	0.6193	0.6155	23.200	22.380	22.234
58	23.20000	20.09179	23.744	23.620	22.800	0.6412	0.6374	0.6348	0.6329	0.6237	0.6218	0.6192	0.6154	23.600	22.780	22.634
59	23.60000	20.43820	24.144	24.020	23.200	0.6414	0.6374	0.6348	0.6329	0.6237	0.6218	0.6192	0.6152	24.000	23.180	23.033
60	24.00000	20.78461	24.544	24.420	23.600	0.6415	0.6375	0.6349	0.6330	0.6236	0.6217	0.6191	0.6151	24.400	23.580	23.433

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. [illegible] Table 105.

d. [illegible] imum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 6–30 DEG PRESSURE ANGLE, FLAT ROOT SIDE FIT, 3/6 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width 0.5236 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness − 0.5236 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.1	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.1
					Note e	Notes a & b								Note g	Note e	
Tolerance in Ten Thousandths					+150 -0									+0 -870		
6	2.000000	1.732051	2.454	2.338	**1.753**	0.5310	0.5288	0.5273	0.5262	0.5210	0.5199	0.5184	0.5162	2.333	**1.748**	1.533
7	2.333333	2.020726	2.787	2.672	**2.067**	0.5311	0.5289	0.5274	0.5263	0.5209	0.5198	0.5183	0.5161	2.667	**2.061**	1.866
8	2.666667	2.309401	3.121	3.006	**2.386**	0.5312	0.5290	0.5274	0.5263	0.5209	0.5198	0.5182	0.5160	3.000	**2.379**	2.199
9	3.000000	2.598076	3.454	3.340	**2.708**	0.5314	0.5290	0.5275	0.5264	0.5208	0.5197	0.5182	0.5158	3.333	**2.701**	2.533
10	3.333333	2.886751	3.787	3.674	**3.034**	0.5315	0.5291	0.5275	0.5264	0.5208	0.5197	0.5181	0.5157	3.667	**3.026**	2.866
11	3.666667	3.175426	4.121	4.008	**3.360**	0.5316	0.5292	0.5276	0.5264	0.5208	0.5196	0.5180	0.5156	4.000	**3.352**	3.199
12	4.000000	3.464102	4.454	4.342	**3.689**	0.5317	0.5293	0.5276	0.5265	0.5207	0.5196	0.5179	0.5155	4.333	**3.680**	3.532
13	4.333333	3.752777	4.787	4.676	**4.018**	0.5318	0.5293	0.5277	0.5265	0.5207	0.5195	0.5179	0.5154	4.667	**4.008**	3.865
14	4.666667	4.041452	5.121	5.010	**4.347**	0.5319	0.5294	0.5277	0.5265	0.5207	0.5195	0.5178	0.5153	5.000	**4.337**	4.198
15	5.000000	4.330127	5.454	5.344	**4.678**	0.5320	0.5295	0.5278	0.5266	0.5206	0.5194	0.5177	0.5152	5.333	**4.667**	4.531
16	5.333333	4.618802	5.787	5.678	**5.009**	0.5321	0.5295	0.5278	0.5266	0.5206	0.5194	0.5177	0.5151	5.667	**4.997**	4.865
17	5.666667	4.907477	6.121	6.012	**5.340**	0.5322	0.5296	0.5279	0.5267	0.5205	0.5193	0.5176	0.5150	6.000	**5.328**	5.198
18	6.000000	5.196152	6.454	6.346	**5.672**	0.5323	0.5297	0.5280	0.5267	0.5205	0.5192	0.5175	0.5149	6.333	**5.659**	5.531
19	6.333333	5.484828	6.787	6.680	**6.004**	0.5324	0.5298	0.5280	0.5267	0.5205	0.5192	0.5174	0.5148	6.667	**5.990**	5.864
20	6.666667	5.773503	7.121	7.014	**6.336**	0.5325	0.5298	0.5281	0.5268	0.5204	0.5191	0.5174	0.5147	7.000	**6.321**	6.197
21	7.000000	6.062178	7.454	7.348	**6.668**	0.5326	0.5299	0.5281	0.5268	0.5204	0.5191	0.5173	0.5146	7.333	**6.653**	6.530
22	7.333333	6.350853	7.787	7.682	7.000	0.5327	0.5300	0.5282	0.5268	0.5204	0.5190	0.5172	0.5145	7.667	6.985	6.864
23	7.666667	6.639528	8.121	8.016	7.334	0.5328	0.5301	0.5282	0.5269	0.5203	0.5190	0.5171	0.5144	8.000	7.318	7.197
24	8.000000	6.928203	8.454	8.350	7.667	0.5329	0.5301	0.5283	0.5269	0.5203	0.5189	0.5171	0.5143	8.333	7.650	7.530
25	8.333333	7.216878	8.787	8.684	8.000	0.5330	0.5302	0.5283	0.5270	0.5202	0.5189	0.5170	0.5142	8.667	7.983	7.863
26	8.666667	7.505553	9.121	9.018	8.334	0.5332	0.5303	0.5284	0.5270	0.5202	0.5188	0.5169	0.5140	9.000	8.316	8.196
27	9.000000	7.794229	9.454	9.352	8.667	0.5333	0.5304	0.5284	0.5270	0.5202	0.5188	0.5168	0.5139	9.333	8.648	8.529
28	9.333333	8.082904	9.787	9.686	9.000	0.5334	0.5304	0.5285	0.5271	0.5201	0.5187	0.5168	0.5138	9.667	8.981	8.862
29	9.666667	8.371579	10.121	10.020	9.334	0.5335	0.5305	0.5285	0.5271	0.5201	0.5187	0.5167	0.5137	10.000	9.314	9.196
30	10.00000	8.660254	10.454	10.354	9.667	0.5336	0.5306	0.5286	0.5271	0.5201	0.5186	0.5166	0.5136	10.333	9.646	9.529
31	10.33333	8.948929	10.787	10.687	10.000	0.5337	0.5307	0.5286	0.5272	0.5200	0.5186	0.5165	0.5135	10.667	9.980	9.862
32	10.66667	9.237604	11.121	11.020	10.334	0.5338	0.5307	0.5287	0.5272	0.5200	0.5185	0.5165	0.5134	11.000	10.313	10.195
33	11.00000	9.526279	11.454	11.354	10.667	0.5339	0.5308	0.5287	0.5273	0.5199	0.5185	0.5164	0.5133	11.333	10.646	10.528
34	11.33333	9.814955	11.787	11.687	11.000	0.5340	0.5309	0.5288	0.5273	0.5199	0.5184	0.5163	0.5132	11.667	10.980	10.861
35	11.66667	10.10363	12.121	12.020	11.334	0.5341	0.5310	0.5289	0.5273	0.5199	0.5183	0.5162	0.5131	12.000	11.313	11.194
36	12.00000	10.39230	12.454	12.354	11.667	0.5342	0.5310	0.5289	0.5274	0.5198	0.5183	0.5162	0.5130	12.333	11.646	11.528
37	12.33333	10.68098	12.787	12.687	12.000	0.5343	0.5311	0.5290	0.5274	0.5198	0.5182	0.5161	0.5129	12.667	11.980	11.861
38	12.66667	10.96966	13.121	13.020	12.334	0.5344	0.5312	0.5290	0.5274	0.5198	0.5182	0.5160	0.5128	13.000	12.313	12.194
39	13.00000	11.25833	13.454	13.354	12.667	0.5345	0.5313	0.5291	0.5275	0.5197	0.5181	0.5159	0.5127	13.333	12.646	12.527
40	13.33333	11.54701	13.787	13.687	13.000	0.5346	0.5313	0.5291	0.5275	0.5197	0.5181	0.5159	0.5126	13.667	12.980	12.860
41	13.66667	11.83568	14.121	14.020	13.334	0.5347	0.5314	0.5292	0.5276	0.5196	0.5180	0.5158	0.5125	14.000	13.313	13.193
42	14.00000	12.12436	14.454	14.354	13.667	0.5349	0.5315	0.5292	0.5276	0.5196	0.5180	0.5157	0.5123	14.333	13.646	13.527
43	14.33333	12.41303	14.787	14.687	14.000	0.5350	0.5316	0.5293	0.5276	0.5196	0.5179	0.5156	0.5122	14.667	13.980	13.860
44	14.66667	12.70171	15.121	15.020	14.334	0.5351	0.5316	0.5293	0.5277	0.5195	0.5179	0.5156	0.5121	15.000	14.313	14.193
45	15.00000	12.99038	15.454	15.354	14.667	0.5352	0.5317	0.5294	0.5277	0.5195	0.5178	0.5155	0.5120	15.333	14.646	14.526
46	15.33333	13.27906	15.787	15.687	15.000	0.5353	0.5318	0.5294	0.5277	0.5195	0.5178	0.5154	0.5119	15.667	14.980	14.859
47	15.66667	13.56773	16.121	16.020	15.334	0.5354	0.5318	0.5295	0.5278	0.5194	0.5177	0.5154	0.5118	16.000	15.313	15.192
48	16.00000	13.85641	16.454	16.354	15.667	0.5355	0.5319	0.5295	0.5278	0.5194	0.5177	0.5153	0.5117	16.333	15.646	15.525
49	16.33333	14.14508	16.787	16.687	16.000	0.5356	0.5320	0.5296	0.5279	0.5193	0.5176	0.5152	0.5116	16.667	15.980	15.859
50	16.66667	14.43376	17.121	17.020	16.334	0.5357	0.5321	0.5296	0.5279	0.5193	0.5175	0.5151	0.5115	17.000	16.313	16.192
51	17.00000	14.72243	17.454	17.354	16.667	0.5358	0.5321	0.5297	0.5279	0.5193	0.5175	0.5151	0.5114	17.333	16.646	16.525
52	17.33333	15.01111	17.787	17.687	17.000	0.5359	0.5322	0.5298	0.5280	0.5192	0.5174	0.5150	0.5113	17.667	16.980	16.858
53	17.66667	15.29978	18.121	18.020	17.334	0.5360	0.5323	0.5298	0.5280	0.5192	0.5174	0.5149	0.5112	18.000	17.313	17.191
54	18.00000	15.58846	18.454	18.354	17.667	0.5361	0.5324	0.5299	0.5280	0.5192	0.5173	0.5148	0.5111	18.333	17.646	17.524
55	18.33333	15.87713	18.787	18.687	18.000	0.5362	0.5324	0.5299	0.5281	0.5191	0.5173	0.5148	0.5110	18.667	17.980	17.857
56	18.66667	16.16581	19.121	19.020	18.334	0.5363	0.5325	0.5300	0.5281	0.5191	0.5172	0.5147	0.5109	19.000	18.313	18.191
57	19.00000	16.45448	19.454	19.354	18.667	0.5364	0.5326	0.5300	0.5282	0.5190	0.5172	0.5146	0.5108	19.333	18.646	18.524
58	19.33333	16.74316	19.787	19.687	19.000	0.5365	0.5327	0.5301	0.5282	0.5190	0.5171	0.5145	0.5107	19.667	18.980	18.857
59	19.66667	17.03183	20.121	20.020	19.334	0.5367	0.5327	0.5301	0.5282	0.5190	0.5171	0.5145	0.5105	20.000	19.313	19.190
60	20.00000	17.32051	20.454	20.354	19.667	0.5368	0.5328	0.5302	0.5283	0.5189	0.5170	0.5144	0.5104	20.333	19.646	19.523

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

e. Figures in bold type are modified values, see Section 25.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15–1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

ximum effective space width, and REF minimum effec- see Table 64

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30 DEG PRESSURE ANGLE

TABLE 7—30 DEG PRESSURE ANGLE, FLAT ROOT SIDE FIT, 4/8 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
						S_V Min. Eff. Circ. Space Width 0.3927 Notes c & d				t_V Max. Eff. Circ. Tooth Thickness 0.3927 Notes c & d						
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia. Max.	D_{Fi} Form Dia.	D_t Minor Dia.	S Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				D_o Major Dia.	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.1	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.1
					Note e	Notes a & b								Note g	Note e	
Tolerance in Ten Thousandths					+100 -0									+0 - 650		
6	1.500000	1.299038	1.842	1.754	**1.316**	0.3994	0.3974	0.3960	0.3951	0.3903	0.3894	0.3880	0.3860	1.750	**1.311**	1.147
7	1.750000	1.515544	2.092	2.004	**1.550**	0.3994	0.3974	0.3961	0.3951	0.3903	0.3893	0.3880	0.3860	2.000	**1.545**	1.397
8	2.000000	1.732051	2.342	2.254	**1.789**	0.3995	0.3975	0.3961	0.3951	0.3903	0.3893	0.3879	0.3859	2.250	**1.784**	1.647
9	2.250000	1.948557	2.592	2.505	**2.031**	0.3996	0.3975	0.3961	0.3951	0.3903	0.3893	0.3879	0.3858	2.500	**2.025**	1.897
10	2.500000	2.165064	2.842	2.755	**2.275**	0.3997	0.3976	0.3962	0.3952	0.3902	0.3892	0.3878	0.3857	2.750	**2.269**	2.146
11	2.750000	2.381570	3.092	3.006	**2.520**	0.3997	0.3976	0.3962	0.3952	0.3902	0.3892	0.3878	0.3857	3.000	**2.513**	2.396
12	3.000000	2.598076	3.342	3.256	**2.766**	0.3998	0.3977	0.3963	0.3952	0.3902	0.3891	0.3877	0.3856	3.250	**2.759**	2.646
13	3.250000	2.814583	3.592	3.507	**3.013**	0.3999	0.3977	0.3963	0.3953	0.3901	0.3891	0.3877	0.3855	3.500	**3.005**	2.896
14	3.500000	3.031089	3.842	3.757	**3.260**	0.4000	0.3978	0.3963	0.3953	0.3901	0.3891	0.3876	0.3854	3.750	**3.252**	3.146
15	3.750000	3.247595	4.092	4.008	**3.508**	0.4000	0.3978	0.3964	0.3953	0.3901	0.3890	0.3876	0.3854	4.000	**3.499**	3.396
16	4.000000	3.464102	4.342	4.258	**3.756**	0.4001	0.3979	0.3964	0.3953	0.3901	0.3890	0.3875	0.3853	4.250	**3.747**	3.646
17	4.250000	3.680608	4.592	4.509	**4.004**	0.4002	0.3979	0.3964	0.3954	0.3900	0.3890	0.3875	0.3852	4.500	**3.995**	3.896
18	4.500000	3.897114	4.842	4.759	**4.253**	0.4003	0.3980	0.3965	0.3954	0.3900	0.3889	0.3874	0.3851	4.750	**4.243**	4.145
19	4.750000	4.113621	5.092	5.010	**4.502**	0.4003	0.3981	0.3965	0.3954	0.3900	0.3889	0.3873	0.3851	5.000	**4.492**	4.395
20	5.000000	4.330127	5.342	5.260	**4.751**	0.4004	0.3981	0.3966	0.3954	0.3900	0.3888	0.3873	0.3850	5.250	**4.740**	4.645
21	5.250000	4.546633	5.592	5.511	5.000	0.4005	0.3982	0.3966	0.3955	0.3899	0.3888	0.3872	0.3849	5.500	4.989	4.895
22	5.500000	4.763140	5.842	5.761	5.250	0.4006	0.3982	0.3966	0.3955	0.3899	0.3888	0.3872	0.3848	5.750	5.239	5.145
23	5.750000	4.979646	6.092	6.012	5.500	0.4006	0.3983	0.3967	0.3955	0.3899	0.3887	0.3871	0.3848	6.000	5.488	5.395
24	6.000000	5.196152	6.342	6.262	5.750	0.4007	0.3983	0.3967	0.3955	0.3899	0.3887	0.3871	0.3847	6.250	5.738	5.645
25	6.250000	5.412659	6.592	6.513	6.000	0.4008	0.3984	0.3967	0.3956	0.3898	0.3887	0.3870	0.3846	6.500	5.987	5.894
26	6.500000	5.629165	6.842	6.763	6.250	0.4009	0.3984	0.3968	0.3956	0.3898	0.3886	0.3870	0.3845	6.750	6.237	6.144
27	6.750000	5.845671	7.092	7.014	6.500	0.4010	0.3985	0.3968	0.3956	0.3898	0.3886	0.3869	0.3844	7.000	6.486	6.394
28	7.000000	6.062178	7.342	7.264	6.750	0.4010	0.3985	0.3969	0.3957	0.3897	0.3885	0.3869	0.3844	7.250	6.736	6.644
29	7.250000	6.278684	7.592	7.515	7.000	0.4011	0.3986	0.3969	0.3957	0.3897	0.3885	0.3868	0.3843	7.500	6.985	6.894
30	7.500000	6.495190	7.842	7.765	7.250	0.4012	0.3986	0.3969	0.3957	0.3897	0.3885	0.3868	0.3842	7.750	7.235	7.144
31	7.750000	6.711697	8.092	8.016	7.500	0.4013	0.3987	0.3970	0.3957	0.3897	0.3884	0.3867	0.3841	8.000	7.484	7.394
32	8.000000	6.928203	8.342	8.266	7.750	0.4013	0.3987	0.3970	0.3958	0.3896	0.3884	0.3867	0.3841	8.250	7.734	7.644
33	8.250000	7.144710	8.592	8.517	8.000	0.4014	0.3988	0.3971	0.3958	0.3896	0.3883	0.3866	0.3840	8.500	7.983	7.893
34	8.500000	7.361216	8.842	8.767	8.250	0.4015	0.3988	0.3971	0.3958	0.3896	0.3883	0.3866	0.3839	8.750	8.233	8.143
35	8.750000	7.577722	9.092	9.018	8.500	0.4016	0.3989	0.3971	0.3958	0.3896	0.3883	0.3865	0.3838	9.000	8.482	8.393
36	9.000000	7.794229	9.342	9.268	8.750	0.4016	0.3990	0.3972	0.3959	0.3895	0.3882	0.3864	0.3838	9.250	8.732	8.643
37	9.250000	8.010735	9.592	9.519	9.000	0.4017	0.3990	0.3972	0.3959	0.3895	0.3882	0.3864	0.3837	9.500	8.981	8.893
38	9.500000	8.227241	9.842	9.769	9.250	0.4018	0.3991	0.3972	0.3959	0.3895	0.3882	0.3863	0.3836	9.750	9.231	9.143
39	9.750000	8.443748	10.092	10.020	9.500	0.4019	0.3991	0.3973	0.3960	0.3894	0.3881	0.3863	0.3835	10.000	9.480	9.393
40	10.00000	8.660254	10.342	10.270	9.750	0.4019	0.3992	0.3973	0.3960	0.3894	0.3881	0.3862	0.3835	10.250	9.730	9.642
41	10.25000	8.876760	10.592	10.520	10.000	0.4020	0.3992	0.3974	0.3960	0.3894	0.3880	0.3862	0.3834	10.500	9.980	9.892
42	10.50000	9.093267	10.842	10.770	10.250	0.4021	0.3993	0.3974	0.3960	0.3894	0.3880	0.3861	0.3833	10.750	10.230	10.142
43	10.75000	9.309773	11.092	11.020	10.500	0.4022	0.3993	0.3974	0.3961	0.3893	0.3880	0.3861	0.3832	11.000	10.480	10.392
44	11.00000	9.526279	11.342	11.270	10.750	0.4022	0.3994	0.3975	0.3961	0.3893	0.3879	0.3860	0.3832	11.250	10.730	10.642
45	11.25000	9.742786	11.592	11.520	11.000	0.4023	0.3994	0.3975	0.3961	0.3893	0.3879	0.3860	0.3831	11.500	10.980	10.892
46	11.50000	9.959292	11.842	11.770	11.250	0.4024	0.3995	0.3975	0.3961	0.3893	0.3879	0.3859	0.3830	11.750	11.230	11.142
47	11.75000	10.17580	12.092	12.020	11.500	0.4025	0.3995	0.3976	0.3962	0.3892	0.3878	0.3859	0.3829	12.000	11.480	11.392
48	12.00000	10.39230	12.342	12.270	11.750	0.4025	0.3996	0.3976	0.3962	0.3892	0.3878	0.3858	0.3829	12.250	11.730	11.641
49	12.25000	10.60881	12.592	12.520	12.000	0.4026	0.3996	0.3977	0.3962	0.3892	0.3877	0.3858	0.3828	12.500	11.980	11.891
50	12.50000	10.82532	12.842	12.770	12.250	0.4027	0.3997	0.3977	0.3962	0.3892	0.3877	0.3857	0.3827	12.750	12.230	12.141
51	12.75000	11.04182	13.092	13.020	12.500	0.4028	0.3998	0.3977	0.3963	0.3891	0.3877	0.3856	0.3826	13.000	12.480	12.391
52	13.00000	11.25833	13.342	13.270	12.750	0.4029	0.3998	0.3978	0.3963	0.3891	0.3876	0.3856	0.3825	13.250	12.730	12.641
53	13.25000	11.47484	13.592	13.520	13.000	0.4029	0.3999	0.3978	0.3963	0.3891	0.3876	0.3855	0.3825	13.500	12.980	12.891
54	13.50000	11.69134	13.842	13.770	13.250	0.4030	0.3999	0.3979	0.3964	0.3890	0.3875	0.3855	0.3824	13.750	13.230	13.141
55	13.75000	11.90785	14.092	14.020	13.500	0.4031	0.4000	0.3979	0.3964	0.3890	0.3875	0.3854	0.3823	14.000	13.480	13.391
56	14.00000	12.12436	14.342	14.270	13.750	0.4032	0.4000	0.3979	0.3964	0.3890	0.3875	0.3854	0.3822	14.250	13.730	13.640
57	14.25000	12.34086	14.592	14.520	14.000	0.4032	0.4001	0.3980	0.3964	0.3890	0.3874	0.3853	0.3822	14.500	13.980	13.890
58	14.50000	12.55737	14.842	14.770	14.250	0.4033	0.4001	0.3980	0.3965	0.3889	0.3874	0.3853	0.3821	14.750	14.230	14.140
59	14.75000	12.77387	15.092	15.020	14.500	0.4034	0.4002	0.3980	0.3965	0.3889	0.3874	0.3852	0.3820	15.000	14.480	14.390
60	15.00000	12.99038	15.342	15.270	14.750	0.4035	0.4002	0.3981	0.3965	0.3889	0.3873	0.3852	0.3819	15.250	14.730	14.640

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 8—30 DEG PRESSURE ANGLE, FLAT ROOT SIDE FIT, 5/10 SPLINE PITCH

	Internal and External		Internal (see Drawing Data)							External (see Drawing Data)						
						s_v Min. Eff. Circ. Space Width = 0.3142 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.3142 Notes c & d						
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia. Max.	D_{Fi} Form Dia.	D_i Minor Dia.	7	6	5	4	4	5	6	7	D_o Major Dia.	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.1	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.1
					Note e	Notes a & b								Note g	Note e	
Tolerance in Ten Thousandths					+ 30 -0									+0 - 530		
6	1.200000	1.039230	1.474	1.404	**1.054**	0.3209	0.3189	0.3175	0.3166	0.3118	0.3109	0.3095	0.3075	1.400	**1.049**	0.914
7	1.400000	1.212436	1.674	1.604	**1.241**	0.3209	0.3189	0.3176	0.3166	0.3118	0.3108	0.3095	0.3075	1.600	**1.236**	1.114
8	1.600000	1.385641	1.874	1.804	**1.432**	0.3210	0.3190	0.3176	0.3166	0.3118	0.3108	0.3094	0.3074	1.800	**1.427**	1.314
9	1.800000	1.558846	2.074	2.004	**1.625**	0.3211	0.3190	0.3176	0.3166	0.3118	0.3108	0.3094	0.3073	2.000	**1.620**	1.514
10	2.000000	1.732051	2.274	2.204	**1.819**	0.3212	0.3191	0.3177	0.3167	0.3117	0.3107	0.3093	0.3072	2.200	**1.814**	1.714
11	2.200000	1.905256	2.474	2.405	**2.015**	0.3212	0.3191	0.3177	0.3167	0.3117	0.3107	0.3093	0.3072	2.400	**2.010**	1.914
12	2.400000	2.078461	2.674	2.605	**2.212**	0.3213	0.3192	0.3178	0.3167	0.3117	0.3106	0.3092	0.3071	2.600	**2.206**	2.114
13	2.600000	2.251666	2.874	2.806	**2.410**	0.3214	0.3192	0.3178	0.3168	0.3116	0.3106	0.3092	0.3070	2.800	**2.403**	2.314
14	2.800000	2.424871	3.074	3.006	**2.608**	0.3215	0.3193	0.3178	0.3168	0.3116	0.3106	0.3091	0.3069	3.000	**2.601**	2.513
15	3.000000	2.598076	3.274	3.206	**2.806**	0.3215	0.3193	0.3179	0.3168	0.3116	0.3105	0.3091	0.3069	3.200	**2.799**	2.713
16	3.200000	2.771281	3.474	3.407	**3.004**	0.3216	0.3194	0.3179	0.3168	0.3116	0.3105	0.3090	0.3068	3.400	**2.997**	2.913
17	3.400000	2.944486	3.674	3.607	**3.203**	0.3217	0.3194	0.3179	0.3169	0.3115	0.3105	0.3090	0.3067	3.600	**3.193**	3.113
18	3.600000	3.117691	3.874	3.808	**3.402**	0.3218	0.3195	0.3180	0.3169	0.3115	0.3104	0.3089	0.3066	3.800	**3.394**	3.313
19	3.800000	3.290897	4.074	4.008	**3.601**	0.3218	0.3196	0.3180	0.3169	0.3115	0.3104	0.3088	0.3066	4.000	**3.592**	3.513
20	4.000000	3.464102	4.274	4.208	3.800	0.3219	0.3196	0.3181	0.3169	0.3115	0.3103	0.3088	0.3065	4.200	3.792	3.713
21	4.200000	3.637307	4.474	4.409	4.000	0.3220	0.3197	0.3181	0.3170	0.3114	0.3103	0.3087	0.3064	4.400	3.991	3.912
22	4.400000	3.810512	4.674	4.609	4.200	0.3221	0.3197	0.3181	0.3170	0.3114	0.3103	0.3087	0.3063	4.600	4.191	4.112
23	4.600000	3.983717	4.874	4.810	4.400	0.3221	0.3198	0.3182	0.3170	0.3114	0.3102	0.3086	0.3063	4.800	4.390	4.312
24	4.800000	4.156922	5.074	5.010	4.600	0.3222	0.3198	0.3182	0.3170	0.3114	0.3102	0.3086	0.3062	5.000	4.590	4.512
25	5.000000	4.330127	5.274	5.210	4.800	0.3223	0.3199	0.3182	0.3171	0.3113	0.3102	0.3085	0.3061	5.200	4.790	4.712
26	5.200000	4.503332	5.474	5.411	5.000	0.3224	0.3199	0.3183	0.3171	0.3113	0.3101	0.3085	0.3060	5.400	4.989	4.912
27	5.400000	4.676537	5.674	5.611	5.200	0.3225	0.3200	0.3183	0.3171	0.3113	0.3101	0.3084	0.3059	5.600	5.189	5.112
28	5.600000	4.849742	5.874	5.812	5.400	0.3225	0.3200	0.3184	0.3172	0.3112	0.3100	0.3084	0.3059	5.800	5.388	5.312
29	5.800000	5.022947	6.074	6.012	5.600	0.3226	0.3201	0.3184	0.3172	0.3112	0.3100	0.3083	0.3058	6.000	5.588	5.511
30	6.000000	5.196152	6.274	6.212	5.800	0.3227	0.3201	0.3184	0.3172	0.3112	0.3100	0.3083	0.3057	6.200	5.788	5.711
31	6.200000	5.369357	6.474	6.413	6.000	0.3228	0.3202	0.3185	0.3172	0.3112	0.3099	0.3082	0.3056	6.400	5.987	5.911
32	6.400000	5.542563	6.674	6.613	6.200	0.3228	0.3202	0.3185	0.3173	0.3111	0.3099	0.3082	0.3056	6.600	6.187	6.111
33	6.600000	5.715768	6.874	6.814	6.400	0.3229	0.3203	0.3186	0.3173	0.3111	0.3098	0.3081	0.3055	6.800	6.386	6.311
34	6.800000	5.888973	7.074	7.014	6.600	0.3230	0.3203	0.3186	0.3173	0.3111	0.3098	0.3081	0.3054	7.000	6.586	6.511
35	7.000000	6.062178	7.274	7.214	6.800	0.3231	0.3204	0.3186	0.3173	0.3111	0.3098	0.3080	0.3053	7.200	6.786	6.711
36	7.200000	6.235383	7.474	7.415	7.000	0.3231	0.3205	0.3187	0.3174	0.3110	0.3097	0.3079	0.3053	7.400	6.985	6.911
37	7.400000	6.408588	7.674	7.615	7.200	0.3232	0.3205	0.3187	0.3174	0.3110	0.3097	0.3079	0.3052	7.600	7.185	7.110
38	7.600000	6.581793	7.874	7.816	7.400	0.3233	0.3206	0.3187	0.3174	0.3110	0.3097	0.3078	0.3051	7.800	7.384	7.310
39	7.800000	6.754998	8.074	8.016	7.600	0.3234	0.3206	0.3188	0.3175	0.3109	0.3096	0.3078	0.3050	8.000	7.584	7.510
40	8.000000	6.928203	8.274	8.216	7.800	0.3234	0.3207	0.3188	0.3175	0.3109	0.3096	0.3077	0.3050	8.200	7.784	7.710
41	8.200000	7.101408	8.474	8.417	8.000	0.3235	0.3207	0.3189	0.3175	0.3109	0.3095	0.3077	0.3049	8.400	7.983	7.910
42	8.400000	7.274613	8.674	8.617	8.200	0.3236	0.3208	0.3189	0.3175	0.3109	0.3095	0.3076	0.3048	8.600	8.183	8.110
43	8.600000	7.447818	8.874	8.818	8.400	0.3237	0.3208	0.3189	0.3176	0.3108	0.3095	0.3076	0.3047	8.800	8.382	8.310
44	8.800000	7.621024	9.074	9.018	8.600	0.3237	0.3209	0.3190	0.3176	0.3108	0.3094	0.3075	0.3047	9.000	8.582	8.509
45	9.000000	7.794229	9.274	9.218	8.800	0.3238	0.3209	0.3190	0.3176	0.3108	0.3094	0.3075	0.3046	9.200	8.782	8.709
46	9.200000	7.967434	9.474	9.419	9.000	0.3239	0.3210	0.3190	0.3176	0.3108	0.3094	0.3074	0.3045	9.400	8.981	8.909
47	9.400000	8.140639	9.674	9.619	9.200	0.3240	0.3210	0.3191	0.3177	0.3107	0.3093	0.3074	0.3044	9.600	9.181	9.109
48	9.600000	8.313844	9.874	9.820	9.400	0.3240	0.3211	0.3191	0.3177	0.3107	0.3093	0.3073	0.3044	9.800	9.380	9.309
49	9.800000	8.487049	10.074	10.020	9.600	0.3241	0.3211	0.3192	0.3177	0.3107	0.3092	0.3073	0.3043	10.000	9.580	9.509
50	10.00000	8.660254	10.274	10.220	9.800	0.3242	0.3212	0.3192	0.3177	0.3107	0.3092	0.3072	0.3042	10.200	9.780	9.709
51	10.20000	8.833459	10.474	10.420	10.000	0.3243	0.3213	0.3192	0.3178	0.3106	0.3092	0.3071	0.3041	10.400	9.980	9.909
52	10.40000	9.006664	10.674	10.620	10.200	0.3244	0.3213	0.3193	0.3178	0.3106	0.3091	0.3071	0.3040	10.600	10.180	10.108
53	10.60000	9.179869	10.874	10.820	10.400	0.3244	0.3214	0.3193	0.3178	0.3106	0.3091	0.3070	0.3040	10.800	10.380	10.308
54	10.80000	9.353074	11.074	11.020	10.600	0.3245	0.3214	0.3194	0.3179	0.3105	0.3090	0.3070	0.3039	11.000	10.580	10.508
55	11.00000	9.526279	11.274	11.220	10.800	0.3246	0.3215	0.3194	0.3179	0.3105	0.3090	0.3069	0.3038	11.200	10.780	10.708
56	11.20000	9.699484	11.474	11.420	11.000	0.3247	0.3215	0.3194	0.3179	0.3105	0.3090	0.3069	0.3037	11.400	10.980	10.908
57	11.40000	9.872690	11.674	11.620	11.200	0.3247	0.3216	0.3195	0.3179	0.3105	0.3089	0.3068	0.3037	11.600	11.180	11.108
58	11.60000	10.04589	11.874	11.820	11.400	0.3248	0.3216	0.3195	0.3180	0.3104	0.3089	0.3068	0.3036	11.800	11.380	11.308
59	11.80000	10.21910	12.074	12.020	11.600	0.3249	0.3217	0.3195	0.3180	0.3104	0.3089	0.3067	0.3035	12.000	11.580	11.507
60	12.00000	10.39230	12.274	12.220	11.800	0.3250	0.3217	0.3196	0.3180	0.3104	0.3088	0.3067	0.3034	12.200	11.780	11.707

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective Table 64.

e. Figures in bold type are modified values, see Section 25.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 9—30 DEG PRESSURE ANGLE, FLAT ROOT SIDE FIT, 6/12 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	S_v Min. Eff. Circ. Space Width 0.2618 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness 0.2618 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.1	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.1
					Note e	Notes a & b								Note g	Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 430		
6	1.000000	0.8660254	1.229	1.171	**0.881**	0.2674	0.2657	0.2646	0.2638	0.2598	0.2590	0.2579	0.2562	1.167	**0.876**	0.761
7	1.166667	1.010363	1.396	1.338	**1.035**	0.2675	0.2658	0.2646	0.2638	0.2598	0.2590	0.2578	0.2561	1.333	**1.030**	0.928
8	1.333333	1.154701	1.562	1.504	**1.194**	0.2676	0.2658	0.2647	0.2638	0.2598	0.2589	0.2578	0.2560	1.500	**1.189**	1.094
9	1.500000	1.299038	1.729	1.671	**1.354**	0.2676	0.2659	0.2647	0.2639	0.2597	0.2589	0.2577	0.2560	1.667	**1.349**	1.261
10	1.666667	1.443376	1.896	1.838	**1.516**	0.2677	0.2659	0.2647	0.2639	0.2597	0.2588	0.2577	0.2559	1.833	**1.511**	1.427
11	1.833333	1.587713	2.062	2.004	**1.680**	0.2678	0.2660	0.2648	0.2639	0.2597	0.2588	0.2576	0.2558	2.000	**1.675**	1.594
12	2.000000	1.732051	2.229	2.171	**1.843**	0.2678	0.2660	0.2648	0.2639	0.2597	0.2588	0.2576	0.2558	2.167	**1.838**	1.761
13	2.166667	1.876388	2.396	2.338	**2.008**	0.2679	0.2661	0.2649	0.2640	0.2596	0.2587	0.2575	0.2557	2.333	**2.002**	1.927
14	2.333333	2.020726	2.562	2.505	**2.173**	0.2680	0.2661	0.2649	0.2640	0.2596	0.2587	0.2575	0.2556	2.500	**2.167**	2.094
15	2.500000	2.165064	2.729	2.672	**2.338**	0.2680	0.2662	0.2649	0.2640	0.2596	0.2587	0.2574	0.2555	2.667	**2.332**	2.260
16	2.666667	2.309401	2.896	2.839	**2.503**	0.2681	0.2662	0.2650	0.2640	0.2596	0.2586	0.2574	0.2555	2.833	**2.497**	2.427
17	2.833333	2.453739	3.062	3.006	**2.669**	0.2682	0.2663	0.2650	0.2641	0.2595	0.2586	0.2573	0.2554	3.000	**2.662**	2.593
18	3.000000	2.598076	3.229	3.173	**2.835**	0.2683	0.2663	0.2650	0.2641	0.2595	0.2586	0.2573	0.2553	3.167	**2.828**	2.760
19	3.166667	2.742414	3.396	3.340	3.000	0.2683	0.2664	0.2651	0.2641	0.2595	0.2585	0.2572	0.2553	3.333	2.993	2.926
20	3.333333	2.886751	3.562	3.507	3.167	0.2684	0.2664	0.2651	0.2641	0.2595	0.2585	0.2572	0.2552	3.500	3.160	3.093
21	3.500000	3.031089	3.729	3.674	3.334	0.2685	0.2665	0.2651	0.2642	0.2594	0.2585	0.2571	0.2551	3.667	3.326	3.259
22	3.666667	3.175426	3.896	3.841	3.500	0.2685	0.2665	0.2652	0.2642	0.2594	0.2584	0.2571	0.2551	3.833	3.492	3.426
23	3.833333	3.319764	4.062	4.008	3.667	0.2686	0.2666	0.2652	0.2642	0.2594	0.2584	0.2570	0.2550	4.000	3.659	3.593
24	4.000000	3.464102	4.229	4.175	3.834	0.2687	0.2666	0.2652	0.2642	0.2594	0.2584	0.2570	0.2549	4.167	3.825	3.759
25	4.166667	3.608439	4.396	4.342	4.000	0.2687	0.2667	0.2653	0.2643	0.2593	0.2583	0.2569	0.2548	4.333	3.991	3.926
26	4.333333	3.752777	4.562	4.509	4.167	0.2688	0.2667	0.2653	0.2643	0.2593	0.2583	0.2569	0.2548	4.500	4.158	4.092
27	4.500000	3.897114	4.729	4.676	4.334	0.2689	0.2668	0.2653	0.2643	0.2593	0.2583	0.2568	0.2547	4.667	4.324	4.259
28	4.666667	4.041452	4.896	4.843	4.500	0.2690	0.2668	0.2654	0.2643	0.2593	0.2582	0.2568	0.2546	4.833	4.490	4.425
29	4.833333	4.185789	5.062	5.010	4.667	0.2690	0.2669	0.2654	0.2644	0.2592	0.2582	0.2567	0.2546	5.000	4.657	4.592
30	5.000000	4.330127	5.229	5.177	4.834	0.2691	0.2669	0.2654	0.2644	0.2592	0.2581	0.2567	0.2545	5.167	4.823	4.758
31	5.166667	4.474465	5.396	5.344	5.000	0.2692	0.2670	0.2655	0.2644	0.2592	0.2581	0.2566	0.2544	5.333	4.989	4.925
32	5.333333	4.618802	5.562	5.511	5.167	0.2692	0.2670	0.2655	0.2644	0.2592	0.2581	0.2566	0.2544	5.500	5.156	5.091
33	5.500000	4.763140	5.729	5.678	5.334	0.2693	0.2671	0.2656	0.2645	0.2591	0.2580	0.2565	0.2543	5.667	5.322	5.258
34	5.666667	4.907477	5.896	5.845	5.500	0.2694	0.2671	0.2656	0.2645	0.2591	0.2580	0.2565	0.2542	5.833	5.488	5.425
35	5.833333	5.051815	6.062	6.012	5.667	0.2694	0.2672	0.2656	0.2645	0.2591	0.2580	0.2564	0.2541	6.000	5.655	5.591
36	6.000000	5.196152	6.229	6.179	5.834	0.2695	0.2672	0.2657	0.2645	0.2591	0.2579	0.2564	0.2541	6.167	5.821	5.758
37	6.166667	5.340490	6.396	6.346	6.000	0.2696	0.2673	0.2657	0.2646	0.2590	0.2579	0.2563	0.2540	6.333	5.987	5.924
38	6.333333	5.484828	6.562	6.513	6.167	0.2697	0.2673	0.2657	0.2646	0.2590	0.2579	0.2563	0.2539	6.500	6.154	6.091
39	6.500000	5.629165	6.729	6.680	6.334	0.2697	0.2674	0.2658	0.2646	0.2590	0.2578	0.2562	0.2539	6.667	6.320	6.257
40	6.666667	5.773503	6.896	6.847	6.500	0.2698	0.2674	0.2658	0.2646	0.2590	0.2578	0.2562	0.2538	6.833	6.486	6.424
41	6.833333	5.917840	7.062	7.014	6.667	0.2699	0.2674	0.2658	0.2647	0.2589	0.2578	0.2562	0.2537	7.000	6.653	6.590
42	7.000000	6.062178	7.229	7.181	6.834	0.2699	0.2675	0.2659	0.2647	0.2589	0.2577	0.2561	0.2537	7.167	6.819	6.757
43	7.166667	6.206515	7.396	7.348	7.000	0.2700	0.2675	0.2659	0.2647	0.2589	0.2577	0.2561	0.2536	7.333	6.985	6.923
44	7.333333	6.350853	7.562	7.515	7.167	0.2701	0.2676	0.2659	0.2647	0.2589	0.2577	0.2560	0.2535	7.500	7.152	7.090
45	7.500000	6.495190	7.729	7.682	7.334	0.2701	0.2676	0.2660	0.2648	0.2588	0.2576	0.2560	0.2534	7.667	7.318	7.257
46	7.666667	6.639528	7.896	7.849	7.500	0.2702	0.2677	0.2660	0.2648	0.2588	0.2576	0.2559	0.2534	7.833	7.484	7.423
47	7.833333	6.783866	8.062	8.016	7.667	0.2703	0.2677	0.2660	0.2648	0.2588	0.2576	0.2559	0.2533	8.000	7.651	7.590
48	8.000000	6.928203	8.229	8.183	7.834	0.2704	0.2678	0.2661	0.2648	0.2588	0.2575	0.2558	0.2532	8.167	7.817	7.756
49	8.166667	7.072541	8.396	8.350	8.000	0.2704	0.2678	0.2661	0.2649	0.2587	0.2575	0.2558	0.2532	8.333	7.983	7.923
50	8.333333	7.216878	8.562	8.517	8.167	0.2705	0.2679	0.2661	0.2649	0.2587	0.2574	0.2557	0.2531	8.500	8.150	8.089
51	8.500000	7.361216	8.729	8.684	8.334	0.2706	0.2679	0.2662	0.2649	0.2587	0.2574	0.2557	0.2530	8.667	8.316	8.256
52	8.666667	7.505553	8.896	8.851	8.500	0.2706	0.2680	0.2662	0.2649	0.2587	0.2574	0.2556	0.2530	8.833	8.482	8.422
53	8.833333	7.649891	9.062	9.018	8.667	0.2707	0.2680	0.2663	0.2650	0.2586	0.2573	0.2556	0.2529	9.000	8.649	8.589
54	9.000000	7.794229	9.229	9.185	8.834	0.2708	0.2681	0.2663	0.2650	0.2586	0.2573	0.2555	0.2528	9.167	8.815	8.755
55	9.166667	7.938566	9.396	9.352	9.000	0.2708	0.2681	0.2663	0.2650	0.2586	0.2573	0.2555	0.2527	9.333	8.981	8.922
56	9.333333	8.082904	9.562	9.519	9.167	0.2709	0.2682	0.2664	0.2650	0.2586	0.2572	0.2554	0.2527	9.500	9.148	9.089
57	9.500000	8.227241	9.729	9.686	9.334	0.2710	0.2682	0.2664	0.2651	0.2585	0.2572	0.2554	0.2526	9.667	9.314	9.255
58	9.666667	8.371579	9.896	9.853	9.500	0.2711	0.2683	0.2664	0.2651	0.2585	0.2572	0.2553	0.2525	9.833	9.480	9.422
59	9.833333	8.515916	10.062	10.020	9.667	0.2711	0.2683	0.2665	0.2651	0.2585	0.2571	0.2553	0.2525	10.000	9.647	9.588
60	10.00000	8.660254	10.229	10.187	9.834	0.2712	0.2684	0.2665	0.2651	0.2585	0.2571	0.2552	0.2524	10.167	9.813	9.755

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. *Figures in bold type are modified values,* see Section 25.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 *full dedendum splines.* If *the mating* spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 10–30 DEG PRESSURE ANGLE, FLAT ROOT SIDE FIT, 8/16 SPLINE PITCH

	Internal and External		Internal (see Drawing Data)							External (see Drawing Data)						
						s_v Min. Eff. Circ. Space Width 0.1963 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness 0.1963 Notes c & d						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.1	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.1
					Note e	Notes a & b								Note g	Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 350		
6	0.7500000	0.6495191	0.923	0.879	**0.664**	0.2019	0.2002	0.1991	0.1983	0.1943	0.1935	0.1924	0.1907	0.875	**0.659**	0.568
7	0.8750000	0.7577722	1.048	1.004	**0.777**	0.2020	0.2003	0.1991	0.1983	0.1943	0.1935	0.1923	0.1906	1.000	**0.772**	0.692
8	1.000000	0.8660254	1.173	1.129	**0.896**	0.2021	0.2003	0.1992	0.1983	0.1943	0.1934	0.1923	0.1905	1.125	**0.891**	0.817
9	1.125000	0.9742786	1.298	1.254	**1.016**	0.2021	0.2004	0.1992	0.1984	0.1942	0.1934	0.1922	0.1905	1.250	**1.011**	0.942
10	1.250000	1.082532	1.423	1.379	**1.138**	0.2022	0.2004	0.1992	0.1984	0.1942	0.1933	0.1922	0.1904	1.375	**1.133**	1.067
11	1.375000	1.190785	1.548	1.504	**1.260**	0.2023	0.2005	0.1993	0.1984	0.1942	0.1933	0.1921	0.1903	1.500	**1.255**	1.192
12	1.500000	1.299038	1.673	1.629	**1.383**	0.2023	0.2005	0.1993	0.1984	0.1942	0.1933	0.1921	0.1903	1.625	**1.378**	1.317
13	1.625000	1.407291	1.798	1.754	**1.506**	0.2024	0.2006	0.1994	0.1985	0.1941	0.1932	0.1920	0.1902	1.750	**1.501**	1.442
14	1.750000	1.515544	1.923	1.879	**1.629**	0.2025	0.2006	0.1994	0.1985	0.1941	0.1932	0.1920	0.1901	1.875	**1.624**	1.567
15	1.875000	1.623798	2.048	2.004	**1.753**	0.2025	0.2007	0.1994	0.1985	0.1941	0.1932	0.1919	0.1900	2.000	**1.748**	1.691
16	2.000000	1.732051	2.173	2.129	**1.877**	0.2026	0.2007	0.1995	0.1985	0.1941	0.1931	0.1919	0.1900	2.125	**1.872**	1.816
17	2.125000	1.840304	2.298	2.255	**2.001**	0.2027	0.2008	0.1995	0.1986	0.1940	0.1931	0.1918	0.1899	2.250	**1.996**	1.941
18	2.250000	1.948557	2.423	2.380	2.125	0.2028	0.2008	0.1995	0.1986	0.1940	0.1931	0.1918	0.1898	2.375	2.120	2.066
19	2.375000	2.056810	2.548	2.505	2.250	0.2028	0.2009	0.1996	0.1986	0.1940	0.1930	0.1917	0.1898	2.500	2.245	2.191
20	2.500000	2.165064	2.673	2.630	2.375	0.2029	0.2009	0.1996	0.1986	0.1940	0.1930	0.1917	0.1897	2.625	2.370	2.316
21	2.625000	2.273317	2.798	2.756	2.500	0.2030	0.2010	0.1996	0.1987	0.1939	0.1930	0.1916	0.1896	2.750	2.494	2.441
22	2.750000	2.381570	2.923	2.881	2.625	0.2030	0.2010	0.1997	0.1987	0.1939	0.1929	0.1916	0.1896	2.875	2.619	2.566
23	2.875000	2.489823	3.048	3.006	2.750	0.2031	0.2011	0.1997	0.1987	0.1939	0.1929	0.1915	0.1895	3.000	2.744	2.690
24	3.000000	2.598076	3.173	3.131	2.875	0.2032	0.2011	0.1997	0.1987	0.1939	0.1929	0.1915	0.1894	3.125	2.869	2.815
25	3.125000	2.706329	3.298	3.257	3.000	0.2032	0.2012	0.1998	0.1988	0.1938	0.1928	0.1914	0.1893	3.250	2.993	2.940
26	3.250000	2.814583	3.423	3.382	3.125	0.2033	0.2012	0.1998	0.1988	0.1938	0.1928	0.1914	0.1893	3.375	3.118	3.065
27	3.375000	2.922836	3.548	3.507	3.250	0.2034	0.2013	0.1998	0.1988	0.1938	0.1928	0.1913	0.1892	3.500	3.243	3.190
28	3.500000	3.031089	3.673	3.632	3.375	0.2035	0.2013	0.1999	0.1988	0.1938	0.1927	0.1913	0.1891	3.625	3.368	3.315
29	3.625000	3.139342	3.798	3.758	3.500	0.2035	0.2014	0.1999	0.1989	0.1937	0.1927	0.1912	0.1891	3.750	3.492	3.440
30	3.750000	3.247595	3.923	3.883	3.625	0.2036	0.2014	0.1999	0.1989	0.1937	0.1926	0.1912	0.1890	3.875	3.617	3.565
31	3.875000	3.355848	4.048	4.008	3.750	0.2037	0.2015	0.2000	0.1989	0.1937	0.1926	0.1911	0.1889	4.000	3.742	3.689
32	4.000000	3.464102	4.173	4.133	3.875	0.2037	0.2015	0.2000	0.1989	0.1937	0.1926	0.1911	0.1889	4.125	3.867	3.814
33	4.125000	3.572355	4.298	4.259	4.000	0.2038	0.2016	0.2001	0.1990	0.1936	0.1925	0.1910	0.1888	4.250	3.991	3.939
34	4.250000	3.680608	4.423	4.384	4.125	0.2039	0.2016	0.2001	0.1990	0.1936	0.1925	0.1910	0.1887	4.375	4.116	4.064
35	4.375000	3.788861	4.548	4.509	4.250	0.2039	0.2017	0.2001	0.1990	0.1936	0.1925	0.1909	0.1887	4.500	4.241	4.189
36	4.500000	3.897114	4.673	4.634	4.375	0.2040	0.2017	0.2002	0.1990	0.1936	0.1924	0.1909	0.1886	4.625	4.366	4.314
37	4.625000	4.005367	4.798	4.760	4.500	0.2041	0.2018	0.2002	0.1991	0.1935	0.1924	0.1908	0.1885	4.750	4.490	4.439
38	4.750000	4.113621	4.923	4.885	4.625	0.2042	0.2018	0.2002	0.1991	0.1935	0.1924	0.1908	0.1884	4.875	4.615	4.564
39	4.875000	4.221874	5.048	5.010	4.750	0.2042	0.2019	0.2003	0.1991	0.1935	0.1923	0.1907	0.1884	5.000	4.740	4.689
40	5.000000	4.330127	5.173	5.135	4.875	0.2043	0.2019	0.2003	0.1991	0.1935	0.1923	0.1907	0.1883	5.125	4.865	4.813
41	5.125000	4.438380	5.298	5.261	5.000	0.2044	0.2019	0.2003	0.1992	0.1934	0.1923	0.1907	0.1882	5.250	4.989	4.938
42	5.250000	4.546633	5.423	5.386	5.125	0.2044	0.2020	0.2004	0.1992	0.1934	0.1922	0.1906	0.1882	5.375	5.114	5.063
43	5.375000	4.654887	5.548	5.511	5.250	0.2045	0.2020	0.2004	0.1992	0.1934	0.1922	0.1906	0.1881	5.500	5.239	5.188
44	5.500000	4.763140	5.673	5.636	5.375	0.2046	0.2021	0.2004	0.1992	0.1934	0.1922	0.1905	0.1880	5.625	5.364	5.313
45	5.625000	4.871393	5.798	5.762	5.500	0.2046	0.2021	0.2005	0.1993	0.1933	0.1921	0.1905	0.1880	5.750	5.488	5.438
46	5.750000	4.979646	5.923	5.887	5.625	0.2047	0.2022	0.2005	0.1993	0.1933	0.1921	0.1904	0.1879	5.875	5.613	5.563
47	5.875000	5.087899	6.048	6.012	5.750	0.2048	0.2022	0.2005	0.1993	0.1933	0.1921	0.1904	0.1878	6.000	5.738	5.688
48	6.000000	5.196152	6.173	6.137	5.875	0.2049	0.2023	0.2006	0.1993	0.1933	0.1920	0.1903	0.1877	6.125	5.863	5.812
49	6.125000	5.304406	6.298	6.263	6.000	0.2049	0.2023	0.2006	0.1994	0.1932	0.1920	0.1903	0.1877	6.250	5.987	5.937
50	6.250000	5.412659	6.423	6.388	6.125	0.2050	0.2024	0.2006	0.1994	0.1932	0.1919	0.1902	0.1876	6.375	6.112	6.062
51	6.375000	5.520912	6.548	6.513	6.250	0.2051	0.2024	0.2007	0.1994	0.1932	0.1919	0.1902	0.1875	6.500	6.237	6.187
52	6.500000	5.629165	6.673	6.638	6.375	0.2051	0.2025	0.2007	0.1994	0.1932	0.1919	0.1901	0.1875	6.625	6.362	6.312
53	6.625000	5.737418	6.798	6.764	6.500	0.2052	0.2025	0.2008	0.1995	0.1931	0.1918	0.1901	0.1874	6.750	6.486	6.437
54	6.750000	5.845671	6.923	6.889	6.625	0.2053	0.2026	0.2008	0.1995	0.1931	0.1918	0.1900	0.1873	6.875	6.611	6.562
55	6.875000	5.953925	7.048	7.014	6.750	0.2053	0.2026	0.2008	0.1995	0.1931	0.1918	0.1900	0.1872	7.000	6.736	6.687
56	7.000000	6.062178	7.173	7.139	6.875	0.2054	0.2027	0.2009	0.1995	0.1931	0.1917	0.1899	0.1872	7.125	6.861	6.811
57	7.125000	6.170431	7.298	7.265	7.000	0.2055	0.2027	0.2009	0.1996	0.1930	0.1917	0.1899	0.1871	7.250	6.985	6.936
58	7.250000	6.278684	7.423	7.390	7.125	0.2056	0.2028	0.2009	0.1996	0.1930	0.1917	0.1898	0.1870	7.375	7.110	7.061
59	7.375000	6.386937	7.548	7.515	7.250	0.2056	0.2028	0.2010	0.1996	0.1930	0.1916	0.1898	0.1870	7.500	7.235	7.186
60	7.500000	6.495190	7.673	7.640	7.375	0.2057	0.2029	0.2010	0.1996	0.1930	0.1916	0.1897	0.1869	7.625	7.360	7.311

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

[illegible] ximum effective space width, and REF minimum effec- see Table 64.

e. Figures in bold type are modified values, see Section 25.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15–1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 11—30 DEG PRESSURE ANGLE, FLAT ROOT SIDE FIT, 10/20 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.1571 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.1571 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.1	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.1
					Note e	Notes a & b								Note g	Note e	
Tolerance in Ten Thousandths					+50 -0									+0 -300		
6	0.6000000	0.5196152	0.739	0.704	**0.534**	0.1624	0.1608	0.1598	0.1590	0.1552	0.1544	0.1534	0.1518	0.700	**0.529**	0.452
7	0.7000000	0.6062178	0.839	0.804	**0.622**	0.1625	0.1609	0.1598	0.1590	0.1552	0.1544	0.1533	0.1517	0.800	**0.617**	0.552
8	0.8000000	0.6928203	0.939	0.904	**0.717**	0.1625	0.1609	0.1598	0.1590	0.1552	0.1544	0.1533	0.1517	0.900	**0.712**	0.652
9	0.9000000	0.7794229	1.039	1.004	**0.814**	0.1626	0.1609	0.1598	0.1590	0.1552	0.1544	0.1533	0.1516	1.000	**0.809**	0.751
10	1.000000	0.8660254	1.139	1.104	**0.911**	0.1626	0.1610	0.1599	0.1591	0.1551	0.1543	0.1532	0.1516	1.100	**0.906**	0.851
11	1.100000	0.9526279	1.239	1.204	**1.008**	0.1627	0.1610	0.1599	0.1591	0.1551	0.1543	0.1532	0.1515	1.200	**1.003**	0.951
12	1.200000	1.039230	1.339	1.304	**1.107**	0.1627	0.1611	0.1599	0.1591	0.1551	0.1543	0.1531	0.1515	1.300	**1.102**	1.051
13	1.300000	1.125833	1.439	1.404	**1.205**	0.1628	0.1611	0.1600	0.1591	0.1551	0.1542	0.1531	0.1514	1.400	**1.200**	1.151
14	1.400000	1.212436	1.539	1.504	**1.304**	0.1629	0.1611	0.1600	0.1591	0.1551	0.1542	0.1531	0.1513	1.500	**1.299**	1.251
15	1.500000	1.299038	1.639	1.604	**1.403**	0.1629	0.1612	0.1600	0.1592	0.1550	0.1542	0.1530	0.1513	1.600	**1.398**	1.351
16	1.600000	1.385641	1.739	1.704	**1.502**	0.1630	0.1612	0.1600	0.1592	0.1550	0.1542	0.1530	0.1512	1.700	**1.497**	1.451
17	1.700000	1.472243	1.839	1.804	**1.601**	0.1630	0.1612	0.1601	0.1592	0.1550	0.1541	0.1530	0.1512	1.800	**1.596**	1.551
18	1.800000	1.558846	1.939	1.904	1.700	0.1631	0.1613	0.1601	0.1592	0.1550	0.1541	0.1529	0.1511	1.900	1.696	1.651
19	1.900000	1.645448	2.039	2.004	1.800	0.1631	0.1613	0.1601	0.1592	0.1550	0.1541	0.1529	0.1511	2.000	1.796	1.751
20	2.000000	1.732051	2.139	2.104	1.900	0.1632	0.1614	0.1601	0.1593	0.1549	0.1541	0.1528	0.1510	2.100	1.896	1.850
21	2.100000	1.818653	2.239	2.205	2.000	0.1632	0.1614	0.1602	0.1593	0.1549	0.1540	0.1528	0.1510	2.200	1.995	1.950
22	2.200000	1.905256	2.339	2.305	2.100	0.1633	0.1614	0.1602	0.1593	0.1549	0.1540	0.1528	0.1509	2.300	2.095	2.050
23	2.300000	1.991858	2.439	2.405	2.200	0.1633	0.1615	0.1602	0.1593	0.1549	0.1540	0.1527	0.1509	2.400	2.195	2.150
24	2.400000	2.078461	2.539	2.505	2.300	0.1634	0.1615	0.1602	0.1593	0.1549	0.1540	0.1527	0.1508	2.500	2.295	2.250
25	2.500000	2.165064	2.639	2.605	2.400	0.1634	0.1615	0.1603	0.1594	0.1548	0.1539	0.1527	0.1507	2.600	2.395	2.350
26	2.600000	2.251666	2.739	2.706	2.500	0.1635	0.1616	0.1603	0.1594	0.1548	0.1539	0.1526	0.1507	2.700	2.494	2.450
27	2.700000	2.338269	2.839	2.806	2.600	0.1636	0.1616	0.1603	0.1594	0.1548	0.1539	0.1526	0.1506	2.800	2.594	2.550
28	2.800000	2.424871	2.939	2.906	2.700	0.1636	0.1617	0.1604	0.1594	0.1548	0.1538	0.1525	0.1506	2.900	2.694	2.650
29	2.900000	2.511474	3.039	3.006	2.800	0.1637	0.1617	0.1604	0.1594	0.1548	0.1538	0.1525	0.1505	3.000	2.794	2.750
30	3.000000	2.598076	3.139	3.106	2.900	0.1637	0.1617	0.1604	0.1595	0.1547	0.1538	0.1525	0.1505	3.100	2.894	2.850
31	3.100000	2.684679	3.239	3.207	3.000	0.1638	0.1618	0.1604	0.1595	0.1547	0.1538	0.1524	0.1504	3.200	2.993	2.949
32	3.200000	2.771281	3.339	3.307	3.100	0.1638	0.1618	0.1605	0.1595	0.1547	0.1537	0.1524	0.1504	3.300	3.093	3.049
33	3.300000	2.857884	3.439	3.407	3.200	0.1639	0.1618	0.1605	0.1595	0.1547	0.1537	0.1524	0.1503	3.400	3.193	3.149
34	3.400000	2.944486	3.539	3.507	3.300	0.1639	0.1619	0.1605	0.1595	0.1547	0.1537	0.1523	0.1503	3.500	3.293	3.249
35	3.500000	3.031089	3.639	3.607	3.400	0.1640	0.1619	0.1605	0.1595	0.1547	0.1537	0.1523	0.1502	3.600	3.393	3.349
36	3.600000	3.117691	3.739	3.708	3.500	0.1640	0.1620	0.1606	0.1596	0.1546	0.1536	0.1522	0.1502	3.700	3.492	3.449
37	3.700000	3.204294	3.839	3.808	3.600	0.1641	0.1620	0.1606	0.1596	0.1546	0.1536	0.1522	0.1501	3.800	3.592	3.549
38	3.800000	3.290897	3.939	3.908	3.700	0.1642	0.1620	0.1606	0.1596	0.1546	0.1536	0.1522	0.1500	3.900	3.692	3.649
39	3.900000	3.377499	4.039	4.008	3.800	0.1642	0.1621	0.1607	0.1596	0.1546	0.1535	0.1521	0.1500	4.000	3.792	3.749
40	4.000000	3.464102	4.139	4.108	3.900	0.1643	0.1621	0.1607	0.1596	0.1546	0.1535	0.1521	0.1499	4.100	3.892	3.849
41	4.100000	3.550704	4.239	4.209	4.000	0.1643	0.1621	0.1607	0.1597	0.1545	0.1535	0.1521	0.1499	4.200	3.991	3.949
42	4.200000	3.637307	4.339	4.309	4.100	0.1644	0.1622	0.1607	0.1597	0.1545	0.1535	0.1520	0.1498	4.300	4.091	4.048
43	4.300000	3.723909	4.439	4.409	4.200	0.1644	0.1622	0.1608	0.1597	0.1545	0.1534	0.1520	0.1498	4.400	4.191	4.148
44	4.400000	3.810512	4.539	4.509	4.300	0.1645	0.1623	0.1608	0.1597	0.1545	0.1534	0.1519	0.1497	4.500	4.291	4.248
45	4.500000	3.897114	4.639	4.609	4.400	0.1645	0.1623	0.1608	0.1597	0.1545	0.1534	0.1519	0.1497	4.600	4.391	4.348
46	4.600000	3.983717	4.739	4.710	4.500	0.1646	0.1623	0.1608	0.1598	0.1544	0.1534	0.1519	0.1496	4.700	4.490	4.448
47	4.700000	4.070319	4.839	4.810	4.600	0.1646	0.1624	0.1609	0.1598	0.1544	0.1533	0.1518	0.1496	4.800	4.590	4.548
48	4.800000	4.156922	4.939	4.910	4.700	0.1647	0.1624	0.1609	0.1598	0.1544	0.1533	0.1518	0.1495	4.900	4.690	4.648
49	4.900000	4.243524	5.039	5.010	4.800	0.1647	0.1625	0.1609	0.1598	0.1544	0.1533	0.1517	0.1495	5.000	4.790	4.748
50	5.000000	4.330127	5.139	5.110	4.900	0.1648	0.1625	0.1609	0.1598	0.1544	0.1532	0.1517	0.1494	5.100	4.890	4.848
51	5.100000	4.416730	5.239	5.211	5.000	0.1649	0.1625	0.1610	0.1599	0.1543	0.1532	0.1517	0.1493	5.200	4.989	4.948
52	5.200000	4.503332	5.339	5.311	5.100	0.1649	0.1626	0.1610	0.1599	0.1543	0.1532	0.1516	0.1493	5.300	5.089	5.047
53	5.300000	4.589935	5.439	5.411	5.200	0.1650	0.1626	0.1610	0.1599	0.1543	0.1532	0.1516	0.1492	5.400	5.189	5.147
54	5.400000	4.676537	5.539	5.511	5.300	0.1650	0.1626	0.1611	0.1599	0.1543	0.1531	0.1516	0.1492	5.500	5.289	5.247
55	5.500000	4.763140	5.639	5.611	5.400	0.1651	0.1627	0.1611	0.1599	0.1543	0.1531	0.1515	0.1491	5.600	5.389	5.347
56	5.600000	4.849742	5.739	5.712	5.500	0.1651	0.1627	0.1611	0.1599	0.1543	0.1531	0.1515	0.1491	5.700	5.488	5.447
57	5.700000	4.936345	5.839	5.812	5.600	0.1652	0.1628	0.1611	0.1600	0.1542	0.1531	0.1514	0.1490	5.800	5.588	5.547
58	5.800000	5.022947	5.939	5.912	5.700	0.1652	0.1628	0.1612	0.1600	0.1542	0.1530	0.1514	0.1490	5.900	5.688	5.647
59	5.900000	5.109550	6.039	6.012	5.800	0.1653	0.1628	0.1612	0.1600	0.1542	0.1530	0.1514	0.1489	6.000	5.788	5.747
60	6.000000	5.196152	6.139	6.112	5.900	0.1653	0.1629	0.1612	0.1600	0.1542	0.1530	0.1513	0.1489	6.100	5.888	5.847

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. Use maximum effective space width, and REF minimum effective tooth thickness.

e. Figures in bold type are modified values, see Section 25.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 12—30 DEG PRESSURE ANGLE, FLAT ROOT SIDE FIT, 12/24 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.1309 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness 0.1309 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.1	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.1
					Note e	Notes a & b								Note g	Note e	
Tolerance in Ten Thousandths					+50 -0									+0 -270		
6	0.5000000	0.4330127	0.617	0.588	**0.448**	0.1362	0.1346	0.1336	0.1328	0.1290	0.1282	0.1272	0.1256	0.583	**0.443**	0.374
7	0.5833333	0.5051814	0.700	0.671	**0.520**	0.1363	0.1347	0.1336	0.1328	0.1290	0.1282	0.1271	0.1255	0.667	**0.515**	0.458
8	0.6666667	0.5773502	0.783	0.754	**0.598**	0.1363	0.1347	0.1336	0.1328	0.1290	0.1282	0.1271	0.1255	0.750	**0.593**	0.541
9	0.7500000	0.6495191	0.867	0.838	**0.678**	0.1364	0.1347	0.1336	0.1328	0.1290	0.1282	0.1271	0.1254	0.833	**0.673**	0.624
10	0.8333333	0.7216878	0.950	0.921	**0.759**	0.1364	0.1348	0.1337	0.1329	0.1289	0.1281	0.1270	0.1254	0.917	**0.754**	0.707
11	0.9166667	0.7938566	1.033	1.004	**0.841**	0.1365	0.1348	0.1337	0.1329	0.1289	0.1281	0.1270	0.1253	1.000	**0.836**	0.790
12	1.000000	0.8660254	1.117	1.088	**0.922**	0.1365	0.1349	0.1337	0.1329	0.1289	0.1281	0.1269	0.1253	1.083	**0.917**	0.874
13	1.083333	0.9381941	1.200	1.171	**1.005**	0.1366	0.1349	0.1338	0.1329	0.1289	0.1280	0.1269	0.1252	1.167	**1.000**	0.957
14	1.166667	1.010363	1.283	1.254	**1.087**	0.1367	0.1349	0.1338	0.1329	0.1289	0.1280	0.1269	0.1251	1.250	**1.082**	1.040
15	1.250000	1.082532	1.367	1.338	**1.169**	0.1367	0.1350	0.1338	0.1330	0.1288	0.1280	0.1268	0.1251	1.333	**1.164**	1.123
16	1.333333	1.154701	1.450	1.421	**1.252**	0.1368	0.1350	0.1338	0.1330	0.1288	0.1280	0.1268	0.1250	1.417	**1.247**	1.207
17	1.416667	1.226869	1.533	1.504	**1.334**	0.1368	0.1350	0.1339	0.1330	0.1288	0.1279	0.1268	0.1250	1.500	**1.329**	1.290
18	1.500000	1.299038	1.617	1.588	**1.417**	0.1369	0.1351	0.1339	0.1330	0.1288	0.1279	0.1267	0.1249	1.583	**1.412**	1.373
19	1.583333	1.371207	1.700	1.671	**1.500**	0.1369	0.1351	0.1339	0.1330	0.1288	0.1279	0.1267	0.1249	1.667	**1.496**	1.456
20	1.666667	1.443376	1.783	1.754	**1.584**	0.1370	0.1352	0.1339	0.1331	0.1287	0.1279	0.1266	0.1248	1.750	**1.579**	1.540
21	1.750000	1.515544	1.867	1.838	**1.667**	0.1370	0.1352	0.1340	0.1331	0.1287	0.1278	0.1266	0.1248	1.833	**1.662**	1.623
22	1.833333	1.587713	1.950	1.921	**1.750**	0.1371	0.1352	0.1340	0.1331	0.1287	0.1278	0.1266	0.1247	1.917	**1.746**	1.706
23	1.916667	1.659882	2.033	2.004	**1.834**	0.1371	0.1353	0.1340	0.1331	0.1287	0.1278	0.1265	0.1247	2.000	**1.829**	1.789
24	2.000000	1.732051	2.117	2.088	**1.917**	0.1372	0.1353	0.1340	0.1331	0.1287	0.1278	0.1265	0.1246	2.083	**1.912**	1.873
25	2.083333	1.804220	2.200	2.171	**2.000**	0.1372	0.1353	0.1341	0.1332	0.1286	0.1277	0.1265	0.1245	2.167	**1.995**	1.956
26	2.166667	1.876388	2.283	2.255	**2.084**	0.1373	0.1354	0.1341	0.1332	0.1286	0.1277	0.1264	0.1245	2.250	**2.079**	2.039
27	2.250000	1.948557	2.367	2.338	**2.167**	0.1374	0.1354	0.1341	0.1332	0.1286	0.1277	0.1264	0.1244	2.333	**2.162**	2.122
28	2.333333	2.020726	2.450	2.422	**2.250**	0.1374	0.1355	0.1342	0.1332	0.1286	0.1276	0.1263	0.1244	2.417	**2.245**	2.206
29	2.416667	2.092895	2.533	2.505	**2.334**	0.1375	0.1355	0.1342	0.1332	0.1286	0.1276	0.1263	0.1243	2.500	**2.328**	2.289
30	2.500000	2.165064	2.617	2.589	**2.417**	0.1375	0.1355	0.1342	0.1333	0.1285	0.1276	0.1263	0.1243	2.583	**2.411**	2.372
31	2.583333	2.237232	2.700	2.672	**2.500**	0.1376	0.1356	0.1342	0.1333	0.1285	0.1276	0.1262	0.1242	2.667	**2.494**	2.455
32	2.666667	2.309401	2.783	2.756	**2.584**	0.1376	0.1356	0.1343	0.1333	0.1285	0.1275	0.1262	0.1242	2.750	**2.578**	2.539
33	2.750000	2.381570	2.867	2.839	**2.667**	0.1377	0.1356	0.1343	0.1333	0.1285	0.1275	0.1262	0.1241	2.833	**2.661**	2.622
34	2.833333	2.453739	2.950	2.923	**2.750**	0.1377	0.1357	0.1343	0.1333	0.1285	0.1275	0.1261	0.1241	2.917	**2.744**	2.705
35	2.916667	2.525907	3.033	3.006	**2.834**	0.1378	0.1357	0.1343	0.1333	0.1285	0.1275	0.1261	0.1240	3.000	**2.827**	2.788
36	3.000000	2.598076	3.117	3.090	**2.917**	0.1378	0.1358	0.1344	0.1334	0.1284	0.1274	0.1260	0.1240	3.083	**2.910**	2.871
37	3.083333	2.670245	3.200	3.173	**3.000**	0.1379	0.1358	0.1344	0.1334	0.1284	0.1274	0.1260	0.1239	3.167	**2.993**	2.955
38	3.166667	2.742414	3.283	3.257	**3.084**	0.1380	0.1358	0.1344	0.1334	0.1284	0.1274	0.1260	0.1238	3.250	**3.077**	3.038
39	3.250000	2.814583	3.367	3.340	**3.167**	0.1380	0.1359	0.1345	0.1334	0.1284	0.1273	0.1259	0.1238	3.333	**3.160**	3.121
40	3.333333	2.886751	3.450	3.424	**3.250**	0.1381	0.1359	0.1345	0.1334	0.1284	0.1273	0.1259	0.1237	3.417	**3.243**	3.204
41	3.416667	2.958920	3.533	3.507	**3.334**	0.1381	0.1359	0.1345	0.1335	0.1283	0.1273	0.1259	0.1237	3.500	**3.326**	3.288
42	3.500000	3.031089	3.617	3.591	**3.417**	0.1382	0.1360	0.1345	0.1335	0.1283	0.1273	0.1258	0.1236	3.583	**3.409**	3.371
43	3.583333	3.103258	3.700	3.674	**3.500**	0.1382	0.1360	0.1346	0.1335	0.1283	0.1272	0.1258	0.1236	3.667	**3.492**	3.454
44	3.666667	3.175426	3.783	3.758	**3.584**	0.1383	0.1361	0.1346	0.1335	0.1283	0.1272	0.1257	0.1235	3.750	**3.576**	3.537
45	3.750000	3.247595	3.867	3.841	**3.667**	0.1383	0.1361	0.1346	0.1335	0.1283	0.1272	0.1257	0.1235	3.833	**3.659**	3.621
46	3.833333	3.319764	3.950	3.925	**3.750**	0.1384	0.1361	0.1346	0.1336	0.1282	0.1272	0.1257	0.1234	3.917	**3.742**	3.704
47	3.916667	3.391933	4.033	4.008	**3.834**	0.1384	0.1362	0.1347	0.1336	0.1282	0.1271	0.1256	0.1234	4.000	**3.825**	3.787
48	4.000000	3.464102	4.117	4.092	**3.917**	0.1385	0.1362	0.1347	0.1336	0.1282	0.1271	0.1256	0.1233	4.083	**3.908**	3.870
49	4.083333	3.536270	4.200	4.175	**4.000**	0.1385	0.1363	0.1347	0.1336	0.1282	0.1271	0.1255	0.1233	4.167	**3.991**	3.954
50	4.166667	3.608439	4.283	4.259	**4.084**	0.1386	0.1363	0.1347	0.1336	0.1282	0.1270	0.1255	0.1232	4.250	**4.075**	4.037
51	4.250000	3.680608	4.367	4.342	**4.167**	0.1387	0.1363	0.1348	0.1337	0.1281	0.1270	0.1255	0.1231	4.333	**4.158**	4.120
52	4.333333	3.752777	4.450	4.426	**4.250**	0.1387	0.1364	0.1348	0.1337	0.1281	0.1270	0.1254	0.1231	4.417	**4.241**	4.203
53	4.416667	3.824946	4.533	4.509	**4.334**	0.1388	0.1364	0.1348	0.1337	0.1281	0.1270	0.1254	0.1230	4.500	**4.324**	4.287
54	4.500000	3.897114	4.617	4.593	**4.417**	0.1388	0.1364	0.1349	0.1337	0.1281	0.1269	0.1254	0.1230	4.583	**4.407**	4.370
55	4.583333	3.969283	4.700	4.676	**4.500**	0.1389	0.1365	0.1349	0.1337	0.1281	0.1269	0.1253	0.1229	4.667	**4.490**	4.453
56	4.666667	4.041452	4.783	4.760	**4.584**	0.1389	0.1365	0.1349	0.1337	0.1281	0.1269	0.1253	0.1229	4.750	**4.574**	4.536
57	4.750000	4.113621	4.867	4.843	**4.667**	0.1390	0.1366	0.1349	0.1338	0.1280	0.1269	0.1252	0.1228	4.833	**4.657**	4.620
58	4.833333	4.185789	4.950	4.927	**4.750**	0.1390	0.1366	0.1350	0.1338	0.1280	0.1268	0.1252	0.1228	4.917	**4.740**	4.703
59	4.916667	4.257958	5.033	5.010	**4.834**	0.1391	0.1366	0.1350	0.1338	0.1280	0.1268	0.1252	0.1227	5.000	**4.823**	4.786
60	5.000000	4.330127	5.117	5.094	**4.917**	0.1391	0.1367	0.1350	0.1338	0.1280	0.1268	0.1251	0.1227	5.083	**4.906**	4.869

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 13–30 DEG PRESSURE ANGLE, FLAT ROOT SIDE FIT, 16/32 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.0982 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.0982 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.1	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.1
					Note e	Notes a & b								Note g	Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 220		
6	0.3750000	0.3247594	0.463	0.442	**0.339**	0.1032	0.1017	0.1007	0.1000	0.0964	0.0957	0.0947	0.0932	0.437	**0.334**	0.278
7	0.4375000	0.3788861	0.526	0.504	**0.393**	0.1033	0.1017	0.1007	0.1000	0.0964	0.0957	0.0947	0.0931	0.500	**0.388**	0.340
8	0.5000000	0.4330127	0.588	0.567	**0.449**	0.1033	0.1018	0.1008	0.1000	0.0964	0.0956	0.0946	0.0931	0.562	**0.444**	0.403
9	0.5625000	0.4871393	0.651	0.629	**0.509**	0.1033	0.1018	0.1008	0.1000	0.0964	0.0956	0.0946	0.0931	0.625	**0.504**	0.465
10	0.6250000	0.5412659	0.713	0.692	**0.570**	0.1034	0.1018	0.1008	0.1000	0.0964	0.0956	0.0946	0.0930	0.687	**0.565**	0.528
11	0.6875000	0.5953925	0.776	0.754	**0.631**	0.1034	0.1019	0.1008	0.1001	0.0963	0.0956	0.0945	0.0930	0.750	**0.626**	0.590
12	0.7500000	0.6495191	0.838	0.817	**0.692**	0.1035	0.1019	0.1008	0.1001	0.0963	0.0956	0.0945	0.0929	0.812	**0.687**	0.653
13	0.8125000	0.7036456	0.901	0.879	**0.754**	0.1035	0.1019	0.1008	0.1001	0.0963	0.0956	0.0945	0.0929	0.875	**0.749**	0.715
14	0.8750000	0.7577722	0.963	0.942	**0.815**	0.1035	0.1019	0.1009	0.1001	0.0963	0.0955	0.0945	0.0929	0.937	**0.810**	0.777
15	0.9375000	0.8118988	1.026	1.004	**0.877**	0.1036	0.1020	0.1009	0.1001	0.0963	0.0955	0.0944	0.0928	1.000	**0.872**	0.840
16	1.000000	0.8660254	1.088	1.067	**0.939**	0.1036	0.1020	0.1009	0.1001	0.0963	0.0955	0.0944	0.0928	1.062	**0.934**	0.902
17	1.062500	0.9201520	1.151	1.129	**1.001**	0.1036	0.1020	0.1009	0.1001	0.0963	0.0955	0.0944	0.0928	1.125	**0.996**	0.965
18	1.125000	0.9742786	1.213	1.192	**1.063**	0.1037	0.1020	0.1009	0.1001	0.0963	0.0955	0.0944	0.0927	1.187	**1.058**	1.027
19	1.187500	1.028405	1.276	1.254	1.125	0.1037	0.1021	0.1010	0.1002	0.0962	0.0954	0.0943	0.0927	1.250	1.121	1.090
20	1.250000	1.082532	1.338	1.317	1.188	0.1038	0.1021	0.1010	0.1002	0.0962	0.0954	0.0943	0.0926	1.312	1.183	1.152
21	1.312500	1.136658	1.401	1.379	1.250	0.1038	0.1021	0.1010	0.1002	0.0962	0.0954	0.0943	0.0926	1.375	1.246	1.214
22	1.375000	1.190785	1.463	1.442	1.313	0.1038	0.1021	0.1010	0.1002	0.0962	0.0954	0.0943	0.0926	1.437	1.308	1.277
23	1.437500	1.244912	1.526	1.504	1.375	0.1039	0.1022	0.1010	0.1002	0.0962	0.0954	0.0942	0.0925	1.500	1.371	1.339
24	1.500000	1.299038	1.588	1.567	1.438	0.1039	0.1022	0.1011	0.1002	0.0962	0.0953	0.0942	0.0925	1.562	1.433	1.402
25	1.562500	1.353165	1.651	1.629	1.500	0.1039	0.1022	0.1011	0.1002	0.0962	0.0953	0.0942	0.0925	1.625	1.496	1.464
26	1.625000	1.407291	1.713	1.692	1.563	0.1040	0.1023	0.1011	0.1003	0.0961	0.0953	0.0941	0.0924	1.687	1.558	1.527
27	1.687500	1.461418	1.776	1.754	1.625	0.1040	0.1023	0.1011	0.1003	0.0961	0.0953	0.0941	0.0924	1.750	1.621	1.589
28	1.750000	1.515544	1.838	1.817	1.688	0.1041	0.1023	0.1011	0.1003	0.0961	0.0953	0.0941	0.0923	1.812	1.683	1.651
29	1.812500	1.569671	1.901	1.879	1.750	0.1041	0.1023	0.1012	0.1003	0.0961	0.0952	0.0941	0.0923	1.875	1.746	1.714
30	1.875000	1.623798	1.963	1.942	1.813	0.1041	0.1024	0.1012	0.1003	0.0961	0.0952	0.0940	0.0923	1.937	1.808	1.776
31	1.937500	1.677924	2.026	2.004	1.875	0.1042	0.1024	0.1012	0.1003	0.0961	0.0952	0.0940	0.0922	2.000	1.871	1.839
32	2.000000	1.732051	2.088	2.067	1.938	0.1042	0.1024	0.1012	0.1003	0.0961	0.0952	0.0940	0.0922	2.062	1.933	1.901
33	2.062500	1.786177	2.151	2.130	2.000	0.1043	0.1024	0.1012	0.1003	0.0961	0.0952	0.0940	0.0921	2.125	1.995	1.964
34	2.125000	1.840304	2.213	2.192	2.063	0.1043	0.1025	0.1012	0.1004	0.0960	0.0952	0.0939	0.0921	2.187	2.058	2.026
35	2.187500	1.894431	2.276	2.255	2.125	0.1043	0.1025	0.1013	0.1004	0.0960	0.0951	0.0939	0.0921	2.250	2.120	2.089
36	2.250000	1.948557	2.338	2.317	2.188	0.1044	0.1025	0.1013	0.1004	0.0960	0.0951	0.0939	0.0920	2.312	2.183	2.151
37	2.312500	2.002684	2.401	2.380	2.250	0.1044	0.1025	0.1013	0.1004	0.0960	0.0951	0.0939	0.0920	2.375	2.245	2.213
38	2.375000	2.056810	2.463	2.443	2.313	0.1044	0.1026	0.1013	0.1004	0.0960	0.0951	0.0938	0.0920	2.437	2.307	2.276
39	2.437500	2.110937	2.526	2.505	2.375	0.1045	0.1026	0.1013	0.1004	0.0960	0.0951	0.0938	0.0919	2.500	2.370	2.338
40	2.500000	2.165064	2.588	2.568	2.438	0.1045	0.1026	0.1014	0.1004	0.0960	0.0950	0.0938	0.0919	2.562	2.432	2.401
41	2.562500	2.219190	2.651	2.631	2.500	0.1046	0.1027	0.1014	0.1005	0.0959	0.0950	0.0937	0.0918	2.625	2.494	2.463
42	2.625000	2.273317	2.713	2.693	2.563	0.1046	0.1027	0.1014	0.1005	0.0959	0.0950	0.0937	0.0918	2.687	2.557	2.526
43	2.687500	2.327443	2.776	2.756	2.625	0.1046	0.1027	0.1014	0.1005	0.0959	0.0950	0.0937	0.0918	2.750	2.619	2.588
44	2.750000	2.381570	2.838	2.818	2.688	0.1047	0.1027	0.1014	0.1005	0.0959	0.0950	0.0937	0.0917	2.812	2.682	2.650
45	2.812500	2.435696	2.901	2.881	2.750	0.1047	0.1028	0.1015	0.1005	0.0959	0.0949	0.0936	0.0917	2.875	2.744	2.713
46	2.875000	2.489823	2.963	2.944	2.813	0.1047	0.1028	0.1015	0.1005	0.0959	0.0949	0.0936	0.0917	2.937	2.806	2.775
47	2.937500	2.543950	3.026	3.006	2.875	0.1048	0.1028	0.1015	0.1005	0.0959	0.0949	0.0936	0.0916	3.000	2.869	2.838
48	3.000000	2.598076	3.088	3.069	2.938	0.1048	0.1028	0.1015	0.1006	0.0958	0.0949	0.0936	0.0916	3.062	2.931	2.900
49	3.062500	2.652203	3.151	3.132	3.000	0.1049	0.1029	0.1015	0.1006	0.0958	0.0949	0.0935	0.0915	3.125	2.993	2.963
50	3.125000	2.706329	3.213	3.194	3.063	0.1049	0.1029	0.1015	0.1006	0.0958	0.0949	0.0935	0.0915	3.187	3.056	3.025
51	3.187500	2.760456	3.276	3.257	3.125	0.1049	0.1029	0.1016	0.1006	0.0958	0.0948	0.0935	0.0915	3.250	3.118	3.087
52	3.250000	2.814583	3.338	3.319	3.188	0.1050	0.1029	0.1016	0.1006	0.0958	0.0948	0.0935	0.0914	3.312	3.181	3.150
53	3.312500	2.868709	3.401	3.382	3.250	0.1050	0.1030	0.1016	0.1006	0.0958	0.0948	0.0934	0.0914	3.375	3.243	3.212
54	3.375000	2.922836	3.463	3.445	3.313	0.1051	0.1030	0.1016	0.1006	0.0958	0.0948	0.0934	0.0913	3.437	3.305	3.275
55	3.437500	2.976962	3.526	3.507	3.375	0.1051	0.1030	0.1016	0.1006	0.0958	0.0948	0.0934	0.0913	3.500	3.368	3.337
56	3.500000	3.031089	3.588	3.570	3.438	0.1051	0.1030	0.1017	0.1007	0.0957	0.0947	0.0934	0.0913	3.562	3.430	3.400
57	3.562500	3.085215	3.651	3.633	3.500	0.1052	0.1031	0.1017	0.1007	0.0957	0.0947	0.0933	0.0912	3.625	3.492	3.462
58	3.625000	3.139342	3.713	3.695	3.563	0.1052	0.1031	0.1017	0.1007	0.0957	0.0947	0.0933	0.0912	3.687	3.555	3.524
59	3.687500	3.193469	3.776	3.758	3.625	0.1052	0.1031	0.1017	0.1007	0.0957	0.0947	0.0933	0.0912	3.750	3.617	3.587
60	3.750000	3.247595	3.838	3.820	3.688	0.1053	0.1032	0.1017	0.1007	0.0957	0.0947	0.0932	0.0911	3.812	3.680	3.649

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15–1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 14—30 DEG PRESSURE ANGLE, FLAT ROOT SIDE FIT, 20/40 SPLINE PITCH

	Internal and External		Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	S_V Min. Eff. Circ. Space Width = 0.0785 Notes c & d				t_V Max. Eff. Circ. Tooth Thickness = 0.0785 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.1	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.1
					Note e	Notes a & b								Note g	Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 200		
6	0.3000000	0.2598076	0.372	0.354	**0.274**	0.0835	0.0820	0.0810	0.0803	0.0767	0.0760	0.0750	0.0735	0.350	**0.269**	0.220
7	0.3500000	0.3031089	0.422	0.404	**0.318**	0.0836	0.0820	0.0810	0.0803	0.0767	0.0760	0.0750	0.0734	0.400	**0.313**	0.270
8	0.4000000	0.3464102	0.472	0.454	**0.361**	0.0836	0.0821	0.0811	0.0803	0.0767	0.0759	0.0749	0.0734	0.450	**0.356**	0.320
9	0.4500000	0.3897114	0.522	0.504	**0.408**	0.0836	0.0821	0.0811	0.0803	0.0767	0.0759	0.0749	0.0734	0.500	**0.403**	0.370
10	0.5000000	0.4330127	0.572	0.554	**0.456**	0.0837	0.0821	0.0811	0.0803	0.0767	0.0759	0.0749	0.0733	0.550	**0.451**	0.420
11	0.5500000	0.4763140	0.622	0.604	**0.505**	0.0837	0.0822	0.0811	0.0804	0.0766	0.0759	0.0748	0.0733	0.600	**0.500**	0.469
12	0.6000000	0.5196152	0.672	0.654	**0.554**	0.0838	0.0822	0.0811	0.0804	0.0766	0.0759	0.0748	0.0732	0.650	**0.549**	0.519
13	0.6500000	0.5629165	0.722	0.704	**0.603**	0.0838	0.0822	0.0811	0.0804	0.0766	0.0759	0.0748	0.0732	0.700	**0.598**	0.569
14	0.7000000	0.6062178	0.772	0.754	**0.653**	0.0838	0.0822	0.0812	0.0804	0.0766	0.0758	0.0748	0.0732	0.750	**0.648**	0.619
15	0.7500000	0.6495191	0.822	0.804	**0.702**	0.0839	0.0823	0.0812	0.0804	0.0766	0.0758	0.0747	0.0731	0.800	**0.697**	0.669
16	0.8000000	0.6928203	0.872	0.854	**0.752**	0.0839	0.0823	0.0812	0.0804	0.0766	0.0758	0.0747	0.0731	0.850	**0.747**	0.719
17	0.8500000	0.7361216	0.922	0.904	**0.801**	0.0839	0.0823	0.0812	0.0804	0.0766	0.0758	0.0747	0.0731	0.900	**0.796**	0.769
18	0.9000000	0.7794229	0.972	0.954	**0.851**	0.0840	0.0823	0.0812	0.0804	0.0766	0.0758	0.0747	0.0730	0.950	**0.846**	0.819
19	0.9500000	0.8227241	1.022	1.004	0.900	0.0840	0.0824	0.0813	0.0805	0.0765	0.0757	0.0746	0.0730	1.000	0.896	0.869
20	1.000000	0.8660254	1.072	1.054	0.950	0.0841	0.0824	0.0813	0.0805	0.0765	0.0757	0.0746	0.0729	1.050	0.946	0.919
21	1.050000	0.9093267	1.122	1.104	1.000	0.0841	0.0824	0.0813	0.0805	0.0765	0.0757	0.0746	0.0729	1.100	0.996	0.969
22	1.100000	0.9526279	1.172	1.154	1.050	0.0841	0.0824	0.0813	0.0805	0.0765	0.0757	0.0746	0.0729	1.150	1.046	1.019
23	1.150000	0.9959292	1.222	1.204	1.100	0.0842	0.0825	0.0813	0.0805	0.0765	0.0757	0.0745	0.0728	1.200	1.096	1.069
24	1.200000	1.039230	1.272	1.254	1.150	0.0842	0.0825	0.0814	0.0805	0.0765	0.0756	0.0745	0.0728	1.250	1.146	1.119
25	1.250000	1.082532	1.322	1.304	1.200	0.0842	0.0825	0.0814	0.0805	0.0765	0.0756	0.0745	0.0728	1.300	1.196	1.169
26	1.300000	1.125833	1.372	1.354	1.250	0.0843	0.0826	0.0814	0.0806	0.0764	0.0756	0.0744	0.0727	1.350	1.246	1.218
27	1.350000	1.169134	1.422	1.404	1.300	0.0843	0.0826	0.0814	0.0806	0.0764	0.0756	0.0744	0.0727	1.400	1.296	1.268
28	1.400000	1.212436	1.472	1.454	1.350	0.0844	0.0826	0.0814	0.0806	0.0764	0.0756	0.0744	0.0726	1.450	1.346	1.318
29	1.450000	1.255737	1.522	1.504	1.400	0.0844	0.0826	0.0815	0.0806	0.0764	0.0755	0.0744	0.0726	1.500	1.396	1.368
30	1.500000	1.299038	1.572	1.554	1.450	0.0844	0.0827	0.0815	0.0806	0.0764	0.0755	0.0743	0.0726	1.550	1.446	1.418
31	1.550000	1.342339	1.622	1.604	1.500	0.0845	0.0827	0.0815	0.0806	0.0764	0.0755	0.0743	0.0725	1.600	1.496	1.468
32	1.600000	1.385641	1.672	1.654	1.550	0.0845	0.0827	0.0815	0.0806	0.0764	0.0755	0.0743	0.0725	1.650	1.546	1.518
33	1.650000	1.428942	1.722	1.704	1.600	0.0846	0.0827	0.0815	0.0806	0.0764	0.0755	0.0743	0.0724	1.700	1.596	1.568
34	1.700000	1.472243	1.772	1.754	1.650	0.0846	0.0828	0.0815	0.0807	0.0763	0.0755	0.0742	0.0724	1.750	1.646	1.618
35	1.750000	1.515544	1.822	1.804	1.700	0.0846	0.0828	0.0816	0.0807	0.0763	0.0754	0.0742	0.0724	1.800	1.696	1.668
36	1.800000	1.558846	1.872	1.854	1.750	0.0847	0.0828	0.0816	0.0807	0.0763	0.0754	0.0742	0.0723	1.850	1.746	1.718
37	1.850000	1.602147	1.922	1.904	1.800	0.0847	0.0828	0.0816	0.0807	0.0763	0.0754	0.0742	0.0723	1.900	1.796	1.768
38	1.900000	1.645448	1.972	1.954	1.850	0.0847	0.0829	0.0816	0.0807	0.0763	0.0754	0.0741	0.0723	1.950	1.846	1.818
39	1.950000	1.688750	2.022	2.004	1.900	0.0848	0.0829	0.0816	0.0807	0.0763	0.0754	0.0741	0.0722	2.000	1.896	1.868
40	2.000000	1.732051	2.072	2.054	1.950	0.0848	0.0829	0.0817	0.0807	0.0763	0.0753	0.0741	0.0722	2.050	1.946	1.918
41	2.050000	1.775352	2.122	2.105	2.000	0.0849	0.0830	0.0817	0.0808	0.0762	0.0753	0.0740	0.0721	2.100	1.995	1.967
42	2.100000	1.818653	2.172	2.155	2.050	0.0849	0.0830	0.0817	0.0808	0.0762	0.0753	0.0740	0.0721	2.150	2.045	2.017
43	2.150000	1.861955	2.222	2.205	2.100	0.0849	0.0830	0.0817	0.0808	0.0762	0.0753	0.0740	0.0721	2.200	2.095	2.067
44	2.200000	1.905256	2.272	2.255	2.150	0.0850	0.0830	0.0817	0.0808	0.0762	0.0753	0.0740	0.0720	2.250	2.145	2.117
45	2.250000	1.948557	2.322	2.305	2.200	0.0850	0.0831	0.0818	0.0808	0.0762	0.0752	0.0739	0.0720	2.300	2.195	2.167
46	2.300000	1.991858	2.372	2.355	2.250	0.0850	0.0831	0.0818	0.0808	0.0762	0.0752	0.0739	0.0720	2.350	2.245	2.217
47	2.350000	2.035160	2.422	2.405	2.300	0.0851	0.0831	0.0818	0.0808	0.0762	0.0752	0.0739	0.0719	2.400	2.295	2.267
48	2.400000	2.078461	2.472	2.455	2.350	0.0851	0.0831	0.0818	0.0809	0.0761	0.0752	0.0739	0.0719	2.450	2.345	2.317
49	2.450000	2.121762	2.522	2.505	2.400	0.0852	0.0832	0.0818	0.0809	0.0761	0.0752	0.0738	0.0718	2.500	2.395	2.367
50	2.500000	2.165064	2.572	2.555	2.450	0.0852	0.0832	0.0818	0.0809	0.0761	0.0752	0.0738	0.0718	2.550	2.445	2.417
51	2.550000	2.208365	2.622	2.606	2.500	0.0852	0.0832	0.0819	0.0809	0.0761	0.0751	0.0738	0.0718	2.600	2.494	2.467
52	2.600000	2.251666	2.672	2.656	2.550	0.0853	0.0832	0.0819	0.0809	0.0761	0.0751	0.0738	0.0717	2.650	2.544	2.517
53	2.650000	2.294967	2.722	2.706	2.600	0.0853	0.0833	0.0819	0.0809	0.0761	0.0751	0.0737	0.0717	2.700	2.594	2.567
54	2.700000	2.338269	2.772	2.756	2.650	0.0854	0.0833	0.0819	0.0809	0.0761	0.0751	0.0737	0.0716	2.750	2.644	2.617
55	2.750000	2.381570	2.822	2.806	2.700	0.0854	0.0833	0.0819	0.0809	0.0761	0.0751	0.0737	0.0716	2.800	2.694	2.667
56	2.800000	2.424871	2.872	2.856	2.750	0.0854	0.0833	0.0820	0.0810	0.0760	0.0750	0.0737	0.0716	2.850	2.744	2.717
57	2.850000	2.468172	2.922	2.906	2.800	0.0855	0.0834	0.0820	0.0810	0.0760	0.0750	0.0736	0.0715	2.900	2.794	2.766
58	2.900000	2.511474	2.972	2.956	2.850	0.0855	0.0834	0.0820	0.0810	0.0760	0.0750	0.0736	0.0715	2.950	2.844	2.816
59	2.950000	2.554775	3.022	3.006	2.900	0.0855	0.0834	0.0820	0.0810	0.0760	0.0750	0.0736	0.0715	3.000	2.894	2.866
60	3.000000	2.598076	3.072	3.056	2.950	0.0856	0.0835	0.0820	0.0810	0.0760	0.0750	0.0735	0.0714	3.050	2.944	2.916

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

e. Figures in bold type are modified values, see Section 25.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 15—30 DEG PRESSURE ANGLE, FLAT ROOT SIDE FIT, 24/48 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	S_v Min. Eff. Circ. Space Width = 0.0654 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.0654 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.1	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.1
					Note e	Notes a & b								Note g	Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 180		
6	0.2500000	0.2165064	0.310	0.296	**0.227**	0.0700	0.0686	0.0677	0.0670	0.0638	0.0631	0.0622	0.0608	0.292	**0.222**	0.182
7	0.2916667	0.2525907	0.352	0.338	**0.263**	0.0701	0.0687	0.0677	0.0671	0.0637	0.0631	0.0621	0.0607	0.333	**0.258**	0.223
8	0.3333333	0.2886751	0.394	0.379	**0.300**	0.0701	0.0687	0.0678	0.0671	0.0637	0.0630	0.0621	0.0607	0.375	**0.295**	0.265
9	0.3750000	0.3247594	0.435	0.421	**0.340**	0.0701	0.0687	0.0678	0.0671	0.0637	0.0630	0.0621	0.0607	0.417	**0.335**	0.307
10	0.4166667	0.3608439	0.477	0.463	**0.381**	0.0702	0.0687	0.0678	0.0671	0.0637	0.0630	0.0621	0.0606	0.458	**0.376**	0.348
11	0.4583333	0.3969283	0.519	0.504	**0.421**	0.0702	0.0688	0.0678	0.0671	0.0637	0.0630	0.0620	0.0606	0.500	**0.416**	0.390
12	0.5000000	0.4330127	0.560	0.546	**0.462**	0.0703	0.0688	0.0678	0.0671	0.0637	0.0630	0.0620	0.0605	0.542	**0.457**	0.431
13	0.5416667	0.4690971	0.602	0.588	**0.503**	0.0703	0.0688	0.0678	0.0671	0.0637	0.0630	0.0620	0.0605	0.583	**0.498**	0.473
14	0.5833333	0.5051814	0.644	0.629	**0.544**	0.0703	0.0689	0.0679	0.0672	0.0636	0.0629	0.0619	0.0605	0.625	**0.539**	0.515
15	0.6250000	0.5412659	0.685	0.671	**0.585**	0.0704	0.0689	0.0679	0.0672	0.0636	0.0629	0.0619	0.0604	0.667	**0.580**	0.556
16	0.6666667	0.5773502	0.727	0.713	**0.627**	0.0704	0.0689	0.0679	0.0672	0.0636	0.0629	0.0619	0.0604	0.708	**0.622**	0.598
17	0.7083333	0.6134346	0.769	0.754	**0.668**	0.0704	0.0689	0.0679	0.0672	0.0636	0.0629	0.0619	0.0604	0.750	**0.663**	0.639
18	0.7500000	0.6495191	0.810	0.796	**0.709**	0.0705	0.0690	0.0679	0.0672	0.0636	0.0629	0.0618	0.0603	0.792	**0.704**	0.681
19	0.7916667	0.6856033	0.852	0.838	**0.751**	0.0705	0.0690	0.0680	0.0672	0.0636	0.0628	0.0618	0.0603	0.833	**0.746**	0.723
20	0.8333333	0.7216878	0.894	0.879	0.792	0.0706	0.0690	0.0680	0.0672	0.0636	0.0628	0.0618	0.0602	0.875	0.787	0.764
21	0.8750000	0.7577722	0.935	0.921	0.834	0.0706	0.0690	0.0680	0.0672	0.0636	0.0628	0.0618	0.0602	0.917	0.829	0.806
22	0.9166667	0.7938566	0.977	0.963	0.875	0.0706	0.0691	0.0680	0.0673	0.0635	0.0628	0.0617	0.0602	0.958	0.871	0.847
23	0.9583333	0.8299410	1.019	1.004	0.917	0.0707	0.0691	0.0680	0.0673	0.0635	0.0628	0.0617	0.0601	1.000	0.912	0.889
24	1.000000	0.8660254	1.060	1.046	0.959	0.0707	0.0691	0.0681	0.0673	0.0635	0.0627	0.0617	0.0601	1.042	0.954	0.931
25	1.041667	0.9021098	1.102	1.088	1.000	0.0707	0.0691	0.0681	0.0673	0.0635	0.0627	0.0617	0.0600	1.083	0.996	0.972
26	1.083333	0.9381941	1.144	1.129	1.042	0.0708	0.0692	0.0681	0.0673	0.0635	0.0627	0.0616	0.0600	1.125	1.037	1.014
27	1.125000	0.9742786	1.185	1.171	1.084	0.0708	0.0692	0.0681	0.0673	0.0635	0.0627	0.0616	0.0600	1.167	1.079	1.055
28	1.166667	1.010363	1.227	1.213	1.125	0.0709	0.0692	0.0681	0.0673	0.0635	0.0627	0.0616	0.0599	1.208	1.121	1.097
29	1.208333	1.046447	1.269	1.254	1.167	0.0709	0.0693	0.0682	0.0674	0.0634	0.0626	0.0615	0.0599	1.250	1.162	1.139
30	1.250000	1.082532	1.310	1.296	1.209	0.0709	0.0693	0.0682	0.0674	0.0634	0.0626	0.0615	0.0599	1.292	1.204	1.180
31	1.291667	1.118616	1.352	1.338	1.250	0.0710	0.0693	0.0682	0.0674	0.0634	0.0626	0.0615	0.0598	1.333	1.246	1.222
32	1.333333	1.154701	1.394	1.379	1.292	0.0710	0.0693	0.0682	0.0674	0.0634	0.0626	0.0615	0.0598	1.375	1.287	1.263
33	1.375000	1.190785	1.435	1.421	1.334	0.0711	0.0694	0.0682	0.0674	0.0634	0.0626	0.0614	0.0597	1.417	1.329	1.305
34	1.416667	1.226869	1.477	1.463	1.375	0.0711	0.0694	0.0682	0.0674	0.0634	0.0626	0.0614	0.0597	1.458	1.371	1.347
35	1.458333	1.262954	1.519	1.504	1.417	0.0711	0.0694	0.0683	0.0674	0.0634	0.0625	0.0614	0.0597	1.500	1.412	1.388
36	1.500000	1.299038	1.560	1.546	1.459	0.0712	0.0694	0.0683	0.0674	0.0634	0.0625	0.0614	0.0596	1.542	1.454	1.430
37	1.541667	1.335122	1.602	1.588	1.500	0.0712	0.0695	0.0683	0.0675	0.0633	0.0625	0.0613	0.0596	1.583	1.496	1.471
38	1.583333	1.371207	1.644	1.629	1.542	0.0712	0.0695	0.0683	0.0675	0.0633	0.0625	0.0613	0.0596	1.625	1.537	1.513
39	1.625000	1.407291	1.685	1.671	1.584	0.0713	0.0695	0.0683	0.0675	0.0633	0.0625	0.0613	0.0595	1.667	1.579	1.555
40	1.666667	1.443376	1.727	1.713	1.625	0.0713	0.0695	0.0684	0.0675	0.0633	0.0624	0.0613	0.0595	1.708	1.621	1.596
41	1.708333	1.479460	1.769	1.754	1.667	0.0714	0.0696	0.0684	0.0675	0.0633	0.0624	0.0612	0.0594	1.750	1.662	1.638
42	1.750000	1.515544	1.810	1.796	1.709	0.0714	0.0696	0.0684	0.0675	0.0633	0.0624	0.0612	0.0594	1.792	1.704	1.679
43	1.791667	1.551629	1.852	1.838	1.750	0.0714	0.0696	0.0684	0.0675	0.0633	0.0624	0.0612	0.0594	1.833	1.746	1.721
44	1.833333	1.587713	1.894	1.879	1.792	0.0715	0.0697	0.0684	0.0676	0.0632	0.0624	0.0611	0.0593	1.875	1.787	1.763
45	1.875000	1.623798	1.935	1.921	1.834	0.0715	0.0697	0.0685	0.0676	0.0632	0.0623	0.0611	0.0593	1.917	1.829	1.804
46	1.916667	1.659882	1.977	1.963	1.875	0.0715	0.0697	0.0685	0.0676	0.0632	0.0623	0.0611	0.0593	1.958	1.871	1.846
47	1.958333	1.695966	2.019	2.004	1.917	0.0716	0.0697	0.0685	0.0676	0.0632	0.0623	0.0611	0.0592	2.000	1.912	1.887
48	2.000000	1.732051	2.060	2.046	1.959	0.0716	0.0698	0.0685	0.0676	0.0632	0.0623	0.0610	0.0592	2.042	1.954	1.929
49	2.041667	1.768135	2.102	2.088	2.000	0.0717	0.0698	0.0685	0.0676	0.0632	0.0623	0.0610	0.0591	2.083	1.995	1.971
50	2.083333	1.804220	2.144	2.130	2.042	0.0717	0.0698	0.0685	0.0676	0.0632	0.0623	0.0610	0.0591	2.125	2.037	2.012
51	2.125000	1.840304	2.185	2.171	2.084	0.0717	0.0698	0.0686	0.0676	0.0632	0.0622	0.0610	0.0591	2.167	2.079	2.054
52	2.166667	1.876388	2.227	2.213	2.125	0.0718	0.0699	0.0686	0.0677	0.0631	0.0622	0.0609	0.0590	2.208	2.120	2.095
53	2.208333	1.912473	2.269	2.255	2.167	0.0718	0.0699	0.0686	0.0677	0.0631	0.0622	0.0609	0.0590	2.250	2.162	2.137
54	2.250000	1.948557	2.310	2.297	2.209	0.0719	0.0699	0.0686	0.0677	0.0631	0.0622	0.0609	0.0589	2.292	2.203	2.179
55	2.291667	1.984642	2.352	2.338	2.250	0.0719	0.0699	0.0686	0.0677	0.0631	0.0622	0.0609	0.0589	2.333	2.245	2.220
56	2.333333	2.020726	2.394	2.380	2.292	0.0719	0.0700	0.0687	0.0677	0.0631	0.0621	0.0608	0.0589	2.375	2.287	2.262
57	2.375000	2.056810	2.435	2.422	2.334	0.0720	0.0700	0.0687	0.0677	0.0631	0.0621	0.0608	0.0588	2.417	2.328	2.303
58	2.416667	2.092895	2.477	2.464	2.375	0.0720	0.0700	0.0687	0.0677	0.0631	0.0621	0.0608	0.0588	2.458	2.370	2.345
59	2.458333	2.128979	2.519	2.505	2.417	0.0720	0.0700	0.0687	0.0678	0.0630	0.0621	0.0608	0.0588	2.500	2.411	2.387
60	2.500000	2.165064	2.560	2.547	2.459	0.0721	0.0701	0.0687	0.0678	0.0630	0.0621	0.0607	0.0587	2.542	2.453	2.428

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

e. Figures in bold type are modified values, see Section 25.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 16–30 DEG PRESSURE ANGLE, FLAT ROOT SIDE FIT, 32/64 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width 0.0491 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness 0.0491 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.1	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.1
					Note e	Notes a & b								Note g	Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 -140		
6	0.1875000	0.1623798	0.234	0.223	**0.173**	0.0537	0.0523	0.0514	0.0507	0.0475	0.0468	0.0459	0.0445	0.219	**0.168**	0.133
7	0.2187500	0.1894431	0.265	0.254	**0.200**	0.0538	0.0524	0.0514	0.0508	0.0474	0.0468	0.0458	0.0444	0.250	**0.195**	0.164
8	0.2500000	0.2165064	0.296	0.286	**0.227**	0.0538	0.0524	0.0515	0.0508	0.0474	0.0467	0.0458	0.0444	0.281	**0.222**	0.196
9	0.2812500	0.2435696	0.327	0.317	**0.256**	0.0538	0.0524	0.0515	0.0508	0.0474	0.0467	0.0458	0.0444	0.312	**0.251**	0.227
10	0.3125000	0.2706329	0.359	0.348	**0.286**	0.0539	0.0524	0.0515	0.0508	0.0474	0.0467	0.0458	0.0443	0.344	**0.281**	0.258
11	0.3437500	0.2976962	0.390	0.379	**0.317**	0.0539	0.0525	0.0515	0.0508	0.0474	0.0467	0.0457	0.0443	0.375	**0.312**	0.289
12	0.3750000	0.3247594	0.421	0.411	**0.347**	0.0540	0.0525	0.0515	0.0508	0.0474	0.0467	0.0457	0.0442	0.406	**0.342**	0.320
13	0.4062500	0.3518228	0.452	0.442	**0.378**	0.0540	0.0525	0.0515	0.0508	0.0474	0.0467	0.0457	0.0442	0.437	**0.373**	0.352
14	0.4375000	0.3788861	0.484	0.473	**0.409**	0.0540	0.0526	0.0516	0.0509	0.0473	0.0466	0.0456	0.0442	0.469	**0.404**	0.383
15	0.4687500	0.4059494	0.515	0.504	**0.439**	0.0541	0.0526	0.0516	0.0509	0.0473	0.0466	0.0456	0.0441	0.500	**0.434**	0.414
16	0.5000000	0.4330127	0.546	0.536	**0.470**	0.0541	0.0526	0.0516	0.0509	0.0473	0.0466	0.0456	0.0441	0.531	**0.465**	0.445
17	0.5312500	0.4600760	0.577	0.567	**0.501**	0.0541	0.0526	0.0516	0.0509	0.0473	0.0466	0.0456	0.0441	0.562	**0.496**	0.476
18	0.5625000	0.4871393	0.609	0.598	**0.532**	0.0542	0.0527	0.0516	0.0509	0.0473	0.0466	0.0455	0.0440	0.594	**0.527**	0.508
19	0.5937500	0.5142026	0.640	0.629	**0.563**	0.0542	0.0527	0.0517	0.0509	0.0473	0.0465	0.0455	0.0440	0.625	**0.558**	0.539
20	0.6250000	0.5412659	0.671	0.661	**0.594**	0.0543	0.0527	0.0517	0.0509	0.0473	0.0465	0.0455	0.0439	0.656	**0.589**	0.570
21	0.6562500	0.5683291	0.702	0.692	0.625	0.0543	0.0527	0.0517	0.0509	0.0473	0.0465	0.0455	0.0439	0.687	0.621	0.601
22	0.6875000	0.5953925	0.734	0.723	0.657	0.0543	0.0528	0.0517	0.0510	0.0472	0.0465	0.0454	0.0439	0.719	0.652	0.632
23	0.7187500	0.6224557	0.765	0.754	0.688	0.0544	0.0528	0.0517	0.0510	0.0472	0.0465	0.0454	0.0438	0.750	0.683	0.663
24	0.7500000	0.6495191	0.796	0.786	0.719	0.0544	0.0528	0.0518	0.0510	0.0472	0.0464	0.0454	0.0438	0.781	0.714	0.695
25	0.7812500	0.6765823	0.827	0.817	0.750	0.0544	0.0528	0.0518	0.0510	0.0472	0.0464	0.0454	0.0437	0.812	0.746	0.726
26	0.8125000	0.7036456	0.859	0.848	0.782	0.0545	0.0529	0.0518	0.0510	0.0472	0.0464	0.0453	0.0437	0.844	0.777	0.757
27	0.8437500	0.7307089	0.890	0.879	0.813	0.0545	0.0529	0.0518	0.0510	0.0472	0.0464	0.0453	0.0437	0.875	0.808	0.788
28	0.8750000	0.7577722	0.921	0.911	0.844	0.0546	0.0529	0.0518	0.0510	0.0472	0.0464	0.0453	0.0436	0.906	0.839	0.819
29	0.9062500	0.7848355	0.952	0.942	0.875	0.0546	0.0530	0.0519	0.0511	0.0471	0.0463	0.0452	0.0436	0.937	0.871	0.851
30	0.9375000	0.8118988	0.984	0.973	0.907	0.0546	0.0530	0.0519	0.0511	0.0471	0.0463	0.0452	0.0436	0.969	0.902	0.882
31	0.9687500	0.8389620	1.015	1.004	0.938	0.0547	0.0530	0.0519	0.0511	0.0471	0.0463	0.0452	0.0435	1.000	0.933	0.913
32	1.000000	0.8660254	1.046	1.036	0.969	0.0547	0.0530	0.0519	0.0511	0.0471	0.0463	0.0452	0.0435	1.031	0.964	0.944
33	1.031250	0.8930887	1.077	1.067	1.000	0.0548	0.0531	0.0519	0.0511	0.0471	0.0463	0.0451	0.0434	1.062	0.996	0.975
34	1.062500	0.9201520	1.109	1.098	1.032	0.0548	0.0531	0.0519	0.0511	0.0471	0.0463	0.0451	0.0434	1.094	1.027	1.006
35	1.093750	0.9472153	1.140	1.129	1.063	0.0548	0.0531	0.0520	0.0511	0.0471	0.0462	0.0451	0.0434	1.125	1.058	1.038
36	1.125000	0.9742786	1.171	1.161	1.094	0.0549	0.0531	0.0520	0.0511	0.0471	0.0462	0.0451	0.0433	1.156	1.089	1.069
37	1.156250	1.001342	1.202	1.192	1.125	0.0549	0.0532	0.0520	0.0512	0.0470	0.0462	0.0450	0.0433	1.187	1.121	1.100
38	1.187500	1.028405	1.234	1.223	1.157	0.0549	0.0532	0.0520	0.0512	0.0470	0.0462	0.0450	0.0433	1.219	1.152	1.131
39	1.218750	1.055468	1.265	1.254	1.188	0.0550	0.0532	0.0520	0.0512	0.0470	0.0462	0.0450	0.0432	1.250	1.183	1.162
40	1.250000	1.082532	1.296	1.286	1.219	0.0550	0.0532	0.0521	0.0512	0.0470	0.0461	0.0450	0.0432	1.281	1.214	1.194
41	1.281250	1.109595	1.327	1.317	1.250	0.0551	0.0533	0.0521	0.0512	0.0470	0.0461	0.0449	0.0431	1.312	1.246	1.225
42	1.312500	1.136658	1.359	1.348	1.282	0.0551	0.0533	0.0521	0.0512	0.0470	0.0461	0.0449	0.0431	1.344	1.277	1.256
43	1.343750	1.163722	1.390	1.379	1.313	0.0551	0.0533	0.0521	0.0512	0.0470	0.0461	0.0449	0.0431	1.375	1.308	1.287
44	1.375000	1.190785	1.421	1.411	1.344	0.0552	0.0534	0.0521	0.0513	0.0469	0.0461	0.0448	0.0430	1.406	1.339	1.318
45	1.406250	1.217848	1.452	1.442	1.375	0.0552	0.0534	0.0522	0.0513	0.0469	0.0460	0.0448	0.0430	1.437	1.371	1.349
46	1.437500	1.244912	1.484	1.473	1.407	0.0552	0.0534	0.0522	0.0513	0.0469	0.0460	0.0448	0.0430	1.469	1.402	1.381
47	1.468750	1.271975	1.515	1.504	1.438	0.0553	0.0534	0.0522	0.0513	0.0469	0.0460	0.0448	0.0429	1.500	1.433	1.412
48	1.500000	1.299038	1.546	1.536	1.469	0.0553	0.0535	0.0522	0.0513	0.0469	0.0460	0.0447	0.0429	1.531	1.464	1.443
49	1.531250	1.326101	1.577	1.567	1.500	0.0554	0.0535	0.0522	0.0513	0.0469	0.0460	0.0447	0.0428	1.562	1.496	1.474
50	1.562500	1.353165	1.609	1.598	1.532	0.0554	0.0535	0.0522	0.0513	0.0469	0.0459	0.0447	0.0428	1.594	1.527	1.505
51	1.593750	1.380228	1.640	1.629	1.563	0.0554	0.0535	0.0523	0.0513	0.0469	0.0459	0.0447	0.0428	1.625	1.558	1.537
52	1.625000	1.407291	1.671	1.661	1.594	0.0555	0.0536	0.0523	0.0514	0.0468	0.0459	0.0446	0.0427	1.656	1.589	1.568
53	1.656250	1.434355	1.702	1.692	1.625	0.0555	0.0536	0.0523	0.0514	0.0468	0.0459	0.0446	0.0427	1.687	1.621	1.599
54	1.687500	1.461418	1.734	1.723	1.657	0.0556	0.0536	0.0523	0.0514	0.0468	0.0459	0.0446	0.0426	1.719	1.652	1.630
55	1.718750	1.488481	1.765	1.754	1.688	0.0556	0.0536	0.0523	0.0514	0.0468	0.0459	0.0446	0.0426	1.750	1.683	1.661
56	1.750000	1.515544	1.796	1.786	1.719	0.0556	0.0537	0.0524	0.0514	0.0468	0.0458	0.0445	0.0426	1.781	1.714	1.693
57	1.781250	1.542608	1.827	1.817	1.750	0.0557	0.0537	0.0524	0.0514	0.0468	0.0458	0.0445	0.0425	1.812	1.746	1.724
58	1.812500	1.569671	1.859	1.848	1.782	0.0557	0.0537	0.0524	0.0514	0.0468	0.0458	0.0445	0.0425	1.844	1.777	1.755
59	1.843750	1.596734	1.890	1.879	1.813	0.0557	0.0537	0.0524	0.0515	0.0467	0.0458	0.0445	0.0425	1.875	1.808	1.786
60	1.875000	1.623798	1.921	1.911	1.844	0.0558	0.0538	0.0524	0.0515	0.0467	0.0458	0.0444	0.0424	1.906	1.839	1.817

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective space width, see Table 64.

e. Figures in bold type are modified values, see Section 25.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15–1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

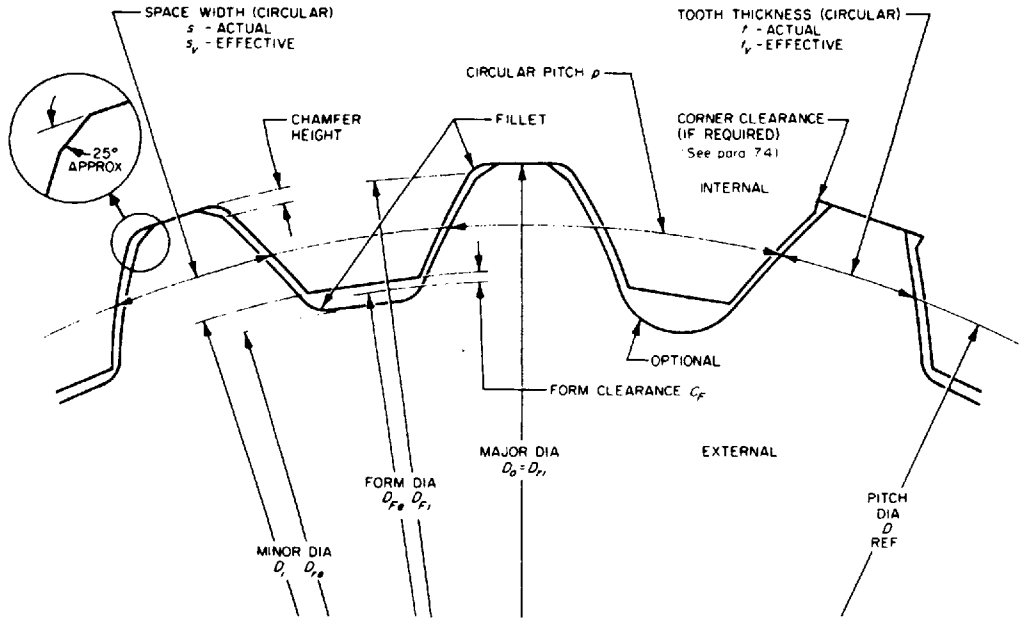
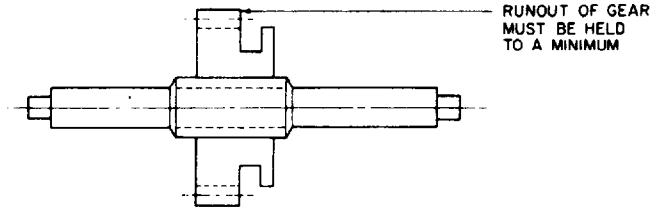


FIG. 6—SPLINE TERMS, SYMBOLS AND DRAWING DATA, 30 DEG PRESSURE ANGLE, FLAT ROOT MAJOR DIAMETER FIT

This fit is used for assemblies where runout of the member having the internal spline must be held to minimum, such as a gear on a shaft as shown below. In this fit, eccentricity between mating members is limited by the radial major diameter clearance.



Caution should be used in considering this fit because:

1. When eccentricity between the major circle and the effective spline does not occur, excessive effective clearance may be present.
2. When eccentricity does occur, torque load is borne by only a few teeth.

Caution should also be used in the finer pitches and smaller numbers of teeth to make sure that the major diameter chamfer is not so great that the remaining top land would be so small that the fit would be ineffective.

Press fits are not tabulated because their design depends on the degree of tightness desired and must allow for such factors as the shape of the blank, wall thickness, material, hardness, thermal expansion, etc. Close tolerances or selective size grouping may be required to limit fit variations.

See Tables 17-24.

DRAWING DATA

INTERNAL INVOLUTE SPLINE DATA		EXTERNAL INVOLUTE SPLINE DATA	
FLAT ROOT MAJOR DIAMETER FIT		FLAT ROOT MAJOR DIAMETER FIT	
NUMBER OF TEETH	xx	NUMBER OF TEETH	xx
SPLINE PITCH	xx/xx	SPLINE PITCH	xx/xx
PRESSURE ANGLE	30°	PRESSURE ANGLE	30°
BASE DIAMETER	x.xxxxxx REF	BASE DIAMETER	x.xxxxxx REF
PITCH DIAMETER	x.xxxxxx REF	PITCH DIAMETER	x.xxxxxx REF
MAJOR DIAMETER	x.xxxx/x.xxxx	MAJOR DIAMETER	x.xxxx/x.xxxx
FORM DIAMETER	x.xxx	FORM DIAMETER	x.xxx
MINOR DIAMETER	x.xxx/x.xxx	MINOR DIAMETER	x.xxx MIN
CIRCULAR SPACE WIDTH		CIRCULAR TOOTH THICKNESS	
MAX ACTUAL	x.xxxx	MAX EFFECTIVE	x.xxxx
MIN EFFECTIVE	x.xxxx	MIN ACTUAL	x.xxxx
NOTE: THE MAJOR DIAMETER AND EFFECTIVE SPLINE MUST BE CONCENTRIC AT MAXIMUM MATERIAL CONDITIONS.		NOTE: THE MAJOR DIAMETER AND EFFECTIVE SPLINE MUST BE CONCENTRIC AT MAXIMUM MATERIAL CONDITIONS.	
The following information may be added as required:		The following information may be added as required:	
MAX MEASUREMENT BETWEEN PINS	x.xxxx REF	MIN MEASUREMENT OVER PINS	x.xxxx REF
PIN DIAMETER	x.xxxx	PIN DIAMETER	x.xxxx
CORNER CLEARANCE (See Fig. 34.)	x.xxx/x.xxx	CHAMFER HEIGHT	x.xxx/x.xxx

The above drawing data is required for the spline specifications. The standard system is shown; for alternate systems, see Table 4 and paragraphs 11.4.1, 11.4.2 and 13.

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30 DEG PRESSURE ANGLE

TABLE 17—30 DEG PRESSURE ANGLE, FLAT ROOT MAJOR DIAMETER FIT, 3/6 SPLINE PITCH

Internal and External			Internal (see Drawing Data)				External (see Drawing Data)				
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia.	D_{Fi} Form Dia.	D_i Minor Dia.	S_v Min. Eff. Circ. Space Width = 0.5236 Notes c & d S_5 Max. Actual Circ. Space Width	t_v Max Eff. Circ. Tooth Thickness	t Min. Actual Circ. Tooth Thickness	D_o Major Dia. Major Dia. Chamfer Max. 0.052 Min. 0.035	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
1	2	3.1	4.3	5.2	6.1	8.5	10	11	14.2	17.1	18.1
					Note e	Notes a & b	Notes a & d	Notes a & b	Note h	Note e	
Tolerance in Ten Thousandths			+(10+3D) -0		+150 -0				+0 -(3+2D)		
6	2.000000	1.732051	2.3334	2.267	**1.753**	0.5273	0.5217	0.5180	2.3332	**1.748**	1.533
7	2.333333	2.020726	2.6667	2.601	**2.067**	0.5274	0.5217	0.5179	2.6666	**2.061**	1.866
8	2.666667	2.309401	3.0000	2.935	**2.386**	0.5274	0.5216	0.5178	2.9999	**2.379**	2.199
9	3.000000	2.598076	3.3334	3.269	**2.708**	0.5275	0.5216	0.5177	3.3332	**2.701**	2.533
10	3.333333	2.886751	3.6667	3.603	**3.034**	0.5275	0.5216	0.5177	3.6666	**3.026**	2.866
11	3.666667	3.175426	4.0000	3.937	**3.360**	0.5276	0.5216	0.5176	3.9999	**3.352**	3.199
12	4.000000	3.464102	4.3334	4.271	**3.689**	0.5276	0.5216	0.5175	4.3332	**3.680**	3.532
13	4.333333	3.752777	4.6667	4.605	**4.018**	0.5277	0.5215	0.5175	4.6666	**4.008**	3.865
14	4.666667	4.041452	5.0000	4.939	**4.347**	0.5277	0.5215	0.5174	4.9999	**4.337**	4.198
15	5.000000	4.330127	5.3334	5.273	**4.678**	0.5278	0.5215	0.5173	5.3332	**4.667**	4.531
16	5.333333	4.618802	5.6667	5.607	**5.009**	0.5278	0.5215	0.5172	5.6666	**4.997**	4.865
17	5.666667	4.907477	6.0000	5.941	**5.340**	0.5279	0.5215	0.5172	5.9999	**5.328**	5.198
18	6.000000	5.196152	6.3334	6.275	**5.672**	0.5280	0.5214	0.5171	6.3332	**5.659**	5.531
19	6.333333	5.484828	6.6667	6.609	**6.004**	0.5280	0.5214	0.5170	6.6666	**5.990**	5.864
20	6.666667	5.773503	7.0000	6.943	**6.336**	0.5281	0.5214	0.5169	6.9999	**6.321**	6.197
21	7.000000	6.062178	7.3334	7.277	**6.668**	0.5281	0.5214	0.5169	7.3332	**6.653**	6.530
22	7.333333	6.350853	7.6667	7.611	7.000	0.5282	0.5214	0.5168	7.6666	6.985	6.864
23	7.666667	6.639528	8.0000	7.945	7.334	0.5282	0.5213	0.5167	7.9999	7.318	7.197
24	8.000000	6.928203	8.3334	8.279	7.667	0.5283	0.5213	0.5166	8.3332	7.650	7.530
25	8.333333	7.216878	8.6667	8.613	8.000	0.5283	0.5213	0.5166	8.6666	7.983	7.863
26	8.666667	7.505553	9.0000	8.947	8.334	0.5284	0.5213	0.5165	8.9999	8.316	8.196
27	9.000000	7.794229	9.3334	9.281	8.667	0.5284	0.5213	0.5164	9.3332	8.648	8.529
28	9.333333	8.082904	9.6667	9.615	9.000	0.5285	0.5212	0.5164	9.6666	8.981	8.862
29	9.666667	8.371579	10.0000	9.949	9.334	0.5285	0.5212	0.5163	9.9999	9.314	9.196
30	10.00000	8.660254	10.3334	10.283	9.667	0.5286	0.5212	0.5162	10.3332	9.646	9.529
31	10.33333	8.948929	10.6667	10.616	10.000	0.5286	0.5212	0.5161	10.6666	9.980	9.862
32	10.66667	9.237604	11.0000	10.950	10.334	0.5287	0.5212	0.5161	10.9999	10.313	10.195
33	11.00000	9.526279	11.3334	11.283	10.667	0.5287	0.5211	0.5160	11.3332	10.646	10.528
34	11.33333	9.814955	11.6667	11.616	11.000	0.5288	0.5211	0.5159	11.6666	10.980	10.861
35	11.66667	10.10363	12.0000	11.950	11.334	0.5289	0.5211	0.5158	11.9999	11.313	11.194
36	12.00000	10.39230	12.3334	12.283	11.667	0.5289	0.5211	0.5158	12.3332	11.646	11.528
37	12.33333	10.68098	12.6667	12.616	12.000	0.5290	0.5211	0.5157	12.6666	11.980	11.861
38	12.66667	10.96966	13.0000	12.950	12.334	0.5290	0.5210	0.5156	12.9999	12.313	12.194
39	13.00000	11.25833	13.3334	13.283	12.667	0.5291	0.5210	0.5156	13.3332	12.646	12.527
40	13.33333	11.54701	13.6667	13.616	13.000	0.5291	0.5210	0.5155	13.6666	12.980	12.860
41	13.66667	11.83568	14.0000	13.950	13.334	0.5292	0.5210	0.5154	13.9999	13.313	13.193
42	14.00000	12.12436	14.3334	14.283	13.667	0.5292	0.5210	0.5153	14.3332	13.646	13.527
43	14.33333	12.41303	14.6667	14.616	14.000	0.5293	0.5209	0.5153	14.6666	13.980	13.860
44	14.66667	12.70171	15.0000	14.950	14.334	0.5293	0.5209	0.5152	14.9999	14.313	14.193
45	15.00000	12.99038	15.3334	15.283	14.667	0.5294	0.5209	0.5151	15.3332	14.646	14.526
46	15.33333	13.27906	15.6667	15.616	15.000	0.5294	0.5209	0.5150	15.6666	14.980	14.859
47	15.66667	13.56773	16.0000	15.950	15.334	0.5295	0.5209	0.5150	15.9999	15.313	15.192
48	16.00000	13.85641	16.3334	16.283	15.667	0.5295	0.5208	0.5149	16.3332	15.646	15.525
49	16.33333	14.14508	16.6667	16.616	16.000	0.5296	0.5208	0.5148	16.6666	15.980	15.859
50	16.66667	14.43376	17.0000	16.950	16.334	0.5296	0.5208	0.5148	16.9999	16.313	16.192
51	17.00000	14.72243	17.3334	17.283	16.667	0.5297	0.5208	0.5147	17.3332	16.646	16.525
52	17.33333	15.01111	17.6667	17.616	17.000	0.5298	0.5208	0.5146	17.6666	16.980	16.858
53	17.66667	15.29978	18.0000	17.950	17.334	0.5298	0.5207	0.5145	17.9999	17.313	17.191
54	18.00000	15.58846	18.3334	18.283	17.667	0.5299	0.5207	0.5145	18.3332	17.646	17.524
55	18.33333	15.87713	18.6667	18.616	18.000	0.5299	0.5207	0.5144	18.6666	17.980	17.857
56	18.66667	16.16581	19.0000	18.950	18.334	0.5300	0.5207	0.5143	18.9999	18.313	18.191
57	19.00000	16.45448	19.3334	19.283	18.667	0.5300	0.5207	0.5142	19.3332	18.646	18.524
58	19.33333	16.74316	19.6667	19.616	19.000	0.5301	0.5206	0.5142	19.6666	18.980	18.857
59	19.66667	17.03183	20.0000	19.950	19.334	0.5301	0.5206	0.5141	19.9999	19.313	19.190
60	20.00000	17.32051	20.3334	20.283	19.667	0.5302	0.5206	0.5140	20.3332	19.646	19.523

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 77 and 84.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

h. See Table 105, items 15 and 16.

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30 DEG PRESSURE ANGLE

TABLE 18—30 DEG PRESSURE ANGLE, FLAT ROOT MAJOR DIAMETER FIT, 4/8 SPLINE PITCH

Internal and External			Internal (see Drawing Data)				External (see Drawing Data)				
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia.	D_{Fi} Form Dia.	D_i Minor Dia.	S_v Min. Eff. Circ. Space Width = 0.3927 Notes c & d S_5 Max. Actual Circ. Space Width	t_v Max Eff. Circ. Tooth Thickness	t Min. Actual Circ. Tooth Thickness	D_o Major Dia. Major Dia. Chamfer Max. 0.041 Min. 0.027	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
1	2	3.1	4.3	5.2	6.1	8.5	10	11	14.2	17.1	18.1
					Note e	Notes a & b	Notes a & d	Notes a & b	Note h	Note e	
Tolerance in Ten Thousandths			+(10+3D) -0		+100 -0				+0 -(3+2D)		
6	1.500000	1.299038	1.7500	1.700	**1.316**	0.3960	0.3910	0.3877	1.7499	**1.311**	1.147
7	1.750000	1.515544	2.0000	1.950	**1.550**	0.3961	0.3910	0.3876	1.9999	**1.545**	1.397
8	2.000000	1.732051	2.2500	2.200	**1.789**	0.3961	0.3910	0.3876	2.2499	**1.784**	1.647
9	2.250000	1.948557	2.5000	2.451	**2.031**	0.3961	0.3910	0.3875	2.4999	**2.025**	1.897
10	2.500000	2.165064	2.7500	2.701	**2.275**	0.3962	0.3910	0.3875	2.7499	**2.269**	2.146
11	2.750000	2.381570	3.0000	2.952	**2.520**	0.3962	0.3909	0.3874	2.9999	**2.513**	2.396
12	3.000000	2.598076	3.2500	3.202	**2.766**	0.3963	0.3909	0.3874	3.2499	**2.759**	2.646
13	3.250000	2.814583	3.5000	3.453	**3.013**	0.3963	0.3909	0.3873	3.4999	**3.005**	2.896
14	3.500000	3.031089	3.7500	3.703	**3.260**	0.3963	0.3909	0.3873	3.7499	**3.252**	3.146
15	3.750000	3.247595	4.0000	3.954	**3.508**	0.3964	0.3909	0.3872	3.9999	**3.499**	3.396
16	4.000000	3.464102	4.2500	4.204	**3.756**	0.3964	0.3909	0.3872	4.2499	**3.747**	3.646
17	4.250000	3.680608	4.5000	4.455	**4.004**	0.3964	0.3908	0.3871	4.4999	**3.995**	3.896
18	4.500000	3.897114	4.7500	4.705	**4.253**	0.3965	0.3908	0.3870	4.7499	**4.243**	4.145
19	4.750000	4.113621	5.0000	4.956	**4.502**	0.3965	0.3908	0.3870	4.9999	**4.492**	4.395
20	5.000000	4.330127	5.2500	5.206	**4.751**	0.3966	0.3908	0.3869	5.2499	**4.740**	4.645
21	5.250000	4.546633	5.5000	5.457	5.000	0.3966	0.3908	0.3869	5.4999	4.989	4.895
22	5.500000	4.763140	5.7500	5.707	5.250	0.3966	0.3908	0.3868	5.7499	5.239	5.145
23	5.750000	4.979646	6.0000	5.958	5.500	0.3967	0.3908	0.3868	5.9999	5.488	5.395
24	6.000000	5.196152	6.2500	6.208	5.750	0.3967	0.3907	0.3867	6.2499	5.738	5.645
25	6.250000	5.412659	6.5000	6.459	6.000	0.3967	0.3907	0.3867	6.4999	5.987	5.894
26	6.500000	5.629165	6.7500	6.709	6.250	0.3968	0.3907	0.3866	6.7499	6.237	6.144
27	6.750000	5.845671	7.0000	6.960	6.500	0.3968	0.3907	0.3866	6.9999	6.486	6.394
28	7.000000	6.062178	7.2500	7.210	6.750	0.3969	0.3907	0.3865	7.2499	6.736	6.644
29	7.250000	6.278684	7.5000	7.461	7.000	0.3969	0.3907	0.3865	7.4999	6.985	6.894
30	7.500000	6.495190	7.7500	7.711	7.250	0.3969	0.3907	0.3864	7.7499	7.235	7.144
31	7.750000	6.711697	8.0000	7.962	7.500	0.3970	0.3906	0.3864	7.9999	7.484	7.394
32	8.000000	6.928203	8.2500	8.212	7.750	0.3970	0.3906	0.3863	8.2499	7.734	7.644
33	8.250000	7.144710	8.5000	8.463	8.000	0.3971	0.3906	0.3863	8.4999	7.983	7.893
34	8.500000	7.361216	8.7500	8.713	8.250	0.3971	0.3906	0.3862	8.7499	8.233	8.143
35	8.750000	7.577722	9.0000	8.964	8.500	0.3971	0.3906	0.3861	8.9999	8.482	8.393
36	9.000000	7.794229	9.2500	9.214	8.750	0.3972	0.3906	0.3861	9.2499	8.732	8.643
37	9.250000	8.010735	9.5000	9.465	9.000	0.3972	0.3905	0.3860	9.4999	8.981	8.893
38	9.500000	8.227241	9.7500	9.715	9.250	0.3972	0.3905	0.3860	9.7499	9.231	9.143
39	9.750000	8.443748	10.0000	9.966	9.500	0.3973	0.3905	0.3859	9.9999	9.480	9.393
40	10.00000	8.660254	10.2500	10.216	9.750	0.3973	0.3905	0.3859	10.2499	9.730	9.642
41	10.25000	8.876760	10.5000	10.466	10.000	0.3974	0.3905	0.3858	10.4999	9.980	9.892
42	10.50000	9.093267	10.7500	10.716	10.250	0.3974	0.3905	0.3858	10.7499	10.230	10.142
43	10.75000	9.309773	11.0000	10.966	10.500	0.3974	0.3905	0.3857	10.9999	10.480	10.392
44	11.00000	9.526279	11.2500	11.216	10.750	0.3975	0.3904	0.3857	11.2499	10.730	10.642
45	11.25000	9.742786	11.5000	11.466	11.000	0.3975	0.3904	0.3856	11.4999	10.980	10.892
46	11.50000	9.959292	11.7500	11.716	11.250	0.3975	0.3904	0.3856	11.7499	11.230	11.142
47	11.75000	10.17580	12.0000	11.966	11.500	0.3976	0.3904	0.3855	11.9999	11.480	11.392
48	12.00000	10.39230	12.2500	12.216	11.750	0.3976	0.3904	0.3855	12.2499	11.730	11.641
49	12.25000	10.60881	12.5000	12.466	12.000	0.3977	0.3904	0.3854	12.4999	11.980	11.891
50	12.50000	10.82532	12.7500	12.716	12.250	0.3977	0.3904	0.3854	12.7499	12.230	12.141
51	12.75000	11.04182	13.0000	12.966	12.500	0.3977	0.3903	0.3853	12.9999	12.480	12.391
52	13.00000	11.25833	13.2500	13.216	12.750	0.3978	0.3903	0.3852	13.2499	12.730	12.641
53	13.25000	11.47484	13.5000	13.466	13.000	0.3978	0.3903	0.3852	13.4999	12.980	12.891
54	13.50000	11.69134	13.7500	13.716	13.250	0.3979	0.3903	0.3851	13.7499	13.230	13.141
55	13.75000	11.90785	14.0000	13.966	13.500	0.3979	0.3903	0.3851	13.9999	13.480	13.391
56	14.00000	12.12436	14.2500	14.216	13.750	0.3979	0.3903	0.3850	14.2499	13.730	13.640
57	14.25000	12.34086	14.5000	14.466	14.000	0.3980	0.3902	0.3850	14.4999	13.980	13.890
58	14.50000	12.55737	14.7500	14.716	14.250	0.3980	0.3902	0.3849	14.7499	14.230	14.140
59	14.75000	12.77387	15.0000	14.966	14.500	0.3980	0.3902	0.3849	14.9999	14.480	14.390
60	15.00000	12.99038	15.2500	15.216	14.750	0.3981	0.3902	0.3848	15.2499	14.730	14.640

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 77 and 84.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

h. See Table 105, items 15 and 16.

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30 DEG PRESSURE ANGLE

TABLE 19—30 DEG PRESSURE ANGLE, FLAT ROOT MAJOR DIAMETER FIT, 5/10 SPLINE PITCH

Internal and External			Internal (see Drawing Data)				External (see Drawing Data)				
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia.	D_{Fi} Form Dia.	D_i Minor Dia.	S_v Min. Eff. Circ. Space Width = 0.3142 Notes c & d S_3 Max. Actual Circ. Space Width	t_v Max Eff. Circ. Tooth Thickness	t Min. Actual Circ. Tooth Thickness	D_o Major Dia. Major Dia. Chamfer Max. 0.034 Min. 0.022	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
1	2	3.1	4.3	5.2	6.1	8.5	10	11	14.2	17.1	18.1
					Note e	Notes a & b	Notes a & d	Notes a & b	Note h	Note e	
Tolerance in Ten Thousandths			-(10 + 3D) -0		+ 80 -0				+0 -(3 + 2D)		
6	1.200000	1.039230	1.4000	1.360	**1.054**	0.3175	0.3125	0.3092	1.3999	**1.049**	0.914
7	1.400000	1.212436	1.6000	1.560	**1.241**	0.3176	0.3125	0.3091	1.5999	**1.236**	1.114
8	1.600000	1.385641	1.8000	1.760	**1.432**	0.3176	0.3125	0.3091	1.7999	**1.427**	1.314
9	1.800000	1.558846	2.0000	1.960	**1.625**	0.3176	0.3125	0.3090	1.9999	**1.620**	1.514
10	2.000000	1.732051	2.2000	2.160	**1.819**	0.3177	0.3125	0.3090	2.1999	**1.814**	1.714
11	2.200000	1.905256	2.4000	2.361	**2.015**	0.3177	0.3124	0.3089	2.3999	**2.010**	1.914
12	2.400000	2.078461	2.6000	2.561	**2.212**	0.3178	0.3124	0.3089	2.5999	**2.206**	2.114
13	2.600000	2.251666	2.8000	2.762	**2.410**	0.3178	0.3124	0.3088	2.7999	**2.403**	2.314
14	2.800000	2.424871	3.0000	2.962	**2.608**	0.3178	0.3124	0.3088	2.9999	**2.601**	2.513
15	3.000000	2.598076	3.2000	3.162	**2.806**	0.3179	0.3124	0.3087	3.1999	**2.799**	2.713
16	3.200000	2.771281	3.4000	3.363	**3.004**	0.3179	0.3124	0.3087	3.3999	**2.997**	2.913
17	3.400000	2.944486	3.6000	3.563	**3.203**	0.3179	0.3123	0.3086	3.5999	**3.195**	3.113
18	3.600000	3.117691	3.8000	3.764	**3.402**	0.3180	0.3123	0.3085	3.7999	**3.394**	3.313
19	3.800000	3.290897	4.0000	3.964	**3.601**	0.3180	0.3123	0.3085	3.9999	**3.592**	3.513
20	4.000000	3.464102	4.2000	4.164	3.800	0.3181	0.3123	0.3084	4.1999	3.792	3.713
21	4.200000	3.637307	4.4000	4.365	4.000	0.3181	0.3123	0.3084	4.3999	3.991	3.912
22	4.400000	3.810512	4.6000	4.565	4.200	0.3181	0.3123	0.3083	4.5999	4.191	4.112
23	4.600000	3.983717	4.8000	4.766	4.400	0.3182	0.3123	0.3083	4.7999	4.390	4.312
24	4.800000	4.156922	5.0000	4.966	4.600	0.3182	0.3122	0.3082	4.9999	4.590	4.512
25	5.000000	4.330127	5.2000	5.166	4.800	0.3182	0.3122	0.3082	5.1999	4.790	4.712
26	5.200000	4.503332	5.4000	5.367	5.000	0.3183	0.3122	0.3081	5.3999	4.989	4.912
27	5.400000	4.676537	5.6000	5.567	5.200	0.3183	0.3122	0.3081	5.5999	5.189	5.112
28	5.600000	4.849742	5.8000	5.768	5.400	0.3184	0.3122	0.3080	5.7999	5.388	5.312
29	5.800000	5.022947	6.0000	5.968	5.600	0.3184	0.3122	0.3080	5.9999	5.588	5.511
30	6.000000	5.196152	6.2000	6.168	5.800	0.3184	0.3122	0.3079	6.1999	5.788	5.711
31	6.200000	5.369357	6.4000	6.369	6.000	0.3185	0.3121	0.3079	6.3999	5.987	5.911
32	6.400000	5.542563	6.6000	6.569	6.200	0.3185	0.3121	0.3078	6.5999	6.187	6.111
33	6.600000	5.715768	6.8000	6.770	6.400	0.3186	0.3121	0.3078	6.7999	6.386	6.311
34	6.800000	5.888973	7.0000	6.970	6.600	0.3186	0.3121	0.3077	6.9999	6.586	6.511
35	7.000000	6.062178	7.2000	7.170	6.800	0.3186	0.3121	0.3076	7.1999	6.786	6.711
36	7.200000	6.235383	7.4000	7.371	7.000	0.3187	0.3121	0.3076	7.3999	6.985	6.911
37	7.400000	6.408588	7.6000	7.571	7.200	0.3187	0.3120	0.3075	7.5999	7.185	7.110
38	7.600000	6.581793	7.8000	7.772	7.400	0.3187	0.3120	0.3075	7.7999	7.384	7.310
39	7.800000	6.754998	8.0000	7.972	7.600	0.3188	0.3120	0.3074	7.9999	7.584	7.510
40	8.000000	6.928203	8.2000	8.172	7.800	0.3188	0.3120	0.3074	8.1999	7.784	7.710
41	8.200000	7.101408	8.4000	8.373	8.000	0.3189	0.3120	0.3073	8.3999	7.983	7.910
42	8.400000	7.274613	8.6000	8.573	8.200	0.3189	0.3120	0.3073	8.5999	8.183	8.110
43	8.600000	7.447818	8.8000	8.774	8.400	0.3189	0.3120	0.3072	8.7999	8.382	8.310
44	8.800000	7.621024	9.0000	8.974	8.600	0.3190	0.3119	0.3072	8.9999	8.582	8.509
45	9.000000	7.794229	9.2000	9.174	8.800	0.3190	0.3119	0.3071	9.1999	8.782	8.709
46	9.200000	7.967434	9.4000	9.375	9.000	0.3190	0.3119	0.3071	9.3999	8.981	8.909
47	9.400000	8.140639	9.6000	9.575	9.200	0.3191	0.3119	0.3070	9.5999	9.181	9.109
48	9.600000	8.313844	9.8000	9.776	9.400	0.3191	0.3119	0.3070	9.7999	9.380	9.309
49	9.800000	8.487049	10.0000	9.976	9.600	0.3192	0.3119	0.3069	9.9999	9.580	9.509
50	10.00000	8.660254	10.2000	10.176	9.800	0.3192	0.3119	0.3069	10.1999	9.780	9.709
51	10.20000	8.833459	10.4000	10.376	10.000	0.3192	0.3118	0.3068	10.3999	9.980	9.909
52	10.40000	9.006664	10.6000	10.576	10.200	0.3193	0.3118	0.3067	10.5999	10.180	10.108
53	10.60000	9.179869	10.8000	10.776	10.400	0.3193	0.3118	0.3067	10.7999	10.380	10.308
54	10.80000	9.353074	11.0000	10.976	10.600	0.3194	0.3118	0.3066	10.9999	10.580	10.508
55	11.00000	9.526279	11.2000	11.176	10.800	0.3194	0.3118	0.3066	11.1999	10.780	10.708
56	11.20000	9.699484	11.4000	11.376	11.000	0.3194	0.3118	0.3065	11.3999	10.980	10.908
57	11.40000	9.872690	11.6000	11.576	11.200	0.3195	0.3117	0.3065	11.5999	11.180	11.108
58	11.60000	10.04589	11.8000	11.776	11.400	0.3195	0.3117	0.3064	11.7999	11.380	11.308
59	11.80000	10.21910	12.0000	11.976	11.600	0.3195	0.3117	0.3064	11.9999	11.580	11.507
60	12.00000	10.39230	12.2000	12.176	11.800	0.3196	0.3117	0.3063	12.1999	11.780	11.707

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 77 and 84.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

h. See Table 105, items 15 and 16.

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30 DEG PRESSURE ANGLE

TABLE 20—30 DEG PRESSURE ANGLE, FLAT ROOT MAJOR DIAMETER FIT, 6/12 SPLINE PITCH

Internal and External			Internal (see Drawing Data)				External (see Drawing Data)				
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia.	D_{Fi} Form Dia.	D_i Minor Dia.	S_V Min. Eff. Circ. Space Width = 0.2618 Notes c & d S_S Max. Actual Circ. Space Width	t_v Max Eff. Circ. Tooth Thickness	t Min. Actual Circ. Tooth Thickness	D_o Major Dia. Major Dia. Chamfer Max. 0.029 Min. 0.018	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
1	2	3.1	4.3	5.2	6.1	8.5	10	11	14.2	17.1	18.1
					Note e	Notes a & b	Notes a & d	Notes a & b	Note h	Note e	
Tolerance in Ten Thousandths			+(10+3D) -0		+ 50 -0				+0 −(3+2D)		
6	1.000000	0.8660254	1.1667	1.134	**0.881**	0.2646	0.2603	0.2575	1.1666	**0.876**	0.761
7	1.166667	1.010363	1.3334	1.300	**1.035**	0.2646	0.2603	0.2575	1.3332	**1.030**	0.928
8	1.333333	1.154701	1.5000	1.467	**1.194**	0.2647	0.2603	0.2574	1.4999	**1.189**	1.094
9	1.500000	1.299038	1.6667	1.634	**1.354**	0.2647	0.2603	0.2574	1.6666	**1.349**	1.261
10	1.666667	1.443376	1.8334	1.800	**1.516**	0.2647	0.2603	0.2574	1.8332	**1.511**	1.427
11	1.833333	1.587713	2.0000	1.967	**1.680**	0.2648	0.2603	0.2573	1.9999	**1.675**	1.594
12	2.000000	1.732051	2.1667	2.134	**1.843**	0.2648	0.2603	0.2573	2.1666	**1.838**	1.761
13	2.166667	1.876388	2.3334	2.301	**2.008**	0.2649	0.2603	0.2572	2.3332	**2.002**	1.927
14	2.333333	2.020726	2.5000	2.468	**2.173**	0.2649	0.2603	0.2572	2.4999	**2.167**	2.094
15	2.500000	2.165064	2.6667	2.635	**2.338**	0.2649	0.2603	0.2571	2.6666	**2.332**	2.260
16	2.666667	2.309401	2.8334	2.802	**2.503**	0.2650	0.2602	0.2571	2.8332	**2.497**	2.427
17	2.833333	2.453739	3.0000	2.969	**2.669**	0.2650	0.2602	0.2570	2.9999	**2.662**	2.593
18	3.000000	2.598076	3.1667	3.136	**2.835**	0.2650	0.2602	0.2570	3.1666	**2.828**	2.760
19	3.166667	2.742414	3.3334	3.303	3.000	0.2651	0.2602	0.2569	3.3332	2.993	2.926
20	3.333333	2.886751	3.5000	3.470	3.167	0.2651	0.2602	0.2569	3.4999	3.160	3.093
21	3.500000	3.031089	3.6667	3.637	3.334	0.2651	0.2602	0.2569	3.6666	3.326	3.259
22	3.666667	3.175426	3.8334	3.804	3.500	0.2652	0.2602	0.2568	3.8332	3.492	3.426
23	3.833333	3.319764	4.0000	3.971	3.667	0.2652	0.2602	0.2568	3.9999	3.659	3.593
24	4.000000	3.464102	4.1667	4.138	3.834	0.2652	0.2602	0.2567	4.1666	3.825	3.759
25	4.166667	3.608439	4.3334	4.305	4.000	0.2653	0.2602	0.2567	4.3332	3.991	3.926
26	4.333333	3.752777	4.5000	4.472	4.167	0.2653	0.2601	0.2566	4.4999	4.158	4.092
27	4.500000	3.897114	4.6667	4.639	4.334	0.2653	0.2601	0.2566	4.6666	4.324	4.259
28	4.666667	4.041452	4.8334	4.806	4.500	0.2654	0.2601	0.2565	4.8332	4.490	4.425
29	4.833333	4.185789	5.0000	4.973	4.667	0.2654	0.2601	0.2565	4.9999	4.657	4.592
30	5.000000	4.330127	5.1667	5.140	4.834	0.2654	0.2601	0.2565	5.1666	4.823	4.758
31	5.166667	4.474465	5.3334	5.307	5.000	0.2655	0.2601	0.2564	5.3332	4.989	4.925
32	5.333333	4.618802	5.5000	5.474	5.167	0.2655	0.2601	0.2564	5.4999	5.156	5.091
33	5.500000	4.763140	5.6667	5.641	5.334	0.2656	0.2601	0.2563	5.6666	5.322	5.258
34	5.666667	4.907477	5.8334	5.808	5.500	0.2656	0.2601	0.2563	5.8332	5.488	5.425
35	5.833333	5.051815	6.0000	5.975	5.667	0.2656	0.2601	0.2562	5.9999	5.655	5.591
36	6.000000	5.196152	6.1667	6.142	5.834	0.2657	0.2600	0.2562	6.1666	5.821	5.758
37	6.166667	5.340490	6.3334	6.309	6.000	0.2657	0.2600	0.2561	6.3332	5.987	5.924
38	6.333333	5.484828	6.5000	6.476	6.167	0.2657	0.2600	0.2561	6.4999	6.154	6.091
39	6.500000	5.629165	6.6667	6.643	6.334	0.2658	0.2600	0.2560	6.6666	6.320	6.257
40	6.666667	5.773503	6.8334	6.810	6.500	0.2658	0.2600	0.2560	6.8332	6.486	6.424
41	6.833333	5.917840	7.0000	6.977	6.667	0.2658	0.2600	0.2560	6.9999	6.653	6.590
42	7.000000	6.062178	7.1667	7.144	6.834	0.2659	0.2600	0.2559	7.1666	6.819	6.757
43	7.166667	6.206515	7.3334	7.311	7.000	0.2659	0.2600	0.2559	7.3332	6.985	6.923
44	7.333333	6.350853	7.5000	7.478	7.167	0.2659	0.2600	0.2558	7.4999	7.152	7.090
45	7.500000	6.495190	7.6667	7.645	7.334	0.2660	0.2600	0.2558	7.6666	7.318	7.257
46	7.666667	6.639528	7.8334	7.812	7.500	0.2660	0.2599	0.2557	7.8332	7.484	7.423
47	7.833333	6.783866	8.0000	7.979	7.667	0.2660	0.2599	0.2557	7.9999	7.651	7.590
48	8.000000	6.928203	8.1667	8.146	7.834	0.2661	0.2599	0.2556	8.1666	7.817	7.756
49	8.166667	7.072541	8.3334	8.313	8.000	0.2661	0.2599	0.2556	8.3332	7.983	7.923
50	8.333333	7.216878	8.5000	8.480	8.167	0.2661	0.2599	0.2556	8.4999	8.150	8.089
51	8.500000	7.361216	8.6667	8.647	8.334	0.2662	0.2599	0.2555	8.6666	8.316	8.256
52	8.666667	7.505553	8.8334	8.814	8.500	0.2662	0.2599	0.2555	8.8332	8.482	8.422
53	8.833333	7.649891	9.0000	8.981	8.667	0.2663	0.2599	0.2554	8.9999	8.649	8.589
54	9.000000	7.794229	9.1667	9.148	8.834	0.2663	0.2599	0.2554	9.1666	8.815	8.755
55	9.166667	7.938566	9.3334	9.315	9.000	0.2663	0.2599	0.2553	9.3332	8.981	8.922
56	9.333333	8.082904	9.5000	9.482	9.167	0.2664	0.2598	0.2553	9.4999	9.148	9.089
57	9.500000	8.227241	9.6667	9.649	9.334	0.2664	0.2598	0.2552	9.6666	9.314	9.255
58	9.666667	8.371579	9.8334	9.816	9.500	0.2664	0.2598	0.2552	9.8332	9.480	9.422
59	9.833333	8.515916	10.0000	9.983	9.667	0.2665	0.2598	0.2551	9.9999	9.647	9.588
60	10.00000	8.660254	10.1667	10.150	9.834	0.2665	0.2598	0.2551	10.1666	9.813	9.755

a. Measurement with pins cannot be used to determine effective space width and tooth thickness. Measurement with pins for actual space width and tooth thickness are in Tables 77 and 84.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

h. See Table 105, items 15 and 16.

Table 105.

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30 DEG PRESSURE ANGLE

TABLE 21—30 DEG PRESSURE ANGLE, FLAT ROOT MAJOR DIAMETER FIT, 8/16 SPLINE PITCH

Internal and External			Internal (see Drawing Data)				External (see Drawing Data)				
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia.	D_{Fi} Form Dia.	D_i Minor Dia.	$\frac{S_V}{S_5}$ Min. Eff. Circ. Space Width = 0.1963 Notes c & d Max. Actual Circ. Space Width	t_v Max Eff. Circ. Tooth Thickness	t Min. Actual Circ. Tooth Thickness	D_o Major Dia. Major Dia. Chamfer Max. 0.023 Min. 0.014	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
1	2	3.1	4.3	5.2	6.1	8.5	10	11	14.2	17.1	18.1
					Note e	Notes a & b	Notes a & d	Notes a & b	Note h	Note e	
Tolerance in Ten Thousandths			+(10+3D) -0		+50 -0				+0 -(3+2D)		
6	0.7500000	0.6495191	0.8750	0.850	**0.664**	0.1991	0.1948	0.1920	0.8749	**0.659**	0.568
7	0.8750000	0.7577722	1.0000	0.975	**0.777**	0.1991	0.1948	0.1920	0.9999	**0.772**	0.692
8	1.000000	0.8660254	1.1250	1.100	**0.896**	0.1992	0.1948	0.1919	1.1249	**0.891**	0.817
9	1.125000	0.9742786	1.2500	1.225	**1.016**	0.1992	0.1948	0.1919	1.2499	**1.011**	0.942
10	1.250000	1.082532	1.3750	1.350	**1.138**	0.1992	0.1948	0.1919	1.3749	**1.133**	1.067
11	1.375000	1.190785	1.5000	1.475	**1.260**	0.1993	0.1948	0.1918	1.4999	**1.255**	1.192
12	1.500000	1.299038	1.6250	1.600	**1.383**	0.1993	0.1948	0.1918	1.6249	**1.378**	1.317
13	1.625000	1.407291	1.7500	1.725	**1.506**	0.1994	0.1948	0.1917	1.7499	**1.501**	1.442
14	1.750000	1.515544	1.8750	1.850	**1.629**	0.1994	0.1948	0.1917	1.8749	**1.624**	1.567
15	1.875000	1.623798	2.0000	1.975	**1.753**	0.1994	0.1948	0.1916	1.9999	**1.748**	1.691
16	2.000000	1.732051	2.1250	2.100	**1.877**	0.1995	0.1947	0.1916	2.1249	**1.872**	1.816
17	2.125000	1.840304	2.2500	2.226	**2.001**	0.1995	0.1947	0.1915	2.2499	**1.996**	1.941
18	2.250000	1.948557	2.3750	2.351	2.125	0.1995	0.1947	0.1915	2.3749	2.120	2.066
19	2.375000	2.056810	2.5000	2.476	2.250	0.1996	0.1947	0.1914	2.4999	2.245	2.191
20	2.500000	2.165064	2.6250	2.601	2.375	0.1996	0.1947	0.1914	2.6249	2.370	2.316
21	2.625000	2.273317	2.7500	2.727	2.500	0.1996	0.1947	0.1914	2.7499	2.494	2.441
22	2.750000	2.381570	2.8750	2.852	2.625	0.1997	0.1947	0.1913	2.8749	2.619	2.566
23	2.875000	2.489823	3.0000	2.977	2.750	0.1997	0.1947	0.1913	2.9999	2.744	2.690
24	3.000000	2.598076	3.1250	3.102	2.875	0.1997	0.1947	0.1912	3.1249	2.869	2.815
25	3.125000	2.706329	3.2500	3.228	3.000	0.1998	0.1947	0.1912	3.2499	2.993	2.940
26	3.250000	2.814583	3.3750	3.353	3.125	0.1998	0.1946	0.1911	3.3749	3.118	3.065
27	3.375000	2.922836	3.5000	3.478	3.250	0.1998	0.1946	0.1911	3.4999	3.243	3.190
28	3.500000	3.031089	3.6250	3.603	3.375	0.1999	0.1946	0.1910	3.6249	3.368	3.315
29	3.625000	3.139342	3.7500	3.729	3.500	0.1999	0.1946	0.1910	3.7499	3.492	3.440
30	3.750000	3.247595	3.8750	3.854	3.625	0.1999	0.1946	0.1910	3.8749	3.617	3.565
31	3.875000	3.355848	4.0000	3.979	3.750	0.2000	0.1946	0.1909	3.9999	3.742	3.689
32	4.000000	3.464102	4.1250	4.104	3.875	0.2000	0.1946	0.1909	4.1249	3.867	3.814
33	4.125000	3.572355	4.2500	4.230	4.000	0.2001	0.1946	0.1908	4.2499	3.991	3.939
34	4.250000	3.680608	4.3750	4.355	4.125	0.2001	0.1946	0.1908	4.3749	4.116	4.064
35	4.375000	3.788861	4.5000	4.480	4.250	0.2001	0.1946	0.1907	4.4999	4.241	4.189
36	4.500000	3.897114	4.6250	4.605	4.375	0.2002	0.1945	0.1907	4.6249	4.366	4.314
37	4.625000	4.005367	4.7500	4.731	4.500	0.2002	0.1945	0.1906	4.7499	4.490	4.439
38	4.750000	4.113621	4.8750	4.856	4.625	0.2002	0.1945	0.1906	4.8749	4.615	4.564
39	4.875000	4.221874	5.0000	4.981	4.750	0.2003	0.1945	0.1905	4.9999	4.740	4.689
40	5.000000	4.330127	5.1250	5.106	4.875	0.2003	0.1945	0.1905	5.1249	4.865	4.813
41	5.125000	4.438380	5.2500	5.232	5.000	0.2003	0.1945	0.1905	5.2499	4.989	4.938
42	5.250000	4.546633	5.3750	5.357	5.125	0.2004	0.1945	0.1904	5.3749	5.114	5.063
43	5.375000	4.654887	5.5000	5.482	5.250	0.2004	0.1945	0.1904	5.4999	5.239	5.188
44	5.500000	4.763140	5.6250	5.607	5.375	0.2004	0.1945	0.1903	5.6249	5.364	5.313
45	5.625000	4.871393	5.7500	5.733	5.500	0.2005	0.1945	0.1903	5.7499	5.488	5.438
46	5.750000	4.979646	5.8750	5.858	5.625	0.2005	0.1944	0.1902	5.8749	5.613	5.563
47	5.875000	5.087899	6.0000	5.983	5.750	0.2005	0.1944	0.1902	5.9999	5.738	5.688
48	6.000000	5.196152	6.1250	6.108	5.875	0.2006	0.1944	0.1901	6.1249	5.863	5.812
49	6.125000	5.304406	6.2500	6.234	6.000	0.2006	0.1944	0.1901	6.2499	5.987	5.937
50	6.250000	5.412659	6.3750	6.359	6.125	0.2006	0.1944	0.1901	6.3749	6.112	6.062
51	6.375000	5.520912	6.5000	6.484	6.250	0.2007	0.1944	0.1900	6.4999	6.237	6.187
52	6.500000	5.629165	6.6250	6.609	6.375	0.2007	0.1944	0.1900	6.6249	6.362	6.312
53	6.625000	5.737418	6.7500	6.735	6.500	0.2008	0.1944	0.1899	6.7499	6.486	6.437
54	6.750000	5.845671	6.8750	6.860	6.625	0.2008	0.1944	0.1899	6.8749	6.611	6.562
55	6.875000	5.953925	7.0000	6.985	6.750	0.2008	0.1944	0.1898	6.9999	6.736	6.687
56	7.000000	6.062178	7.1250	7.110	6.875	0.2009	0.1943	0.1898	7.1249	6.861	6.811
57	7.125000	6.170431	7.2500	7.236	7.000	0.2009	0.1943	0.1897	7.2499	6.985	6.936
58	7.250000	6.278684	7.3750	7.361	7.125	0.2009	0.1943	0.1897	7.3749	7.110	7.061
59	7.375000	6.386937	7.5000	7.486	7.250	0.2010	0.1943	0.1896	7.4999	7.235	7.186
60	7.500000	6.495190	7.6250	7.611	7.375	0.2010	0.1943	0.1896	7.6249	7.360	7.311

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 77 and 84.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

h. See Table 105, items 15 and 16.

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30 DEG PRESSURE ANGLE

TABLE 22–30 DEG PRESSURE ANGLE, FLAT ROOT MAJOR DIAMETER FIT, 10/20 SPLINE PITCH

Internal and External			Internal (see Drawing Data)				External (see Drawing Data)				
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia.	D_{Fi} Form Dia.	D_i Minor Dia.	S_v Min. Eff. Circ. Space Width = 0.1571 Notes c & d S_s Max. Actual Circ. Space Width	t_v Max Eff. Circ. Tooth Thickness	t Min. Actual Circ. Tooth Thickness	D_o Major Dia. Major Dia. Chamfer Max. 0.020 Min. 0.012	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
1	2	3.1	4.3	5.2	6.1	8.5	10	11	14.2	17.1	18.1
					Note e	Notes a & b	Notes a & d	Notes a & b	Note h	Note e	
Tolerance in Ten Thousandths			+(10+3D) -0		+50 -0				+0 −(3+2D)		
6	0.6000000	0.5196152	0.7000	0.680	**0.534**	0.1598	0.1557	0.1530	0.6999	**0.529**	0.452
7	0.7000000	0.6062178	0.8000	0.780	**0.622**	0.1598	0.1557	0.1530	0.7999	**0.617**	0.552
8	0.8000000	0.6928203	0.9000	0.880	**0.717**	0.1598	0.1556	0.1529	0.8999	**0.712**	0.652
9	0.9000000	0.7794229	1.0000	0.980	**0.814**	0.1598	0.1556	0.1529	0.9999	**0.809**	0.751
10	1.000000	0.8660254	1.1000	1.080	**0.911**	0.1599	0.1556	0.1529	1.0999	**0.906**	0.851
11	1.100000	0.9526279	1.2000	1.180	**1.008**	0.1599	0.1556	0.1528	1.1999	**1.003**	0.951
12	1.200000	1.039230	1.3000	1.280	**1.107**	0.1599	0.1556	0.1528	1.2999	**1.102**	1.051
13	1.300000	1.125833	1.4000	1.380	**1.205**	0.1600	0.1556	0.1528	1.3999	**1.200**	1.151
14	1.400000	1.212436	1.5000	1.480	**1.304**	0.1600	0.1556	0.1527	1.4999	**1.299**	1.251
15	1.500000	1.299038	1.6000	1.580	**1.403**	0.1600	0.1556	0.1527	1.5999	**1.398**	1.351
16	1.600000	1.385641	1.7000	1.680	**1.502**	0.1600	0.1556	0.1527	1.6999	**1.497**	1.451
17	1.700000	1.472243	1.8000	1.780	**1.601**	0.1601	0.1556	0.1526	1.7999	**1.596**	1.551
18	1.800000	1.558846	1.9000	1.880	1.700	0.1601	0.1556	0.1526	1.8999	1.696	1.651
19	1.900000	1.645448	2.0000	1.980	1.800	0.1601	0.1556	0.1526	1.9999	1.796	1.751
20	2.000000	1.732051	2.1000	2.080	1.900	0.1601	0.1556	0.1525	2.0999	1.896	1.850
21	2.100000	1.818653	2.2000	2.181	2.000	0.1602	0.1556	0.1525	2.1999	1.995	1.950
22	2.200000	1.905256	2.3000	2.281	2.100	0.1602	0.1555	0.1525	2.2999	2.095	2.050
23	2.300000	1.991858	2.4000	2.381	2.200	0.1602	0.1555	0.1524	2.3999	2.195	2.150
24	2.400000	2.078461	2.5000	2.481	2.300	0.1602	0.1555	0.1524	2.4999	2.295	2.250
25	2.500000	2.165064	2.6000	2.581	2.400	0.1603	0.1555	0.1524	2.5999	2.395	2.350
26	2.600000	2.251666	2.7000	2.682	2.500	0.1603	0.1555	0.1523	2.6999	2.494	2.450
27	2.700000	2.338269	2.8000	2.782	2.600	0.1603	0.1555	0.1523	2.7999	2.594	2.550
28	2.800000	2.424871	2.9000	2.882	2.700	0.1604	0.1555	0.1522	2.8999	2.694	2.650
29	2.900000	2.511474	3.0000	2.982	2.800	0.1604	0.1555	0.1522	2.9999	2.794	2.750
30	3.000000	2.598076	3.1000	3.082	2.900	0.1604	0.1555	0.1522	3.0999	2.894	2.850
31	3.100000	2.684679	3.2000	3.183	3.000	0.1604	0.1555	0.1521	3.1999	2.993	2.949
32	3.200000	2.771281	3.3000	3.283	3.100	0.1605	0.1555	0.1521	3.2999	3.093	3.049
33	3.300000	2.857884	3.4000	3.383	3.200	0.1605	0.1555	0.1521	3.3999	3.193	3.149
34	3.400000	2.944486	3.5000	3.483	3.300	0.1605	0.1555	0.1520	3.4999	3.293	3.249
35	3.500000	3.031089	3.6000	3.583	3.400	0.1605	0.1555	0.1520	3.5999	3.393	3.349
36	3.600000	3.117691	3.7000	3.684	3.500	0.1606	0.1554	0.1520	3.6999	3.492	3.449
37	3.700000	3.204294	3.8000	3.784	3.601	0.1606	0.1554	0.1519	3.7999	3.592	3.549
38	3.800000	3.290897	3.9000	3.884	3.700	0.1606	0.1554	0.1519	3.8999	3.692	3.649
39	3.900000	3.377499	4.0000	3.984	3.800	0.1607	0.1554	0.1519	3.9999	3.792	3.749
40	4.000000	3.464102	4.1000	4.084	3.900	0.1607	0.1554	0.1518	4.0999	3.892	3.849
41	4.100000	3.550704	4.2000	4.185	4.000	0.1607	0.1554	0.1518	4.1999	3.991	3.949
42	4.200000	3.637307	4.3000	4.285	4.100	0.1607	0.1554	0.1518	4.2999	4.091	4.048
43	4.300000	3.723909	4.4000	4.385	4.200	0.1608	0.1554	0.1517	4.3999	4.191	4.148
44	4.400000	3.810512	4.5000	4.485	4.300	0.1608	0.1554	0.1517	4.4999	4.291	4.248
45	4.500000	3.897114	4.6000	4.585	4.400	0.1608	0.1554	0.1517	4.5999	4.391	4.348
46	4.600000	3.983717	4.7000	4.686	4.500	0.1608	0.1554	0.1516	4.6999	4.490	4.448
47	4.700000	4.070319	4.8000	4.786	4.600	0.1609	0.1554	0.1516	4.7999	4.590	4.548
48	4.800000	4.156922	4.9000	4.886	4.700	0.1609	0.1554	0.1516	4.8999	4.690	4.648
49	4.900000	4.243524	5.0000	4.986	4.800	0.1609	0.1554	0.1515	4.9999	4.790	4.748
50	5.000000	4.330127	5.1000	5.086	4.900	0.1609	0.1554	0.1515	5.0999	4.890	4.848
51	5.100000	4.416730	5.2000	5.187	5.000	0.1610	0.1553	0.1515	5.1999	4.989	4.948
52	5.200000	4.503332	5.3000	5.287	5.100	0.1610	0.1553	0.1514	5.2999	5.089	5.047
53	5.300000	4.589935	5.4000	5.387	5.200	0.1610	0.1553	0.1514	5.3999	5.189	5.147
54	5.400000	4.676537	5.5000	5.487	5.300	0.1611	0.1553	0.1514	5.4999	5.289	5.247
55	5.500000	4.763140	5.6000	5.587	5.400	0.1611	0.1553	0.1513	5.5999	5.389	5.347
56	5.600000	4.849742	5.7000	5.688	5.500	0.1611	0.1553	0.1513	5.6999	5.488	5.447
57	5.700000	4.936345	5.8000	5.788	5.600	0.1611	0.1553	0.1513	5.7999	5.588	5.547
58	5.800000	5.022947	5.9000	5.888	5.700	0.1612	0.1553	0.1512	5.8999	5.688	5.647
59	5.900000	5.109550	6.0000	5.988	5.800	0.1612	0.1553	0.1512	5.9999	5.788	5.747
60	6.000000	5.196152	6.1000	6.088	5.900	0.1612	0.1553	0.1512	6.0999	5.888	5.847

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 77 and 84.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

h. See Table 105, items 15 and 16.

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30 DEG PRESSURE ANGLE

TABLE 23–30 DEG PRESSURE ANGLE, FLAT ROOT MAJOR DIAMETER FIT, 12/24 SPLINE PITCH

Internal and External			Internal (see Drawing Data)				External (see Drawing Data)				
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia.	D_{Fi} Form Dia.	D_i Minor Dia.	S_v Min. Eff. Circ. Space Width = 0.1309 Notes c & d S_s Max. Actual Circ. Space Width	t_v Max Eff. Circ. Tooth Thickness	t Min. Actual Circ. Tooth Thickness	D_o Major Dia. Major Dia. Chamfer Max. 0.017 Min. 0.010	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
1	2	3.1	4.3	5.2	6.1	8.5	10	11	14.2	17.1	18.1
					Note e	Notes a & b	Notes a & d	Notes a & b	Note h	Note e	
Tolerance in Ten Thousandths			+(10+3D) -0		+50 -0				+0 -(3+2D)		
6	0.5000000	0.4330127	0.5834	0.567	**0.448**	0.1336	0.1295	0.1268	0.5832	**0.443**	0.374
7	0.5833333	0.5051814	0.6667	0.650	**0.520**	0.1336	0.1295	0.1268	0.6666	**0.515**	0.458
8	0.6666667	0.5773502	0.7500	0.734	**0.598**	0.1336	0.1294	0.1267	0.7499	**0.593**	0.541
9	0.7500000	0.6495191	0.8334	0.817	**0.678**	0.1336	0.1294	0.1267	0.8332	**0.673**	0.624
10	0.8333333	0.7216878	0.9167	0.900	**0.759**	0.1337	0.1294	0.1267	0.9166	**0.754**	0.707
11	0.9166667	0.7938566	1.0000	0.984	**0.841**	0.1337	0.1294	0.1266	0.9999	**0.836**	0.790
12	1.000000	0.8660254	1.0834	1.067	**0.922**	0.1337	0.1294	0.1266	1.0832	**0.917**	0.874
13	1.083333	0.9381941	1.1667	1.150	**1.005**	0.1338	0.1294	0.1266	1.1666	**1.000**	0.957
14	1.166667	1.010363	1.2500	1.234	**1.087**	0.1338	0.1294	0.1265	1.2499	**1.082**	1.040
15	1.250000	1.082532	1.3334	1.317	**1.169**	0.1338	0.1294	0.1265	1.3332	**1.164**	1.123
16	1.333333	1.154701	1.4167	1.400	**1.252**	0.1338	0.1294	0.1265	1.4166	**1.247**	1.207
17	1.416667	1.226869	1.5000	1.484	**1.334**	0.1339	0.1294	0.1264	1.4999	**1.329**	1.290
18	1.500000	1.299038	1.5834	1.567	1.417	0.1339	0.1294	0.1264	1.5832	1.412	1.373
19	1.583333	1.371207	1.6667	1.650	1.500	0.1339	0.1294	0.1264	1.6666	1.496	1.456
20	1.666667	1.443376	1.7500	1.734	1.584	0.1339	0.1294	0.1263	1.7499	1.579	1.540
21	1.750000	1.515544	1.8334	1.817	1.667	0.1340	0.1294	0.1263	1.8332	1.662	1.623
22	1.833333	1.587713	1.9167	1.900	1.750	0.1340	0.1293	0.1263	1.9166	1.746	1.706
23	1.916667	1.659882	2.0000	1.984	1.834	0.1340	0.1293	0.1262	1.9999	1.829	1.789
24	2.000000	1.732051	2.0834	2.067	1.917	0.1340	0.1293	0.1262	2.0832	1.912	1.873
25	2.083333	1.804220	2.1667	2.151	2.000	0.1341	0.1293	0.1262	2.1666	1.995	1.956
26	2.166667	1.876388	2.2500	2.234	2.084	0.1341	0.1293	0.1261	2.2499	2.079	2.039
27	2.250000	1.948557	2.3334	2.318	2.167	0.1341	0.1293	0.1261	2.3332	2.162	2.122
28	2.333333	2.020726	2.4167	2.401	2.250	0.1342	0.1293	0.1260	2.4166	2.245	2.206
29	2.416667	2.092895	2.5000	2.485	2.334	0.1342	0.1293	0.1260	2.4999	2.328	2.289
30	2.500000	2.165064	2.5834	2.568	2.417	0.1342	0.1293	0.1260	2.5832	2.411	2.372
31	2.583333	2.237232	2.6667	2.652	2.500	0.1342	0.1293	0.1259	2.6666	2.494	2.455
32	2.666667	2.309401	2.7500	2.735	2.584	0.1343	0.1293	0.1259	2.7499	2.578	2.539
33	2.750000	2.381570	2.8334	2.819	2.667	0.1343	0.1293	0.1259	2.8332	2.661	2.622
34	2.833333	2.453739	2.9167	2.902	2.750	0.1343	0.1293	0.1258	2.9166	2.744	2.705
35	2.916667	2.525907	3.0000	2.986	2.834	0.1343	0.1293	0.1258	2.9999	2.827	2.788
36	3.000000	2.598076	3.0834	3.069	2.917	0.1344	0.1292	0.1258	3.0832	2.910	2.871
37	3.083333	2.670245	3.1667	3.153	3.000	0.1344	0.1292	0.1257	3.1666	2.993	2.955
38	3.166667	2.742414	3.2500	3.236	3.084	0.1344	0.1292	0.1257	3.2499	3.077	3.038
39	3.250000	2.814583	3.3334	3.320	3.167	0.1345	0.1292	0.1257	3.3332	3.160	3.121
40	3.333333	2.886751	3.4167	3.403	3.250	0.1345	0.1292	0.1256	3.4166	3.243	3.204
41	3.416667	2.958920	3.5000	3.487	3.334	0.1345	0.1292	0.1256	3.4999	3.326	3.288
42	3.500000	3.031089	3.5834	3.570	3.417	0.1345	0.1292	0.1256	3.5832	3.409	3.371
43	3.583333	3.103258	3.6667	3.654	3.500	0.1346	0.1292	0.1255	3.6666	3.492	3.454
44	3.666667	3.175426	3.7500	3.737	3.584	0.1346	0.1292	0.1255	3.7499	3.576	3.537
45	3.750000	3.247595	3.8334	3.821	3.667	0.1346	0.1292	0.1255	3.8332	3.659	3.621
46	3.833333	3.319764	3.9167	3.904	3.750	0.1346	0.1292	0.1254	3.9166	3.742	3.704
47	3.916667	3.391933	4.0000	3.988	3.834	0.1347	0.1292	0.1254	3.9999	3.825	3.787
48	4.000000	3.464102	4.0834	4.071	3.917	0.1347	0.1292	0.1254	4.0832	3.908	3.870
49	4.083333	3.536270	4.1667	4.155	4.000	0.1347	0.1292	0.1253	4.1666	3.991	3.954
50	4.166667	3.608439	4.2500	4.238	4.084	0.1347	0.1292	0.1253	4.2499	4.075	4.037
51	4.250000	3.680608	4.3334	4.322	4.167	0.1348	0.1291	0.1253	4.3332	4.158	4.120
52	4.333333	3.752777	4.4167	4.405	4.250	0.1348	0.1291	0.1252	4.4166	4.241	4.203
53	4.416667	3.824946	4.5000	4.489	4.334	0.1348	0.1291	0.1252	4.4999	4.324	4.287
54	4.500000	3.897114	4.5834	4.572	4.417	0.1349	0.1291	0.1252	4.5832	4.407	4.370
55	4.583333	3.969283	4.6667	4.656	4.500	0.1349	0.1291	0.1251	4.6666	4.490	4.453
56	4.666667	4.041452	4.7500	4.739	4.584	0.1349	0.1291	0.1251	4.7499	4.574	4.536
57	4.750000	4.113621	4.8334	4.823	4.667	0.1349	0.1291	0.1251	4.8332	4.657	4.620
58	4.833333	4.185789	4.9167	4.906	4.750	0.1350	0.1291	0.1250	4.9166	4.740	4.703
59	4.916667	4.257958	5.0000	4.990	4.834	0.1350	0.1291	0.1250	4.9999	4.823	4.786
60	5.000000	4.330127	5.0834	5.073	4.917	0.1350	0.1291	0.1250	5.0832	4.906	4.869

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 77 and 84.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

h. See Table 105, items 15 and 16.

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30 DEG PRESSURE ANGLE

TABLE 24—30 DEG PRESSURE ANGLE, FLAT ROOT MAJOR DIAMETER FIT, 16/32 SPLINE PITCH

Internal and External			Internal (see Drawing Data)				External (see Drawing Data)				
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia.	D_{Fi} Form Dia.	D_i Minor Dia.	S_v Min. Eff. Circ. Space Width = 0.0982 Notes c & d S_5 Max. Actual Circ. Space Width	t_v Max Eff. Circ. Tooth Thickness	t Min. Actual Circ. Tooth Thickness	D_o Major Dia. Major Dia. Chamfer Max. 0.014 Min. 0.008	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
1	2	3.1	4.3	5.2	6.1	8.5	10	11	14.2	17.1	18.1
					Note e	Notes a & b	Notes a & d	Notes a & b	Note h	Note e	
Tolerance in Ten Thousandths			+(10+3D) -0		+50 -0				+0 -(3+2D)		
6	0.3750000	0.3247594	0.4375	0.425	**0.339**	0.1007	0.0967	0.0942	0.4374	**0.334**	0.278
7	0.4375000	0.3788861	0.5000	0.488	**0.393**	0.1007	0.0967	0.0942	0.4999	**0.388**	0.340
8	0.5000000	0.4330127	0.5625	0.550	**0.449**	0.1008	0.0967	0.0941	0.5624	**0.444**	0.403
9	0.5625000	0.4871393	0.6250	0.613	**0.509**	0.1008	0.0967	0.0941	0.6249	**0.504**	0.465
10	0.6250000	0.5412659	0.6875	0.675	**0.570**	0.1008	0.0967	0.0941	0.6874	**0.565**	0.528
11	0.6875000	0.5953925	0.7500	0.738	**0.631**	0.1008	0.0967	0.0941	0.7499	**0.626**	0.590
12	0.7500000	0.6495191	0.8125	0.800	**0.692**	0.1008	0.0967	0.0941	0.8124	**0.687**	0.653
13	0.8125000	0.7036456	0.8750	0.863	**0.754**	0.1008	0.0967	0.0941	0.8749	**0.749**	0.715
14	0.8750000	0.7577722	0.9375	0.925	**0.815**	0.1009	0.0967	0.0940	0.9374	**0.810**	0.777
15	0.9375000	0.8118988	1.0000	0.988	**0.877**	0.1009	0.0967	0.0940	0.9999	**0.872**	0.840
16	1.000000	0.8660254	1.0625	1.050	**0.939**	0.1009	0.0967	0.0940	1.0624	**0.934**	0.902
17	1.062500	0.9201520	1.1250	1.113	**1.001**	0.1009	0.0967	0.0940	1.1249	**0.996**	0.965
18	1.125000	0.9742786	1.1875	1.175	**1.063**	0.1009	0.0967	0.0940	1.1874	**1.058**	1.027
19	1.187500	1.028405	1.2500	1.238	1.125	0.1010	0.0967	0.0939	1.2499	1.121	1.090
20	1.250000	1.082532	1.3125	1.300	1.188	0.1010	0.0967	0.0939	1.3124	1.183	1.152
21	1.312500	1.136658	1.3750	1.363	1.250	0.1010	0.0967	0.0939	1.3749	1.246	1.214
22	1.375000	1.190785	1.4375	1.425	1.313	0.1010	0.0967	0.0939	1.4374	1.308	1.277
23	1.437500	1.244912	1.5000	1.488	1.375	0.1010	0.0967	0.0939	1.4999	1.371	1.339
24	1.500000	1.299038	1.5625	1.550	1.438	0.1011	0.0967	0.0938	1.5624	1.433	1.402
25	1.562500	1.353165	1.6250	1.613	1.500	0.1011	0.0967	0.0938	1.6249	1.496	1.464
26	1.625000	1.407291	1.6875	1.675	1.563	0.1011	0.0967	0.0938	1.6874	1.558	1.527
27	1.687500	1.461418	1.7500	1.738	1.625	0.1011	0.0967	0.0938	1.7499	1.621	1.589
28	1.750000	1.515544	1.8125	1.800	1.688	0.1011	0.0967	0.0938	1.8124	1.683	1.651
29	1.812500	1.569671	1.8750	1.863	1.750	0.1012	0.0967	0.0937	1.8749	1.746	1.714
30	1.875000	1.623798	1.9375	1.925	1.813	0.1012	0.0967	0.0937	1.9374	1.808	1.776
31	1.937500	1.677924	2.0000	1.988	1.875	0.1012	0.0967	0.0937	1.9999	1.871	1.839
32	2.000000	1.732051	2.0625	2.050	1.938	0.1012	0.0967	0.0937	2.0624	1.933	1.901
33	2.062500	1.786177	2.1250	2.113	2.000	0.1012	0.0967	0.0937	2.1249	1.995	1.964
34	2.125000	1.840304	2.1875	2.176	2.063	0.1012	0.0967	0.0937	2.1874	2.058	2.026
35	2.187500	1.894431	2.2500	2.238	2.125	0.1013	0.0967	0.0936	2.2499	2.120	2.089
36	2.250000	1.948557	2.3125	2.301	2.188	0.1013	0.0967	0.0936	2.3124	2.183	2.151
37	2.312500	2.002684	2.3750	2.364	2.250	0.1013	0.0967	0.0936	2.3749	2.245	2.213
38	2.375000	2.056810	2.4375	2.426	2.313	0.1013	0.0967	0.0936	2.4374	2.307	2.276
39	2.437500	2.110937	2.5000	2.489	2.375	0.1013	0.0967	0.0936	2.4999	2.370	2.338
40	2.500000	2.165064	2.5625	2.551	2.438	0.1014	0.0967	0.0935	2.5624	2.432	2.401
41	2.562500	2.219190	2.6250	2.614	2.500	0.1014	0.0967	0.0935	2.6249	2.494	2.463
42	2.625000	2.273317	2.6875	2.677	2.563	0.1014	0.0967	0.0935	2.6874	2.557	2.526
43	2.687500	2.327443	2.7500	2.739	2.625	0.1014	0.0967	0.0935	2.7499	2.619	2.588
44	2.750000	2.381570	2.8125	2.802	2.688	0.1014	0.0967	0.0935	2.8124	2.682	2.650
45	2.812500	2.435696	2.8750	2.865	2.750	0.1015	0.0967	0.0934	2.8749	2.744	2.713
46	2.875000	2.489823	2.9375	2.927	2.813	0.1015	0.0967	0.0934	2.9374	2.806	2.775
47	2.937500	2.543950	3.0000	2.990	2.875	0.1015	0.0967	0.0934	2.9999	2.869	2.838
48	3.000000	2.598076	3.0625	3.052	2.938	0.1015	0.0967	0.0934	3.0624	2.931	2.900
49	3.062500	2.652203	3.1250	3.115	3.000	0.1015	0.0967	0.0934	3.1249	2.993	2.963
50	3.125000	2.706329	3.1875	3.178	3.063	0.1015	0.0967	0.0934	3.1874	3.056	3.025
51	3.187500	2.760456	3.2500	3.240	3.125	0.1016	0.0967	0.0933	3.2499	3.118	3.087
52	3.250000	2.814583	3.3125	3.303	3.188	0.1016	0.0967	0.0933	3.3124	3.181	3.150
53	3.312500	2.868709	3.3750	3.366	3.250	0.1016	0.0967	0.0933	3.3749	3.243	3.212
54	3.375000	2.922836	3.4375	3.428	3.313	0.1016	0.0967	0.0933	3.4374	3.305	3.275
55	3.437500	2.976962	3.5000	3.491	3.375	0.1016	0.0967	0.0933	3.4999	3.368	3.337
56	3.500000	3.031089	3.5625	3.553	3.438	0.1017	0.0967	0.0932	3.5624	3.430	3.400
57	3.562500	3.085215	3.6250	3.616	3.500	0.1017	0.0967	0.0932	3.6249	3.492	3.462
58	3.625000	3.139342	3.6875	3.679	3.563	0.1017	0.0967	0.0932	3.6874	3.555	3.524
59	3.687500	3.193469	3.7500	3.741	3.625	0.1017	0.0967	0.0932	3.7499	3.617	3.587
60	3.750000	3.247595	3.8125	3.804	3.688	0.1017	0.0967	0.0932	3.8124	3.680	3.649

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 77 and 84.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

h. See Table 105, items 15 and 16.

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30 DEG PRESSURE ANGLE

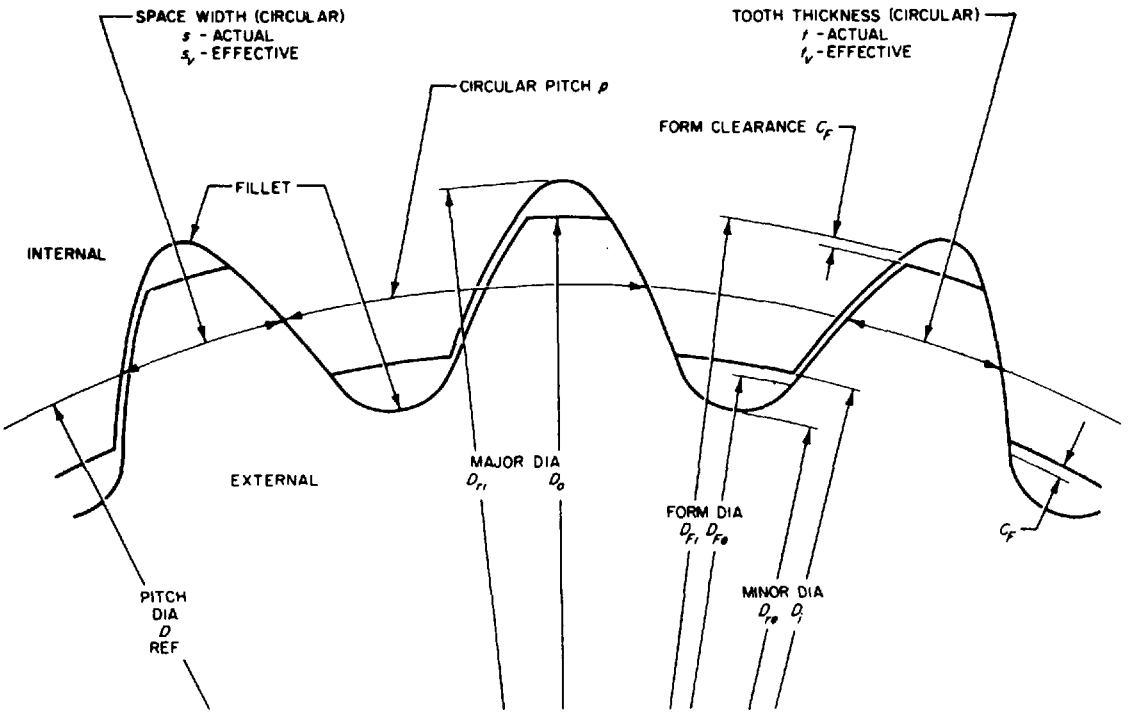


FIG. 7–SPLINE TERMS, SYMBOLS AND DRAWING DATA, 30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT

The fillet radius permits heavier loading and effects greater fatigue resistance than flat roots through absence of stress raisers.

Press fits are not tabulated because their design depends on the degree of tightness desired and must allow for such factors as the shape of the blank, wall thickness, material, hardness, thermal expansion, etc. Close tolerances or selective size grouping may be required to limit fit variations.

See Tables 25-38.

DRAWING DATA

INTERNAL INVOLUTE SPLINE DATA		EXTERNAL INVOLUTE SPLINE DATA	
FILLET ROOT SIDE FIT		FILLET ROOT SIDE FIT	
NUMBER OF TEETH	xx	NUMBER OF TEETH	xx
SPLINE PITCH	xx/xx	SPLINE PITCH	xx/xx
PRESSURE ANGLE	30°	PRESSURE ANGLE	30°
BASE DIAMETER	x.xxxxxx REF	BASE DIAMETER	x.xxxxxx REF
PITCH DIAMETER	x.xxxxxx REF	PITCH DIAMETER	x.xxxxxx REF
MAJOR DIAMETER	x.xxx MAX	MAJOR DIAMETER	x.xxx/x.xxx
FORM DIAMETER	x.xxx	FORM DIAMETER	x.xxx
MINOR DIAMETER	x.xxx/x.xxx	MINOR DIAMETER	x.xxx MIN
CIRCULAR SPACE WIDTH		CIRCULAR TOOTH THICKNESS	
MAX ACTUAL	x.xxxx	MAX EFFECTIVE	x.xxxx
MIN EFFECTIVE	x.xxxx	MIN ACTUAL	x.xxxx
The following information may be added as required:		The following information may be added as required:	
MAX MEASUREMENT BETWEEN PINS	x.xxxx REF	MIN MEASUREMENT OVER PINS	x.xxxx REF
PIN DIAMETER	x.xxxx	PIN DIAMETER	x.xxxx
FILLET RADIUS MIN	x.xxxx	FILLET RADIUS MIN	x.xxxx

The above drawing data is required for the spline specifications. The standard is system shown; for alternate systems, see Table 4 and paragraphs 11.4.1, 11.4.2 and 13.

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30 DEG PRESSURE ANGLE

TABLE 25—30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 2.5/5 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.6283 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.6283 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.2	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.2
			Note f		Note e	Notes a & b								Note g	Note e	Note f
Tolerance in Ten Thousandths					+200 -0									+0 - 200		
6	2.400000	2.078461	3.173	2.805	2.094	0.6357	0.6335	0.6320	0.6309	0.6257	0.6246	0.6231	0.6209	2.800	2.088	1.627
7	2.800000	2.424871	3.573	3.206	2.453	0.6358	0.6336	0.6321	0.6310	0.6256	0.6245	0.6230	0.6208	3.200	2.446	2.027
8	3.200000	2.771281	3.973	3.607	2.828	0.6359	0.6337	0.6321	0.6310	0.6256	0.6245	0.6229	0.6207	3.600	2.821	2.427
9	3.600000	3.117691	4.373	4.008	3.209	0.6361	0.6337	0.6322	0.6311	0.6255	0.6244	0.6229	0.6205	4.000	3.201	2.827
10	4.000000	3.464102	4.774	4.408	3.600	0.6362	0.6338	0.6322	0.6311	0.6255	0.6244	0.6228	0.6204	4.400	3.592	3.226
11	4.400000	3.810512	5.174	4.809	4.000	0.6363	0.6339	0.6323	0.6311	0.6255	0.6243	0.6227	0.6203	4.800	3.991	3.626
12	4.800000	4.156922	5.574	5.210	4.400	0.6364	0.6340	0.6323	0.6312	0.6254	0.6243	0.6226	0.6202	5.200	4.390	4.026
13	5.200000	4.503332	5.974	5.611	4.800	0.6365	0.6340	0.6324	0.6312	0.6254	0.6242	0.6226	0.6201	5.600	4.789	4.426
14	5.600000	4.849742	6.374	6.012	5.200	0.6366	0.6341	0.6324	0.6312	0.6254	0.6242	0.6225	0.6200	6.000	5.188	4.826
15	6.000000	5.196152	6.775	6.412	5.600	0.6367	0.6342	0.6325	0.6313	0.6253	0.6241	0.6224	0.6199	6.400	5.588	5.225
16	6.400000	5.542563	7.175	6.813	6.000	0.6368	0.6342	0.6325	0.6313	0.6253	0.6241	0.6224	0.6198	6.800	5.987	5.625
17	6.800000	5.888973	7.575	7.214	6.400	0.6369	0.6343	0.6326	0.6314	0.6252	0.6240	0.6223	0.6197	7.200	6.386	6.025
18	7.200000	6.235383	7.975	7.615	6.800	0.6370	0.6344	0.6327	0.6314	0.6252	0.6239	0.6222	0.6196	7.600	6.785	6.425
19	7.600000	6.581793	8.375	8.016	7.200	0.6371	0.6345	0.6327	0.6314	0.6252	0.6239	0.6221	0.6195	8.000	7.184	6.825
20	8.000000	6.928203	8.775	8.416	7.600	0.6372	0.6345	0.6328	0.6315	0.6251	0.6238	0.6221	0.6194	8.400	7.584	7.225
21	8.400000	7.274613	9.176	8.817	8.000	0.6373	0.6346	0.6328	0.6315	0.6251	0.6238	0.6220	0.6193	8.800	7.983	7.624
22	8.800000	7.621024	9.576	9.218	8.400	0.6374	0.6347	0.6329	0.6315	0.6251	0.6237	0.6219	0.6192	9.200	8.382	8.024
23	9.200000	7.967434	9.976	9.619	8.800	0.6375	0.6348	0.6329	0.6316	0.6250	0.6237	0.6218	0.6191	9.600	8.781	8.424
24	9.600000	8.313844	10.376	10.020	9.200	0.6376	0.6348	0.6330	0.6316	0.6250	0.6236	0.6218	0.6190	10.000	9.180	8.824
25	10.00000	8.660254	10.776	10.420	9.600	0.6378	0.6349	0.6330	0.6317	0.6249	0.6236	0.6217	0.6189	10.400	9.580	9.224
26	10.40000	9.006664	11.177	10.820	10.000	0.6379	0.6350	0.6331	0.6317	0.6249	0.6235	0.6216	0.6187	10.800	9.980	9.623
27	10.80000	9.353074	11.577	11.220	10.400	0.6380	0.6351	0.6331	0.6317	0.6249	0.6235	0.6215	0.6186	11.200	10.380	10.023
28	11.20000	9.699484	11.977	11.620	10.800	0.6381	0.6351	0.6332	0.6318	0.6248	0.6234	0.6215	0.6185	11.600	10.780	10.423
29	11.60000	10.04589	12.377	12.020	11.200	0.6382	0.6352	0.6332	0.6318	0.6248	0.6234	0.6214	0.6184	12.000	11.180	10.823
30	12.00000	10.39230	12.777	12.420	11.600	0.6383	0.6353	0.6333	0.6318	0.6248	0.6233	0.6213	0.6183	12.400	11.580	11.223
31	12.40000	10.73871	13.177	12.820	12.000	0.6384	0.6354	0.6333	0.6319	0.6247	0.6233	0.6212	0.6182	12.800	11.980	11.623
32	12.80000	11.08513	13.578	13.220	12.400	0.6385	0.6354	0.6334	0.6319	0.6247	0.6232	0.6212	0.6181	13.200	12.380	12.022
33	13.20000	11.43154	13.978	13.620	12.800	0.6386	0.6355	0.6334	0.6320	0.6246	0.6232	0.6211	0.6180	13.600	12.780	12.422
34	13.60000	11.77795	14.378	14.020	13.200	0.6387	0.6356	0.6335	0.6320	0.6246	0.6231	0.6210	0.6179	14.000	13.180	12.822
35	14.00000	12.12436	14.778	14.420	13.600	0.6388	0.6357	0.6336	0.6320	0.6246	0.6230	0.6209	0.6178	14.400	13.580	13.222
36	14.40000	12.47077	15.178	14.820	14.000	0.6389	0.6357	0.6336	0.6321	0.6245	0.6230	0.6209	0.6177	14.800	13.980	13.622
37	14.80000	12.81718	15.579	15.220	14.400	0.6390	0.6358	0.6337	0.6321	0.6245	0.6229	0.6208	0.6176	15.200	14.380	14.021
38	15.20000	13.16359	15.979	15.620	14.800	0.6391	0.6359	0.6337	0.6321	0.6245	0.6229	0.6207	0.6175	15.600	14.780	14.421
39	15.60000	13.51000	16.379	16.020	15.200	0.6392	0.6360	0.6338	0.6322	0.6244	0.6228	0.6206	0.6174	16.000	15.180	14.821
40	16.00000	13.85641	16.779	16.420	15.600	0.6393	0.6360	0.6338	0.6322	0.6244	0.6228	0.6206	0.6173	16.400	15.580	15.221
41	16.40000	14.20282	17.179	16.820	16.000	0.6394	0.6361	0.6339	0.6323	0.6243	0.6227	0.6205	0.6172	16.800	15.980	15.621
42	16.80000	14.54923	17.579	17.220	16.400	0.6396	0.6362	0.6339	0.6323	0.6243	0.6227	0.6204	0.6170	17.200	16.380	16.021
43	17.20000	14.89564	17.980	17.620	16.800	0.6397	0.6363	0.6340	0.6323	0.6243	0.6226	0.6203	0.6169	17.600	16.780	16.420
44	17.60000	15.24205	18.380	18.020	17.200	0.6398	0.6363	0.6340	0.6324	0.6242	0.6226	0.6203	0.6168	18.000	17.180	16.820
45	18.00000	15.58846	18.780	18.420	17.600	0.6399	0.6364	0.6341	0.6324	0.6242	0.6225	0.6202	0.6167	18.400	17.580	17.220
46	18.40000	15.93487	19.180	18.820	18.000	0.6400	0.6365	0.6341	0.6324	0.6242	0.6225	0.6201	0.6166	18.800	17.980	17.620
47	18.80000	16.28128	19.580	19.220	18.400	0.6401	0.6365	0.6342	0.6325	0.6241	0.6224	0.6201	0.6165	19.200	18.380	18.020
48	19.20000	16.62769	19.981	19.620	18.800	0.6402	0.6366	0.6342	0.6325	0.6241	0.6224	0.6200	0.6164	19.600	18.780	18.419
49	19.60000	16.97410	20.381	20.020	19.200	0.6403	0.6367	0.6343	0.6326	0.6240	0.6223	0.6199	0.6163	20.000	19.180	18.819
50	20.00000	17.32051	20.781	20.420	19.600	0.6404	0.6368	0.6344	0.6326	0.6240	0.6223	0.6198	0.6162	20.400	19.580	19.219
51	20.40000	17.66692	21.181	20.820	20.000	0.6405	0.6368	0.6344	0.6326	0.6240	0.6222	0.6198	0.6161	20.800	19.980	19.619
52	20.80000	18.01333	21.581	21.220	20.400	0.6406	0.6369	0.6345	0.6327	0.6239	0.6221	0.6197	0.6160	21.200	20.380	20.019
53	21.20000	18.35974	21.982	21.620	20.800	0.6407	0.6370	0.6345	0.6327	0.6239	0.6221	0.6196	0.6159	21.600	20.780	20.418
54	21.60000	18.70615	22.382	22.020	21.200	0.6408	0.6371	0.6346	0.6327	0.6239	0.6220	0.6195	0.6158	22.000	21.180	20.818
55	22.00000	19.05256	22.782	22.420	21.600	0.6409	0.6371	0.6346	0.6328	0.6238	0.6220	0.6195	0.6157	22.400	21.580	21.218
56	22.40000	19.39897	23.182	22.820	22.000	0.6410	0.6372	0.6347	0.6328	0.6238	0.6219	0.6194	0.6156	22.800	21.980	21.618
57	22.80000	19.74538	23.582	23.220	22.400	0.6411	0.6373	0.6347	0.6329	0.6237	0.6219	0.6193	0.6155	23.200	22.380	22.018
58	23.20000	20.09179	23.982	23.620	22.800	0.6412	0.6374	0.6348	0.6329	0.6237	0.6218	0.6192	0.6154	23.600	22.780	22.418
59	23.60000	20.43820	24.383	24.020	23.200	0.6414	0.6374	0.6348	0.6329	0.6237	0.6218	0.6192	0.6152	24.000	23.180	22.817
60	24.00000	20.78461	24.783	24.420	23.600	0.6415	0.6375	0.6349	0.6330	0.6236	0.6217	0.6191	0.6151	24.400	23.580	23.217

a. Measurement with pins cannot be used to determine effective space width and tooth thickness. Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. For REF values, see Section 25.

f. Where a minimum value for the fillet radius must be specified, see paragraph 7.3 and Table 108.

g. External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.

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30 DEG PRESSURE ANGLE

TABLE 26–30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 3/6 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.5236 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.5236 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
			7	6	5	4				4	5	6	7			
			s_7	s_6	s_5	s_4				t_4	t_5	t_6	t_7			
1	2	3.1	4.2	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.2
			Note f		Note e	Notes a & b								Note g	Note e	Note f
Tolerance in Ten Thousandths					+150 -0									+0 - 150		
6	2.000000	1.732051	2.646	2.338	1.747	0.5310	0.5288	0.5273	0.5262	0.5210	0.5199	0.5184	0.5162	2.333	1.742	1.354
7	2.333333	2.020726	2.980	2.672	2.044	0.5311	0.5289	0.5274	0.5263	0.5209	0.5198	0.5183	0.5161	2.667	2.039	1.687
8	2.666667	2.309401	3.313	3.006	2.357	0.5312	0.5290	0.5274	0.5263	0.5209	0.5198	0.5182	0.5160	3.000	2.350	2.020
9	3.000000	2.598076	3.647	3.340	2.675	0.5314	0.5290	0.5275	0.5264	0.5208	0.5197	0.5182	0.5158	3.333	2.668	2.353
10	3.333333	2.886751	3.980	3.674	3.000	0.5315	0.5291	0.5275	0.5264	0.5208	0.5197	0.5181	0.5157	3.667	2.993	2.686
11	3.666667	3.175426	4.314	4.008	3.334	0.5316	0.5292	0.5276	0.5264	0.5208	0.5196	0.5180	0.5156	4.000	3.326	3.020
12	4.000000	3.464102	4.647	4.342	3.667	0.5317	0.5293	0.5276	0.5265	0.5207	0.5196	0.5179	0.5155	4.333	3.658	3.353
13	4.333333	3.752777	4.981	4.676	4.000	0.5318	0.5293	0.5277	0.5265	0.5207	0.5195	0.5179	0.5154	4.667	3.991	3.686
14	4.666667	4.041452	5.314	5.010	4.334	0.5319	0.5294	0.5277	0.5265	0.5207	0.5195	0.5178	0.5153	5.000	4.324	4.019
15	5.000000	4.330127	5.648	5.344	4.667	0.5320	0.5295	0.5278	0.5266	0.5206	0.5194	0.5177	0.5152	5.333	4.656	4.352
16	5.333333	4.618802	5.981	5.678	5.000	0.5321	0.5295	0.5278	0.5266	0.5206	0.5194	0.5177	0.5151	5.667	4.989	4.685
17	5.666667	4.907477	6.315	6.012	5.334	0.5322	0.5296	0.5279	0.5267	0.5205	0.5193	0.5176	0.5150	6.000	5.322	5.018
18	6.000000	5.196152	6.648	6.346	5.667	0.5323	0.5297	0.5280	0.5267	0.5205	0.5192	0.5175	0.5149	6.333	5.654	5.352
19	6.333333	5.484828	6.982	6.680	6.000	0.5324	0.5298	0.5280	0.5267	0.5205	0.5192	0.5174	0.5148	6.667	5.987	5.685
20	6.666667	5.773503	7.315	7.014	6.334	0.5325	0.5298	0.5281	0.5268	0.5204	0.5191	0.5174	0.5147	7.000	6.320	6.018
21	7.000000	6.062178	7.649	7.348	6.667	0.5326	0.5299	0.5281	0.5268	0.5204	0.5191	0.5173	0.5146	7.333	6.652	6.351
22	7.333333	6.350853	7.982	7.682	7.000	0.5327	0.5300	0.5282	0.5268	0.5204	0.5190	0.5172	0.5145	7.667	6.985	6.684
23	7.666667	6.639528	8.316	8.016	7.334	0.5328	0.5301	0.5282	0.5269	0.5203	0.5190	0.5171	0.5144	8.000	7.318	7.017
24	8.000000	6.928203	8.650	8.350	7.667	0.5329	0.5301	0.5283	0.5269	0.5203	0.5189	0.5171	0.5143	8.333	7.650	7.350
25	8.333333	7.216878	8.983	8.684	8.000	0.5330	0.5302	0.5283	0.5270	0.5202	0.5189	0.5170	0.5142	8.667	7.983	7.684
26	8.666667	7.505553	9.317	9.018	8.334	0.5332	0.5303	0.5284	0.5270	0.5202	0.5188	0.5169	0.5140	9.000	8.316	8.017
27	9.000000	7.794229	9.650	9.352	8.667	0.5333	0.5304	0.5284	0.5270	0.5202	0.5188	0.5168	0.5139	9.333	8.648	8.350
28	9.333333	8.082904	9.984	9.686	9.000	0.5334	0.5304	0.5285	0.5271	0.5201	0.5187	0.5168	0.5138	9.667	8.981	8.683
29	9.666667	8.371579	10.317	10.020	9.334	0.5335	0.5305	0.5285	0.5271	0.5201	0.5187	0.5167	0.5137	10.000	9.314	9.016
30	10.00000	8.660254	10.651	10.354	9.667	0.5336	0.5306	0.5286	0.5271	0.5201	0.5186	0.5166	0.5136	10.333	9.646	9.349
31	10.33333	8.948929	10.984	10.687	10.000	0.5337	0.5307	0.5286	0.5272	0.5200	0.5186	0.5165	0.5135	10.667	9.980	9.683
32	10.66667	9.237604	11.318	11.020	10.334	0.5338	0.5307	0.5287	0.5272	0.5200	0.5185	0.5165	0.5134	11.000	10.313	10.016
33	11.00000	9.526279	11.651	11.354	10.667	0.5339	0.5308	0.5287	0.5273	0.5199	0.5185	0.5164	0.5133	11.333	10.646	10.349
34	11.33333	9.814955	11.985	11.687	11.000	0.5340	0.5309	0.5288	0.5273	0.5199	0.5184	0.5163	0.5132	11.667	10.980	10.682
35	11.66667	10.10363	12.318	12.020	11.334	0.5341	0.5310	0.5289	0.5273	0.5199	0.5183	0.5162	0.5131	12.000	11.313	11.015
36	12.00000	10.39230	12.652	12.354	11.667	0.5342	0.5310	0.5289	0.5274	0.5198	0.5183	0.5162	0.5130	12.333	11.646	11.348
37	12.33333	10.68098	12.985	12.687	12.000	0.5343	0.5311	0.5290	0.5274	0.5198	0.5182	0.5161	0.5129	12.667	11.980	11.681
38	12.66667	10.96966	13.319	13.020	12.334	0.5344	0.5312	0.5290	0.5274	0.5198	0.5182	0.5160	0.5128	13.000	12.313	12.015
39	13.00000	11.25833	13.652	13.354	12.667	0.5345	0.5313	0.5291	0.5275	0.5197	0.5181	0.5159	0.5127	13.333	12.646	12.348
40	13.33333	11.54701	13.986	13.687	13.000	0.5346	0.5313	0.5291	0.5275	0.5197	0.5181	0.5159	0.5126	13.667	12.980	12.681
41	13.66667	11.83568	14.319	14.020	13.334	0.5347	0.5314	0.5292	0.5276	0.5196	0.5180	0.5158	0.5125	14.000	13.313	13.014
42	14.00000	12.12436	14.653	14.354	13.667	0.5349	0.5315	0.5292	0.5276	0.5196	0.5180	0.5157	0.5123	14.333	13.646	13.347
43	14.33333	12.41303	14.986	14.687	14.000	0.5350	0.5316	0.5293	0.5276	0.5196	0.5179	0.5156	0.5122	14.667	13.980	13.680
44	14.66667	12.70171	15.320	15.020	14.334	0.5351	0.5316	0.5293	0.5277	0.5195	0.5179	0.5156	0.5121	15.000	14.313	14.013
45	15.00000	12.99038	15.653	15.354	14.667	0.5352	0.5317	0.5294	0.5277	0.5195	0.5178	0.5155	0.5120	15.333	14.646	14.347
46	15.33333	13.27906	15.987	15.687	15.000	0.5353	0.5318	0.5294	0.5277	0.5195	0.5178	0.5154	0.5119	15.667	14.980	14.680
47	15.66667	13.56773	16.320	16.020	15.334	0.5354	0.5318	0.5295	0.5278	0.5194	0.5177	0.5154	0.5118	16.000	15.313	15.013
48	16.00000	13.85641	16.654	16.354	15.667	0.5355	0.5319	0.5295	0.5278	0.5194	0.5177	0.5153	0.5117	16.333	15.646	15.346
49	16.33333	14.14508	16.987	16.687	16.000	0.5356	0.5320	0.5296	0.5279	0.5193	0.5176	0.5152	0.5116	16.667	15.980	15.679
50	16.66667	14.43376	17.321	17.020	16.334	0.5357	0.5321	0.5296	0.5279	0.5193	0.5175	0.5151	0.5115	17.000	16.313	16.012
51	17.00000	14.72243	17.654	17.354	16.667	0.5358	0.5321	0.5297	0.5279	0.5193	0.5175	0.5151	0.5114	17.333	16.646	16.346
52	17.33333	15.01111	17.988	17.687	17.000	0.5359	0.5322	0.5298	0.5280	0.5192	0.5174	0.5150	0.5113	17.667	16.980	16.679
53	17.66667	15.29978	18.322	18.020	17.334	0.5360	0.5323	0.5298	0.5280	0.5192	0.5174	0.5149	0.5112	18.000	17.313	17.012
54	18.00000	15.58846	18.655	18.354	17.667	0.5361	0.5324	0.5299	0.5280	0.5192	0.5173	0.5148	0.5111	18.333	17.646	17.345
55	18.33333	15.87713	18.989	18.687	18.000	0.5362	0.5324	0.5299	0.5281	0.5191	0.5173	0.5148	0.5110	18.667	17.980	17.678
56	18.66667	16.16581	19.322	19.020	18.334	0.5363	0.5325	0.5300	0.5281	0.5191	0.5172	0.5147	0.5109	19.000	18.313	18.011
57	19.00000	16.45448	19.656	19.354	18.667	0.5364	0.5326	0.5300	0.5282	0.5190	0.5172	0.5146	0.5108	19.333	18.646	18.344
58	19.33333	16.74316	19.989	19.687	19.000	0.5365	0.5327	0.5301	0.5282	0.5190	0.5171	0.5145	0.5107	19.667	18.980	18.678
59	19.66667	17.03183	20.323	20.020	19.334	0.5367	0.5327	0.5301	0.5282	0.5190	0.5171	0.5145	0.5105	20.000	19.313	19.011
60	20.00000	17.32051	20.656	20.354	19.667	0.5368	0.5328	0.5302	0.5283	0.5189	0.5170	0.5144	0.5104	20.333	19.646	19.344

a. Measurement with pins cannot be used to determine effective space width and tooth thickness. Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. For modified values, see Section 25.

f. Where a minimum value for the fillet radius must be specified, see paragraph 7.3 and Table 108.

g. External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15–1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.

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30 DEG PRESSURE ANGLE

TABLE 27–30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 4/8 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	S_v Min. Eff. Circ. Space Width = 0.3927 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.3927 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.2	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.2
			Note f		Note e	Notes a & b								Note g	Note e	Note f
Tolerance in Ten Thousandths					+100 -0									+0 -100		
6	1.500000	1.299038	1.987	1.754	1.314	0.3994	0.3974	0.3960	0.3951	0.3903	0.3894	0.3880	0.3860	1.750	1.309	1.013
7	1.750000	1.515544	2.237	2.004	1.534	0.3994	0.3974	0.3961	0.3951	0.3903	0.3893	0.3880	0.3860	2.000	1.529	1.263
8	2.000000	1.732051	2.487	2.254	1.768	0.3995	0.3975	0.3961	0.3951	0.3903	0.3893	0.3879	0.3859	2.250	1.763	1.513
9	2.250000	1.948557	2.737	2.505	2.006	0.3996	0.3975	0.3961	0.3951	0.3903	0.3893	0.3879	0.3858	2.500	2.001	1.763
10	2.500000	2.165064	2.987	2.755	2.250	0.3997	0.3976	0.3962	0.3952	0.3902	0.3892	0.3878	0.3857	2.750	2.245	2.013
11	2.750000	2.381570	3.237	3.006	2.500	0.3997	0.3976	0.3962	0.3952	0.3902	0.3892	0.3878	0.3857	3.000	2.494	2.263
12	3.000000	2.598076	3.487	3.256	2.750	0.3998	0.3977	0.3963	0.3952	0.3902	0.3891	0.3877	0.3856	3.250	2.744	2.513
13	3.250000	2.814583	3.737	3.507	3.000	0.3999	0.3977	0.3963	0.3953	0.3901	0.3891	0.3877	0.3855	3.500	2.993	2.763
14	3.500000	3.031089	3.988	3.757	3.250	0.4000	0.3978	0.3963	0.3953	0.3901	0.3891	0.3876	0.3854	3.750	3.243	3.012
15	3.750000	3.247595	4.238	4.008	3.500	0.4000	0.3978	0.3964	0.3953	0.3901	0.3890	0.3876	0.3854	4.000	3.492	3.262
16	4.000000	3.464102	4.488	4.258	3.750	0.4001	0.3979	0.3964	0.3953	0.3901	0.3890	0.3875	0.3853	4.250	3.742	3.512
17	4.250000	3.680608	4.738	4.509	4.000	0.4002	0.3979	0.3964	0.3954	0.3900	0.3890	0.3875	0.3852	4.500	3.991	3.762
18	4.500000	3.897114	4.988	4.759	4.250	0.4003	0.3980	0.3965	0.3954	0.3900	0.3889	0.3874	0.3851	4.750	4.241	4.012
19	4.750000	4.113621	5.238	5.010	4.500	0.4003	0.3981	0.3965	0.3954	0.3900	0.3889	0.3873	0.3851	5.000	4.490	4.262
20	5.000000	4.330127	5.488	5.260	4.750	0.4004	0.3981	0.3966	0.3954	0.3900	0.3888	0.3873	0.3850	5.250	4.740	4.512
21	5.250000	4.546633	5.739	5.511	5.000	0.4005	0.3982	0.3966	0.3955	0.3899	0.3888	0.3872	0.3849	5.500	4.989	4.761
22	5.500000	4.763140	5.989	5.761	5.250	0.4006	0.3982	0.3966	0.3955	0.3899	0.3888	0.3872	0.3848	5.750	5.239	5.011
23	5.750000	4.979646	6.239	6.012	5.500	0.4006	0.3983	0.3967	0.3955	0.3899	0.3887	0.3871	0.3848	6.000	5.488	5.261
24	6.000000	5.196152	6.489	6.262	5.750	0.4007	0.3983	0.3967	0.3955	0.3899	0.3887	0.3871	0.3847	6.250	5.738	5.511
25	6.250000	5.412659	6.739	6.513	6.000	0.4008	0.3984	0.3967	0.3956	0.3898	0.3887	0.3870	0.3846	6.500	5.987	5.761
26	6.500000	5.629165	6.989	6.763	6.250	0.4009	0.3984	0.3968	0.3956	0.3898	0.3886	0.3870	0.3845	6.750	6.237	6.011
27	6.750000	5.845671	7.239	7.014	6.500	0.4010	0.3985	0.3968	0.3956	0.3898	0.3886	0.3869	0.3844	7.000	6.486	6.261
28	7.000000	6.062178	7.489	7.264	6.750	0.4010	0.3985	0.3969	0.3957	0.3897	0.3885	0.3869	0.3844	7.250	6.736	6.511
29	7.250000	6.278684	7.740	7.515	7.000	0.4011	0.3986	0.3969	0.3957	0.3897	0.3885	0.3868	0.3843	7.500	6.985	6.760
30	7.500000	6.495190	7.990	7.765	7.250	0.4012	0.3986	0.3969	0.3957	0.3897	0.3885	0.3868	0.3842	7.750	7.235	7.010
31	7.750000	6.711697	8.240	8.016	7.500	0.4013	0.3987	0.3970	0.3957	0.3897	0.3884	0.3867	0.3841	8.000	7.484	7.260
32	8.000000	6.928203	8.490	8.266	7.750	0.4013	0.3987	0.3970	0.3958	0.3896	0.3884	0.3867	0.3841	8.250	7.734	7.510
33	8.250000	7.144710	8.740	8.517	8.000	0.4014	0.3988	0.3971	0.3958	0.3896	0.3883	0.3866	0.3840	8.500	7.983	7.760
34	8.500000	7.361216	8.990	8.767	8.250	0.4015	0.3988	0.3971	0.3958	0.3896	0.3883	0.3866	0.3839	8.750	8.233	8.010
35	8.750000	7.577722	9.240	9.018	8.500	0.4016	0.3989	0.3971	0.3958	0.3896	0.3883	0.3865	0.3838	9.000	8.482	8.260
36	9.000000	7.794229	9.490	9.268	8.750	0.4016	0.3990	0.3972	0.3959	0.3895	0.3882	0.3864	0.3838	9.250	8.732	8.510
37	9.250000	8.010735	9.741	9.519	9.000	0.4017	0.3990	0.3972	0.3959	0.3895	0.3882	0.3864	0.3837	9.500	8.981	8.759
38	9.500000	8.227241	9.991	9.769	9.250	0.4018	0.3991	0.3972	0.3959	0.3895	0.3882	0.3863	0.3836	9.750	9.231	9.009
39	9.750000	8.443748	10.241	10.020	9.500	0.4019	0.3991	0.3973	0.3960	0.3894	0.3881	0.3863	0.3835	10.000	9.480	9.259
40	10.00000	8.660254	10.491	10.270	9.750	0.4019	0.3992	0.3973	0.3960	0.3894	0.3881	0.3862	0.3835	10.250	9.730	9.509
41	10.25000	8.876760	10.741	10.520	10.000	0.4020	0.3992	0.3974	0.3960	0.3894	0.3880	0.3862	0.3834	10.500	9.980	9.759
42	10.50000	9.093267	10.991	10.770	10.250	0.4021	0.3993	0.3974	0.3960	0.3894	0.3880	0.3861	0.3833	10.750	10.230	10.009
43	10.75000	9.309773	11.241	11.020	10.500	0.4022	0.3993	0.3974	0.3961	0.3893	0.3880	0.3861	0.3832	11.000	10.480	10.259
44	11.00000	9.526279	11.492	11.270	10.750	0.4022	0.3994	0.3975	0.3961	0.3893	0.3879	0.3860	0.3832	11.250	10.730	10.508
45	11.25000	9.742786	11.742	11.520	11.000	0.4023	0.3994	0.3975	0.3961	0.3893	0.3879	0.3860	0.3831	11.500	10.980	10.758
46	11.50000	9.959292	11.992	11.770	11.250	0.4024	0.3995	0.3975	0.3961	0.3893	0.3879	0.3859	0.3830	11.750	11.230	11.008
47	11.75000	10.17580	12.242	12.020	11.500	0.4025	0.3995	0.3976	0.3962	0.3892	0.3878	0.3859	0.3829	12.000	11.480	11.258
48	12.00000	10.39230	12.492	12.270	11.750	0.4025	0.3996	0.3976	0.3962	0.3892	0.3878	0.3858	0.3829	12.250	11.730	11.508
49	12.25000	10.60881	12.742	12.520	12.000	0.4026	0.3996	0.3977	0.3962	0.3892	0.3877	0.3858	0.3828	12.500	11.980	11.758
50	12.50000	10.82532	12.992	12.770	12.250	0.4027	0.3997	0.3977	0.3962	0.3892	0.3877	0.3857	0.3827	12.750	12.230	12.008
51	12.75000	11.04182	13.242	13.020	12.500	0.4028	0.3998	0.3977	0.3963	0.3891	0.3877	0.3856	0.3826	13.000	12.480	12.258
52	13.00000	11.25833	13.493	13.270	12.750	0.4029	0.3998	0.3978	0.3963	0.3891	0.3876	0.3856	0.3825	13.250	12.730	12.507
53	13.25000	11.47484	13.743	13.520	13.000	0.4029	0.3999	0.3978	0.3963	0.3891	0.3876	0.3855	0.3825	13.500	12.980	12.757
54	13.50000	11.69134	13.993	13.770	13.250	0.4030	0.3999	0.3979	0.3964	0.3890	0.3875	0.3855	0.3824	13.750	13.230	13.007
55	13.75000	11.90785	14.243	14.020	13.500	0.4031	0.4000	0.3979	0.3964	0.3890	0.3875	0.3854	0.3823	14.000	13.480	13.257
56	14.00000	12.12436	14.493	14.270	13.750	0.4032	0.4000	0.3979	0.3964	0.3890	0.3875	0.3854	0.3822	14.250	13.730	13.507
57	14.25000	12.34086	14.743	14.520	14.000	0.4032	0.4001	0.3980	0.3964	0.3890	0.3874	0.3853	0.3822	14.500	13.980	13.757
58	14.50000	12.55737	14.993	14.770	14.250	0.4033	0.4001	0.3980	0.3965	0.3889	0.3874	0.3853	0.3821	14.750	14.230	14.007
59	14.75000	12.77387	15.244	15.020	14.500	0.4034	0.4002	0.3980	0.3965	0.3889	0.3874	0.3852	0.3820	15.000	14.480	14.256
60	15.00000	12.99038	15.494	15.270	14.750	0.4035	0.4002	0.3981	0.3965	0.3889	0.3873	0.3852	0.3819	15.250	14.730	14.506

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective thickness, see Table 64.

e. Values in this column are basic dimensions. All other values in this type are modified values, see Section 25.

f. Where a minimum value for the fillet radius must be specified, see paragraph 7.3 and Table 108.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15–1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 28—30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 5/10 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
						S_v Min. Eff. Circ. Space Width = 0.3142 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.3142 Notes c & d						
						S Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia. Max.	D_{Fi} Form Dia.	D_i Minor Dia.	7	6	5	4	4	5	6	7	D_o Major Dia.	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
						S_7	S_6	S_5	S_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.2	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.2
			Note f		Note e	Notes a & b								Note g	Note e	Note f
Tolerance in Ten Thousandths					+ 80 -0									+0 - 80		
6	1.200000	1.039230	1.592	1.404	**1.054**	0.3209	0.3189	0.3175	0.3166	0.3118	0.3109	0.3095	0.3075	1.400	**1.049**	0.808
7	1.400000	1.212436	1.792	1.604	**1.228**	0.3209	0.3189	0.3176	0.3166	0.3118	0.3108	0.3095	0.3075	1.600	**1.223**	1.008
8	1.600000	1.385641	1.992	1.804	**1.415**	0.3210	0.3190	0.3176	0.3166	0.3118	0.3108	0.3094	0.3074	1.800	**1.410**	1.208
9	1.800000	1.558846	2.192	2.004	**1.605**	0.3211	0.3190	0.3176	0.3166	0.3118	0.3108	0.3094	0.3073	2.000	**1.600**	1.408
10	2.000000	1.732051	2.392	2.204	1.800	0.3212	0.3191	0.3177	0.3167	0.3117	0.3107	0.3093	0.3072	2.200	1.796	1.608
11	2.200000	1.905256	2.592	2.405	2.000	0.3212	0.3191	0.3177	0.3167	0.3117	0.3107	0.3093	0.3072	2.400	1.995	1.808
12	2.400000	2.078461	2.792	2.605	2.200	0.3213	0.3192	0.3178	0.3167	0.3117	0.3106	0.3092	0.3071	2.600	2.195	2.008
13	2.600000	2.251666	2.992	2.806	2.400	0.3214	0.3192	0.3178	0.3168	0.3116	0.3106	0.3092	0.3070	2.800	2.394	2.208
14	2.800000	2.424871	3.193	3.006	2.600	0.3215	0.3193	0.3178	0.3168	0.3116	0.3106	0.3091	0.3069	3.000	2.594	2.407
15	3.000000	2.598076	3.393	3.206	2.800	0.3215	0.3193	0.3179	0.3168	0.3116	0.3105	0.3091	0.3069	3.200	2.794	2.607
16	3.200000	2.771281	3.593	3.407	3.000	0.3216	0.3194	0.3179	0.3168	0.3116	0.3105	0.3090	0.3068	3.400	2.993	2.807
17	3.400000	2.944486	3.793	3.607	3.200	0.3217	0.3194	0.3179	0.3169	0.3115	0.3105	0.3090	0.3067	3.600	3.193	3.007
18	3.600000	3.117691	3.993	3.808	3.400	0.3218	0.3195	0.3180	0.3169	0.3115	0.3104	0.3089	0.3066	3.800	3.392	3.207
19	3.800000	3.290897	4.193	4.008	3.601	0.3218	0.3196	0.3180	0.3169	0.3115	0.3104	0.3088	0.3066	4.000	3.592	3.407
20	4.000000	3.464102	4.393	4.208	3.800	0.3219	0.3196	0.3181	0.3169	0.3115	0.3103	0.3088	0.3065	4.200	3.792	3.607
21	4.200000	3.637307	4.594	4.409	4.000	0.3220	0.3197	0.3181	0.3170	0.3114	0.3103	0.3087	0.3064	4.400	3.991	3.806
22	4.400000	3.810512	4.794	4.609	4.200	0.3221	0.3197	0.3181	0.3170	0.3114	0.3103	0.3087	0.3063	4.600	4.191	4.006
23	4.600000	3.983717	4.994	4.810	4.400	0.3221	0.3198	0.3182	0.3170	0.3114	0.3102	0.3086	0.3063	4.800	4.390	4.206
24	4.800000	4.156922	5.194	5.010	4.600	0.3222	0.3198	0.3182	0.3170	0.3114	0.3102	0.3086	0.3062	5.000	4.590	4.406
25	5.000000	4.330127	5.394	5.210	4.800	0.3223	0.3199	0.3182	0.3171	0.3113	0.3102	0.3085	0.3061	5.200	4.790	4.606
26	5.200000	4.503332	5.594	5.411	5.000	0.3224	0.3199	0.3183	0.3171	0.3113	0.3101	0.3085	0.3060	5.400	4.989	4.806
27	5.400000	4.676537	5.794	5.611	5.200	0.3225	0.3200	0.3183	0.3171	0.3113	0.3101	0.3084	0.3059	5.600	5.189	5.006
28	5.600000	4.849742	5.994	5.812	5.400	0.3225	0.3200	0.3184	0.3172	0.3112	0.3100	0.3084	0.3059	5.800	5.388	5.206
29	5.800000	5.022947	6.195	6.012	5.600	0.3226	0.3201	0.3184	0.3172	0.3112	0.3100	0.3083	0.3058	6.000	5.588	5.405
30	6.000000	5.196152	6.395	6.212	5.800	0.3227	0.3201	0.3184	0.3172	0.3112	0.3100	0.3083	0.3057	6.200	5.788	5.605
31	6.200000	5.369357	6.595	6.413	6.000	0.3228	0.3202	0.3185	0.3172	0.3112	0.3099	0.3082	0.3056	6.400	5.987	5.805
32	6.400000	5.542563	6.795	6.613	6.200	0.3228	0.3202	0.3185	0.3173	0.3111	0.3099	0.3082	0.3056	6.600	6.187	6.005
33	6.600000	5.715768	6.995	6.814	6.400	0.3229	0.3203	0.3186	0.3173	0.3111	0.3098	0.3081	0.3055	6.800	6.386	6.205
34	6.800000	5.888973	7.195	7.014	6.600	0.3230	0.3203	0.3186	0.3173	0.3111	0.3098	0.3081	0.3054	7.000	6.586	6.405
35	7.000000	6.062178	7.395	7.214	6.800	0.3231	0.3204	0.3186	0.3173	0.3111	0.3098	0.3080	0.3053	7.200	6.786	6.605
36	7.200000	6.235383	7.595	7.415	7.000	0.3231	0.3205	0.3187	0.3174	0.3110	0.3097	0.3079	0.3053	7.400	6.985	6.805
37	7.400000	6.408588	7.796	7.615	7.200	0.3232	0.3205	0.3187	0.3174	0.3110	0.3097	0.3079	0.3052	7.600	7.185	7.004
38	7.600000	6.581793	7.996	7.816	7.400	0.3233	0.3206	0.3187	0.3174	0.3110	0.3097	0.3078	0.3051	7.800	7.384	7.204
39	7.800000	6.754998	8.196	8.016	7.600	0.3234	0.3206	0.3188	0.3175	0.3109	0.3096	0.3078	0.3050	8.000	7.584	7.404
40	8.000000	6.928203	8.396	8.216	7.800	0.3234	0.3207	0.3188	0.3175	0.3109	0.3096	0.3077	0.3050	8.200	7.784	7.604
41	8.200000	7.101408	8.596	8.417	8.000	0.3235	0.3207	0.3189	0.3175	0.3109	0.3095	0.3077	0.3049	8.400	7.983	7.804
42	8.400000	7.274613	8.796	8.617	8.200	0.3236	0.3208	0.3189	0.3175	0.3109	0.3095	0.3076	0.3048	8.600	8.183	8.004
43	8.600000	7.447818	8.996	8.818	8.400	0.3237	0.3208	0.3189	0.3176	0.3108	0.3095	0.3076	0.3047	8.800	8.382	8.204
44	8.800000	7.621024	9.197	9.018	8.600	0.3237	0.3209	0.3190	0.3176	0.3108	0.3094	0.3075	0.3047	9.000	8.582	8.403
45	9.000000	7.794229	9.397	9.218	8.800	0.3238	0.3209	0.3190	0.3176	0.3108	0.3094	0.3075	0.3046	9.200	8.782	8.603
46	9.200000	7.967434	9.597	9.419	9.000	0.3239	0.3210	0.3190	0.3176	0.3108	0.3094	0.3074	0.3045	9.400	8.981	8.803
47	9.400000	8.140639	9.797	9.619	9.200	0.3240	0.3210	0.3191	0.3177	0.3107	0.3093	0.3074	0.3044	9.600	9.181	9.003
48	9.600000	8.313844	9.997	9.820	9.400	0.3240	0.3211	0.3191	0.3177	0.3107	0.3093	0.3073	0.3044	9.800	9.380	9.203
49	9.800000	8.487049	10.197	10.020	9.600	0.3241	0.3211	0.3192	0.3177	0.3107	0.3092	0.3073	0.3043	10.000	9.580	9.403
50	10.00000	8.660254	10.397	10.220	9.800	0.3242	0.3212	0.3192	0.3177	0.3107	0.3092	0.3072	0.3042	10.200	9.780	9.603
51	10.20000	8.833459	10.597	10.420	10.000	0.3243	0.3213	0.3192	0.3178	0.3106	0.3092	0.3071	0.3041	10.400	9.980	9.803
52	10.40000	9.006664	10.798	10.620	10.200	0.3244	0.3213	0.3193	0.3178	0.3106	0.3091	0.3071	0.3040	10.600	10.180	10.002
53	10.60000	9.179869	10.998	10.820	10.400	0.3244	0.3214	0.3193	0.3178	0.3106	0.3091	0.3070	0.3040	10.800	10.380	10.202
54	10.80000	9.353074	11.198	11.020	10.600	0.3245	0.3214	0.3194	0.3179	0.3105	0.3090	0.3070	0.3039	11.000	10.580	10.402
55	11.00000	9.526279	11.398	11.220	10.800	0.3246	0.3215	0.3194	0.3179	0.3105	0.3090	0.3069	0.3038	11.200	10.780	10.602
56	11.20000	9.699484	11.598	11.420	11.000	0.3247	0.3215	0.3194	0.3179	0.3105	0.3090	0.3069	0.3037	11.400	10.980	10.802
57	11.40000	9.872690	11.798	11.620	11.200	0.3247	0.3216	0.3195	0.3179	0.3105	0.3089	0.3068	0.3037	11.600	11.180	11.002
58	11.60000	10.04589	11.998	11.820	11.400	0.3248	0.3216	0.3195	0.3180	0.3104	0.3089	0.3068	0.3036	11.800	11.380	11.202
59	11.80000	10.21910	12.199	12.020	11.600	0.3249	0.3217	0.3195	0.3180	0.3104	0.3089	0.3067	0.3035	12.000	11.580	11.401
60	12.00000	10.39230	12.399	12.220	11.800	0.3250	0.3217	0.3196	0.3180	0.3104	0.3088	0.3067	0.3034	12.200	11.780	11.601

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. Figures for minimum effective space width, and REF minimum effective space width, see Table 64.

e. Figures in bold type are modified values, see Section 25.

f. Where a minimum value for the fillet radius must be specified, see paragraph 7.3 and Table 108.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 29—30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 6/12 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.2618 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.2618 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.2	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.2
			Note f		Note e	Notes a & b								Note g	Note e	Note f
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
6	1.000000	0.8660254	1.326	1.171	**0.881**	0.2674	0.2657	0.2646	0.2638	0.2598	0.2590	0.2579	0.2562	1.167	**0.876**	0.674
7	1.166667	1.010363	1.493	1.338	**1.025**	0.2675	0.2658	0.2646	0.2638	0.2598	0.2590	0.2578	0.2561	1.333	**1.020**	0.840
8	1.333333	1.154701	1.660	1.504	**1.180**	0.2676	0.2658	0.2647	0.2638	0.2598	0.2589	0.2578	0.2560	1.500	**1.175**	1.007
9	1.500000	1.299038	1.827	1.671	**1.339**	0.2676	0.2659	0.2647	0.2639	0.2597	0.2589	0.2577	0.2560	1.667	**1.334**	1.173
10	1.666667	1.443376	1.994	1.838	1.500	0.2677	0.2659	0.2647	0.2639	0.2597	0.2588	0.2577	0.2559	1.833	1.496	1.340
11	1.833333	1.587713	2.160	2.004	1.667	0.2678	0.2660	0.2648	0.2639	0.2597	0.2588	0.2576	0.2558	2.000	1.662	1.506
12	2.000000	1.732051	2.327	2.171	1.834	0.2678	0.2660	0.2648	0.2639	0.2597	0.2588	0.2576	0.2558	2.167	1.829	1.673
13	2.166667	1.876388	2.494	2.338	2.000	0.2679	0.2661	0.2649	0.2640	0.2596	0.2587	0.2575	0.2557	2.333	1.995	1.839
14	2.333333	2.020726	2.661	2.505	2.167	0.2680	0.2661	0.2649	0.2640	0.2596	0.2587	0.2575	0.2556	2.500	2.162	2.006
15	2.500000	2.165064	2.827	2.672	2.334	0.2680	0.2662	0.2649	0.2640	0.2596	0.2587	0.2574	0.2555	2.667	2.328	2.173
16	2.666667	2.309401	2.994	2.839	2.500	0.2681	0.2662	0.2650	0.2640	0.2596	0.2586	0.2574	0.2555	2.833	2.494	2.339
17	2.833333	2.453739	3.161	3.006	2.667	0.2682	0.2663	0.2650	0.2641	0.2595	0.2586	0.2573	0.2554	3.000	2.661	2.506
18	3.000000	2.598076	3.328	3.173	2.834	0.2683	0.2663	0.2650	0.2641	0.2595	0.2586	0.2573	0.2553	3.167	2.827	2.672
19	3.166667	2.742414	3.495	3.340	3.000	0.2683	0.2664	0.2651	0.2641	0.2595	0.2585	0.2572	0.2553	3.333	2.993	2.839
20	3.333333	2.886751	3.661	3.507	3.167	0.2684	0.2664	0.2651	0.2641	0.2595	0.2585	0.2572	0.2552	3.500	3.160	3.005
21	3.500000	3.031089	3.828	3.674	3.334	0.2685	0.2665	0.2651	0.2642	0.2594	0.2585	0.2571	0.2551	3.667	3.326	3.172
22	3.666667	3.175426	3.995	3.841	3.500	0.2685	0.2665	0.2652	0.2642	0.2594	0.2584	0.2571	0.2551	3.833	3.492	3.338
23	3.833333	3.319764	4.162	4.008	3.667	0.2686	0.2666	0.2652	0.2642	0.2594	0.2584	0.2570	0.2550	4.000	3.659	3.505
24	4.000000	3.464102	4.329	4.175	3.834	0.2687	0.2666	0.2652	0.2642	0.2594	0.2584	0.2570	0.2549	4.167	3.825	3.671
25	4.166667	3.608439	4.495	4.342	4.000	0.2687	0.2667	0.2653	0.2643	0.2593	0.2583	0.2569	0.2548	4.333	3.991	3.838
26	4.333333	3.752777	4.662	4.509	4.167	0.2688	0.2667	0.2653	0.2643	0.2593	0.2583	0.2569	0.2548	4.500	4.158	4.005
27	4.500000	3.897114	4.829	4.676	4.334	0.2689	0.2668	0.2653	0.2643	0.2593	0.2583	0.2568	0.2547	4.667	4.324	4.171
28	4.666667	4.041452	4.996	4.843	4.500	0.2690	0.2668	0.2654	0.2643	0.2593	0.2582	0.2568	0.2546	4.833	4.490	4.338
29	4.833333	4.185789	5.163	5.010	4.667	0.2690	0.2669	0.2654	0.2644	0.2592	0.2582	0.2567	0.2546	5.000	4.657	4.504
30	5.000000	4.330127	5.329	5.177	4.834	0.2691	0.2669	0.2654	0.2644	0.2592	0.2581	0.2567	0.2545	5.167	4.823	4.671
31	5.166667	4.474465	5.496	5.344	5.000	0.2692	0.2670	0.2655	0.2644	0.2592	0.2581	0.2566	0.2544	5.333	4.989	4.837
32	5.333333	4.618802	5.663	5.511	5.167	0.2692	0.2670	0.2655	0.2644	0.2592	0.2581	0.2566	0.2544	5.500	5.156	5.004
33	5.500000	4.763140	5.830	5.678	5.334	0.2693	0.2671	0.2656	0.2645	0.2591	0.2580	0.2565	0.2543	5.667	5.322	5.170
34	5.666667	4.907477	5.996	5.845	5.500	0.2694	0.2671	0.2656	0.2645	0.2591	0.2580	0.2565	0.2542	5.833	5.488	5.337
35	5.833333	5.051815	6.163	6.012	5.667	0.2694	0.2672	0.2656	0.2645	0.2591	0.2580	0.2564	0.2541	6.000	5.655	5.503
36	6.000000	5.196152	6.330	6.179	5.834	0.2695	0.2672	0.2657	0.2645	0.2591	0.2579	0.2564	0.2541	6.167	5.821	5.670
37	6.166667	5.340490	6.497	6.346	6.000	0.2696	0.2673	0.2657	0.2646	0.2590	0.2579	0.2563	0.2540	6.333	5.987	5.837
38	6.333333	5.484828	6.664	6.513	6.167	0.2697	0.2673	0.2657	0.2646	0.2590	0.2579	0.2563	0.2539	6.500	6.154	6.003
39	6.500000	5.629165	6.830	6.680	6.334	0.2697	0.2674	0.2658	0.2646	0.2590	0.2578	0.2562	0.2539	6.667	6.320	6.170
40	6.666667	5.773503	6.997	6.847	6.500	0.2698	0.2674	0.2658	0.2646	0.2590	0.2578	0.2562	0.2538	6.833	6.486	6.336
41	6.833333	5.917840	7.164	7.014	6.667	0.2699	0.2674	0.2658	0.2647	0.2589	0.2578	0.2562	0.2537	7.000	6.653	6.503
42	7.000000	6.062178	7.331	7.181	6.834	0.2699	0.2675	0.2659	0.2647	0.2589	0.2577	0.2561	0.2537	7.167	6.819	6.669
43	7.166667	6.206515	7.498	7.348	7.000	0.2700	0.2675	0.2659	0.2647	0.2589	0.2577	0.2561	0.2536	7.333	6.985	6.836
44	7.333333	6.350853	7.664	7.515	7.167	0.2701	0.2676	0.2659	0.2647	0.2589	0.2577	0.2560	0.2535	7.500	7.152	7.002
45	7.500000	6.495190	7.831	7.682	7.334	0.2701	0.2676	0.2660	0.2648	0.2588	0.2576	0.2560	0.2534	7.667	7.318	7.169
46	7.666667	6.639528	7.998	7.849	7.500	0.2702	0.2677	0.2660	0.2648	0.2588	0.2576	0.2559	0.2534	7.833	7.484	7.335
47	7.833333	6.783866	8.165	8.016	7.667	0.2703	0.2677	0.2660	0.2648	0.2588	0.2576	0.2559	0.2533	8.000	7.651	7.502
48	8.000000	6.928203	8.331	8.183	7.834	0.2704	0.2678	0.2661	0.2648	0.2588	0.2575	0.2558	0.2532	8.167	7.817	7.669
49	8.166667	7.072541	8.498	8.350	8.000	0.2704	0.2678	0.2661	0.2649	0.2587	0.2575	0.2558	0.2532	8.333	7.983	7.835
50	8.333333	7.216878	8.665	8.517	8.167	0.2705	0.2679	0.2661	0.2649	0.2587	0.2574	0.2557	0.2531	8.500	8.150	8.002
51	8.500000	7.361216	8.832	8.684	8.334	0.2706	0.2679	0.2662	0.2649	0.2587	0.2574	0.2557	0.2530	8.667	8.316	8.168
52	8.666667	7.505553	8.999	8.851	8.500	0.2706	0.2680	0.2662	0.2649	0.2587	0.2574	0.2556	0.2530	8.833	8.482	8.335
53	8.833333	7.649891	9.165	9.018	8.667	0.2707	0.2680	0.2663	0.2650	0.2586	0.2573	0.2556	0.2529	9.000	8.649	8.501
54	9.000000	7.794229	9.332	9.185	8.834	0.2708	0.2681	0.2663	0.2650	0.2586	0.2573	0.2555	0.2528	9.167	8.815	8.668
55	9.166667	7.938566	9.499	9.352	9.000	0.2708	0.2681	0.2663	0.2650	0.2586	0.2573	0.2555	0.2527	9.333	8.981	8.834
56	9.333333	8.082904	9.666	9.519	9.167	0.2709	0.2682	0.2664	0.2650	0.2586	0.2572	0.2554	0.2527	9.500	9.148	9.001
57	9.500000	8.227241	9.833	9.686	9.334	0.2710	0.2682	0.2664	0.2651	0.2585	0.2572	0.2554	0.2526	9.667	9.314	9.167
58	9.666667	8.371579	9.999	9.853	9.500	0.2711	0.2683	0.2664	0.2651	0.2585	0.2572	0.2553	0.2525	9.833	9.480	9.334
59	9.833333	8.515916	10.166	10.020	9.667	0.2711	0.2683	0.2665	0.2651	0.2585	0.2571	0.2553	0.2525	10.000	9.647	9.501
60	10.00000	8.660254	10.333	10.187	9.834	0.2712	0.2684	0.2665	0.2651	0.2585	0.2571	0.2552	0.2524	10.167	9.813	9.667

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. For basis of these d values, see Section 25.

f. Where a minimum value for the fillet radius must be specified, see paragraph 7.3 and Table 108.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 30–30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 8/16 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.1963 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness - 0.1963 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.2	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.2
			Note f		Note e	Notes a & b								Note g	Note e	Note f
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
6	0.7500000	0.6495191	0.997	0.879	**0.664**	0.2019	0.2002	0.1991	0.1983	0.1943	0.1935	0.1924	0.1907	0.875	**0.659**	0.503
7	0.8750000	0.7577722	1.122	1.004	**0.772**	0.2020	0.2003	0.1991	0.1983	0.1943	0.1935	0.1923	0.1906	1.000	**0.767**	0.628
8	1.000000	0.8660254	1.247	1.129	**0.886**	0.2021	0.2003	0.1992	0.1983	0.1943	0.1934	0.1923	0.1905	1.125	**0.881**	0.753
9	1.125000	0.9742786	1.373	1.254	**1.005**	0.2021	0.2004	0.1992	0.1984	0.1942	0.1934	0.1922	0.1905	1.250	**1.000**	0.877
10	1.250000	1.082532	1.498	1.379	1.125	0.2022	0.2004	0.1992	0.1984	0.1942	0.1933	0.1922	0.1904	1.375	1.121	1.002
11	1.375000	1.190785	1.623	1.504	1.250	0.2023	0.2005	0.1993	0.1984	0.1942	0.1933	0.1921	0.1903	1.500	1.246	1.127
12	1.500000	1.299038	1.748	1.629	1.375	0.2023	0.2005	0.1993	0.1984	0.1942	0.1933	0.1921	0.1903	1.625	1.371	1.252
13	1.625000	1.407291	1.873	1.754	1.500	0.2024	0.2006	0.1994	0.1985	0.1941	0.1932	0.1920	0.1902	1.750	1.496	1.377
14	1.750000	1.515544	1.998	1.879	1.625	0.2025	0.2006	0.1994	0.1985	0.1941	0.1932	0.1920	0.1901	1.875	1.621	1.502
15	1.875000	1.623798	2.123	2.004	1.750	0.2025	0.2007	0.1994	0.1985	0.1941	0.1932	0.1919	0.1900	2.000	1.746	1.627
16	2.000000	1.732051	2.248	2.129	1.875	0.2026	0.2007	0.1995	0.1985	0.1941	0.1931	0.1919	0.1900	2.125	1.871	1.752
17	2.125000	1.840304	2.374	2.255	2.000	0.2027	0.2008	0.1995	0.1986	0.1940	0.1931	0.1918	0.1899	2.250	1.995	1.876
18	2.250000	1.948557	2.499	2.380	2.125	0.2028	0.2008	0.1995	0.1986	0.1940	0.1931	0.1918	0.1898	2.375	2.120	2.001
19	2.375000	2.056810	2.624	2.505	2.250	0.2028	0.2009	0.1996	0.1986	0.1940	0.1930	0.1917	0.1898	2.500	2.245	2.126
20	2.500000	2.165064	2.749	2.630	2.375	0.2029	0.2009	0.1996	0.1986	0.1940	0.1930	0.1917	0.1897	2.625	2.370	2.251
21	2.625000	2.273317	2.874	2.756	2.500	0.2030	0.2010	0.1996	0.1987	0.1939	0.1930	0.1916	0.1896	2.750	2.494	2.376
22	2.750000	2.381570	2.999	2.881	2.625	0.2030	0.2010	0.1997	0.1987	0.1939	0.1929	0.1916	0.1896	2.875	2.619	2.501
23	2.875000	2.489823	3.124	3.006	2.750	0.2031	0.2011	0.1997	0.1987	0.1939	0.1929	0.1915	0.1895	3.000	2.744	2.626
24	3.000000	2.598076	3.249	3.131	2.875	0.2032	0.2011	0.1997	0.1987	0.1939	0.1929	0.1915	0.1894	3.125	2.869	2.751
25	3.125000	2.706329	3.375	3.257	3.000	0.2032	0.2012	0.1998	0.1988	0.1938	0.1928	0.1914	0.1893	3.250	2.993	2.875
26	3.250000	2.814583	3.500	3.382	3.125	0.2033	0.2012	0.1998	0.1988	0.1938	0.1928	0.1914	0.1893	3.375	3.118	3.000
27	3.375000	2.922836	3.625	3.507	3.250	0.2034	0.2013	0.1998	0.1988	0.1938	0.1928	0.1913	0.1892	3.500	3.243	3.125
28	3.500000	3.031089	3.750	3.632	3.375	0.2035	0.2013	0.1999	0.1988	0.1938	0.1927	0.1913	0.1891	3.625	3.368	3.250
29	3.625000	3.139342	3.875	3.758	3.500	0.2035	0.2014	0.1999	0.1989	0.1937	0.1927	0.1912	0.1891	3.750	3.492	3.375
30	3.750000	3.247595	4.000	3.883	3.625	0.2036	0.2014	0.1999	0.1989	0.1937	0.1926	0.1912	0.1890	3.875	3.617	3.500
31	3.875000	3.355848	4.125	4.008	3.750	0.2037	0.2015	0.2000	0.1989	0.1937	0.1926	0.1911	0.1889	4.000	3.742	3.625
32	4.000000	3.464102	4.250	4.133	3.875	0.2037	0.2015	0.2000	0.1989	0.1937	0.1926	0.1911	0.1889	4.125	3.867	3.750
33	4.125000	3.572355	4.376	4.259	4.000	0.2038	0.2016	0.2001	0.1990	0.1936	0.1925	0.1910	0.1888	4.250	3.991	3.874
34	4.250000	3.680608	4.501	4.384	4.125	0.2039	0.2016	0.2001	0.1990	0.1936	0.1925	0.1910	0.1887	4.375	4.116	3.999
35	4.375000	3.788861	4.626	4.509	4.250	0.2039	0.2017	0.2001	0.1990	0.1936	0.1925	0.1909	0.1887	4.500	4.241	4.124
36	4.500000	3.897114	4.751	4.634	4.375	0.2040	0.2017	0.2002	0.1990	0.1936	0.1924	0.1909	0.1886	4.625	4.366	4.249
37	4.625000	4.005367	4.876	4.760	4.500	0.2041	0.2018	0.2002	0.1991	0.1935	0.1924	0.1908	0.1885	4.750	4.490	4.374
38	4.750000	4.113621	5.001	4.885	4.625	0.2042	0.2018	0.2002	0.1991	0.1935	0.1924	0.1908	0.1884	4.875	4.615	4.499
39	4.875000	4.221874	5.126	5.010	4.750	0.2042	0.2019	0.2003	0.1991	0.1935	0.1923	0.1907	0.1884	5.000	4.740	4.624
40	5.000000	4.330127	5.251	5.135	4.875	0.2043	0.2019	0.2003	0.1991	0.1935	0.1923	0.1907	0.1883	5.125	4.865	4.749
41	5.125000	4.438380	5.376	5.261	5.000	0.2044	0.2019	0.2003	0.1992	0.1934	0.1923	0.1907	0.1882	5.250	4.989	4.874
42	5.250000	4.546633	5.502	5.386	5.125	0.2044	0.2020	0.2004	0.1992	0.1934	0.1922	0.1906	0.1882	5.375	5.114	4.998
43	5.375000	4.654887	5.627	5.511	5.250	0.2045	0.2020	0.2004	0.1992	0.1934	0.1922	0.1906	0.1881	5.500	5.239	5.123
44	5.500000	4.763140	5.752	5.636	5.375	0.2046	0.2021	0.2004	0.1992	0.1934	0.1922	0.1905	0.1880	5.625	5.364	5.248
45	5.625000	4.871393	5.877	5.762	5.500	0.2046	0.2021	0.2005	0.1993	0.1933	0.1921	0.1905	0.1880	5.750	5.488	5.373
46	5.750000	4.979646	6.002	5.887	5.625	0.2047	0.2022	0.2005	0.1993	0.1933	0.1921	0.1904	0.1879	5.875	5.613	5.498
47	5.875000	5.087899	6.127	6.012	5.750	0.2048	0.2022	0.2005	0.1993	0.1933	0.1921	0.1904	0.1878	6.000	5.738	5.623
48	6.000000	5.196152	6.252	6.137	5.875	0.2049	0.2023	0.2006	0.1993	0.1933	0.1920	0.1903	0.1877	6.125	5.863	5.748
49	6.125000	5.304406	6.377	6.263	6.000	0.2049	0.2023	0.2006	0.1994	0.1932	0.1920	0.1903	0.1877	6.250	5.987	5.873
50	6.250000	5.412659	6.503	6.388	6.125	0.2050	0.2024	0.2006	0.1994	0.1932	0.1919	0.1902	0.1876	6.375	6.112	5.997
51	6.375000	5.520912	6.628	6.513	6.250	0.2051	0.2024	0.2007	0.1994	0.1932	0.1919	0.1902	0.1875	6.500	6.237	6.122
52	6.500000	5.629165	6.753	6.638	6.375	0.2051	0.2025	0.2007	0.1994	0.1932	0.1919	0.1901	0.1875	6.625	6.362	6.247
53	6.625000	5.737418	6.878	6.764	6.500	0.2052	0.2025	0.2008	0.1995	0.1931	0.1918	0.1901	0.1874	6.750	6.486	6.372
54	6.750000	5.845671	7.003	6.889	6.625	0.2053	0.2026	0.2008	0.1995	0.1931	0.1918	0.1900	0.1873	6.875	6.611	6.497
55	6.875000	5.953925	7.128	7.014	6.750	0.2053	0.2026	0.2008	0.1995	0.1931	0.1918	0.1900	0.1872	7.000	6.736	6.622
56	7.000000	6.062178	7.253	7.139	6.875	0.2054	0.2027	0.2009	0.1995	0.1931	0.1917	0.1899	0.1872	7.125	6.861	6.747
57	7.125000	6.170431	7.378	7.265	7.000	0.2055	0.2027	0.2009	0.1996	0.1930	0.1917	0.1899	0.1871	7.250	6.985	6.872
58	7.250000	6.278684	7.504	7.390	7.125	0.2056	0.2028	0.2009	0.1996	0.1930	0.1917	0.1898	0.1870	7.375	7.110	6.996
59	7.375000	6.386937	7.629	7.515	7.250	0.2056	0.2028	0.2010	0.1996	0.1930	0.1916	0.1898	0.1870	7.500	7.235	7.121
60	7.500000	6.495190	7.754	7.640	7.375	0.2057	0.2029	0.2010	0.1996	0.1930	0.1916	0.1897	0.1869	7.625	7.360	7.246

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. For modified values, see Section 25.

f. Where a minimum value for the fillet radius must be specified, see paragraph 7.3 and Table 108.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15–1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 31—30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 10/20 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.1571 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.1571 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.2	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.2
			Note f		Note e	Notes a & b								Note g	Note e	Note f
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
6	0.6000000	0.5196152	0.799	0.704	0.534	0.1624	0.1608	0.1598	0.1590	0.1552	0.1544	0.1534	0.1518	0.700	0.529	0.401
7	0.7000000	0.6062178	0.899	0.804	0.621	0.1625	0.1609	0.1598	0.1590	0.1552	0.1544	0.1533	0.1517	0.800	0.616	0.501
8	0.8000000	0.6928203	0.999	0.904	0.710	0.1625	0.1609	0.1598	0.1590	0.1552	0.1544	0.1533	0.1517	0.900	0.705	0.601
9	0.9000000	0.7794229	1.100	1.004	0.805	0.1626	0.1609	0.1598	0.1590	0.1552	0.1544	0.1533	0.1516	1.000	0.800	0.700
10	1.000000	0.8660254	1.200	1.104	0.901	0.1626	0.1610	0.1599	0.1591	0.1551	0.1543	0.1532	0.1516	1.100	0.896	0.800
11	1.100000	0.9526279	1.300	1.204	1.000	0.1627	0.1610	0.1599	0.1591	0.1551	0.1543	0.1532	0.1515	1.200	0.996	0.900
12	1.200000	1.039230	1.400	1.304	1.100	0.1627	0.1611	0.1599	0.1591	0.1551	0.1543	0.1531	0.1515	1.300	1.096	1.000
13	1.300000	1.125833	1.500	1.404	1.200	0.1628	0.1611	0.1600	0.1591	0.1551	0.1542	0.1531	0.1514	1.400	1.196	1.100
14	1.400000	1.212436	1.600	1.504	1.300	0.1629	0.1611	0.1600	0.1591	0.1551	0.1542	0.1531	0.1513	1.500	1.296	1.200
15	1.500000	1.299038	1.700	1.604	1.400	0.1629	0.1612	0.1600	0.1592	0.1550	0.1542	0.1530	0.1513	1.600	1.396	1.300
16	1.600000	1.385641	1.800	1.704	1.500	0.1630	0.1612	0.1600	0.1592	0.1550	0.1542	0.1530	0.1512	1.700	1.496	1.400
17	1.700000	1.472243	1.900	1.804	1.600	0.1630	0.1612	0.1601	0.1592	0.1550	0.1541	0.1530	0.1512	1.800	1.596	1.500
18	1.800000	1.558846	2.000	1.904	1.700	0.1631	0.1613	0.1601	0.1592	0.1550	0.1541	0.1529	0.1511	1.900	1.696	1.600
19	1.900000	1.645448	2.100	2.004	1.800	0.1631	0.1613	0.1601	0.1592	0.1550	0.1541	0.1529	0.1511	2.000	1.796	1.700
20	2.000000	1.732051	2.201	2.104	1.900	0.1632	0.1614	0.1601	0.1593	0.1549	0.1541	0.1528	0.1510	2.100	1.896	1.799
21	2.100000	1.818653	2.301	2.205	2.000	0.1632	0.1614	0.1602	0.1593	0.1549	0.1540	0.1528	0.1510	2.200	1.995	1.899
22	2.200000	1.905256	2.401	2.305	2.100	0.1633	0.1614	0.1602	0.1593	0.1549	0.1540	0.1528	0.1509	2.300	2.095	1.999
23	2.300000	1.991858	2.501	2.405	2.200	0.1633	0.1615	0.1602	0.1593	0.1549	0.1540	0.1527	0.1509	2.400	2.195	2.099
24	2.400000	2.078461	2.601	2.505	2.300	0.1634	0.1615	0.1602	0.1593	0.1549	0.1540	0.1527	0.1508	2.500	2.295	2.199
25	2.500000	2.165064	2.701	2.605	2.400	0.1634	0.1615	0.1603	0.1594	0.1548	0.1539	0.1527	0.1507	2.600	2.395	2.299
26	2.600000	2.251666	2.801	2.706	2.500	0.1635	0.1616	0.1603	0.1594	0.1548	0.1539	0.1526	0.1507	2.700	2.494	2.399
27	2.700000	2.338269	2.901	2.806	2.600	0.1636	0.1616	0.1603	0.1594	0.1548	0.1539	0.1526	0.1506	2.800	2.594	2.499
28	2.800000	2.424871	3.001	2.906	2.700	0.1636	0.1617	0.1604	0.1594	0.1548	0.1538	0.1525	0.1506	2.900	2.694	2.599
29	2.900000	2.511474	3.101	3.006	2.800	0.1637	0.1617	0.1604	0.1594	0.1548	0.1538	0.1525	0.1505	3.000	2.794	2.699
30	3.000000	2.598076	3.201	3.106	2.900	0.1637	0.1617	0.1604	0.1595	0.1547	0.1538	0.1525	0.1505	3.100	2.894	2.799
31	3.100000	2.684679	3.302	3.207	3.000	0.1638	0.1618	0.1604	0.1595	0.1547	0.1538	0.1524	0.1504	3.200	2.993	2.898
32	3.200000	2.771281	3.402	3.307	3.100	0.1638	0.1618	0.1605	0.1595	0.1547	0.1537	0.1524	0.1504	3.300	3.093	2.998
33	3.300000	2.857884	3.502	3.407	3.200	0.1639	0.1618	0.1605	0.1595	0.1547	0.1537	0.1524	0.1503	3.400	3.193	3.098
34	3.400000	2.944486	3.602	3.507	3.300	0.1639	0.1619	0.1605	0.1595	0.1547	0.1537	0.1523	0.1503	3.500	3.293	3.198
35	3.500000	3.031089	3.702	3.607	3.400	0.1640	0.1619	0.1605	0.1595	0.1547	0.1537	0.1523	0.1502	3.600	3.393	3.298
36	3.600000	3.117691	3.802	3.708	3.500	0.1640	0.1620	0.1606	0.1596	0.1546	0.1536	0.1522	0.1502	3.700	3.492	3.398
37	3.700000	3.204294	3.902	3.808	3.600	0.1641	0.1620	0.1606	0.1596	0.1546	0.1536	0.1522	0.1501	3.800	3.592	3.498
38	3.800000	3.290897	4.002	3.908	3.700	0.1642	0.1620	0.1606	0.1596	0.1546	0.1536	0.1522	0.1500	3.900	3.692	3.598
39	3.900000	3.377499	4.102	4.008	3.800	0.1642	0.1621	0.1607	0.1596	0.1546	0.1535	0.1521	0.1500	4.000	3.792	3.698
40	4.000000	3.464102	4.202	4.108	3.900	0.1643	0.1621	0.1607	0.1596	0.1546	0.1535	0.1521	0.1499	4.100	3.892	3.798
41	4.100000	3.550704	4.302	4.209	4.000	0.1643	0.1621	0.1607	0.1597	0.1545	0.1535	0.1521	0.1499	4.200	3.991	3.898
42	4.200000	3.637307	4.403	4.309	4.100	0.1644	0.1622	0.1607	0.1597	0.1545	0.1535	0.1520	0.1498	4.300	4.091	3.997
43	4.300000	3.723909	4.503	4.409	4.200	0.1644	0.1622	0.1608	0.1597	0.1545	0.1534	0.1520	0.1498	4.400	4.191	4.097
44	4.400000	3.810512	4.603	4.509	4.300	0.1645	0.1623	0.1608	0.1597	0.1545	0.1534	0.1519	0.1497	4.500	4.291	4.197
45	4.500000	3.897114	4.703	4.609	4.400	0.1645	0.1623	0.1608	0.1597	0.1545	0.1534	0.1519	0.1497	4.600	4.391	4.297
46	4.600000	3.983717	4.803	4.710	4.500	0.1646	0.1623	0.1608	0.1598	0.1544	0.1534	0.1519	0.1496	4.700	4.490	4.397
47	4.700000	4.070319	4.903	4.810	4.600	0.1646	0.1624	0.1609	0.1598	0.1544	0.1533	0.1518	0.1496	4.800	4.590	4.497
48	4.800000	4.156922	5.003	4.910	4.700	0.1647	0.1624	0.1609	0.1598	0.1544	0.1533	0.1518	0.1495	4.900	4.690	4.597
49	4.900000	4.243524	5.103	5.010	4.800	0.1647	0.1625	0.1609	0.1598	0.1544	0.1533	0.1517	0.1495	5.000	4.790	4.697
50	5.000000	4.330127	5.203	5.110	4.900	0.1648	0.1625	0.1609	0.1598	0.1544	0.1532	0.1517	0.1494	5.100	4.890	4.797
51	5.100000	4.416730	5.303	5.211	5.000	0.1649	0.1625	0.1610	0.1599	0.1543	0.1532	0.1517	0.1493	5.200	4.989	4.897
52	5.200000	4.503332	5.404	5.311	5.100	0.1649	0.1626	0.1610	0.1599	0.1543	0.1532	0.1516	0.1493	5.300	5.089	4.996
53	5.300000	4.589935	5.504	5.411	5.200	0.1650	0.1626	0.1610	0.1599	0.1543	0.1532	0.1516	0.1492	5.400	5.189	5.096
54	5.400000	4.676537	5.604	5.511	5.300	0.1650	0.1626	0.1611	0.1599	0.1543	0.1531	0.1516	0.1492	5.500	5.289	5.196
55	5.500000	4.763140	5.704	5.611	5.400	0.1651	0.1627	0.1611	0.1599	0.1543	0.1531	0.1515	0.1491	5.600	5.389	5.296
56	5.600000	4.849742	5.804	5.712	5.500	0.1651	0.1627	0.1611	0.1599	0.1543	0.1531	0.1515	0.1491	5.700	5.488	5.396
57	5.700000	4.936345	5.904	5.812	5.600	0.1652	0.1628	0.1611	0.1600	0.1542	0.1531	0.1514	0.1490	5.800	5.588	5.496
58	5.800000	5.022947	6.004	5.912	5.700	0.1652	0.1628	0.1612	0.1600	0.1542	0.1530	0.1514	0.1490	5.900	5.688	5.596
59	5.900000	5.109550	6.104	6.012	5.800	0.1653	0.1628	0.1612	0.1600	0.1542	0.1530	0.1514	0.1489	6.000	5.788	5.696
60	6.000000	5.196152	6.204	6.112	5.900	0.1653	0.1629	0.1612	0.1600	0.1542	0.1530	0.1513	0.1489	6.100	5.888	5.796

a. Measurement with pins cannot be used to determine effective space width and tooth thickness. Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. For REF values, see Section 25.

f. Where a minimum value for the fillet radius must be specified, see paragraph 7.3 and Table 108.

g. External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and tolerances on major diameter must be reduced by 0.2/P ∘ 0.004 in

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30 DEG PRESSURE ANGLE

TABLE 32—30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 12/24 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	S_v Min. Eff. Circ. Space Width = 0.1309 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.1309 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.2	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.2
			Note f		Note e	Notes a & b								Note g	Note e	Note f
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
6	0.5000000	0.4330127	0.668	0.588	**0.448**	0.1362	0.1346	0.1336	0.1328	0.1290	0.1282	0.1272	0.1256	0.583	**0.443**	0.332
7	0.5833333	0.5051814	0.751	0.671	**0.520**	0.1363	0.1347	0.1336	0.1328	0.1290	0.1282	0.1271	0.1255	0.667	**0.515**	0.416
8	0.6666667	0.5773502	0.834	0.754	**0.592**	0.1363	0.1347	0.1336	0.1328	0.1290	0.1282	0.1271	0.1255	0.750	**0.587**	0.499
9	0.7500000	0.6495191	0.918	0.838	**0.672**	0.1364	0.1347	0.1336	0.1328	0.1290	0.1282	0.1271	0.1254	0.833	**0.667**	0.582
10	0.8333333	0.7216878	1.001	0.921	**0.752**	0.1364	0.1348	0.1337	0.1329	0.1289	0.1281	0.1270	0.1254	0.917	**0.747**	0.665
11	0.9166667	0.7938566	1.085	1.004	0.834	0.1365	0.1348	0.1337	0.1329	0.1289	0.1281	0.1270	0.1253	1.000	0.829	0.749
12	1.000000	0.8660254	1.168	1.088	0.917	0.1365	0.1349	0.1337	0.1329	0.1289	0.1281	0.1269	0.1253	1.083	0.912	0.832
13	1.083333	0.9381941	1.252	1.171	1.000	0.1366	0.1349	0.1338	0.1329	0.1289	0.1280	0.1269	0.1252	1.167	0.996	0.915
14	1.166667	1.010363	1.335	1.254	1.084	0.1367	0.1349	0.1338	0.1329	0.1289	0.1280	0.1269	0.1251	1.250	1.079	0.998
15	1.250000	1.082532	1.418	1.338	1.167	0.1367	0.1350	0.1338	0.1330	0.1288	0.1280	0.1268	0.1251	1.333	1.162	1.082
16	1.333333	1.154701	1.502	1.421	1.250	0.1368	0.1350	0.1338	0.1330	0.1288	0.1280	0.1268	0.1250	1.417	1.246	1.165
17	1.416667	1.226869	1.585	1.504	1.334	0.1368	0.1350	0.1339	0.1330	0.1288	0.1279	0.1268	0.1250	1.500	1.329	1.248
18	1.500000	1.299038	1.669	1.588	1.417	0.1369	0.1351	0.1339	0.1330	0.1288	0.1279	0.1267	0.1249	1.583	1.412	1.331
19	1.583333	1.371207	1.752	1.671	1.500	0.1369	0.1351	0.1339	0.1330	0.1288	0.1279	0.1267	0.1249	1.667	1.496	1.415
20	1.666667	1.443376	1.836	1.754	1.584	0.1370	0.1352	0.1339	0.1331	0.1287	0.1279	0.1266	0.1248	1.750	1.579	1.498
21	1.750000	1.515544	1.919	1.838	1.667	0.1370	0.1352	0.1340	0.1331	0.1287	0.1278	0.1266	0.1248	1.833	1.662	1.581
22	1.833333	1.587713	2.002	1.921	1.750	0.1371	0.1352	0.1340	0.1331	0.1287	0.1278	0.1266	0.1247	1.917	1.746	1.664
23	1.916667	1.659882	2.086	2.004	1.834	0.1371	0.1353	0.1340	0.1331	0.1287	0.1278	0.1265	0.1247	2.000	1.829	1.748
24	2.000000	1.732051	2.169	2.088	1.917	0.1372	0.1353	0.1340	0.1331	0.1287	0.1278	0.1265	0.1246	2.083	1.912	1.831
25	2.083333	1.804220	2.253	2.171	2.000	0.1372	0.1353	0.1341	0.1332	0.1286	0.1277	0.1265	0.1245	2.167	1.995	1.914
26	2.166667	1.876388	2.336	2.255	2.084	0.1373	0.1354	0.1341	0.1332	0.1286	0.1277	0.1264	0.1245	2.250	2.079	1.997
27	2.250000	1.948557	2.420	2.338	2.167	0.1374	0.1354	0.1341	0.1332	0.1286	0.1277	0.1264	0.1244	2.333	2.162	2.080
28	2.333333	2.020726	2.503	2.422	2.250	0.1374	0.1355	0.1342	0.1332	0.1286	0.1276	0.1263	0.1244	2.417	2.245	2.164
29	2.416667	2.092895	2.586	2.505	2.334	0.1375	0.1355	0.1342	0.1332	0.1286	0.1276	0.1263	0.1243	2.500	2.328	2.247
30	2.500000	2.165064	2.670	2.589	2.417	0.1375	0.1355	0.1342	0.1333	0.1285	0.1276	0.1263	0.1243	2.583	2.411	2.330
31	2.583333	2.237232	2.753	2.672	2.500	0.1376	0.1356	0.1342	0.1333	0.1285	0.1276	0.1262	0.1242	2.667	2.494	2.413
32	2.666667	2.309401	2.837	2.756	2.584	0.1376	0.1356	0.1343	0.1333	0.1285	0.1275	0.1262	0.1242	2.750	2.578	2.497
33	2.750000	2.381570	2.920	2.839	2.667	0.1377	0.1356	0.1343	0.1333	0.1285	0.1275	0.1262	0.1241	2.833	2.661	2.580
34	2.833333	2.453739	3.004	2.923	2.750	0.1377	0.1357	0.1343	0.1333	0.1285	0.1275	0.1261	0.1241	2.917	2.744	2.663
35	2.916667	2.525907	3.087	3.006	2.834	0.1378	0.1357	0.1343	0.1333	0.1285	0.1275	0.1261	0.1240	3.000	2.827	2.746
36	3.000000	2.598076	3.170	3.090	2.917	0.1378	0.1358	0.1344	0.1334	0.1284	0.1274	0.1260	0.1240	3.083	2.910	2.830
37	3.083333	2.670245	3.254	3.173	3.000	0.1379	0.1358	0.1344	0.1334	0.1284	0.1274	0.1260	0.1239	3.167	2.993	2.913
38	3.166667	2.742414	3.337	3.257	3.084	0.1380	0.1358	0.1344	0.1334	0.1284	0.1274	0.1260	0.1238	3.250	3.077	2.996
39	3.250000	2.814583	3.421	3.340	3.167	0.1380	0.1359	0.1345	0.1334	0.1284	0.1273	0.1259	0.1238	3.333	3.160	3.079
40	3.333333	2.886751	3.504	3.424	3.250	0.1381	0.1359	0.1345	0.1334	0.1284	0.1273	0.1259	0.1237	3.417	3.243	3.163
41	3.416667	2.958920	3.587	3.507	3.334	0.1381	0.1359	0.1345	0.1335	0.1283	0.1273	0.1259	0.1237	3.500	3.326	3.246
42	3.500000	3.031089	3.671	3.591	3.417	0.1382	0.1360	0.1345	0.1335	0.1283	0.1273	0.1258	0.1236	3.583	3.409	3.329
43	3.583333	3.103258	3.754	3.674	3.500	0.1382	0.1360	0.1346	0.1335	0.1283	0.1272	0.1258	0.1236	3.667	3.492	3.412
44	3.666667	3.175426	3.838	3.758	3.584	0.1383	0.1361	0.1346	0.1335	0.1283	0.1272	0.1257	0.1235	3.750	3.576	3.496
45	3.750000	3.247595	3.921	3.841	3.667	0.1383	0.1361	0.1346	0.1335	0.1283	0.1272	0.1257	0.1235	3.833	3.659	3.579
46	3.833333	3.319764	4.005	3.925	3.750	0.1384	0.1361	0.1346	0.1336	0.1282	0.1272	0.1257	0.1234	3.917	3.742	3.662
47	3.916667	3.391933	4.088	4.008	3.834	0.1384	0.1362	0.1347	0.1336	0.1282	0.1271	0.1256	0.1234	4.000	3.825	3.745
48	4.000000	3.464102	4.171	4.092	3.917	0.1385	0.1362	0.1347	0.1336	0.1282	0.1271	0.1256	0.1233	4.083	3.908	3.829
49	4.083333	3.536270	4.255	4.175	4.000	0.1385	0.1363	0.1347	0.1336	0.1282	0.1271	0.1255	0.1233	4.167	3.991	3.912
50	4.166667	3.608439	4.338	4.259	4.084	0.1386	0.1363	0.1347	0.1336	0.1282	0.1270	0.1255	0.1232	4.250	4.075	3.995
51	4.250000	3.680608	4.422	4.342	4.167	0.1387	0.1363	0.1348	0.1337	0.1281	0.1270	0.1255	0.1231	4.333	4.158	4.078
52	4.333333	3.752777	4.505	4.426	4.250	0.1387	0.1364	0.1348	0.1337	0.1281	0.1270	0.1254	0.1231	4.417	4.241	4.161
53	4.416667	3.824946	4.589	4.509	4.334	0.1388	0.1364	0.1348	0.1337	0.1281	0.1270	0.1254	0.1230	4.500	4.324	4.245
54	4.500000	3.897114	4.672	4.593	4.417	0.1388	0.1364	0.1349	0.1337	0.1281	0.1269	0.1254	0.1230	4.583	4.407	4.328
55	4.583333	3.969283	4.755	4.676	4.500	0.1389	0.1365	0.1349	0.1337	0.1281	0.1269	0.1253	0.1229	4.667	4.490	4.411
56	4.666667	4.041452	4.839	4.760	4.584	0.1389	0.1365	0.1349	0.1337	0.1281	0.1269	0.1253	0.1229	4.750	4.574	4.494
57	4.750000	4.113621	4.922	4.843	4.667	0.1390	0.1366	0.1349	0.1338	0.1280	0.1269	0.1252	0.1228	4.833	4.657	4.578
58	4.833333	4.185789	5.006	4.927	4.750	0.1390	0.1366	0.1350	0.1338	0.1280	0.1268	0.1252	0.1228	4.917	4.740	4.661
59	4.916667	4.257958	5.089	5.010	4.834	0.1391	0.1366	0.1350	0.1338	0.1280	0.1268	0.1252	0.1227	5.000	4.823	4.744
60	5.000000	4.330127	5.173	5.094	4.917	0.1391	0.1367	0.1350	0.1338	0.1280	0.1268	0.1251	0.1227	5.083	4.906	4.827

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. For modified values, see Section 25.

f. Where a minimum value for the fillet radius must be specified, see paragraph 7.3 and Table 108.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15–1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameters must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 33—30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 16/32 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
						s_v Min. Eff. Circ. Space Width = 0.0982 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.0982 Notes c & d						
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia. Max.	D_{Fi} Form Dia.	D_i Minor Dia.	7	6	5	4	4	5	6	7	D_o Major Dia.	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.2	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.2
			Note f		Note e	Notes a & b								Note g	Note e	Note f
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
6	0.3750000	0.3247594	0.502	0.442	**0.339**	0.1032	0.1017	0.1007	0.1000	0.0964	0.0957	0.0947	0.0932	0.437	**0.334**	0.235
7	0.4375000	0.3788861	0.565	0.504	**0.393**	0.1033	0.1017	0.1007	0.1000	0.0964	0.0957	0.0947	0.0931	0.500	**0.388**	0.297
8	0.5000000	0.4330127	0.628	0.567	**0.448**	0.1033	0.1018	0.1008	0.1000	0.0964	0.0956	0.0946	0.0931	0.562	**0.443**	0.360
9	0.5625000	0.4871393	0.690	0.629	**0.505**	0.1033	0.1018	0.1008	0.1000	0.0964	0.0956	0.0946	0.0931	0.625	**0.500**	0.422
10	0.6250000	0.5412659	0.753	0.692	**0.565**	0.1034	0.1018	0.1008	0.1000	0.0964	0.0956	0.0946	0.0930	0.687	**0.560**	0.485
11	0.6875000	0.5953925	0.815	0.754	0.625	0.1034	0.1019	0.1008	0.1001	0.0963	0.0956	0.0945	0.0930	0.750	0.621	0.547
12	0.7500000	0.6495191	0.878	0.817	0.688	0.1035	0.1019	0.1008	0.1001	0.0963	0.0956	0.0945	0.0929	0.812	0.683	0.610
13	0.8125000	0.7036456	0.940	0.879	0.750	0.1035	0.1019	0.1008	0.1001	0.0963	0.0956	0.0945	0.0929	0.875	0.746	0.672
14	0.8750000	0.7577722	1.003	0.942	0.813	0.1035	0.1019	0.1009	0.1001	0.0963	0.0955	0.0945	0.0929	0.937	0.808	0.735
15	0.9375000	0.8118988	1.066	1.004	0.875	0.1036	0.1020	0.1009	0.1001	0.0963	0.0955	0.0944	0.0928	1.000	0.871	0.797
16	1.000000	0.8660254	1.128	1.067	0.938	0.1036	0.1020	0.1009	0.1001	0.0963	0.0955	0.0944	0.0928	1.062	0.933	0.859
17	1.062500	0.9201520	1.191	1.129	1.000	0.1036	0.1020	0.1009	0.1001	0.0963	0.0955	0.0944	0.0928	1.125	0.996	0.922
18	1.125000	0.9742786	1.253	1.192	1.063	0.1037	0.1020	0.1009	0.1001	0.0963	0.0955	0.0944	0.0927	1.187	1.058	0.984
19	1.187500	1.028405	1.316	1.254	1.125	0.1037	0.1021	0.1010	0.1002	0.0962	0.0954	0.0943	0.0927	1.250	1.121	1.047
20	1.250000	1.082532	1.378	1.317	1.188	0.1038	0.1021	0.1010	0.1002	0.0962	0.0954	0.0943	0.0926	1.312	1.183	1.109
21	1.312500	1.136658	1.441	1.379	1.250	0.1038	0.1021	0.1010	0.1002	0.0962	0.0954	0.0943	0.0926	1.375	1.246	1.172
22	1.375000	1.190785	1.504	1.442	1.313	0.1038	0.1021	0.1010	0.1002	0.0962	0.0954	0.0943	0.0926	1.437	1.308	1.234
23	1.437500	1.244912	1.566	1.504	1.375	0.1039	0.1022	0.1010	0.1002	0.0962	0.0954	0.0942	0.0925	1.500	1.371	1.296
24	1.500000	1.299038	1.629	1.567	1.438	0.1039	0.1022	0.1011	0.1002	0.0962	0.0953	0.0942	0.0925	1.562	1.433	1.359
25	1.562500	1.353165	1.691	1.629	1.500	0.1039	0.1022	0.1011	0.1002	0.0962	0.0953	0.0942	0.0925	1.625	1.496	1.421
26	1.625000	1.407291	1.754	1.692	1.563	0.1040	0.1023	0.1011	0.1003	0.0961	0.0953	0.0941	0.0924	1.687	1.558	1.484
27	1.687500	1.461418	1.816	1.754	1.625	0.1040	0.1023	0.1011	0.1003	0.0961	0.0953	0.0941	0.0924	1.750	1.621	1.546
28	1.750000	1.515544	1.879	1.817	1.688	0.1041	0.1023	0.1011	0.1003	0.0961	0.0953	0.0941	0.0923	1.812	1.683	1.609
29	1.812500	1.569671	1.941	1.879	1.750	0.1041	0.1023	0.1012	0.1003	0.0961	0.0952	0.0941	0.0923	1.875	1.746	1.671
30	1.875000	1.623798	2.004	1.942	1.813	0.1041	0.1024	0.1012	0.1003	0.0961	0.0952	0.0940	0.0923	1.937	1.808	1.733
31	1.937500	1.677924	2.067	2.004	1.875	0.1042	0.1024	0.1012	0.1003	0.0961	0.0952	0.0940	0.0922	2.000	1.871	1.796
32	2.000000	1.732051	2.129	2.067	1.938	0.1042	0.1024	0.1012	0.1003	0.0961	0.0952	0.0940	0.0922	2.062	1.933	1.858
33	2.062500	1.786177	2.192	2.130	2.000	0.1043	0.1024	0.1012	0.1003	0.0961	0.0952	0.0940	0.0921	2.125	1.995	1.921
34	2.125000	1.840304	2.254	2.192	2.063	0.1043	0.1025	0.1012	0.1004	0.0960	0.0952	0.0939	0.0921	2.187	2.058	1.983
35	2.187500	1.894431	2.317	2.255	2.125	0.1043	0.1025	0.1013	0.1004	0.0960	0.0951	0.0939	0.0921	2.250	2.120	2.046
36	2.250000	1.948557	2.379	2.317	2.188	0.1044	0.1025	0.1013	0.1004	0.0960	0.0951	0.0939	0.0920	2.312	2.183	2.108
37	2.312500	2.002684	2.442	2.380	2.250	0.1044	0.1025	0.1013	0.1004	0.0960	0.0951	0.0939	0.0920	2.375	2.245	2.171
38	2.375000	2.056810	2.505	2.443	2.313	0.1044	0.1026	0.1013	0.1004	0.0960	0.0951	0.0938	0.0920	2.437	2.307	2.233
39	2.437500	2.110937	2.567	2.505	2.375	0.1045	0.1026	0.1013	0.1004	0.0960	0.0951	0.0938	0.0919	2.500	2.370	2.295
40	2.500000	2.165064	2.630	2.568	2.438	0.1045	0.1026	0.1014	0.1004	0.0960	0.0950	0.0938	0.0919	2.562	2.432	2.358
41	2.562500	2.219190	2.692	2.631	2.500	0.1046	0.1027	0.1014	0.1005	0.0959	0.0950	0.0937	0.0918	2.625	2.494	2.420
42	2.625000	2.273317	2.755	2.693	2.563	0.1046	0.1027	0.1014	0.1005	0.0959	0.0950	0.0937	0.0918	2.687	2.557	2.483
43	2.687500	2.327443	2.817	2.756	2.625	0.1046	0.1027	0.1014	0.1005	0.0959	0.0950	0.0937	0.0918	2.750	2.619	2.545
44	2.750000	2.381570	2.880	2.818	2.688	0.1047	0.1027	0.1014	0.1005	0.0959	0.0950	0.0937	0.0917	2.812	2.682	2.608
45	2.812500	2.435696	2.943	2.881	2.750	0.1047	0.1028	0.1015	0.1005	0.0959	0.0949	0.0936	0.0917	2.875	2.744	2.670
46	2.875000	2.489823	3.005	2.944	2.813	0.1047	0.1028	0.1015	0.1005	0.0959	0.0949	0.0936	0.0917	2.937	2.806	2.732
47	2.937500	2.543950	3.068	3.006	2.875	0.1048	0.1028	0.1015	0.1005	0.0959	0.0949	0.0936	0.0916	3.000	2.869	2.795
48	3.000000	2.598076	3.130	3.069	2.938	0.1048	0.1028	0.1015	0.1006	0.0958	0.0949	0.0936	0.0916	3.062	2.931	2.857
49	3.062500	2.652203	3.193	3.132	3.000	0.1049	0.1029	0.1015	0.1006	0.0958	0.0949	0.0935	0.0915	3.125	2.993	2.920
50	3.125000	2.706329	3.255	3.194	3.063	0.1049	0.1029	0.1015	0.1006	0.0958	0.0949	0.0935	0.0915	3.187	3.056	2.982
51	3.187500	2.760456	3.318	3.257	3.125	0.1049	0.1029	0.1016	0.1006	0.0958	0.0948	0.0935	0.0915	3.250	3.118	3.045
52	3.250000	2.814583	3.380	3.319	3.188	0.1050	0.1029	0.1016	0.1006	0.0958	0.0948	0.0935	0.0914	3.312	3.181	3.107
53	3.312500	2.868709	3.443	3.382	3.250	0.1050	0.1030	0.1016	0.1006	0.0958	0.0948	0.0934	0.0914	3.375	3.243	3.169
54	3.375000	2.922836	3.506	3.445	3.313	0.1051	0.1030	0.1016	0.1006	0.0958	0.0948	0.0934	0.0913	3.437	3.305	3.232
55	3.437500	2.976962	3.568	3.507	3.375	0.1051	0.1030	0.1016	0.1006	0.0958	0.0948	0.0934	0.0913	3.500	3.368	3.294
56	3.500000	3.031089	3.631	3.570	3.438	0.1051	0.1030	0.1017	0.1007	0.0957	0.0947	0.0934	0.0913	3.562	3.430	3.357
57	3.562500	3.085215	3.693	3.633	3.500	0.1052	0.1031	0.1017	0.1007	0.0957	0.0947	0.0933	0.0912	3.625	3.492	3.419
58	3.625000	3.139342	3.756	3.695	3.563	0.1052	0.1031	0.1017	0.1007	0.0957	0.0947	0.0933	0.0912	3.687	3.555	3.482
59	3.687500	3.193469	3.818	3.758	3.625	0.1052	0.1031	0.1017	0.1007	0.0957	0.0947	0.0933	0.0912	3.750	3.617	3.544
60	3.750000	3.247595	3.881	3.820	3.688	0.1053	0.1032	0.1017	0.1007	0.0957	0.0947	0.0932	0.0911	3.812	3.680	3.606

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Pin diameters are modified values, see Section 25.

f. Where a minimum value for the fillet radius must be specified, see paragraph 7.3 and Table 108.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15–1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 34—30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 20/40 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width 0.0785 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness 0.0785 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.2	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.2
			Note f		Note e	Notes a & b								Note g	Note e	Note f
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
6	0.3000000	0.2598076	0.404	0.354	**0.274**	0.0835	0.0820	0.0810	0.0803	0.0767	0.0760	0.0750	0.0735	0.350	**0.269**	0.186
7	0.3500000	0.3031089	0.454	0.404	**0.318**	0.0836	0.0820	0.0810	0.0803	0.0767	0.0760	0.0750	0.0734	0.400	**0.313**	0.236
8	0.4000000	0.3464102	0.504	0.454	**0.361**	0.0836	0.0821	0.0811	0.0803	0.0767	0.0759	0.0749	0.0734	0.450	**0.356**	0.286
9	0.4500000	0.3897114	0.554	0.504	**0.405**	0.0836	0.0821	0.0811	0.0803	0.0767	0.0759	0.0749	0.0734	0.500	**0.400**	0.336
10	0.5000000	0.4330127	0.604	0.554	**0.453**	0.0837	0.0821	0.0811	0.0803	0.0767	0.0759	0.0749	0.0733	0.550	**0.448**	0.386
11	0.5500000	0.4763140	0.654	0.604	**0.501**	0.0837	0.0822	0.0811	0.0804	0.0766	0.0759	0.0748	0.0733	0.600	**0.496**	0.436
12	0.6000000	0.5196152	0.704	0.654	0.550	0.0838	0.0822	0.0811	0.0804	0.0766	0.0759	0.0748	0.0732	0.650	0.546	0.486
13	0.6500000	0.5629165	0.754	0.704	0.600	0.0838	0.0822	0.0811	0.0804	0.0766	0.0759	0.0748	0.0732	0.700	0.596	0.536
14	0.7000000	0.6062178	0.804	0.754	0.650	0.0838	0.0822	0.0812	0.0804	0.0766	0.0758	0.0748	0.0732	0.750	0.646	0.586
15	0.7500000	0.6495191	0.854	0.804	0.700	0.0839	0.0823	0.0812	0.0804	0.0766	0.0758	0.0747	0.0731	0.800	0.696	0.636
16	0.8000000	0.6928203	0.904	0.854	0.750	0.0839	0.0823	0.0812	0.0804	0.0766	0.0758	0.0747	0.0731	0.850	0.746	0.686
17	0.8500000	0.7361216	0.954	0.904	0.800	0.0839	0.0823	0.0812	0.0804	0.0766	0.0758	0.0747	0.0731	0.900	0.796	0.736
18	0.9000000	0.7794229	1.004	0.954	0.850	0.0840	0.0823	0.0812	0.0804	0.0766	0.0758	0.0747	0.0730	0.950	0.846	0.786
19	0.9500000	0.8227241	1.055	1.004	0.900	0.0840	0.0824	0.0813	0.0805	0.0765	0.0757	0.0746	0.0730	1.000	0.896	0.835
20	1.000000	0.8660254	1.105	1.054	0.950	0.0841	0.0824	0.0813	0.0805	0.0765	0.0757	0.0746	0.0729	1.050	0.946	0.885
21	1.050000	0.9093267	1.155	1.104	1.000	0.0841	0.0824	0.0813	0.0805	0.0765	0.0757	0.0746	0.0729	1.100	0.996	0.935
22	1.100000	0.9526279	1.205	1.154	1.050	0.0841	0.0824	0.0813	0.0805	0.0765	0.0757	0.0746	0.0729	1.150	1.046	0.985
23	1.150000	0.9959292	1.255	1.204	1.100	0.0842	0.0825	0.0813	0.0805	0.0765	0.0757	0.0745	0.0728	1.200	1.096	1.035
24	1.200000	1.039230	1.305	1.254	1.150	0.0842	0.0825	0.0814	0.0805	0.0765	0.0756	0.0745	0.0728	1.250	1.146	1.085
25	1.250000	1.082532	1.355	1.304	1.200	0.0842	0.0825	0.0814	0.0805	0.0765	0.0756	0.0745	0.0728	1.300	1.196	1.135
26	1.300000	1.125833	1.405	1.354	1.250	0.0843	0.0826	0.0814	0.0806	0.0764	0.0756	0.0744	0.0727	1.350	1.246	1.185
27	1.350000	1.169134	1.455	1.404	1.300	0.0843	0.0826	0.0814	0.0806	0.0764	0.0756	0.0744	0.0727	1.400	1.296	1.235
28	1.400000	1.212436	1.505	1.454	1.350	0.0844	0.0826	0.0814	0.0806	0.0764	0.0756	0.0744	0.0726	1.450	1.346	1.285
29	1.450000	1.255737	1.555	1.504	1.400	0.0844	0.0826	0.0815	0.0806	0.0764	0.0755	0.0744	0.0726	1.500	1.396	1.335
30	1.500000	1.299038	1.605	1.554	1.450	0.0844	0.0827	0.0815	0.0806	0.0764	0.0755	0.0743	0.0726	1.550	1.446	1.385
31	1.550000	1.342339	1.655	1.604	1.500	0.0845	0.0827	0.0815	0.0806	0.0764	0.0755	0.0743	0.0725	1.600	1.496	1.435
32	1.600000	1.385641	1.705	1.654	1.550	0.0845	0.0827	0.0815	0.0806	0.0764	0.0755	0.0743	0.0725	1.650	1.546	1.485
33	1.650000	1.428942	1.755	1.704	1.600	0.0846	0.0827	0.0815	0.0806	0.0764	0.0755	0.0743	0.0724	1.700	1.596	1.535
34	1.700000	1.472243	1.806	1.754	1.650	0.0846	0.0828	0.0815	0.0807	0.0763	0.0755	0.0742	0.0724	1.750	1.646	1.584
35	1.750000	1.515544	1.856	1.804	1.700	0.0846	0.0828	0.0816	0.0807	0.0763	0.0754	0.0742	0.0724	1.800	1.696	1.634
36	1.800000	1.558846	1.906	1.854	1.750	0.0847	0.0828	0.0816	0.0807	0.0763	0.0754	0.0742	0.0723	1.850	1.746	1.684
37	1.850000	1.602147	1.956	1.904	1.800	0.0847	0.0828	0.0816	0.0807	0.0763	0.0754	0.0742	0.0723	1.900	1.796	1.734
38	1.900000	1.645448	2.006	1.954	1.850	0.0847	0.0829	0.0816	0.0807	0.0763	0.0754	0.0741	0.0723	1.950	1.846	1.784
39	1.950000	1.688750	2.056	2.004	1.900	0.0848	0.0829	0.0816	0.0807	0.0763	0.0754	0.0741	0.0722	2.000	1.896	1.834
40	2.000000	1.732051	2.106	2.054	1.950	0.0848	0.0829	0.0817	0.0807	0.0763	0.0753	0.0741	0.0722	2.050	1.946	1.884
41	2.050000	1.775352	2.156	2.105	2.000	0.0849	0.0830	0.0817	0.0808	0.0762	0.0753	0.0740	0.0721	2.100	1.995	1.934
42	2.100000	1.818653	2.206	2.155	2.050	0.0849	0.0830	0.0817	0.0808	0.0762	0.0753	0.0740	0.0721	2.150	2.045	1.984
43	2.150000	1.861955	2.256	2.205	2.100	0.0849	0.0830	0.0817	0.0808	0.0762	0.0753	0.0740	0.0721	2.200	2.095	2.034
44	2.200000	1.905256	2.306	2.255	2.150	0.0850	0.0830	0.0817	0.0808	0.0762	0.0753	0.0740	0.0720	2.250	2.145	2.084
45	2.250000	1.948557	2.356	2.305	2.200	0.0850	0.0831	0.0818	0.0808	0.0762	0.0752	0.0739	0.0720	2.300	2.195	2.134
46	2.300000	1.991858	2.406	2.355	2.250	0.0850	0.0831	0.0818	0.0808	0.0762	0.0752	0.0739	0.0720	2.350	2.245	2.184
47	2.350000	2.035160	2.456	2.405	2.300	0.0851	0.0831	0.0818	0.0808	0.0762	0.0752	0.0739	0.0719	2.400	2.295	2.234
48	2.400000	2.078461	2.506	2.455	2.350	0.0851	0.0831	0.0818	0.0809	0.0761	0.0752	0.0739	0.0719	2.450	2.345	2.284
49	2.450000	2.121762	2.557	2.505	2.400	0.0852	0.0832	0.0818	0.0809	0.0761	0.0752	0.0738	0.0718	2.500	2.395	2.333
50	2.500000	2.165064	2.607	2.555	2.450	0.0852	0.0832	0.0818	0.0809	0.0761	0.0752	0.0738	0.0718	2.550	2.445	2.383
51	2.550000	2.208365	2.657	2.606	2.500	0.0852	0.0832	0.0819	0.0809	0.0761	0.0751	0.0738	0.0718	2.600	2.494	2.433
52	2.600000	2.251666	2.707	2.656	2.550	0.0853	0.0832	0.0819	0.0809	0.0761	0.0751	0.0738	0.0717	2.650	2.544	2.483
53	2.650000	2.294967	2.757	2.706	2.600	0.0853	0.0833	0.0819	0.0809	0.0761	0.0751	0.0737	0.0717	2.700	2.594	2.533
54	2.700000	2.338269	2.807	2.756	2.650	0.0854	0.0833	0.0819	0.0809	0.0761	0.0751	0.0737	0.0716	2.750	2.644	2.583
55	2.750000	2.381570	2.857	2.806	2.700	0.0854	0.0833	0.0819	0.0809	0.0761	0.0751	0.0737	0.0716	2.800	2.694	2.633
56	2.800000	2.424871	2.907	2.856	2.750	0.0854	0.0833	0.0820	0.0810	0.0760	0.0750	0.0737	0.0716	2.850	2.744	2.683
57	2.850000	2.468172	2.957	2.906	2.800	0.0855	0.0834	0.0820	0.0810	0.0760	0.0750	0.0736	0.0715	2.900	2.794	2.733
58	2.900000	2.511474	3.007	2.956	2.850	0.0855	0.0834	0.0820	0.0810	0.0760	0.0750	0.0736	0.0715	2.950	2.844	2.783
59	2.950000	2.554775	3.057	3.006	2.900	0.0855	0.0834	0.0820	0.0810	0.0760	0.0750	0.0736	0.0715	3.000	2.894	2.833
60	3.000000	2.598076	3.107	3.056	2.950	0.0856	0.0835	0.0820	0.0810	0.0760	0.0750	0.0735	0.0714	3.050	2.944	2.883

c. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

d. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

e. See Table 105.

f. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

Where a minimum value for the fillet radius must be specified, see paragraph 7.3 and Table 108.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 35—30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 24/48 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.0654 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.0654 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.2	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.2
			Note f		Note e	Notes a & b								Note g	Note e	Note f
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
6	0.2500000	0.2165064	0.337	0.296	**0.227**	0.0700	0.0686	0.0677	0.0670	0.0638	0.0631	0.0622	0.0608	0.292	**0.222**	0.154
7	0.2916667	0.2525907	0.379	0.338	**0.263**	0.0701	0.0687	0.0677	0.0671	0.0637	0.0631	0.0621	0.0607	0.333	**0.258**	0.196
8	0.3333333	0.2886751	0.421	0.379	**0.299**	0.0701	0.0687	0.0678	0.0671	0.0637	0.0630	0.0621	0.0607	0.375	**0.294**	0.238
9	0.3750000	0.3247594	0.462	0.421	**0.338**	0.0701	0.0687	0.0678	0.0671	0.0637	0.0630	0.0621	0.0607	0.417	**0.333**	0.279
10	0.4166667	0.3608439	0.504	0.463	**0.378**	0.0702	0.0687	0.0678	0.0671	0.0637	0.0630	0.0621	0.0606	0.458	**0.373**	0.321
11	0.4583333	0.3969283	0.546	0.504	**0.418**	0.0702	0.0688	0.0678	0.0671	0.0637	0.0630	0.0620	0.0606	0.500	**0.413**	0.362
12	0.5000000	0.4330127	0.588	0.546	**0.459**	0.0703	0.0688	0.0678	0.0671	0.0637	0.0630	0.0620	0.0605	0.542	**0.454**	0.404
13	0.5416667	0.4690971	0.629	0.588	0.500	0.0703	0.0688	0.0678	0.0671	0.0637	0.0630	0.0620	0.0605	0.583	0.496	0.446
14	0.5833333	0.5051814	0.671	0.629	0.542	0.0703	0.0689	0.0679	0.0672	0.0636	0.0629	0.0619	0.0605	0.625	0.537	0.487
15	0.6250000	0.5412659	0.713	0.671	0.584	0.0704	0.0689	0.0679	0.0672	0.0636	0.0629	0.0619	0.0604	0.667	0.579	0.529
16	0.6666667	0.5773502	0.755	0.713	0.625	0.0704	0.0689	0.0679	0.0672	0.0636	0.0629	0.0619	0.0604	0.708	0.621	0.570
17	0.7083333	0.6134346	0.796	0.754	0.667	0.0704	0.0689	0.0679	0.0672	0.0636	0.0629	0.0619	0.0604	0.750	0.662	0.612
18	0.7500000	0.6495191	0.838	0.796	0.709	0.0705	0.0690	0.0679	0.0672	0.0636	0.0629	0.0618	0.0603	0.792	0.704	0.654
19	0.7916667	0.6856033	0.880	0.838	0.750	0.0705	0.0690	0.0680	0.0672	0.0636	0.0628	0.0618	0.0603	0.833	0.746	0.695
20	0.8333333	0.7216878	0.921	0.879	0.792	0.0706	0.0690	0.0680	0.0672	0.0636	0.0628	0.0618	0.0602	0.875	0.787	0.737
21	0.8750000	0.7577722	0.963	0.921	0.834	0.0706	0.0690	0.0680	0.0672	0.0636	0.0628	0.0618	0.0602	0.917	0.829	0.778
22	0.9166667	0.7938566	1.005	0.963	0.875	0.0706	0.0691	0.0680	0.0673	0.0635	0.0628	0.0617	0.0602	0.958	0.871	0.820
23	0.9583333	0.8299410	1.047	1.004	0.917	0.0707	0.0691	0.0680	0.0673	0.0635	0.0628	0.0617	0.0601	1.000	0.912	0.862
24	1.000000	0.8660254	1.088	1.046	0.959	0.0707	0.0691	0.0681	0.0673	0.0635	0.0627	0.0617	0.0601	1.042	0.954	0.903
25	1.041667	0.9021098	1.130	1.088	1.000	0.0707	0.0691	0.0681	0.0673	0.0635	0.0627	0.0617	0.0600	1.083	0.996	0.945
26	1.083333	0.9381941	1.172	1.129	1.042	0.0708	0.0692	0.0681	0.0673	0.0635	0.0627	0.0616	0.0600	1.125	1.037	0.987
27	1.125000	0.9742786	1.214	1.171	1.084	0.0708	0.0692	0.0681	0.0673	0.0635	0.0627	0.0616	0.0600	1.167	1.079	1.028
28	1.166667	1.010363	1.255	1.213	1.125	0.0709	0.0692	0.0681	0.0673	0.0635	0.0627	0.0616	0.0599	1.208	1.121	1.070
29	1.208333	1.046447	1.297	1.254	1.167	0.0709	0.0693	0.0682	0.0674	0.0634	0.0626	0.0615	0.0599	1.250	1.162	1.111
30	1.250000	1.082532	1.339	1.296	1.209	0.0709	0.0693	0.0682	0.0674	0.0634	0.0626	0.0615	0.0599	1.292	1.204	1.153
31	1.291667	1.118616	1.380	1.338	1.250	0.0710	0.0693	0.0682	0.0674	0.0634	0.0626	0.0615	0.0598	1.333	1.246	1.195
32	1.333333	1.154701	1.422	1.379	1.292	0.0710	0.0693	0.0682	0.0674	0.0634	0.0626	0.0615	0.0598	1.375	1.287	1.236
33	1.375000	1.190785	1.464	1.421	1.334	0.0711	0.0694	0.0682	0.0674	0.0634	0.0626	0.0614	0.0597	1.417	1.329	1.278
34	1.416667	1.226869	1.506	1.463	1.375	0.0711	0.0694	0.0682	0.0674	0.0634	0.0626	0.0614	0.0597	1.458	1.371	1.319
35	1.458333	1.262954	1.547	1.504	1.417	0.0711	0.0694	0.0683	0.0674	0.0634	0.0625	0.0614	0.0597	1.500	1.412	1.361
36	1.500000	1.299038	1.589	1.546	1.459	0.0712	0.0694	0.0683	0.0674	0.0634	0.0625	0.0614	0.0596	1.542	1.454	1.403
37	1.541667	1.335122	1.631	1.588	1.500	0.0712	0.0695	0.0683	0.0675	0.0633	0.0625	0.0613	0.0596	1.583	1.496	1.444
38	1.583333	1.371207	1.673	1.629	1.542	0.0712	0.0695	0.0683	0.0675	0.0633	0.0625	0.0613	0.0596	1.625	1.537	1.486
39	1.625000	1.407291	1.714	1.671	1.584	0.0713	0.0695	0.0683	0.0675	0.0633	0.0625	0.0613	0.0595	1.667	1.579	1.527
40	1.666667	1.443376	1.756	1.713	1.625	0.0713	0.0695	0.0684	0.0675	0.0633	0.0624	0.0613	0.0595	1.708	1.621	1.569
41	1.708333	1.479460	1.798	1.754	1.667	0.0714	0.0696	0.0684	0.0675	0.0633	0.0624	0.0612	0.0594	1.750	1.662	1.611
42	1.750000	1.515544	1.840	1.796	1.709	0.0714	0.0696	0.0684	0.0675	0.0633	0.0624	0.0612	0.0594	1.792	1.704	1.652
43	1.791667	1.551629	1.881	1.838	1.750	0.0714	0.0696	0.0684	0.0675	0.0633	0.0624	0.0612	0.0594	1.833	1.746	1.694
44	1.833333	1.587713	1.923	1.879	1.792	0.0715	0.0697	0.0684	0.0676	0.0632	0.0624	0.0611	0.0593	1.875	1.787	1.735
45	1.875000	1.623798	1.965	1.921	1.834	0.0715	0.0697	0.0685	0.0676	0.0632	0.0623	0.0611	0.0593	1.917	1.829	1.777
46	1.916667	1.659882	2.006	1.963	1.875	0.0715	0.0697	0.0685	0.0676	0.0632	0.0623	0.0611	0.0593	1.958	1.871	1.819
47	1.958333	1.695966	2.048	2.004	1.917	0.0716	0.0697	0.0685	0.0676	0.0632	0.0623	0.0611	0.0592	2.000	1.912	1.860
48	2.000000	1.732051	2.090	2.046	1.959	0.0716	0.0698	0.0685	0.0676	0.0632	0.0623	0.0610	0.0592	2.042	1.954	1.902
49	2.041667	1.768135	2.132	2.088	2.000	0.0717	0.0698	0.0685	0.0676	0.0632	0.0623	0.0610	0.0591	2.083	1.995	1.943
50	2.083333	1.804220	2.173	2.130	2.042	0.0717	0.0698	0.0685	0.0676	0.0632	0.0623	0.0610	0.0591	2.125	2.037	1.985
51	2.125000	1.840304	2.215	2.171	2.084	0.0717	0.0698	0.0686	0.0676	0.0632	0.0622	0.0610	0.0591	2.167	2.079	2.027
52	2.166667	1.876388	2.257	2.213	2.125	0.0718	0.0699	0.0686	0.0677	0.0631	0.0622	0.0609	0.0590	2.208	2.120	2.068
53	2.208333	1.912473	2.299	2.255	2.167	0.0718	0.0699	0.0686	0.0677	0.0631	0.0622	0.0609	0.0590	2.250	2.162	2.110
54	2.250000	1.948557	2.340	2.297	2.209	0.0719	0.0699	0.0686	0.0677	0.0631	0.0622	0.0609	0.0589	2.292	2.203	2.151
55	2.291667	1.984642	2.382	2.338	2.250	0.0719	0.0699	0.0686	0.0677	0.0631	0.0622	0.0609	0.0589	2.333	2.245	2.193
56	2.333333	2.020726	2.424	2.380	2.292	0.0719	0.0700	0.0687	0.0677	0.0631	0.0621	0.0608	0.0589	2.375	2.287	2.235
57	2.375000	2.056810	2.466	2.422	2.334	0.0720	0.0700	0.0687	0.0677	0.0631	0.0621	0.0608	0.0588	2.417	2.328	2.276
58	2.416667	2.092895	2.507	2.464	2.375	0.0720	0.0700	0.0687	0.0677	0.0631	0.0621	0.0608	0.0588	2.458	2.370	2.318
59	2.458333	2.128979	2.549	2.505	2.417	0.0720	0.0700	0.0687	0.0678	0.0630	0.0621	0.0608	0.0588	2.500	2.411	2.359
60	2.500000	2.165064	2.591	2.547	2.459	0.0721	0.0701	0.0687	0.0678	0.0630	0.0621	0.0607	0.0587	2.542	2.453	2.401

a. Measurement with pins cannot be used to determine effective space width and tooth thickness. Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Basic values are modified values, see Section 25.

f. Where a minimum value for the fillet radius must be specified, see paragraph 7.3 and Table 108.

g. External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.

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30 DEG PRESSURE ANGLE

TABLE 36—30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 32/64 SPLINE PITCH

	Internal and External		Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.0491 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.0491 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.2	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.2
			Note f		Note e	Notes a & b								Note g	Note e	Note f
Tolerance in Ten Thousandths					+30 -0									+0 -30		
6	0.1875000	0.1623798	0.255	0.223	**0.173**	0.0537	0.0523	0.0514	0.0507	0.0475	0.0468	0.0459	0.0445	0.219	**0.168**	0.114
7	0.2187500	0.1894431	0.286	0.254	**0.200**	0.0538	0.0524	0.0514	0.0508	0.0474	0.0468	0.0458	0.0444	0.250	**0.195**	0.145
8	0.2500000	0.2165064	0.318	0.286	**0.227**	0.0538	0.0524	0.0515	0.0508	0.0474	0.0467	0.0458	0.0444	0.281	**0.222**	0.176
9	0.2812500	0.2435696	0.349	0.317	**0.255**	0.0538	0.0524	0.0515	0.0508	0.0474	0.0467	0.0458	0.0444	0.312	**0.250**	0.207
10	0.3125000	0.2706329	0.380	0.348	**0.285**	0.0539	0.0524	0.0515	0.0508	0.0474	0.0467	0.0458	0.0443	0.344	**0.280**	0.239
11	0.3437500	0.2976962	0.411	0.379	**0.315**	0.0539	0.0525	0.0515	0.0508	0.0474	0.0467	0.0457	0.0443	0.375	**0.310**	0.270
12	0.3750000	0.3247594	0.443	0.411	**0.345**	0.0540	0.0525	0.0515	0.0508	0.0474	0.0467	0.0457	0.0442	0.406	**0.340**	0.301
13	0.4062500	0.3518228	0.474	0.442	**0.376**	0.0540	0.0525	0.0515	0.0508	0.0474	0.0467	0.0457	0.0442	0.437	**0.371**	0.332
14	0.4375000	0.3788861	0.505	0.473	0.407	0.0540	0.0526	0.0516	0.0509	0.0473	0.0466	0.0456	0.0442	0.469	0.402	0.363
15	0.4687500	0.4059494	0.537	0.504	0.438	0.0541	0.0526	0.0516	0.0509	0.0473	0.0466	0.0456	0.0441	0.500	0.433	0.395
16	0.5000000	0.4330127	0.568	0.536	0.469	0.0541	0.0526	0.0516	0.0509	0.0473	0.0466	0.0456	0.0441	0.531	0.464	0.426
17	0.5312500	0.4600760	0.599	0.567	0.500	0.0541	0.0526	0.0516	0.0509	0.0473	0.0466	0.0456	0.0441	0.562	0.496	0.457
18	0.5625000	0.4871393	0.631	0.598	0.532	0.0542	0.0527	0.0516	0.0509	0.0473	0.0466	0.0455	0.0440	0.594	0.527	0.488
19	0.5937500	0.5142026	0.662	0.629	0.563	0.0542	0.0527	0.0517	0.0509	0.0473	0.0465	0.0455	0.0440	0.625	0.558	0.519
20	0.6250000	0.5412659	0.693	0.661	0.594	0.0543	0.0527	0.0517	0.0509	0.0473	0.0465	0.0455	0.0439	0.656	0.589	0.550
21	0.6562500	0.5683291	0.725	0.692	0.625	0.0543	0.0527	0.0517	0.0509	0.0473	0.0465	0.0455	0.0439	0.687	0.621	0.582
22	0.6875000	0.5953925	0.756	0.723	0.657	0.0543	0.0528	0.0517	0.0510	0.0472	0.0465	0.0454	0.0439	0.719	0.652	0.613
23	0.7187500	0.6224557	0.787	0.754	0.688	0.0544	0.0528	0.0517	0.0510	0.0472	0.0465	0.0454	0.0438	0.750	0.683	0.644
24	0.7500000	0.6495191	0.819	0.786	0.719	0.0544	0.0528	0.0518	0.0510	0.0472	0.0464	0.0454	0.0438	0.781	0.714	0.675
25	0.7812500	0.6765823	0.850	0.817	0.750	0.0544	0.0528	0.0518	0.0510	0.0472	0.0464	0.0454	0.0437	0.812	0.746	0.706
26	0.8125000	0.7036456	0.881	0.848	0.782	0.0545	0.0529	0.0518	0.0510	0.0472	0.0464	0.0453	0.0437	0.844	0.777	0.738
27	0.8437500	0.7307089	0.913	0.879	0.813	0.0545	0.0529	0.0518	0.0510	0.0472	0.0464	0.0453	0.0437	0.875	0.808	0.769
28	0.8750000	0.7577722	0.944	0.911	0.844	0.0546	0.0529	0.0518	0.0510	0.0472	0.0464	0.0453	0.0436	0.906	0.839	0.800
29	0.9062500	0.7848355	0.975	0.942	0.875	0.0546	0.0530	0.0519	0.0511	0.0471	0.0463	0.0452	0.0436	0.937	0.871	0.831
30	0.9375000	0.8118988	1.006	0.973	0.907	0.0546	0.0530	0.0519	0.0511	0.0471	0.0463	0.0452	0.0436	0.969	0.902	0.862
31	0.9687500	0.8389620	1.038	1.004	0.938	0.0547	0.0530	0.0519	0.0511	0.0471	0.0463	0.0452	0.0435	1.000	0.933	0.893
32	1.000000	0.8660254	1.069	1.036	0.969	0.0547	0.0530	0.0519	0.0511	0.0471	0.0463	0.0452	0.0435	1.031	0.964	0.925
33	1.031250	0.8930887	1.100	1.067	1.000	0.0548	0.0531	0.0519	0.0511	0.0471	0.0463	0.0451	0.0434	1.062	0.996	0.956
34	1.062500	0.9201520	1.132	1.098	1.032	0.0548	0.0531	0.0519	0.0511	0.0471	0.0463	0.0451	0.0434	1.094	1.027	0.987
35	1.093750	0.9472153	1.163	1.129	1.063	0.0548	0.0531	0.0520	0.0511	0.0471	0.0462	0.0451	0.0434	1.125	1.058	1.018
36	1.125000	0.9742786	1.194	1.161	1.094	0.0549	0.0531	0.0520	0.0511	0.0471	0.0462	0.0451	0.0433	1.156	1.089	1.049
37	1.156250	1.001342	1.226	1.192	1.125	0.0549	0.0532	0.0520	0.0512	0.0470	0.0462	0.0450	0.0433	1.187	1.121	1.081
38	1.187500	1.028405	1.257	1.223	1.157	0.0549	0.0532	0.0520	0.0512	0.0470	0.0462	0.0450	0.0433	1.219	1.152	1.112
39	1.218750	1.055468	1.288	1.254	1.188	0.0550	0.0532	0.0520	0.0512	0.0470	0.0462	0.0450	0.0432	1.250	1.183	1.143
40	1.250000	1.082532	1.320	1.286	1.219	0.0550	0.0532	0.0521	0.0512	0.0470	0.0461	0.0450	0.0432	1.281	1.214	1.174
41	1.281250	1.109595	1.351	1.317	1.250	0.0551	0.0533	0.0521	0.0512	0.0470	0.0461	0.0449	0.0431	1.312	1.246	1.205
42	1.312500	1.136658	1.382	1.348	1.282	0.0551	0.0533	0.0521	0.0512	0.0470	0.0461	0.0449	0.0431	1.344	1.277	1.236
43	1.343750	1.163722	1.414	1.379	1.313	0.0551	0.0533	0.0521	0.0512	0.0470	0.0461	0.0449	0.0431	1.375	1.308	1.268
44	1.375000	1.190785	1.445	1.411	1.344	0.0552	0.0534	0.0521	0.0513	0.0469	0.0461	0.0448	0.0430	1.406	1.339	1.299
45	1.406250	1.217848	1.476	1.442	1.375	0.0552	0.0534	0.0522	0.0513	0.0469	0.0460	0.0448	0.0430	1.437	1.371	1.330
46	1.437500	1.244912	1.508	1.473	1.407	0.0552	0.0534	0.0522	0.0513	0.0469	0.0460	0.0448	0.0430	1.469	1.402	1.361
47	1.468750	1.271975	1.539	1.504	1.438	0.0553	0.0534	0.0522	0.0513	0.0469	0.0460	0.0448	0.0429	1.500	1.433	1.392
48	1.500000	1.299038	1.570	1.536	1.469	0.0553	0.0535	0.0522	0.0513	0.0469	0.0460	0.0447	0.0429	1.531	1.464	1.424
49	1.531250	1.326101	1.601	1.567	1.500	0.0554	0.0535	0.0522	0.0513	0.0469	0.0460	0.0447	0.0428	1.562	1.496	1.455
50	1.562500	1.353165	1.633	1.598	1.532	0.0554	0.0535	0.0522	0.0513	0.0469	0.0459	0.0447	0.0428	1.594	1.527	1.486
51	1.593750	1.380228	1.664	1.629	1.563	0.0554	0.0535	0.0523	0.0513	0.0469	0.0459	0.0447	0.0428	1.625	1.558	1.517
52	1.625000	1.407291	1.695	1.661	1.594	0.0555	0.0536	0.0523	0.0514	0.0468	0.0459	0.0446	0.0427	1.656	1.589	1.548
53	1.656250	1.434355	1.727	1.692	1.625	0.0555	0.0536	0.0523	0.0514	0.0468	0.0459	0.0446	0.0427	1.687	1.621	1.580
54	1.687500	1.461418	1.758	1.723	1.657	0.0556	0.0536	0.0523	0.0514	0.0468	0.0459	0.0446	0.0426	1.719	1.652	1.611
55	1.718750	1.488481	1.789	1.754	1.688	0.0556	0.0536	0.0523	0.0514	0.0468	0.0459	0.0446	0.0426	1.750	1.683	1.642
56	1.750000	1.515544	1.821	1.786	1.719	0.0556	0.0537	0.0524	0.0514	0.0468	0.0458	0.0445	0.0426	1.781	1.714	1.673
57	1.781250	1.542608	1.852	1.817	1.750	0.0557	0.0537	0.0524	0.0514	0.0468	0.0458	0.0445	0.0425	1.812	1.746	1.704
58	1.812500	1.569671	1.883	1.848	1.782	0.0557	0.0537	0.0524	0.0514	0.0468	0.0458	0.0445	0.0425	1.844	1.777	1.735
59	1.843750	1.596734	1.915	1.879	1.813	0.0557	0.0537	0.0524	0.0515	0.0467	0.0458	0.0445	0.0425	1.875	1.808	1.767
60	1.875000	1.623798	1.946	1.911	1.844	0.0558	0.0538	0.0524	0.0515	0.0467	0.0458	0.0444	0.0424	1.906	1.839	1.798

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective space width and tooth thickness, see Table 64.

e. See Section 25.

f. Where a minimum value for the fillet radius must be specified, see paragraph 7.3 and Table 108.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and** tolerances on major diameter must be reduced by 0.2/P + 0.004 in.

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30 DEG PRESSURE ANGLE

TABLE 37—30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 40/80 SPLINE PITCH

	Internal and External		Internal (see Drawing Data)							External (see Drawing Data)						
						S_V Min. Eff. Circ. Space Width = 0.0393 Notes c & d				t_V Max. Eff. Circ. Tooth Thickness = 0.0393 Notes c & d						
N	D	D_b	D_{ri}	D_{Fi}	D_i	S Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						S_7	S_6	S_5	S_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.2	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.2
			Note f		Note e	Notes a & b								Note g	Note e	Note f
Tolerance in Ten Thousandths					+30 -0									+0 -30		
6	0.1500000	0.1299038	0.206	0.179	**0.140**	0.0439	0.0425	0.0416	0.0409	0.0377	0.0370	0.0361	0.0347	0.175	**0.135**	0.089
7	0.1750000	0.1515543	0.231	0.205	**0.162**	0.0440	0.0426	0.0416	0.0410	0.0376	0.0370	0.0360	0.0346	0.200	**0.157**	0.114
8	0.2000000	0.1732051	0.256	0.230	**0.184**	0.0440	0.0426	0.0417	0.0410	0.0376	0.0369	0.0360	0.0346	0.225	**0.179**	0.139
9	0.2250000	0.1948557	0.281	0.254	**0.205**	0.0440	0.0426	0.0417	0.0410	0.0376	0.0369	0.0360	0.0346	0.250	**0.200**	0.164
10	0.2500000	0.2165064	0.306	0.279	**0.229**	0.0441	0.0426	0.0417	0.0410	0.0376	0.0369	0.0360	0.0345	0.275	**0.224**	0.189
11	0.2750000	0.2381570	0.331	0.304	**0.253**	0.0441	0.0427	0.0417	0.0410	0.0376	0.0369	0.0359	0.0345	0.300	**0.248**	0.214
12	0.3000000	0.2598076	0.356	0.329	**0.277**	0.0442	0.0427	0.0417	0.0410	0.0376	0.0369	0.0359	0.0344	0.325	**0.272**	0.239
13	0.3250000	0.2814582	0.381	0.354	**0.302**	0.0442	0.0427	0.0417	0.0410	0.0376	0.0369	0.0359	0.0344	0.350	**0.297**	0.264
14	0.3500000	0.3031089	0.406	0.379	**0.326**	0.0442	0.0428	0.0418	0.0411	0.0375	0.0368	0.0358	0.0344	0.375	**0.321**	0.289
15	0.3750000	0.3247594	0.431	0.404	**0.351**	0.0443	0.0428	0.0418	0.0411	0.0375	0.0368	0.0358	0.0343	0.400	**0.346**	0.314
16	0.4000000	0.3464102	0.456	0.429	**0.376**	0.0443	0.0428	0.0418	0.0411	0.0375	0.0368	0.0358	0.0343	0.425	**0.371**	0.339
17	0.4250000	0.3680608	0.481	0.454	0.400	0.0443	0.0428	0.0418	0.0411	0.0375	0.0368	0.0358	0.0343	0.450	0.396	0.364
18	0.4500000	0.3897114	0.506	0.479	0.425	0.0444	0.0429	0.0418	0.0411	0.0375	0.0368	0.0357	0.0342	0.475	0.421	0.389
19	0.4750000	0.4113621	0.531	0.504	0.450	0.0444	0.0429	0.0419	0.0411	0.0375	0.0367	0.0357	0.0342	0.500	0.446	0.414
20	0.5000000	0.4330127	0.556	0.529	0.475	0.0445	0.0429	0.0419	0.0411	0.0375	0.0367	0.0357	0.0341	0.525	0.471	0.439
21	0.5250000	0.4546633	0.582	0.554	0.500	0.0445	0.0429	0.0419	0.0411	0.0375	0.0367	0.0357	0.0341	0.550	0.496	0.463
22	0.5500000	0.4763140	0.607	0.579	0.525	0.0445	0.0430	0.0419	0.0412	0.0374	0.0367	0.0356	0.0341	0.575	0.521	0.488
23	0.5750000	0.4979646	0.632	0.604	0.550	0.0446	0.0430	0.0419	0.0412	0.0374	0.0367	0.0356	0.0340	0.600	0.546	0.513
24	0.6000000	0.5196152	0.657	0.629	0.575	0.0446	0.0430	0.0420	0.0412	0.0374	0.0366	0.0356	0.0340	0.625	0.571	0.538
25	0.6250000	0.5412659	0.682	0.654	0.600	0.0446	0.0430	0.0420	0.0412	0.0374	0.0366	0.0356	0.0340	0.650	0.596	0.563
26	0.6500000	0.5629165	0.707	0.679	0.625	0.0447	0.0431	0.0420	0.0412	0.0374	0.0366	0.0355	0.0339	0.675	0.621	0.588
27	0.6750000	0.5845671	0.732	0.704	0.650	0.0447	0.0431	0.0420	0.0412	0.0374	0.0366	0.0355	0.0339	0.700	0.646	0.613
28	0.7000000	0.6062178	0.757	0.729	0.675	0.0448	0.0431	0.0420	0.0412	0.0374	0.0366	0.0355	0.0338	0.725	0.671	0.638
29	0.7250000	0.6278684	0.782	0.754	0.700	0.0448	0.0432	0.0421	0.0413	0.0373	0.0365	0.0354	0.0338	0.750	0.696	0.663
30	0.7500000	0.6495191	0.807	0.779	0.725	0.0448	0.0432	0.0421	0.0413	0.0373	0.0365	0.0354	0.0338	0.775	0.721	0.688
31	0.7750000	0.6711697	0.832	0.804	0.750	0.0449	0.0432	0.0421	0.0413	0.0373	0.0365	0.0354	0.0337	0.800	0.746	0.713
32	0.8000000	0.6928203	0.857	0.829	0.775	0.0449	0.0432	0.0421	0.0413	0.0373	0.0365	0.0354	0.0337	0.825	0.771	0.738
33	0.8250000	0.7144710	0.882	0.854	0.800	0.0450	0.0433	0.0421	0.0413	0.0373	0.0365	0.0353	0.0336	0.850	0.796	0.763
34	0.8500000	0.7361216	0.907	0.879	0.825	0.0450	0.0433	0.0421	0.0413	0.0373	0.0365	0.0353	0.0336	0.875	0.821	0.788
35	0.8750000	0.7577722	0.932	0.904	0.850	0.0450	0.0433	0.0422	0.0413	0.0373	0.0364	0.0353	0.0336	0.900	0.846	0.813
36	0.9000000	0.7794229	0.957	0.929	0.875	0.0451	0.0433	0.0422	0.0413	0.0373	0.0364	0.0353	0.0335	0.925	0.871	0.838
37	0.9250000	0.8010734	0.983	0.954	0.900	0.0451	0.0434	0.0422	0.0414	0.0372	0.0364	0.0352	0.0335	0.950	0.896	0.862
38	0.9500000	0.8227241	1.008	0.979	0.925	0.0451	0.0434	0.0422	0.0414	0.0372	0.0364	0.0352	0.0335	0.975	0.921	0.887
39	0.9750000	0.8443748	1.033	1.004	0.950	0.0452	0.0434	0.0422	0.0414	0.0372	0.0364	0.0352	0.0334	1.000	0.946	0.912
40	1.000000	0.8660254	1.058	1.029	0.975	0.0452	0.0434	0.0423	0.0414	0.0372	0.0363	0.0352	0.0334	1.025	0.971	0.937
41	1.025000	0.8876760	1.083	1.054	1.000	0.0453	0.0435	0.0423	0.0414	0.0372	0.0363	0.0351	0.0333	1.050	0.996	0.962
42	1.050000	0.9093267	1.108	1.079	1.025	0.0453	0.0435	0.0423	0.0414	0.0372	0.0363	0.0351	0.0333	1.075	1.021	0.987
43	1.075000	0.9309773	1.133	1.104	1.050	0.0453	0.0435	0.0423	0.0414	0.0372	0.0363	0.0351	0.0333	1.100	1.046	1.012
44	1.100000	0.9526279	1.158	1.129	1.075	0.0454	0.0436	0.0423	0.0415	0.0371	0.0363	0.0350	0.0332	1.125	1.071	1.037
45	1.125000	0.9742786	1.183	1.154	1.100	0.0454	0.0436	0.0424	0.0415	0.0371	0.0362	0.0350	0.0332	1.150	1.096	1.062
46	1.150000	0.9959292	1.208	1.179	1.125	0.0454	0.0436	0.0424	0.0415	0.0371	0.0362	0.0350	0.0332	1.175	1.121	1.087
47	1.175000	1.017580	1.233	1.204	1.150	0.0455	0.0436	0.0424	0.0415	0.0371	0.0362	0.0350	0.0331	1.200	1.146	1.112
48	1.200000	1.039230	1.258	1.229	1.175	0.0455	0.0437	0.0424	0.0415	0.0371	0.0362	0.0349	0.0331	1.225	1.171	1.137
49	1.225000	1.060881	1.283	1.254	1.200	0.0456	0.0437	0.0424	0.0415	0.0371	0.0362	0.0349	0.0330	1.250	1.196	1.162
50	1.250000	1.082532	1.308	1.279	1.225	0.0456	0.0437	0.0424	0.0415	0.0371	0.0362	0.0349	0.0330	1.275	1.221	1.187
51	1.275000	1.104182	1.333	1.304	1.250	0.0456	0.0437	0.0425	0.0415	0.0371	0.0361	0.0349	0.0330	1.300	1.246	1.212
52	1.300000	1.125833	1.359	1.329	1.275	0.0457	0.0438	0.0425	0.0416	0.0370	0.0361	0.0348	0.0329	1.325	1.271	1.236
53	1.325000	1.147484	1.384	1.354	1.300	0.0457	0.0438	0.0425	0.0416	0.0370	0.0361	0.0348	0.0329	1.350	1.296	1.261
54	1.350000	1.169134	1.409	1.379	1.325	0.0458	0.0438	0.0425	0.0416	0.0370	0.0361	0.0348	0.0328	1.375	1.321	1.286
55	1.375000	1.190785	1.434	1.404	1.350	0.0458	0.0438	0.0425	0.0416	0.0370	0.0361	0.0348	0.0328	1.400	1.346	1.311
56	1.400000	1.212436	1.459	1.429	1.375	0.0458	0.0439	0.0426	0.0416	0.0370	0.0360	0.0347	0.0328	1.425	1.371	1.336
57	1.425000	1.234086	1.484	1.454	1.400	0.0459	0.0439	0.0426	0.0416	0.0370	0.0360	0.0347	0.0327	1.450	1.396	1.361
58	1.450000	1.255737	1.509	1.479	1.425	0.0459	0.0439	0.0426	0.0416	0.0370	0.0360	0.0347	0.0327	1.475	1.421	1.386
59	1.475000	1.277387	1.534	1.504	1.450	0.0459	0.0439	0.0426	0.0417	0.0369	0.0360	0.0347	0.0327	1.500	1.446	1.411
60	1.500000	1.299038	1.559	1.529	1.475	0.0460	0.0440	0.0426	0.0417	0.0369	0.0360	0.0346	0.0326	1.525	1.471	1.436

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Type are modified values, see Section 25.

f. Where a minimum value for the fillet radius must be specified, see paragraph 7.3 and Table 108.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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30 DEG PRESSURE ANGLE

TABLE 38—30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 48/96 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	S_v Min. Eff. Circ. Space Width = 0.0327 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness - 0.0327 Notes c & d				D_o	D_{Fe}	D_{re}
						S Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						S_7	S_6	S_5	S_4	t_4	t_5	t_6	t_7			
1	2	3.1	4.2	5.1	6.1	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.1	18.2
			Note f		Note e	Notes a & b								Note g	Note e	Note f
Tolerance in Ten Thousandths					+ 30 -0									+0 -30		
6	0.1250000	0.1082532	0.173	0.150	**0.119**	0.0373	0.0359	0.0350	0.0343	0.0311	0.0304	0.0295	0.0281	0.146	**0.114**	0.073
7	0.1458332	0.1262954	0.193	0.171	**0.137**	0.0374	0.0360	0.0350	0.0344	0.0310	0.0304	0.0294	0.0280	0.167	**0.132**	0.094
8	0.1666667	0.1443375	0.214	0.192	**0.155**	0.0374	0.0360	0.0351	0.0344	0.0310	0.0303	0.0294	0.0280	0.188	**0.150**	0.115
9	0.1875000	0.1623798	0.235	0.213	**0.173**	0.0374	0.0360	0.0351	0.0344	0.0310	0.0303	0.0294	0.0280	0.208	**0.168**	0.136
10	0.2083333	0.1804220	0.256	0.234	**0.191**	0.0375	0.0360	0.0351	0.0344	0.0310	0.0303	0.0294	0.0279	0.229	**0.186**	0.156
11	0.2291667	0.1984642	0.277	0.254	**0.211**	0.0375	0.0361	0.0351	0.0344	0.0310	0.0303	0.0293	0.0279	0.250	**0.206**	0.177
12	0.2500000	0.2165064	0.298	0.275	**0.232**	0.0376	0.0361	0.0351	0.0344	0.0310	0.0303	0.0293	0.0278	0.271	**0.227**	0.198
13	0.2708333	0.2345485	0.319	0.296	**0.252**	0.0376	0.0361	0.0351	0.0344	0.0310	0.0303	0.0293	0.0278	0.292	**0.247**	0.219
14	0.2916667	0.2525907	0.340	0.317	**0.273**	0.0376	0.0362	0.0352	0.0345	0.0309	0.0302	0.0292	0.0278	0.312	**0.268**	0.239
15	0.3125000	0.2706329	0.361	0.338	**0.293**	0.0377	0.0362	0.0352	0.0345	0.0309	0.0302	0.0292	0.0277	0.333	**0.288**	0.260
16	0.3333333	0.2886751	0.382	0.359	**0.314**	0.0377	0.0362	0.0352	0.0345	0.0309	0.0302	0.0292	0.0277	0.354	**0.309**	0.281
17	0.3541667	0.3067172	0.402	0.379	**0.334**	0.0377	0.0362	0.0352	0.0345	0.0309	0.0302	0.0292	0.0277	0.375	**0.329**	0.302
18	0.3750000	0.3247594	0.423	0.400	**0.355**	0.0378	0.0363	0.0352	0.0345	0.0309	0.0302	0.0291	0.0276	0.396	**0.350**	0.322
19	0.3958333	0.3428016	0.444	0.421	**0.376**	0.0378	0.0363	0.0353	0.0345	0.0309	0.0301	0.0291	0.0276	0.417	**0.371**	0.343
20	0.4166667	0.3608439	0.465	0.442	0.396	0.0379	0.0363	0.0353	0.0345	0.0309	0.0301	0.0291	0.0275	0.437	0.391	0.364
21	0.4375000	0.3788861	0.486	0.463	0.417	0.0379	0.0363	0.0353	0.0345	0.0309	0.0301	0.0291	0.0275	0.458	0.412	0.385
22	0.4583333	0.3969283	0.507	0.484	0.438	0.0379	0.0364	0.0353	0.0346	0.0308	0.0301	0.0290	0.0275	0.479	0.433	0.406
23	0.4791667	0.4149705	0.528	0.504	0.459	0.0380	0.0364	0.0353	0.0346	0.0308	0.0301	0.0290	0.0274	0.500	0.454	0.426
24	0.5000000	0.4330127	0.549	0.525	0.480	0.0380	0.0364	0.0354	0.0346	0.0308	0.0300	0.0290	0.0274	0.521	0.475	0.447
25	0.5208333	0.4510549	0.570	0.546	0.500	0.0380	0.0364	0.0354	0.0346	0.0308	0.0300	0.0290	0.0273	0.542	0.496	0.468
26	0.5416667	0.4690971	0.591	0.567	0.521	0.0381	0.0365	0.0354	0.0346	0.0308	0.0300	0.0289	0.0273	0.562	0.516	0.489
27	0.5625000	0.4871393	0.611	0.588	0.542	0.0381	0.0365	0.0354	0.0346	0.0308	0.0300	0.0289	0.0273	0.583	0.537	0.509
28	0.5833333	0.5051814	0.632	0.609	0.563	0.0382	0.0365	0.0354	0.0346	0.0308	0.0300	0.0289	0.0272	0.604	0.558	0.530
29	0.6041667	0.5232237	0.653	0.629	0.584	0.0382	0.0366	0.0355	0.0347	0.0307	0.0299	0.0288	0.0272	0.625	0.579	0.551
30	0.6250000	0.5412659	0.674	0.650	0.605	0.0382	0.0366	0.0355	0.0347	0.0307	0.0299	0.0288	0.0272	0.646	0.600	0.572
31	0.6458333	0.5593081	0.695	0.671	0.625	0.0383	0.0366	0.0355	0.0347	0.0307	0.0299	0.0288	0.0271	0.667	0.621	0.592
32	0.6666667	0.5773502	0.716	0.692	0.646	0.0383	0.0366	0.0355	0.0347	0.0307	0.0299	0.0288	0.0271	0.687	0.641	0.613
33	0.6875000	0.5953925	0.737	0.713	0.667	0.0384	0.0367	0.0355	0.0347	0.0307	0.0299	0.0287	0.0270	0.708	0.662	0.634
34	0.7083333	0.6134346	0.758	0.734	0.688	0.0384	0.0367	0.0355	0.0347	0.0307	0.0299	0.0287	0.0270	0.729	0.683	0.655
35	0.7291667	0.6314769	0.779	0.754	0.709	0.0384	0.0367	0.0356	0.0347	0.0307	0.0298	0.0287	0.0270	0.750	0.704	0.675
36	0.7500000	0.6495191	0.800	0.775	0.730	0.0385	0.0367	0.0356	0.0347	0.0307	0.0298	0.0287	0.0269	0.771	0.725	0.696
37	0.7708333	0.6675611	0.820	0.796	0.750	0.0385	0.0368	0.0356	0.0348	0.0306	0.0298	0.0286	0.0269	0.792	0.746	0.717
38	0.7916667	0.6856033	0.841	0.817	0.771	0.0385	0.0368	0.0356	0.0348	0.0306	0.0298	0.0286	0.0269	0.812	0.766	0.738
39	0.8125000	0.7036456	0.862	0.838	0.792	0.0386	0.0368	0.0356	0.0348	0.0306	0.0298	0.0286	0.0268	0.833	0.787	0.759
40	0.8333333	0.7216878	0.883	0.859	0.813	0.0386	0.0368	0.0357	0.0348	0.0306	0.0297	0.0286	0.0268	0.854	0.808	0.779
41	0.8541667	0.7397300	0.904	0.879	0.834	0.0387	0.0369	0.0357	0.0348	0.0306	0.0297	0.0285	0.0267	0.875	0.829	0.800
42	0.8750000	0.7577722	0.925	0.900	0.855	0.0387	0.0369	0.0357	0.0348	0.0306	0.0297	0.0285	0.0267	0.896	0.850	0.821
43	0.8958333	0.7758144	0.946	0.921	0.875	0.0387	0.0369	0.0357	0.0348	0.0306	0.0297	0.0285	0.0267	0.917	0.871	0.842
44	0.9166667	0.7938566	0.967	0.942	0.896	0.0388	0.0370	0.0357	0.0349	0.0305	0.0297	0.0284	0.0266	0.937	0.891	0.862
45	0.9375000	0.8118988	0.988	0.963	0.917	0.0388	0.0370	0.0358	0.0349	0.0305	0.0296	0.0284	0.0266	0.958	0.912	0.883
46	0.9583333	0.8299410	1.009	0.984	0.938	0.0388	0.0370	0.0358	0.0349	0.0305	0.0296	0.0284	0.0266	0.979	0.933	0.904
47	0.9791667	0.8479832	1.029	1.004	0.959	0.0389	0.0370	0.0358	0.0349	0.0305	0.0296	0.0284	0.0265	1.000	0.954	0.925
48	1.000000	0.8660254	1.050	1.025	0.980	0.0389	0.0371	0.0358	0.0349	0.0305	0.0296	0.0283	0.0265	1.021	0.975	0.945
49	1.020833	0.8840676	1.071	1.046	1.000	0.0390	0.0371	0.0358	0.0349	0.0305	0.0296	0.0283	0.0264	1.042	0.996	0.966
50	1.041667	0.9021098	1.092	1.067	1.021	0.0390	0.0371	0.0358	0.0349	0.0305	0.0296	0.0283	0.0264	1.062	1.016	0.987
51	1.062500	0.9201520	1.113	1.088	1.042	0.0390	0.0371	0.0359	0.0349	0.0305	0.0295	0.0283	0.0264	1.083	1.037	1.008
52	1.083333	0.9381941	1.134	1.109	1.063	0.0391	0.0372	0.0359	0.0350	0.0304	0.0295	0.0282	0.0263	1.104	1.058	1.029
53	1.104167	0.9562364	1.155	1.129	1.084	0.0391	0.0372	0.0359	0.0350	0.0304	0.0295	0.0282	0.0263	1.125	1.079	1.049
54	1.125000	0.9742786	1.176	1.150	1.105	0.0392	0.0372	0.0359	0.0350	0.0304	0.0295	0.0282	0.0262	1.146	1.100	1.070
55	1.145833	0.9923208	1.197	1.171	1.125	0.0392	0.0372	0.0359	0.0350	0.0304	0.0295	0.0282	0.0262	1.167	1.121	1.091
56	1.166667	1.010363	1.218	1.192	1.146	0.0392	0.0373	0.0360	0.0350	0.0304	0.0294	0.0281	0.0262	1.187	1.141	1.112
57	1.187500	1.028405	1.238	1.213	1.167	0.0393	0.0373	0.0360	0.0350	0.0304	0.0294	0.0281	0.0261	1.208	1.162	1.132
58	1.208333	1.046447	1.259	1.234	1.188	0.0393	0.0373	0.0360	0.0350	0.0304	0.0294	0.0281	0.0261	1.229	1.183	1.153
59	1.229167	1.064490	1.280	1.254	1.209	0.0393	0.0373	0.0360	0.0351	0.0303	0.0294	0.0281	0.0261	1.250	1.204	1.174
60	1.250000	1.082532	1.301	1.275	1.230	0.0394	0.0374	0.0360	0.0351	0.0303	0.0294	0.0280	0.0260	1.271	1.225	1.195

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 76-83.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64. **are modified values, see Section 25.**

f. Where a minimum value for the fillet radius must be specified, see paragraph 7.3 and Table 108.

g. **External splines designed to this major diameter tabulation may not be interchanged with splines designed to previous spline standards. It is permissible to specify the full range of tolerances listed for External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full dedendum splines. If the mating spline is per other spline standards, the Max Major Diameter and Tolerances on major diameter must be reduced by 0.2/P + 0.004 in.**

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37.5 DEG PRESSURE ANGLE

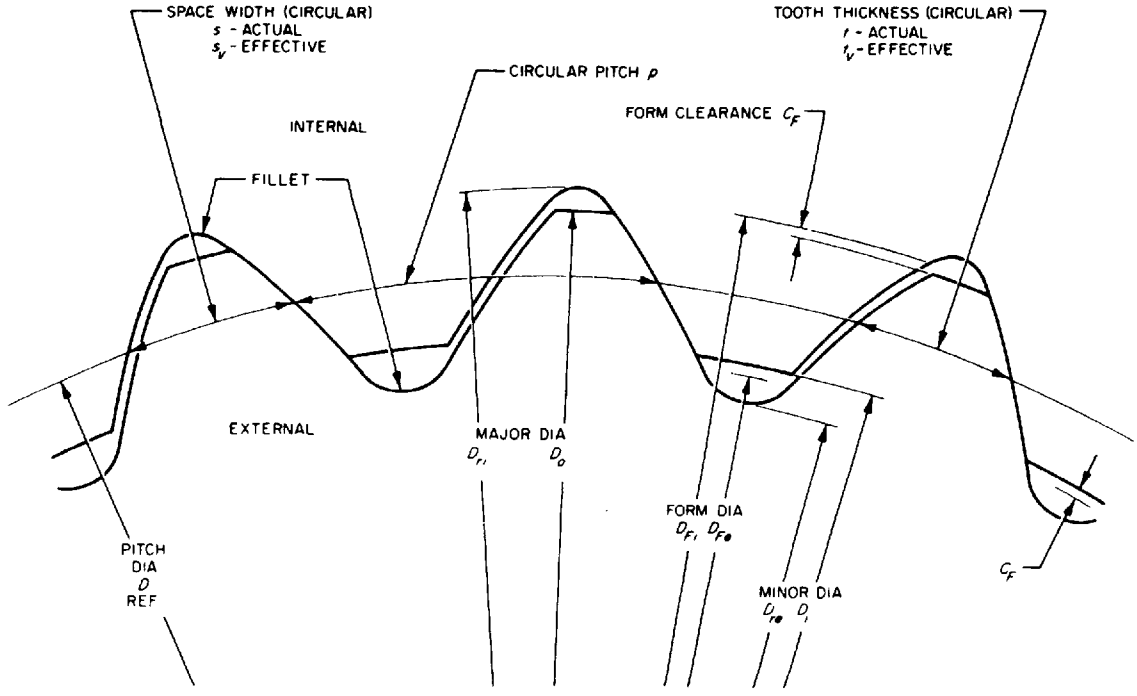


FIG. 8–SPLINE TERMS, SYMBOLS AND DRAWING DATA, 37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT

The pressure angle and proportions of this spline are a direct compromise of the 30 and 45 deg pressure angle splines. It is often used on couplings where the external spline is to be cold formed; especially where a 45 deg pressure angle spline will not satisfy functional requirements and the shaft material is above hardness limitation of 30 deg pressure angle cold forming tools.

Press fits are not tabulated because their design depends on the degree of tightness desired and must allow for such factors as the shape of the blank, wall thickness, material, hardness, thermal expansion, etc. Close tolerances or selective size grouping may be required to limit fit variations.

See Tables 39-52.

DRAWING DATA

INTERNAL INVOLUTE SPLINE DATA		EXTERNAL INVOLUTE SPLINE DATA	
FILLET ROOT SIDE FIT		FILLET ROOT SIDE FIT	
NUMBER OF TEETH	xx	NUMBER OF TEETH	xx
SPLINE PITCH	xx/xx	SPLINE PITCH	xx/xx
PRESSURE ANGLE	37.5°	PRESSURE ANGLE	37.5°
BASE DIAMETER	x.xxxxxx REF	BASE DIAMETER	x.xxxxxx REF
PITCH DIAMETER	x.xxxxxx REF	PITCH DIAMETER	x.xxxxxx REF
MAJOR DIAMETER	x.xxx MAX	MAJOR DIAMETER	x.xxx/x.xxx
FORM DIAMETER	x.xxx	FORM DIAMETER	x.xxx
MINOR DIAMETER	x.xxx/x.xxx	MINOR DIAMETER	x.xxx MIN
CIRCULAR SPACE WIDTH		CIRCULAR TOOTH THICKNESS	
MAX ACTUAL	x.xxxx	MAX EFFECTIVE	x.xxxx
MIN EFFECTIVE	x.xxxx	MIN ACTUAL	x.xxxx
The following information may be added as required:		The following information may be added as required:	
MAX MEASUREMENT BETWEEN PINS	x.xxxx REF	MIN MEASUREMENT OVER PINS	x.xxxx REF
PIN DIAMETER	x.xxxx	PIN DIAMETER	x.xxxx

The above drawing data is required for the spline specifications. The standard system is shown; for alternate systems, see Table 4 and paragraphs 11.4.1, 11.4.2 and 13.

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37.5 DEG PRESSURE ANGLE

TABLE 39–37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 2.5/5 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.6683 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.6683 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.2	4.4	5.1	6.2	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.2	18.3
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+200 -0									+0 - 200		
6	2.400000	1.904048	3.090	2.805	**2.088**	0.6757	0.6735	0.6720	0.6709	0.6657	0.6646	0.6631	0.6609	2.800	**2.082**	1.830
7	2.800000	2.221389	3.490	3.206	2.480	0.6758	0.6736	0.6721	0.6710	0.6656	0.6645	0.6630	0.6608	3.200	2.474	2.230
8	3.200000	2.538731	3.890	3.607	2.880	0.6759	0.6737	0.6721	0.6710	0.6656	0.6645	0.6629	0.6607	3.600	2.873	2.630
9	3.600000	2.856072	4.290	4.008	3.280	0.6761	0.6737	0.6722	0.6711	0.6655	0.6644	0.6629	0.6605	4.000	3.272	3.030
10	4.000000	3.173413	4.690	4.408	3.680	0.6762	0.6738	0.6722	0.6711	0.6655	0.6644	0.6628	0.6604	4.400	3.672	3.430
11	4.400000	3.490755	5.090	4.809	4.080	0.6763	0.6739	0.6723	0.6711	0.6655	0.6643	0.6627	0.6603	4.800	4.071	3.830
12	4.800000	3.808096	5.491	5.210	4.480	0.6764	0.6740	0.6723	0.6712	0.6654	0.6643	0.6626	0.6602	5.200	4.470	4.229
13	5.200000	4.125437	5.891	5.611	4.880	0.6765	0.6740	0.6724	0.6712	0.6654	0.6642	0.6626	0.6601	5.600	4.869	4.629
14	5.600000	4.442778	6.291	6.012	5.280	0.6766	0.6741	0.6724	0.6712	0.6654	0.6642	0.6625	0.6600	6.000	5.268	5.029
15	6.000000	4.760120	6.691	6.412	5.680	0.6767	0.6742	0.6725	0.6713	0.6653	0.6641	0.6624	0.6599	6.400	5.668	5.429
16	6.400000	5.077461	7.091	6.813	6.080	0.6768	0.6742	0.6725	0.6713	0.6653	0.6641	0.6624	0.6598	6.800	6.067	5.829
17	6.800000	5.394802	7.491	7.214	6.480	0.6769	0.6743	0.6726	0.6714	0.6652	0.6640	0.6623	0.6597	7.200	6.466	6.229
18	7.200000	5.712144	7.891	7.615	6.880	0.6770	0.6744	0.6727	0.6714	0.6652	0.6639	0.6622	0.6596	7.600	6.865	6.629
19	7.600000	6.029485	8.291	8.016	7.280	0.6771	0.6745	0.6727	0.6714	0.6652	0.6639	0.6621	0.6595	8.000	7.264	7.029
20	8.000000	6.346826	8.692	8.416	7.680	0.6772	0.6745	0.6728	0.6715	0.6651	0.6638	0.6621	0.6594	8.400	7.664	7.428
21	8.400000	6.664168	9.092	8.817	8.080	0.6773	0.6746	0.6728	0.6715	0.6651	0.6638	0.6620	0.6593	8.800	8.063	7.828
22	8.800000	6.981509	9.492	9.218	8.480	0.6774	0.6747	0.6729	0.6715	0.6651	0.6637	0.6619	0.6592	9.200	8.462	8.228
23	9.200000	7.298850	9.892	9.619	8.880	0.6775	0.6748	0.6729	0.6716	0.6650	0.6637	0.6618	0.6591	9.600	8.861	8.628
24	9.600000	7.616192	10.292	10.020	9.280	0.6776	0.6748	0.6730	0.6716	0.6650	0.6636	0.6618	0.6590	10.000	9.260	9.028
25	10.00000	7.933533	10.692	10.420	9.680	0.6778	0.6749	0.6730	0.6717	0.6649	0.6636	0.6617	0.6589	10.400	9.660	9.428
26	10.40000	8.250874	11.092	10.820	10.080	0.6779	0.6750	0.6731	0.6717	0.6649	0.6635	0.6616	0.6587	10.800	10.060	9.828
27	10.80000	8.568216	11.493	11.220	10.480	0.6780	0.6751	0.6731	0.6717	0.6649	0.6635	0.6615	0.6586	11.200	10.460	10.227
28	11.20000	8.885557	11.893	11.620	10.880	0.6781	0.6751	0.6732	0.6718	0.6648	0.6634	0.6615	0.6585	11.600	10.860	10.627
29	11.60000	9.202898	12.293	12.020	11.280	0.6782	0.6752	0.6732	0.6718	0.6648	0.6634	0.6614	0.6584	12.000	11.260	11.027
30	12.00000	9.520240	12.693	12.420	11.680	0.6783	0.6753	0.6733	0.6718	0.6648	0.6633	0.6613	0.6583	12.400	11.660	11.427
31	12.40000	9.837581	13.093	12.820	12.080	0.6784	0.6754	0.6733	0.6719	0.6647	0.6633	0.6612	0.6582	12.800	12.060	11.827
32	12.80000	10.15492	13.493	13.220	12.480	0.6785	0.6754	0.6734	0.6719	0.6647	0.6632	0.6612	0.6581	13.200	12.460	12.227
33	13.20000	10.47226	13.893	13.620	12.880	0.6786	0.6755	0.6734	0.6720	0.6646	0.6632	0.6611	0.6580	13.600	12.860	12.627
34	13.60000	10.78960	14.294	14.020	13.280	0.6787	0.6756	0.6735	0.6720	0.6646	0.6631	0.6610	0.6579	14.000	13.260	13.026
35	14.00000	11.10695	14.694	14.420	13.680	0.6788	0.6757	0.6736	0.6720	0.6646	0.6630	0.6609	0.6578	14.400	13.660	13.426
36	14.40000	11.42429	15.094	14.820	14.080	0.6789	0.6757	0.6736	0.6721	0.6645	0.6630	0.6609	0.6577	14.800	14.060	13.826
37	14.80000	11.74163	15.494	15.220	14.480	0.6790	0.6758	0.6737	0.6721	0.6645	0.6629	0.6608	0.6576	15.200	14.460	14.226
38	15.20000	12.05897	15.894	15.620	14.880	0.6791	0.6759	0.6737	0.6721	0.6645	0.6629	0.6607	0.6575	15.600	14.860	14.626
39	15.60000	12.37631	16.294	16.020	15.280	0.6792	0.6760	0.6738	0.6722	0.6644	0.6628	0.6606	0.6574	16.000	15.260	15.026
40	16.00000	12.69365	16.694	16.420	15.680	0.6793	0.6760	0.6738	0.6722	0.6644	0.6628	0.6606	0.6573	16.400	15.660	15.426
41	16.40000	13.01099	17.095	16.820	16.080	0.6794	0.6761	0.6739	0.6723	0.6643	0.6627	0.6605	0.6572	16.800	16.060	15.825
42	16.80000	13.32834	17.495	17.220	16.480	0.6796	0.6762	0.6739	0.6723	0.6643	0.6627	0.6604	0.6570	17.200	16.460	16.225
43	17.20000	13.64568	17.895	17.620	16.880	0.6797	0.6763	0.6740	0.6723	0.6643	0.6626	0.6603	0.6569	17.600	16.860	16.625
44	17.60000	13.96302	18.295	18.020	17.280	0.6798	0.6763	0.6740	0.6724	0.6642	0.6626	0.6603	0.6568	18.000	17.260	17.025
45	18.00000	14.28036	18.695	18.420	17.680	0.6799	0.6764	0.6741	0.6724	0.6642	0.6625	0.6602	0.6567	18.400	17.660	17.425
46	18.40000	14.59770	19.095	18.820	18.080	0.6800	0.6765	0.6741	0.6724	0.6642	0.6625	0.6601	0.6566	18.800	18.060	17.825
47	18.80000	14.91504	19.495	19.220	18.480	0.6801	0.6765	0.6742	0.6725	0.6641	0.6624	0.6601	0.6565	19.200	18.460	18.225
48	19.20000	15.23238	19.895	19.620	18.880	0.6802	0.6766	0.6742	0.6725	0.6641	0.6624	0.6600	0.6564	19.600	18.860	18.625
49	19.60000	15.54972	20.296	20.020	19.280	0.6803	0.6767	0.6743	0.6726	0.6640	0.6623	0.6599	0.6563	20.000	19.260	19.024
50	20.00000	15.86707	20.696	20.420	19.680	0.6804	0.6768	0.6744	0.6726	0.6640	0.6623	0.6598	0.6562	20.400	19.660	19.424
51	20.40000	16.18441	21.096	20.820	20.080	0.6805	0.6768	0.6744	0.6726	0.6640	0.6622	0.6598	0.6561	20.800	20.060	19.824
52	20.80000	16.50175	21.496	21.220	20.480	0.6806	0.6769	0.6745	0.6727	0.6639	0.6621	0.6597	0.6560	21.200	20.460	20.224
53	21.20000	16.81909	21.896	21.620	20.880	0.6807	0.6770	0.6745	0.6727	0.6639	0.6621	0.6596	0.6559	21.600	20.860	20.624
54	21.60000	17.13643	22.296	22.020	21.280	0.6808	0.6771	0.6746	0.6727	0.6639	0.6620	0.6595	0.6558	22.000	21.260	21.024
55	22.00000	17.45377	22.696	22.420	21.680	0.6809	0.6771	0.6746	0.6728	0.6638	0.6620	0.6595	0.6557	22.400	21.660	21.424
56	22.40000	17.77111	23.097	22.820	22.080	0.6810	0.6772	0.6747	0.6728	0.6638	0.6619	0.6594	0.6556	22.800	22.060	21.823
57	22.80000	18.08846	23.497	23.220	22.480	0.6811	0.6773	0.6747	0.6729	0.6637	0.6619	0.6593	0.6555	23.200	22.460	22.223
58	23.20000	18.40580	23.897	23.620	22.880	0.6812	0.6774	0.6748	0.6729	0.6637	0.6618	0.6592	0.6554	23.600	22.860	22.623
59	23.60000	18.72314	24.297	24.020	23.280	0.6814	0.6774	0.6748	0.6729	0.6637	0.6618	0.6592	0.6552	24.000	23.260	23.023
60	24.00000	19.04048	24.697	24.420	23.680	0.6815	0.6775	0.6749	0.6730	0.6636	0.6617	0.6591	0.6551	24.400	23.660	23.423

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 85-92.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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37.5 DEG PRESSURE ANGLE

TABLE 40—37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 3/6 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width 0.5569 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness 0.5569 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.2	4.4	5.1	6.2	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.2	18.3
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+150 -0									+0 - 150		
6	2.000000	1.586707	2.576	2.338	**1.740**	0.5643	0.5621	0.5606	0.5595	0.5543	0.5532	0.5517	0.5495	2.333	**1.735**	1.524
7	2.333333	1.851158	2.910	2.672	2.067	0.5644	0.5622	0.5607	0.5596	0.5542	0.5531	0.5516	0.5494	2.667	2.062	1.857
8	2.666667	2.115609	3.243	3.006	2.400	0.5645	0.5623	0.5607	0.5596	0.5542	0.5531	0.5515	0.5493	3.000	2.394	2.190
9	3.000000	2.380060	3.577	3.340	2.734	0.5647	0.5623	0.5608	0.5597	0.5541	0.5530	0.5515	0.5491	3.333	2.727	2.523
10	3.333333	2.644511	3.910	3.674	3.067	0.5648	0.5624	0.5608	0.5597	0.5541	0.5530	0.5514	0.5490	3.667	3.060	2.856
11	3.666667	2.908962	4.244	4.008	3.400	0.5649	0.5625	0.5609	0.5597	0.5541	0.5529	0.5513	0.5489	4.000	3.392	3.190
12	4.000000	3.173413	4.577	4.342	3.734	0.5650	0.5626	0.5609	0.5598	0.5540	0.5529	0.5512	0.5488	4.333	3.725	3.523
13	4.333333	3.437864	4.911	4.676	4.067	0.5651	0.5626	0.5610	0.5598	0.5540	0.5528	0.5512	0.5487	4.667	4.058	3.856
14	4.666667	3.702315	5.244	5.010	4.400	0.5652	0.5627	0.5610	0.5598	0.5540	0.5528	0.5511	0.5486	5.000	4.390	4.189
15	5.000000	3.966766	5.578	5.344	4.734	0.5653	0.5628	0.5611	0.5599	0.5539	0.5527	0.5510	0.5485	5.333	4.723	4.522
16	5.333333	4.231218	5.911	5.678	5.067	0.5654	0.5628	0.5611	0.5599	0.5539	0.5527	0.5510	0.5484	5.667	5.056	4.856
17	5.666667	4.495669	6.245	6.012	5.400	0.5655	0.5629	0.5612	0.5600	0.5538	0.5526	0.5509	0.5483	6.000	5.388	5.189
18	6.000000	4.760120	6.578	6.346	5.734	0.5656	0.5630	0.5613	0.5600	0.5538	0.5525	0.5508	0.5482	6.333	5.721	5.522
19	6.333333	5.024571	6.911	6.680	6.067	0.5657	0.5631	0.5613	0.5600	0.5538	0.5525	0.5507	0.5481	6.667	6.054	5.855
20	6.666667	5.289022	7.245	7.014	6.400	0.5658	0.5631	0.5614	0.5601	0.5537	0.5524	0.5507	0.5480	7.000	6.386	6.188
21	7.000000	5.553473	7.578	7.348	6.734	0.5659	0.5632	0.5614	0.5601	0.5537	0.5524	0.5506	0.5479	7.333	6.719	6.522
22	7.333333	5.817924	7.912	7.682	7.067	0.5660	0.5633	0.5615	0.5601	0.5537	0.5523	0.5505	0.5478	7.667	7.052	6.855
23	7.666667	6.082375	8.245	8.016	7.400	0.5661	0.5634	0.5615	0.5602	0.5536	0.5523	0.5504	0.5477	8.000	7.384	7.188
24	8.000000	6.346826	8.579	8.350	7.734	0.5662	0.5634	0.5616	0.5602	0.5536	0.5522	0.5504	0.5476	8.333	7.717	7.521
25	8.333333	6.611277	8.912	8.684	8.067	0.5663	0.5635	0.5616	0.5603	0.5535	0.5522	0.5503	0.5474	8.667	8.050	7.854
26	8.666667	6.875729	9.246	9.018	8.400	0.5665	0.5636	0.5617	0.5603	0.5535	0.5521	0.5502	0.5473	9.000	8.382	8.188
27	9.000000	7.140180	9.579	9.352	8.734	0.5666	0.5637	0.5617	0.5603	0.5535	0.5521	0.5501	0.5472	9.333	8.715	8.521
28	9.333333	7.404631	9.913	9.686	9.067	0.5667	0.5637	0.5618	0.5604	0.5534	0.5520	0.5501	0.5471	9.667	9.048	8.854
29	9.666667	7.669082	10.246	10.020	9.400	0.5668	0.5638	0.5618	0.5604	0.5534	0.5520	0.5500	0.5470	10.000	9.380	9.187
30	10.00000	7.933533	10.580	10.354	9.734	0.5669	0.5639	0.5619	0.5604	0.5534	0.5519	0.5499	0.5469	10.333	9.713	9.520
31	10.33333	8.197984	10.913	10.687	10.067	0.5670	0.5640	0.5619	0.5605	0.5533	0.5519	0.5498	0.5468	10.667	10.046	9.854
32	10.66667	8.462435	11.247	11.020	10.400	0.5671	0.5640	0.5620	0.5605	0.5533	0.5518	0.5498	0.5467	11.000	10.380	10.187
33	11.00000	8.726886	11.580	11.354	10.734	0.5672	0.5641	0.5620	0.5606	0.5532	0.5518	0.5497	0.5466	11.333	10.713	10.520
34	11.33333	8.991337	11.914	11.687	11.067	0.5673	0.5642	0.5621	0.5606	0.5532	0.5517	0.5496	0.5465	11.667	11.046	10.853
35	11.66667	9.255788	12.247	12.020	11.400	0.5674	0.5643	0.5622	0.5606	0.5532	0.5516	0.5495	0.5464	12.000	11.380	11.186
36	12.00000	9.520240	12.581	12.354	11.734	0.5675	0.5643	0.5622	0.5607	0.5531	0.5516	0.5495	0.5463	12.333	11.713	11.519
37	12.33333	9.784691	12.914	12.687	12.067	0.5676	0.5644	0.5623	0.5607	0.5531	0.5515	0.5494	0.5462	12.667	12.046	11.853
38	12.66667	10.04914	13.247	13.020	12.400	0.5677	0.5645	0.5623	0.5607	0.5531	0.5515	0.5493	0.5461	13.000	12.380	12.186
39	13.00000	10.31359	13.581	13.354	12.734	0.5678	0.5646	0.5624	0.5608	0.5530	0.5514	0.5492	0.5460	13.333	12.713	12.519
40	13.33333	10.57804	13.914	13.687	13.067	0.5679	0.5646	0.5624	0.5608	0.5530	0.5514	0.5492	0.5459	13.667	13.046	12.852
41	13.66667	10.84250	14.248	14.020	13.400	0.5680	0.5647	0.5625	0.5609	0.5529	0.5513	0.5491	0.5458	14.000	13.380	13.185
42	14.00000	11.10695	14.581	14.354	13.734	0.5682	0.5648	0.5625	0.5609	0.5529	0.5513	0.5490	0.5456	14.338	13.713	13.519
43	14.33333	11.37140	14.915	14.687	14.067	0.5683	0.5649	0.5626	0.5609	0.5529	0.5512	0.5489	0.5455	14.667	14.046	13.852
44	14.66667	11.63585	15.248	15.020	14.400	0.5684	0.5649	0.5626	0.5610	0.5528	0.5512	0.5489	0.5454	15.000	14.380	14.185
45	15.00000	11.90030	15.582	15.354	14.734	0.5685	0.5650	0.5627	0.5610	0.5528	0.5511	0.5488	0.5453	15.333	14.713	14.518
46	15.33333	12.16475	15.915	15.687	15.067	0.5686	0.5651	0.5627	0.5610	0.5528	0.5511	0.5487	0.5452	15.667	15.046	14.851
47	15.66667	12.42920	16.249	16.020	15.400	0.5687	0.5651	0.5628	0.5611	0.5527	0.5510	0.5487	0.5451	16.000	15.380	15.185
48	16.00000	12.69365	16.582	16.354	15.734	0.5688	0.5652	0.5628	0.5611	0.5527	0.5510	0.5486	0.5450	16.333	15.713	15.518
49	16.33333	12.95810	16.916	16.687	16.067	0.5689	0.5653	0.5629	0.5612	0.5526	0.5509	0.5485	0.5449	16.667	16.046	15.851
50	16.66667	13.22255	17.249	17.020	16.400	0.5690	0.5654	0.5629	0.5612	0.5526	0.5508	0.5484	0.5448	17.000	16.380	16.184
51	17.00000	13.48701	17.583	17.354	16.734	0.5691	0.5654	0.5630	0.5612	0.5526	0.5508	0.5484	0.5447	17.333	16.713	16.517
52	17.33333	13.75146	17.916	17.687	17.067	0.5692	0.5655	0.5631	0.5613	0.5525	0.5507	0.5483	0.5446	17.667	17.046	16.851
53	17.66667	14.01591	18.250	18.020	17.400	0.5693	0.5656	0.5631	0.5613	0.5525	0.5507	0.5482	0.5445	18.000	17.380	17.184
54	18.00000	14.28036	18.583	18.354	17.734	0.5694	0.5657	0.5632	0.5613	0.5525	0.5506	0.5481	0.5444	18.333	17.713	17.517
55	18.33333	14.54481	18.916	18.687	18.067	0.5695	0.5657	0.5632	0.5614	0.5524	0.5506	0.5481	0.5443	18.667	18.046	17.850
56	18.66667	14.80926	19.250	19.020	18.400	0.5696	0.5658	0.5633	0.5614	0.5524	0.5505	0.5480	0.5442	19.000	18.380	18.183
57	19.00000	15.07371	19.583	19.354	18.734	0.5697	0.5659	0.5633	0.5615	0.5523	0.5505	0.5479	0.5441	19.333	18.713	18.517
58	19.33333	15.33816	19.917	19.687	19.067	0.5698	0.5660	0.5634	0.5615	0.5523	0.5504	0.5478	0.5440	19.667	19.046	18.850
59	19.66667	15.60261	20.250	20.020	19.400	0.5700	0.5660	0.5634	0.5615	0.5523	0.5504	0.5478	0.5438	20.000	19.380	19.183
60	20.00000	15.86707	20.584	20.354	19.734	0.5701	0.5661	0.5635	0.5616	0.5522	0.5503	0.5477	0.5437	20.333	19.713	19.516

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 85-92.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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37.5 DEG PRESSURE ANGLE

TABLE 41—37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 4/8 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.4177 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.4177 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.2	4.4	5.1	6.2	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.2	18.3
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+100 -0									+0 -100		
6	1.500000	1.190030	1.934	1.754	**1.306**	0.4244	0.4224	0.4210	0.4201	0.4153	0.4144	0.4130	0.4110	1.750	**1.301**	1.141
7	1.750000	1.388368	2.184	2.004	1.550	0.4244	0.4224	0.4211	0.4201	0.4153	0.4143	0.4130	0.4110	2.000	1.546	1.391
8	2.000000	1.586707	2.434	2.254	1.800	0.4245	0.4225	0.4211	0.4201	0.4153	0.4143	0.4129	0.4109	2.250	1.796	1.641
9	2.250000	1.785045	2.684	2.505	2.050	0.4246	0.4225	0.4211	0.4201	0.4153	0.4143	0.4129	0.4108	2.500	2.045	1.891
10	2.500000	1.983383	2.934	2.755	2.300	0.4247	0.4226	0.4212	0.4202	0.4152	0.4142	0.4128	0.4107	2.750	2.295	2.141
11	2.750000	2.181722	3.184	3.006	2.550	0.4247	0.4226	0.4212	0.4202	0.4152	0.4142	0.4128	0.4107	3.000	2.544	2.391
12	3.000000	2.380060	3.434	3.256	2.800	0.4248	0.4227	0.4213	0.4202	0.4152	0.4141	0.4127	0.4106	3.250	2.794	2.641
13	3.250000	2.578398	3.684	3.507	3.050	0.4249	0.4227	0.4213	0.4203	0.4151	0.4141	0.4127	0.4105	3.500	3.043	2.891
14	3.500000	2.776737	3.934	3.757	3.300	0.4250	0.4228	0.4213	0.4203	0.4151	0.4141	0.4126	0.4104	3.750	3.293	3.141
15	3.750000	2.975075	4.185	4.008	3.550	0.4250	0.4228	0.4214	0.4203	0.4151	0.4140	0.4126	0.4104	4.000	3.542	3.390
16	4.000000	3.173413	4.435	4.258	3.800	0.4251	0.4229	0.4214	0.4203	0.4151	0.4140	0.4125	0.4103	4.250	3.792	3.640
17	4.250000	3.371752	4.685	4.509	4.050	0.4252	0.4229	0.4214	0.4204	0.4150	0.4140	0.4125	0.4102	4.500	4.041	3.890
18	4.500000	3.570090	4.935	4.759	4.300	0.4253	0.4230	0.4215	0.4204	0.4150	0.4139	0.4124	0.4101	4.750	4.291	4.140
19	4.750000	3.768428	5.185	5.010	4.550	0.4253	0.4231	0.4215	0.4204	0.4150	0.4139	0.4123	0.4101	5.000	4.540	4.390
20	5.000000	3.966766	5.435	5.260	4.800	0.4254	0.4231	0.4216	0.4204	0.4150	0.4138	0.4123	0.4100	5.250	4.790	4.640
21	5.250000	4.165105	5.685	5.511	5.050	0.4255	0.4232	0.4216	0.4205	0.4149	0.4138	0.4122	0.4099	5.500	5.039	4.890
22	5.500000	4.363443	5.935	5.761	5.300	0.4256	0.4232	0.4216	0.4205	0.4149	0.4138	0.4122	0.4098	5.750	5.289	5.140
23	5.750000	4.561781	6.185	6.012	5.550	0.4256	0.4233	0.4217	0.4205	0.4149	0.4137	0.4121	0.4098	6.000	5.538	5.390
24	6.000000	4.760120	6.435	6.262	5.800	0.4257	0.4233	0.4217	0.4205	0.4149	0.4137	0.4121	0.4097	6.250	5.788	5.640
25	6.250000	4.958458	6.686	6.513	6.050	0.4258	0.4234	0.4217	0.4206	0.4148	0.4136	0.4120	0.4096	6.500	6.037	5.889
26	6.500000	5.156796	6.936	6.763	6.300	0.4259	0.4234	0.4218	0.4206	0.4148	0.4136	0.4120	0.4095	6.750	6.287	6.139
27	6.750000	5.355135	7.186	7.014	6.550	0.4260	0.4235	0.4218	0.4206	0.4148	0.4136	0.4119	0.4094	7.000	6.536	6.389
28	7.000000	5.553473	7.436	7.264	6.800	0.4260	0.4235	0.4219	0.4207	0.4147	0.4135	0.4119	0.4094	7.250	6.786	6.639
29	7.250000	5.751811	7.686	7.515	7.050	0.4261	0.4236	0.4219	0.4207	0.4147	0.4135	0.4118	0.4093	7.500	7.035	6.889
30	7.500000	5.950150	7.936	7.765	7.300	0.4262	0.4236	0.4219	0.4207	0.4147	0.4135	0.4118	0.4092	7.750	7.285	7.139
31	7.750000	6.148488	8.186	8.016	7.550	0.4263	0.4237	0.4220	0.4207	0.4147	0.4134	0.4117	0.4091	8.000	7.534	7.389
32	8.000000	6.346826	8.436	8.266	7.800	0.4263	0.4237	0.4220	0.4208	0.4146	0.4134	0.4117	0.4091	8.250	7.784	7.639
33	8.250000	6.545165	8.686	8.517	8.050	0.4264	0.4238	0.4221	0.4208	0.4146	0.4133	0.4116	0.4090	8.500	8.033	7.889
34	8.500000	6.743503	8.936	8.767	8.300	0.4265	0.4238	0.4221	0.4208	0.4146	0.4133	0.4116	0.4089	8.750	8.283	8.139
35	8.750000	6.941841	9.187	9.018	8.550	0.4266	0.4239	0.4221	0.4208	0.4146	0.4133	0.4115	0.4088	9.000	8.532	8.388
36	9.000000	7.140180	9.437	9.268	8.800	0.4266	0.4240	0.4222	0.4209	0.4145	0.4132	0.4114	0.4088	9.250	8.782	8.638
37	9.250000	7.338518	9.687	9.519	9.050	0.4267	0.4240	0.4222	0.4209	0.4145	0.4132	0.4114	0.4087	9.500	9.031	8.888
38	9.500000	7.536856	9.937	9.769	9.300	0.4268	0.4241	0.4222	0.4209	0.4145	0.4132	0.4113	0.4086	9.750	9.281	9.138
39	9.750000	7.735195	10.187	10.020	9.550	0.4269	0.4241	0.4223	0.4210	0.4144	0.4131	0.4113	0.4085	10.000	9.530	9.388
40	10.00000	7.933533	10.437	10.270	9.800	0.4269	0.4242	0.4223	0.4210	0.4144	0.4131	0.4112	0.4085	10.250	9.780	9.638
41	10.25000	8.131871	10.687	10.520	10.050	0.4270	0.4242	0.4224	0.4210	0.4144	0.4130	0.4112	0.4084	10.500	10.030	9.888
42	10.50000	8.330210	10.937	10.770	10.300	0.4271	0.4243	0.4224	0.4210	0.4144	0.4130	0.4111	0.4083	10.750	10.280	10.138
43	10.75000	8.528548	11.187	11.020	10.550	0.4272	0.4243	0.4224	0.4211	0.4143	0.4130	0.4111	0.4082	11.000	10.530	10.388
44	11.00000	8.726886	11.437	11.270	10.800	0.4272	0.4244	0.4225	0.4211	0.4143	0.4129	0.4110	0.4082	11.250	10.780	10.638
45	11.25000	8.925225	11.688	11.520	11.050	0.4273	0.4244	0.4225	0.4211	0.4143	0.4129	0.4110	0.4081	11.500	11.030	10.887
46	11.50000	9.123563	11.938	11.770	11.300	0.4274	0.4245	0.4225	0.4211	0.4143	0.4129	0.4109	0.4080	11.750	11.280	11.137
47	11.75000	9.321901	12.188	12.020	11.550	0.4275	0.4245	0.4226	0.4212	0.4142	0.4128	0.4109	0.4079	12.000	11.530	11.387
48	12.00000	9.520240	12.438	12.270	11.800	0.4275	0.4246	0.4226	0.4212	0.4142	0.4128	0.4108	0.4079	12.250	11.780	11.637
49	12.25000	9.718578	12.688	12.520	12.050	0.4276	0.4246	0.4227	0.4212	0.4142	0.4127	0.4108	0.4078	12.500	12.030	11.887
50	12.50000	9.916916	12.938	12.770	12.300	0.4277	0.4247	0.4227	0.4212	0.4141	0.4127	0.4107	0.4077	12.750	12.280	12.137
51	12.75000	10.11525	13.188	13.020	12.550	0.4278	0.4248	0.4227	0.4213	0.4141	0.4127	0.4106	0.4076	13.000	12.530	12.387
52	13.00000	10.31359	13.438	13.270	12.800	0.4279	0.4248	0.4228	0.4213	0.4141	0.4126	0.4106	0.4075	13.250	12.780	12.637
53	13.25000	10.51193	13.688	13.520	13.050	0.4279	0.4249	0.4228	0.4213	0.4141	0.4126	0.4105	0.4075	13.500	13.030	12.887
54	13.50000	10.71027	13.938	13.770	13.300	0.4280	0.4249	0.4229	0.4214	0.4140	0.4125	0.4105	0.4074	13.750	13.280	13.137
55	13.75000	10.90861	14.189	14.020	13.550	0.4281	0.4250	0.4229	0.4214	0.4140	0.4125	0.4104	0.4073	14.000	13.530	13.386
56	14.00000	11.10695	14.439	14.270	13.800	0.4282	0.4250	0.4229	0.4214	0.4140	0.4125	0.4104	0.4072	14.250	13.780	13.636
57	14.25000	11.30528	14.689	14.520	14.050	0.4282	0.4251	0.4230	0.4214	0.4140	0.4124	0.4103	0.4072	14.500	14.030	13.886
58	14.50000	11.50362	14.939	14.770	14.300	0.4283	0.4251	0.4230	0.4215	0.4139	0.4124	0.4103	0.4071	14.750	14.280	14.136
59	14.75000	11.70196	15.189	15.020	14.550	0.4284	0.4252	0.4230	0.4215	0.4139	0.4124	0.4102	0.4070	15.000	14.530	14.386
60	15.00000	11.90030	15.439	15.270	14.800	0.4285	0.4252	0.4231	0.4215	0.4139	0.4123	0.4102	0.4069	15.250	14.780	14.636

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 85-92.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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37.5 DEG PRESSURE ANGLE

TABLE 42—37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 5/10 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.3342 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.3342 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.2	4.4	5.1	6.2	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.2	18.3
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 80 -0									+0 - 80		
6	1.200000	0.9520240	1.549	1.404	**1.046**	0.3409	0.3389	0.3375	0.3366	0.3318	0.3309	0.3295	0.3275	1.400	**1.041**	0.911
7	1.400000	1.110695	1.749	1.604	1.240	0.3409	0.3389	0.3376	0.3366	0.3318	0.3308	0.3295	0.3275	1.600	1.236	1.111
8	1.600000	1.269365	1.949	1.804	1.440	0.3410	0.3390	0.3376	0.3366	0.3318	0.3308	0.3294	0.3274	1.800	1.436	1.311
9	1.800000	1.428036	2.149	2.004	1.640	0.3411	0.3390	0.3376	0.3366	0.3318	0.3308	0.3294	0.3273	2.000	1.636	1.511
10	2.000000	1.586707	2.349	2.204	1.840	0.3412	0.3391	0.3377	0.3367	0.3317	0.3307	0.3293	0.3272	2.200	1.836	1.711
11	2.200000	1.745377	2.549	2.405	2.040	0.3412	0.3391	0.3377	0.3367	0.3317	0.3307	0.3293	0.3272	2.400	2.035	1.911
12	2.400000	1.904048	2.749	2.605	2.240	0.3413	0.3392	0.3378	0.3367	0.3317	0.3306	0.3292	0.3271	2.600	2.235	2.111
13	2.600000	2.062719	2.949	2.806	2.440	0.3414	0.3392	0.3378	0.3368	0.3316	0.3306	0.3292	0.3270	2.800	2.434	2.311
14	2.800000	2.221389	3.149	3.006	2.640	0.3415	0.3393	0.3378	0.3368	0.3316	0.3306	0.3291	0.3269	3.000	2.634	2.511
15	3.000000	2.380060	3.350	3.206	2.840	0.3415	0.3393	0.3379	0.3368	0.3316	0.3305	0.3291	0.3269	3.200	2.834	2.710
16	3.200000	2.538731	3.550	3.407	3.040	0.3416	0.3394	0.3379	0.3368	0.3316	0.3305	0.3290	0.3268	3.400	3.033	2.910
17	3.400000	2.697401	3.750	3.607	3.241	0.3417	0.3394	0.3379	0.3369	0.3315	0.3305	0.3290	0.3267	3.600	3.233	3.110
18	3.600000	2.856072	3.950	3.808	3.440	0.3418	0.3395	0.3380	0.3369	0.3315	0.3304	0.3289	0.3266	3.800	3.432	3.310
19	3.800000	3.014743	4.150	4.008	3.640	0.3418	0.3396	0.3380	0.3369	0.3315	0.3304	0.3288	0.3266	4.000	3.632	3.510
20	4.000000	3.173413	4.350	4.208	3.840	0.3419	0.3396	0.3381	0.3369	0.3315	0.3303	0.3288	0.3265	4.200	3.832	3.710
21	4.200000	3.332084	4.550	4.409	4.040	0.3420	0.3397	0.3381	0.3370	0.3314	0.3303	0.3287	0.3264	4.400	4.031	3.910
22	4.400000	3.490755	4.750	4.609	4.240	0.3421	0.3397	0.3381	0.3370	0.3314	0.3303	0.3287	0.3263	4.600	4.231	4.110
23	4.600000	3.649425	4.950	4.810	4.440	0.3421	0.3398	0.3382	0.3370	0.3314	0.3302	0.3286	0.3263	4.800	4.430	4.310
24	4.800000	3.808096	5.150	5.010	4.640	0.3422	0.3398	0.3382	0.3370	0.3314	0.3302	0.3286	0.3262	5.000	4.630	4.510
25	5.000000	3.966766	5.351	5.210	4.840	0.3423	0.3399	0.3382	0.3371	0.3313	0.3302	0.3285	0.3261	5.200	4.830	4.709
26	5.200000	4.125437	5.551	5.411	5.040	0.3424	0.3399	0.3383	0.3371	0.3313	0.3301	0.3285	0.3260	5.400	5.029	4.909
27	5.400000	4.284108	5.751	5.611	5.240	0.3425	0.3400	0.3383	0.3371	0.3313	0.3301	0.3284	0.3259	5.600	5.229	5.109
28	5.600000	4.442778	5.951	5.812	5.440	0.3425	0.3400	0.3384	0.3372	0.3312	0.3300	0.3284	0.3259	5.800	5.428	5.309
29	5.800000	4.601449	6.151	6.012	5.640	0.3426	0.3401	0.3384	0.3372	0.3312	0.3300	0.3283	0.3258	6.000	5.628	5.509
30	6.000000	4.760120	6.351	6.212	5.840	0.3427	0.3401	0.3384	0.3372	0.3312	0.3300	0.3283	0.3257	6.200	5.828	5.709
31	6.200000	4.918790	6.551	6.413	6.040	0.3428	0.3402	0.3385	0.3372	0.3312	0.3299	0.3282	0.3256	6.400	6.027	5.909
32	6.400000	5.077461	6.751	6.613	6.240	0.3428	0.3402	0.3385	0.3373	0.3311	0.3299	0.3282	0.3256	6.600	6.227	6.109
33	6.600000	5.236132	6.951	6.814	6.440	0.3429	0.3403	0.3386	0.3373	0.3311	0.3298	0.3281	0.3255	6.800	6.426	6.309
34	6.800000	5.394802	7.151	7.014	6.640	0.3430	0.3403	0.3386	0.3373	0.3311	0.3298	0.3281	0.3254	7.000	6.626	6.509
35	7.000000	5.553473	7.352	7.214	6.840	0.3431	0.3404	0.3386	0.3373	0.3311	0.3298	0.3280	0.3253	7.200	6.826	6.708
36	7.200000	5.712144	7.552	7.415	7.040	0.3431	0.3405	0.3387	0.3374	0.3310	0.3297	0.3279	0.3253	7.400	7.025	6.908
37	7.400000	5.870814	7.752	7.615	7.240	0.3432	0.3405	0.3387	0.3374	0.3310	0.3297	0.3279	0.3252	7.600	7.225	7.108
38	7.600000	6.029485	7.952	7.816	7.440	0.3433	0.3406	0.3387	0.3374	0.3310	0.3297	0.3278	0.3251	7.800	7.424	7.308
39	7.800000	6.188156	8.152	8.016	7.640	0.3434	0.3406	0.3388	0.3375	0.3309	0.3296	0.3278	0.3250	8.000	7.624	7.508
40	8.000000	6.346826	8.352	8.216	7.840	0.3434	0.3407	0.3388	0.3375	0.3309	0.3296	0.3277	0.3250	8.200	7.824	7.708
41	8.200000	6.505497	8.552	8.417	8.040	0.3435	0.3407	0.3389	0.3375	0.3309	0.3295	0.3277	0.3249	8.400	8.023	7.908
42	8.400000	6.664168	8.752	8.617	8.240	0.3436	0.3408	0.3389	0.3375	0.3309	0.3295	0.3276	0.3248	8.600	8.223	8.108
43	8.600000	6.822838	8.952	8.818	8.440	0.3437	0.3408	0.3389	0.3376	0.3308	0.3295	0.3276	0.3247	8.800	8.422	8.308
44	8.800000	6.981509	9.152	9.018	8.640	0.3437	0.3409	0.3390	0.3376	0.3308	0.3294	0.3275	0.3247	9.000	8.622	8.508
45	9.000000	7.140180	9.353	9.218	8.840	0.3438	0.3409	0.3390	0.3376	0.3308	0.3294	0.3275	0.3246	9.200	8.822	8.707
46	9.200000	7.298850	9.553	9.419	9.040	0.3439	0.3410	0.3390	0.3376	0.3308	0.3294	0.3274	0.3245	9.400	9.021	8.907
47	9.400000	7.457521	9.753	9.619	9.240	0.3440	0.3410	0.3391	0.3377	0.3307	0.3293	0.3274	0.3244	9.600	9.221	9.107
48	9.600000	7.616192	9.953	9.820	9.440	0.3440	0.3411	0.3391	0.3377	0.3307	0.3293	0.3273	0.3244	9.800	9.420	9.307
49	9.800000	7.774862	10.153	10.020	9.640	0.3441	0.3411	0.3392	0.3377	0.3307	0.3292	0.3273	0.3243	10.000	9.620	9.507
50	10.00000	7.933533	10.353	10.220	9.840	0.3442	0.3412	0.3392	0.3377	0.3307	0.3292	0.3272	0.3242	10.200	9.820	9.707
51	10.20000	8.092204	10.553	10.420	10.040	0.3443	0.3413	0.3392	0.3378	0.3306	0.3292	0.3271	0.3241	10.400	10.020	9.907
52	10.40000	8.250874	10.753	10.620	10.240	0.3444	0.3413	0.3393	0.3378	0.3306	0.3291	0.3271	0.3240	10.600	10.220	10.107
53	10.60000	8.409545	10.953	10.820	10.440	0.3444	0.3414	0.3393	0.3378	0.3306	0.3291	0.3270	0.3240	10.800	10.420	10.307
54	10.80000	8.568216	11.153	11.020	10.640	0.3445	0.3414	0.3394	0.3379	0.3305	0.3290	0.3270	0.3239	11.000	10.620	10.507
55	11.00000	8.726886	11.354	11.220	10.840	0.3446	0.3415	0.3394	0.3379	0.3305	0.3290	0.3269	0.3238	11.200	10.820	10.706
56	11.20000	8.885557	11.554	11.420	11.040	0.3447	0.3415	0.3394	0.3379	0.3305	0.3290	0.3269	0.3237	11.400	11.020	10.906
57	11.40000	9.044228	11.754	11.620	11.240	0.3447	0.3416	0.3395	0.3379	0.3305	0.3289	0.3268	0.3237	11.600	11.220	11.106
58	11.60000	9.202898	11.954	11.820	11.440	0.3448	0.3416	0.3395	0.3380	0.3304	0.3289	0.3268	0.3236	11.800	11.420	11.306
59	11.80000	9.361569	12.154	12.020	11.640	0.3449	0.3417	0.3395	0.3380	0.3304	0.3289	0.3267	0.3235	12.000	11.620	11.506
60	12.00000	9.520240	12.354	12.220	11.840	0.3450	0.3417	0.3396	0.3380	0.3304	0.3288	0.3267	0.3234	12.200	11.820	11.706

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** *Measurement with pins for actual space width and tooth thickness are in Tables 85-92.*

b. For REF minimum actual space width, and REF maximum actual [illegible] see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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37.5 DEG PRESSURE ANGLE

TABLE 43—37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 6/12 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.2785 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.2785 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.2	4.4	5.1	6.2	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.2	18.3
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
6	1.000000	0.7933532	1.291	1.171	**0.872**	0.2841	0.2824	0.2813	0.2805	0.2765	0.2757	0.2746	0.2729	1.167	**0.867**	0.759
7	1.166667	0.9255788	1.457	1.338	1.034	0.2842	0.2825	0.2813	0.2805	0.2765	0.2757	0.2745	0.2728	1.333	1.029	0.926
8	1.333333	1.057804	1.624	1.504	1.200	0.2843	0.2825	0.2814	0.2805	0.2765	0.2756	0.2745	0.2727	1.500	1.196	1.092
9	1.500000	1.190030	1.791	1.671	1.367	0.2843	0.2826	0.2814	0.2806	0.2764	0.2756	0.2744	0.2727	1.667	1.362	1.259
10	1.666667	1.322255	1.958	1.838	1.534	0.2844	0.2826	0.2814	0.2806	0.2764	0.2755	0.2744	0.2726	1.833	1.529	1.426
11	1.833333	1.454481	2.124	2.004	1.700	0.2845	0.2827	0.2815	0.2806	0.2764	0.2755	0.2743	0.2725	2.000	1.696	1.592
12	2.000000	1.586707	2.291	2.171	1.867	0.2845	0.2827	0.2815	0.2806	0.2764	0.2755	0.2743	0.2725	2.167	1.862	1.759
13	2.166667	1.718932	2.458	2.338	2.034	0.2846	0.2828	0.2816	0.2807	0.2763	0.2754	0.2742	0.2724	2.333	2.029	1.925
14	2.333333	1.851158	2.625	2.505	2.200	0.2847	0.2828	0.2816	0.2807	0.2763	0.2754	0.2742	0.2723	2.500	2.195	2.092
15	2.500000	1.983383	2.791	2.672	2.367	0.2847	0.2829	0.2816	0.2807	0.2763	0.2754	0.2741	0.2722	2.667	2.361	2.259
16	2.666667	2.115609	2.958	2.839	2.534	0.2848	0.2829	0.2817	0.2807	0.2763	0.2753	0.2741	0.2722	2.833	2.528	2.425
17	2.833333	2.247834	3.125	3.006	2.700	0.2849	0.2830	0.2817	0.2808	0.2762	0.2753	0.2740	0.2721	3.000	2.694	2.592
18	3.000000	2.380060	3.292	3.173	2.867	0.2850	0.2830	0.2817	0.2808	0.2762	0.2753	0.2740	0.2720	3.167	2.860	2.758
19	3.166667	2.512285	3.459	3.340	3.034	0.2850	0.2831	0.2818	0.2808	0.2762	0.2752	0.2739	0.2720	3.333	3.027	2.925
20	3.333333	2.644511	3.625	3.507	3.200	0.2851	0.2831	0.2818	0.2808	0.2762	0.2752	0.2739	0.2719	3.500	3.193	3.091
21	3.500000	2.776737	3.792	3.674	3.367	0.2852	0.2832	0.2818	0.2809	0.2761	0.2752	0.2738	0.2718	3.667	3.359	3.258
22	3.666667	2.908962	3.959	3.841	3.534	0.2852	0.2832	0.2819	0.2809	0.2761	0.2751	0.2738	0.2718	3.833	3.526	3.425
23	3.833333	3.041188	4.126	4.008	3.700	0.2853	0.2833	0.2819	0.2809	0.2761	0.2751	0.2737	0.2717	4.000	3.692	3.591
24	4.000000	3.173413	4.292	4.175	3.867	0.2854	0.2833	0.2819	0.2809	0.2761	0.2751	0.2737	0.2716	4.167	3.858	3.758
25	4.166667	3.305639	4.459	4.342	4.034	0.2854	0.2834	0.2820	0.2810	0.2760	0.2750	0.2736	0.2715	4.333	4.025	3.924
26	4.333333	3.437864	4.626	4.509	4.200	0.2855	0.2834	0.2820	0.2810	0.2760	0.2750	0.2736	0.2715	4.500	4.191	4.091
27	4.500000	3.570090	4.793	4.676	4.367	0.2856	0.2835	0.2820	0.2810	0.2760	0.2750	0.2735	0.2714	4.667	4.357	4.257
28	4.666667	3.702315	4.959	4.843	4.534	0.2857	0.2835	0.2821	0.2810	0.2760	0.2749	0.2735	0.2713	4.833	4.524	4.424
29	4.833333	3.834541	5.126	5.010	4.700	0.2857	0.2836	0.2821	0.2811	0.2759	0.2749	0.2734	0.2713	5.000	4.690	4.591
30	5.000000	3.966766	5.293	5.177	4.867	0.2858	0.2836	0.2821	0.2811	0.2759	0.2748	0.2734	0.2712	5.167	4.856	4.757
31	5.166667	4.098992	5.460	5.344	5.034	0.2859	0.2837	0.2822	0.2811	0.2759	0.2748	0.2733	0.2711	5.333	5.023	4.924
32	5.333333	4.231218	5.626	5.511	5.200	0.2859	0.2837	0.2822	0.2811	0.2759	0.2748	0.2733	0.2711	5.500	5.189	5.090
33	5.500000	4.363443	5.793	5.678	5.367	0.2860	0.2838	0.2823	0.2812	0.2758	0.2747	0.2732	0.2710	5.667	5.355	5.257
34	5.666667	4.495669	5.960	5.845	5.534	0.2861	0.2838	0.2823	0.2812	0.2758	0.2747	0.2732	0.2709	5.833	5.522	5.423
35	5.833333	4.627894	6.127	6.012	5.700	0.2861	0.2839	0.2823	0.2812	0.2758	0.2747	0.2731	0.2708	6.000	5.688	5.590
36	6.000000	4.760120	6.293	6.179	5.867	0.2862	0.2839	0.2824	0.2812	0.2758	0.2746	0.2731	0.2708	6.167	5.854	5.757
37	6.166667	4.892345	6.460	6.346	6.034	0.2863	0.2840	0.2824	0.2813	0.2757	0.2746	0.2730	0.2707	6.333	6.021	5.923
38	6.333333	5.024571	6.627	6.513	6.200	0.2864	0.2840	0.2824	0.2813	0.2757	0.2746	0.2730	0.2706	6.500	6.187	6.090
39	6.500000	5.156796	6.794	6.680	6.367	0.2864	0.2841	0.2825	0.2813	0.2757	0.2745	0.2729	0.2706	6.667	6.353	6.256
40	6.666667	5.289022	6.960	6.847	6.534	0.2865	0.2841	0.2825	0.2813	0.2757	0.2745	0.2729	0.2705	6.833	6.520	6.423
41	6.833333	5.421248	7.127	7.014	6.700	0.2866	0.2841	0.2825	0.2814	0.2756	0.2745	0.2729	0.2704	7.000	6.686	6.589
42	7.000000	5.553473	7.294	7.181	6.867	0.2866	0.2842	0.2826	0.2814	0.2756	0.2744	0.2728	0.2704	7.167	6.852	6.756
43	7.166667	5.685699	7.461	7.348	7.034	0.2867	0.2842	0.2826	0.2814	0.2756	0.2744	0.2728	0.2703	7.333	7.019	6.923
44	7.333333	5.817924	7.627	7.515	7.200	0.2868	0.2843	0.2826	0.2814	0.2756	0.2744	0.2727	0.2702	7.500	7.185	7.089
45	7.500000	5.950150	7.794	7.682	7.367	0.2868	0.2843	0.2827	0.2815	0.2755	0.2743	0.2727	0.2702	7.667	7.351	7.256
46	7.666667	6.082375	7.961	7.849	7.534	0.2869	0.2844	0.2827	0.2815	0.2755	0.2743	0.2726	0.2701	7.833	7.518	7.422
47	7.833333	6.214601	8.128	8.016	7.700	0.2870	0.2844	0.2827	0.2815	0.2755	0.2743	0.2726	0.2700	8.000	7.684	7.589
48	8.000000	6.346826	8.294	8.183	7.867	0.2871	0.2845	0.2828	0.2815	0.2755	0.2742	0.2725	0.2699	8.167	7.850	7.756
49	8.166667	6.479052	8.461	8.350	8.034	0.2871	0.2845	0.2828	0.2816	0.2754	0.2742	0.2725	0.2699	8.333	8.017	7.922
50	8.333333	6.611277	8.628	8.517	8.200	0.2872	0.2846	0.2828	0.2816	0.2754	0.2741	0.2724	0.2698	8.500	8.183	8.089
51	8.500000	6.743503	8.795	8.684	8.367	0.2873	0.2846	0.2829	0.2816	0.2754	0.2741	0.2724	0.2697	8.667	8.349	8.255
52	8.666667	6.875729	8.962	8.851	8.534	0.2873	0.2847	0.2829	0.2816	0.2754	0.2741	0.2723	0.2697	8.833	8.516	8.422
53	8.833333	7.007954	9.128	9.018	8.700	0.2874	0.2847	0.2830	0.2817	0.2753	0.2740	0.2723	0.2696	9.000	8.682	8.588
54	9.000000	7.140180	9.295	9.185	8.867	0.2875	0.2848	0.2830	0.2817	0.2753	0.2740	0.2722	0.2695	9.167	8.848	8.755
55	9.166667	7.272405	9.462	9.352	9.034	0.2875	0.2848	0.2830	0.2817	0.2753	0.2740	0.2722	0.2694	9.333	9.015	8.922
56	9.333333	7.404631	9.629	9.519	9.200	0.2876	0.2849	0.2831	0.2817	0.2753	0.2739	0.2721	0.2694	9.500	9.181	9.088
57	9.500000	7.536856	9.795	9.686	9.367	0.2877	0.2849	0.2831	0.2818	0.2752	0.2739	0.2721	0.2693	9.667	9.347	9.255
58	9.666667	7.669082	9.962	9.853	9.534	0.2878	0.2850	0.2831	0.2818	0.2752	0.2739	0.2720	0.2692	9.833	9.514	9.421
59	9.833333	7.801307	10.129	10.020	9.700	0.2878	0.2850	0.2832	0.2818	0.2752	0.2738	0.2720	0.2692	10.000	9.680	9.588
60	10.00000	7.933533	10.296	10.187	9.867	0.2879	0.2851	0.2832	0.2818	0.2752	0.2738	0.2719	0.2691	10.167	9.846	9.754

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 85-92.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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37.5 DEG PRESSURE ANGLE

TABLE 44—37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 8/16 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.2088 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.2088 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.2	4.4	5.1	6.2	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.2	18.3
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+50 -0									+0 -50		
6	0.7500000	0.5950150	0.970	0.879	**0.655**	0.2144	0.2127	0.2116	0.2108	0.2068	0.2060	0.2049	0.2032	0.875	**0.650**	0.568
7	0.8750000	0.6941841	1.095	1.004	0.775	0.2145	0.2128	0.2116	0.2108	0.2068	0.2060	0.2048	0.2031	1.000	0.771	0.693
8	1.000000	0.7933532	1.220	1.129	0.900	0.2146	0.2128	0.2117	0.2108	0.2068	0.2059	0.2048	0.2030	1.125	0.896	0.817
9	1.125000	0.8925225	1.345	1.254	1.025	0.2146	0.2129	0.2117	0.2109	0.2067	0.2059	0.2047	0.2030	1.250	1.021	0.942
10	1.250000	0.9916916	1.470	1.379	1.150	0.2147	0.2129	0.2117	0.2109	0.2067	0.2058	0.2047	0.2029	1.375	1.146	1.067
11	1.375000	1.090861	1.595	1.504	1.275	0.2148	0.2130	0.2118	0.2109	0.2067	0.2058	0.2046	0.2028	1.500	1.271	1.192
12	1.500000	1.190030	1.720	1.629	1.400	0.2148	0.2130	0.2118	0.2109	0.2067	0.2058	0.2046	0.2028	1.625	1.396	1.317
13	1.625000	1.289199	1.845	1.754	1.525	0.2149	0.2131	0.2119	0.2110	0.2066	0.2057	0.2045	0.2027	1.750	1.521	1.442
14	1.750000	1.388368	1.971	1.879	1.650	0.2150	0.2131	0.2119	0.2110	0.2066	0.2057	0.2045	0.2026	1.875	1.646	1.567
15	1.875000	1.487537	2.096	2.004	1.775	0.2150	0.2132	0.2119	0.2110	0.2066	0.2057	0.2044	0.2025	2.000	1.771	1.692
16	2.000000	1.586707	2.221	2.129	1.900	0.2151	0.2132	0.2120	0.2110	0.2066	0.2056	0.2044	0.2025	2.125	1.896	1.817
17	2.125000	1.685876	2.346	2.255	2.025	0.2152	0.2133	0.2120	0.2111	0.2065	0.2056	0.2043	0.2024	2.250	2.020	1.942
18	2.250000	1.785045	2.471	2.380	2.150	0.2153	0.2133	0.2120	0.2111	0.2065	0.2056	0.2043	0.2023	2.375	2.145	2.067
19	2.375000	1.884214	2.596	2.505	2.275	0.2153	0.2134	0.2121	0.2111	0.2065	0.2055	0.2042	0.2023	2.500	2.270	2.191
20	2.500000	1.983383	2.721	2.630	2.400	0.2154	0.2134	0.2121	0.2111	0.2065	0.2055	0.2042	0.2022	2.625	2.395	2.316
21	2.625000	2.082552	2.846	2.756	2.525	0.2155	0.2135	0.2121	0.2112	0.2064	0.2055	0.2041	0.2021	2.750	2.519	2.441
22	2.750000	2.181722	2.971	2.881	2.650	0.2155	0.2135	0.2122	0.2112	0.2064	0.2054	0.2041	0.2021	2.875	2.644	2.566
23	2.875000	2.280891	3.096	3.006	2.775	0.2156	0.2136	0.2122	0.2112	0.2064	0.2054	0.2040	0.2020	3.000	2.769	2.691
24	3.000000	2.380060	3.221	3.131	2.900	0.2157	0.2136	0.2122	0.2112	0.2064	0.2054	0.2040	0.2019	3.125	2.894	2.816
25	3.125000	2.479229	3.347	3.257	3.025	0.2157	0.2137	0.2123	0.2113	0.2063	0.2053	0.2039	0.2018	3.250	3.018	2.941
26	3.250000	2.578398	3.472	3.382	3.150	0.2158	0.2137	0.2123	0.2113	0.2063	0.2053	0.2039	0.2018	3.375	3.143	3.066
27	3.375000	2.677567	3.597	3.507	3.275	0.2159	0.2138	0.2123	0.2113	0.2063	0.2053	0.2038	0.2017	3.500	3.268	3.191
28	3.500000	2.776737	3.722	3.632	3.400	0.2160	0.2138	0.2124	0.2113	0.2063	0.2052	0.2038	0.2016	3.625	3.393	3.316
29	3.625000	2.875906	3.847	3.758	3.525	0.2160	0.2139	0.2124	0.2114	0.2062	0.2052	0.2037	0.2016	3.750	3.517	3.441
30	3.750000	2.975075	3.972	3.883	3.650	0.2161	0.2139	0.2124	0.2114	0.2062	0.2051	0.2037	0.2015	3.875	3.642	3.565
31	3.875000	3.074244	4.097	4.008	3.775	0.2162	0.2140	0.2125	0.2114	0.2062	0.2051	0.2036	0.2014	4.000	3.767	3.690
32	4.000000	3.173413	4.222	4.133	3.900	0.2162	0.2140	0.2125	0.2114	0.2062	0.2051	0.2036	0.2014	4.125	3.892	3.815
33	4.125000	3.272582	4.347	4.259	4.025	0.2163	0.2141	0.2126	0.2115	0.2061	0.2050	0.2035	0.2013	4.250	4.016	3.940
34	4.250000	3.371752	4.472	4.384	4.150	0.2164	0.2141	0.2126	0.2115	0.2061	0.2050	0.2035	0.2012	4.375	4.141	4.065
35	4.375000	3.470921	4.597	4.509	4.275	0.2164	0.2142	0.2126	0.2115	0.2061	0.2050	0.2034	0.2011	4.500	4.266	4.190
36	4.500000	3.570090	4.723	4.634	4.400	0.2165	0.2142	0.2127	0.2115	0.2061	0.2049	0.2034	0.2011	4.625	4.391	4.315
37	4.625000	3.669259	4.848	4.760	4.525	0.2166	0.2143	0.2127	0.2116	0.2060	0.2049	0.2033	0.2010	4.750	4.515	4.440
38	4.750000	3.768428	4.973	4.885	4.650	0.2167	0.2143	0.2127	0.2116	0.2060	0.2049	0.2033	0.2009	4.875	4.640	4.565
39	4.875000	3.867597	5.098	5.010	4.775	0.2167	0.2144	0.2128	0.2116	0.2060	0.2048	0.2032	0.2009	5.000	4.765	4.690
40	5.000000	3.966766	5.223	5.135	4.900	0.2168	0.2144	0.2128	0.2116	0.2060	0.2048	0.2032	0.2008	5.125	4.890	4.815
41	5.125000	4.065936	5.348	5.261	5.025	0.2169	0.2144	0.2128	0.2117	0.2059	0.2048	0.2032	0.2007	5.250	5.014	4.939
42	5.250000	4.165105	5.473	5.386	5.150	0.2169	0.2145	0.2129	0.2117	0.2059	0.2047	0.2031	0.2007	5.375	5.139	5.064
43	5.375000	4.264274	5.598	5.511	5.275	0.2170	0.2145	0.2129	0.2117	0.2059	0.2047	0.2031	0.2006	5.500	5.264	5.189
44	5.500000	4.363443	5.723	5.636	5.400	0.2171	0.2146	0.2129	0.2117	0.2059	0.2047	0.2030	0.2005	5.625	5.389	5.314
45	5.625000	4.462612	5.848	5.762	5.525	0.2171	0.2146	0.2130	0.2118	0.2058	0.2046	0.2030	0.2004	5.750	5.513	5.439
46	5.750000	4.561781	5.973	5.887	5.650	0.2172	0.2147	0.2130	0.2118	0.2058	0.2046	0.2029	0.2004	5.875	5.638	5.564
47	5.875000	4.660951	6.099	6.012	5.775	0.2173	0.2147	0.2130	0.2118	0.2058	0.2046	0.2029	0.2003	6.000	5.763	5.689
48	6.000000	4.760120	6.224	6.137	5.900	0.2174	0.2148	0.2131	0.2118	0.2058	0.2045	0.2028	0.2002	6.125	5.888	5.814
49	6.125000	4.859289	6.349	6.263	6.025	0.2174	0.2148	0.2131	0.2119	0.2057	0.2045	0.2028	0.2002	6.250	6.012	5.939
50	6.250000	4.958458	6.474	6.388	6.150	0.2175	0.2149	0.2131	0.2119	0.2057	0.2044	0.2027	0.2001	6.375	6.137	6.064
51	6.375000	5.057627	6.599	6.513	6.275	0.2176	0.2149	0.2132	0.2119	0.2057	0.2044	0.2027	0.2000	6.500	6.262	6.189
52	6.500000	5.156796	6.724	6.638	6.400	0.2176	0.2150	0.2132	0.2119	0.2057	0.2044	0.2026	0.2000	6.625	6.387	6.313
53	6.625000	5.255966	6.849	6.764	6.525	0.2177	0.2150	0.2133	0.2120	0.2056	0.2043	0.2026	0.1999	6.750	6.511	6.438
54	6.750000	5.355135	6.974	6.889	6.650	0.2178	0.2151	0.2133	0.2120	0.2056	0.2043	0.2025	0.1998	6.875	6.636	6.563
55	6.875000	5.454304	7.099	7.014	6.775	0.2178	0.2151	0.2133	0.2120	0.2056	0.2043	0.2025	0.1997	7.000	6.761	6.688
56	7.000000	5.553473	7.224	7.139	6.900	0.2179	0.2152	0.2134	0.2120	0.2056	0.2042	0.2024	0.1997	7.125	6.886	6.813
57	7.125000	5.652642	7.349	7.265	7.025	0.2180	0.2152	0.2134	0.2121	0.2055	0.2042	0.2024	0.1996	7.250	7.010	6.938
58	7.250000	5.751811	7.475	7.390	7.150	0.2181	0.2153	0.2134	0.2121	0.2055	0.2042	0.2023	0.1995	7.375	7.135	7.063
59	7.375000	5.850981	7.600	7.515	7.275	0.2181	0.2153	0.2135	0.2121	0.2055	0.2041	0.2023	0.1995	7.500	7.260	7.188
60	7.500000	5.950150	7.725	7.640	7.400	0.2182	0.2154	0.2135	0.2121	0.2055	0.2041	0.2022	0.1994	7.625	7.385	7.313

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 85-92.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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37.5 DEG PRESSURE ANGLE

TABLE 45–37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 10/20 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.1671 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.1671 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.2	4.4	5.1	6.2	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.2	18.3
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
6	0.6000000	0.4760120	0.777	0.704	**0.525**	0.1724	0.1708	0.1698	0.1690	0.1652	0.1644	0.1634	0.1618	0.700	**0.520**	0.453
7	0.7000000	0.5553472	0.877	0.804	0.620	0.1725	0.1709	0.1698	0.1690	0.1652	0.1644	0.1633	0.1617	0.800	0.616	0.553
8	0.8000000	0.6346826	0.977	0.904	0.720	0.1725	0.1709	0.1698	0.1690	0.1652	0.1644	0.1633	0.1617	0.900	0.716	0.653
9	0.9000000	0.7140180	1.077	1.004	0.820	0.1726	0.1709	0.1698	0.1690	0.1652	0.1644	0.1633	0.1616	1.000	0.816	0.753
10	1.000000	0.7933532	1.177	1.104	0.920	0.1726	0.1710	0.1699	0.1691	0.1651	0.1643	0.1632	0.1616	1.100	0.916	0.853
11	1.100000	0.8726886	1.277	1.204	1.020	0.1727	0.1710	0.1699	0.1691	0.1651	0.1643	0.1632	0.1615	1.200	1.016	0.953
12	1.200000	0.9520240	1.377	1.304	1.120	0.1727	0.1711	0.1699	0.1691	0.1651	0.1643	0.1631	0.1615	1.300	1.116	1.053
13	1.300000	1.031359	1.477	1.404	1.220	0.1728	0.1711	0.1700	0.1691	0.1651	0.1642	0.1631	0.1614	1.400	1.216	1.153
14	1.400000	1.110695	1.578	1.504	1.320	0.1729	0.1711	0.1700	0.1691	0.1651	0.1642	0.1631	0.1613	1.500	1.316	1.252
15	1.500000	1.190030	1.678	1.604	1.420	0.1729	0.1712	0.1700	0.1692	0.1650	0.1642	0.1630	0.1613	1.600	1.416	1.352
16	1.600000	1.269365	1.778	1.704	1.520	0.1730	0.1712	0.1700	0.1692	0.1650	0.1642	0.1630	0.1612	1.700	1.516	1.452
17	1.700000	1.348701	1.878	1.804	1.620	0.1730	0.1712	0.1701	0.1692	0.1650	0.1641	0.1630	0.1612	1.800	1.616	1.552
18	1.800000	1.428036	1.978	1.904	1.720	0.1731	0.1713	0.1701	0.1692	0.1650	0.1641	0.1629	0.1611	1.900	1.716	1.652
19	1.900000	1.507371	2.078	2.004	1.820	0.1731	0.1713	0.1701	0.1692	0.1650	0.1641	0.1629	0.1611	2.000	1 816	1.752
20	2.000000	1.586707	2.178	2.104	1.920	0.1732	0.1714	0.1701	0.1693	0.1649	0.1641	0.1628	0.1610	2.100	1.916	1.852
21	2.100000	1.666042	2.278	2.205	2.020	0.1732	0.1714	0.1702	0.1693	0.1649	0.1640	0.1628	0.1610	2.200	2.015	1.952
22	2.200000	1.745377	2.378	2.305	2.120	0.1733	0.1714	0.1702	0.1693	0.1649	0.1640	0.1628	0.1609	2.300	2.115	2.052
23	2.300000	1.824713	2.478	2.405	2.220	0.1733	0.1715	0.1702	0.1693	0.1649	0.1640	0.1627	0.1609	2.400	2.215	2.152
24	2.400000	1.904048	2.578	2.505	2.320	0.1734	0.1715	0.1702	0.1693	0.1649	0.1640	0.1627	0.1608	2.500	2.315	2.252
25	2.500000	1.983383	2.678	2.605	2.420	0.1734	0.1715	0.1703	0.1694	0.1648	0.1639	0.1627	0.1608	2.600	2.415	2.352
26	2.600000	2.062719	2.778	2.706	2.520	0.1735	0.1716	0.1703	0.1694	0.1648	0.1639	0.1626	0.1607	2.700	2.514	2.452
27	2.700000	2.142054	2.878	2.806	2.620	0.1736	0.1716	0.1703	0.1694	0.1648	0.1639	0.1626	0.1606	2.800	2.614	2.552
28	2.800000	2.221389	2.978	2.906	2.720	0.1736	0.1717	0.1704	0.1694	0.1648	0.1638	0.1625	0.1606	2.900	2.714	2.652
29	2.900000	2.300725	3.079	3.006	2.820	0.1737	0.1717	0.1704	0.1694	0.1648	0.1638	0.1625	0.1605	3.000	2.814	2.751
30	3.000000	2.380060	3.179	3.106	2.920	0.1737	0.1717	0.1704	0.1695	0.1647	0.1638	0.1625	0.1605	3.100	2.914	2.851
31	3.100000	2.459395	3.279	3.207	3.020	0.1738	0.1718	0.1704	0.1695	0.1647	0.1638	0.1624	0.1604	3.200	3.013	2.951
32	3.200000	2.538731	3.379	3.307	3.120	0.1738	0.1718	0.1705	0.1695	0.1647	0.1637	0.1624	0.1604	3.300	3.113	3.051
33	3.300000	2.618066	3.479	3.407	3.220	0.1739	0.1718	0.1705	0.1695	0.1647	0.1637	0.1624	0.1603	3.400	3.213	3.151
34	3.400000	2.697401	3.579	3.507	3.320	0.1739	0.1719	0.1705	0.1695	0.1647	0.1637	0.1623	0.1603	3.500	3.313	3.251
35	3.500000	2.776737	3.679	3.607	3.420	0.1740	0.1719	0.1705	0.1695	0.1647	0.1637	0.1623	0.1602	3.600	3.413	3.351
36	3.600000	2.856072	3.779	3.708	3.520	0.1740	0.1720	0.1706	0.1696	0.1646	0.1636	0.1622	0.1602	3.700	3.512	3.451
37	3.700000	2.935407	3.879	3.808	3.620	0.1741	0.1720	0.1706	0.1696	0.1646	0.1636	0.1622	0.1601	3.800	3.612	3.551
38	3.800000	3.014743	3.979	3.908	3.720	0.1742	0.1720	0.1706	0.1696	0.1646	0.1636	0.1622	0.1600	3.900	3.712	3.651
39	3.900000	3.094078	4.079	4.008	3.820	0.1742	0.1721	0.1707	0.1696	0.1646	0.1635	0.1621	0.1600	4.000	3.812	3.751
40	4.000000	3.173413	4.179	4.108	3.920	0.1743	0.1721	0.1707	0.1696	0.1646	0.1635	0.1621	0.1599	4.100	3.912	3.851
41	4.100000	3.252749	4.279	4.209	4.020	0.1743	0.1721	0.1707	0.1697	0.1645	0.1635	0.1621	0.1599	4.200	4.011	3.951
42	4.200000	3.332084	4.379	4.309	4.120	0.1744	0.1722	0.1707	0.1697	0.1645	0.1635	0.1620	0.1598	4.300	4.111	4.051
43	4.300000	3.411419	4.480	4.409	4.220	0.1744	0.1722	0.1708	0.1697	0.1645	0.1634	0.1620	0.1598	4.400	4.211	4.150
44	4.400000	3.490755	4.580	4.509	4.320	0.1745	0.1723	0.1708	0.1697	0.1645	0.1634	0.1619	0.1597	4.500	4.311	4.250
45	4.500000	3.570090	4.680	4.609	4.420	0.1745	0.1723	0.1708	0.1697	0.1645	0.1634	0.1619	0.1597	4.600	4.411	4.350
46	4.600000	3.649425	4.780	4.710	4.520	0.1746	0.1723	0.1708	0.1698	0.1644	0.1634	0.1619	0.1596	4.700	4.510	4.450
47	4.700000	3.728761	4.880	4.810	4.620	0.1746	0.1724	0.1709	0.1698	0.1644	0.1633	0.1618	0.1596	4.800	4.610	4.550
48	4.800000	3.808096	4.980	4.910	4.720	0.1747	0.1724	0.1709	0.1698	0.1644	0.1633	0.1618	0.1595	4.900	4.710	4.650
49	4.900000	3.887431	5.080	5.010	4.820	0.1747	0.1725	0.1709	0.1698	0.1644	0.1633	0.1617	0.1595	5.000	4.810	4.750
50	5.000000	3.966766	5.180	5.110	4.920	0.1748	0.1725	0.1709	0.1698	0.1644	0.1632	0.1617	0.1594	5.100	4.910	4.850
51	5.100000	4.046102	5.280	5.211	5.020	0.1749	0.1725	0.1710	0.1699	0.1643	0.1632	0.1617	0.1593	5.200	5.009	4.950
52	5.200000	4.125437	5.380	5.311	5.120	0.1749	0.1726	0.1710	0.1699	0.1643	0.1632	0.1616	0.1593	5.300	5.109	5.050
53	5.300000	4.204772	5.480	5.411	5.220	0.1750	0.1726	0.1710	0.1699	0.1643	0.1632	0.1616	0.1592	5.400	5.209	5.150
54	5.400000	4.284108	5.580	5.511	5.320	0.1750	0.1726	0.1711	0.1699	0.1643	0.1631	0.1616	0.1592	5.500	5.309	5.250
55	5.500000	4.363443	5.680	5.611	5.420	0.1751	0.1727	0.1711	0.1699	0.1643	0.1631	0.1615	0.1591	5.600	5.409	5.350
56	5.600000	4.442778	5.780	5.712	5.520	0.1751	0.1727	0.1711	0.1699	0.1643	0.1631	0.1615	0.1591	5.700	5.508	5.450
57	5.700000	4.522114	5.881	5.812	5.620	0.1752	0.1728	0.1711	0.1700	0.1642	0.1631	0.1614	0.1590	5.800	5.608	5.549
58	5.800000	4.601449	5.981	5.912	5.720	0.1752	0.1728	0.1712	0.1700	0.1642	0.1630	0.1614	0.1590	5.900	5.708	5.649
59	5.900000	4.680784	6.081	6.012	5.820	0.1753	0.1728	0.1712	0.1700	0.1642	0.1630	0.1614	0.1589	6.000	5.808	5.749
60	6.000000	4.760120	6.181	6.112	5.920	0.1753	0.1729	0.1712	0.1700	0.1642	0.1630	0.1613	0.1589	6.100	5.908	5.849

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 85-92.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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37.5 DEG PRESSURE ANGLE

TABLE 46–37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 12/24 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width − 0.1392 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness − 0.1392 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.2	4.4	5.1	6.2	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.2	18.3
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
6	0.5000000	0.3966765	0.649	0.588	**0.438**	0.1445	0.1429	0.1419	0.1411	0.1373	0.1365	0.1355	0.1339	0.583	**0.433**	0.376
7	0.5833333	0.4627894	0.732	0.671	0.517	0.1446	0.1430	0.1419	0.1411	0.1373	0.1365	0.1354	0.1338	0.667	0.512	0.460
8	0.6666667	0.5289022	0.815	0.754	0.600	0.1446	0.1430	0.1419	0.1411	0.1373	0.1365	0.1354	0.1338	0.750	0.596	0.543
9	0.7500000	0.5950150	0.899	0.838	0.684	0.1447	0.1430	0.1419	0.1411	0.1373	0.1365	0.1354	0.1337	0.833	0.679	0.626
10	0.8333333	0.6611277	0.982	0.921	0.767	0.1447	0.1431	0.1420	0.1412	0.1372	0.1364	0.1353	0.1337	0.917	0.762	0.709
11	0.9166667	0.7272405	1.066	1.004	0.850	0.1448	0.1431	0.1420	0.1412	0.1372	0.1364	0.1353	0.1336	1.000	0.846	0.793
12	1.000000	0.7933532	1.149	1.088	0.934	0.1448	0.1432	0.1420	0.1412	0.1372	0.1364	0.1352	0.1336	1.083	0.929	0.876
13	1.083333	0.8594661	1.232	1.171	1.017	0.1449	0.1432	0.1421	0.1412	0.1372	0.1363	0.1352	0.1335	1.167	1.012	0.959
14	1.166667	0.9255788	1.316	1.254	1.100	0.1450	0.1432	0.1421	0.1412	0.1372	0.1363	0.1352	0.1334	1.250	1.096	1.042
15	1.250000	0.9916916	1.399	1.338	1.184	0.1450	0.1433	0.1421	0.1413	0.1371	0.1363	0.1351	0.1334	1.333	1.179	1.126
16	1.333333	1.057804	1.483	1.421	1.267	0.1451	0.1433	0.1421	0.1413	0.1371	0.1363	0.1351	0.1333	1.417	1.262	1.209
17	1.416667	1.123917	1.566	1.504	1.350	0.1451	0.1433	0.1422	0.1413	0.1371	0.1362	0.1351	0.1333	1.500	1.346	1.292
18	1.500000	1.190030	1.649	1.588	1.434	0.1452	0.1434	0.1422	0.1413	0.1371	0.1362	0.1350	0.1332	1.583	1.429	1.376
19	1.583333	1.256143	1.733	1.671	1.517	0.1452	0.1434	0.1422	0.1413	0.1371	0.1362	0.1350	0.1332	1.667	1.512	1.459
20	1.666667	1.322255	1.816	1.754	1.600	0.1453	0.1435	0.1422	0.1414	0.1370	0.1362	0.1349	0.1331	1.750	1.596	1.542
21	1.750000	1.388368	1.900	1.838	1.684	0.1453	0.1435	0.1423	0.1414	0.1370	0.1361	0.1349	0.1331	1.833	1.679	1.625
22	1.833333	1.454481	1.983	1.921	1.767	0.1454	0.1435	0.1423	0.1414	0.1370	0.1361	0.1349	0.1330	1.917	1.762	1.709
23	1.916667	1.520594	2.066	2.004	1.850	0.1454	0.1436	0.1423	0.1414	0.1370	0.1361	0.1348	0.1330	2.000	1.846	1.792
24	2.000000	1.586707	2.150	2.088	1.934	0.1455	0.1436	0.1423	0.1414	0.1370	0.1361	0.1348	0.1329	2.083	1.929	1.875
25	2.083333	1.652819	2.233	2.171	2.017	0.1455	0.1436	0.1424	0.1415	0.1369	0.1360	0.1348	0.1329	2.167	2.012	1.958
26	2.166667	1.718932	2.317	2.255	2.100	0.1456	0.1437	0.1424	0.1415	0.1369	0.1360	0.1347	0.1328	2.250	2.095	2.042
27	2.250000	1.785045	2.400	2.338	2.184	0.1457	0.1437	0.1424	0.1415	0.1369	0.1360	0.1347	0.1327	2.333	2.178	2.125
28	2.333333	1.851158	2.483	2.422	2.267	0.1457	0.1438	0.1425	0.1415	0.1369	0.1359	0.1346	0.1327	2.417	2.262	2.208
29	2.416667	1.917270	2.567	2.505	2.350	0.1458	0.1438	0.1425	0.1415	0.1369	0.1359	0.1346	0.1326	2.500	2.345	2.291
30	2.500000	1.983383	2.650	2.589	2.434	0.1458	0.1438	0.1425	0.1416	0.1368	0.1359	0.1346	0.1326	2.583	2.428	2.375
31	2.583333	2.049496	2.734	2.672	2.517	0.1459	0.1439	0.1425	0.1416	0.1368	0.1359	0.1345	0.1325	2.667	2.511	2.458
32	2.666667	2.115609	2.817	2.756	2.600	0.1459	0.1439	0.1426	0.1416	0.1368	0.1358	0.1345	0.1325	2.750	2.594	2.541
33	2.750000	2.181722	2.901	2.839	2.684	0.1460	0.1439	0.1426	0.1416	0.1368	0.1358	0.1345	0.1324	2.833	2.677	2.624
34	2.833333	2.247834	2.984	2.923	2.767	0.1460	0.1440	0.1426	0.1416	0.1368	0.1358	0.1344	0.1324	2.917	2.761	2.708
35	2.916667	2.313947	3.067	3.006	2.850	0.1461	0.1440	0.1426	0.1416	0.1368	0.1358	0.1344	0.1323	3.000	2.844	2.791
36	3.000000	2.380060	3.151	3.090	2.934	0.1461	0.1441	0.1427	0.1417	0.1367	0.1357	0.1343	0.1323	3.083	2.927	2.874
37	3.083333	2.446173	3.234	3.173	3.017	0.1462	0.1441	0.1427	0.1417	0.1367	0.1357	0.1343	0.1322	3.167	3.010	2.958
38	3.166667	2.512285	3.318	3.257	3.100	0.1463	0.1441	0.1427	0.1417	0.1367	0.1357	0.1343	0.1321	3.250	3.093	3.041
39	3.250000	2.578398	3.401	3.340	3.184	0.1463	0.1442	0.1428	0.1417	0.1367	0.1356	0.1342	0.1321	3.333	3.176	3.124
40	3.333333	2.644511	3.484	3.424	3.267	0.1464	0.1442	0.1428	0.1417	0.1367	0.1356	0.1342	0.1320	3.417	3.260	3.207
41	3.416667	2.710624	3.568	3.507	3.350	0.1464	0.1442	0.1428	0.1418	0.1366	0.1356	0.1342	0.1320	3.500	3.343	3.291
42	3.500000	2.776737	3.651	3.591	3.434	0.1465	0.1443	0.1428	0.1418	0.1366	0.1356	0.1341	0.1319	3.583	3.426	3.374
43	3.583333	2.842849	3.735	3.674	3.517	0.1465	0.1443	0.1429	0.1418	0.1366	0.1355	0.1341	0.1319	3.667	3.509	3.457
44	3.666667	2.908962	3.818	3.758	3.600	0.1466	0.1444	0.1429	0.1418	0.1366	0.1355	0.1340	0.1318	3.750	3.592	3.540
45	3.750000	2.975075	3.901	3.841	3.684	0.1466	0.1444	0.1429	0.1418	0.1366	0.1355	0.1340	0.1318	3.833	3.675	3.624
46	3.833333	3.041188	3.985	3.925	3.767	0.1467	0.1444	0.1429	0.1419	0.1365	0.1355	0.1340	0.1317	3.917	3.759	3.707
47	3.916667	3.107300	4.068	4.008	3.850	0.1467	0.1445	0.1430	0.1419	0.1365	0.1354	0.1339	0.1317	4.000	3.842	3.790
48	4.000000	3.173413	4.152	4.092	3.934	0.1468	0.1445	0.1430	0.1419	0.1365	0.1354	0.1339	0.1316	4.083	3.925	3.873
49	4.083333	3.239526	4.235	4.175	4.017	0.1468	0.1446	0.1430	0.1419	0.1365	0.1354	0.1338	0.1316	4.167	4.008	3.957
50	4.166667	3.305639	4.318	4.259	4.100	0.1469	0.1446	0.1430	0.1419	0.1365	0.1353	0.1338	0.1315	4.250	4.091	4.040
51	4.250000	3.371752	4.402	4.342	4.184	0.1470	0.1446	0.1431	0.1420	0.1364	0.1353	0.1338	0.1314	4.333	4.174	4.123
52	4.333333	3.437864	4.485	4.426	4.267	0.1470	0.1447	0.1431	0.1420	0.1364	0.1353	0.1337	0.1314	4.417	4.258	4.206
53	4.416667	3.503977	4.569	4.509	4.350	0.1471	0.1447	0.1431	0.1420	0.1364	0.1353	0.1337	0.1313	4.500	4.341	4.290
54	4.500000	3.570090	4.652	4.593	4.434	0.1471	0.1447	0.1432	0.1420	0.1364	0.1352	0.1337	0.1313	4.583	4.424	4.373
55	4.583333	3.636203	4.735	4.676	4.517	0.1472	0.1448	0.1432	0.1420	0.1364	0.1352	0.1336	0.1312	4.667	4.507	4.456
56	4.666667	3.702315	4.819	4.760	4.600	0.1472	0.1448	0.1432	0.1420	0.1364	0.1352	0.1336	0.1312	4.750	4.590	4.540
57	4.750000	3.768428	4.902	4.843	4.684	0.1473	0.1449	0.1432	0.1421	0.1363	0.1352	0.1335	0.1311	4.833	4.673	4.623
58	4.833333	3.834541	4.986	4.927	4.767	0.1473	0.1449	0.1433	0.1421	0.1363	0.1351	0.1335	0.1311	4.917	4.757	4.706
59	4.916667	3.900654	5.069	5.010	4.850	0.1474	0.1449	0.1433	0.1421	0.1363	0.1351	0.1335	0.1310	5.000	4.840	4.789
60	5.000000	3.966766	5.152	5.094	4.934	0.1474	0.1450	0.1433	0.1421	0.1363	0.1351	0.1334	0.1310	5.083	4.923	4.873

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 85-92.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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37.5 DEG PRESSURE ANGLE

TABLE 47—37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 16/32 SPLINE PITCH

	Internal and External		Internal (see Drawing Data)			External (see Drawing Data)									
						s_v Min. Eff. Circ. Space Width = 0.1044 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.1044 Notes c & d						
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia. Max.	D_{Fi} Form Dia.	D_i Minor Dia.	7	6	5	4	4	5	6	7	D_o Major Dia.	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.2	4.4	5.1	6.2	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.2	18.3
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
6	0.3750000	0.2975075	0.488	0.442	**0.330**	0.1094	0.1079	0.1069	0.1062	0.1026	0.1019	0.1009	0.0994	0.437	**0.325**	0.281
7	0.4375000	0.3470921	0.550	0.504	0.388	0.1095	0.1079	0.1069	0.1062	0.1026	0.1019	0.1009	0.0993	0.500	0.383	0.343
8	0.5000000	0.3966765	0.613	0.567	0.450	0.1095	0.1080	0.1070	0.1062	0.1026	0.1018	0.1008	0.0993	0.562	0.446	0.406
9	0.5625000	0.4462612	0.675	0.629	0.513	0.1095	0.1080	0.1070	0.1062	0.1026	0.1018	0.1008	0.0993	0.625	0.508	0.468
10	0.6250000	0.4958458	0.738	0.692	0.575	0.1096	0.1080	0.1070	0.1062	0.1026	0.1018	0.1008	0.0992	0.687	0.571	0.531
11	0.6875000	0.5454303	0.801	0.754	0.638	0.1096	0.1081	0.1070	0.1063	0.1025	0.1018	0.1007	0.0992	0.750	0.633	0.593
12	0.7500000	0.5950150	0.863	0.817	0.700	0.1097	0.1081	0.1070	0.1063	0.1025	0.1018	0.1007	0.0991	0.812	0.696	0.656
13	0.8125000	0.6445996	0.926	0.879	0.763	0.1097	0.1081	0.1070	0.1063	0.1025	0.1018	0.1007	0.0991	0.875	0.758	0.718
14	0.8750000	0.6941841	0.988	0.942	0.825	0.1097	0.1081	0.1071	0.1063	0.1025	0.1017	0.1007	0.0991	0.937	0.821	0.781
15	0.9375000	0.7437687	1.051	1.004	0.888	0.1098	0.1082	0.1071	0.1063	0.1025	0.1017	0.1006	0.0990	1.000	0.883	0.843
16	1.000000	0.7933532	1.113	1.067	0.950	0.1098	0.1082	0.1071	0.1063	0.1025	0.1017	0.1006	0.0990	1.062	0.946	0.905
17	1.062500	0.8429379	1.176	1.129	1.013	0.1098	0.1082	0.1071	0.1063	0.1025	0.1017	0.1006	0.0990	1.125	1.008	0.968
18	1.125000	0.8925225	1.238	1.192	1.075	0.1099	0.1082	0.1071	0.1063	0.1025	0.1017	0.1006	0.0989	1.187	1.071	1.030
19	1.187500	0.9421070	1.301	1.254	1.138	0.1099	0.1083	0.1072	0.1064	0.1024	0.1016	0.1005	0.0989	1.250	1.133	1.093
20	1.250000	0.9916916	1.363	1.317	1.200	0.1100	0.1083	0.1072	0.1064	0.1024	0.1016	0.1005	0.0988	1.312	1.196	1.155
21	1.312500	1.041276	1.426	1.379	1.263	0.1100	0.1083	0.1072	0.1064	0.1024	0.1016	0.1005	0.0988	1.375	1.258	1.218
22	1.375000	1.090861	1.489	1.442	1.325	0.1100	0.1083	0.1072	0.1064	0.1024	0.1016	0.1005	0.0988	1.437	1.321	1.280
23	1.437500	1.140445	1.551	1.504	1.388	0.1101	0.1084	0.1072	0.1064	0.1024	0.1016	0.1004	0.0987	1.500	1.383	1.343
24	1.500000	1.190030	1.614	1.567	1.450	0.1101	0.1084	0.1073	0.1064	0.1024	0.1015	0.1004	0.0987	1.562	1.446	1.405
25	1.562500	1.239615	1.676	1.629	1.513	0.1101	0.1084	0.1073	0.1064	0.1024	0.1015	0.1004	0.0987	1.625	1.508	1.468
26	1.625000	1.289199	1.739	1.692	1.575	0.1102	0.1085	0.1073	0.1065	0.1023	0.1015	0.1003	0.0986	1.687	1.571	1.530
27	1.687500	1.338784	1.801	1.754	1.638	0.1102	0.1085	0.1073	0.1065	0.1023	0.1015	0.1003	0.0986	1.750	1.633	1.592
28	1.750000	1.388368	1.864	1.817	1.700	0.1103	0.1085	0.1073	0.1065	0.1023	0.1015	0.1003	0.0985	1.812	1.696	1.655
29	1.812500	1.437953	1.926	1.879	1.763	0.1103	0.1085	0.1074	0.1065	0.1023	0.1014	0.1003	0.0985	1.875	1.758	1.717
30	1.875000	1.487537	1.989	1.942	1.825	0.1103	0.1086	0.1074	0.1065	0.1023	0.1014	0.1002	0.0985	1.937	1.821	1.780
31	1.937500	1.537122	2.052	2.004	1.888	0.1104	0.1086	0.1074	0.1065	0.1023	0.1014	0.1002	0.0984	2.000	1.883	1.842
32	2.000000	1.586707	2.114	2.067	1.950	0.1104	0.1086	0.1074	0.1065	0.1023	0.1014	0.1002	0.0984	2.062	1.946	1.905
33	2.062500	1.636291	2.177	2.130	2.013	0.1105	0.1086	0.1074	0.1065	0.1023	0.1014	0.1002	0.0983	2.125	2.008	1.967
34	2.125000	1.685876	2.239	2.192	2.075	0.1105	0.1087	0.1074	0.1066	0.1022	0.1014	0.1001	0.0983	2.187	2.070	2.030
35	2.187500	1.735460	2.302	2.255	2.138	0.1105	0.1087	0.1075	0.1066	0.1022	0.1013	0.1001	0.0983	2.250	2.133	2.092
36	2.250000	1.785045	2.364	2.317	2.200	0.1106	0.1087	0.1075	0.1066	0.1022	0.1013	0.1001	0.0982	2.312	2.195	2.154
37	2.312500	1.834630	2.427	2.380	2.263	0.1106	0.1087	0.1075	0.1066	0.1022	0.1013	0.1001	0.0982	2.375	2.257	2.217
38	2.375000	1.884214	2.489	2.443	2.325	0.1106	0.1088	0.1075	0.1066	0.1022	0.1013	0.1000	0.0982	2.437	2.320	2.279
39	2.437500	1.933799	2.552	2.505	2.388	0.1107	0.1088	0.1075	0.1066	0.1022	0.1013	0.1000	0.0981	2.500	2.382	2.342
40	2.500000	1.983383	2.614	2.568	2.450	0.1107	0.1088	0.1076	0.1066	0.1022	0.1012	0.1000	0.0981	2.562	2.445	2.404
41	2.562500	2.032968	2.677	2.631	2.513	0.1108	0.1089	0.1076	0.1067	0.1021	0.1012	0.0999	0.0980	2.625	2.507	2.467
42	2.625000	2.082552	2.740	2.693	2.575	0.1108	0.1089	0.1076	0.1067	0.1021	0.1012	0.0999	0.0980	2.687	2.569	2.529
43	2.687500	2.132137	2.802	2.756	2.638	0.1108	0.1089	0.1076	0.1067	0.1021	0.1012	0.0999	0.0980	2.750	2.632	2.592
44	2.750000	2.181722	2.865	2.818	2.700	0.1109	0.1089	0.1076	0.1067	0.1021	0.1012	0.0999	0.0979	2.812	2.694	2.654
45	2.812500	2.231306	2.927	2.881	2.763	0.1109	0.1090	0.1077	0.1067	0.1021	0.1011	0.0998	0.0979	2.875	2.756	2.717
46	2.875000	2.280891	2.990	2.944	2.825	0.1109	0.1090	0.1077	0.1067	0.1021	0.1011	0.0998	0.0979	2.937	2.819	2.779
47	2.937500	2.330475	3.052	3.006	2.888	0.1110	0.1090	0.1077	0.1067	0.1021	0.1011	0.0998	0.0978	3.000	2.881	2.841
48	3.000000	2.380060	3.115	3.069	2.950	0.1110	0.1090	0.1077	0.1068	0.1020	0.1011	0.0998	0.0978	3.062	2.944	2.904
49	3.062500	2.429644	3.177	3.132	3.013	0.1111	0.1091	0.1077	0.1068	0.1020	0.1011	0.0997	0.0977	3.125	3.006	2.966
50	3.125000	2.479229	3.240	3.194	3.075	0.1111	0.1091	0.1077	0.1068	0.1020	0.1010	0.0997	0.0977	3.187	3.068	3.029
51	3.187500	2.528814	3.303	3.257	3.138	0.1111	0.1091	0.1078	0.1068	0.1020	0.1010	0.0997	0.0977	3.250	3.131	3.091
52	3.250000	2.578398	3.365	3.319	3.200	0.1112	0.1091	0.1078	0.1068	0.1020	0.1010	0.0997	0.0976	3.312	3.193	3.154
53	3.312500	2.627983	3.428	3.382	3.263	0.1112	0.1092	0.1078	0.1068	0.1020	0.1010	0.0996	0.0976	3.375	3.255	3.216
54	3.375000	2.677567	3.490	3.445	3.325	0.1113	0.1092	0.1078	0.1068	0.1020	0.1010	0.0996	0.0975	3.437	3.318	3.279
55	3.437500	2.727152	3.553	3.507	3.388	0.1113	0.1092	0.1078	0.1068	0.1020	0.1010	0.0996	0.0975	3.500	3.380	3.341
56	3.500000	2.776737	3.615	3.570	3.450	0.1113	0.1092	0.1079	0.1069	0.1019	0.1009	0.0996	0.0975	3.562	3.443	3.403
57	3.562500	2.826321	3.678	3.633	3.513	0.1114	0.1093	0.1079	0.1069	0.1019	0.1009	0.0995	0.0974	3.625	3.505	3.466
58	3.625000	2.875906	3.740	3.695	3.575	0.1114	0.1093	0.1079	0.1069	0.1019	0.1009	0.0995	0.0974	3.687	3.567	3.528
59	3.687500	2.925490	3.803	3.758	3.638	0.1114	0.1093	0.1079	0.1069	0.1019	0.1009	0.0995	0.0974	3.750	3.630	3.591
60	3.750000	2.975075	3.865	3.820	3.700	0.1115	0.1094	0.1079	0.1069	0.1019	0.1009	0.0994	0.0973	3.812	3.692	3.653

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 85-92.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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37.5 DEG PRESSURE ANGLE

TABLE 48–37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 20/40 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
						S_v Min. Eff. Circ. Space Width 0.0835 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness 0.0835 Notes c & d						
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia. Max.	D_{Fi} Form Dia.	D_i Minor Dia.	7	6	5	4	4	5	6	7	D_o Major Dia.	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.2	4.4	5.1	6.2	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.2	18.3
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
6	0.3000000	0.2380060	0.392	0.354	0.265	0.0885	0.0870	0.0860	0.0853	0.0817	0.0810	0.0800	0.0785	0.350	0.260	0.223
7	0.3500000	0.2776737	0.442	0.404	0.310	0.0886	0.0870	0.0860	0.0853	0.0817	0.0810	0.0800	0.0784	0.400	0.306	0.273
8	0.4000000	0.3173413	0.492	0.454	0.360	0.0886	0.0871	0.0861	0.0853	0.0817	0.0809	0.0799	0.0784	0.450	0.356	0.323
9	0.4500000	0.3570090	0.542	0.504	0.410	0.0886	0.0871	0.0861	0.0853	0.0817	0.0809	0.0799	0.0784	0.500	0.406	0.373
10	0.5000000	0.3966765	0.592	0.554	0.460	0.0887	0.0871	0.0861	0.0853	0.0817	0.0809	0.0799	0.0783	0.550	0.456	0.423
11	0.5500000	0.4363443	0.642	0.604	0.510	0.0887	0.0872	0.0861	0.0854	0.0816	0.0809	0.0798	0.0783	0.600	0.506	0.473
12	0.6000000	0.4760120	0.692	0.654	0.560	0.0888	0.0872	0.0861	0.0854	0.0816	0.0809	0.0798	0.0782	0.650	0.556	0.523
13	0.6500000	0.5156795	0.742	0.704	0.610	0.0888	0.0872	0.0861	0.0854	0.0816	0.0809	0.0798	0.0782	0.700	0.606	0.573
14	0.7000000	0.5553472	0.792	0.754	0.660	0.0888	0.0872	0.0862	0.0854	0.0816	0.0808	0.0798	0.0782	0.750	0.656	0.623
15	0.7500000	0.5950150	0.842	0.804	0.710	0.0889	0.0873	0.0862	0.0854	0.0816	0.0808	0.0797	0.0781	0.800	0.706	0.673
16	0.8000000	0.6346826	0.892	0.854	0.760	0.0889	0.0873	0.0862	0.0854	0.0816	0.0808	0.0797	0.0781	0.850	0.756	0.723
17	0.8500000	0.6743503	0.942	0.904	0.810	0.0889	0.0873	0.0862	0.0854	0.0816	0.0808	0.0797	0.0781	0.900	0.806	0.773
18	0.9000000	0.7140180	0.992	0.954	0.860	0.0890	0.0873	0.0862	0.0854	0.0816	0.0808	0.0797	0.0780	0.950	0.856	0.823
19	0.9500000	0.7536855	1.042	1.004	0.910	0.0890	0.0874	0.0863	0.0855	0.0815	0.0807	0.0796	0.0780	1.000	0.906	0.873
20	1.000000	0.7933532	1.092	1.054	0.960	0.0891	0.0874	0.0863	0.0855	0.0815	0.0807	0.0796	0.0779	1.050	0.956	0.923
21	1.050000	0.8330210	1.142	1.104	1.010	0.0891	0.0874	0.0863	0.0855	0.0815	0.0807	0.0796	0.0779	1.100	1.006	0.973
22	1.100000	0.8726886	1.192	1.154	1.060	0.0891	0.0874	0.0863	0.0855	0.0815	0.0807	0.0796	0.0779	1.150	1.056	1.023
23	1.150000	0.9123563	1.242	1.204	1.110	0.0892	0.0875	0.0863	0.0855	0.0815	0.0807	0.0795	0.0778	1.200	1.106	1.073
24	1.200000	0.9520240	1.292	1.254	1.160	0.0892	0.0875	0.0864	0.0855	0.0815	0.0806	0.0795	0.0778	1.250	1.156	1.123
25	1.250000	0.9916916	1.342	1.304	1.210	0.0892	0.0875	0.0864	0.0855	0.0815	0.0806	0.0795	0.0778	1.300	1.206	1.173
26	1.300000	1.031359	1.393	1.354	1.260	0.0893	0.0876	0.0864	0.0856	0.0814	0.0806	0.0794	0.0777	1.350	1.256	1.222
27	1.350000	1.071027	1.443	1.404	1.310	0.0893	0.0876	0.0864	0.0856	0.0814	0.0806	0.0794	0.0777	1.400	1.306	1.272
28	1.400000	1.110695	1.493	1.454	1.360	0.0894	0.0876	0.0864	0.0856	0.0814	0.0806	0.0794	0.0776	1.450	1.356	1.322
29	1.450000	1.150362	1.543	1.504	1.410	0.0894	0.0876	0.0865	0.0856	0.0814	0.0805	0.0794	0.0776	1.500	1.406	1.372
30	1.500000	1.190030	1.593	1.554	1.460	0.0894	0.0877	0.0865	0.0856	0.0814	0.0805	0.0793	0.0776	1.550	1.456	1.422
31	1.550000	1.229698	1.643	1.604	1.510	0.0895	0.0877	0.0865	0.0856	0.0814	0.0805	0.0793	0.0775	1.600	1.506	1.472
32	1.600000	1.269365	1.693	1.654	1.560	0.0895	0.0877	0.0865	0.0856	0.0814	0.0805	0.0793	0.0775	1.650	1.556	1.522
33	1.650000	1.309033	1.743	1.704	1.610	0.0896	0.0877	0.0865	0.0856	0.0814	0.0805	0.0793	0.0774	1.700	1.606	1.572
34	1.700000	1.348701	1.793	1.754	1.660	0.0896	0.0878	0.0865	0.0857	0.0813	0.0805	0.0792	0.0774	1.750	1.656	1.622
35	1.750000	1.388368	1.843	1.804	1.710	0.0896	0.0878	0.0866	0.0857	0.0813	0.0804	0.0792	0.0774	1.800	1.706	1.672
36	1.800000	1.428036	1.893	1.854	1.760	0.0897	0.0878	0.0866	0.0857	0.0813	0.0804	0.0792	0.0773	1.850	1.756	1.722
37	1.850000	1.467704	1.943	1.904	1.810	0.0897	0.0878	0.0866	0.0857	0.0813	0.0804	0.0792	0.0773	1.900	1.806	1.772
38	1.900000	1.507371	1.993	1.954	1.860	0.0897	0.0879	0.0866	0.0857	0.0813	0.0804	0.0791	0.0773	1.950	1.856	1.822
39	1.950000	1.547039	2.043	2.004	1.910	0.0898	0.0879	0.0866	0.0857	0.0813	0.0804	0.0791	0.0772	2.000	1.906	1.872
40	2.000000	1.586707	2.093	2.054	1.960	0.0898	0.0879	0.0867	0.0857	0.0813	0.0803	0.0791	0.0772	2.050	1.956	1.922
41	2.050000	1.626374	2.143	2.105	2.010	0.0899	0.0880	0.0867	0.0858	0.0812	0.0803	0.0790	0.0771	2.100	2.005	1.972
42	2.100000	1.666042	2.193	2.155	2.060	0.0899	0.0880	0.0867	0.0858	0.0812	0.0803	0.0790	0.0771	2.150	2.055	2.022
43	2.150000	1.705710	2.243	2.205	2.110	0.0899	0.0880	0.0867	0.0858	0.0812	0.0803	0.0790	0.0771	2.200	2.105	2.072
44	2.200000	1.745377	2.293	2.255	2.160	0.0900	0.0880	0.0867	0.0858	0.0812	0.0803	0.0790	0.0770	2.250	2.155	2.122
45	2.250000	1.785045	2.343	2.305	2.210	0.0900	0.0881	0.0868	0.0858	0.0812	0.0802	0.0789	0.0770	2.300	2.205	2.172
46	2.300000	1.824713	2.394	2.355	2.260	0.0900	0.0881	0.0868	0.0858	0.0812	0.0802	0.0789	0.0770	2.350	2.255	2.221
47	2.350000	1.864380	2.444	2.405	2.310	0.0901	0.0881	0.0868	0.0858	0.0812	0.0802	0.0789	0.0769	2.400	2.305	2.271
48	2.400000	1.904048	2.494	2.455	2.360	0.0901	0.0881	0.0868	0.0859	0.0811	0.0802	0.0789	0.0769	2.450	2.355	2.321
49	2.450000	1.943716	2.544	2.505	2.410	0.0902	0.0882	0.0868	0.0859	0.0811	0.0802	0.0788	0.0768	2.500	2.405	2.371
50	2.500000	1.983383	2.594	2.555	2.460	0.0902	0.0882	0.0868	0.0859	0.0811	0.0802	0.0788	0.0768	2.550	2.455	2.421
51	2.550000	2.023051	2.644	2.606	2.510	0.0902	0.0882	0.0869	0.0859	0.0811	0.0801	0.0788	0.0768	2.600	2.504	2.471
52	2.600000	2.062719	2.694	2.656	2.560	0.0903	0.0882	0.0869	0.0859	0.0811	0.0801	0.0788	0.0767	2.650	2.554	2.521
53	2.650000	2.102386	2.744	2.706	2.610	0.0903	0.0883	0.0869	0.0859	0.0811	0.0801	0.0787	0.0767	2.700	2.604	2.571
54	2.700000	2.142054	2.794	2.756	2.660	0.0904	0.0883	0.0869	0.0859	0.0811	0.0801	0.0787	0.0766	2.750	2.654	2.621
55	2.750000	2.181722	2.844	2.806	2.710	0.0904	0.0883	0.0869	0.0859	0.0811	0.0801	0.0787	0.0766	2.800	2.704	2.671
56	2.800000	2.221389	2.894	2.856	2.760	0.0904	0.0883	0.0870	0.0860	0.0810	0.0800	0.0787	0.0766	2.850	2.754	2.721
57	2.850000	2.261057	2.944	2.906	2.810	0.0905	0.0884	0.0870	0.0860	0.0810	0.0800	0.0786	0.0765	2.900	2.804	2.771
58	2.900000	2.300725	2.994	2.956	2.860	0.0905	0.0884	0.0870	0.0860	0.0810	0.0800	0.0786	0.0765	2.950	2.854	2.821
59	2.950000	2.340392	3.044	3.006	2.910	0.0905	0.0884	0.0870	0.0860	0.0810	0.0800	0.0786	0.0765	3.000	2.904	2.871
60	3.000000	2.380060	3.094	3.056	2.960	0.0906	0.0885	0.0870	0.0860	0.0810	0.0800	0.0785	0.0764	3.050	2.954	2.921

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 85-92.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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37.5 DEG PRESSURE ANGLE

TABLE 49–37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 24/48 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width 0.0696 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness 0.0696 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.2	4.4	5.1	6.2	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.2	18.3
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
6	0.2500000	0.1983382	0.327	0.296	**0.221**	0.0742	0.0728	0.0719	0.0712	0.0680	0.0673	0.0664	0.0650	0.292	**0.216**	0.186
7	0.2916667	0.2313947	0.369	0.338	**0.259**	0.0743	0.0729	0.0719	0.0713	0.0679	0.0673	0.0663	0.0649	0.333	**0.254**	0.227
8	0.3333333	0.2644510	0.410	0.379	0.300	0.0743	0.0729	0.0720	0.0713	0.0679	0.0672	0.0663	0.0649	0.375	0.296	0.269
9	0.3750000	0.2975075	0.452	0.421	0.342	0.0743	0.0729	0.0720	0.0713	0.0679	0.0672	0.0663	0.0649	0.417	0.337	0.310
10	0.4166667	0.3305639	0.494	0.463	0.384	0.0744	0.0729	0.0720	0.0713	0.0679	0.0672	0.0663	0.0648	0.458	0.379	0.352
11	0.4583333	0.3636202	0.535	0.504	0.426	0.0744	0.0730	0.0720	0.0713	0.0679	0.0672	0.0662	0.0648	0.500	0.421	0.394
12	0.5000000	0.3966765	0.577	0.546	0.467	0.0745	0.0730	0.0720	0.0713	0.0679	0.0672	0.0662	0.0647	0.542	0.462	0.435
13	0.5416667	0.4297330	0.619	0.588	0.509	0.0745	0.0730	0.0720	0.0713	0.0679	0.0672	0.0662	0.0647	0.583	0.504	0.477
14	0.5833333	0.4627894	0.661	0.629	0.550	0.0745	0.0731	0.0721	0.0714	0.0678	0.0671	0.0661	0.0647	0.625	0.546	0.519
15	0.6250000	0.4958458	0.702	0.671	0.592	0.0746	0.0731	0.0721	0.0714	0.0678	0.0671	0.0661	0.0646	0.667	0.587	0.560
16	0.6666667	0.5289022	0.744	0.713	0.634	0.0746	0.0731	0.0721	0.0714	0.0678	0.0671	0.0661	0.0646	0.708	0.629	0.602
17	0.7083333	0.5619586	0.786	0.754	0.675	0.0746	0.0731	0.0721	0.0714	0.0678	0.0671	0.0661	0.0646	0.750	0.671	0.643
18	0.7500000	0.5950150	0.827	0.796	0.717	0.0747	0.0732	0.0721	0.0714	0.0678	0.0671	0.0660	0.0645	0.792	0.712	0.685
19	0.7916667	0.6280714	0.869	0.838	0.759	0.0747	0.0732	0.0722	0.0714	0.0678	0.0670	0.0660	0.0645	0.833	0.754	0.727
20	0.8333333	0.6611277	0.911	0.879	0.800	0.0748	0.0732	0.0722	0.0714	0.0678	0.0670	0.0660	0.0644	0.875	0.796	0.768
21	0.8750000	0.6941841	0.953	0.921	0.842	0.0748	0.0732	0.0722	0.0714	0.0678	0.0670	0.0660	0.0644	0.917	0.837	0.810
22	0.9166667	0.7272405	0.994	0.963	0.884	0.0748	0.0733	0.0722	0.0715	0.0677	0.0670	0.0659	0.0644	0.958	0.879	0.852
23	0.9583333	0.7602969	1.036	1.004	0.925	0.0749	0.0733	0.0722	0.0715	0.0677	0.0670	0.0659	0.0643	1.000	0.921	0.893
24	1.000000	0.7933532	1.078	1.046	0.967	0.0749	0.0733	0.0723	0.0715	0.0677	0.0669	0.0659	0.0643	1.042	0.962	0.935
25	1.041667	0.8264097	1.119	1.088	1.009	0.0750	0.0733	0.0723	0.0715	0.0677	0.0669	0.0659	0.0643	1.083	1.004	0.976
26	1.083333	0.8594661	1.161	1.129	1.050	0.0750	0.0734	0.0723	0.0715	0.0677	0.0669	0.0658	0.0642	1.125	1.046	1.018
27	1.125000	0.8925225	1.203	1.171	1.092	0.0750	0.0734	0.0723	0.0715	0.0677	0.0669	0.0658	0.0642	1.167	1.087	1.060
28	1.166667	0.9255788	1.245	1.213	1.134	0.0751	0.0734	0.0723	0.0715	0.0677	0.0669	0.0658	0.0641	1.208	1.129	1.101
29	1.208333	0.9586352	1.286	1.254	1.175	0.0751	0.0735	0.0724	0.0716	0.0676	0.0668	0.0657	0.0641	1.250	1.171	1.143
30	1.250000	0.9916916	1.328	1.296	1.217	0.0751	0.0735	0.0724	0.0716	0.0676	0.0668	0.0657	0.0641	1.292	1.212	1.184
31	1.291667	1.024748	1.370	1.338	1.259	0.0752	0.0735	0.0724	0.0716	0.0676	0.0668	0.0657	0.0640	1.333	1.254	1.226
32	1.333333	1.057804	1.411	1.379	1.300	0.0752	0.0735	0.0724	0.0716	0.0676	0.0668	0.0657	0.0640	1.375	1.296	1.268
33	1.375000	1.090861	1.453	1.421	1.342	0.0753	0.0736	0.0724	0.0716	0.0676	0.0668	0.0656	0.0639	1.417	1.337	1.309
34	1.416667	1.123917	1.495	1.463	1.384	0.0753	0.0736	0.0724	0.0716	0.0676	0.0668	0.0656	0.0639	1.458	1.379	1.351
35	1.458333	1.156974	1.537	1.504	1.425	0.0753	0.0736	0.0725	0.0716	0.0676	0.0667	0.0656	0.0639	1.500	1.421	1.393
36	1.500000	1.190030	1.578	1.546	1.467	0.0754	0.0736	0.0725	0.0716	0.0676	0.0667	0.0656	0.0638	1.542	1.462	1.434
37	1.541667	1.223086	1.620	1.588	1.509	0.0754	0.0737	0.0725	0.0717	0.0675	0.0667	0.0655	0.0638	1.583	1.504	1.476
38	1.583333	1.256143	1.662	1.629	1.550	0.0754	0.0737	0.0725	0.0717	0.0675	0.0667	0.0655	0.0638	1.625	1.546	1.517
39	1.625000	1.289199	1.703	1.671	1.592	0.0755	0.0737	0.0725	0.0717	0.0675	0.0667	0.0655	0.0637	1.667	1.587	1.559
40	1.666667	1.322255	1.745	1.713	1.634	0.0755	0.0737	0.0726	0.0717	0.0675	0.0666	0.0655	0.0637	1.708	1.629	1.601
41	1.708333	1.355312	1.787	1.754	1.675	0.0756	0.0738	0.0726	0.0717	0.0675	0.0666	0.0654	0.0636	1.750	1.671	1.642
42	1.750000	1.388368	1.829	1.796	1.717	0.0756	0.0738	0.0726	0.0717	0.0675	0.0666	0.0654	0.0636	1.792	1.712	1.684
43	1.791667	1.421425	1.870	1.838	1.759	0.0756	0.0738	0.0726	0.0717	0.0675	0.0666	0.0654	0.0636	1.833	1.754	1.725
44	1.833333	1.454481	1.912	1.879	1.800	0.0757	0.0739	0.0726	0.0718	0.0674	0.0666	0.0653	0.0635	1.875	1.796	1.767
45	1.875000	1.487537	1.954	1.921	1.842	0.0757	0.0739	0.0727	0.0718	0.0674	0.0665	0.0653	0.0635	1.917	1.837	1.809
46	1.916667	1.520594	1.996	1.963	1.884	0.0757	0.0739	0.0727	0.0718	0.0674	0.0665	0.0653	0.0635	1.958	1.879	1.850
47	1.958333	1.553650	2.037	2.004	1.925	0.0758	0.0739	0.0727	0.0718	0.0674	0.0665	0.0653	0.0634	2.000	1.921	1.892
48	2.000000	1.586707	2.079	2.046	1.967	0.0758	0.0740	0.0727	0.0718	0.0674	0.0665	0.0652	0.0634	2.042	1.962	1.934
49	2.041667	1.619763	2.121	2.088	2.009	0.0759	0.0740	0.0727	0.0718	0.0674	0.0665	0.0652	0.0633	2.083	2.004	1.975
50	2.083333	1.652819	2.162	2.130	2.050	0.0759	0.0740	0.0727	0.0718	0.0674	0.0665	0.0652	0.0633	2.125	2.045	2.017
51	2.125000	1.685876	2.204	2.171	2.092	0.0759	0.0740	0.0728	0.0718	0.0674	0.0664	0.0652	0.0633	2.167	2.087	2.058
52	2.166667	1.718932	2.246	2.213	2.134	0.0760	0.0741	0.0728	0.0719	0.0673	0.0664	0.0651	0.0632	2.208	2.129	2.100
53	2.208333	1.751989	2.288	2.255	2.175	0.0760	0.0741	0.0728	0.0719	0.0673	0.0664	0.0651	0.0632	2.250	2.170	2.142
54	2.250000	1.785045	2.329	2.297	2.217	0.0761	0.0741	0.0728	0.0719	0.0673	0.0664	0.0651	0.0631	2.292	2.212	2.183
55	2.291667	1.818101	2.371	2.338	2.259	0.0761	0.0741	0.0728	0.0719	0.0673	0.0664	0.0651	0.0631	2.333	2.253	2.225
56	2.333333	1.851158	2.413	2.380	2.300	0.0761	0.0742	0.0729	0.0719	0.0673	0.0663	0.0650	0.0631	2.375	2.295	2.266
57	2.375000	1.884214	2.454	2.422	2.342	0.0762	0.0742	0.0729	0.0719	0.0673	0.0663	0.0650	0.0630	2.417	2.336	2.308
58	2.416667	1.917270	2.496	2.464	2.384	0.0762	0.0742	0.0729	0.0719	0.0673	0.0663	0.0650	0.0630	2.458	2.378	2.350
59	2.458333	1.950327	2.538	2.505	2.425	0.0762	0.0742	0.0729	0.0720	0.0672	0.0663	0.0650	0.0630	2.500	2.420	2.391
60	2.500000	1.983383	2.580	2.547	2.467	0.0763	0.0743	0.0729	0.0720	0.0672	0.0663	0.0649	0.0629	2.542	2.461	2.433

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 85-92.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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37.5 DEG PRESSURE ANGLE

TABLE 50—37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 32/64 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width − 0.0522 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness − 0.0522 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.2	4.4	5.1	6.2	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.2	18.3
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+30 −0									+0 −30		
6	0.1875000	0.1487537	0.247	0.223	0.167	0.0568	0.0554	0.0545	0.0538	0.0506	0.0499	0.0490	0.0476	0.219	0.162	0.138
7	0.2187500	0.1735460	0.278	0.254	0.196	0.0569	0.0555	0.0545	0.0539	0.0505	0.0499	0.0489	0.0475	0.250	0.191	0.169
8	0.2500000	0.1983382	0.309	0.286	0.225	0.0569	0.0555	0.0546	0.0539	0.0505	0.0498	0.0489	0.0475	0.281	0.221	0.200
9	0.2812500	0.2231306	0.341	0.317	0.257	0.0569	0.0555	0.0546	0.0539	0.0505	0.0498	0.0489	0.0475	0.312	0.252	0.231
10	0.3125000	0.2479229	0.372	0.348	0.288	0.0570	0.0555	0.0546	0.0539	0.0505	0.0498	0.0489	0.0474	0.344	0.283	0.263
11	0.3437500	0.2727151	0.403	0.379	0.319	0.0570	0.0556	0.0546	0.0539	0.0505	0.0498	0.0488	0.0474	0.375	0.314	0.294
12	0.3750000	0.2975075	0.434	0.411	0.350	0.0571	0.0556	0.0546	0.0539	0.0505	0.0498	0.0488	0.0473	0.406	0.346	0.325
13	0.4062500	0.3222997	0.466	0.442	0.382	0.0571	0.0556	0.0546	0.0539	0.0505	0.0498	0.0488	0.0473	0.437	0.377	0.356
14	0.4375000	0.3470921	0.497	0.473	0.413	0.0571	0.0557	0.0547	0.0540	0.0504	0.0497	0.0487	0.0473	0.469	0.408	0.387
15	0.4687500	0.3718844	0.528	0.504	0.444	0.0572	0.0557	0.0547	0.0540	0.0504	0.0497	0.0487	0.0472	0.500	0.439	0.419
16	0.5000000	0.3966765	0.560	0.536	0.475	0.0572	0.0557	0.0547	0.0540	0.0504	0.0497	0.0487	0.0472	0.531	0.471	0.450
17	0.5312500	0.4214689	0.591	0.567	0.507	0.0572	0.0557	0.0547	0.0540	0.0504	0.0497	0.0487	0.0472	0.562	0.502	0.481
18	0.5625000	0.4462612	0.622	0.598	0.538	0.0573	0.0558	0.0547	0.0540	0.0504	0.0497	0.0486	0.0471	0.594	0.533	0.512
19	0.5937500	0.4710535	0.654	0.629	0.569	0.0573	0.0558	0.0548	0.0540	0.0504	0.0496	0.0486	0.0471	0.625	0.564	0.543
20	0.6250000	0.4958458	0.685	0.661	0.600	0.0574	0.0558	0.0548	0.0540	0.0504	0.0496	0.0486	0.0470	0.656	0.596	0.575
21	0.6562500	0.5206381	0.716	0.692	0.632	0.0574	0.0558	0.0548	0.0540	0.0504	0.0496	0.0486	0.0470	0.687	0.627	0.606
22	0.6875000	0.5454303	0.747	0.723	0.663	0.0574	0.0559	0.0548	0.0541	0.0503	0.0496	0.0485	0.0470	0.719	0.658	0.637
23	0.7187500	0.5702227	0.779	0.754	0.694	0.0575	0.0559	0.0548	0.0541	0.0503	0.0496	0.0485	0.0469	0.750	0.689	0.668
24	0.7500000	0.5950150	0.810	0.786	0.725	0.0575	0.0559	0.0549	0.0541	0.0503	0.0495	0.0485	0.0469	0.781	0.721	0.699
25	0.7812500	0.6198072	0.841	0.817	0.757	0.0575	0.0559	0.0549	0.0541	0.0503	0.0495	0.0485	0.0468	0.812	0.752	0.731
26	0.8125000	0.6445996	0.873	0.848	0.788	0.0576	0.0560	0.0549	0.0541	0.0503	0.0495	0.0484	0.0468	0.844	0.783	0.762
27	0.8437500	0.6693917	0.904	0.879	0.819	0.0576	0.0560	0.0549	0.0541	0.0503	0.0495	0.0484	0.0468	0.875	0.814	0.793
28	0.8750000	0.6941841	0.935	0.911	0.850	0.0577	0.0560	0.0549	0.0541	0.0503	0.0495	0.0484	0.0467	0.906	0.846	0.824
29	0.9062500	0.7189764	0.967	0.942	0.882	0.0577	0.0561	0.0550	0.0542	0.0502	0.0494	0.0483	0.0467	0.937	0.877	0.855
30	0.9375000	0.7437687	0.998	0.973	0.913	0.0577	0.0561	0.0550	0.0542	0.0502	0.0494	0.0483	0.0467	0.969	0.908	0.887
31	0.9687500	0.7685610	1.029	1.004	0.944	0.0578	0.0561	0.0550	0.0542	0.0502	0.0494	0.0483	0.0466	1.000	0.939	0.918
32	1.000000	0.7933532	1.060	1.036	0.975	0.0578	0.0561	0.0550	0.0542	0.0502	0.0494	0.0483	0.0466	1.031	0.971	0.949
33	1.031250	0.8181456	1.092	1.067	1.007	0.0579	0.0562	0.0550	0.0542	0.0502	0.0494	0.0482	0.0465	1.062	1.002	0.980
34	1.062500	0.8429379	1.123	1.098	1.038	0.0579	0.0562	0.0550	0.0542	0.0502	0.0494	0.0482	0.0465	1.094	1.033	1.011
35	1.093750	0.8677302	1.154	1.129	1.069	0.0579	0.0562	0.0551	0.0542	0.0502	0.0493	0.0482	0.0465	1.125	1.064	1.043
36	1.125000	0.8925225	1.186	1.161	1.100	0.0580	0.0562	0.0551	0.0542	0.0502	0.0493	0.0482	0.0464	1.156	1.096	1.074
37	1.156250	0.9173148	1.217	1.192	1.132	0.0580	0.0563	0.0551	0.0543	0.0501	0.0493	0.0481	0.0464	1.187	1.127	1.105
38	1.187500	0.9421070	1.248	1.223	1.163	0.0580	0.0563	0.0551	0.0543	0.0501	0.0493	0.0481	0.0464	1.219	1.158	1.136
39	1.218750	0.9668993	1.280	1.254	1.194	0.0581	0.0563	0.0551	0.0543	0.0501	0.0493	0.0481	0.0463	1.250	1.189	1.167
40	1.250000	0.9916916	1.311	1.286	1.225	0.0581	0.0563	0.0552	0.0543	0.0501	0.0492	0.0481	0.0463	1.281	1.221	1.199
41	1.281250	1.016484	1.342	1.317	1.257	0.0582	0.0564	0.0552	0.0543	0.0501	0.0492	0.0480	0.0462	1.312	1.252	1.230
42	1.312500	1.041276	1.373	1.348	1.288	0.0582	0.0564	0.0552	0.0543	0.0501	0.0492	0.0480	0.0462	1.344	1.283	1.261
43	1.343750	1.066068	1.405	1.379	1.319	0.0582	0.0564	0.0552	0.0543	0.0501	0.0492	0.0480	0.0462	1.375	1.314	1.292
44	1.375000	1.090861	1.436	1.411	1.350	0.0583	0.0565	0.0552	0.0544	0.0500	0.0492	0.0479	0.0461	1.406	1.346	1.323
45	1.406250	1.115653	1.467	1.442	1.382	0.0583	0.0565	0.0553	0.0544	0.0500	0.0491	0.0479	0.0461	1.437	1.377	1.355
46	1.437500	1.140445	1.499	1.473	1.413	0.0583	0.0565	0.0553	0.0544	0.0500	0.0491	0.0479	0.0461	1.469	1.408	1.386
47	1.468750	1.165238	1.530	1.504	1.444	0.0584	0.0565	0.0553	0.0544	0.0500	0.0491	0.0479	0.0460	1.500	1.439	1.417
48	1.500000	1.190030	1.561	1.536	1.475	0.0584	0.0566	0.0553	0.0544	0.0500	0.0491	0.0478	0.0460	1.531	1.471	1.448
49	1.531250	1.214822	1.593	1.567	1.507	0.0585	0.0566	0.0553	0.0544	0.0500	0.0491	0.0478	0.0459	1.562	1.502	1.479
50	1.562500	1.239615	1.624	1.598	1.538	0.0585	0.0566	0.0553	0.0544	0.0500	0.0490	0.0478	0.0459	1.594	1.533	1.511
51	1.593750	1.264407	1.655	1.629	1.569	0.0585	0.0566	0.0554	0.0544	0.0500	0.0490	0.0478	0.0459	1.625	1.564	1.542
52	1.625000	1.289199	1.686	1.661	1.600	0.0586	0.0567	0.0554	0.0545	0.0499	0.0490	0.0477	0.0458	1.656	1.596	1.573
53	1.656250	1.313991	1.718	1.692	1.632	0.0586	0.0567	0.0554	0.0545	0.0499	0.0490	0.0477	0.0458	1.687	1.627	1.604
54	1.687500	1.338784	1.749	1.723	1.663	0.0587	0.0567	0.0554	0.0545	0.0499	0.0490	0.0477	0.0457	1.719	1.658	1.635
55	1.718750	1.363576	1.780	1.754	1.694	0.0587	0.0567	0.0554	0.0545	0.0499	0.0490	0.0477	0.0457	1.750	1.689	1.667
56	1.750000	1.388368	1.812	1.786	1.725	0.0587	0.0568	0.0555	0.0545	0.0499	0.0489	0.0476	0.0457	1.781	1.721	1.698
57	1.781250	1.413161	1.843	1.817	1.757	0.0588	0.0568	0.0555	0.0545	0.0499	0.0489	0.0476	0.0456	1.812	1.752	1.729
58	1.812500	1.437953	1.874	1.848	1.788	0.0588	0.0568	0.0555	0.0545	0.0499	0.0489	0.0476	0.0456	1.844	1.783	1.760
59	1.843750	1.462745	1.906	1.879	1.819	0.0588	0.0568	0.0555	0.0546	0.0498	0.0489	0.0476	0.0456	1.875	1.814	1.791
60	1.875000	1.487537	1.937	1.911	1.850	0.0589	0.0569	0.0555	0.0546	0.0498	0.0489	0.0475	0.0455	1.906	1.846	1.823

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 85-92.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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37.5 DEG PRESSURE ANGLE

TABLE 51—37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 40/80 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width 0.0418 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness − 0.0418 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.2	4.4	5.1	6.2	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.2	18.3
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+30 −0									+0 −30		
6	0.1500000	0.1190030	0.199	0.179	**0.135**	0.0464	0.0450	0.0441	0.0434	0.0402	0.0395	0.0386	0.0372	0.175	**0.130**	0.109
7	0.1750000	0.1388368	0.224	0.205	**0.157**	0.0465	0.0451	0.0441	0.0435	0.0401	0.0395	0.0385	0.0371	0.200	**0.152**	0.134
8	0.2000000	0.1586707	0.249	0.230	**0.181**	0.0465	0.0451	0.0442	0.0435	0.0401	0.0394	0.0385	0.0371	0.225	**0.176**	0.159
9	0.2250000	0.1785045	0.274	0.254	0.205	0.0465	0.0451	0.0442	0.0435	0.0401	0.0394	0.0385	0.0371	0.250	0.201	0.184
10	0.2500000	0.1983382	0.299	0.279	0.230	0.0466	0.0451	0.0442	0.0435	0.0401	0.0394	0.0385	0.0370	0.275	0.226	0.209
11	0.2750000	0.2181722	0.324	0.304	0.255	0.0466	0.0452	0.0442	0.0435	0.0401	0.0394	0.0384	0.0370	0.300	0.251	0.234
12	0.3000000	0.2380060	0.349	0.329	0.280	0.0467	0.0452	0.0442	0.0435	0.0401	0.0394	0.0384	0.0369	0.325	0.276	0.259
13	0.3250000	0.2578397	0.374	0.354	0.305	0.0467	0.0452	0.0442	0.0435	0.0401	0.0394	0.0384	0.0369	0.350	0.301	0.284
14	0.3500000	0.2776737	0.399	0.379	0.330	0.0467	0.0453	0.0443	0.0436	0.0400	0.0393	0.0383	0.0369	0.375	0.326	0.309
15	0.3750000	0.2975075	0.424	0.404	0.355	0.0468	0.0453	0.0443	0.0436	0.0400	0.0393	0.0383	0.0368	0.400	0.351	0.334
16	0.4000000	0.3173413	0.449	0.429	0.380	0.0468	0.0453	0.0443	0.0436	0.0400	0.0393	0.0383	0.0368	0.425	0.376	0.358
17	0.4250000	0.3371751	0.474	0.454	0.405	0.0468	0.0453	0.0443	0.0436	0.0400	0.0393	0.0383	0.0368	0.450	0.401	0.383
18	0.4500000	0.3570090	0.499	0.479	0.430	0.0469	0.0454	0.0443	0.0436	0.0400	0.0393	0.0382	0.0367	0.475	0.426	0.408
19	0.4750000	0.3768427	0.524	0.504	0.455	0.0469	0.0454	0.0444	0.0436	0.0400	0.0392	0.0382	0.0367	0.500	0.451	0.433
20	0.5000000	0.3966765	0.549	0.529	0.480	0.0470	0.0454	0.0444	0.0436	0.0400	0.0392	0.0382	0.0366	0.525	0.476	0.458
21	0.5250000	0.4165105	0.574	0.554	0.505	0.0470	0.0454	0.0444	0.0436	0.0400	0.0392	0.0382	0.0366	0.550	0.501	0.483
22	0.5500000	0.4363443	0.599	0.579	0.530	0.0470	0.0455	0.0444	0.0437	0.0399	0.0392	0.0381	0.0366	0.575	0.526	0.508
23	0.5750000	0.4561781	0.624	0.604	0.555	0.0471	0.0455	0.0444	0.0437	0.0399	0.0392	0.0381	0.0365	0.600	0.551	0.533
24	0.6000000	0.4760120	0.649	0.629	0.580	0.0471	0.0455	0.0445	0.0437	0.0399	0.0391	0.0381	0.0365	0.625	0.576	0.558
25	0.6250000	0.4958458	0.674	0.654	0.605	0.0471	0.0455	0.0445	0.0437	0.0399	0.0391	0.0381	0.0364	0.650	0.601	0.583
26	0.6500000	0.5156795	0.700	0.679	0.630	0.0472	0.0456	0.0445	0.0437	0.0399	0.0391	0.0380	0.0364	0.675	0.626	0.608
27	0.6750000	0.5355135	0.725	0.704	0.655	0.0472	0.0456	0.0445	0.0437	0.0399	0.0391	0.0380	0.0364	0.700	0.651	0.633
28	0.7000000	0.5553472	0.750	0.729	0.680	0.0473	0.0456	0.0445	0.0437	0.0399	0.0391	0.0380	0.0363	0.725	0.676	0.658
29	0.7250000	0.5751810	0.775	0.754	0.705	0.0473	0.0457	0.0446	0.0438	0.0398	0.0390	0.0379	0.0363	0.750	0.701	0.683
30	0.7500000	0.5950150	0.800	0.779	0.730	0.0473	0.0457	0.0446	0.0438	0.0398	0.0390	0.0379	0.0363	0.775	0.726	0.708
31	0.7750000	0.6148488	0.825	0.804	0.755	0.0474	0.0457	0.0446	0.0438	0.0398	0.0390	0.0379	0.0362	0.800	0.751	0.733
32	0.8000000	0.6346826	0.850	0.829	0.780	0.0474	0.0457	0.0446	0.0438	0.0398	0.0390	0.0379	0.0362	0.825	0.776	0.758
33	0.8250000	0.6545164	0.875	0.854	0.806	0.0475	0.0458	0.0446	0.0438	0.0398	0.0390	0.0378	0.0361	0.850	0.801	0.783
34	0.8500000	0.6743503	0.900	0.879	0.830	0.0475	0.0458	0.0446	0.0438	0.0398	0.0390	0.0378	0.0361	0.875	0.826	0.808
35	0.8750000	0.6941841	0.925	0.904	0.855	0.0475	0.0458	0.0447	0.0438	0.0398	0.0389	0.0378	0.0361	0.900	0.851	0.833
36	0.9000000	0.7140180	0.950	0.929	0.880	0.0476	0.0458	0.0447	0.0438	0.0398	0.0389	0.0378	0.0360	0.925	0.876	0.857
37	0.9250000	0.7338517	0.975	0.954	0.905	0.0476	0.0459	0.0447	0.0439	0.0397	0.0389	0.0377	0.0360	0.950	0.901	0.882
38	0.9500000	0.7536855	1.000	0.979	0.930	0.0476	0.0459	0.0447	0.0439	0.0397	0.0389	0.0377	0.0360	0.975	0.926	0.907
39	0.9750000	0.7735194	1.025	1.004	0.955	0.0477	0.0459	0.0447	0.0439	0.0397	0.0389	0.0377	0.0359	1.000	0.951	0.932
40	1.000000	0.7933532	1.050	1.029	0.980	0.0477	0.0459	0.0448	0.0439	0.0397	0.0388	0.0377	0.0359	1.025	0.976	0.957
41	1.025000	0.8131870	1.075	1.054	1.005	0.0478	0.0460	0.0448	0.0439	0.0397	0.0388	0.0376	0.0358	1.050	1.001	0.982
42	1.050000	0.8330210	1.100	1.079	1.030	0.0478	0.0460	0.0448	0.0439	0.0397	0.0388	0.0376	0.0358	1.075	1.026	1.007
43	1.075000	0.8528548	1.125	1.104	1.055	0.0478	0.0460	0.0448	0.0439	0.0397	0.0388	0.0376	0.0358	1.100	1.051	1.032
44	1.100000	0.8726886	1.150	1.129	1.080	0.0479	0.0461	0.0448	0.0440	0.0396	0.0388	0.0375	0.0357	1.125	1.076	1.057
45	1.125000	0.8925225	1.175	1.154	1.105	0.0479	0.0461	0.0449	0.0440	0.0396	0.0387	0.0375	0.0357	1.150	1.101	1.082
46	1.150000	0.9123563	1.201	1.179	1.130	0.0479	0.0461	0.0449	0.0440	0.0396	0.0387	0.0375	0.0357	1.175	1.126	1.107
47	1.175000	0.9321901	1.226	1.204	1.155	0.0480	0.0461	0.0449	0.0440	0.0396	0.0387	0.0375	0.0356	1.200	1.151	1.132
48	1.200000	0.9520240	1.251	1.229	1.180	0.0480	0.0462	0.0449	0.0440	0.0396	0.0387	0.0374	0.0356	1.225	1.176	1.157
49	1.225000	0.9718578	1.276	1.254	1.205	0.0481	0.0462	0.0449	0.0440	0.0396	0.0387	0.0374	0.0355	1.250	1.201	1.182
50	1.250000	0.9916916	1.301	1.279	1.230	0.0481	0.0462	0.0449	0.0440	0.0396	0.0386	0.0374	0.0355	1.275	1.226	1.207
51	1.275000	1.011525	1.326	1.304	1.255	0.0481	0.0462	0.0450	0.0440	0.0396	0.0386	0.0374	0.0355	1.300	1.251	1.232
52	1.300000	1.031359	1.351	1.329	1.280	0.0482	0.0463	0.0450	0.0441	0.0395	0.0386	0.0373	0.0354	1.325	1.276	1.257
53	1.325000	1.051193	1.376	1.354	1.305	0.0482	0.0463	0.0450	0.0441	0.0395	0.0386	0.0373	0.0354	1.350	1.301	1.282
54	1.350000	1.071027	1.401	1.379	1.330	0.0483	0.0463	0.0450	0.0441	0.0395	0.0386	0.0373	0.0353	1.375	1.326	1.307
55	1.375000	1.090861	1.426	1.404	1.355	0.0483	0.0463	0.0450	0.0441	0.0395	0.0386	0.0373	0.0353	1.400	1.351	1.332
56	1.400000	1.110695	1.451	1.429	1.380	0.0483	0.0464	0.0451	0.0441	0.0395	0.0385	0.0372	0.0353	1.425	1.376	1.356
57	1.425000	1.130528	1.476	1.454	1.405	0.0484	0.0464	0.0451	0.0441	0.0395	0.0385	0.0372	0.0352	1.450	1.401	1.381
58	1.450000	1.150362	1.501	1.479	1.430	0.0484	0.0464	0.0451	0.0441	0.0395	0.0385	0.0372	0.0352	1.475	1.426	1.406
59	1.475000	1.170196	1.526	1.504	1.455	0.0484	0.0464	0.0451	0.0442	0.0394	0.0385	0.0372	0.0352	1.500	1.451	1.431
60	1.500000	1.190030	1.551	1.529	1.480	0.0485	0.0465	0.0451	0.0442	0.0394	0.0385	0.0371	0.0351	1.525	1.476	1.456

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 85-92.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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37.5 DEG PRESSURE ANGLE

TABLE 52—37.5 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 48/96 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	S_V Min. Eff. Circ. Space Width 0.0348 Notes c & d				t_V Max. Eff. Circ. Tooth Thickness 0.0348 Notes c & d				D_o	D_{Fe}	D_{re}
						S Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.2	4.4	5.1	6.2	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.2	18.3
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+30 -0									+0 -30		
6	0.1250000	0.0991691	0.166	0.150	**0.113**	0.0394	0.0380	0.0371	0.0364	0.0332	0.0325	0.0316	0.0302	0.146	**0.108**	0.090
7	0.1458332	0.1156974	0.187	0.171	**0.132**	0.0395	0.0381	0.0371	0.0365	0.0331	0.0325	0.0315	0.0301	0.167	**0.127**	0.111
8	0.1666667	0.1322255	0.208	0.192	**0.151**	0.0395	0.0381	0.0372	0.0365	0.0331	0.0324	0.0315	0.0301	0.188	**0.146**	0.131
9	0.1875000	0.1487537	0.229	0.213	0.171	0.0395	0.0381	0.0372	0.0365	0.0331	0.0324	0.0315	0.0301	0.208	0.166	0.152
10	0.2083333	0.1652819	0.250	0.234	0.192	0.0396	0.0381	0.0372	0.0365	0.0331	0.0324	0.0315	0.0300	0.229	0.187	0.173
11	0.2291667	0.1818100	0.271	0.254	0.213	0.0396	0.0382	0.0372	0.0365	0.0331	0.0324	0.0314	0.0300	0.250	0.208	0.194
12	0.2500000	0.1983382	0.292	0.275	0.234	0.0397	0.0382	0.0372	0.0365	0.0331	0.0324	0.0314	0.0299	0.271	0.229	0.215
13	0.2708333	0.2148665	0.313	0.296	0.255	0.0397	0.0382	0.0372	0.0365	0.0331	0.0324	0.0314	0.0299	0.292	0.250	0.235
14	0.2916667	0.2313947	0.334	0.317	0.275	0.0397	0.0383	0.0373	0.0366	0.0330	0.0323	0.0313	0.0299	0.312	0.271	0.256
15	0.3125000	0.2479229	0.354	0.338	0.296	0.0398	0.0383	0.0373	0.0366	0.0330	0.0323	0.0313	0.0298	0.333	0.291	0.277
16	0.3333333	0.2644510	0.375	0.359	0.317	0.0398	0.0383	0.0373	0.0366	0.0330	0.0323	0.0313	0.0298	0.354	0.312	0.298
17	0.3541667	0.2809793	0.396	0.379	0.338	0.0398	0.0383	0.0373	0.0366	0.0330	0.0323	0.0313	0.0298	0.375	0.333	0.318
18	0.3750000	0.2975075	0.417	0.400	0.359	0.0399	0.0384	0.0373	0.0366	0.0330	0.0323	0.0312	0.0297	0.396	0.354	0.339
19	0.3958333	0.3140357	0.438	0.421	0.380	0.0399	0.0384	0.0374	0.0366	0.0330	0.0322	0.0312	0.0297	0.417	0.375	0.360
20	0.4166667	0.3305639	0.459	0.442	0.400	0.0400	0.0384	0.0374	0.0366	0.0330	0.0322	0.0312	0.0296	0.437	0.396	0.381
21	0.4375000	0.3470921	0.480	0.463	0.421	0.0400	0.0384	0.0374	0.0366	0.0330	0.0322	0.0312	0.0296	0.458	0.416	0.402
22	0.4583333	0.3636202	0.501	0.484	0.442	0.0400	0.0385	0.0374	0.0367	0.0329	0.0322	0.0311	0.0296	0.479	0.437	0.422
23	0.4791667	0.3801484	0.521	0.504	0.463	0.0401	0.0385	0.0374	0.0367	0.0329	0.0322	0.0311	0.0295	0.500	0.458	0.443
24	0.5000000	0.3966765	0.542	0.525	0.484	0.0401	0.0385	0.0375	0.0367	0.0329	0.0321	0.0311	0.0295	0.521	0.479	0.464
25	0.5208333	0.4132048	0.563	0.546	0.505	0.0401	0.0385	0.0375	0.0367	0.0329	0.0321	0.0311	0.0295	0.542	0.500	0.485
26	0.5416667	0.4297330	0.584	0.567	0.525	0.0402	0.0386	0.0375	0.0367	0.0329	0.0321	0.0310	0.0294	0.562	0.521	0.505
27	0.5625000	0.4462612	0.605	0.588	0.546	0.0402	0.0386	0.0375	0.0367	0.0329	0.0321	0.0310	0.0294	0.583	0.541	0.526
28	0.5833333	0.4627894	0.626	0.609	0.567	0.0403	0.0386	0.0375	0.0367	0.0329	0.0321	0.0310	0.0293	0.604	0.562	0.547
29	0.6041667	0.4793176	0.647	0.629	0.588	0.0403	0.0387	0.0376	0.0368	0.0328	0.0320	0.0309	0.0293	0.625	0.583	0.568
30	0.6250000	0.4958458	0.668	0.650	0.609	0.0403	0.0387	0.0376	0.0368	0.0328	0.0320	0.0309	0.0293	0.646	0.604	0.589
31	0.6458333	0.5123739	0.689	0.671	0.630	0.0404	0.0387	0.0376	0.0368	0.0328	0.0320	0.0309	0.0292	0.667	0.625	0.609
32	0.6666667	0.5289022	0.709	0.692	0.650	0.0404	0.0387	0.0376	0.0368	0.0328	0.0320	0.0309	0.0292	0.687	0.646	0.630
33	0.6875000	0.5454303	0.730	0.713	0.671	0.0405	0.0388	0.0376	0.0368	0.0328	0.0320	0.0308	0.0291	0.708	0.666	0.651
34	0.7083333	0.5619586	0.751	0.734	0.692	0.0405	0.0388	0.0376	0.0368	0.0328	0.0320	0.0308	0.0291	0.729	0.687	0.672
35	0.7291667	0.5784867	0.772	0.754	0.713	0.0405	0.0388	0.0377	0.0368	0.0328	0.0319	0.0308	0.0291	0.750	0.708	0.693
36	0.7500000	0.5950150	0.793	0.775	0.734	0.0406	0.0388	0.0377	0.0368	0.0328	0.0319	0.0308	0.0290	0.771	0.729	0.713
37	0.7708333	0.6115431	0.814	0.796	0.755	0.0406	0.0389	0.0377	0.0369	0.0327	0.0319	0.0307	0.0290	0.792	0.750	0.734
38	0.7916667	0.6280714	0.835	0.817	0.775	0.0406	0.0389	0.0377	0.0369	0.0327	0.0319	0.0307	0.0290	0.812	0.771	0.755
39	0.8125000	0.6445996	0.856	0.838	0.796	0.0407	0.0389	0.0377	0.0369	0.0327	0.0319	0.0307	0.0289	0.833	0.791	0.776
40	0.8333333	0.6611277	0.876	0.859	0.817	0.0407	0.0389	0.0378	0.0369	0.0327	0.0318	0.0307	0.0289	0.854	0.812	0.796
41	0.8541667	0.6776559	0.897	0.879	0.838	0.0408	0.0390	0.0378	0.0369	0.0327	0.0318	0.0306	0.0288	0.875	0.833	0.817
42	0.8750000	0.6941841	0.918	0.900	0.859	0.0408	0.0390	0.0378	0.0369	0.0327	0.0318	0.0306	0.0288	0.896	0.854	0.838
43	0.8958333	0.7107123	0.939	0.921	0.880	0.0408	0.0390	0.0378	0.0369	0.0327	0.0318	0.0306	0.0288	0.917	0.875	0.859
44	0.9166667	0.7272405	0.960	0.942	0.900	0.0409	0.0391	0.0378	0.0370	0.0326	0.0318	0.0305	0.0287	0.937	0.896	0.880
45	0.9375000	0.7437687	0.981	0.963	0.921	0.0409	0.0391	0.0379	0.0370	0.0326	0.0317	0.0305	0.0287	0.958	0.916	0.900
46	0.9583333	0.7602969	1.002	0.984	0.942	0.0409	0.0391	0.0379	0.0370	0.0326	0.0317	0.0305	0.0287	0.979	0.937	0.921
47	0.9791667	0.7768250	1.023	1.004	0.963	0.0410	0.0391	0.0379	0.0370	0.0326	0.0317	0.0305	0.0286	1.000	0.958	0.942
48	1.000000	0.7933532	1.044	1.025	0.984	0.0410	0.0392	0.0379	0.0370	0.0326	0.0317	0.0304	0.0286	1.021	0.979	0.963
49	1.020833	0.8098814	1.064	1.046	1.005	0.0411	0.0392	0.0379	0.0370	0.0326	0.0317	0.0304	0.0285	1.042	1.000	0.984
50	1.041667	0.8264097	1.085	1.067	1.025	0.0411	0.0392	0.0379	0.0370	0.0326	0.0317	0.0304	0.0285	1.062	1.021	1.004
51	1.062500	0.8429379	1.106	1.088	1.046	0.0411	0.0392	0.0380	0.0370	0.0326	0.0316	0.0304	0.0285	1.083	1.041	1.025
52	1.083333	0.8594661	1.127	1.109	1.067	0.0412	0.0393	0.0380	0.0371	0.0325	0.0316	0.0303	0.0284	1.104	1.062	1.046
53	1.104167	0.8759943	1.148	1.129	1.088	0.0412	0.0393	0.0380	0.0371	0.0325	0.0316	0.0303	0.0284	1.125	1.083	1.067
54	1.125000	0.8925225	1.169	1.150	1.109	0.0413	0.0393	0.0380	0.0371	0.0325	0.0316	0.0303	0.0283	1.146	1.104	1.087
55	1.145833	0.9090507	1.190	1.171	1.130	0.0413	0.0393	0.0380	0.0371	0.0325	0.0316	0.0303	0.0283	1.167	1.125	1.108
56	1.166667	0.9255788	1.211	1.192	1.150	0.0413	0.0394	0.0381	0.0371	0.0325	0.0315	0.0302	0.0283	1.187	1.146	1.129
57	1.187500	0.9421070	1.231	1.213	1.171	0.0414	0.0394	0.0381	0.0371	0.0325	0.0315	0.0302	0.0282	1.208	1.166	1.150
58	1.208333	0.9586352	1.252	1.234	1.192	0.0414	0.0394	0.0381	0.0371	0.0325	0.0315	0.0302	0.0282	1.229	1.187	1.171
59	1.229167	0.9751634	1.273	1.254	1.213	0.0414	0.0394	0.0381	0.0372	0.0324	0.0315	0.0302	0.0282	1.250	1.208	1.191
60	1.250000	0.9916916	1.294	1.275	1.234	0.0415	0.0395	0.0381	0.0372	0.0324	0.0315	0.0301	0.0281	1.271	1.229	1.212

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness**. Measurement with pins for actual space width and tooth thickness are in Tables 85-92.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

ile 105.

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45 DEG PRESSURE ANGLE

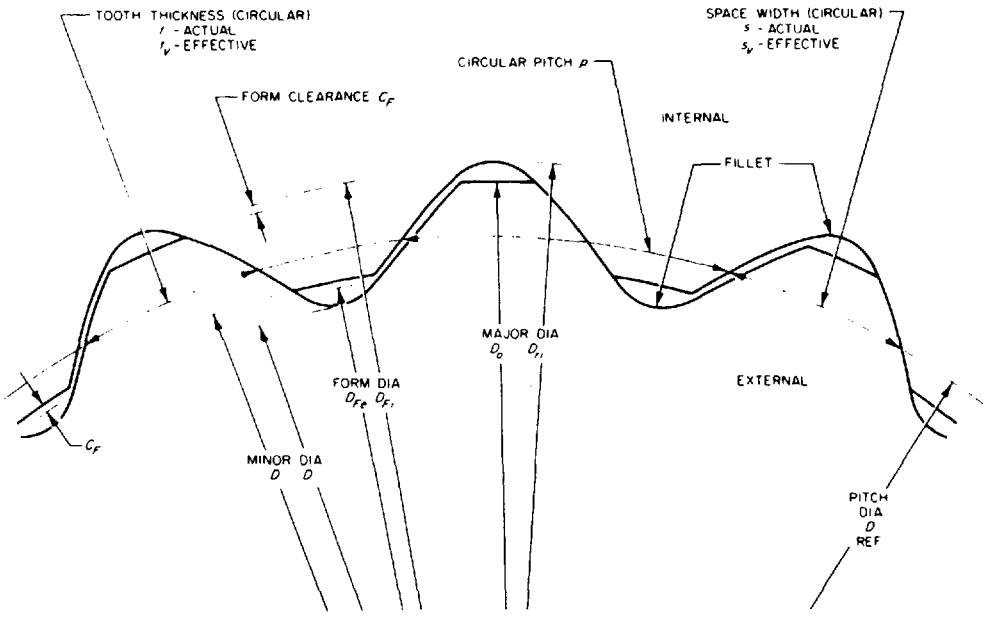


FIG. 9—SPLINE TERMS, SYMBOLS AND DRAWING DATA, 45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT

Involute splines with 45 deg pressure angle are used where the toothed member delivers torque only (does not slide under load) and where wall thicknesses are great enough to resist bursting tendencies. The 45 deg pressure angle spline is highly suitable for cold forming.

Press fits are not tabulated because their design depends on the degree of tightness desired and must allow for such factors as the shape of the blank, wall thickness, material, hardness, thermal expansion, etc. Close tolerances or selective size grouping may be required to limit fit variation.

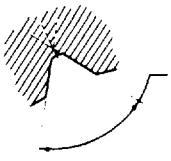
See Tables 53-63.

DRAWING DATA

INTERNAL INVOLUTE SPLINE DATA		EXTERNAL INVOLUTE SPLINE DATA	
FILLET ROOT SIDE FIT		FILLET ROOT SIDE FIT	
NUMBER OF TEETH	xx	NUMBER OF TEETH	xx
SPLINE PITCH	xx/xx	SPLINE PITCH	xx/xx
PRESSURE ANGLE	45°	PRESSURE ANGLE	45°
BASE DIAMETER	x.xxxxxx REF	BASE DIAMETER	x.xxxxxx REF
PITCH DIAMETER	x.xxxxxx REF	PITCH DIAMETER	x.xxxxxx REF
MAJOR DIAMETER	x.xxx MAX	MAJOR DIAMETER	x.xxx/x.xxx
FORM DIAMETER	x.xxx	FORM DIAMETER	x.xxx
MINOR DIAMETER	x.xxx/x.xxx	MINOR DIAMETER	x.xxx MIN
CIRCULAR SPACE WIDTH		CIRCULAR TOOTH THICKNESS	
MAX ACTUAL	x.xxxx	MAX EFFECTIVE	x.xxxx
MIN EFFECTIVE	x.xxxx	MIN ACTUAL	x.xxxx
The following information may be added as required:		The following information may be added as required:	
MAX MEASUREMENT BETWEEN PINS	x.xxxx REF	MIN MEASUREMENT OVER PINS	x.xxxx REF
PIN DIAMETER	x.xxxx	PIN DIAMETER	x.xxxx

The above drawing data is required for the spline specifications. The standard system is shown; for alternate systems see Table 4 and paragraphs 11.4.1, 11.4.2 and 13.

INTERNAL STRAIGHT SIDED OPTION—ALTERNATE DESIGN



The following information may be added as required:

MAX MEASUREMENT BETWEEN PINS PIN DIAMETER X XXXX	X XXXX REF
INTERNAL FORM ANGLE VARIATION (Table 66)	+XX° -XX°

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45 DEG PRESSURE ANGLE

TABLE 53—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 10/20 SPLINE PITCH

	Internal and External		Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.1771 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.1771 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
				Note f	Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50	Note f	
6	0.6000000	0.4242641	0.755	0.704	0.540	0.1824	0.1808	0.1798	0.1790	0.1752	0.1744	0.1734	0.1718	0.700	0.536	0.485
7	0.7000000	0.4949748	0.855	0.804	0.640	0.1825	0.1809	0.1798	0.1790	0.1752	0.1744	0.1733	0.1717	0.800	0.636	0.585
8	0.8000000	0.5656854	0.955	0.904	0.740	0.1825	0.1809	0.1798	0.1790	0.1752	0.1744	0.1733	0.1717	0.900	0.736	0.685
9	0.9000000	0.6363961	1.055	1.004	0.840	0.1826	0.1809	0.1798	0.1790	0.1752	0.1744	0.1733	0.1716	1.000	0.836	0.785
10	1.000000	0.7071068	1.156	1.104	0.940	0.1826	0.1810	0.1799	0.1791	0.1751	0.1743	0.1732	0.1716	1.100	0.936	0.884
11	1.100000	0.7778174	1.256	1.204	1.040	0.1827	0.1810	0.1799	0.1791	0.1751	0.1743	0.1732	0.1715	1.200	1.036	0.984
12	1.200000	0.8485282	1.356	1.304	1.140	0.1827	0.1811	0.1799	0.1791	0.1751	0.1743	0.1731	0.1715	1.300	1.136	1.084
13	1.300000	0.9192388	1.456	1.404	1.240	0.1828	0.1811	0.1800	0.1791	0.1751	0.1742	0.1731	0.1714	1.400	1.236	1.184
14	1.400000	0.9899495	1.556	1.504	1.340	0.1829	0.1811	0.1800	0.1791	0.1751	0.1742	0.1731	0.1713	1.500	1.336	1.284
15	1.500000	1.060660	1.656	1.604	1.440	0.1829	0.1812	0.1800	0.1792	0.1750	0.1742	0.1730	0.1713	1.600	1.436	1.384
16	1.600000	1.131371	1.756	1.704	1.540	0.1830	0.1812	0.1800	0.1792	0.1750	0.1742	0.1730	0.1712	1.700	1.536	1.484
17	1.700000	1.202082	1.856	1.804	1.640	0.1830	0.1812	0.1801	0.1792	0.1750	0.1741	0.1730	0.1712	1.800	1.636	1.584
18	1.800000	1.272792	1.956	1.904	1.740	0.1831	0.1813	0.1801	0.1792	0.1750	0.1741	0.1729	0.1711	1.900	1.736	1.684
19	1.900000	1.343503	2.056	2.004	1.840	0.1831	0.1813	0.1801	0.1792	0.1750	0.1741	0.1729	0.1711	2.000	1.836	1.784
20	2.000000	1.414214	2.156	2.104	1.940	0.1832	0.1814	0.1801	0.1793	0.1749	0.1741	0.1728	0.1710	2.100	1.936	1.884
21	2.100000	1.484924	2.256	2.205	2.040	0.1832	0.1814	0.1802	0.1793	0.1749	0.1740	0.1728	0.1710	2.200	2.035	1.984
22	2.200000	1.555635	2.356	2.305	2.140	0.1833	0.1814	0.1802	0.1793	0.1749	0.1740	0.1728	0.1709	2.300	2.135	2.084
23	2.300000	1.626346	2.456	2.405	2.240	0.1833	0.1815	0.1802	0.1793	0.1749	0.1740	0.1727	0.1709	2.400	2.235	2.184
24	2.400000	1.697056	2.556	2.505	2.340	0.1834	0.1815	0.1802	0.1793	0.1749	0.1740	0.1727	0.1708	2.500	2.335	2.284
25	2.500000	1.767767	2.656	2.605	2.440	0.1834	0.1815	0.1803	0.1794	0.1748	0.1739	0.1727	0.1708	2.600	2.435	2.384
26	2.600000	1.838478	2.756	2.706	2.540	0.1835	0.1816	0.1803	0.1794	0.1748	0.1739	0.1726	0.1707	2.700	2.534	2.484
27	2.700000	1.909188	2.856	2.806	2.640	0.1836	0.1816	0.1803	0.1794	0.1748	0.1739	0.1726	0.1706	2.800	2.634	2.584
28	2.800000	1.979899	2.957	2.906	2.740	0.1836	0.1817	0.1804	0.1794	0.1748	0.1738	0.1725	0.1706	2.900	2.734	2.683
29	2.900000	2.050610	3.057	3.006	2.840	0.1837	0.1817	0.1804	0.1794	0.1748	0.1738	0.1725	0.1705	3.000	2.834	2.783
30	3.000000	2.121320	3.157	3.106	2.940	0.1837	0.1817	0.1804	0.1795	0.1747	0.1738	0.1725	0.1705	3.100	2.934	2.883
31	3.100000	2.192031	3.257	3.207	3.040	0.1838	0.1818	0.1804	0.1795	0.1747	0.1738	0.1724	0.1704	3.200	3.033	2.983
32	3.200000	2.262742	3.357	3.307	3.140	0.1838	0.1818	0.1805	0.1795	0.1747	0.1737	0.1724	0.1704	3.300	3.133	3.083
33	3.300000	2.333452	3.457	3.407	3.240	0.1839	0.1818	0.1805	0.1795	0.1747	0.1737	0.1724	0.1703	3.400	3.233	3.183
34	3.400000	2.404163	3.557	3.507	3.340	0.1839	0.1819	0.1805	0.1795	0.1747	0.1737	0.1723	0.1703	3.500	3.333	3.283
35	3.500000	2.474874	3.657	3.607	3.440	0.1840	0.1819	0.1805	0.1795	0.1747	0.1737	0.1723	0.1702	3.600	3.433	3.383
36	3.600000	2.545584	3.757	3.708	3.540	0.1840	0.1820	0.1806	0.1796	0.1746	0.1736	0.1722	0.1702	3.700	3.532	3.483
37	3.700000	2.616295	3.857	3.808	3.640	0.1841	0.1820	0.1806	0.1796	0.1746	0.1736	0.1722	0.1701	3.800	3.632	3.583
38	3.800000	2.687006	3.957	3.908	3.740	0.1842	0.1820	0.1806	0.1796	0.1746	0.1736	0.1722	0.1700	3.900	3.732	3.683
39	3.900000	2.757717	4.057	4.008	3.840	0.1842	0.1821	0.1807	0.1796	0.1746	0.1735	0.1721	0.1700	4.000	3.832	3.783
40	4.000000	2.828427	4.157	4.108	3.940	0.1843	0.1821	0.1807	0.1796	0.1746	0.1735	0.1721	0.1699	4.100	3.932	3.883
41	4.100000	2.899138	4.257	4.209	4.040	0.1843	0.1821	0.1807	0.1797	0.1745	0.1735	0.1721	0.1699	4.200	4.031	3.983
42	4.200000	2.969849	4.357	4.309	4.140	0.1844	0.1822	0.1807	0.1797	0.1745	0.1735	0.1720	0.1698	4.300	4.131	4.083
43	4.300000	3.040559	4.457	4.409	4.240	0.1844	0.1822	0.1808	0.1797	0.1745	0.1734	0.1720	0.1698	4.400	4.231	4.183
44	4.400000	3.111270	4.557	4.509	4.340	0.1845	0.1823	0.1808	0.1797	0.1745	0.1734	0.1719	0.1697	4.500	4.331	4.283
45	4.500000	3.181981	4.657	4.609	4.440	0.1845	0.1823	0.1808	0.1797	0.1745	0.1734	0.1719	0.1697	4.600	4.430	4.383
46	4.600000	3.252691	4.757	4.710	4.540	0.1846	0.1823	0.1808	0.1798	0.1744	0.1734	0.1719	0.1696	4.700	4.530	4.483
47	4.700000	3.323402	4.858	4.810	4.640	0.1846	0.1824	0.1809	0.1798	0.1744	0.1733	0.1718	0.1696	4.800	4.630	4.582
48	4.800000	3.394113	4.958	4.910	4.740	0.1847	0.1824	0.1809	0.1798	0.1744	0.1733	0.1718	0.1695	4.900	4.730	4.682
49	4.900000	3.464823	5.058	5.010	4.840	0.1847	0.1825	0.1809	0.1798	0.1744	0.1733	0.1717	0.1695	5.000	4.830	4.782
50	5.000000	3.535534	5.158	5.110	4.940	0.1848	0.1825	0.1809	0.1798	0.1744	0.1732	0.1717	0.1694	5.100	4.929	4.882
51	5.100000	3.606245	5.258	5.211	5.040	0.1849	0.1825	0.1810	0.1799	0.1743	0.1732	0.1717	0.1693	5.200	5.029	4.982
52	5.200000	3.676955	5.358	5.311	5.140	0.1849	0.1826	0.1810	0.1799	0.1743	0.1732	0.1716	0.1693	5.300	5.129	5.082
53	5.300000	3.747666	5.458	5.411	5.240	0.1850	0.1826	0.1810	0.1799	0.1743	0.1732	0.1716	0.1692	5.400	5.229	5.182
54	5.400000	3.818377	5.558	5.511	5.340	0.1850	0.1826	0.1811	0.1799	0.1743	0.1731	0.1716	0.1692	5.500	5.329	5.282
55	5.500000	3.889087	5.658	5.611	5.440	0.1851	0.1827	0.1811	0.1799	0.1743	0.1731	0.1715	0.1691	5.600	5.428	5.382
56	5.600000	3.959798	5.758	5.712	5.540	0.1851	0.1827	0.1811	0.1799	0.1743	0.1731	0.1715	0.1691	5.700	5.528	5.482
57	5.700000	4.030509	5.858	5.812	5.640	0.1852	0.1828	0.1811	0.1800	0.1742	0.1731	0.1714	0.1690	5.800	5.628	5.582
58	5.800000	4.101219	5.958	5.912	5.740	0.1852	0.1828	0.1812	0.1800	0.1742	0.1730	0.1714	0.1690	5.900	5.728	5.682
59	5.900000	4.171930	6.058	6.012	5.840	0.1853	0.1828	0.1812	0.1800	0.1742	0.1730	0.1714	0.1689	6.000	5.828	5.782
60	6.000000	4.242641	6.158	6.112	5.940	0.1853	0.1829	0.1812	0.1800	0.1742	0.1730	0.1713	0.1689	6.100	5.927	5.882

(continued on next page)

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

f. Form dia values for 6 thru 15 teeth corrected with 1996 reaffirmation.

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.45 DEG PRESSURE ANGLE

TABLE 53–45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 10/20 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.1771 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.1771 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
			7	6	5	4	4	5	6	7						
			s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7						
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
61	6.100000	4.313351	6.258	6.213	6.040	0.1854	0.1829	0.1812	0.1800	0.1742	0.1730	0.1713	0.1688	6.200	6.027	5.982
62	6.200000	4.384062	6.358	6.313	6.140	0.1854	0.1829	0.1813	0.1801	0.1741	0.1729	0.1713	0.1688	6.300	6.127	6.082
63	6.300000	4.454773	6.458	6.413	6.240	0.1855	0.1830	0.1813	0.1801	0.1741	0.1729	0.1712	0.1687	6.400	6.227	6.182
64	6.400000	4.525484	6.558	6.513	6.340	0.1856	0.1830	0.1813	0.1801	0.1741	0.1729	0.1712	0.1686	6.500	6.327	6.282
65	6.500000	4.596194	6.659	6.613	6.440	0.1856	0.1831	0.1814	0.1801	0.1741	0.1728	0.1711	0.1686	6.600	6.427	6.381
66	6.600000	4.666905	6.759	6.714	6.540	0.1857	0.1831	0.1814	0.1801	0.1741	0.1728	0.1711	0.1685	6.700	6.526	6.481
67	6.700000	4.737616	6.859	6.814	6.640	0.1857	0.1831	0.1814	0.1802	0.1740	0.1728	0.1711	0.1685	6.800	6.626	6.581
68	6.800000	4.808326	6.959	6.914	6.740	0.1858	0.1832	0.1814	0.1802	0.1740	0.1728	0.1710	0.1684	6.900	6.726	6.681
69	6.900000	4.879037	7.059	7.014	6.840	0.1858	0.1832	0.1815	0.1802	0.1740	0.1727	0.1710	0.1684	7.000	6.826	6.781
70	7.000000	4.949748	7.159	7.114	6.940	0.1859	0.1832	0.1815	0.1802	0.1740	0.1727	0.1710	0.1683	7.100	6.926	6.881
71	7.100000	5.020458	7.259	7.215	7.040	0.1859	0.1833	0.1815	0.1802	0.1740	0.1727	0.1709	0.1683	7.200	7.025	6.981
72	7.200000	5.091169	7.359	7.315	7.140	0.1860	0.1833	0.1815	0.1803	0.1739	0.1727	0.1709	0.1682	7.300	7.125	7.081
73	7.300000	5.161880	7.459	7.415	7.240	0.1860	0.1834	0.1816	0.1803	0.1739	0.1726	0.1708	0.1682	7.400	7.225	7.181
74	7.400000	5.232590	7.559	7.515	7.340	0.1861	0.1834	0.1816	0.1803	0.1739	0.1726	0.1708	0.1681	7.500	7.325	7.281
75	7.500000	5.303301	7.659	7.615	7.440	0.1861	0.1834	0.1816	0.1803	0.1739	0.1726	0.1708	0.1680	7.600	7.425	7.381
76	7.600000	5.374012	7.759	7.716	7.540	0.1862	0.1835	0.1817	0.1803	0.1739	0.1725	0.1707	0.1680	7.700	7.524	7.481
77	7.700000	5.444722	7.859	7.816	7.640	0.1863	0.1835	0.1817	0.1804	0.1738	0.1725	0.1707	0.1679	7.800	7.624	7.581
78	7.800000	5.515433	7.959	7.916	7.740	0.1863	0.1835	0.1817	0.1804	0.1738	0.1725	0.1707	0.1679	7.900	7.724	7.681
79	7.900000	5.586144	8.059	8.016	7.840	0.1864	0.1836	0.1817	0.1804	0.1738	0.1725	0.1706	0.1678	8.000	7.824	7.781
80	8.000000	5.656854	8.159	8.11[illegible]	7.940	0.1864	0.1836	0.1818	0.1804	0.1738	0.1724	0.1706	0.1678	8.100	7.924	7.881
81	8.100000	5.727565	8.259	8.21[illegible]	8.040	0.1865	0.1837	0.1818	0.1804	0.1738	0.1724	0.1705	0.1677	8.200	8.023	7.981
82	8.200000	5.798276	8.359	8.317	8.140	0.1865	0.1837	0.1818	0.1804	0.1738	0.1724	0.1705	0.1677	8.300	8.123	8.081
83	8.300000	5.868986	8.459	8.417	8.240	0.1866	0.1837	0.1818	0.1805	0.1737	0.1724	0.1705	0.1676	8.400	8.223	8.181
84	8.400000	5.939697	8.560	8.517	8.340	0.1866	0.1838	0.1819	0.1805	0.1737	0.1723	0.1704	0.1676	8.500	8.323	8.280
85	8.500000	6.010408	8.660	8.617	8.440	0.1867	0.1838	0.1819	0.1805	0.1737	0.1723	0.1704	0.1675	8.600	8.423	8.380
86	8.600000	6.081118	8.760	8.718	8.540	0.1867	0.1839	0.1819	0.1805	0.1737	0.1723	0.1703	0.1675	8.700	8.522	8.480
87	8.700000	6.151829	8.860	8.818	8.640	0.1868	0.1839	0.1819	0.1805	0.1737	0.1723	0.1703	0.1674	8.800	8.622	8.580
88	8.800000	6.222540	8.960	8.918	8.740	0.1869	0.1839	0.1820	0.1806	0.1736	0.1722	0.1703	0.1673	8.900	8.722	8.680
89	8.900000	6.293251	9.060	9.018	8.840	0.1869	0.1840	0.1820	0.1806	0.1736	0.1722	0.1702	0.1673	9.000	8.822	8.780
90	9.000000	6.363961	9.160	9.118	8.940	0.1870	0.1840	0.1820	0.1806	0.1736	0.1722	0.1702	0.1672	9.100	8.921	8.880
91	9.100000	6.434672	9.260	9.219	9.040	0.1870	0.1840	0.1821	0.1806	0.1736	0.1721	0.1702	0.1672	9.200	9.021	8.980
92	9.200000	6.505383	9.360	9.319	9.140	0.1871	0.1841	0.1821	0.1806	0.1736	0.1721	0.1701	0.1671	9.300	9.121	9.080
93	9.300000	6.576093	9.460	9.419	9.240	0.1871	0.1841	0.1821	0.1807	0.1735	0.1721	0.1701	0.1671	9.400	9.221	9.180
94	9.400000	6.646804	9.560	9.519	9.340	0.1872	0.1842	0.1821	0.1807	0.1735	0.1721	0.1700	0.1670	9.500	9.321	9.280
95	9.500000	6.717515	9.660	9.619	9.440	0.1872	0.1842	0.1822	0.1807	0.1735	0.1720	0.1700	0.1670	9.600	9.421	9.380
96	9.600000	6.788225	9.760	9.720	9.540	0.1873	0.1842	0.1822	0.1807	0.1735	0.1720	0.1700	0.1669	9.700	9.520	9.480
97	9.700000	6.858936	9.860	9.820	9.640	0.1873	0.1843	0.1822	0.1807	0.1735	0.1720	0.1699	0.1669	9.800	9.620	9.580
98	9.800000	6.929647	9.960	9.920	9.740	0.1874	0.1843	0.1822	0.1808	0.1734	0.1720	0.1699	0.1668	9.900	9.720	9.680
99	9.900000	7.000357	10.060	10.020	9.840	0.1874	0.1843	0.1823	0.1808	0.1734	0.1719	0.1699	0.1668	10.000	9.820	9.780
100	10.00000	7.071068	10.160	10.120	9.940	0.1875	0.1844	0.1823	0.1808	0.1734	0.1719	0.1698	0.1667	10.100	9.920	9.880

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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45 DEG PRESSURE ANGLE

TABLE 54—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 12/24 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width 0.1476 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness 0.1476 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
				Note f	Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50	Note f	
6	0.5000000	0.3535534	0.630	0.588	0.450	0.1529	0.1513	0.1503	0.1495	0.1457	0.1449	0.1439	0.1423	0.583	0.446	0.403
7	0.5833333	0.4124790	0.714	0.671	0.534	0.1530	0.1514	0.1503	0.1495	0.1457	0.1449	0.1438	0.1422	0.667	0.529	0.486
8	0.6666667	0.4714045	0.797	0.754	0.617	0.1530	0.1514	0.1503	0.1495	0.1457	0.1449	0.1438	0.1422	0.750	0.612	0.570
9	0.7500000	0.5303301	0.880	0.838	0.700	0.1531	0.1514	0.1503	0.1495	0.1457	0.1449	0.1438	0.1421	0.833	0.696	0.653
10	0.8333333	0.5892556	0.964	0.921	0.784	0.1531	0.1515	0.1504	0.1496	0.1456	0.1448	0.1437	0.1421	0.917	0.779	0.736
11	0.9166667	0.6481812	1.047	1.004	0.867	0.1532	0.1515	0.1504	0.1496	0.1456	0.1448	0.1437	0.1420	1.000	0.862	0.819
12	1.000000	0.7071068	1.131	1.088	0.950	0.1532	0.1516	0.1504	0.1496	0.1456	0.1448	0.1436	0.1420	1.083	0.946	0.903
13	1.083333	0.7660324	1.214	1.171	1.034	0.1533	0.1516	0.1505	0.1496	0.1456	0.1447	0.1436	0.1419	1.167	1.029	0.986
14	1.166667	0.8249579	1.297	1.254	1.117	0.1534	0.1516	0.1505	0.1496	0.1456	0.1447	0.1436	0.1418	1.250	1.112	1.069
15	1.250000	0.8838835	1.381	1.338	1.200	0.1534	0.1517	0.1505	0.1497	0.1455	0.1447	0.1435	0.1418	1.333	1.196	1.153
16	1.333333	0.9428091	1.464	1.421	1.284	0.1535	0.1517	0.1505	0.1497	0.1455	0.1447	0.1435	0.1417	1.417	1.279	1.236
17	1.416667	1.001735	1.548	1.504	1.367	0.1535	0.1517	0.1506	0.1497	0.1455	0.1446	0.1435	0.1417	1.500	1.362	1.319
18	1.500000	1.060660	1.631	1.588	1.450	0.1536	0.1518	0.1506	0.1497	0.1455	0.1446	0.1434	0.1416	1.583	1.446	1.402
19	1.583333	1.119586	1.714	1.671	1.534	0.1536	0.1518	0.1506	0.1497	0.1455	0.1446	0.1434	0.1416	1.667	1.529	1.486
20	1.666667	1.178511	1.798	1.754	1.617	0.1537	0.1519	0.1506	0.1498	0.1454	0.1446	0.1433	0.1415	1.750	1.612	1.569
21	1.750000	1.237437	1.881	1.837	1.700	0.1537	0.1519	0.1507	0.1498	0.1454	0.1445	0.1433	0.1415	1.833	1.696	1.652
22	1.833333	1.296362	1.965	1.921	1.784	0.1538	0.1519	0.1507	0.1498	0.1454	0.1445	0.1433	0.1414	1.917	1.779	1.735
23	1.916667	1.355288	2.048	2.004	1.867	0.1538	0.1520	0.1507	0.1498	0.1454	0.1445	0.1432	0.1414	2.000	1.862	1.819
24	2.000000	1.414214	2.131	2.088	1.950	0.1539	0.1520	0.1507	0.1498	0.1454	0.1445	0.1432	0.1413	2.083	1.946	1.902
25	2.083333	1.473139	2.215	2.171	2.034	0.1539	0.1520	0.1508	0.1499	0.1453	0.1444	0.1432	0.1412	2.167	2.029	1.985
26	2.166667	1.532065	2.298	2.255	2.117	0.1540	0.1521	0.1508	0.1499	0.1453	0.1444	0.1431	0.1412	2.250	2.112	2.069
27	2.250000	1.590990	2.381	2.338	2.200	0.1541	0.1521	0.1508	0.1499	0.1453	0.1444	0.1431	0.1411	2.333	2.195	2.152
28	2.333333	1.649916	2.465	2.422	2.284	0.1541	0.1522	0.1509	0.1499	0.1453	0.1443	0.1430	0.1411	2.417	2.278	2.235
29	2.416667	1.708841	2.548	2.505	2.367	0.1542	0.1522	0.1509	0.1499	0.1453	0.1443	0.1430	0.1410	2.500	2.361	2.318
30	2.500000	1.767767	2.632	2.589	2.450	0.1542	0.1522	0.1509	0.1500	0.1452	0.1443	0.1430	0.1410	2.583	2.445	2.402
31	2.583333	1.826693	2.715	2.672	2.534	0.1543	0.1523	0.1509	0.1500	0.1452	0.1443	0.1429	0.1409	2.667	2.528	2.485
32	2.666667	1.885618	2.798	2.756	2.617	0.1543	0.1523	0.1510	0.1500	0.1452	0.1442	0.1429	0.1409	2.750	2.611	2.568
33	2.750000	1.944544	2.882	2.839	2.700	0.1544	0.1523	0.1510	0.1500	0.1452	0.1442	0.1429	0.1408	2.833	2.694	2.652
34	2.833333	2.003469	2.965	2.923	2.784	0.1544	0.1524	0.1510	0.1500	0.1452	0.1442	0.1428	0.1408	2.917	2.777	2.735
35	2.916667	2.062395	3.049	3.006	2.867	0.1545	0.1524	0.1510	0.1500	0.1452	0.1442	0.1428	0.1407	3.000	2.860	2.818
36	3.000000	2.121320	3.132	3.090	2.950	0.1545	0.1525	0.1511	0.1501	0.1451	0.1441	0.1427	0.1407	3.083	2.944	2.901
37	3.083333	2.180246	3.215	3.173	3.034	0.1546	0.1525	0.1511	0.1501	0.1451	0.1441	0.1427	0.1406	3.167	3.027	2.985
38	3.166667	2.239172	3.299	3.257	3.117	0.1547	0.1525	0.1511	0.1501	0.1451	0.1441	0.1427	0.1405	3.250	3.110	3.068
39	3.250000	2.298097	3.382	3.340	3.200	0.1547	0.1526	0.1512	0.1501	0.1451	0.1440	0.1426	0.1405	3.333	3.193	3.151
40	3.333333	2.357023	3.465	3.424	3.284	0.1548	0.1526	0.1512	0.1501	0.1451	0.1440	0.1426	0.1404	3.417	3.276	3.235
41	3.416667	2.415948	3.549	3.507	3.367	0.1548	0.1526	0.1512	0.1502	0.1450	0.1440	0.1426	0.1404	3.500	3.359	3.318
42	3.500000	2.474874	3.632	3.591	3.450	0.1549	0.1527	0.1512	0.1502	0.1450	0.1440	0.1425	0.1403	3.583	3.443	3.401
43	3.583333	2.533799	3.716	3.674	3.534	0.1549	0.1527	0.1513	0.1502	0.1450	0.1439	0.1425	0.1403	3.667	3.526	3.484
44	3.666667	2.592725	3.799	3.758	3.617	0.1550	0.1528	0.1513	0.1502	0.1450	0.1439	0.1424	0.1402	3.750	3.609	3.568
45	3.750000	2.651650	3.882	3.841	3.700	0.1550	0.1528	0.1513	0.1502	0.1450	0.1439	0.1424	0.1402	3.833	3.692	3.651
46	3.833333	2.710576	3.966	3.925	3.784	0.1551	0.1528	0.1513	0.1503	0.1449	0.1439	0.1424	0.1401	3.917	3.775	3.734
47	3.916667	2.769502	4.049	4.008	3.867	0.1551	0.1529	0.1514	0.1503	0.1449	0.1438	0.1423	0.1401	4.000	3.858	3.817
48	4.000000	2.828427	4.133	4.092	3.950	0.1552	0.1529	0.1514	0.1503	0.1449	0.1438	0.1423	0.1400	4.083	3.942	3.901
49	4.083333	2.887353	4.216	4.175	4.034	0.1552	0.1530	0.1514	0.1503	0.1449	0.1438	0.1422	0.1400	4.167	4.025	3.984
50	4.166667	2.946278	4.299	4.259	4.117	0.1553	0.1530	0.1514	0.1503	0.1449	0.1437	0.1422	0.1399	4.250	4.108	4.067
51	4.250000	3.005204	4.383	4.342	4.200	0.1554	0.1530	0.1515	0.1504	0.1448	0.1437	0.1422	0.1398	4.333	4.191	4.151
52	4.333333	3.064129	4.466	4.426	4.284	0.1554	0.1531	0.1515	0.1504	0.1448	0.1437	0.1421	0.1398	4.417	4.274	4.234
53	4.416667	3.123055	4.550	4.509	4.367	0.1555	0.1531	0.1515	0.1504	0.1448	0.1437	0.1421	0.1397	4.500	4.357	4.317
54	4.500000	3.181981	4.633	4.593	4.450	0.1555	0.1531	0.1516	0.1504	0.1448	0.1436	0.1421	0.1397	4.583	4.440	4.400
55	4.583333	3.240906	4.716	4.676	4.534	0.1556	0.1532	0.1516	0.1504	0.1448	0.1436	0.1420	0.1396	4.667	4.524	4.484
56	4.666667	3.299832	4.800	4.760	4.617	0.1556	0.1532	0.1516	0.1504	0.1448	0.1436	0.1420	0.1396	4.750	4.607	4.567
57	4.750000	3.358757	4.883	4.843	4.700	0.1557	0.1533	0.1516	0.1505	0.1447	0.1436	0.1419	0.1395	4.833	4.690	4.650
58	4.833333	3.417683	4.966	4.927	4.784	0.1557	0.1533	0.1517	0.1505	0.1447	0.1435	0.1419	0.1395	4.917	4.773	4.734
59	4.916667	3.476608	5.050	5.010	4.867	0.1558	0.1533	0.1517	0.1505	0.1447	0.1435	0.1419	0.1394	5.000	4.856	4.817
60	5.000000	3.535534	5.133	5.094	4.950	0.1558	0.1534	0.1517	0.1505	0.1447	0.1435	0.1418	0.1394	5.083	4.940	4.900

(continued on next page)

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

f. Form dia values for 6 thru 20 teeth corrected with 1996 reaffirmation.

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45 DEG PRESSURE ANGLE

TABLE 54—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 12/24 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width 0.1476 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness 0.1476 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
61	5.083333	3.594460	5.217	5.177	5.034	0.1559	0.1534	0.1517	0.1505	0.1447	0.1435	0.1418	0.1393	5.167	5.023	4.983
62	5.166667	3.653385	5.300	5.261	5.117	0.1559	0.1534	0.1518	0.1506	0.1446	0.1434	0.1418	0.1393	5.250	5.106	5.067
63	5.250000	3.712311	5.383	5.344	5.200	0.1560	0.1535	0.1518	0.1506	0.1446	0.1434	0.1417	0.1392	5.333	5.189	5.150
64	5.333333	3.771236	5.467	5.428	5.284	0.1561	0.1535	0.1518	0.1506	0.1446	0.1434	0.1417	0.1391	5.417	5.272	5.233
65	5.416667	3.830162	5.550	5.511	5.367	0.1561	0.1536	0.1519	0.1506	0.1446	0.1433	0.1416	0.1391	5.500	5.355	5.316
66	5.500000	3.889087	5.634	5.595	5.450	0.1562	0.1536	0.1519	0.1506	0.1446	0.1433	0.1416	0.1390	5.583	5.439	5.400
67	5.583333	3.948013	5.717	5.678	5.534	0.1562	0.1536	0.1519	0.1507	0.1445	0.1433	0.1416	0.1390	5.667	5.522	5.483
68	5.666667	4.006939	5.800	5.762	5.617	0.1563	0.1537	0.1519	0.1507	0.1445	0.1433	0.1415	0.1389	5.750	5.605	5.566
69	5.750000	4.065864	5.884	5.845	5.700	0.1563	0.1537	0.1520	0.1507	0.1445	0.1432	0.1415	0.1389	5.833	5.688	5.650
70	5.833333	4.124790	5.967	5.929	5.784	0.1564	0.1537	0.1520	0.1507	0.1445	0.1432	0.1415	0.1388	5.917	5.771	5.733
71	5.916667	4.183715	6.051	6.012	5.867	0.1564	0.1538	0.1520	0.1507	0.1445	0.1432	0.1414	0.1388	6.000	5.854	5.816
72	6.000000	4.242641	6.134	6.096	5.950	0.1565	0.1538	0.1520	0.1508	0.1444	0.1432	0.1414	0.1387	6.083	5.938	5.899
73	6.083333	4.301566	6.217	6.179	6.034	0.1565	0.1539	0.1521	0.1508	0.1444	0.1431	0.1413	0.1387	6.167	6.021	5.983
74	6.166667	4.360492	6.301	6.263	6.117	0.1566	0.1539	0.1521	0.1508	0.1444	0.1431	0.1413	0.1386	6.250	6.104	6.066
75	6.250000	4.419418	6.384	6.346	6.200	0.1566	0.1539	0.1521	0.1508	0.1444	0.1431	0.1413	0.1385	6.333	6.187	6.149
76	6.333333	4.478343	6.467	6.430	6.284	0.1567	0.1540	0.1522	0.1508	0.1444	0.1430	0.1412	0.1385	6.417	6.270	6.233
77	6.416667	4.537269	6.551	6.513	6.367	0.1568	0.1540	0.1522	0.1509	0.1443	0.1430	0.1412	0.1384	6.500	6.353	6.316
78	6.500000	4.596194	6.634	6.597	6.450	0.1568	0.1540	0.1522	0.1509	0.1443	0.1430	0.1412	0.1384	6.583	6.437	6.399
79	6.583333	4.655120	6.718	6.680	6.534	0.1569	0.1541	0.1522	0.1509	0.1443	0.1430	0.1411	0.1383	6.667	6.520	6.482
80	6.666667	4.714045	6.801	6.764	6.617	0.1569	0.1541	0.1523	0.1509	0.1443	0.1429	0.1411	0.1383	6.750	6.603	6.566
81	6.750000	4.772971	6.884	6.847	6.700	0.1570	0.1542	0.1523	0.1509	0.1443	0.1429	0.1410	0.1382	6.833	6.686	6.649
82	6.833333	4.831896	6.968	6.931	6.784	0.1570	0.1542	0.1523	0.1509	0.1443	0.1429	0.1410	0.1382	6.917	6.769	6.732
83	6.916667	4.890822	7.051	7.014	6.867	0.1571	0.1542	0.1523	0.1510	0.1442	0.1429	0.1410	0.1381	7.000	6.852	6.816
84	7.000000	4.949748	7.135	7.098	6.950	0.1571	0.1543	0.1524	0.1510	0.1442	0.1428	0.1409	0.1381	7.083	6.936	6.899
85	7.083333	5.008673	7.218	7.181	7.034	0.1572	0.1543	0.1524	0.1510	0.1442	0.1428	0.1409	0.1380	7.167	7.019	6.982
86	7.166667	5.067599	7.301	7.265	7.117	0.1572	0.1544	0.1524	0.1510	0.1442	0.1428	0.1408	0.1380	7.250	7.102	7.065
87	7.250000	5.126524	7.385	7.348	7.200	0.1573	0.1544	0.1524	0.1510	0.1442	0.1428	0.1408	0.1379	7.333	7.185	7.149
88	7.333333	5.185450	7.468	7.432	7.284	0.1574	0.1544	0.1525	0.1511	0.1441	0.1427	0.1408	0.1378	7.417	7.268	7.232
89	7.416667	5.244375	7.551	7.515	7.367	0.1574	0.1545	0.1525	0.1511	0.1441	0.1427	0.1407	0.1378	7.500	7.351	7.315
90	7.500000	5.303301	7.635	7.599	7.450	0.1575	0.1545	0.1525	0.1511	0.1441	0.1427	0.1407	0.1377	7.583	7.435	7.398
91	7.583333	5.362227	7.718	7.682	7.534	0.1575	0.1545	0.1526	0.1511	0.1441	0.1426	0.1407	0.1377	7.667	7.518	7.482
92	7.666667	5.421152	7.802	7.766	7.617	0.1576	0.1546	0.1526	0.1511	0.1441	0.1426	0.1406	0.1376	7.750	7.601	7.565
93	7.750000	5.480078	7.885	7.849	7.700	0.1576	0.1546	0.1526	0.1512	0.1440	0.1426	0.1406	0.1376	7.833	7.684	7.648
94	7.833333	5.539003	7.968	7.933	7.784	0.1577	0.1547	0.1526	0.1512	0.1440	0.1426	0.1405	0.1375	7.917	7.767	7.732
95	7.916667	5.597929	8.052	8.016	7.867	0.1577	0.1547	0.1527	0.1512	0.1440	0.1425	0.1405	0.1375	8.000	7.850	7.815
96	8.000000	5.656854	8.135	8.100	7.950	0.1578	0.1547	0.1527	0.1512	0.1440	0.1425	0.1405	0.1374	8.083	7.934	7.898
97	8.083333	5.715780	8.219	8.183	8.034	0.1578	0.1548	0.1527	0.1512	0.1440	0.1425	0.1404	0.1374	8.167	8.017	7.981
98	8.166667	5.774706	8.302	8.267	8.117	0.1579	0.1548	0.1527	0.1513	0.1439	0.1425	0.1404	0.1373	8.250	8.100	8.065
99	8.250000	5.833631	8.385	8.350	8.200	0.1579	0.1548	0.1528	0.1513	0.1439	0.1424	0.1404	0.1373	8.333	8.183	8.148
100	8.333333	5.892557	8.469	8.434	8.284	0.1580	0.1549	0.1528	0.1513	0.1439	0.1424	0.1403	0.1372	8.417	8.266	8.231

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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45 DEG PRESSURE ANGLE

TABLE 55—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 16/32 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.1107 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.1107 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
				Note f	Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50	Note f	
6	0.3750000	0.2651650	0.474	0.442	0.338	0.1157	0.1142	0.1132	0.1125	0.1089	0.1082	0.1072	0.1057	0.437	0.333	0.301
7	0.4375000	0.3093592	0.536	0.504	0.400	0.1158	0.1142	0.1132	0.1125	0.1089	0.1082	0.1072	0.1056	0.500	0.396	0.364
8	0.5000000	0.3535534	0.599	0.567	0.463	0.1158	0.1143	0.1133	0.1125	0.1089	0.1081	0.1071	0.1056	0.562	0.458	0.426
9	0.5625000	0.3977476	0.661	0.629	0.525	0.1158	0.1143	0.1133	0.1125	0.1089	0.1081	0.1071	0.1056	0.625	0.521	0.489
10	0.6250000	0.4419417	0.724	0.692	0.588	0.1159	0.1143	0.1133	0.1125	0.1089	0.1081	0.1071	0.1055	0.687	0.583	0.551
11	0.6875000	0.4861359	0.786	0.754	0.650	0.1159	0.1144	0.1133	0.1126	0.1088	0.1081	0.1070	0.1055	0.750	0.646	0.614
12	0.7500000	0.5303301	0.849	0.817	0.713	0.1160	0.1144	0.1133	0.1126	0.1088	0.1081	0.1070	0.1054	0.812	0.708	0.676
13	0.8125000	0.5745243	0.912	0.879	0.775	0.1160	0.1144	0.1133	0.1126	0.1088	0.1081	0.1070	0.1054	0.875	0.771	0.738
14	0.8750000	0.6187184	0.974	0.942	0.838	0.1160	0.1144	0.1134	0.1126	0.1088	0.1080	0.1070	0.1054	0.937	0.833	0.801
15	0.9375000	0.6629126	1.037	1.004	0.900	0.1161	0.1145	0.1134	0.1126	0.1088	0.1080	0.1069	0.1053	1.000	0.896	0.863
16	1.000000	0.7071068	1.099	1.067	0.963	0.1161	0.1145	0.1134	0.1126	0.1088	0.1080	0.1069	0.1053	1.062	0.958	0.926
17	1.062500	0.7513009	1.162	1.129	1.025	0.1161	0.1145	0.1134	0.1126	0.1088	0.1080	0.1069	0.1053	1.125	1.021	0.988
18	1.125000	0.7954951	1.224	1.192	1.088	0.1162	0.1145	0.1134	0.1126	0.1088	0.1080	0.1069	0.1052	1.187	1.083	1.051
19	1.187500	0.8396893	1.287	1.254	1.150	0.1162	0.1146	0.1135	0.1127	0.1087	0.1079	0.1068	0.1052	1.250	1.146	1.113
20	1.250000	0.8838835	1.349	1.317	1.213	0.1163	0.1146	0.1135	0.1127	0.1087	0.1079	0.1068	0.1051	1.312	1.208	1.176
21	1.312500	0.9280777	1.412	1.379	1.275	0.1163	0.1146	0.1135	0.1127	0.1087	0.1079	0.1068	0.1051	1.375	1.271	1.238
22	1.375000	0.9722718	1.474	1.442	1.338	0.1163	0.1146	0.1135	0.1127	0.1087	0.1079	0.1068	0.1051	1.437	1.333	1.301
23	1.437500	1.016466	1.537	1.504	1.400	0.1164	0.1147	0.1135	0.1127	0.1087	0.1079	0.1067	0.1050	1.500	1.396	1.363
24	1.500000	1.060660	1.599	1.567	1.463	0.1164	0.1147	0.1136	0.1127	0.1087	0.1078	0.1067	0.1050	1.562	1.458	1.426
25	1.562500	1.104854	1.662	1.629	1.525	0.1164	0.1147	0.1136	0.1127	0.1087	0.1078	0.1067	0.1049	1.625	1.521	1.488
26	1.625000	1.149049	1.725	1.692	1.588	0.1165	0.1148	0.1136	0.1128	0.1086	0.1078	0.1066	0.1049	1.687	1.583	1.550
27	1.687500	1.193243	1.787	1.754	1.650	0.1165	0.1148	0.1136	0.1128	0.1086	0.1078	0.1066	0.1049	1.750	1.646	1.613
28	1.750000	1.237437	1.850	1.817	1.713	0.1166	0.1148	0.1136	0.1128	0.1086	0.1078	0.1066	0.1048	1.812	1.708	1.675
29	1.812500	1.281631	1.912	1.879	1.775	0.1166	0.1148	0.1137	0.1128	0.1086	0.1077	0.1066	0.1048	1.875	1.771	1.738
30	1.875000	1.325825	1.975	1.942	1.838	0.1166	0.1149	0.1137	0.1128	0.1086	0.1077	0.1065	0.1048	1.937	1.833	1.800
31	1.937500	1.370019	2.037	2.004	1.900	0.1167	0.1149	0.1137	0.1128	0.1086	0.1077	0.1065	0.1047	2.000	1.896	1.863
32	2.000000	1.414214	2.100	2.067	1.963	0.1167	0.1149	0.1137	0.1128	0.1086	0.1077	0.1065	0.1047	2.062	1.958	1.925
33	2.062500	1.458408	2.162	2.130	2.025	0.1168	0.1149	0.1137	0.1128	0.1086	0.1077	0.1065	0.1046	2.125	2.020	1.988
34	2.125000	1.502602	2.225	2.192	2.088	0.1168	0.1150	0.1137	0.1129	0.1085	0.1077	0.1064	0.1046	2.187	2.083	2.050
35	2.187500	1.546796	2.287	2.255	2.150	0.1168	0.1150	0.1138	0.1129	0.1085	0.1076	0.1064	0.1046	2.250	2.145	2.113
36	2.250000	1.590990	2.350	2.317	2.213	0.1169	0.1150	0.1138	0.1129	0.1085	0.1076	0.1064	0.1045	2.312	2.208	2.175
37	2.312500	1.635184	2.412	2.380	2.275	0.1169	0.1150	0.1138	0.1129	0.1085	0.1076	0.1064	0.1045	2.375	2.270	2.238
38	2.375000	1.679379	2.475	2.443	2.338	0.1169	0.1151	0.1138	0.1129	0.1085	0.1076	0.1063	0.1045	2.437	2.332	2.300
39	2.437500	1.723573	2.538	2.505	2.400	0.1170	0.1151	0.1138	0.1129	0.1085	0.1076	0.1063	0.1044	2.500	2.395	2.362
40	2.500000	1.767767	2.600	2.568	2.463	0.1170	0.1151	0.1139	0.1129	0.1085	0.1075	0.1063	0.1044	2.562	2.457	2.425
41	2.562500	1.811961	2.663	2.631	2.525	0.1171	0.1152	0.1139	0.1130	0.1084	0.1075	0.1062	0.1043	2.625	2.519	2.487
42	2.625000	1.856155	2.725	2.693	2.588	0.1171	0.1152	0.1139	0.1130	0.1084	0.1075	0.1062	0.1043	2.687	2.582	2.550
43	2.687500	1.900350	2.788	2.756	2.650	0.1171	0.1152	0.1139	0.1130	0.1084	0.1075	0.1062	0.1043	2.750	2.644	2.612
44	2.750000	1.944544	2.850	2.818	2.713	0.1172	0.1152	0.1139	0.1130	0.1084	0.1075	0.1062	0.1042	2.812	2.707	2.675
45	2.812500	1.988738	2.913	2.881	2.775	0.1172	0.1153	0.1140	0.1130	0.1084	0.1074	0.1061	0.1042	2.875	2.769	2.737
46	2.875000	2.032932	2.975	2.944	2.838	0.1172	0.1153	0.1140	0.1130	0.1084	0.1074	0.1061	0.1042	2.937	2.831	2.800
47	2.937500	2.077126	3.038	3.006	2.900	0.1173	0.1153	0.1140	0.1130	0.1084	0.1074	0.1061	0.1041	3.000	2.894	2.862
48	3.000000	2.121320	3.100	3.069	2.963	0.1173	0.1153	0.1140	0.1131	0.1083	0.1074	0.1061	0.1041	3.062	2.956	2.925
49	3.062500	2.165515	3.163	3.132	3.025	0.1174	0.1154	0.1140	0.1131	0.1083	0.1074	0.1060	0.1040	3.125	3.018	2.987
50	3.125000	2.209709	3.225	3.194	3.088	0.1174	0.1154	0.1140	0.1131	0.1083	0.1073	0.1060	0.1040	3.187	3.081	3.050
51	3.187500	2.253903	3.288	3.257	3.150	0.1174	0.1154	0.1141	0.1131	0.1083	0.1073	0.1060	0.1040	3.250	3.143	3.112
52	3.250000	2.298097	3.351	3.319	3.213	0.1175	0.1154	0.1141	0.1131	0.1083	0.1073	0.1060	0.1039	3.312	3.206	3.174
53	3.312500	2.342291	3.413	3.382	3.275	0.1175	0.1155	0.1141	0.1131	0.1083	0.1073	0.1059	0.1039	3.375	3.268	3.237
54	3.375000	2.386485	3.476	3.445	3.338	0.1176	0.1155	0.1141	0.1131	0.1083	0.1073	0.1059	0.1038	3.437	3.330	3.299
55	3.437500	2.430680	3.538	3.507	3.400	0.1176	0.1155	0.1141	0.1131	0.1083	0.1073	0.1059	0.1038	3.500	3.393	3.362
56	3.500000	2.474874	3.601	3.570	3.463	0.1176	0.1155	0.1142	0.1132	0.1082	0.1072	0.1059	0.1038	3.562	3.455	3.424
57	3.562500	2.519068	3.663	3.633	3.525	0.1177	0.1156	0.1142	0.1132	0.1082	0.1072	0.1058	0.1037	3.625	3.517	3.487
58	3.625000	2.563262	3.726	3.695	3.588	0.1177	0.1156	0.1142	0.1132	0.1082	0.1072	0.1058	0.1037	3.687	3.580	3.549
59	3.687500	2.607456	3.788	3.758	3.650	0.1177	0.1156	0.1142	0.1132	0.1082	0.1072	0.1058	0.1037	3.750	3.642	3.612
60	3.750000	2.651650	3.851	3.820	3.713	0.1178	0.1157	0.1142	0.1132	0.1082	0.1072	0.1057	0.1036	3.812	3.705	3.674

(continued on next page)

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

f. Form dia values for 6 thru 28 teeth corrected with 1996 reaffirmation.

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45 DEG PRESSURE ANGLE

TABLE 55—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 16/32 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	S_v Min. Eff. Circ. Space Width = 0.1107 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.1107 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
61	3.812500	2.695845	3.913	3.883	3.775	0.1178	0.1157	0.1143	0.1132	0.1082	0.1071	0.1057	0.1036	3.875	3.767	3.737
62	3.875000	2.740039	3.976	3.946	3.838	0.1179	0.1157	0.1143	0.1132	0.1082	0.1071	0.1057	0.1035	3.937	3.829	3.799
63	3.937500	2.784233	4.038	4.008	3.900	0.1179	0.1157	0.1143	0.1133	0.1081	0.1071	0.1057	0.1035	4.000	3.892	3.862
64	4.000000	2.828427	4.101	4.071	3.963	0.1179	0.1158	0.1143	0.1133	0.1081	0.1071	0.1056	0.1035	4.062	3.954	3.924
65	4.062500	2.872621	4.164	4.134	4.025	0.1180	0.1158	0.1143	0.1133	0.1081	0.1071	0.1056	0.1034	4.125	4.016	3.986
66	4.125000	2.916816	4.226	4.196	4.088	0.1180	0.1158	0.1144	0.1133	0.1081	0.1070	0.1056	0.1034	4.187	4.079	4.049
67	4.187500	2.961010	4.289	4.259	4.150	0.1180	0.1158	0.1144	0.1133	0.1081	0.1070	0.1056	0.1034	4.250	4.141	4.111
68	4.250000	3.005204	4.351	4.321	4.213	0.1181	0.1159	0.1144	0.1133	0.1081	0.1070	0.1055	0.1033	4.312	4.204	4.174
69	4.312500	3.049398	4.414	4.384	4.275	0.1181	0.1159	0.1144	0.1133	0.1081	0.1070	0.1055	0.1033	4.375	4.266	4.236
70	4.375000	3.093592	4.476	4.447	4.338	0.1182	0.1159	0.1144	0.1133	0.1081	0.1070	0.1055	0.1032	4.437	4.328	4.299
71	4.437500	3.137786	4.539	4.509	4.400	0.1182	0.1159	0.1144	0.1134	0.1080	0.1070	0.1055	0.1032	4.500	4.391	4.361
72	4.500000	3.181981	4.601	4.572	4.463	0.1182	0.1160	0.1145	0.1134	0.1080	0.1069	0.1054	0.1032	4.562	4.453	4.424
73	4.562500	3.226175	4.664	4.635	4.525	0.1183	0.1160	0.1145	0.1134	0.1080	0.1069	0.1054	0.1031	4.625	4.515	4.486
74	4.625000	3.270369	4.726	4.697	4.588	0.1183	0.1160	0.1145	0.1134	0.1080	0.1069	0.1054	0.1031	4.687	4.578	4.549
75	4.687500	3.314563	4.789	4.760	4.650	0.1183	0.1161	0.1145	0.1134	0.1080	0.1069	0.1053	0.1030	4.750	4.640	4.611
76	4.750000	3.358757	4.851	4.822	4.713	0.1184	0.1161	0.1145	0.1134	0.1080	0.1069	0.1053	0.1030	4.812	4.703	4.674
77	4.812500	3.402951	4.914	4.885	4.775	0.1184	0.1161	0.1146	0.1134	0.1080	0.1068	0.1053	0.1030	4.875	4.765	4.736
78	4.875000	3.447146	4.977	4.948	4.838	0.1185	0.1161	0.1146	0.1135	0.1079	0.1068	0.1053	0.1029	4.937	4.827	4.798
79	4.937500	3.491340	5.039	5.010	4.900	0.1185	0.1162	0.1146	0.1135	0.1079	0.1068	0.1052	0.1029	5.000	4.890	4.861
80	5.000000	3.535534	5.102	5.073	4.963	0.1185	0.1162	0.1146	0.1135	0.1079	0.1068	0.1052	0.1029	5.062	4.952	4.923
81	5.062500	3.579728	5.164	5.136	5.025	0.1186	0.1162	0.1146	0.1135	0.1079	0.1068	0.1052	0.1028	5.125	5.014	4.986
82	5.125000	3.623922	5.227	5.198	5.088	0.1186	0.1162	0.1147	0.1135	0.1079	0.1067	0.1052	0.1028	5.187	5.077	5.048
83	5.187500	3.668117	5.289	5.261	5.150	0.1187	0.1163	0.1147	0.1135	0.1079	0.1067	0.1051	0.1027	5.250	5.139	5.111
84	5.250000	3.712311	5.352	5.323	5.213	0.1187	0.1163	0.1147	0.1135	0.1079	0.1067	0.1051	0.1027	5.312	5.202	5.173
85	5.312500	3.756505	5.414	5.386	5.275	0.1187	0.1163	0.1147	0.1136	0.1078	0.1067	0.1051	0.1027	5.375	5.264	5.236
86	5.375000	3.800699	5.477	5.449	5.338	0.1188	0.1163	0.1147	0.1136	0.1078	0.1067	0.1051	0.1026	5.437	5.326	5.298
87	5.437500	3.844893	5.539	5.511	5.400	0.1188	0.1164	0.1148	0.1136	0.1078	0.1066	0.1050	0.1026	5.500	5.389	5.361
88	5.500000	3.889087	5.602	5.574	5.463	0.1188	0.1164	0.1148	0.1136	0.1078	0.1066	0.1050	0.1026	5.562	5.451	5.423
89	5.562500	3.933282	5.664	5.637	5.525	0.1189	0.1164	0.1148	0.1136	0.1078	0.1066	0.1050	0.1025	5.625	5.513	5.486
90	5.625000	3.977476	5.727	5.699	5.588	0.1189	0.1165	0.1148	0.1136	0.1078	0.1066	0.1049	0.1025	5.687	5.576	5.548
91	5.687500	4.021670	5.790	5.762	5.650	0.1190	0.1165	0.1148	0.1136	0.1078	0.1066	0.1049	0.1024	5.750	5.638	5.610
92	5.750000	4.065864	5.852	5.824	5.713	0.1190	0.1165	0.1148	0.1136	0.1078	0.1066	0.1049	0.1024	5.812	5.701	5.673
93	5.812500	4.110058	5.915	5.887	5.775	0.1190	0.1165	0.1149	0.1137	0.1077	0.1065	0.1049	0.1024	5.875	5.763	5.735
94	5.875000	4.154252	5.977	5.950	5.838	0.1191	0.1166	0.1149	0.1137	0.1077	0.1065	0.1048	0.1023	5.937	5.825	5.798
95	5.937500	4.198447	6.040	6.012	5.900	0.1191	0.1166	0.1149	0.1137	0.1077	0.1065	0.1048	0.1023	6.000	5.888	5.860
96	6.000000	4.242641	6.102	6.075	5.963	0.1191	0.1166	0.1149	0.1137	0.1077	0.1065	0.1048	0.1023	6.062	5.950	5.923
97	6.062500	4.286835	6.165	6.138	6.025	0.1192	0.1166	0.1149	0.1137	0.1077	0.1065	0.1048	0.1022	6.125	6.012	5.985
98	6.125000	4.331029	6.227	6.200	6.088	0.1192	0.1167	0.1150	0.1137	0.1077	0.1064	0.1047	0.1022	6.187	6.075	6.048
99	6.187500	4.375223	6.290	6.263	6.150	0.1193	0.1167	0.1150	0.1137	0.1077	0.1064	0.1047	0.1021	6.250	6.137	6.110
100	6.250000	4.419418	6.352	6.325	6.213	0.1193	0.1167	0.1150	0.1138	0.1076	0.1064	0.1047	0.1021	6.312	6.200	6.173

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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45 DEG PRESSURE ANGLE

TABLE 56—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 20/40 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.0885 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.0885 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
				Note f	Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50	Note f	
6	0.3000000	0.2121320	0.380	0.354	0.270	0.0935	0.0920	0.0910	0.0903	0.0867	0.0860	0.0850	0.0835	0.350	0.266	0.240
7	0.3500000	0.2474874	0.430	0.404	0.320	0.0936	0.0920	0.0910	0.0903	0.0867	0.0860	0.0850	0.0834	0.400	0.316	0.290
8	0.4000000	0.2828427	0.480	0.454	0.370	0.0936	0.0921	0.0911	0.0903	0.0867	0.0859	0.0849	0.0834	0.450	0.366	0.340
9	0.4500000	0.3181981	0.530	0.504	0.420	0.0936	0.0921	0.0911	0.0903	0.0867	0.0859	0.0849	0.0834	0.500	0.416	0.390
10	0.5000000	0.3535534	0.580	0.554	0.470	0.0937	0.0921	0.0911	0.0903	0.0867	0.0859	0.0849	0.0833	0.550	0.466	0.440
11	0.5500000	0.3889087	0.630	0.604	0.520	0.0937	0.0922	0.0911	0.0904	0.0866	0.0859	0.0848	0.0833	0.600	0.516	0.490
12	0.6000000	0.4242641	0.680	0.654	0.570	0.0938	0.0922	0.0911	0.0904	0.0866	0.0859	0.0848	0.0832	0.650	0.566	0.540
13	0.6500000	0.4596194	0.730	0.704	0.620	0.0938	0.0922	0.0911	0.0904	0.0866	0.0859	0.0848	0.0832	0.700	0.616	0.590
14	0.7000000	0.4949748	0.780	0.754	0.670	0.0938	0.0922	0.0912	0.0904	0.0866	0.0858	0.0848	0.0832	0.750	0.666	0.640
15	0.7500000	0.5303301	0.830	0.804	0.720	0.0939	0.0923	0.0912	0.0904	0.0866	0.0858	0.0847	0.0831	0.800	0.716	0.690
16	0.8000000	0.5656854	0.880	0.854	0.770	0.0939	0.0923	0.0912	0.0904	0.0866	0.0858	0.0847	0.0831	0.850	0.766	0.740
17	0.8500000	0.6010408	0.930	0.904	0.820	0.0939	0.0923	0.0912	0.0904	0.0866	0.0858	0.0847	0.0831	0.900	0.816	0.790
18	0.9000000	0.6363961	0.980	0.954	0.870	0.0940	0.0923	0.0912	0.0904	0.0866	0.0858	0.0847	0.0830	0.950	0.866	0.840
19	0.9500000	0.6717515	1.031	1.004	0.920	0.0940	0.0924	0.0913	0.0905	0.0865	0.0857	0.0846	0.0830	1.000	0.916	0.889
20	1.000000	0.7071068	1.081	1.054	0.970	0.0941	0.0924	0.0913	0.0905	0.0865	0.0857	0.0846	0.0829	1.050	0.966	0.939
21	1.050000	0.7424621	1.131	1.104	1.020	0.0941	0.0924	0.0913	0.0905	0.0865	0.0857	0.0846	0.0829	1.100	1.016	0.989
22	1.100000	0.7778174	1.181	1.154	1.070	0.0941	0.0924	0.0913	0.0905	0.0865	0.0857	0.0846	0.0829	1.150	1.066	1.039
23	1.150000	0.8131728	1.231	1.204	1.120	0.0942	0.0925	0.0913	0.0905	0.0865	0.0857	0.0845	0.0828	1.200	1.116	1.089
24	1.200000	0.8485282	1.281	1.254	1.170	0.0942	0.0925	0.0914	0.0905	0.0865	0.0856	0.0845	0.0828	1.250	1.166	1.139
25	1.250000	0.8838835	1.331	1.304	1.220	0.0942	0.0925	0.0914	0.0905	0.0865	0.0856	0.0845	0.0828	1.300	1.216	1.189
26	1.300000	0.9192388	1.381	1.354	1.270	0.0943	0.0926	0.0914	0.0906	0.0864	0.0856	0.0844	0.0827	1.350	1.266	1.239
27	1.350000	0.9545942	1.431	1.404	1.320	0.0943	0.0926	0.0914	0.0906	0.0864	0.0856	0.0844	0.0827	1.400	1.316	1.289
28	1.400000	0.9899495	1.481	1.454	1.370	0.0944	0.0926	0.0914	0.0906	0.0864	0.0856	0.0844	0.0826	1.450	1.366	1.339
29	1.450000	1.025305	1.531	1.504	1.420	0.0944	0.0926	0.0915	0.0906	0.0864	0.0855	0.0844	0.0826	1.500	1.416	1.389
30	1.500000	1.060660	1.581	1.554	1.470	0.0944	0.0927	0.0915	0.0906	0.0864	0.0855	0.0843	0.0826	1.550	1.466	1.439
31	1.550000	1.096016	1.631	1.604	1.520	0.0945	0.0927	0.0915	0.0906	0.0864	0.0855	0.0843	0.0825	1.600	1.516	1.489
32	1.600000	1.131371	1.681	1.654	1.570	0.0945	0.0927	0.0915	0.0906	0.0864	0.0855	0.0843	0.0825	1.650	1.566	1.539
33	1.650000	1.166726	1.731	1.704	1.620	0.0946	0.0927	0.0915	0.0906	0.0864	0.0855	0.0843	0.0824	1.700	1.616	1.589
34	1.700000	1.202082	1.781	1.754	1.670	0.0946	0.0928	0.0915	0.0907	0.0863	0.0855	0.0842	0.0824	1.750	1.666	1.639
35	1.750000	1.237437	1.831	1.804	1.720	0.0946	0.0928	0.0916	0.0907	0.0863	0.0854	0.0842	0.0824	1.800	1.716	1.689
36	1.800000	1.272792	1.881	1.854	1.770	0.0947	0.0928	0.0916	0.0907	0.0863	0.0854	0.0842	0.0823	1.850	1.766	1.739
37	1.850000	1.308148	1.931	1.904	1.820	0.0947	0.0928	0.0916	0.0907	0.0863	0.0854	0.0842	0.0823	1.900	1.816	1.789
38	1.900000	1.343503	1.981	1.954	1.870	0.0947	0.0929	0.0916	0.0907	0.0863	0.0854	0.0841	0.0823	1.950	1.866	1.839
39	1.950000	1.378858	2.031	2.004	1.920	0.0948	0.0929	0.0916	0.0907	0.0863	0.0854	0.0841	0.0822	2.000	1.916	1.889
40	2.000000	1.414214	2.081	2.054	1.970	0.0948	0.0929	0.0917	0.0907	0.0863	0.0853	0.0841	0.0822	2.050	1.966	1.939
41	2.050000	1.449569	2.131	2.105	2.020	0.0949	0.0930	0.0917	0.0908	0.0862	0.0853	0.0840	0.0821	2.100	2.015	1.989
42	2.100000	1.484924	2.181	2.155	2.070	0.0949	0.0930	0.0917	0.0908	0.0862	0.0853	0.0840	0.0821	2.150	2.065	2.039
43	2.150000	1.520280	2.231	2.205	2.120	0.0949	0.0930	0.0917	0.0908	0.0862	0.0853	0.0840	0.0821	2.200	2.115	2.089
44	2.200000	1.555635	2.281	2.255	2.170	0.0950	0.0930	0.0917	0.0908	0.0862	0.0853	0.0840	0.0820	2.250	2.165	2.139
45	2.250000	1.590990	2.332	2.305	2.220	0.0950	0.0931	0.0918	0.0908	0.0862	0.0852	0.0839	0.0820	2.300	2.215	2.188
46	2.300000	1.626346	2.382	2.355	2.270	0.0950	0.0931	0.0918	0.0908	0.0862	0.0852	0.0839	0.0820	2.350	2.265	2.238
47	2.350000	1.661701	2.432	2.405	2.320	0.0951	0.0931	0.0918	0.0908	0.0862	0.0852	0.0839	0.0819	2.400	2.315	2.288
48	2.400000	1.697056	2.482	2.455	2.370	0.0951	0.0931	0.0918	0.0909	0.0861	0.0852	0.0839	0.0819	2.450	2.365	2.338
49	2.450000	1.732412	2.532	2.505	2.420	0.0952	0.0932	0.0918	0.0909	0.0861	0.0852	0.0838	0.0818	2.500	2.415	2.388
50	2.500000	1.767767	2.582	2.555	2.470	0.0952	0.0932	0.0918	0.0909	0.0861	0.0852	0.0838	0.0818	2.550	2.464	2.438
51	2.550000	1.803122	2.632	2.606	2.520	0.0952	0.0932	0.0919	0.0909	0.0861	0.0851	0.0838	0.0818	2.600	2.514	2.488
52	2.600000	1.838478	2.682	2.656	2.570	0.0953	0.0932	0.0919	0.0909	0.0861	0.0851	0.0838	0.0817	2.650	2.564	2.538
53	2.650000	1.873833	2.732	2.706	2.620	0.0953	0.0933	0.0919	0.0909	0.0861	0.0851	0.0837	0.0817	2.700	2.614	2.588
54	2.700000	1.909188	2.782	2.756	2.670	0.0954	0.0933	0.0919	0.0909	0.0861	0.0851	0.0837	0.0816	2.750	2.664	2.638
55	2.750000	1.944544	2.832	2.806	2.720	0.0954	0.0933	0.0919	0.0909	0.0861	0.0851	0.0837	0.0816	2.800	2.714	2.688
56	2.800000	1.979899	2.882	2.856	2.770	0.0954	0.0933	0.0920	0.0910	0.0860	0.0850	0.0837	0.0816	2.850	2.764	2.738
57	2.850000	2.015254	2.932	2.906	2.820	0.0955	0.0934	0.0920	0.0910	0.0860	0.0850	0.0836	0.0815	2.900	2.814	2.788
58	2.900000	2.050610	2.982	2.956	2.870	0.0955	0.0934	0.0920	0.0910	0.0860	0.0850	0.0836	0.0815	2.950	2.864	2.838
59	2.950000	2.085965	3.032	3.006	2.920	0.0955	0.0934	0.0920	0.0910	0.0860	0.0850	0.0836	0.0815	3.000	2.914	2.888
60	3.000000	2.121320	3.082	3.056	2.970	0.0956	0.0935	0.0920	0.0910	0.0860	0.0850	0.0835	0.0814	3.050	2.963	2.938

(continued on next page)

a Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

f. Form dia values for 6 thru 30 teeth corrected with 1996 reaffirmation.

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45 DEG PRESSURE ANGLE

TABLE 56—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 20/40 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width + 0.0885 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness + 0.0885 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
61	3.050000	2.156676	3.132	3.107	3.020	0.0956	0.0935	0.0921	0.0910	0.0860	0.0849	0.0835	0.0814	3.100	3.013	2.988
62	3.100000	2.192031	3.182	3.157	3.070	0.0957	0.0935	0.0921	0.0910	0.0860	0.0849	0.0835	0.0813	3.150	3.063	3.038
63	3.150000	2.227386	3.232	3.207	3.120	0.0957	0.0935	0.0921	0.0911	0.0859	0.0849	0.0835	0.0813	3.200	3.113	3.088
64	3.200000	2.262742	3.282	3.257	3.170	0.0957	0.0936	0.0921	0.0911	0.0859	0.0849	0.0834	0.0813	3.250	3.163	3.138
65	3.250000	2.298097	3.332	3.307	3.220	0.0958	0.0936	0.0921	0.0911	0.0859	0.0849	0.0834	0.0812	3.300	3.213	3.188
66	3.300000	2.333452	3.382	3.357	3.270	0.0958	0.0936	0.0922	0.0911	0.0859	0.0848	0.0834	0.0812	3.350	3.263	3.238
67	3.350000	2.368808	3.432	3.407	3.320	0.0958	0.0936	0.0922	0.0911	0.0859	0.0848	0.0834	0.0812	3.400	3.313	3.288
68	3.400000	2.404163	3.482	3.457	3.370	0.0959	0.0937	0.0922	0.0911	0.0859	0.0848	0.0833	0.0811	3.450	3.363	3.338
69	3.450000	2.439518	3.532	3.507	3.420	0.0959	0.0937	0.0922	0.0911	0.0859	0.0848	0.0833	0.0811	3.500	3.413	3.388
70	3.500000	2.474874	3.582	3.557	3.470	0.0960	0.0937	0.0922	0.0911	0.0859	0.0848	0.0833	0.0810	3.550	3.463	3.438
71	3.550000	2.510229	3.632	3.608	3.520	0.0960	0.0937	0.0922	0.0912	0.0858	0.0848	0.0833	0.0810	3.600	3.512	3.488
72	3.600000	2.545584	3.683	3.658	3.570	0.0960	0.0938	0.0923	0.0912	0.0858	0.0847	0.0832	0.0810	3.650	3.562	3.537
73	3.650000	2.580940	3.733	3.708	3.620	0.0961	0.0938	0.0923	0.0912	0.0858	0.0847	0.0832	0.0809	3.700	3.612	3.587
74	3.700000	2.616295	3.783	3.758	3.670	0.0961	0.0938	0.0923	0.0912	0.0858	0.0847	0.0832	0.0809	3.750	3.662	3.637
75	3.750000	2.651650	3.833	3.808	3.720	0.0961	0.0939	0.0923	0.0912	0.0858	0.0847	0.0831	0.0808	3.800	3.712	3.687
76	3.800000	2.687006	3.883	3.858	3.770	0.0962	0.0939	0.0923	0.0912	0.0858	0.0847	0.0831	0.0808	3.850	3.762	3.737
77	3.850000	2.722361	3.933	3.908	3.820	0.0962	0.0939	0.0924	0.0912	0.0858	0.0846	0.0831	0.0808	3.900	3.812	3.787
78	3.900000	2.757717	3.983	3.958	3.870	0.0963	0.0939	0.0924	0.0913	0.0857	0.0846	0.0831	0.0807	3.950	3.862	3.837
79	3.950000	2.793072	4.033	4.008	3.920	0.0963	0.0940	0.0924	0.0913	0.0857	0.0846	0.0830	0.0807	4.000	3.912	3.887
80	4.000000	2.828427	4.083	4.058	3.970	0.0963	0.0940	0.0924	0.0913	0.0857	0.0846	0.0830	0.0807	4.050	3.962	3.937
81	4.050000	2.863783	4.133	4.109	4.020	0.0964	0.0940	0.0924	0.0913	0.0857	0.0846	0.0830	0.0806	4.100	4.011	3.987
82	4.100000	2.899138	4.183	4.159	4.070	0.0964	0.0940	0.0925	0.0913	0.0857	0.0845	0.0830	0.0806	4.150	4.061	4.037
83	4.150000	2.934493	4.233	4.209	4.120	0.0965	0.0941	0.0925	0.0913	0.0857	0.0845	0.0829	0.0805	4.200	4.111	4.087
84	4.200000	2.969849	4.283	4.259	4.170	0.0965	0.0941	0.0925	0.0913	0.0857	0.0845	0.0829	0.0805	4.250	4.161	4.137
85	4.250000	3.005204	4.333	4.309	4.220	0.0965	0.0941	0.0925	0.0914	0.0856	0.0845	0.0829	0.0805	4.300	4.211	4.187
86	4.300000	3.040559	4.383	4.359	4.270	0.0966	0.0941	0.0925	0.0914	0.0856	0.0845	0.0829	0.0804	4.350	4.261	4.237
87	4.350000	3.075915	4.433	4.409	4.320	0.0966	0.0942	0.0926	0.0914	0.0856	0.0844	0.0828	0.0804	4.400	4.311	4.287
88	4.400000	3.111270	4.483	4.459	4.370	0.0966	0.0942	0.0926	0.0914	0.0856	0.0844	0.0828	0.0804	4.450	4.361	4.337
89	4.450000	3.146625	4.533	4.509	4.420	0.0967	0.0942	0.0926	0.0914	0.0856	0.0844	0.0828	0.0803	4.500	4.411	4.387
90	4.500000	3.181981	4.583	4.559	4.470	0.0967	0.0943	0.0926	0.0914	0.0856	0.0844	0.0827	0.0803	4.550	4.460	4.437
91	4.550000	3.217336	4.633	4.610	4.520	0.0968	0.0943	0.0926	0.0914	0.0856	0.0844	0.0827	0.0802	4.600	4.510	4.487
92	4.600000	3.252691	4.683	4.660	4.570	0.0968	0.0943	0.0926	0.0914	0.0856	0.0844	0.0827	0.0802	4.650	4.560	4.537
93	4.650000	3.288047	4.733	4.710	4.620	0.0968	0.0943	0.0927	0.0915	0.0855	0.0843	0.0827	0.0802	4.700	4.610	4.587
94	4.700000	3.323402	4.783	4.760	4.670	0.0969	0.0944	0.0927	0.0915	0.0855	0.0843	0.0826	0.0801	4.750	4.660	4.637
95	4.750000	3.358757	4.833	4.810	4.720	0.0969	0.0944	0.0927	0.0915	0.0855	0.0843	0.0826	0.0801	4.800	4.710	4.687
96	4.800000	3.394113	4.883	4.860	4.770	0.0969	0.0944	0.0927	0.0915	0.0855	0.0843	0.0826	0.0801	4.850	4.760	4.737
97	4.850000	3.429468	4.933	4.910	4.820	0.0970	0.0944	0.0927	0.0915	0.0855	0.0843	0.0826	0.0800	4.900	4.810	4.787
98	4.900000	3.464823	4.984	4.960	4.870	0.0970	0.0945	0.0928	0.0915	0.0855	0.0842	0.0825	0.0800	4.950	4.860	4.836
99	4.950000	3.500179	5.034	5.010	4.920	0.0971	0.0945	0.0928	0.0915	0.0855	0.0842	0.0825	0.0799	5.000	4.910	4.886
100	5.000000	3.535534	5.084	5.060	4.970	0.0971	0.0945	0.0928	0.0916	0.0854	0.0842	0.0825	0.0799	5.050	4.960	4.936

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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45 DEG PRESSURE ANGLE

TABLE 57—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 24/48 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.0738 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.0738 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
				Note f	Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50	Note f	
6	0.2500000	0.1767767	0.317	0.296	0.225	0.0784	0.0770	0.0761	0.0754	0.0722	0.0715	0.0706	0.0692	0.292	0.221	0.200
7	0.2916667	0.2062395	0.359	0.338	0.267	0.0785	0.0771	0.0761	0.0755	0.0721	0.0715	0.0705	0.0691	0.333	0.262	0.241
8	0.3333333	0.2357023	0.401	0.379	0.309	0.0785	0.0771	0.0762	0.0755	0.0721	0.0714	0.0705	0.0691	0.375	0.304	0.283
9	0.3750000	0.2651650	0.442	0.421	0.350	0.0785	0.0771	0.0762	0.0755	0.0721	0.0714	0.0705	0.0691	0.417	0.346	0.324
10	0.4166667	0.2946278	0.484	0.463	0.392	0.0786	0.0771	0.0762	0.0755	0.0721	0.0714	0.0705	0.0690	0.458	0.387	0.366
11	0.4583333	0.3240906	0.526	0.504	0.434	0.0786	0.0772	0.0762	0.0755	0.0721	0.0714	0.0704	0.0690	0.500	0.429	0.408
12	0.5000000	0.3535534	0.567	0.546	0.475	0.0787	0.0772	0.0762	0.0755	0.0721	0.0714	0.0704	0.0689	0.542	0.471	0.449
13	0.5416667	0.3830162	0.609	0.588	0.517	0.0787	0.0772	0.0762	0.0755	0.0721	0.0714	0.0704	0.0689	0.583	0.512	0.491
14	0.5833333	0.4124790	0.651	0.629	0.559	0.0787	0.0773	0.0763	0.0756	0.0720	0.0713	0.0703	0.0689	0.625	0.554	0.533
15	0.6250000	0.4419417	0.692	0.671	0.600	0.0788	0.0773	0.0763	0.0756	0.0720	0.0713	0.0703	0.0688	0.667	0.596	0.574
16	0.6666667	0.4714045	0.734	0.713	0.642	0.0788	0.0773	0.0763	0.0756	0.0720	0.0713	0.0703	0.0688	0.708	0.637	0.616
17	0.7083333	0.5008673	0.776	0.754	0.684	0.0788	0.0773	0.0763	0.0756	0.0720	0.0713	0.0703	0.0688	0.750	0.679	0.657
18	0.7500000	0.5303301	0.818	0.796	0.725	0.0789	0.0774	0.0763	0.0756	0.0720	0.0713	0.0702	0.0687	0.792	0.721	0.699
19	0.7916667	0.5597929	0.859	0.838	0.767	0.0789	0.0774	0.0764	0.0756	0.0720	0.0712	0.0702	0.0687	0.833	0.762	0.741
20	0.8333333	0.5892556	0.901	0.879	0.809	0.0790	0.0774	0.0764	0.0756	0.0720	0.0712	0.0702	0.0686	0.875	0.804	0.782
21	0.8750000	0.6187184	0.943	0.921	0.850	0.0790	0.0774	0.0764	0.0756	0.0720	0.0712	0.0702	0.0686	0.917	0.846	0.824
22	0.9166667	0.6481812	0.984	0.963	0.892	0.0790	0.0775	0.0764	0.0757	0.0719	0.0712	0.0701	0.0686	0.958	0.887	0.866
23	0.9583333	0.6776440	1.026	1.004	0.934	0.0791	0.0775	0.0764	0.0757	0.0719	0.0712	0.0701	0.0685	1.000	0.929	0.907
24	1.000000	0.7071068	1.068	1.046	0.975	0.0791	0.0775	0.0765	0.0757	0.0719	0.0711	0.0701	0.0685	1.042	0.971	0.949
25	1.041667	0.7365695	1.110	1.088	1.017	0.0791	0.0775	0.0765	0.0757	0.0719	0.0711	0.0701	0.0684	1.083	1.012	0.990
26	1.083333	0.7660324	1.151	1.129	1.059	0.0792	0.0776	0.0765	0.0757	0.0719	0.0711	0.0700	0.0684	1.125	1.054	1.032
27	1.125000	0.7954951	1.193	1.171	1.100	0.0792	0.0776	0.0765	0.0757	0.0719	0.0711	0.0700	0.0684	1.167	1.096	1.074
28	1.166667	0.8249579	1.235	1.213	1.142	0.0793	0.0776	0.0765	0.0757	0.0719	0.0711	0.0700	0.0683	1.208	1.137	1.115
29	1.208333	0.8544207	1.276	1.254	1.184	0.0793	0.0777	0.0766	0.0758	0.0718	0.0710	0.0699	0.0683	1.250	1.179	1.157
30	1.250000	0.8838835	1.318	1.296	1.225	0.0793	0.0777	0.0766	0.0758	0.0718	0.0710	0.0699	0.0683	1.292	1.221	1.199
31	1.291667	0.9133463	1.360	1.338	1.267	0.0794	0.0777	0.0766	0.0758	0.0718	0.0710	0.0699	0.0682	1.333	1.262	1.240
32	1.333333	0.9428091	1.401	1.379	1.309	0.0794	0.0777	0.0766	0.0758	0.0718	0.0710	0.0699	0.0682	1.375	1.304	1.282
33	1.375000	0.9722718	1.443	1.421	1.350	0.0795	0.0778	0.0766	0.0758	0.0718	0.0710	0.0698	0.0681	1.417	1.346	1.324
34	1.416667	1.001735	1.485	1.463	1.392	0.0795	0.0778	0.0766	0.0758	0.0718	0.0710	0.0698	0.0681	1.458	1.387	1.365
35	1.458333	1.031197	1.527	1.504	1.434	0.0795	0.0778	0.0767	0.0758	0.0718	0.0709	0.0698	0.0681	1.500	1.429	1.407
36	1.500000	1.060660	1.568	1.546	1.475	0.0796	0.0778	0.0767	0.0758	0.0718	0.0709	0.0698	0.0680	1.542	1.471	1.448
37	1.541667	1.090123	1.610	1.588	1.517	0.0796	0.0779	0.0767	0.0759	0.0717	0.0709	0.0697	0.0680	1.583	1.512	1.490
38	1.583333	1.119586	1.652	1.629	1.559	0.0796	0.0779	0.0767	0.0759	0.0717	0.0709	0.0697	0.0680	1.625	1.554	1.532
39	1.625000	1.149049	1.693	1.671	1.600	0.0797	0.0779	0.0767	0.0759	0.0717	0.0709	0.0697	0.0679	1.667	1.596	1.573
40	1.666667	1.178511	1.735	1.713	1.642	0.0797	0.0779	0.0768	0.0759	0.0717	0.0708	0.0697	0.0679	1.708	1.637	1.615
41	1.708333	1.207974	1.777	1.754	1.684	0.0798	0.0780	0.0768	0.0759	0.0717	0.0708	0.0696	0.0678	1.750	1.679	1.657
42	1.750000	1.237437	1.818	1.796	1.725	0.0798	0.0780	0.0768	0.0759	0.0717	0.0708	0.0696	0.0678	1.792	1.721	1.698
43	1.791667	1.266900	1.860	1.838	1.767	0.0798	0.0780	0.0768	0.0759	0.0717	0.0708	0.0696	0.0678	1.833	1.762	1.740
44	1.833333	1.296362	1.902	1.879	1.809	0.0799	0.0781	0.0768	0.0760	0.0716	0.0708	0.0695	0.0677	1.875	1.804	1.781
45	1.875000	1.325825	1.944	1.921	1.850	0.0799	0.0781	0.0769	0.0760	0.0716	0.0707	0.0695	0.0677	1.917	1.846	1.823
46	1.916667	1.355288	1.985	1.963	1.892	0.0799	0.0781	0.0769	0.0760	0.0716	0.0707	0.0695	0.0677	1.958	1.887	1.865
47	1.958333	1.384751	2.027	2.004	1.934	0.0800	0.0781	0.0769	0.0760	0.0716	0.0707	0.0695	0.0676	2.000	1.929	1.906
48	2.000000	1.414214	2.069	2.046	1.975	0.0800	0.0782	0.0769	0.0760	0.0716	0.0707	0.0694	0.0676	2.042	1.971	1.948
49	2.041667	1.443676	2.110	2.088	2.017	0.0801	0.0782	0.0769	0.0760	0.0716	0.0707	0.0694	0.0675	2.083	2.012	1.990
50	2.083333	1.473139	2.152	2.130	2.059	0.0801	0.0782	0.0769	0.0760	0.0716	0.0707	0.0694	0.0675	2.125	2.054	2.031
51	2.125000	1.502602	2.194	2.171	2.100	0.0801	0.0782	0.0770	0.0760	0.0716	0.0706	0.0694	0.0675	2.167	2.095	2.073
52	2.166667	1.532065	2.236	2.213	2.142	0.0802	0.0783	0.0770	0.0761	0.0715	0.0706	0.0693	0.0674	2.208	2.137	2.114
53	2.208333	1.561528	2.277	2.255	2.184	0.0802	0.0783	0.0770	0.0761	0.0715	0.0706	0.0693	0.0674	2.250	2.178	2.156
54	2.250000	1.590990	2.319	2.297	2.225	0.0803	0.0783	0.0770	0.0761	0.0715	0.0706	0.0693	0.0673	2.292	2.220	2.198
55	2.291667	1.620453	2.361	2.338	2.267	0.0803	0.0783	0.0770	0.0761	0.0715	0.0706	0.0693	0.0673	2.333	2.262	2.239
56	2.333333	1.649916	2.402	2.380	2.309	0.0803	0.0784	0.0771	0.0761	0.0715	0.0705	0.0692	0.0673	2.375	2.303	2.281
57	2.375000	1.679379	2.444	2.422	2.350	0.0804	0.0784	0.0771	0.0761	0.0715	0.0705	0.0692	0.0672	2.417	2.345	2.323
58	2.416667	1.708841	2.486	2.464	2.392	0.0804	0.0784	0.0771	0.0761	0.0715	0.0705	0.0692	0.0672	2.458	2.386	2.364
59	2.458333	1.738304	2.527	2.505	2.434	0.0804	0.0784	0.0771	0.0762	0.0714	0.0705	0.0692	0.0672	2.500	2.428	2.406
60	2.500000	1.767767	2.569	2.547	2.475	0.0805	0.0785	0.0771	0.0762	0.0714	0.0705	0.0691	0.0671	2.542	2.470	2.447

(continued on next page)

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

f. Form dia values for 6 thru 43 teeth corrected with 1996 reaffirmation.

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45 DEG PRESSURE ANGLE

TABLE 57—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 24/48 SPLINE PITCH

	Internal and External		Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.0738 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.0738 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 50 -0									+0 - 50		
61	2.541667	1.797230	2.611	2.589	2.517	0.0805	0.0785	0.0772	0.0762	0.0714	0.0704	0.0691	0.0671	2.583	2.511	2.489
62	2.583333	1.826693	2.653	2.631	2.559	0.0806	0.0785	0.0772	0.0762	0.0714	0.0704	0.0691	0.0670	2.625	2.553	2.531
63	2.625000	1.856155	2.694	2.672	2.600	0.0806	0.0786	0.0772	0.0762	0.0714	0.0704	0.0690	0.0670	2.667	2.594	2.572
64	2.666667	1.885618	2.736	2.714	2.642	0.0806	0.0786	0.0772	0.0762	0.0714	0.0704	0.0690	0.0670	2.708	2.636	2.614
65	2.708333	1.915081	2.778	2.756	2.684	0.0807	0.0786	0.0772	0.0762	0.0714	0.0704	0.0690	0.0669	2.750	2.677	2.656
66	2.750000	1.944544	2.819	2.798	2.725	0.0807	0.0786	0.0773	0.0763	0.0713	0.0703	0.0690	0.0669	2.792	2.719	2.697
67	2.791667	1.974006	2.861	2.839	2.767	0.0807	0.0787	0.0773	0.0763	0.0713	0.0703	0.0689	0.0669	2.833	2.761	2.739
68	2.833333	2.003469	2.903	2.881	2.809	0.0808	0.0787	0.0773	0.0763	0.0713	0.0703	0.0689	0.0668	2.875	2.802	2.781
69	2.875000	2.032932	2.945	2.923	2.850	0.0808	0.0787	0.0773	0.0763	0.0713	0.0703	0.0689	0.0668	2.917	2.844	2.822
70	2.916667	2.062395	2.986	2.965	2.892	0.0809	0.0787	0.0773	0.0763	0.0713	0.0703	0.0689	0.0667	2.958	2.885	2.864
71	2.958333	2.091858	3.028	3.006	2.934	0.0809	0.0788	0.0773	0.0763	0.0713	0.0703	0.0688	0.0667	3.000	2.927	2.905
72	3.000000	2.121320	3.070	3.048	2.975	0.0809	0.0788	0.0774	0.0763	0.0713	0.0702	0.0688	0.0667	3.042	2.969	2.947
73	3.041667	2.150783	3.111	3.090	3.017	0.0810	0.0788	0.0774	0.0763	0.0713	0.0702	0.0688	0.0666	3.083	3.010	2.989
74	3.083333	2.180246	3.153	3.132	3.059	0.0810	0.0788	0.0774	0.0764	0.0712	0.0702	0.0688	0.0666	3.125	3.052	3.030
75	3.125000	2.209709	3.195	3.173	3.100	0.0810	0.0789	0.0774	0.0764	0.0712	0.0702	0.0687	0.0666	3.167	3.093	3.072
76	3.166667	2.239172	3.236	3.215	3.142	0.0811	0.0789	0.0774	0.0764	0.0712	0.0702	0.0687	0.0665	3.208	3.135	3.114
77	3.208333	2.268634	3.278	3.257	3.184	0.0811	0.0789	0.0775	0.0764	0.0712	0.0701	0.0687	0.0665	3.250	3.176	3.155
78	3.250000	2.298097	3.320	3.299	3.225	0.0812	0.0790	0.0775	0.0764	0.0712	0.0701	0.0686	0.0664	3.292	3.218	3.197
79	3.291667	2.327560	3.362	3.340	3.267	0.0812	0.0790	0.0775	0.0764	0.0712	0.0701	0.0686	0.0664	3.333	3.260	3.238
80	3.333333	2.357023	3.403	3.382	3.309	0.0812	0.0790	0.0775	0.0764	0.0712	0.0701	0.0686	0.0664	3.375	3.301	3.280
81	3.375000	2.386485	3.445	3.424	3.350	0.0813	0.0790	0.0775	0.0765	0.0711	0.0701	0.0686	0.0663	3.417	3.343	3.322
82	3.416667	2.415948	3.487	3.466	3.392	0.0813	0.0791	0.0776	0.0765	0.0711	0.0700	0.0685	0.0663	3.458	3.384	3.363
83	3.458333	2.445411	3.528	3.507	3.434	0.0814	0.0791	0.0776	0.0765	0.0711	0.0700	0.0685	0.0662	3.500	3.426	3.405
84	3.500000	2.474874	3.570	3.549	3.475	0.0814	0.0791	0.0776	0.0765	0.0711	0.0700	0.0685	0.0662	3.542	3.468	3.447
85	3.541667	2.504337	3.612	3.591	3.517	0.0814	0.0791	0.0776	0.0765	0.0711	0.0700	0.0685	0.0662	3.583	3.509	3.488
86	3.583333	2.533799	3.654	3.633	3.559	0.0815	0.0792	0.0776	0.0765	0.0711	0.0700	0.0684	0.0661	3.625	3.551	3.530
87	3.625000	2.563262	3.695	3.674	3.600	0.0815	0.0792	0.0777	0.0765	0.0711	0.0699	0.0684	0.0661	3.667	3.592	3.571
88	3.666667	2.592725	3.737	3.716	3.642	0.0815	0.0792	0.0777	0.0765	0.0711	0.0699	0.0684	0.0661	3.708	3.634	3.613
89	3.708333	2.622188	3.779	3.758	3.684	0.0816	0.0792	0.0777	0.0766	0.0710	0.0699	0.0684	0.0660	3.750	3.675	3.655
90	3.750000	2.651650	3.820	3.800	3.725	0.0816	0.0793	0.0777	0.0766	0.0710	0.0699	0.0683	0.0660	3.792	3.717	3.696
91	3.791667	2.681113	3.862	3.841	3.767	0.0817	0.0793	0.0777	0.0766	0.0710	0.0699	0.0683	0.0659	3.833	3.759	3.738
92	3.833333	2.710576	3.904	3.883	3.809	0.0817	0.0793	0.0777	0.0766	0.0710	0.0699	0.0683	0.0659	3.875	3.800	3.780
93	3.875000	2.740039	3.945	3.925	3.850	0.0817	0.0794	0.0778	0.0766	0.0710	0.0698	0.0682	0.0659	3.917	3.842	3.821
94	3.916667	2.769502	3.987	3.967	3.892	0.0818	0.0794	0.0778	0.0766	0.0710	0.0698	0.0682	0.0658	3.958	3.883	3.863
95	3.958333	2.798964	4.029	4.008	3.934	0.0818	0.0794	0.0778	0.0766	0.0710	0.0698	0.0682	0.0658	4.000	3.925	3.904
96	4.000000	2.828427	4.071	4.050	3.975	0.0818	0.0794	0.0778	0.0767	0.0709	0.0698	0.0682	0.0658	4.042	3.967	3.946
97	4.041667	2.857890	4.112	4.092	4.017	0.0819	0.0795	0.0778	0.0767	0.0709	0.0698	0.0681	0.0657	4.083	4.008	3.988
98	4.083333	2.887353	4.154	4.134	4.059	0.0819	0.0795	0.0779	0.0767	0.0709	0.0697	0.0681	0.0657	4.125	4.050	4.029
99	4.125000	2.916816	4.196	4.175	4.100	0.0820	0.0795	0.0779	0.0767	0.0709	0.0697	0.0681	0.0656	4.167	4.091	4.071
100	4.166667	2.946278	4.237	4.217	4.142	0.0820	0.0795	0.0779	0.0767	0.0709	0.0697	0.0681	0.0656	4.208	4.133	4.113

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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45 DEG PRESSURE ANGLE

TABLE 58—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 32/64 SPLINE PITCH

	Internal and External		Internal (see Drawing Data)							External (see Drawing Data)						
						s_v Min. Eff. Circ. Space Width 0.0553 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness 0.0553 Notes c & d						
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia. Max.	D_{Fi} Form Dia.	D_i Minor Dia.	7	6	5	4	4	5	6	7	D_o Major Dia.	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
				Note f	Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 30 -0									+0 - 30	Note f	
6	0.1875000	0.1325825	0.239	0.223	0.169	0.0599	0.0585	0.0576	0.0569	0.0537	0.0530	0.0521	0.0507	0.219	0.164	0.148
7	0.2187500	0.1546796	0.270	0.254	0.200	0.0600	0.0586	0.0576	0.0570	0.0536	0.0530	0.0520	0.0506	0.250	0.196	0.180
8	0.2500000	0.1767767	0.302	0.286	0.232	0.0600	0.0586	0.0577	0.0570	0.0536	0.0529	0.0520	0.0506	0.281	0.227	0.211
9	0.2812500	0.1988738	0.333	0.317	0.263	0.0600	0.0586	0.0577	0.0570	0.0536	0.0529	0.0520	0.0506	0.312	0.258	0.242
10	0.3125000	0.2209709	0.364	0.348	0.294	0.0601	0.0586	0.0577	0.0570	0.0536	0.0529	0.0520	0.0505	0.344	0.289	0.273
11	0.3437500	0.2430680	0.395	0.379	0.325	0.0601	0.0587	0.0577	0.0570	0.0536	0.0529	0.0519	0.0505	0.375	0.321	0.305
12	0.3750000	0.2651650	0.427	0.411	0.357	0.0602	0.0587	0.0577	0.0570	0.0536	0.0529	0.0519	0.0504	0.406	0.352	0.336
13	0.4062500	0.2872621	0.458	0.442	0.388	0.0602	0.0587	0.0577	0.0570	0.0536	0.0529	0.0519	0.0504	0.437	0.383	0.367
14	0.4375000	0.3093592	0.489	0.473	0.419	0.0602	0.0588	0.0578	0.0571	0.0535	0.0528	0.0518	0.0504	0.469	0.414	0.398
15	0.4687500	0.3314562	0.521	0.504	0.450	0.0603	0.0588	0.0578	0.0571	0.0535	0.0528	0.0518	0.0503	0.500	0.446	0.429
16	0.5000000	0.3535534	0.552	0.536	0.482	0.0603	0.0588	0.0578	0.0571	0.0535	0.0528	0.0518	0.0503	0.531	0.477	0.461
17	0.5312500	0.3756504	0.583	0.567	0.513	0.0603	0.0588	0.0578	0.0571	0.0535	0.0528	0.0518	0.0503	0.562	0.508	0.492
18	0.5625000	0.3977476	0.614	0.598	0.544	0.0604	0.0589	0.0578	0.0571	0.0535	0.0528	0.0517	0.0502	0.594	0.539	0.523
19	0.5937500	0.4198447	0.646	0.629	0.575	0.0604	0.0589	0.0579	0.0571	0.0535	0.0527	0.0517	0.0502	0.625	0.571	0.554
20	0.6250000	0.4419417	0.677	0.661	0.607	0.0605	0.0589	0.0579	0.0571	0.0535	0.0527	0.0517	0.0501	0.656	0.602	0.585
21	0.6562500	0.4640388	0.708	0.692	0.638	0.0605	0.0589	0.0579	0.0571	0.0535	0.0527	0.0517	0.0501	0.687	0.633	0.617
22	0.6875000	0.4861359	0.740	0.723	0.669	0.0605	0.0590	0.0579	0.0572	0.0534	0.0527	0.0516	0.0501	0.719	0.664	0.648
23	0.7187500	0.5082329	0.771	0.754	0.700	0.0606	0.0590	0.0579	0.0572	0.0534	0.0527	0.0516	0.0500	0.750	0.696	0.679
24	0.7500000	0.5303301	0.802	0.786	0.732	0.0606	0.0590	0.0580	0.0572	0.0534	0.0526	0.0516	0.0500	0.781	0.727	0.710
25	0.7812500	0.5524272	0.833	0.817	0.763	0.0606	0.0590	0.0580	0.0572	0.0534	0.0526	0.0516	0.0500	0.812	0.758	0.742
26	0.8125000	0.5745243	0.865	0.848	0.794	0.0607	0.0591	0.0580	0.0572	0.0534	0.0526	0.0515	0.0499	0.844	0.789	0.773
27	0.8437500	0.5966214	0.896	0.879	0.825	0.0607	0.0591	0.0580	0.0572	0.0534	0.0526	0.0515	0.0499	0.875	0.821	0.804
28	0.8750000	0.6187184	0.927	0.911	0.857	0.0608	0.0591	0.0580	0.0572	0.0534	0.0526	0.0515	0.0498	0.906	0.852	0.835
29	0.9062500	0.6408154	0.959	0.942	0.888	0.0608	0.0592	0.0581	0.0573	0.0533	0.0525	0.0514	0.0498	0.937	0.883	0.866
30	0.9375000	0.6629126	0.990	0.973	0.919	0.0608	0.0592	0.0581	0.0573	0.0533	0.0525	0.0514	0.0498	0.969	0.914	0.898
31	0.9687500	0.6850097	1.021	1.004	0.950	0.0609	0.0592	0.0581	0.0573	0.0533	0.0525	0.0514	0.0497	1.000	0.946	0.929
32	1.000000	0.7071068	1.052	1.036	0.982	0.0609	0.0592	0.0581	0.0573	0.0533	0.0525	0.0514	0.0497	1.031	0.977	0.960
33	1.031250	0.7292039	1.084	1.067	1.013	0.0610	0.0593	0.0581	0.0573	0.0533	0.0525	0.0513	0.0496	1.062	1.008	0.991
34	1.062500	0.7513009	1.115	1.098	1.044	0.0610	0.0593	0.0581	0.0573	0.0533	0.0525	0.0513	0.0496	1.094	1.039	1.022
35	1.093750	0.7733980	1.146	1.129	1.075	0.0610	0.0593	0.0582	0.0573	0.0533	0.0524	0.0513	0.0496	1.125	1.071	1.054
36	1.125000	0.7954951	1.178	1.161	1.107	0.0611	0.0593	0.0582	0.0573	0.0533	0.0524	0.0513	0.0495	1.156	1.102	1.085
37	1.156250	0.8175922	1.209	1.192	1.138	0.0611	0.0594	0.0582	0.0574	0.0532	0.0524	0.0512	0.0495	1.187	1.133	1.116
38	1.187500	0.8396893	1.240	1.223	1.169	0.0611	0.0594	0.0582	0.0574	0.0532	0.0524	0.0512	0.0495	1.219	1.164	1.147
39	1.218750	0.8617864	1.272	1.254	1.200	0.0612	0.0594	0.0582	0.0574	0.0532	0.0524	0.0512	0.0494	1.250	1.196	1.178
40	1.250000	0.8838835	1.303	1.286	1.232	0.0612	0.0594	0.0583	0.0574	0.0532	0.0523	0.0512	0.0494	1.281	1.227	1.210
41	1.281250	0.9059806	1.334	1.317	1.263	0.0613	0.0595	0.0583	0.0574	0.0532	0.0523	0.0511	0.0493	1.312	1.258	1.241
42	1.312500	0.9280777	1.365	1.348	1.294	0.0613	0.0595	0.0583	0.0574	0.0532	0.0523	0.0511	0.0493	1.344	1.289	1.272
43	1.343750	0.9501748	1.397	1.379	1.325	0.0613	0.0595	0.0583	0.0574	0.0532	0.0523	0.0511	0.0493	1.375	1.321	1.303
44	1.375000	0.9722718	1.428	1.411	1.357	0.0614	0.0596	0.0583	0.0575	0.0531	0.0523	0.0510	0.0492	1.406	1.352	1.335
45	1.406250	0.9943689	1.459	1.442	1.388	0.0614	0.0596	0.0584	0.0575	0.0531	0.0522	0.0510	0.0492	1.437	1.383	1.366
46	1.437500	1.016466	1.491	1.473	1.419	0.0614	0.0596	0.0584	0.0575	0.0531	0.0522	0.0510	0.0492	1.469	1.414	1.397
47	1.468750	1.038563	1.522	1.504	1.450	0.0615	0.0596	0.0584	0.0575	0.0531	0.0522	0.0510	0.0491	1.500	1.446	1.428
48	1.500000	1.060660	1.553	1.536	1.482	0.0615	0.0597	0.0584	0.0575	0.0531	0.0522	0.0509	0.0491	1.531	1.477	1.459
49	1.531250	1.082757	1.584	1.567	1.513	0.0616	0.0597	0.0584	0.0575	0.0531	0.0522	0.0509	0.0490	1.562	1.508	1.491
50	1.562500	1.104854	1.616	1.598	1.544	0.0616	0.0597	0.0584	0.0575	0.0531	0.0522	0.0509	0.0490	1.594	1.539	1.522
51	1.593750	1.126951	1.647	1.629	1.575	0.0616	0.0597	0.0585	0.0575	0.0531	0.0521	0.0509	0.0490	1.625	1.571	1.553
52	1.625000	1.149049	1.678	1.661	1.607	0.0617	0.0598	0.0585	0.0576	0.0530	0.0521	0.0508	0.0489	1.656	1.602	1.584
53	1.656250	1.171146	1.710	1.692	1.638	0.0617	0.0598	0.0585	0.0576	0.0530	0.0521	0.0508	0.0489	1.687	1.633	1.615
54	1.687500	1.193243	1.741	1.723	1.669	0.0618	0.0598	0.0585	0.0576	0.0530	0.0521	0.0508	0.0488	1.719	1.664	1.647
55	1.718750	1.215340	1.772	1.754	1.700	0.0618	0.0598	0.0585	0.0576	0.0530	0.0521	0.0508	0.0488	1.750	1.696	1.678
56	1.750000	1.237437	1.803	1.786	1.732	0.0618	0.0599	0.0586	0.0576	0.0530	0.0520	0.0507	0.0488	1.781	1.727	1.709
57	1.781250	1.259534	1.835	1.817	1.763	0.0619	0.0599	0.0586	0.0576	0.0530	0.0520	0.0507	0.0487	1.812	1.758	1.740
58	1.812500	1.281631	1.866	1.848	1.794	0.0619	0.0599	0.0586	0.0576	0.0530	0.0520	0.0507	0.0487	1.844	1.789	1.772
59	1.843750	1.303728	1.897	1.879	1.825	0.0619	0.0599	0.0586	0.0577	0.0529	0.0520	0.0507	0.0487	1.875	1.821	1.803
60	1.875000	1.325825	1.929	1.911	1.857	0.0620	0.0600	0.0586	0.0577	0.0529	0.0520	0.0506	0.0486	1.906	1.852	1.834

(continued on next page)

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

f. Form dia values for 6 thru 60 teeth corrected with 1996 reaffirmation.

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TABLE 58—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 32/64 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.0553 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness 0.0553 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 30 -0									+0 - 30		
61	1.906250	1.347922	1.960	1.942	1.888	0.0620	0.0600	0.0587	0.0577	0.0529	0.0519	0.0506	0.0486	1.937	1.883	1.865
62	1.937500	1.370019	1.991	1.973	1.919	0.0621	0.0600	0.0587	0.0577	0.0529	0.0519	0.0506	0.0485	1.969	1.914	1.896
63	1.968750	1.392117	2.022	2.004	1.950	0.0621	0.0601	0.0587	0.0577	0.0529	0.0519	0.0505	0.0485	2.000	1.946	1.928
64	2.000000	1.414214	2.054	2.036	1.982	0.0621	0.0601	0.0587	0.0577	0.0529	0.0519	0.0505	0.0485	2.031	1.977	1.959
65	2.031250	1.436311	2.085	2.067	2.013	0.0622	0.0601	0.0587	0.0577	0.0529	0.0519	0.0505	0.0484	2.062	2.008	1.990
66	2.062500	1.458408	2.116	2.098	2.044	0.0622	0.0601	0.0588	0.0578	0.0528	0.0518	0.0505	0.0484	2.094	2.039	2.021
67	2.093750	1.480505	2.148	2.130	2.075	0.0622	0.0602	0.0588	0.0578	0.0528	0.0518	0.0504	0.0484	2.125	2.070	2.052
68	2.125000	1.502602	2.179	2.161	2.107	0.0623	0.0602	0.0588	0.0578	0.0528	0.0518	0.0504	0.0483	2.156	2.102	2.084
69	2.156250	1.524699	2.210	2.192	2.138	0.0623	0.0602	0.0588	0.0578	0.0528	0.0518	0.0504	0.0483	2.187	2.133	2.115
70	2.187500	1.546796	2.241	2.224	2.169	0.0624	0.0602	0.0588	0.0578	0.0528	0.0518	0.0504	0.0482	2.219	2.164	2.146
71	2.218750	1.568893	2.273	2.255	2.200	0.0624	0.0603	0.0588	0.0578	0.0528	0.0518	0.0503	0.0482	2.250	2.195	2.177
72	2.250000	1.590990	2.304	2.286	2.232	0.0624	0.0603	0.0589	0.0578	0.0528	0.0517	0.0503	0.0482	2.281	2.226	2.208
73	2.281250	1.613087	2.335	2.318	2.263	0.0625	0.0603	0.0589	0.0578	0.0528	0.0517	0.0503	0.0481	2.312	2.257	2.240
74	2.312500	1.635184	2.367	2.349	2.294	0.0625	0.0603	0.0589	0.0579	0.0527	0.0517	0.0503	0.0481	2.344	2.289	2.271
75	2.343750	1.657282	2.398	2.380	2.325	0.0625	0.0604	0.0589	0.0579	0.0527	0.0517	0.0502	0.0481	2.375	2.320	2.302
76	2.375000	1.679379	2.429	2.411	2.357	0.0626	0.0604	0.0589	0.0579	0.0527	0.0517	0.0502	0.0480	2.406	2.351	2.333
77	2.406250	1.701476	2.460	2.443	2.388	0.0626	0.0604	0.0590	0.0579	0.0527	0.0516	0.0502	0.0480	2.437	2.382	2.365
78	2.437500	1.723573	2.492	2.474	2.419	0.0627	0.0605	0.0590	0.0579	0.0527	0.0516	0.0501	0.0479	2.469	2.413	2.396
79	2.468750	1.745670	2.523	2.505	2.450	0.0627	0.0605	0.0590	0.0579	0.0527	0.0516	0.0501	0.0479	2.500	2.445	2.427
80	2.500000	1.767767	2.554	2.537	2.482	0.0627	0.0605	0.0590	0.0579	0.0527	0.0516	0.0501	0.0479	2.531	2.476	2.458
81	2.531250	1.789864	2.586	2.568	2.513	0.0628	0.0605	0.0590	0.0580	0.0526	0.0516	0.0501	0.0478	2.562	2.507	2.489
82	2.562500	1.811961	2.617	2.599	2.544	0.0628	0.0606	0.0591	0.0580	0.0526	0.0515	0.0500	0.0478	2.594	2.538	2.521
83	2.593750	1.834058	2.648	2.631	2.575	0.0629	0.0606	0.0591	0.0580	0.0526	0.0515	0.0500	0.0477	2.625	2.569	2.552
84	2.625000	1.856155	2.679	2.662	2.607	0.0629	0.0606	0.0591	0.0580	0.0526	0.0515	0.0500	0.0477	2.656	2.601	2.583
85	2.656250	1.878252	2.711	2.693	2.638	0.0629	0.0606	0.0591	0.0580	0.0526	0.0515	0.0500	0.0477	2.687	2.632	2.614
86	2.687500	1.900350	2.742	2.725	2.669	0.0630	0.0607	0.0591	0.0580	0.0526	0.0515	0.0499	0.0476	2.719	2.663	2.645
87	2.718750	1.922447	2.773	2.756	2.700	0.0630	0.0607	0.0592	0.0580	0.0526	0.0514	0.0499	0.0476	2.750	2.694	2.677
88	2.750000	1.944544	2.805	2.787	2.732	0.0630	0.0607	0.0592	0.0580	0.0526	0.0514	0.0499	0.0476	2.781	2.725	2.708
89	2.781250	1.966641	2.836	2.819	2.763	0.0631	0.0607	0.0592	0.0581	0.0525	0.0514	0.0499	0.0475	2.812	2.756	2.739
90	2.812500	1.988738	2.867	2.850	2.794	0.0631	0.0608	0.0592	0.0581	0.0525	0.0514	0.0498	0.0475	2.844	2.788	2.770
91	2.843750	2.010835	2.898	2.881	2.825	0.0632	0.0608	0.0592	0.0581	0.0525	0.0514	0.0498	0.0474	2.875	2.819	2.802
92	2.875000	2.032932	2.930	2.912	2.857	0.0632	0.0608	0.0592	0.0581	0.0525	0.0514	0.0498	0.0474	2.906	2.850	2.833
93	2.906250	2.055029	2.961	2.944	2.888	0.0632	0.0609	0.0593	0.0581	0.0525	0.0513	0.0497	0.0474	2.937	2.881	2.864
94	2.937500	2.077126	2.992	2.975	2.919	0.0633	0.0609	0.0593	0.0581	0.0525	0.0513	0.0497	0.0473	2.969	2.912	2.895
95	2.968750	2.099223	3.024	3.006	2.950	0.0633	0.0609	0.0593	0.0581	0.0525	0.0513	0.0497	0.0473	3.000	2.944	2.926
96	3.000000	2.121320	3.055	3.038	2.982	0.0633	0.0609	0.0593	0.0582	0.0524	0.0513	0.0497	0.0473	3.031	2.975	2.958
97	3.031250	2.143417	3.086	3.069	3.013	0.0634	0.0610	0.0593	0.0582	0.0524	0.0513	0.0496	0.0472	3.062	3.006	2.989
98	3.062500	2.165515	3.117	3.100	3.044	0.0634	0.0610	0.0594	0.0582	0.0524	0.0512	0.0496	0.0472	3.094	3.037	3.020
99	3.093750	2.187612	3.149	3.132	3.075	0.0635	0.0610	0.0594	0.0582	0.0524	0.0512	0.0496	0.0471	3.125	3.068	3.051
100	3.125000	2.209709	3.180	3.163	3.107	0.0635	0.0610	0.0594	0.0582	0.0524	0.0512	0.0496	0.0471	3.156	3.100	3.082

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.
b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.
c. See Table 105.
d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.
e. Figures in bold type are modified values, see Section 25.

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45 DEG PRESSURE ANGLE

TABLE 59—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 40/80 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.0443 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.0443 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
				Note f	Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+30 -0									+0 -30	Note f	
6	0.1500000	0.1060660	0.192	0.179	0.135	0.0489	0.0475	0.0466	0.0459	0.0427	0.0420	0.0411	0.0397	0.175	0.131	0.118
7	0.1750000	0.1237437	0.217	0.204	0.160	0.0490	0.0476	0.0466	0.0460	0.0426	0.0420	0.0410	0.0396	0.200	0.156	0.143
8	0.2000000	0.1414214	0.242	0.229	0.185	0.0490	0.0476	0.0467	0.0460	0.0426	0.0419	0.0410	0.0396	0.225	0.181	0.168
9	0.2250000	0.1590990	0.267	0.254	0.210	0.0490	0.0476	0.0467	0.0460	0.0426	0.0419	0.0410	0.0396	0.250	0.206	0.193
10	0.2500000	0.1767767	0.292	0.279	0.235	0.0491	0.0476	0.0467	0.0460	0.0426	0.0419	0.0410	0.0395	0.275	0.231	0.218
11	0.2750000	0.1944543	0.317	0.304	0.260	0.0491	0.0477	0.0467	0.0460	0.0426	0.0419	0.0409	0.0395	0.300	0.256	0.243
12	0.3000000	0.2121320	0.342	0.329	0.285	0.0492	0.0477	0.0467	0.0460	0.0426	0.0419	0.0409	0.0394	0.325	0.281	0.268
13	0.3250000	0.2298097	0.367	0.354	0.310	0.0492	0.0477	0.0467	0.0460	0.0426	0.0419	0.0409	0.0394	0.350	0.306	0.293
14	0.3500000	0.2474874	0.392	0.379	0.335	0.0492	0.0478	0.0468	0.0461	0.0425	0.0418	0.0408	0.0394	0.375	0.331	0.318
15	0.3750000	0.2651650	0.417	0.404	0.360	0.0493	0.0478	0.0468	0.0461	0.0425	0.0418	0.0408	0.0393	0.400	0.356	0.343
16	0.4000000	0.2828427	0.443	0.429	0.385	0.0493	0.0478	0.0468	0.0461	0.0425	0.0418	0.0408	0.0393	0.425	0.381	0.367
17	0.4250000	0.3005204	0.468	0.454	0.410	0.0493	0.0478	0.0468	0.0461	0.0425	0.0418	0.0408	0.0393	0.450	0.406	0.392
18	0.4500000	0.3181981	0.493	0.479	0.435	0.0494	0.0479	0.0468	0.0461	0.0425	0.0418	0.0407	0.0392	0.475	0.431	0.417
19	0.4750000	0.3358757	0.518	0.504	0.460	0.0494	0.0479	0.0469	0.0461	0.0425	0.0417	0.0407	0.0392	0.500	0.456	0.442
20	0.5000000	0.3535534	0.543	0.529	0.485	0.0495	0.0479	0.0469	0.0461	0.0425	0.0417	0.0407	0.0391	0.525	0.481	0.467
21	0.5250000	0.3712311	0.568	0.554	0.510	0.0495	0.0479	0.0469	0.0461	0.0425	0.0417	0.0407	0.0391	0.550	0.506	0.492
22	0.5500000	0.3889087	0.593	0.579	0.535	0.0495	0.0480	0.0469	0.0462	0.0424	0.0417	0.0406	0.0391	0.575	0.531	0.517
23	0.5750000	0.4065864	0.618	0.604	0.560	0.0496	0.0480	0.0469	0.0462	0.0424	0.0417	0.0406	0.0390	0.600	0.556	0.542
24	0.6000000	0.4242641	0.643	0.629	0.585	0.0496	0.0480	0.0470	0.0462	0.0424	0.0416	0.0406	0.0390	0.625	0.581	0.567
25	0.6250000	0.4419417	0.668	0.654	0.610	0.0496	0.0480	0.0470	0.0462	0.0424	0.0416	0.0406	0.0389	0.650	0.606	0.592
26	0.6500000	0.4596194	0.693	0.679	0.635	0.0497	0.0481	0.0470	0.0462	0.0424	0.0416	0.0405	0.0389	0.675	0.631	0.617
27	0.6750000	0.4772971	0.718	0.704	0.660	0.0497	0.0481	0.0470	0.0462	0.0424	0.0416	0.0405	0.0389	0.700	0.656	0.642
28	0.7000000	0.4949748	0.743	0.729	0.685	0.0498	0.0481	0.0470	0.0462	0.0424	0.0416	0.0405	0.0388	0.725	0.681	0.667
29	0.7250000	0.5126523	0.768	0.754	0.710	0.0498	0.0482	0.0471	0.0463	0.0423	0.0415	0.0404	0.0388	0.750	0.706	0.692
30	0.7500000	0.5303301	0.793	0.779	0.735	0.0498	0.0482	0.0471	0.0463	0.0423	0.0415	0.0404	0.0388	0.775	0.731	0.717
31	0.7750000	0.5480078	0.818	0.804	0.760	0.0499	0.0482	0.0471	0.0463	0.0423	0.0415	0.0404	0.0387	0.800	0.756	0.742
32	0.8000000	0.5656854	0.843	0.829	0.785	0.0499	0.0482	0.0471	0.0463	0.0423	0.0415	0.0404	0.0387	0.825	0.781	0.767
33	0.8250000	0.5833631	0.868	0.854	0.810	0.0500	0.0483	0.0471	0.0463	0.0423	0.0415	0.0403	0.0386	0.850	0.806	0.792
34	0.8500000	0.6010408	0.893	0.879	0.835	0.0500	0.0483	0.0471	0.0463	0.0423	0.0415	0.0403	0.0386	0.875	0.831	0.817
35	0.8750000	0.6187184	0.918	0.904	0.860	0.0500	0.0483	0.0472	0.0463	0.0423	0.0414	0.0403	0.0386	0.900	0.856	0.842
36	0.9000000	0.6363961	0.943	0.929	0.885	0.0501	0.0483	0.0472	0.0463	0.0423	0.0414	0.0403	0.0385	0.925	0.881	0.867
37	0.9250000	0.6540737	0.968	0.954	0.910	0.0501	0.0484	0.0472	0.0464	0.0422	0.0414	0.0402	0.0385	0.950	0.906	0.892
38	0.9500000	0.6717515	0.993	0.979	0.935	0.0501	0.0484	0.0472	0.0464	0.0422	0.0414	0.0402	0.0385	0.975	0.931	0.917
39	0.9750000	0.6894291	1.018	1.004	0.960	0.0502	0.0484	0.0472	0.0464	0.0422	0.0414	0.0402	0.0384	1.000	0.956	0.942
40	1.000000	0.7071068	1.043	1.029	0.985	0.0502	0.0484	0.0473	0.0464	0.0422	0.0413	0.0402	0.0384	1.025	0.981	0.967
41	1.025000	0.7247845	1.068	1.054	1.010	0.0503	0.0485	0.0473	0.0464	0.0422	0.0413	0.0401	0.0383	1.050	1.006	0.992
42	1.050000	0.7424621	1.093	1.079	1.035	0.0503	0.0485	0.0473	0.0464	0.0422	0.0413	0.0401	0.0383	1.075	1.031	1.017
43	1.075000	0.7601397	1.119	1.104	1.060	0.0503	0.0485	0.0473	0.0464	0.0422	0.0413	0.0401	0.0383	1.100	1.056	1.041
44	1.100000	0.7778174	1.144	1.129	1.085	0.0504	0.0486	0.0473	0.0465	0.0421	0.0413	0.0400	0.0382	1.125	1.081	1.066
45	1.125000	0.7954951	1.169	1.154	1.110	0.0504	0.0486	0.0474	0.0465	0.0421	0.0412	0.0400	0.0382	1.150	1.106	1.091
46	1.150000	0.8131728	1.194	1.179	1.135	0.0504	0.0486	0.0474	0.0465	0.0421	0.0412	0.0400	0.0382	1.175	1.131	1.116
47	1.175000	0.8308505	1.219	1.204	1.160	0.0505	0.0486	0.0474	0.0465	0.0421	0.0412	0.0400	0.0381	1.200	1.156	1.141
48	1.200000	0.8485282	1.244	1.229	1.185	0.0505	0.0487	0.0474	0.0465	0.0421	0.0412	0.0399	0.0381	1.225	1.181	1.166
49	1.225000	0.8662058	1.269	1.254	1.210	0.0506	0.0487	0.0474	0.0465	0.0421	0.0412	0.0399	0.0380	1.250	1.206	1.191
50	1.250000	0.8838835	1.294	1.279	1.235	0.0506	0.0487	0.0474	0.0465	0.0421	0.0412	0.0399	0.0380	1.275	1.231	1.216
51	1.275000	0.9015612	1.319	1.304	1.260	0.0506	0.0487	0.0475	0.0465	0.0421	0.0411	0.0399	0.0380	1.300	1.256	1.241
52	1.300000	0.9192388	1.344	1.329	1.285	0.0507	0.0488	0.0475	0.0466	0.0420	0.0411	0.0398	0.0379	1.325	1.281	1.266
53	1.325000	0.9369165	1.369	1.354	1.310	0.0507	0.0488	0.0475	0.0466	0.0420	0.0411	0.0398	0.0379	1.350	1.306	1.291
54	1.350000	0.9545942	1.394	1.379	1.335	0.0508	0.0488	0.0475	0.0466	0.0420	0.0411	0.0398	0.0378	1.375	1.331	1.316
55	1.375000	0.9722718	1.419	1.404	1.360	0.0508	0.0488	0.0475	0.0466	0.0420	0.0411	0.0398	0.0378	1.400	1.356	1.341
56	1.400000	0.9899495	1.444	1.429	1.385	0.0508	0.0489	0.0476	0.0466	0.0420	0.0410	0.0397	0.0378	1.425	1.381	1.366
57	1.425000	1.007627	1.469	1.454	1.410	0.0509	0.0489	0.0476	0.0466	0.0420	0.0410	0.0397	0.0377	1.450	1.406	1.391
58	1.450000	1.025305	1.494	1.479	1.435	0.0509	0.0489	0.0476	0.0466	0.0420	0.0410	0.0397	0.0377	1.475	1.431	1.416
59	1.475000	1.042983	1.519	1.504	1.460	0.0509	0.0489	0.0476	0.0467	0.0419	0.0410	0.0397	0.0377	1.500	1.456	1.441
60	1.500000	1.060660	1.544	1.529	1.485	0.0510	0.0490	0.0476	0.0467	0.0419	0.0410	0.0396	0.0376	1.525	1.481	1.466

(continued on next page)

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

f. Form dia values for 6 thru 60 teeth corrected with 1996 reaffirmation.

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45 DEG PRESSURE ANGLE

TABLE 59–45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 40/80 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.0443 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.0443 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
					Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+30 -0									+0 -30		
61	1.525000	1.078338	1.569	1.554	1.510	0.0510	0.0490	0.0477	0.0467	0.0419	0.0409	0.0396	0.0376	1.550	1.506	1.491
62	1.550000	1.096016	1.594	1.579	1.535	0.0511	0.0490	0.0477	0.0467	0.0419	0.0409	0.0396	0.0375	1.575	1.531	1.516
63	1.575000	1.113693	1.619	1.604	1.560	0.0511	0.0491	0.0477	0.0467	0.0419	0.0409	0.0395	0.0375	1.600	1.556	1.541
64	1.600000	1.131371	1.644	1.629	1.585	0.0511	0.0491	0.0477	0.0467	0.0419	0.0409	0.0395	0.0375	1.625	1.581	1.566
65	1.625000	1.149049	1.669	1.654	1.610	0.0512	0.0491	0.0477	0.0467	0.0419	0.0409	0.0395	0.0374	1.650	1.606	1.591
66	1.650000	1.166726	1.694	1.679	1.635	0.0512	0.0491	0.0478	0.0468	0.0418	0.0408	0.0395	0.0374	1.675	1.631	1.616
67	1.675000	1.184404	1.719	1.704	1.660	0.0512	0.0492	0.0478	0.0468	0.0418	0.0408	0.0394	0.0374	1.700	1.656	1.641
68	1.700000	1.202082	1.744	1.729	1.685	0.0513	0.0492	0.0478	0.0468	0.0418	0.0408	0.0394	0.0373	1.725	1.681	1.666
69	1.725000	1.219759	1.770	1.754	1.710	0.0513	0.0492	0.0478	0.0468	0.0418	0.0408	0.0394	0.0373	1.750	1.706	1.690
70	1.750000	1.237437	1.795	1.779	1.735	0.0514	0.0492	0.0478	0.0468	0.0418	0.0408	0.0394	0.0372	1.775	1.731	1.715
71	1.775000	1.255115	1.820	1.804	1.760	0.0514	0.0493	0.0478	0.0468	0.0418	0.0408	0.0393	0.0372	1.800	1.756	1.740
72	1.800000	1.272792	1.845	1.829	1.785	0.0514	0.0493	0.0479	0.0468	0.0418	0.0407	0.0393	0.0372	1.825	1.781	1.765
73	1.825000	1.290470	1.870	1.854	1.810	0.0515	0.0493	0.0479	0.0468	0.0418	0.0407	0.0393	0.0371	1.850	1.806	1.790
74	1.850000	1.308148	1.895	1.879	1.835	0.0515	0.0493	0.0479	0.0469	0.0417	0.0407	0.0393	0.0371	1.875	1.831	1.815
75	1.875000	1.325825	1.920	1.904	1.860	0.0515	0.0494	0.0479	0.0469	0.0417	0.0407	0.0392	0.0370	1.900	1.856	1.840
76	1.900000	1.343503	1.945	1.929	1.885	0.0516	0.0494	0.0479	0.0469	0.0417	0.0407	0.0392	0.0370	1.925	1.881	1.865
77	1.925000	1.361181	1.970	1.954	1.910	0.0516	0.0494	0.0480	0.0469	0.0417	0.0406	0.0392	0.0370	1.950	1.906	1.890
78	1.950000	1.378858	1.995	1.979	1.935	0.0517	0.0495	0.0480	0.0469	0.0417	0.0406	0.0391	0.0369	1.975	1.931	1.915
79	1.975000	1.396536	2.020	2.004	1.960	0.0517	0.0495	0.0480	0.0469	0.0417	0.0406	0.0391	0.0369	2.000	1.956	1.940
80	2.000000	1.414214	2.045	2.029	1.985	0.0517	0.0495	0.0480	0.0469	0.0417	0.0406	0.0391	0.0369	2.025	1.981	1.965
81	2.025000	1.431891	2.070	2.055	2.010	0.0518	0.0495	0.0480	0.0470	0.0416	0.0406	0.0391	0.0368	2.050	2.005	1.990
82	2.050000	1.449569	2.095	2.080	2.035	0.0518	0.0496	0.0481	0.0470	0.0416	0.0405	0.0390	0.0368	2.075	2.030	2.015
83	2.075000	1.467247	2.120	2.105	2.060	0.0519	0.0496	0.0481	0.0470	0.0416	0.0405	0.0390	0.0367	2.100	2.055	2.040
84	2.100000	1.484924	2.145	2.130	2.085	0.0519	0.0496	0.0481	0.0470	0.0416	0.0405	0.0390	0.0367	2.125	2.080	2.065
85	2.125000	1.502602	2.170	2.155	2.110	0.0519	0.0496	0.0481	0.0470	0.0416	0.0405	0.0390	0.0367	2.150	2.105	2.090
86	2.150000	1.520280	2.195	2.180	2.135	0.0520	0.0497	0.0481	0.0470	0.0416	0.0405	0.0389	0.0366	2.175	2.130	2.115
87	2.175000	1.537957	2.220	2.205	2.160	0.0520	0.0497	0.0482	0.0470	0.0416	0.0404	0.0389	0.0366	2.200	2.155	2.140
88	2.200000	1.555635	2.245	2.230	2.185	0.0520	0.0497	0.0482	0.0470	0.0416	0.0404	0.0389	0.0366	2.225	2.180	2.165
89	2.225000	1.573313	2.270	2.255	2.210	0.0521	0.0497	0.0482	0.0471	0.0415	0.0404	0.0389	0.0365	2.250	2.205	2.190
90	2.250000	1.590990	2.295	2.280	2.235	0.0521	0.0498	0.0482	0.0471	0.0415	0.0404	0.0388	0.0365	2.275	2.230	2.215
91	2.275000	1.608668	2.320	2.305	2.260	0.0522	0.0498	0.0482	0.0471	0.0415	0.0404	0.0388	0.0364	2.300	2.255	2.240
92	2.300000	1.626346	2.345	2.330	2.285	0.0522	0.0498	0.0482	0.0471	0.0415	0.0404	0.0388	0.0364	2.325	2.280	2.265
93	2.325000	1.644023	2.370	2.355	2.310	0.0522	0.0499	0.0483	0.0474	0.0415	0.0403	0.0387	0.0364	2.350	2.305	2.290
94	2.350000	1.661701	2.395	2.380	2.335	0.0523	0.0499	0.0483	0.0471	0.0415	0.0403	0.0387	0.0363	2.375	2.330	2.315
95	2.375000	1.679379	2.421	2.405	2.360	0.0523	0.0499	0.0483	0.0471	0.0415	0.0403	0.0387	0.0363	2.400	2.355	2.339
96	2.400000	1.697056	2.446	2.430	2.385	0.0523	0.0499	0.0483	0.0472	0.0414	0.0403	0.0387	0.0363	2.425	2.380	2.364
97	2.425000	1.714734	2.471	2.455	2.410	0.0524	0.0500	0.0483	0.0472	0.0414	0.0403	0.0386	0.0362	2.450	2.405	2.389
98	2.450000	1.732412	2.496	2.480	2.435	0.0524	0.0500	0.0484	0.0472	0.0414	0.0402	0.0386	0.0362	2.475	2.430	2.414
99	2.475000	1.750089	2.521	2.505	2.460	0.0525	0.0500	0.0484	0.0472	0.0414	0.0402	0.0386	0.0361	2.500	2.455	2.439
100	2.500000	1.767767	2.546	2.530	2.485	0.0525	0.0500	0.0484	0.0472	0.0414	0.0402	0.0386	0.0361	2.525	2.480	2.464

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

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45 DEG PRESSURE ANGLE

TABLE 60—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 48/96 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width − 0.0369 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness + 0.0369 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
				Note f	Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 30 -0									+0 - 30	Note f	
6	0.1250000	0.0883883	0.161	0.150	0.113	0.0415	0.0401	0.0392	0.0385	0.0353	0.0346	0.0337	0.0323	0.146	0.108	**0.097**
7	0.1458332	0.1031197	0.182	0.171	0.134	0.0416	0.0402	0.0392	0.0386	0.0352	0.0346	0.0336	0.0322	0.167	0.129	**0.118**
8	0.1666667	0.1178511	0.203	0.192	0.155	0.0416	0.0402	0.0393	0.0386	0.0352	0.0345	0.0336	0.0322	0.188	0.150	**0.139**
9	0.1875000	0.1325825	0.223	0.213	0.175	0.0416	0.0402	0.0393	0.0386	0.0352	0.0345	0.0336	0.0322	0.208	0.171	**0.160**
10	0.2083333	0.1473139	0.244	0.234	0.196	0.0417	0.0402	0.0393	0.0386	0.0352	0.0345	0.0336	0.0321	0.229	0.191	**0.181**
11	0.2291667	0.1620453	0.265	0.254	0.217	0.0417	0.0403	0.0393	0.0386	0.0352	0.0345	0.0335	0.0321	0.250	0.212	**0.201**
12	0.2500000	0.1767767	0.286	0.275	0.238	0.0418	0.0403	0.0393	0.0386	0.0352	0.0345	0.0335	0.0320	0.271	0.233	**0.222**
13	0.2708333	0.1915081	0.307	0.296	0.259	0.0418	0.0403	0.0393	0.0386	0.0352	0.0345	0.0335	0.0320	0.292	0.254	**0.243**
14	0.2916667	0.2062395	0.328	0.317	0.280	0.0418	0.0404	0.0394	0.0387	0.0351	0.0344	0.0334	0.0320	0.312	0.275	**0.264**
15	0.3125000	0.2209709	0.349	0.338	0.300	0.0419	0.0404	0.0394	0.0387	0.0351	0.0344	0.0334	0.0319	0.333	0.296	**0.285**
16	0.3333333	0.2357023	0.370	0.359	0.321	0.0419	0.0404	0.0394	0.0387	0.0351	0.0344	0.0334	0.0319	0.354	0.316	**0.305**
17	0.3541667	0.2504337	0.390	0.379	0.342	0.0419	0.0404	0.0394	0.0387	0.0351	0.0344	0.0334	0.0319	0.375	0.337	**0.326**
18	0.3750000	0.2651650	0.411	0.400	0.363	0.0420	0.0405	0.0394	0.0387	0.0351	0.0344	0.0333	0.0318	0.396	0.358	**0.347**
19	0.3958333	0.2798964	0.432	0.421	0.384	0.0420	0.0405	0.0395	0.0387	0.0351	0.0343	0.0333	0.0318	0.417	0.379	**0.368**
20	0.4166667	0.2946278	0.453	0.442	0.405	0.0421	0.0405	0.0395	0.0387	0.0351	0.0343	0.0333	0.0317	0.437	0.400	**0.389**
21	0.4375000	0.3093592	0.474	0.463	0.425	0.0421	0.0405	0.0395	0.0387	0.0351	0.0343	0.0333	0.0317	0.458	0.421	**0.409**
22	0.4583333	0.3240906	0.495	0.484	0.446	0.0421	0.0406	0.0395	0.0388	0.0350	0.0343	0.0332	0.0317	0.479	0.441	**0.430**
23	0.4791667	0.3388220	0.516	0.504	0.467	0.0422	0.0406	0.0395	0.0388	0.0350	0.0343	0.0332	0.0316	0.500	0.462	**0.451**
24	0.5000000	0.3535534	0.537	0.525	0.488	0.0422	0.0406	0.0396	0.0388	0.0350	0.0342	0.0332	0.0316	0.521	0.483	**0.472**
25	0.5208333	0.3682848	0.557	0.546	0.509	0.0422	0.0406	0.0396	0.0388	0.0350	0.0342	0.0332	0.0315	0.542	0.504	**0.493**
26	0.5416667	0.3830162	0.578	0.567	0.530	0.0423	0.0407	0.0396	0.0388	0.0350	0.0342	0.0331	0.0315	0.562	0.525	**0.513**
27	0.5625000	0.3977476	0.599	0.588	0.550	0.0423	0.0407	0.0396	0.0388	0.0350	0.0342	0.0331	0.0315	0.583	0.546	**0.534**
28	0.5833333	0.4124790	0.620	0.609	0.571	0.0424	0.0407	0.0396	0.0388	0.0350	0.0342	0.0331	0.0314	0.604	0.566	**0.555**
29	0.6041667	0.4272104	0.641	0.629	0.592	0.0424	0.0408	0.0397	0.0389	0.0349	0.0341	0.0330	0.0314	0.625	0.587	**0.576**
30	0.6250000	0.4419417	0.662	0.650	0.613	0.0424	0.0408	0.0397	0.0389	0.0349	0.0341	0.0330	0.0314	0.646	0.608	**0.597**
31	0.6458333	0.4566731	0.683	0.671	0.634	0.0425	0.0408	0.0397	0.0389	0.0349	0.0341	0.0330	0.0313	0.667	0.629	**0.617**
32	0.6666667	0.4714045	0.704	0.692	0.655	0.0425	0.0408	0.0397	0.0389	0.0349	0.0341	0.0330	0.0313	0.687	0.650	**0.638**
33	0.6875000	0.4861359	0.724	0.713	0.675	0.0426	0.0409	0.0397	0.0389	0.0349	0.0341	0.0329	0.0312	0.708	0.671	**0.659**
34	0.7083333	0.5008673	0.745	0.734	0.696	0.0426	0.0409	0.0397	0.0389	0.0349	0.0341	0.0329	0.0312	0.729	0.691	**0.680**
35	0.7291667	0.5155986	0.766	0.754	0.717	0.0426	0.0409	0.0398	0.0389	0.0349	0.0340	0.0329	0.0312	0.750	0.712	**0.701**
36	0.7500000	0.5303301	0.787	0.775	0.738	0.0427	0.0409	0.0398	0.0389	0.0349	0.0340	0.0329	0.0311	0.771	0.733	**0.721**
37	0.7708333	0.5450615	0.808	0.796	0.759	0.0427	0.0410	0.0398	0.0390	0.0348	0.0340	0.0328	0.0311	0.792	0.754	**0.742**
38	0.7916667	0.5597929	0.829	0.817	0.780	0.0427	0.0410	0.0398	0.0390	0.0348	0.0340	0.0328	0.0311	0.812	0.775	**0.763**
39	0.8125000	0.5745243	0.850	0.838	0.800	0.0428	0.0410	0.0398	0.0390	0.0348	0.0340	0.0328	0.0310	0.833	0.796	**0.784**
40	0.8333333	0.5892556	0.871	0.859	0.821	0.0428	0.0410	0.0399	0.0390	0.0348	0.0339	0.0328	0.0310	0.854	0.816	**0.804**
41	0.8541667	0.6039871	0.891	0.879	0.842	0.0429	0.0411	0.0399	0.0390	0.0348	0.0339	0.0327	0.0309	0.875	0.837	**0.825**
42	0.8750000	0.6187184	0.912	0.900	0.863	0.0429	0.0411	0.0399	0.0390	0.0348	0.0339	0.0327	0.0309	0.896	0.858	**0.846**
43	0.8958333	0.6334498	0.933	0.921	0.884	0.0429	0.0411	0.0399	0.0390	0.0348	0.0339	0.0327	0.0309	0.917	0.879	**0.867**
44	0.9166667	0.6481812	0.954	0.942	0.905	0.0430	0.0412	0.0399	0.0391	0.0347	0.0339	0.0326	0.0308	0.937	0.900	**0.888**
45	0.9375000	0.6629126	0.975	0.963	0.925	0.0430	0.0412	0.0400	0.0391	0.0347	0.0338	0.0326	0.0308	0.958	0.921	**0.908**
46	0.9583333	0.6776440	0.996	0.984	0.946	0.0430	0.0412	0.0400	0.0391	0.0347	0.0338	0.0326	0.0308	0.979	0.941	**0.929**
47	0.9791667	0.6923754	1.017	1.004	0.967	0.0431	0.0412	0.0400	0.0391	0.0347	0.0338	0.0326	0.0307	1.000	0.962	**0.950**
48	1.000000	0.7071068	1.037	1.025	0.988	0.0431	0.0413	0.0400	0.0391	0.0347	0.0338	0.0325	0.0307	1.021	0.983	**0.971**
49	1.020833	0.7218381	1.058	1.046	1.009	0.0432	0.0413	0.0400	0.0391	0.0347	0.0338	0.0325	0.0306	1.042	1.004	**0.992**
50	1.041667	0.7365695	1.079	1.067	1.030	0.0432	0.0413	0.0400	0.0391	0.0347	0.0337	0.0325	0.0306	1.062	1.025	**1.012**
51	1.062500	0.7513009	1.100	1.088	1.050	0.0432	0.0413	0.0401	0.0391	0.0347	0.0337	0.0325	0.0306	1.083	1.046	**1.033**
52	1.083333	0.7660324	1.121	1.109	1.071	0.0433	0.0414	0.0401	0.0392	0.0346	0.0337	0.0324	0.0305	1.104	1.066	**1.054**
53	1.104167	0.7807638	1.142	1.129	1.092	0.0433	0.0414	0.0401	0.0392	0.0346	0.0337	0.0324	0.0305	1.125	1.087	**1.075**
54	1.125000	0.7954951	1.163	1.150	1.113	0.0434	0.0414	0.0401	0.0392	0.0346	0.0337	0.0324	0.0304	1.146	1.108	**1.096**
55	1.145833	0.8102265	1.184	1.171	1.134	0.0434	0.0414	0.0401	0.0392	0.0346	0.0337	0.0324	0.0304	1.167	1.129	**1.116**
56	1.166667	0.8249579	1.204	1.192	1.155	0.0434	0.0415	0.0402	0.0392	0.0346	0.0336	0.0323	0.0304	1.187	1.150	**1.137**
57	1.187500	0.8396893	1.225	1.213	1.175	0.0435	0.0415	0.0402	0.0392	0.0346	0.0336	0.0323	0.0303	1.208	1.171	**1.158**
58	1.208333	0.8544207	1.246	1.234	1.196	0.0435	0.0415	0.0402	0.0392	0.0346	0.0336	0.0323	0.0303	1.229	1.191	**1.179**
59	1.229167	0.8691521	1.267	1.254	1.217	0.0435	0.0415	0.0402	0.0393	0.0345	0.0336	0.0323	0.0303	1.250	1.212	**1.200**
60	1.250000	0.8838835	1.288	1.275	1.238	0.0436	0.0416	0.0402	0.0393	0.0345	0.0336	0.0322	0.0302	1.271	1.233	**1.220**

(continued on next page)

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

f. Form dia values for 6 thru 88 teeth corrected with 1996 reaffirmation.

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45 DEG PRESSURE ANGLE

TABLE 60—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 48/96 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	s_v Min. Eff. Circ. Space Width = 0.0369 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.0369 Notes c & d				D_o	D_{Fe}	D_{re}
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class				Major Dia.	Form Dia.	Minor Dia. Min.
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
				Note f	Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 30 -0									+0 - 30	Note f	
61	1.270833	0.8986149	1.309	1.296	1.259	0.0436	0.0416	0.0403	0.0393	0.0345	0.0335	0.0322	0.0302	1.292	1.254	1.241
62	1.291667	0.9133463	1.330	1.317	1.280	0.0437	0.0416	0.0403	0.0393	0.0345	0.0335	0.0322	0.0301	1.312	1.275	1.262
63	1.312500	0.9280777	1.351	1.338	1.300	0.0437	0.0417	0.0403	0.0393	0.0345	0.0335	0.0321	0.0301	1.333	1.296	1.283
64	1.333333	0.9428091	1.371	1.359	1.321	0.0437	0.0417	0.0403	0.0393	0.0345	0.0335	0.0321	0.0301	1.354	1.316	1.304
65	1.354167	0.9575405	1.392	1.379	1.342	0.0438	0.0417	0.0403	0.0393	0.0345	0.0335	0.0321	0.0300	1.375	1.337	1.324
66	1.375000	0.9722718	1.413	1.400	1.363	0.0438	0.0417	0.0404	0.0394	0.0344	0.0334	0.0321	0.0300	1.396	1.358	1.345
67	1.395833	0.9870031	1.434	1.421	1.384	0.0438	0.0418	0.0404	0.0394	0.0344	0.0334	0.0320	0.0300	1.417	1.379	1.366
68	1.416667	1.001735	1.455	1.442	1.405	0.0439	0.0418	0.0404	0.0394	0.0344	0.0334	0.0320	0.0299	1.437	1.400	1.387
69	1.437500	1.016466	1.476	1.463	1.425	0.0439	0.0418	0.0404	0.0394	0.0344	0.0334	0.0320	0.0299	1.458	1.421	1.408
70	1.458333	1.031197	1.497	1.484	1.446	0.0440	0.0418	0.0404	0.0394	0.0344	0.0334	0.0320	0.0298	1.479	1.441	1.428
71	1.479167	1.045929	1.518	1.504	1.467	0.0440	0.0419	0.0404	0.0394	0.0344	0.0334	0.0319	0.0298	1.500	1.462	1.449
72	1.500000	1.060660	1.538	1.525	1.488	0.0440	0.0419	0.0405	0.0394	0.0344	0.0333	0.0319	0.0298	1.521	1.483	1.470
73	1.520833	1.075392	1.559	1.546	1.509	0.0441	0.0419	0.0405	0.0394	0.0344	0.0333	0.0319	0.0297	1.542	1.504	1.491
74	1.541667	1.090123	1.580	1.567	1.530	0.0441	0.0419	0.0405	0.0395	0.0343	0.0333	0.0319	0.0297	1.562	1.525	1.512
75	1.562500	1.104854	1.601	1.588	1.550	0.0441	0.0420	0.0405	0.0395	0.0343	0.0333	0.0318	0.0296	1.583	1.546	1.532
76	1.583333	1.119586	1.622	1.609	1.571	0.0442	0.0420	0.0405	0.0395	0.0343	0.0333	0.0318	0.0296	1.604	1.566	1.553
77	1.604167	1.134317	1.643	1.629	1.592	0.0442	0.0420	0.0406	0.0395	0.0343	0.0332	0.0318	0.0296	1.625	1.587	1.574
78	1.625000	1.149049	1.664	1.650	1.613	0.0443	0.0421	0.0406	0.0395	0.0343	0.0332	0.0317	0.0295	1.646	1.608	1.595
79	1.645833	1.163780	1.684	1.671	1.634	0.0443	0.0421	0.0406	0.0395	0.0343	0.0332	0.0317	0.0295	1.667	1.629	1.616
80	1.666667	1.178511	1.705	1.692	1.655	0.0443	0.0421	0.0406	0.0395	0.0343	0.0332	0.0317	0.0295	1.687	1.650	1.636
81	1.687500	1.193243	1.726	1.713	1.675	0.0444	0.0421	0.0406	0.0396	0.0342	0.0332	0.0317	0.0294	1.708	1.671	1.657
82	1.708333	1.207974	1.747	1.734	1.696	0.0444	0.0422	0.0407	0.0396	0.0342	0.0331	0.0316	0.0294	1.729	1.691	1.678
83	1.729167	1.222706	1.768	1.754	1.717	0.0445	0.0422	0.0407	0.0396	0.0342	0.0331	0.0316	0.0293	1.750	1.712	1.699
84	1.750000	1.237437	1.789	1.775	1.738	0.0445	0.0422	0.0407	0.0396	0.0342	0.0331	0.0316	0.0293	1.771	1.733	1.719
85	1.770833	1.252168	1.810	1.796	1.759	0.0445	0.0422	0.0407	0.0396	0.0342	0.0331	0.0316	0.0293	1.792	1.754	1.740
86	1.791667	1.266900	1.831	1.817	1.780	0.0446	0.0423	0.0407	0.0396	0.0342	0.0331	0.0315	0.0292	1.812	1.775	1.761
87	1.812500	1.281631	1.851	1.838	1.800	0.0446	0.0423	0.0408	0.0396	0.0342	0.0330	0.0315	0.0292	1.833	1.796	1.782
88	1.833333	1.296362	1.872	1.859	1.821	0.0446	0.0423	0.0408	0.0396	0.0342	0.0330	0.0315	0.0292	1.854	1.816	1.803
89	1.854167	1.311094	1.893	1.879	1.842	0.0447	0.0423	0.0408	0.0397	0.0341	0.0330	0.0315	0.0291	1.875	1.837	1.823
90	1.875000	1.325825	1.914	1.900	1.863	0.0447	0.0424	0.0408	0.0397	0.0341	0.0330	0.0314	0.0291	1.896	1.858	1.844
91	1.895833	1.340557	1.935	1.921	1.884	0.0448	0.0424	0.0408	0.0397	0.0341	0.0330	0.0314	0.0290	1.917	1.879	1.865
92	1.916667	1.355288	1.956	1.942	1.905	0.0448	0.0424	0.0408	0.0397	0.0341	0.0330	0.0314	0.0290	1.937	1.900	1.886
93	1.937500	1.370019	1.977	1.963	1.925	0.0448	0.0425	0.0409	0.0397	0.0341	0.0329	0.0313	0.0290	1.958	1.921	1.907
94	1.958333	1.384751	1.998	1.984	1.946	0.0449	0.0425	0.0409	0.0397	0.0341	0.0329	0.0313	0.0289	1.979	1.941	1.927
95	1.979167	1.399482	2.018	2.004	1.967	0.0449	0.0425	0.0409	0.0397	0.0341	0.0329	0.0313	0.0289	2.000	1.962	1.948
96	2.000000	1.414214	2.039	2.025	1.988	0.0449	0.0425	0.0409	0.0398	0.0340	0.0329	0.0313	0.0289	2.021	1.983	1.969
97	2.020833	1.428945	2.060	2.046	2.009	0.0450	0.0426	0.0409	0.0398	0.0340	0.0329	0.0312	0.0288	2.042	2.004	1.990
98	2.041667	1.443676	2.081	2.067	2.030	0.0450	0.0426	0.0410	0.0398	0.0340	0.0328	0.0312	0.0288	2.062	2.025	2.011
99	2.062500	1.458408	2.102	2.088	2.050	0.0451	0.0426	0.0410	0.0398	0.0340	0.0328	0.0312	0.0287	2.083	2.045	2.031
100	2.083333	1.473139	2.123	2.109	2.071	0.0451	0.0426	0.0410	0.0398	0.0340	0.0328	0.0312	0.0287	2.104	2.066	2.052

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.

b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.

c. See Table 105.

d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.

e. Figures in bold type are modified values, see Section 25.

f. Form dia values for 6 thru 88 teeth corrected with 1996 reaffirmation.

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45 DEG PRESSURE ANGLE

TABLE 61—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 64/128 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_F	D_i	s_v Min. Eff. Circ. Space Width = 0.0277 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.0277 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
				Note f	Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 20 -0									+0 - 20	Note f	
11	0.1718750	0.1215340	0.1995	0.1915	0.1625	0.0319	0.0306	0.0298	0.0292	0.0262	0.0256	0.0248	0.0235	0.1875	0.1585	0.1505
12	0.1875000	0.1325825	0.2151	0.2072	0.1782	0.0319	0.0306	0.0298	0.0292	0.0262	0.0256	0.0248	0.0235	0.2031	0.1741	0.1661
13	0.2031250	0.1436310	0.2308	0.2228	0.1938	0.0319	0.0307	0.0298	0.0292	0.0262	0.0256	0.0247	0.0235	0.2188	0.1897	0.1817
14	0.2187500	0.1546796	0.2464	0.2384	0.2094	0.0319	0.0307	0.0298	0.0292	0.0262	0.0256	0.0247	0.0235	0.2344	0.2053	0.1973
15	0.2343750	0.1657282	0.2621	0.2540	0.2250	0.0320	0.0307	0.0298	0.0292	0.0262	0.0256	0.0247	0.0234	0.2500	0.2210	0.2129
16	0.2500000	0.1767767	0.2777	0.2697	0.2407	0.0320	0.0307	0.0299	0.0292	0.0262	0.0255	0.0247	0.0234	0.2656	0.2366	0.2285
17	0.2656250	0.1878252	0.2934	0.2853	0.2563	0.0320	0.0307	0.0299	0.0292	0.0262	0.0255	0.0247	0.0234	0.2813	0.2522	0.2441
18	0.2812500	0.1988738	0.3091	0.3009	0.2719	0.0321	0.0308	0.0299	0.0293	0.0261	0.0255	0.0246	0.0233	0.2969	0.2678	0.2597
19	0.2968750	0.2099223	0.3247	0.3165	0.2875	0.0321	0.0308	0.0299	0.0293	0.0261	0.0255	0.0246	0.0233	0.3125	0.2835	0.2753
20	0.3125000	0.2209709	0.3404	0.3322	0.3032	0.0321	0.0308	0.0299	0.0293	0.0261	0.0255	0.0246	0.0233	0.3281	0.2991	0.2909
21	0.3281250	0.2320194	0.3560	0.3478	0.3188	0.0322	0.0308	0.0299	0.0293	0.0261	0.0255	0.0246	0.0232	0.3438	0.3147	0.3065
22	0.3437500	0.2430680	0.3717	0.3634	0.3344	0.0322	0.0309	0.0300	0.0293	0.0261	0.0254	0.0245	0.0232	0.3594	0.3303	0.3221
23	0.3593750	0.2541164	0.3873	0.3790	0.3500	0.0322	0.0309	0.0300	0.0293	0.0261	0.0254	0.0245	0.0232	0.3750	0.3460	0.3377
24	0.3750000	0.2651650	0.4030	0.3947	0.3657	0.0323	0.0309	0.0300	0.0293	0.0261	0.0254	0.0245	0.0231	0.3906	0.3616	0.3532
25	0.3906250	0.2762136	0.4187	0.4103	0.3813	0.0323	0.0309	0.0300	0.0293	0.0261	0.0254	0.0245	0.0231	0.4063	0.3772	0.3688
26	0.4062500	0.2872621	0.4343	0.4259	0.3969	0.0323	0.0309	0.0300	0.0293	0.0261	0.0254	0.0245	0.0231	0.4219	0.3928	0.3844
27	0.4218750	0.2983107	0.4500	0.4415	0.4125	0.0324	0.0310	0.0300	0.0294	0.0260	0.0254	0.0244	0.0230	0.4375	0.4085	0.4000
28	0.4375000	0.3093592	0.4656	0.4572	0.4282	0.0324	0.0310	0.0300	0.0294	0.0260	0.0254	0.0244	0.0230	0.4531	0.4241	0.4156
29	0.4531250	0.3204077	0.4813	0.4728	0.4438	0.0324	0.0310	0.0301	0.0294	0.0260	0.0253	0.0244	0.0230	0.4688	0.4397	0.4312
30	0.4687500	0.3314562	0.4969	0.4884	0.4594	0.0325	0.0310	0.0301	0.0294	0.0260	0.0253	0.0244	0.0229	0.4844	0.4553	0.4468
31	0.4843750	0.3425049	0.5126	0.5040	0.4750	0.0325	0.0311	0.0301	0.0294	0.0260	0.0253	0.0243	0.0229	0.5000	0.4710	0.4624

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.
b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.
c. See Table 105.
d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.
e. Figures in bold type are modified values, see Section 25.
f. Form dia values for 11 thru 31 teeth corrected with 1996 reaffirmation.

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45 DEG PRESSURE ANGLE

TABLE 62—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 80/160 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N	D	D_b	D_{ri}	D_{Fi}	D_i	S_v Min. Eff. Circ. Space Width = 0.0221 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.0221 Notes c & d				D_o	D_{Fe}	D_{re}
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia. Max.	Form Dia.	Minor Dia.	7	6	5	4	4	5	6	7	Major Dia.	Form Dia.	Minor Dia. Min.
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
				Note f	Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 20 -0									+0 - 20	Note f	
11	0.1375000	0.0972271	0.1604	0.1540	0.1300	0.0263	0.0250	0.0242	0.0236	0.0206	0.0200	0.0192	0.0179	0.1500	0.1260	0.1196
12	0.1500000	0.1060660	0.1729	0.1665	0.1425	0.0263	0.0250	0.0242	0.0236	0.0206	0.0200	0.0192	0.0179	0.1625	0.1385	0.1321
13	0.1625000	0.1149049	0.1855	0.1790	0.1550	0.0263	0.0251	0.0242	0.0236	0.0206	0.0200	0.0191	0.0179	0.1750	0.1510	0.1445
14	0.1750000	0.1237437	0.1980	0.1915	0.1675	0.0263	0.0251	0.0242	0.0236	0.0206	0.0200	0.0191	0.0179	0.1875	0.1635	0.1570
15	0.1875000	0.1325825	0.2105	0.2040	0.1800	0.0264	0.0251	0.0242	0.0236	0.0206	0.0200	0.0191	0.0178	0.2000	0.1760	0.1695
16	0.2000000	0.1414214	0.2231	0.2165	0.1925	0.0264	0.0251	0.0243	0.0236	0.0206	0.0199	0.0191	0.0178	0.2125	0.1885	0.1819
17	0.2125000	0.1502602	0.2356	0.2290	0.2050	0.0264	0.0251	0.0243	0.0236	0.0206	0.0199	0.0191	0.0178	0.2250	0.2010	0.1944
18	0.2250000	0.1590990	0.2481	0.2415	0.2175	0.0265	0.0252	0.0243	0.0237	0.0205	0.0199	0.0190	0.0177	0.2375	0.2135	0.2069
19	0.2375000	0.1679378	0.2607	0.2540	0.2300	0.0265	0.0252	0.0243	0.0237	0.0205	0.0199	0.0190	0.0177	0.2500	0.2260	0.2193
20	0.2500000	0.1767767	0.2732	0.2665	0.2425	0.0265	0.0252	0.0243	0.0237	0.0205	0.0199	0.0190	0.0177	0.2625	0.2385	0.2318
21	0.2625000	0.1856155	0.2857	0.2790	0.2550	0.0266	0.0252	0.0243	0.0237	0.0205	0.0199	0.0190	0.0176	0.2750	0.2510	0.2443
22	0.2750000	0.1944543	0.2983	0.2915	0.2675	0.0266	0.0253	0.0244	0.0237	0.0205	0.0198	0.0189	0.0176	0.2875	0.2635	0.2567
23	0.2875000	0.2032931	0.3108	0.3040	0.2800	0.0266	0.0253	0.0244	0.0237	0.0205	0.0198	0.0189	0.0176	0.3000	0.2760	0.2692
24	0.3000000	0.2121320	0.3233	0.3165	0.2925	0.0267	0.0253	0.0244	0.0237	0.0205	0.0198	0.0189	0.0175	0.3125	0.2885	0.2817
25	0.3125000	0.2209709	0.3358	0.3290	0.3050	0.0267	0.0253	0.0244	0.0237	0.0205	0.0198	0.0189	0.0175	0.3250	0.3010	0.2942
26	0.3250000	0.2298097	0.3484	0.3415	0.3175	0.0267	0.0253	0.0244	0.0237	0.0205	0.0198	0.0189	0.0175	0.3375	0.3135	0.3066
27	0.3375000	0.2386485	0.3609	0.3540	0.3300	0.0268	0.0254	0.0244	0.0238	0.0204	0.0198	0.0188	0.0174	0.3500	0.3260	0.3191

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.
b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.
c. See Table 105.
d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.
e. Figures in bold type are modified values, see Section 25.
f. Form dia values for 11 thru 27 teeth corrected with 1996 reaffirmation.

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45 DEG PRESSURE ANGLE

TABLE 63—45 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT, 128/256 SPLINE PITCH

Internal and External			Internal (see Drawing Data)							External (see Drawing Data)						
N No. of Teeth	D Pitch Dia.	D_b Base Dia.	D_{ri} Major Dia. Max.	D_{Fi} Form Dia.	D_i Minor Dia.	s_v Min. Eff. Circ. Space Width = 0.0138 Notes c & d				t_v Max. Eff. Circ. Tooth Thickness = 0.0138 Notes c & d				D_o Major Dia.	D_{Fe} Form Dia.	D_{re} Minor Dia. Min.
						s Max. Actual Circ. Space Width for Tolerance Class				t Min. Actual Circ. Tooth Thickness for Tolerance Class						
						7	6	5	4	4	5	6	7			
						s_7	s_6	s_5	s_4	t_4	t_5	t_6	t_7			
1	2	3.3	4.5	5.1	6.3	8.7	8.6	8.5	8.4	11.4	11.5	11.6	11.7	14.1	17.3	18.4
				Note f	Note e	Notes a & b									Note e	
Tolerance in Ten Thousandths					+ 20 -0									+0 - 20	Note f	
11	0.0859375	0.0607670	0.1015	0.0978	0.0813	0.0177	0.0165	0.0157	0.0152	0.0124	0.0119	0.0111	0.0099	0.0938	0.0776	0.0735
12	0.0937500	0.0662913	0.1094	0.1056	0.0891	0.0177	0.0165	0.0158	0.0152	0.0124	0.0118	0.0111	0.0099	0.1016	0.0852	0.0812
13	0.1015625	0.0718154	0.1172	0.1134	0.0969	0.0177	0.0166	0.0158	0.0152	0.0124	0.0118	0.0110	0.0099	0.1094	0.0928	0.0890
14	0.1093750	0.0773398	0.1251	0.1212	0.1047	0.0178	0.0166	0.0158	0.0152	0.0124	0.0118	0.0110	0.0098	0.1172	0.1006	0.0968
15	0.1171875	0.0828641	0.1329	0.1290	0.1125	0.0178	0.0166	0.0158	0.0152	0.0124	0.0118	0.0110	0.0098	0.1250	0.1085	0.1046
16	0.1250000	0.0883883	0.1407	0.1369	0.1204	0.0178	0.0166	0.0158	0.0152	0.0124	0.0118	0.0110	0.0098	0.1328	0.1163	0.1124
17	0.1328125	0.0939126	0.1486	0.1447	0.1282	0.0178	0.0166	0.0158	0.0152	0.0124	0.0118	0.0110	0.0098	0.1406	0.1241	0.1202
18	0.1406250	0.0994369	0.1564	0.1525	0.1360	0.0179	0.0166	0.0158	0.0152	0.0124	0.0118	0.0110	0.0097	0.1484	0.1319	0.1280
19	0.1484375	0.1049612	0.1643	0.1603	0.1438	0.0179	0.0167	0.0158	0.0153	0.0123	0.0118	0.0109	0.0097	0.1563	0.1397	0.1357
20	0.1562500	0.1104854	0.1721	0.1681	0.1516	0.0179	0.0167	0.0159	0.0153	0.0123	0.0117	0.0109	0.0097	0.1641	0.1475	0.1435
21	0.1640624	0.1160097	0.1799	0.1759	0.1594	0.0179	0.0167	0.0159	0.0153	0.0123	0.0117	0.0109	0.0097	0.1719	0.1553	0.1513
22	0.1718750	0.1215340	0.1878	0.1837	0.1672	0.0180	0.0167	0.0159	0.0153	0.0123	0.0117	0.0109	0.0096	0.1797	0.1631	0.1591
23	0.1796875	0.1270583	0.1956	0.1915	0.1750	0.0180	0.0167	0.0159	0.0153	0.0123	0.0117	0.0109	0.0096	0.1875	0.1710	0.1669
24	0.1875000	0.1325825	0.2034	0.1994	0.1829	0.0180	0.0168	0.0159	0.0153	0.0123	0.0117	0.0108	0.0096	0.1953	0.1788	0.1747

a. Measurement with pins cannot be used to determine **effective space width and tooth thickness.** Measurement with pins for actual space width and tooth thickness are in Tables 93-104.
b. For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.
c. See Table 105.
d. For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.
e. Figures in bold type are modified values, see Section 25.
f. Form dia values for 11 thru 24 teeth corrected with 1996 reaffirmation.

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TABLE 64—MACHINING TOLERANCES FOR TOLERANCE CLASS 5[a] SPLINES

Internal Circular Space Width

Min actual = Max actual — Table value
Max effective = Min effective + Table value

External Circular Tooth Thickness

Max actual = Min actual + Table value
Min effective = Max effective — Table value

N	Spline Pitch						
	2.5/5 and 3/6	4/8 and 5/10	6/12 and 8/16	10/20 and 12/24	16/32 thru 48/96	64/128 and 80/160	128/256
6	0.00151	0.00139	0.00119	0.00116	0.00114	—	—
7	0.00153	0.00141	0.00121	0.00117	0.00115	—	—
8	0.00154	0.00142	0.00122	0.00118	0.00116	—	—
9	0.00156	0.00144	0.00124	0.00119	0.00116	—	—
10	0.00158	0.00145	0.00125	0.00120	0.00117	—	—
11	0.00160	0.00147	0.00127	0.00121	0.00118	0.00097	0.00096
12	0.00162	0.00148	0.00128	0.00122	0.00118	0.00097	0.00096
13	0.00163	0.00150	0.00130	0.00123	0.00119	0.00098	0.00097
14	0.00165	0.00151	0.00131	0.00124	0.00120	0.00098	0.00097
15	0.00167	0.00153	0.00133	0.00125	0.00121	0.00099	0.00098
16	0.00169	0.00154	0.00134	0.00126	0.00121	0.00100	0.00098
17	0.00171	0.00156	0.00136	0.00127	0.00122	0.00100	0.00099
18	0.00172	0.00157	0.00137	0.00128	0.00123	0.00101	0.00099
19	0.00174	0.00159	0.00139	0.00129	0.00123	0.00101	0.00100
20	0.00176	0.00160	0.00140	0.00130	0.00124	0.00102	0.00100
21	0.00178	0.00162	0.00142	0.00131	0.00125	0.00103	0.00101
22	0.00180	0.00163	0.00143	0.00132	0.00125	0.00103	0.00101
23	0.00181	0.00165	0.00145	0.00133	0.00126	0.00104	0.00102
24	0.00183	0.00166	0.00146	0.00134	0.00127	0.00104	0.00102
25	0.00185	0.00168	0.00148	0.00135	0.00128	0.00105	—
26	0.00187	0.00169	0.00149	0.00136	0.00128	0.00106	—
27	0.00189	0.00171	0.00151	0.00137	0.00129	0.00106	—
28	0.00190	0.00172	0.00152	0.00138	0.00130	0.00107	—
29	0.00192	0.00174	0.00154	0.00139	0.00130	0.00107	—
30	0.00194	0.00175	0.00155	0.00140	0.00131	0.00108	—
31	0.00196	0.00177	0.00157	0.00141	0.00132	0.00109	—
32	0.00198	0.00178	0.00158	0.00142	0.00132	—	—
33	0.00199	0.00180	0.00160	0.00143	0.00133	—	—
34	0.00200	0.00181	0.00161	0.00144	0.00134	—	—
35	0.00203	0.00183	0.00163	0.00145	0.00135	—	—
36	0.00205	0.00184	0.00164	0.00146	0.00135		
37	0.00207	0.00186	0.00166	0.00147	0.00136		
38	0.00208	0.00187	0.00167	0.00148	0.00137		
39	0.00210	0.00189	0.00169	0.00149	0.00137		
40	0.00212	0.00190	0.00170	0.00150	0.00138		
41	0.00214	0.00192	0.00172	0.00151	0.00139		
42	0.00216	0.00193	0.00173	0.00152	0.00139		
43	0.00217	0.00195	0.00175	0.00153	0.00140		
44	0.00219	0.00196	0.00176	0.00154	0.00141		
45	0.00221	0.00198	0.00178	0.00155	0.00142		
46	0.00223	0.00199	0.00179	0.00156	0.00142		
47	0.00225	0.00201	0.00181	0.00157	0.00143		
48	0.00226	0.00202	0.00182	0.00158	0.00144		
49	0.00228	0.00204	0.00184	0.00159	0.00144		
50	0.00230	0.00205	0.00185	0.00160	0.00145		
51	0.00232	0.00207	0.00187	0.00161	0.00146		
52	0.00234	0.00208	0.00188	0.00162	0.00146		
53	0.00235	0.00210	0.00190	0.00163	0.00147		
54	0.00237	0.00211	0.00191	0.00164	0.00148		
55	0.00239	0.00213	0.00193	0.00165	0.00149		
56	0.00241	0.00214	0.00194	0.00166	0.00149		
57	0.00243	0.00216	0.00196	0.00167	0.00150		
58	0.00244	0.00217	0.00197	0.00168	0.00151		
59	0.00246	0.00219	0.00199	0.00169	0.00151		
60	0.00248	0.00220	0.00200	0.00170	0.00152		

N	Spline Pitch	
	10/20 and 12/24	16/32 thru 24/48
61	0.00171	0.00153
62	0.00172	0.00153
63	0.00173	0.00154
64	0.00174	0.00155
65	0.00175	0.00156
66	0.00179	0.00158
67	0.00178	0.00158
68	0.00177	0.00157
69	0.00178	0.00158
70	0.00180	0.00159
71	0.00181	0.00160
72	0.00182	0.00160
73	0.00183	0.00161
74	0.00184	0.00162
75	0.00185	0.00163
76	0.00186	0.00163
77	0.00187	0.00164
78	0.00188	0.00165
79	0.00189	0.00165
80	0.00190	0.00166
81	0.00191	0.00167
82	0.00192	0.00167
83	0.00193	0.00168
84	0.00194	0.00169
85	0.00195	0.00170
86	0.00196	0.00170
87	0.00197	0.00171
88	0.00198	0.00172
89	0.00199	0.00172
90	0.00200	0.00173
91	0.00201	0.00174
92	0.00202	0.00174
93	0.00203	0.00175
94	0.00204	0.00176
95	0.00205	0.00177
96	0.00206	0.00177
97	0.00207	0.00178
98	0.00208	0.00179
99	0.00209	0.00179
100	0.00210	0.00180

[a]See Table 106 for formulas from which these values were derived.

For other tolerance classes:
Class 4 = 0.71 × Tabulated value
Class 5 = As tabulated in table
Class 6 = 1.40 × Tabulated value
Class 7 = 2.00 × Tabulated value

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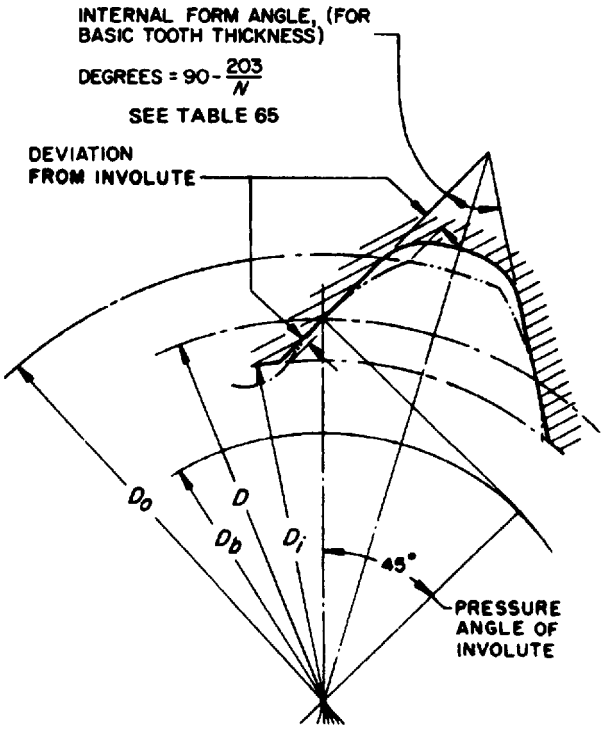


FIG. 10A—INTERNAL STRAIGHT SIDED 45 DEG PRESSURE ANGLE SPLINES

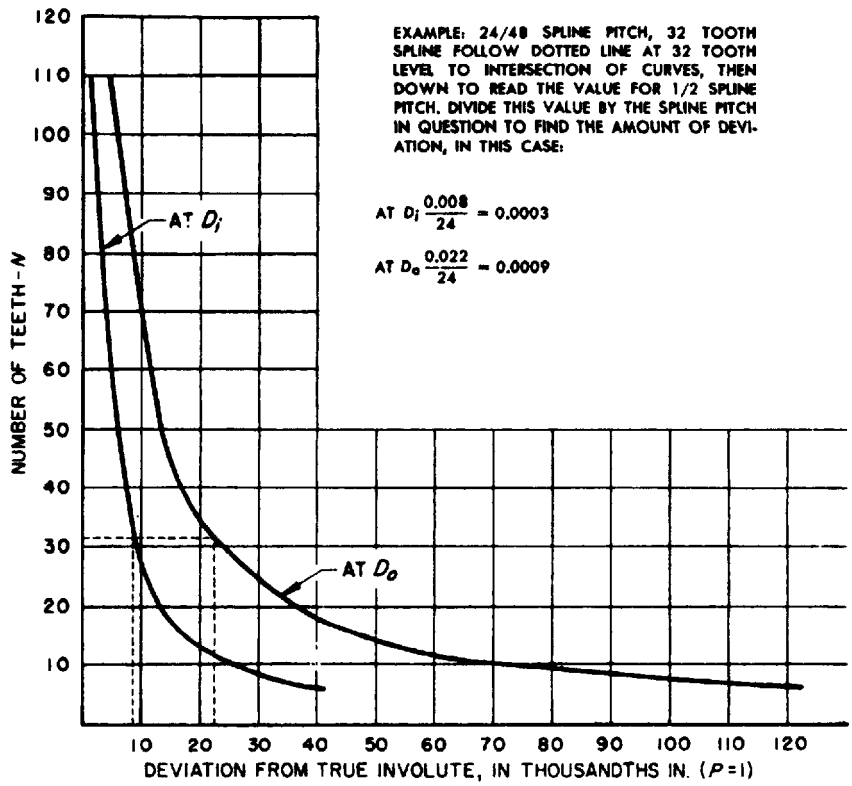


FIG. 10B—DEVIATION FROM TRUE INVOLUTE OF INTERNAL STRAIGHT SIDED 45 DEG PRESSURE ANGLE SPLINES

TABLE 65—INTERNAL FORM ANGLES FOR INTERNAL STRAIGHT SIDED 45 DEG SPLINES

N	Angle, deg	N	Angle, deg	N	Angle, deg	N	Angle, deg	N	Angle, deg	N	Angle, deg	N	Angle, deg
6	56.2	21	80.3	36	84.4	51	86.0	66	86.9	81	87.5	96	87.9
7*	61.0	22	80.8	37	84.5	52	86.1	67	87.0	82	87.5	97	87.9
8	64.6	23	81.2	38	84.7	53	86.2	68	87.0	83	87.6	98	87.9
9	67.4	24	81.5	39	84.8	54	86.2	69	87.1	84	87.6	99	88.0
10	69.7	25	81.9	40	84.9	55	86.3	70	87.1	85	87.6	100	88.0
11	71.5	26	82.2	41	85.0	56	86.4	71	87.1	86	87.6		
12	73.1	27	82.5	42	85.2	57	86.4	72	87.2	87	87.7		
13	74.4	28	82.8	43	85.3	58	86.5	73	87.2	88	87.7		
14	75.5	29	83.0	44	85.4	59	86.6	74	87.3	89	87.7		
15	76.5	30	83.2	45	85.5	60	86.6	75	87.3	90	87.7		
16	77.3	31	83.5	46	85.6	61	86.7	76	87.3	91	87.8		
17	78.1	32	83.7	47	85.7	62	86.7	77	87.4	92	87.8		
18	78.7	33	83.8	48	85.8	63	86.8	78	87.4	93	87.8		
19	79.3	34	84.0	49	85.9	64	86.8	79	87.4	94	87.8		
20	79.8	35	84.2	50	85.9	65	86.9	80	87.5	95	87.9		

14. Internal 45 deg Pressure Angle Splines with Straight Sided Option

14.1 Straight Profiles—On internal 45 deg splines, straight profiles may be specified as optional with involute profiles if the deviation of the straight side from the involute is compatible with design requirements. The external spline is always designed with involute profiles. The internal straight sided profile localizes the tooth contact.

14.2 Internal Form Angle—The internal form angle is that angle, the legs of which are tangent at the pitch line, to the involute profiles which bound the basic space (see Fig. 10A). This angle is constant for a given number of teeth and values are listed in Table 65.

14.3 Profile Tolerances—The tolerances on profile of internal straight sided 45 deg splines are stated in terms of internal form angle variations and are listed in Table 66. The profile is allowed to deviate farther in the direction of the space, to the limit of the theoretical involute profile. The amount of this deviation is shown in Fig. 10B for one diametral pitch. To determine the deviations for other spline pitches, divide values from Fig. 10B by the applicable diametral pitch.

TABLE 66—TOLERANCES FOR INTERNAL FORM ANGLE VARIATION FOR INTERNAL STRAIGHT SIDED SPLINES OPTION

Spline Pitch	10/20 thru 24/48	32/64 thru 48/96	64/128 thru 128/256
All N	+ 2° − 1°	+ 4° − 2°	+10° − 6°

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INSPECTION

15. Purpose and Scope—This portion of the standard covers the subject of spline inspection. Conformance to dimensional specifications assures the desired fit and interchangeable assembly. Dimensions which are marked REF do not require control by inspection. The basic principles are applicable to all types of splines.

15.1 Inspection Methods

15.1.1 Spline gages are used for routine inspection of production parts.

15.1.2 Analytical inspection, which is the measurement of individual dimensions and variations, may be required:

A—To supplement inspection by gages, for example, where NOT GO composite gages are used in place of NOT GO sector gages and variations must be controlled.

B—To evaluate parts rejected by gages.

C—For prototype parts or short runs where spline gages are not used.

D—To supplement inspection by gages where each individual variation must be restrained from assuming too great a portion of the tolerance between the minimum material actual and the maximum material effective dimensions.

16. Inspection with Gages—Fig. 11 illustrates the relationship between the various space width and tooth thickness limits and the main types of gages used for their inspection.

16.1 Types of Gages

16.1.1 A composite spline gage is a gage having a full complement of teeth.

16.1.2 A sector spline gage is a gage having two diametrically opposite groups of teeth.

16.1.3 A sector plug gage with only two teeth per sector is also known as a "paddle gage."

16.1.4 A sector ring gage with only two teeth per sector is also known as a "snap ring gage."

16.1.5 A progressive gage is a gage consisting of two or more adjacent sections with different inspection functions. Progressive GO gages are physical combinations of GO gage members which check consecutively first one feature or one group of features, then their relationship to other features. GO and NOT GO gages may also be combined physically to form a progressive gage.

16.2 GO and NOT GO Gages

16.2.1 GO gages are used to inspect maximum material conditions (maximum external, minimum internal dimensions). They may be used to inspect an individual dimension or the relationship between two or more functional dimensions. They control the minimum looseness or maximum interference.

16.2.2 NOT GO gages are used to inspect minimum material conditions (minimum external, maximum internal dimensions), thereby controlling the maximum looseness or minimum interference. Unless otherwise agreed upon, a product is acceptable only if the NOT GO gage does not enter or go on the part. A NOT GO gage can be used to inspect only one dimension. An attempt at simultaneous NOT GO inspection of more than one dimension could result in failure of such a gage to enter or go on (acceptance of part), even though all but one of the dimensions were outside product limits. In the event all dimensions are outside the limits, their relationship could be such as to allow acceptance.

16.3 Effective and Actual Dimensions

16.3.1 EFFECTIVE DIMENSIONS—The effective space width and tooth thickness are inspected by means of an accurate mating member in the form of a composite spline gage.

16.3.2 ACTUAL DIMENSIONS—The actual space width and

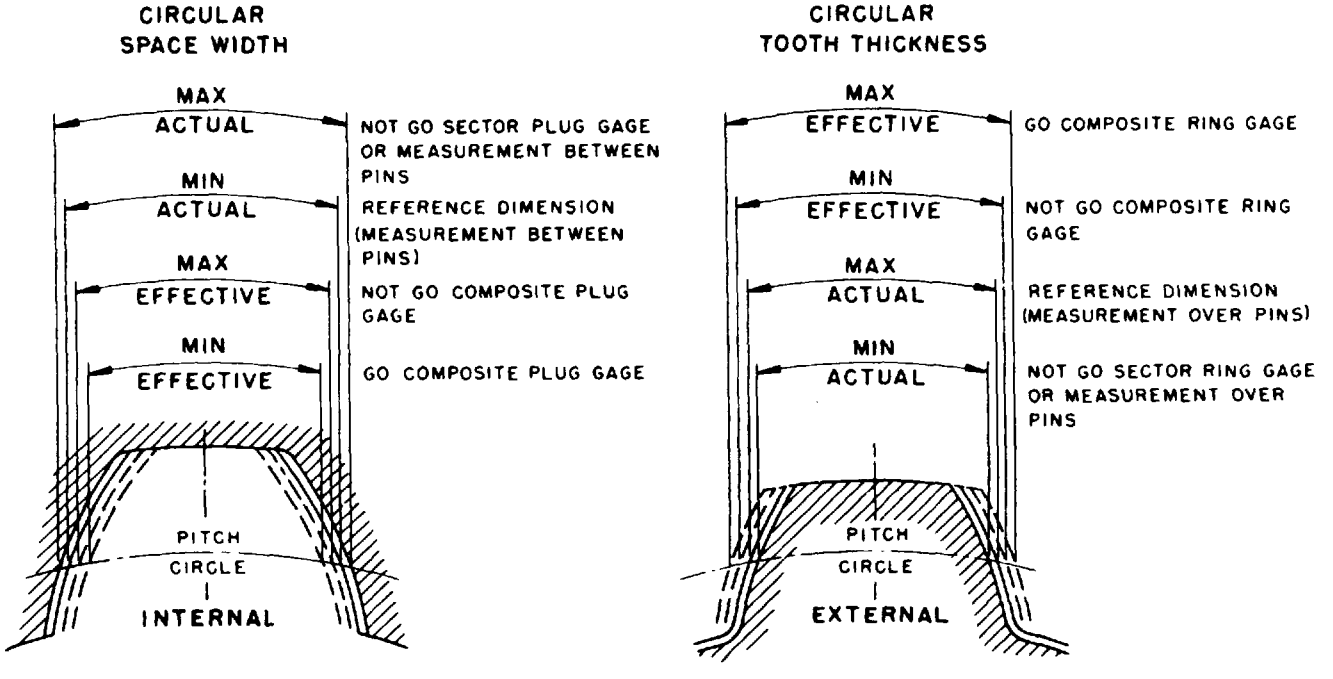
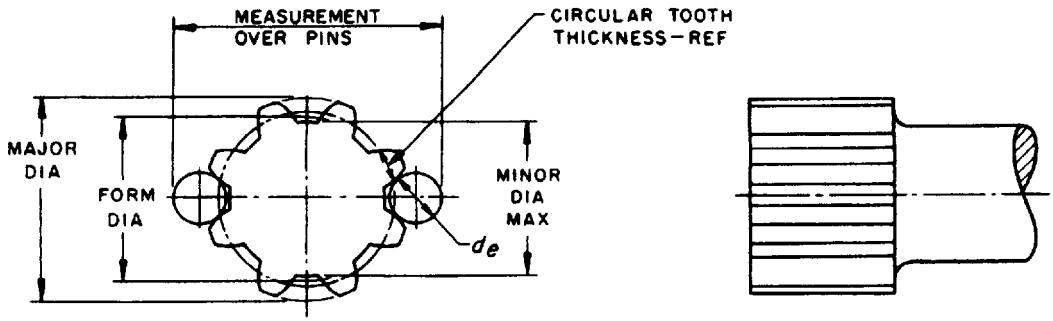


FIG. 11—SPACE WIDTH AND TOOTH THICKNESS INSPECTION

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Gage Dimension		Formula, GO	Formula, NOT GO
Major Dia		+ tolerance from Table 73 D_{Fi}, − 0.000	$\frac{2D_{Fi}+D}{3}$, ±0.001
Form Dia		D_i min − $2c_F$	
Minor Dia, max		Must clear form dia, and measuring pins	
Circular Tooth Thickness, REF	New Gage	s_v min + wear allowance from Table 74	s_v max
	Wear Limit	s_v min	None

Gage Dimension		Formula, GO	Formula, NOT GO
Measuring Pin Dia, d_e		1.9200/P	
Measurement Over Pins	New Gage	+tolerance from Table 71 −0.0000	+0.0000 −tolerance from Table 71
	Wear Limit	No tolerance	Not applicable

FIG. 12—COMPOSITE PLUG GAGE—GO SIDE FIT, NOT GO SIDE FIT, AND NOT GO MAJOR DIAMETER FIT

tooth thickness are inspected with sector plug and ring gages, or by measurements with pins.

16.4 Function and Selection of Gages—Product drawings usually conform to the "Standard Method" in Table 4, which requires, for the internal member, control of:

A—Maximum actual space width

B—Minimum effective space width

and for the external member, control of:

C—Maximum effective tooth thickness

D—Minimum actual tooth thickness

GO composite and NOT GO sector gages are then required. This combination of gages controls the minimum effective clearance and checks the sum of machining tolerance and the effective variation.

16.4.1 Where both limits of actual space width or actual tooth thickness are marked REF, as shown in Alternate Method B of Table 4, the maximum and minimum effective space width and effective tooth thickness are the control dimensions. These dimensions require GO and NOT GO composite gages which control the minimum and maximum effective clearance, but not the effective variation.

16.5 Side Fit and Major Diameter Fit Gages—The same types of gages are used for these fits except as noted below. In addition, the major diameter fit spline requires gages for the major diameter which may not be needed for side fit splines.

16.5.1 The GO composite side fit gage checks the minimum effective space width or the maximum effective tooth thickness and the form diameter.

16.5.2 The GO composite major diameter fit gage checks the same features as the GO composite side fit gage, also the concentricity between the pitch and major circles, and the land at the major diameter of the internal spline.

16.5.3 The gages described in this standard do not control the chamfers of external major diameter fit splines. Independent inspection or special gages are required.

16.6 Gages for 45 deg Pressure Angle Involute Splines—The gages for the internal 45 deg pressure angle spline parts are made with involute tooth form even though the part may have the optional straight sided form.

16.7 Tolerances for Measurement with Pins—Table 70 indicates reasonable manufacturing tolerances on gage tooth thickness and space width. The over or between pin measurement for gages shall be calculated based on these tolerances and shown to five places to the right of the decimal point without rounding. In the event there is a need for closer gage tolerances, this becomes a matter of agreement between purchaser and gage vendor.

17. Gage Blanks

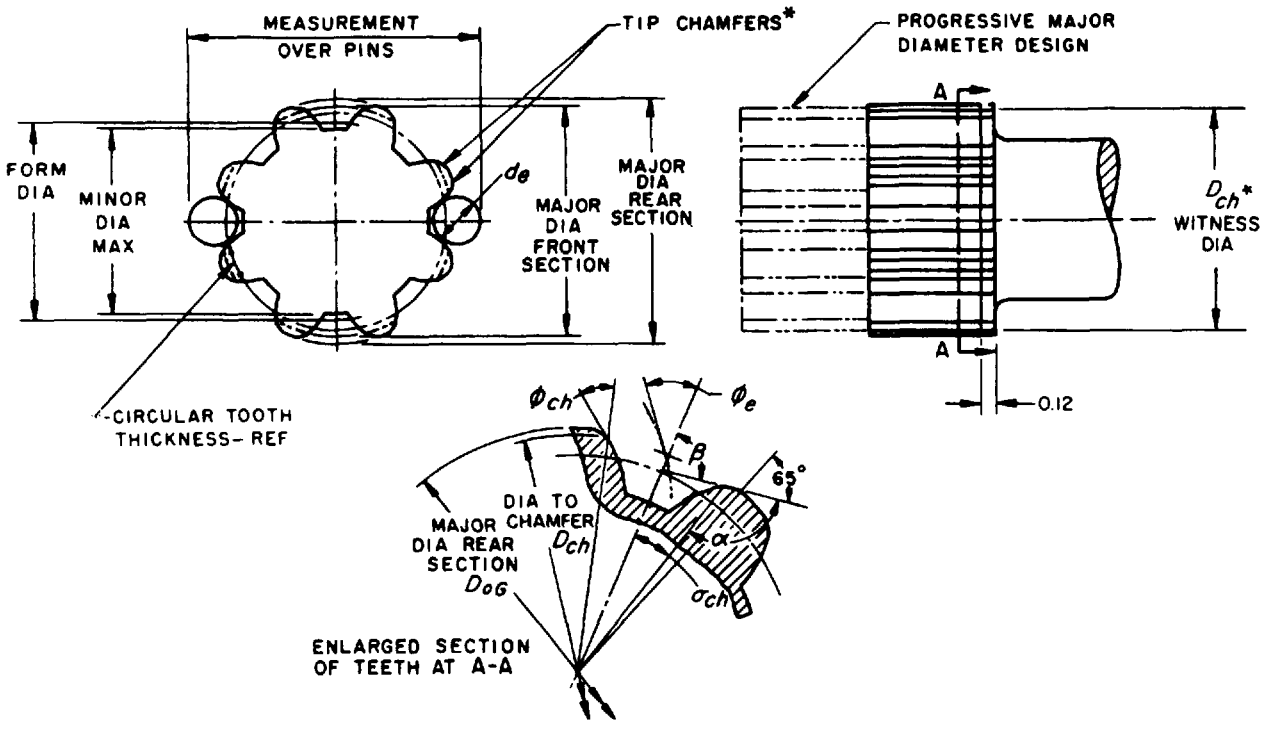
17.1 Standard Blanks—Standard gage blanks with and without integral pilots are described in the Commercial Standard CS8.[1]

17.1.1 Pilots may be provided for ease of entrance. Pilots have no gaging function and gaging tolerances are not applied. The integral pilot will be gashed when cutting the spline teeth. No pilot is necessary for tapered tooth plug gages.

17.2 Alignment Gage Blanks—These blanks are necessary where the length of engagement is substantially greater than the standard gage length. A gage length equal to 75% of the length of engagement is usually satisfactory.

[1]Latest issue, available from Superintendent of Documents, Washington, D.C. 20025

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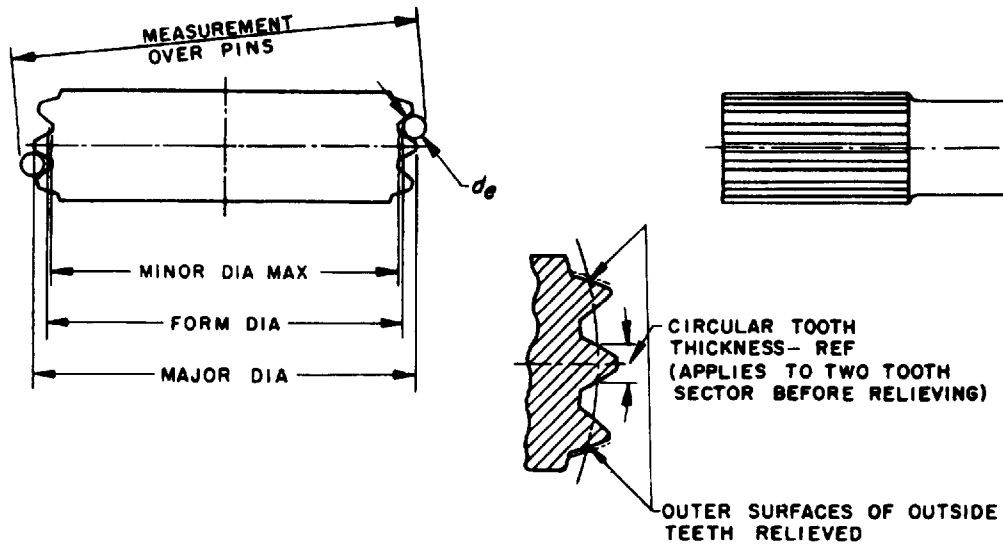


Gage Dimension			Formula, GO
Major Dia	Rear Section D_{oG}	New Gage	D_{ri} min + wear allowance from Table 74, $^{+\text{tolerance from Table 73}}_{-0.000}$
		Wear Limit	D_{ri} min
	Front Section		D_{Fi}, $^{+\text{tolerance from Table 73}}_{-0.000}$
Form Dia			D_i min − $2c_F$
Minor Dia, max			Must clear form dia and measuring pins
Circular Tooth Thickness, REF		New Gage	s_v min + wear allowance from Table 74
		Wear Limit	s_v min
Dia to Chamfer*, D_{ch}			D_{Fi}, REF
Chamfer* Cutting Angle, β (see Table 67)			$\sin\alpha = \frac{D_{oG}\sin 65^\circ}{D_{Fi}}$, and $\cos\phi_{ch} = \frac{D_b}{D_{Fi}}$ (α always greater than 90 deg) $\sigma_{ch}\,(\text{deg}) = \left(\frac{\pi}{N} - \frac{s_v \text{ min}}{D} - \text{inv } 30^\circ + \text{inv } \phi_{ch}\right)\frac{180^\circ}{\pi}$ $\beta = 180^\circ - \alpha + \sigma_{ch}$
Measurements for Chamfer*			The start of chamfer for this gage may be assured visually by use of the witness diameter D_{ch} or by determination of the roll angle at the start of chamfer when inspected on an involute checker.
Measuring Pin Dia, d_e			$\frac{1.9200}{P}$
Measurement Over Pins		New Gage	$^{+\text{tolerance from Table 71}}_{-0.0000}$
		Wear Limit	No tolerance

*Where corner clearance (as noted in paragraphs 7.4 and 23) is used, the gage is not chamfered.

FIG. 13—GO COMPOSITE MAJOR DIAMETER FIT PLUG GAGE

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Gage Dimension	Formula, NOT GO
Major Dia	$\frac{2D_{Fi} + D}{3}$, ±0.001
Form Dia	D_i min − $2c_F$
Minor Dia, max	Must clear form dia, and measuring pins

Gage Dimension		Formula, NOT GO						
Circular Tooth Thickness, REF		s max						
Measurement Over Pins		+0.0000, −tolerance from Table 71						
No. of Teeth	In Spline	6-30	31-44	45-58	59-72	73-86	87-100	N
	In Sector	2	3	4	5	6	7	0.075N

FIG. 14—NOT GO SECTOR PLUG GAGE

TABLE 67—CHAMFER CUTTING ANGLE β FOR GO COMPOSITE MAJOR DIAMETER FIT PLUG GAGE

N	Angle, deg	N	Angle, deg	N	Angle, deg	N	Angle, deg
6	89.0	31	69.5	56	67.4	81	66.6
7	85.5	32	69.4	57	67.4	82	66.6
8	82.9	33	69.2	58	67.3	83	66.6
9	80.9	34	69.1	59	67.3	84	66.5
10	79.3	35	69.0	60	67.2	85	66.5
11	78.0	36	68.9	61	67.2	86	66.5
12	76.9	37	68.7	62	67.2	87	66.5
13	76.0	38	68.6	63	67.1	88	66.5
14	75.2	39	68.5	64	67.1	89	66.5
15	74.5	40	68.5	65	67.1	90	66.4
16	73.9	41	68.4	66	67.0	91	66.4
17	73.4	42	68.3	67	67.0	92	66.4
18	72.9	43	68.2	68	67.0	93	66.4
19	72.5	44	68.1	69	66.9	94	66.4
20	72.1	45	68.0	70	66.9	95	66.3
21	71.8	46	68.0	71	66.9	96	66.3
22	71.4	47	67.9	72	66.9	97	66.3
23	71.1	48	67.8	73	66.8	98	66.3
24	70.9	49	67.8	74	66.8	99	66.3
25	70.6	50	67.7	75	66.8	100	66.3
26	70.4	51	67.7	76	66.7		
27	70.2	52	67.6	77	66.7		
28	70.0	53	67.6	78	66.7		
29	69.8	54	67.5	79	66.7		
30	69.7	55	67.5	80	66.6		

18. Gages for Internal Splines

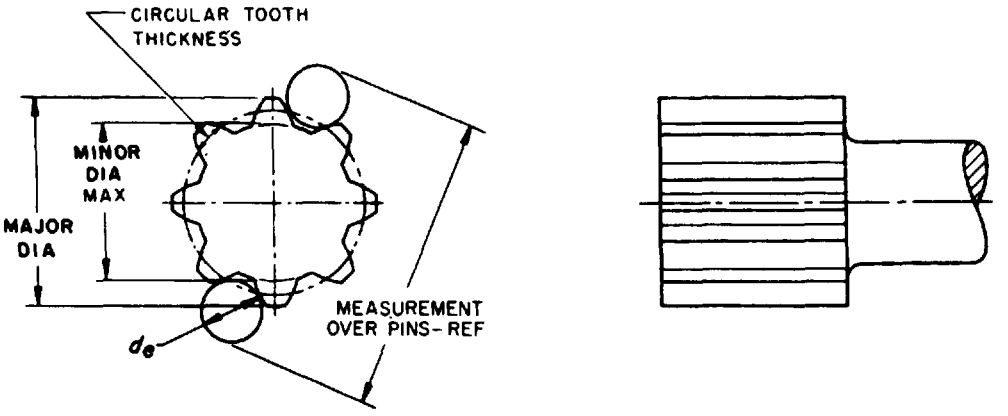
18.1 GO Composite Side Fit Plug gage—This gage, shown in Fig. 12, is required for side fit splines. It checks the minimum effective space width and the form diameter. It clears the major and minor circles.

18.2 NOT GO Composite Plug Gage—This gage, shown in Fig. 12, checks the maximum effective space width of side fit and major diameter fit splines. The major diameter of this gage is truncated to prevent acceptance of parts with excessive fillets.

18.3 GO Composite Major Diameter Fit Plug Gage—This gage, shown in Fig. 13, is required for major diameter fit splines. It checks the minimum effective space width, the form diameter, the minimum major diameter, and the relationship between the pitch and major circles. Gage tooth tip chamfers are designed to control encroachment of the part fillet upon the major diameter land and the form diameter. These chamfers may be checked as suggested in Fig. 13. The design shown by full lines is used as an acceptance gage. To evaluate rejections, the progressive design, indicated by phantom lines, is recommended. Gage tooth dimensions for the front section are the same as for the GO composite side fit plug gage (Fig. 12). Both sections of the progressive gage are GO members. If only the front section enters, the effective space width is acceptable, but the major diameter, its eccentricity, or the fillet, causes rejection.

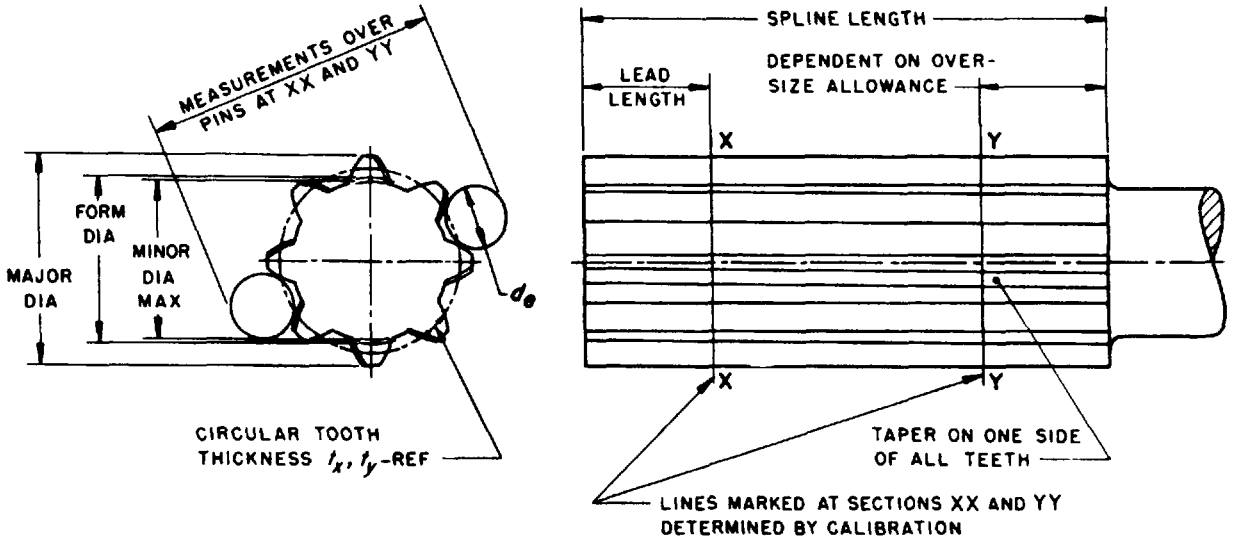
18.4 NOT GO Sector Plug Gage—This gage, depicted in Fig. 14, is used to check the maximum actual space width. It is designed with two opposite sectors, each containing at least two teeth. In the case of parts with high numbers of teeth, each sector contains three or more teeth and could accept parts having individual spaces oversize by the amount of spline variations in the part contacted by the sector. This liberalization is permissible, since large diameters, rather than load requirements, lead to the use of high numbers of teeth. Sector gages with two teeth per sector may be designed to perform a function equivalent to measurements with pins by limiting the area of contact between gage and part. This optional feature, which prevents part profile variations from causing acceptance by the

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Gage Dimension		Formula, GO	Formula, NOT GO
Major Dia	New Gage	D_{ri} min + wear allowance from Table 74 +tolerance from Table 73 −0.000	D_{ri} max, $^{+0.000}_{-\text{tolerance from Table 73}}$
	Wear Limit	D_{ri} min	None
Minor Dia, max		Must clear minor dia of part and measuring pins	
Circular Tooth Thickness for Involute Teeth		Must provide adequate top land at the major diameter without interference with the fillet radii of the internal spline where corner clearance is not used.	

FIG. 15—MAJOR DIAMETER PLUG GAGE

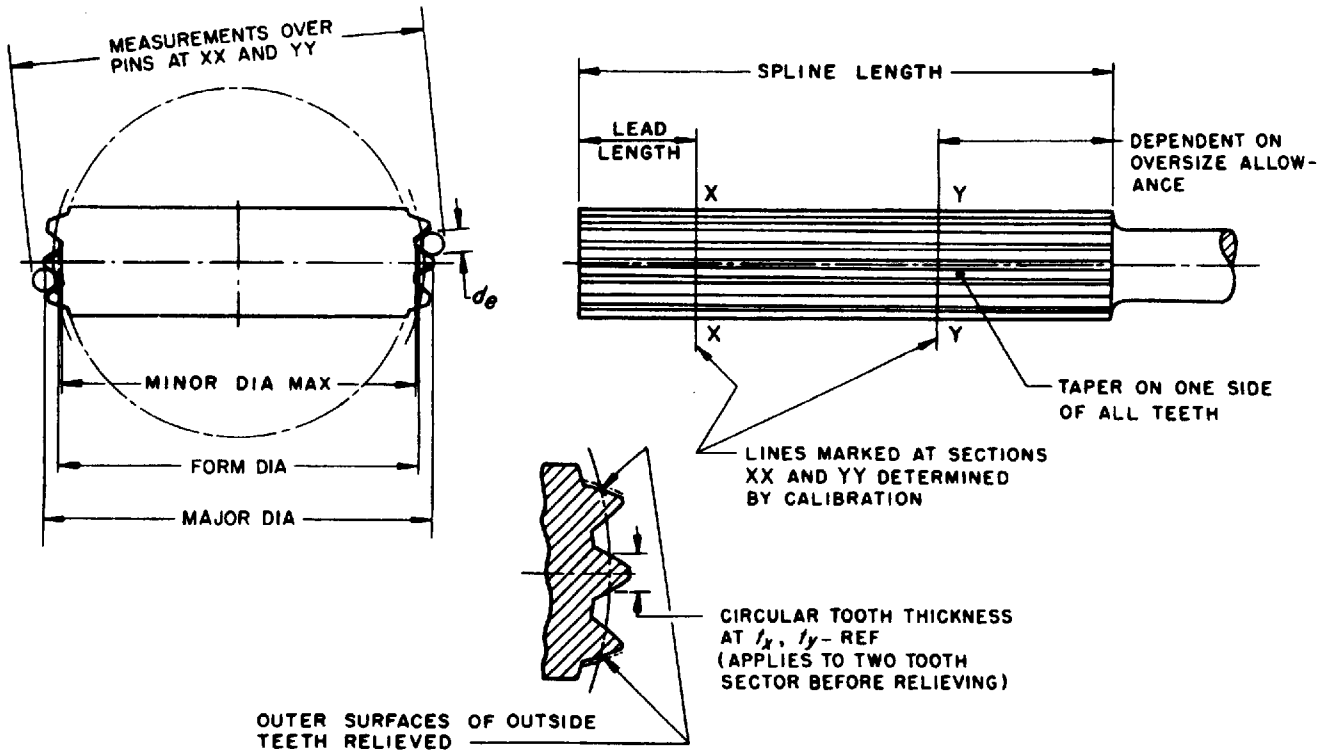


Gage Dimension		Formula
Major Dia		D_{Fi}, $^{+\text{tolerance from Table 73}}_{-0.000}$
Form Dia		D_i min − $2c_F$
Minor Dia, max		Must clear form dia and measuring pins
Circular Tooth Thickness, REF	t_x at XX	s_v min
	t_y at YY	s_v max
Measurements Over Pins at XX and YY		No tolerance

Gage Dimension	Formula
Circular Tooth Thickness Taper per in TPI, REF	To be selected to suit gage manufacture, not less thc 0.0002
Lead Length	Not less than two-thirds part spline length or 0.25 in
Oversize Allowance	To be selected to suit gage application
Spline Length	$\frac{t_y - t_x + \text{oversize allowance}}{\text{TPI}}$ + lead length
	Should be less than 6D, preferably less than 4D. T reduce length, tooth thickness taper per inch is increase oversize allowance is decreased, or both.

FIG. 16—COMPOSITE SIDE FIT PLUG GAGE WITH TAPERED TEETH

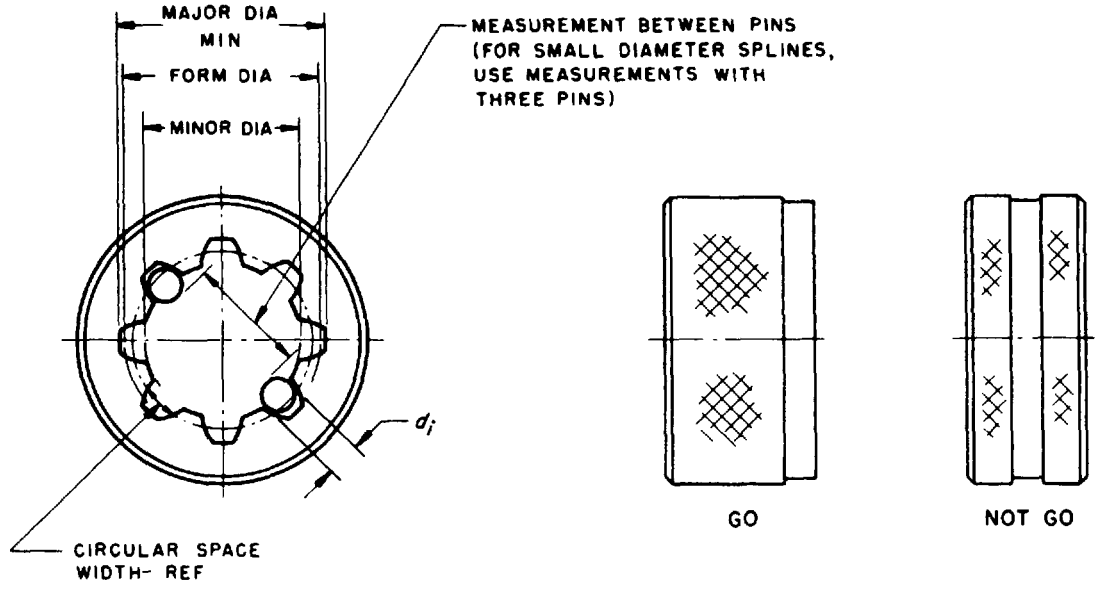
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Gage Dimension		Formula						
Major Dia		$\frac{2D_{Fi} + D}{3}$, ±0.001						
Form Dia		D_i min − $2c_F$						
Minor Dia, max		Must clear form dia and measuring pins						
Circular Tooth Thickness, REF	t_x at XX	s min						
	t_y at YY	s max						
Measurements Over Pins at XX and YY		No tolerance						
Circular Tooth Thickness Taper per in, TPI, REF		To be selected to suit gage manufacture, not less than 0.0002						
Lead Length		Not less than two-thirds of part spline length, or 0.25 in						
Oversize Allowance		To be selected to suit gage application						
Spline Length		$\frac{t_y - t_x + \text{oversize allowance}}{\text{TPI}}$ + lead length						
		Should be less than 6D, preferably less than 4D. To reduce length, tooth thickness taper per inch is increased, oversize allowance is decreased, or both.						
No. of Teeth	In Spline	6-30	31-44	45-58	59-72	73-86	87-100	N
	In Sector	2	3	4	5	6	7	0.075N

FIG. 17—SECTOR PLUG GAGE WITH TAPERED TEETH

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Gage Dimension		Formula, GO	Formula, NOT GO
Minor Dia		D_{Fe}, $^{+0.000}_{-\text{tolerance from Table 73}}$	$\frac{D + 2D_{Fe}}{3}$, ±0.001
Form Dia		D_o max + $2c_F$	
Major Dia, min		Must clear form dia and measuring pins	
Circular Space Width, REF	New Gage	t_v max − wear allowance from Table 74	t_v min
	Wear Limit	t_v max	None

Gage Dimension			Formula, GO	Formula, NOT GO
Measuring Pin Dia			1.7280/P	
Measurement Between Pins	Ring fitted to tapered tooth master		Use t_v max, REF	Use t_v min, REF
	Ring finished without master	New Gage	+0.0000 −tolerance from Table 72	+tolerance from Table 72 −0.0000
		Wear Limit	No tolerance	Not applicable

FIG. 18—COMPOSITE RING GAGE—GO SIDE FIT, NOT GO SIDE FIT, AND NOT GO MAJOR DIAMETER FIT

NOT GO sector plug gage, consists of reducing the major diameter of the gage and providing a negative profile modification in the area inside the pitch diameter of the unrelieved tooth profiles. Gage measuring pins must be selected to contact the unmodified portion of the gage profile.

18.5 Major Diameter Plug Gage—This gage usually has a full complement of teeth which clear the part tooth profiles, but may also take the form of a sector gage. Involute or straight tooth profiles may be used. The sides of their teeth may have any form, provided they clear the tooth profiles and fillets of the part.

CAUTION: In the event a gage of this nature is designed for flat root or fillet root side fit internal splines, there is a danger that the top land could be narrow to the degree of being a knife edge. This condition must be recognized and taken into account before a gage of this kind is used.

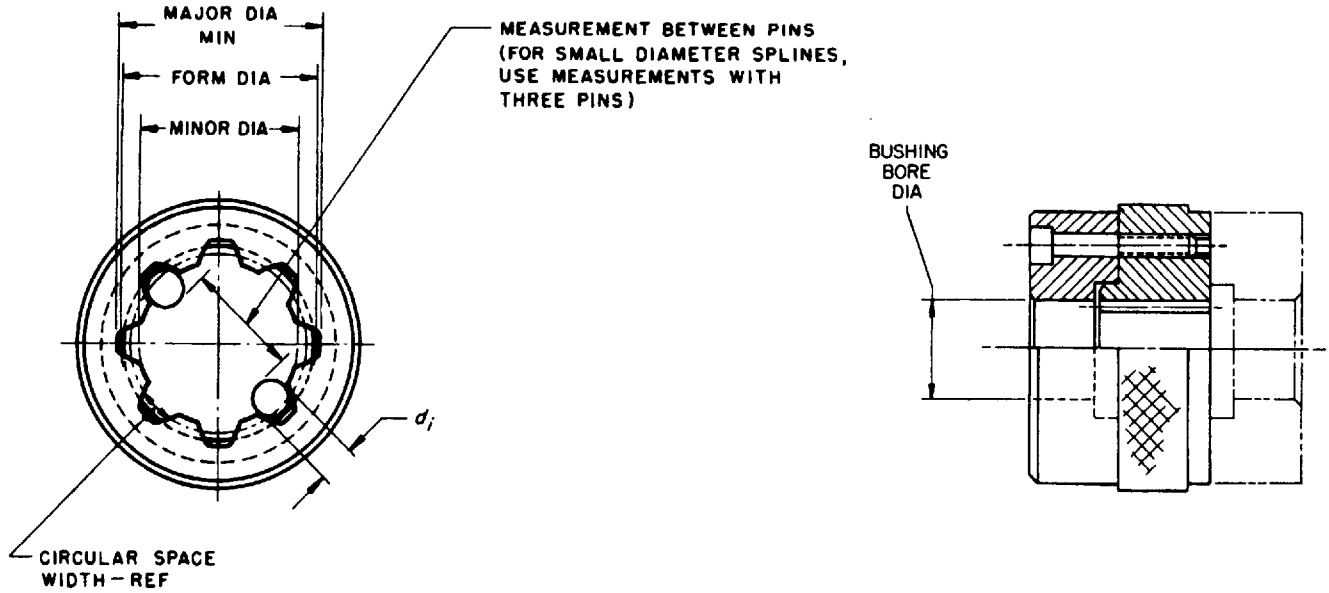
18.5.1 The NOT GO gage for major diameter, shown in Fig. 15, is required for major diameter fit splines.

18.5.2 The GO gage for major diameter, shown in Fig. 15, is optional for major diameter fit splines, but is not required for side fit splines. In the case of major diameter fit splines, it may be used to determine whether rejection by the GO composite major diameter fit plug gage is due to undersize major diameter or other causes, such as undersize effective space width, eccentricity between major and pitch circles, or the fillet. In the case of side fit splines, the form diameter is checked by the Go composite gage and the clearance at the major diameter needs no control.

18.6 Plug Gage with Tapered Teeth—This gage has a taper of not less than 0.0002 in/in on one side of each tooth. It determines whether or not the dimension checked is within limits and also furnishes a measurement. A steep taper may be desirable to shorten the gage length. However, where the gage is also used as an inspection arbor, a slight taper may be required. In order that the gage tolerances on tooth thickness will not affect inspection results, the axial locations of low and high limits are determined by measurement and marked on the gage. Therefore, this gage is recommended where the sum of standard wear allowance and tolerances on the tooth thickness of GO and NOT GO gages would absorb more than about 25% of the part machining tolerance. Where the part tooth thickness tolerance is large, the tooth thickness range required in the gage may cause excessive profile variations on the tapered side of the teeth. To overcome this limitation, a series of tapered tooth gages, each covering a portion of the part tolerance, may be used.

18.6.1 The composite side fit plug gage with tapered

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Gage Dimension			Formula, GO
Bushing Bore			D_o max — wear allowance from Table 74, $+0.000$ $-\frac{5+2D}{100000}$
Minor Dia			D_{Fe}, $+0.000$ — tolerance from Table 73
Form Dia			D_o max $+ 2c_F$
Major Dia of Spline, Min			Must clear major dia of part
Circular Space Width, REF		New Gage	t_v max — wear allowance from Table 74
		Wear Limit	t_v max
Measuring Pin Dia			$\frac{1.7280}{P}$
Measurement Between Pins	Ring fitted to tapered tooth master		Use t_v max, REF
	Ring finished without master	New Gage	$+0.0000$ — tolerance from Table 72
		Wear Limit	No tolerance

FIG. 19—GO COMPOSITE MAJOR DIAMETER FIT RING GAGE

teeth, shown in Fig. 16, enables the determination of the effective space width of the part.

18.6.2 The sector plug gage with tapered teeth, shown in Fig. 17, enables the determination of the actual width of the part.

19. Gages for External Splines

19.1 GO Composite Side Fit Ring Gage—This gage, shown in Fig. 18, is required for side fit splines. It checks the maximum effective tooth thickness and form diameter and clears the major and minor diameters.

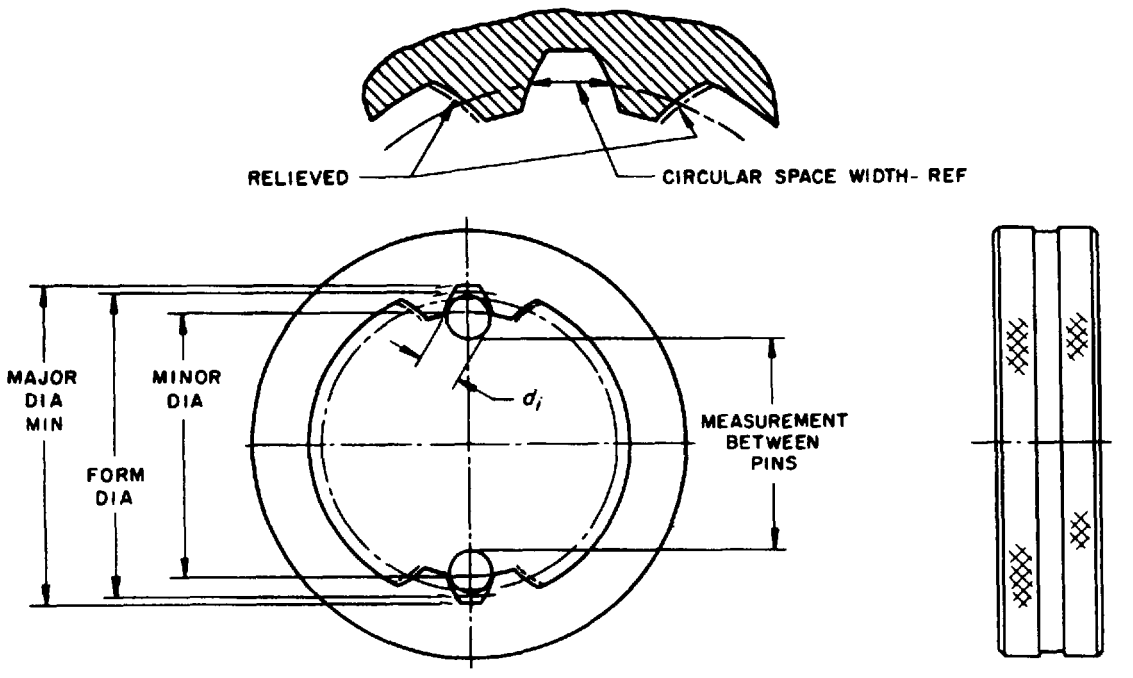
19.2 NOT GO Composite Ring Gage—This gage, shown in Fig. 18, checks the minimum effective tooth thickness of side fit and major diameter fit splines. The minor diameter of this gage is truncated to prevent acceptance of parts with excessive fillets.

19.3 GO Composite Major Diameter Fit Ring Gage—This gage, shown in Fig. 19, is required for major diameter fit splines. It checks the maximum effective tooth thickness, the form diameter, the major diameter, and the relationship between pitch and major circles. The one bushing design allows a progressive check. The two bushing design checks alignment of major and pitch circles within their concentricity limits. It is also recommended where the gage is used for indicating purposes.

19.3.1 To evaluate rejections by the GO composite major diameter fit ring gage, or to check parts before the major diameter is finish machined, the GO composite side fit ring gage may be required.

19.4 NOT GO Sector ring gage—This gage, shown in Fig. 20, is used to check the minimum actual tooth thickness. It is designed with two opposite sectors, each contain-

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Gage Dimension	Formula, NOT GO
Minor Dia	$\frac{D + 2\,D_{Fe}}{3}$, ±0.001
Form Dia	D_o max
Major Dia, min	Must clear form dia and measuring pins
Circular Space Width, REF	t min

Gage Dimension						Formula, NOT GO			
Measurement Between Pins, Calculated						Ring fitted to tapered tooth master			REF
						Ring finished without master			+tolerance from Table 72 −0.0000
No. of Teeth	In Spline	6-30	31-44	45-58	59-72	73-86	87-100	N	
	In Sector	2	3	4	5	6	7	0.075N	

FIG. 20—NOT GO SECTOR RING GAGE

ing at least two teeth. In the case of parts having high numbers of teeth, each sector contains two or more spaces, and could accept parts having individual teeth oversize by the amount of spline variations in the part teeth contacted by the sector. This liberalization is permissible since large diameters rather than load requirements lead to the use of high numbers of teeth. The numbers of teeth recommended for sector gages is shown in Fig. 14. The outer profiles of the sectors are relieved as shown in Fig. 20. Sector gages with two teeth per sector may be designed to perform a function equivalent to measurements with pins by limiting the area of contact between gage and part. This optional feature, which prevents part profile variations from causing acceptance by the NOT GO sector ring gage, consists of increasing the minor diameter of the gage and of providing a negative profile modification in the area outside the pitch diameter of the unrelieved tooth profiles. Measuring pins must be selected to contact the unmodified portion of the gage profile.

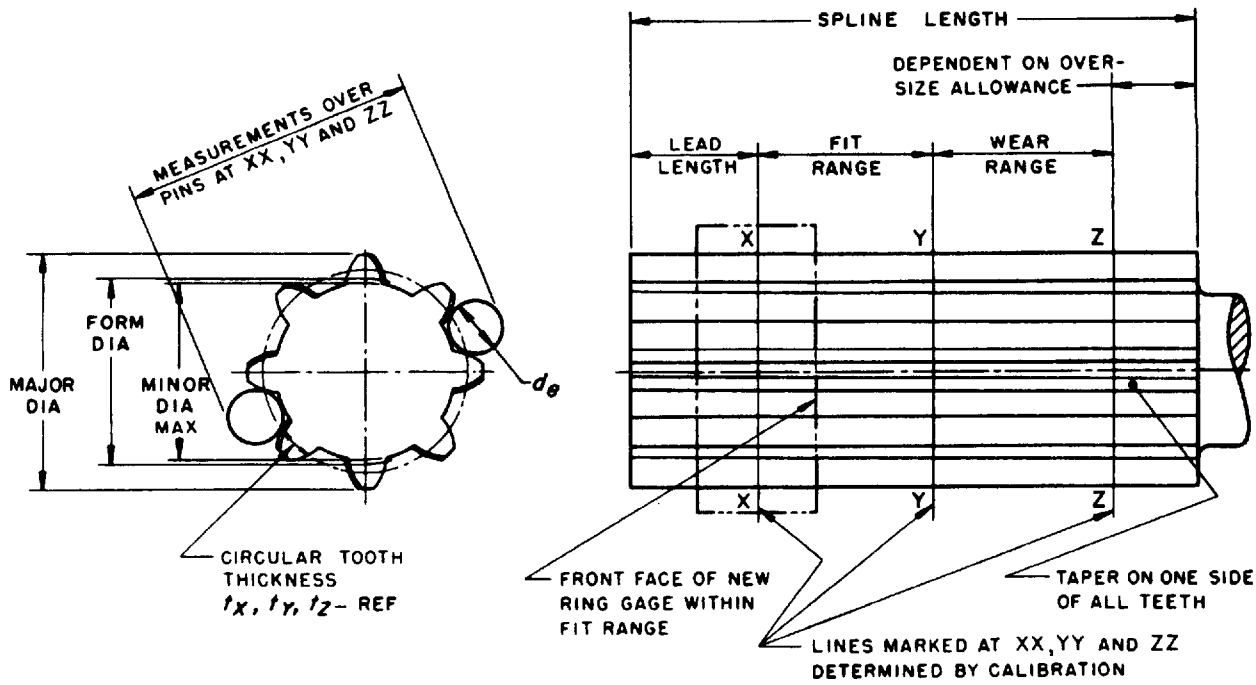
19.5 Tapered Tooth Master Plug Gage—Ring gages are usually fitted to a tapered tooth master plug, or their size may be measured between pins. The effective size of ring gages made to measurements between pins is usually slightly smaller than that of rings fitted to a master. Since the effective tooth thickness of the master plug and the plug gage for the mating part are subject to the same variation allowances, the use of a master plug gage assures a close correlation between the effective sizes of the ring gage and the plug gage for the mating part. Its use also assures replacement rings of a like effective size and enables inspection of ring gage wear.

19.5.1 Tapered tooth masters for composite ring gages, as shown in Figs. 21 and 22, check the effective space width of composite ring gages. The same side of each tooth is tapered to provide a varying tooth thickness. The major diameter of the master is designed to confine the contact between the ring and master to the area of greatest ring wear. Masters for a set of GO and NOT GO ring gages are designed with the same taper and the same overall length to minimize taper settings, even though their spline length may be different.

19.6 Ring and Snap Gages for Major Diameter—GO and NOT GO gages, or other measuring devices, are used to check the major diameter. Conventional snap gages can be employed for this purpose only when the number of teeth is even, or to check the blanks.

19.6.1 GO gages for major diameter will determine whether rejection by the GO composite major diameter fit ring gage is due to oversize major diameter or other causes, such as oversize effective tooth thickness or eccentricity between the major and pitch circles.

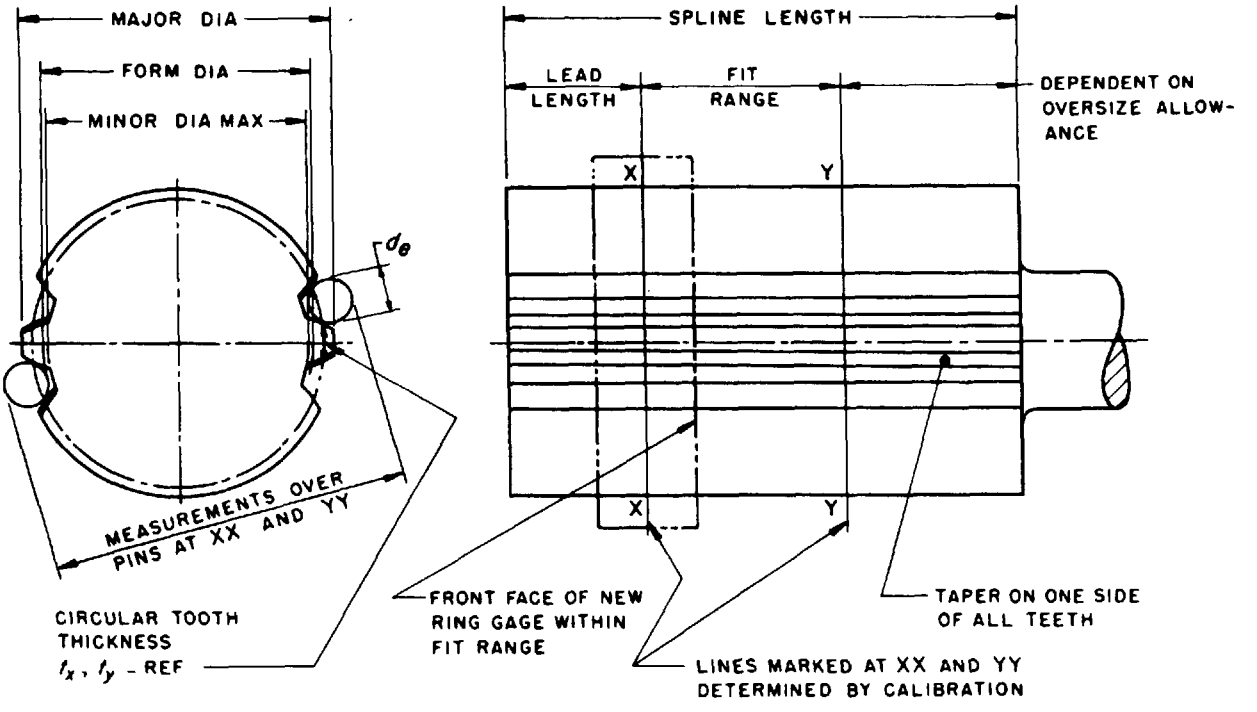
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Dimension of Master		Formula, GO Ring Master	Formula, NOT GO Ring Master
Major Dia		D_o min, $^{+0.000}_{-\text{tolerance from Table 73}}$ For major diameter fit, reduce applicable D_o min by twice maximum chamfer	
Form Dia		$D_{Fe} - 0.010$	$\frac{D + 2D_{Fe}}{3} - 0.010$
Minor Dia, max		Must clear form dia and measuring pins	
Circular Tooth Thickness, REF	t_x at XX	t_v max – wear allowance from Table 74 – tolerance from Table 70	t_v min
	t_y at YY	t_v max – wear allowance from Table 74	t_v min + tolerance from Table 70
	t_z at ZZ	t_v max	Not applicable
Measurement Over Pins at XX, YY, and ZZ		No tolerance	
Circular Tooth Thickness Taper per in, TPI, REF		To be selected to suit gage manufacture, not less than 0.0002	
Lead Length		Not less than width of ring, preferably twice the width	
Oversize Allowance		To be selected to suit gage application	
Spline Length		$\frac{t_z - t_x + \text{oversize allowance}}{\text{TPI}} + \text{lead length}$	$\frac{t_y - t_x + \text{oversize allowance}}{\text{TPI}} + \text{lead length}$
		Should be less than 6D, preferably less than 4D. To reduce length, tooth thickness taper per inch is increased, oversize allowance is decreased, or both.	

FIG. 21—TAPERED TOOTH MASTER FOR COMPOSITE RING GAGES

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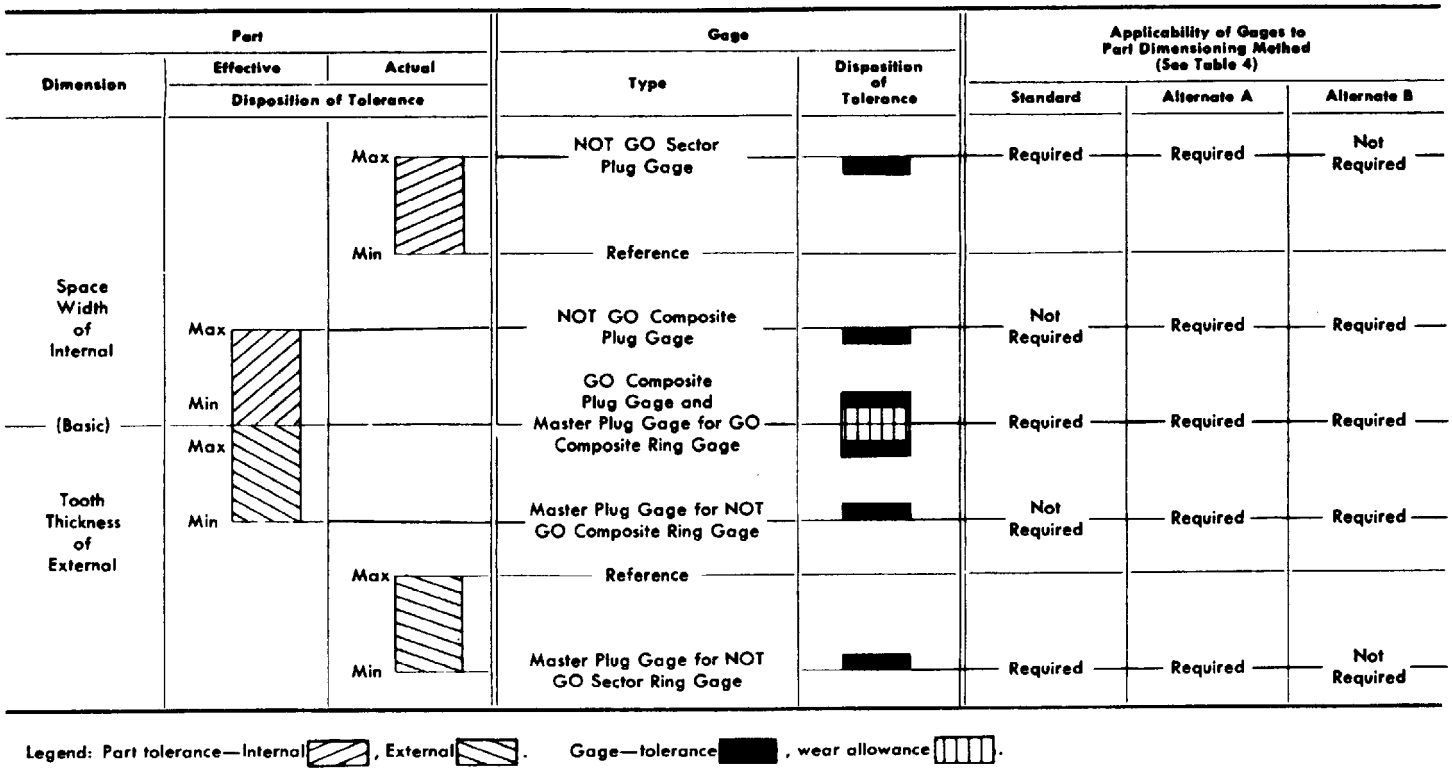


Dimension of Master		Formula
Major Dia		D_o min, $\begin{matrix}+0.000\\-\text{tolerance from Table 73}\end{matrix}$ For major dia fit, reduce applicable D_o min by twice max chamfer
Form Dia		$\frac{D + 2D_{Fe}}{3} - 0.010$
Minor Dia, max		Must clear form dia and measuring pins
Circular Tooth Thickness, REF	t_x at XX	t min
	t_y at YY	t min + tolerance from Table 70
Measurements Over Pins at XX and YY		No tolerance
Circular Tooth Thickness Taper per in, TPI,REF		To be selected to suit gage manufacture, not less than 0.0002
Lead Length		Not less than width of ring, preferably twice the width
Oversize Allowance		To be selected to suit gage application
Spline Length		$\frac{t_y - t_x + \text{oversize allowance}}{\text{TPI}} + \text{lead length}$
		Should be less than 6D, preferably less than 4D. To reduce length, tooth thickness taper per inch is increased, oversize allowance is decreased, or both.
No. of Teeth		To be same as in Sector Ring, see Fig. 20

FIG. 22–TAPERED TOOTH MASTER FOR NOT GO SECTOR RING GAGES

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TABLE 68—PART AND GAGE RELATIONSHIP FOR SIDE FIT SPLINES SPACE WIDTH AND TOOTH THICKNESS



20. Gage Tolerances

20.1 General—All gages are dimensioned within the extreme limits of the product, inasmuch as the product tolerances are those deemed necessary to include all manufacturing and gaging variations. Parts which meet the minimum material limit may be rejected by a NOT GO sector gage, due to permissible gage tolerances. Such parts can be qualified by measurements with pins.

20.2 Part and Gage Tolerance Relationship—Generally the sum of the gage tolerances, including the wear allowance of the GO gage, is allowed to absorb 10-15%, in no case more than 25%, of the part tolerance. Wherever the separate GO and NOT GO gages would absorb more than 25% of the part tolerance, tapered tooth plug gages or indicator gages may be used.

20.2.1 In establishing the part and gage tolerance relationship, the part tolerance should be the spread between the dimensions checked. It will be the total tolerance ($\lambda + m$) in the case of the Standard Method of dimensioning illustrated in Table 68, also in evaluating the tolerance absorbtion of the GO composite and NOT GO sector gages for Alternate Method A of dimensioning. However, in the case of the GO and NOT GO composite gages used for both Alternate Method A and Alternate Method B, it will be the machining tolerance only.

20.2.2 Recommended gage tolerances for 5/10 spline pitch and finer are shown in Tables 70-74. Larger tolerances should be used wherever possible. Gage makers should be consulted concerning tolerances for coarser spline pitches.

TABLE 69—ALLOWABLE VARIATIONS FOR GAGES[a]

Pitch Dia		Profile Total	Index Total	Runout (FIM)[b]		Total Length		Lead (FIM)
Over	Thru			Ring Gage	Plug Gage	Over	Thru	
0.00	2.00	0.0002	0.0002	0.0003	0.0002	0.00	1.00	0.000
2.00	4.00	0.0002	0.0002	0.0004	0.0003	1.00	3.00	0.0002
4.00	6.00	0.0002	0.0003	0.0005	0.0004	3.00	5.00	0.000*
6.00	8.00	0.0002	0.0004	0.0005	0.0004			

[a]The accumulation of variations can be checked only in the case of rings fitted to master plugs. The actual space width of the ring may exceed the actual tooth thickness of the master, at the fit plane, by 0.0004 in max, up to 8.00 in pitch dia.

[b]Referred to centers of plug gages and to indicating bands of ring gages.

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TABLE 70—TOLERANCES FOR ACTUAL SPACE WIDTH AND TOOTH THICKNESS OF GAGES
Hundred Thousandths (20=0.00020)

Spline Pitch[a] N	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	45	50	55	60 to 100
5/10	10	10	10	10	10	10	10	10	11	12	13	14	15	16	17	18	19	20	—	—	—	—	—
6/12	10	10	10	10	10	10	10	10	10	10	11	12	13	13	14	15	16	17	18	19	21	23	25
8/16	10	10	10	10	10	10	10	10	10	10	10	10	10	10	11	11	12	13	13	14	16	18	20
10/20	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	11	11	13	15	17
12/24 and finer	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	11	12	13

Note: See paragraph 16.7 for use of this table.
[a]For coarser spline pitches, see paragraph 20.2.2.

TABLE 71—TOLERANCES FOR MEASUREMENTS OVER PINS ON PLUG GAGES

This table has been deleted, see paragraph 16.7.

TABLE 72—TOLERANCES FOR MEASUREMENTS BETWEEN PINS ON RING GAGES

This table has been deleted, see paragraph 16.7.

TABLE 73—TOLERANCES FOR MAJOR AND MINOR DIAMETERS OF GAGES

Type of Fit	Plug Gage				Ring Gage			
	Major Dia[a]			Minor Dia[b]	Minor Dia[a]			Major Dia[b]
	Over 0.00 thru 1.50	Over 1.50 thru 6.00	Over 6.00 thru 8.00		Over 0.00 thru 1.50	Over 1.50 thru 6.00	Over 6.00 thru 8.00	
Sides of Teeth	0.0005	0.0005	0.0005	Max	0.0005	0.0005	0.0010	Min
Major Dia	0.0001	0.0002	0.0003	Max	0.0005	0.0005	0.0010	Min

[a]Tolerances on truncated gage diameters and on major diameters of master plugs are twice those given in the table for side fit.
[b]These are clearance dimensions and do not require close tolerances.

TABLE 74—WEAR ALLOWANCES FOR GO GAGES

Spline Pitch	Space Width or Tooth Thickness		Major Dia Checking Surfaces
	Standard and Alternate A[a]	Alternate B[a]	
5/10 through 8/16	0.0003	0.0002	0.0002
10/20 through 20/40	0.0003	0.0002	0.0002
24/48 through 48/96	0.0002	0.0002	0.0002
64/128 through 128/256	0.0002	0.0002	0.0002

[a]See Tables 4 and 68.

21. Measurements with Pins

21.1 General—Actual space width and actual tooth thickness may be measured with pins. These measurements do not determine the fit between mating parts but may be used as a part of analytical inspection of splines to evaluate the effective space width or tooth thickness by approximation.

21.1.1 The diameters of measuring pins are shown in Figs. 23 and 25. Pins are held within 0.000025 in for roundness and size, and are calibrated between flat parallel measuring contacts. The 1.92 series is used for all 45 deg pressure angle splines, including internal straight sided splines. These pins contact the tooth approximately at the mid-point of the profile. Exact pitch line contact is not necessary.

21.2 Measurements with Two Pins

21.2.1 The formulas in Figs. 23-25 should be used for calculations. All dimensions used should be carried to seven significant figures. Rounded values from the main tables shall be used.

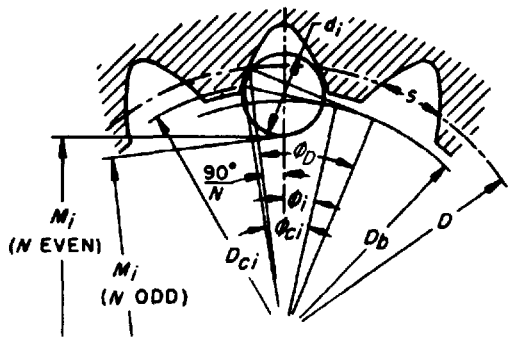
21.2.2 Measurements between pins for internal splines or ring gages with low numbers of teeth, such as 6, 7, and sometimes 8, present special problems. The pin must clear the major diameter of the part or gage, and it must not interfere with the involute profile near the base circle as shown in Fig. 26.

21.2.3 Where clearance at the major diameter cannot be obtained with round pins, flatted pins are required.

21.3 Measurements with Three Pins—If three pins are used for measurements, as shown in Fig. 27, a plug of M_1 diameter must be used for checking both even and odd numbers of teeth. Measurements with three pins are sometimes preferred for small splines.

21.4 Pin Contact Diameter—The diameter at the pin

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$d_i = 1.7280/P$ FOR 30 DEG AND 37.5 DEG ϕ_D SPLINES
$= 1.9200/P$ FOR 45 DEG ϕ_D SPLINES

$$\text{inv}\,\phi_i = \frac{s}{D} + (\text{inv}\,\phi_D - \frac{d_i}{D_b})$$

Find ϕ_i in degrees

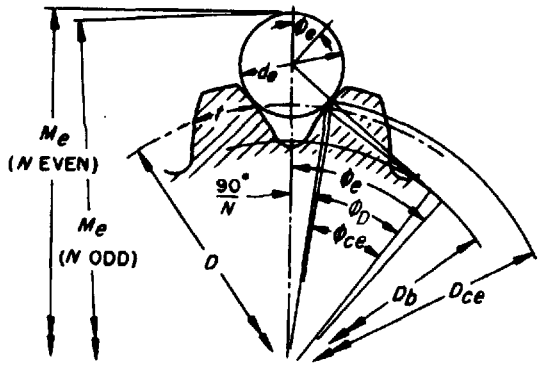
(N EVEN) $M_i = D_b \sec \phi_i - d_i$

(N ODD) $M_i = (D_b \cos \frac{90°}{N}) \sec \phi_i - d_i$

$$\tan \phi_{ci} = \tan \phi_i + \frac{d_i}{D_b}$$

$D_{ci} = D_b \sec \phi_{ci}$

FIG. 23—MEASUREMENT BETWEEN PINS OF INTERNAL INVOLUTE SPLINES



$d_e = 1.9200/P$

$$\text{inv}\,\phi_e = \frac{t}{D} + (\text{inv}\,\phi_D + \frac{d_e}{D_b} - \frac{\pi}{N})$$

Find ϕ_e in degrees

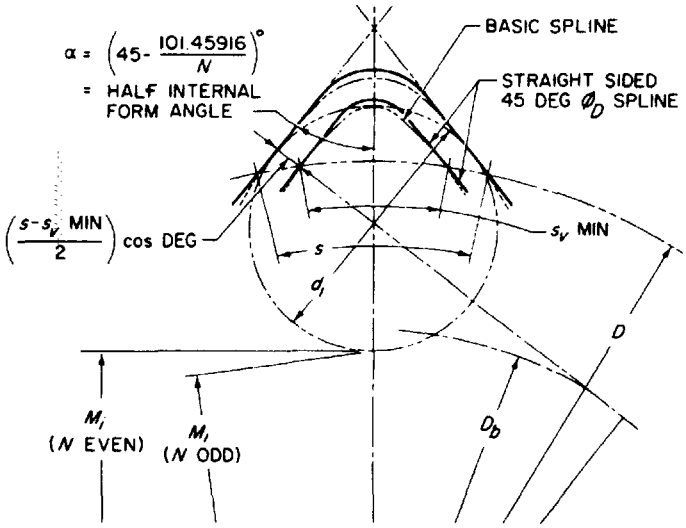
(N EVEN) $M_e = D_b \sec \phi_e + d_e$

(N ODD) $M_e = (D_b \cos \frac{90°}{N}) \sec \phi_e + d_e$

$$\tan \phi_{ce} = \tan \phi_e - \frac{d_e}{D_b}$$

$D_{ce} = D_b \sec \phi_{ce}$

FIG. 25—MEASUREMENT OVER PINS OF EXTERNAL INVOLUTE SPLINES



BASIC SPACE WIDTH

(N EVEN) $M_i = \frac{D \sin 45° - d_i}{\sin \alpha} - d_i$

(N ODD) $M_i = \left[\frac{D \sin 45° - d_i}{\sin \alpha}\right] \cos \frac{90°}{N} - d_i$

NONBASIC SPACE WIDTH

(N EVEN) $M_i = \left[\frac{\sin 45° (s - s_v \text{ min} + D) - d_i}{\sin \alpha}\right] - d_i$

(N ODD) $M_i = \left[\frac{\sin 45° (s - s_v \text{ min} + D) - d_i}{\sin \alpha}\right] \cos \frac{90°}{N} - d_i$

FIG. 24—MEASUREMENT BETWEEN PINS OF INTERNAL STRAIGHT SIDED 45 DEG ϕ_D SPLINES

contact point may be calculated for all splines from the formulas in Figs. 23 or 25.

21.5 Conditions for Measurements

21.5.1 Pressures for measurement of spline gages with pins should be negotiated with due consideration of the variables introduced by material, geometry, and measuring methods.

21.5.2 The temperature for measurements is 20 °C (68 °F).

22. *Analytical Inspection*

22.1 General—Analytical inspection is the measurement of individual dimensions and variations. Major and minor diameters are checked by conventional methods; the measurements of actual space width and tooth thickness are covered in previous sections. This section deals with the individual measurement of spline variations of index, profile, lead, roundness, and eccentricity. Profile inspection also covers the form diameter and tooth tip chamfer.

22.2 Measurements of Spline Variations—The effect of these variations on the fit between mating parts is described in Section 9.

22.2.1 TOTAL INDEX VARIATION—Index variations are the variations in the spacing of all corresponding tooth profiles from perfect spacing with respect to one arbitrarily selected tooth side. The total index variation is the spread between the two greatest opposite index variations. It may be measured directly, or obtained indirectly by measuring the circular pitch variations, which are the variations from the correct circular pitch. The measurement of circular pitch variations is of little value for splines unless converted to total index variation.

22.2.1.1 Index variation of tooth profiles is not identical with the index variation of the centerlines of spaces or teeth. Measurement of either variation is acceptable, since

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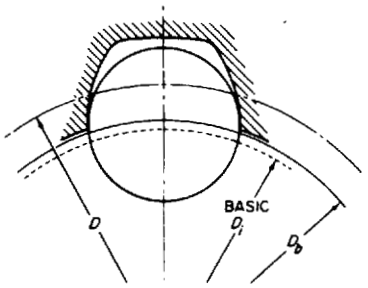


FIG. 26—SIX-TOOTH INTERNAL SPLINE

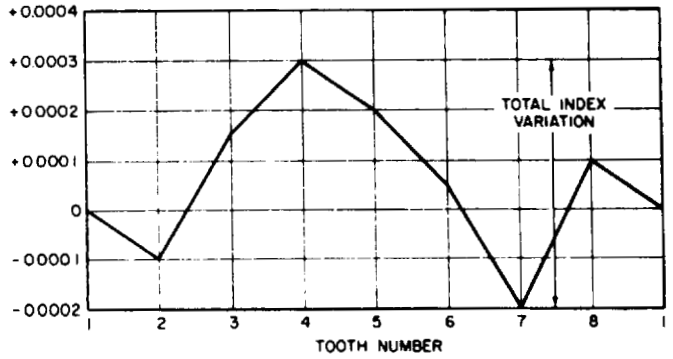
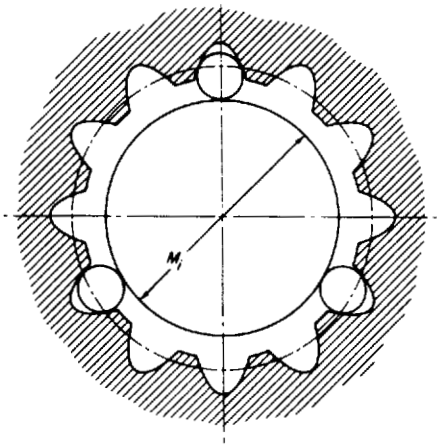


FIG. 28—INDEX VARIATION CHART



WHERE N IS EVEN, USE
M_i FROM PIN MEASUREMENT
(TABLES 76 THRU 104)

WHERE N IS ODD, USE
$M_i = D_b \sec \phi_i - d_i$

FOR ϕ_i SEE FORMULA IN FIG 23

FIG. 27—MEASUREMENT WITH THREE PINS

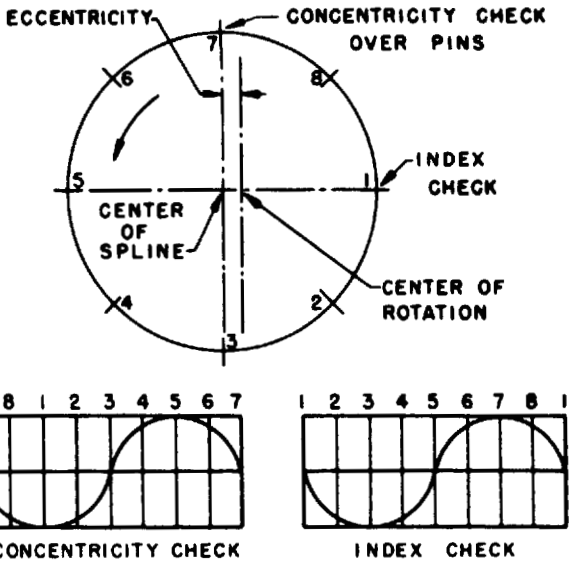


FIG. 29—INDEX READINGS DUE TO ECCENTRICITY

only a percentage of the total index variation is assumed to be reflected in the fit. Where readings must be repeatable, it is necessary to describe in detail the manner of inspection. Measurements taken on the centerlines of internal spaces and external teeth may be more suitable for determining the effective variation since they are not influenced by space width and tooth thickness variations. On the other hand, determinations of the spacing of tooth profiles permits contact analysis and separate inspection of drive and coast sides. Index variation is usually measured normal to the tooth surface as shown in Fig. 33B. This practice yields readings smaller than the variation at the pitch circle but is generally accepted.

22.2.1.2 The total index variation may be inspected directly by means of precision indexing devices. Readings may be recorded as shown in Fig. 28. No computations are required. However, the readings may be affected by eccentricity. If the plotted curves of the concentricity and index checks are identical as shown in Fig. 29, the part has no index variation, but is mounted eccentrically.

Tooth No.	Tooth to Tooth Reading[a]	Circular Pitch Variation[b]	Index Variation From Tooth No. One[c]	Total Index Variation
1	+0.00050	−0.00010	0.00000	
2	+0.00085	+0.00025	−0.00010	
3	+0.00075	+0.00015	+0.00015	
4	+0.00050	−0.00010	+0.00030*	
5	+0.00045	−0.00015	+0.00020	0.0005
6	+0.00035	−0.00025	+0.00005	
7	+0.00090	+0.00030	−0.00020*	
8	+0.00050	−0.00010	+0.00010	
1			0.00000	
	+0.00480 sum +0.00060 average	0.00000 sum (must be zero)	*Total index variation is obtained as the spread between two greatest opposite index variations.	

[a]Initial zero setting not required.
[b]Tooth to tooth reading minus average reading.
[c]Add or subtract, for each tooth, all preceding circular pitch variations.

FIG. 30—INDEX VARIATION TABULATION

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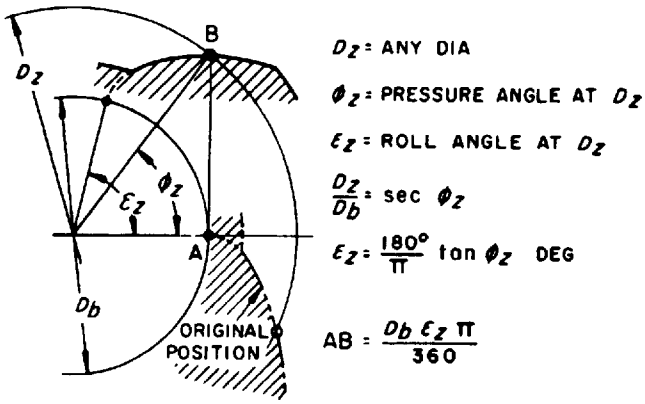


FIG. 31—USE OF ROLL ANGLES

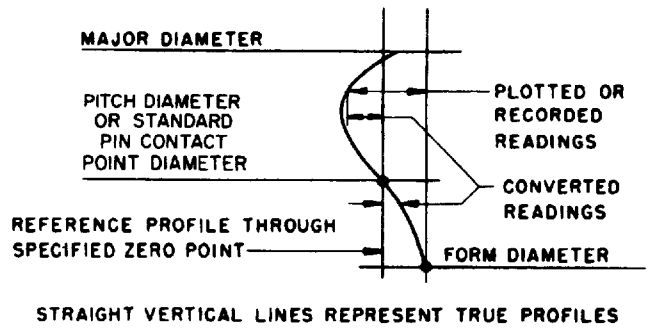


FIG. 32—ANALYSIS OF PROFILE READINGS

22.2.1.3 The total index variation may be determined indirectly by measuring the differences in circular pitch. This method compares the spacing of all pairs of adjacent teeth with that of an arbitrarily selected pair. Since the spacing of this reference pair is not necessarily equal to the correct spacing, the readings obtained are not circular pitch variations, but rather differences in circular pitch as related to the reference pair. The circular pitch variations are obtained by subtracting the average of the readings from each reading. The index variation of each tooth with respect to the first tooth of the reference pair is obtained by adding or subtracting, as indicated all circular pitch variations of preceding spaces, starting from the reference pair. These index variations are equal to the readings obtained directly, as in paragraph 22.2.1.2. The total index variation is determined as shown in Fig. 30. This numerical evaluation is time consuming, but the equipment required for this method is relatively simple. Great care is required in taking each reading in order to minimize the accumulation of measuring reading errors.

22.2.1.4 Where readings are taken over a constant span of more than one circular pitch, for example over 90 or 180 deg, these readings give an indication of the quality of the spacing. However, determination of the total index variation is possible only when the number of circular pitches checked and the number of teeth have no common factor, and even then is rather difficult.

22.2.1.5 It is of little significance whether or not inspection of index variation is performed near the pitch point, as long as all profiles are contacted at corresponding points.

22.2.1.6 Measurements of base pitch, which is the shortest distance between corresponding profiles of adjacent teeth, are influenced by profile variations. They furnish merely an indication of spacing quality and do not permit an exact evaluation of the total index variation.

22.2.2 PROFILE VARIATION

22.2.2.1 Inspection of the involute profile may be performed by measuring, for a number of tooth positions, the distance AB along a tangent to the base diameter. An original tooth position is assumed for which the involute, or its extension, passes through point A (see Fig. 31). Rotation of the involute profile through the roll angle brings consecutive profile points onto the tangent line. Table 75 is provided to aid in the determination of the roll angle for any desired diameter. The distance AB can be found from the formula in Fig. 31. This computation is the first carried out for the pitch diameter (or pin contact diameter) and an indicating device set to zero at that distance AB which corresponds to $D_z = D$ and $\phi_z = \phi_D$. The starting position of the tooth profile is obtained by rotation of the spline member until a zero reading is registered. Other diameters may then be assumed and new settings made for the decrease or increase in roll angle and in the distance AB. Profile variations from a true involute will be registered by the indicating device. Care should be taken to assure that contact occurs exactly at a tangent to the base circle in order to avoid false readings, particularly in the area near the base circle where the radius of curvature of the involute approaches the value zero.

22.2.2.2 Involute profile checking machines are commonly used, in which the rotation of the tooth profile and the straight motion of the indicating member are held in timed relation. They require the determination of the roll angle or the equivalent arc at the base circle. Readings start at the form diameter, in order to avoid the need for reversing the motions of the instrument. In such cases, the readings should be converted by subtracting from all readings the reading at the specified pitch point or standard pin contact point diameter, as shown in Fig. 32.

22.2.2.3 The tooth profile is sometimes inspected by checking the width of the tooth space at a number of diameters, for example, by a series of three or more radial measurements with pins of different diameters. Allowance should be made for the fact that the angle between the profile tangent at the pin contact point and the centerline of the space changes with the pin diameter; therefore, each deviation of the radial measurement must be multiplied by the sine of the pressure angle at the center of the respective pin. These values, after the conversion as shown in Fig. 32, can be considered as profile variations at the contact points, only if the profiles are symmetrical with respect to the space centerline. Another shortcoming of this method lies in the fact that it does not reflect variations due to improper position or angularity of the tooth centerline (leaning teeth).

22.2.2.4 The tooth profile may also be inspected by enlarged projection and compared to profile layouts. The reliability of this method depends on the magnification accuracy of the layout, and the skill of the operator in measuring the projected deviations. It also requires that the layout and the profile projection be in the proper re-

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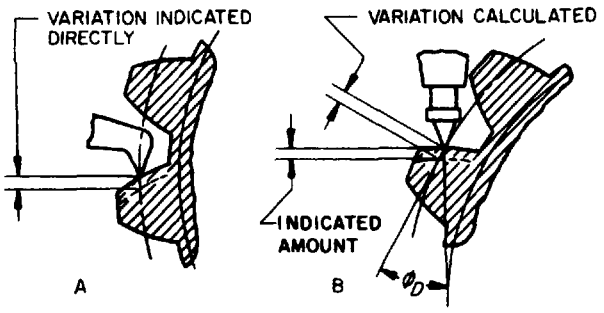


FIG. 33—INDICATING LEAD VARIATION

lation to their respective centers; otherwise, false readings will be obtained.

22.2.2.5 Other methods employ projections of contact surfaces, master involute templates, a series of probes, etc.

22.2.2.6 The form diameter, converted to degrees of involute roll can be measured by profile inspection, as described in paragraphs 22.2.2.1 and 22.2.2.2.

22.2.2.7 The points on the profile at which the maximum and minimum chamfers begin may be converted to degrees of involute roll and measured by profile inspection as described in paragraphs 22.2.2.1 and 22.2.2.2.

22.2.3 LEAD VARIATION

22.2.3.1 Lead variation of a spline, as measured from a reference axis (see definitions), includes the effect of helix, parallelism, and alignment variations. The lead variation will affect the fit between mating splines if all or part of the lead variation is due to helix or parallelism variation. It will also affect the fit between mating splines in event the same reference axis is used for location of a related component, such as the major diameter for a major diameter fit spline.

22.2.3.2 Lead variation is measured, with the part mounted on the referenced or specified axis, either in a direction tangent to the pitch surface, as in Fig. 33A, or normal to the tooth surface, as in Fig. 33B. In the latter case, the indicated amount shall be divided by the cosine of the pressure angle. These readings are taken at or near the pitch surface in an axial direction.

22.2.3.3 Inspection of lead variation by means of pins is not recommended because this method provides readings which are the result of the mean variation of the two sides of the space being inspected. The readings do not reveal hollows or waviness and do not indicate the effect of taper.

22.2.3.4 To find the true reason for the amount of lead variation, all of the teeth should be inspected. Thus, an analysis of these readings, based on the definitions of lead, parallelism, and alignment variation along with the related illustrations, will indicate the true nature of the variation. With a spline connection that does not have any location restriction other than the spline teeth, the only segment of the lead variation that will effect assembly is the helix and parallelism variation.

22.2.4 OUT OF ROUNDNESS—Out of roundness is measured by taking a series of measurements, using two pins placed diametrically opposite.

22.2.5 ECCENTRICITY—These sections deal with inspection of the eccentricity between the spline axis and the axis of the product established by the mounting surfaces.

22.2.5.1 Eccentricity may be inspected by readings over one pin while rotating about the part axis. These readings include the effect of out of roundness and index variations.

22.2.5.2 Eccentricity may also be inspected by measuring the center distance variation when the teeth roll in tight mesh with a mating master. Since splines are not designed to roll as gears, each tooth may lose involute contact before the next tooth comes into mesh, causing abrupt center distance variations between each tooth engagement which must be disregarded. Readings obtained by this method reflect index and profile variations and are sometimes used to give a general indication of spline uniformity; however, they ascertain neither the total index variation nor the effective space width or tooth thickness.

22.2.5.3 Where eccentricity is checked by using gages with straight or tapered teeth, or special gaging fixtures with solid or expanding spline members, the relation of the effective spline contour with respect to other surfaces is checked without the effect of out of roundness. The type of equipment employed depends on the tolerances on space width, tooth thickness, and eccentricity. Solid gages, designed for an eccentricity allowance which applies for maximum material limits, will permit more eccentricity for parts machined to minimum material limits. Where eccentricity tolerances must be independent of other dimensions, special expanding or tapered spline members must be used together with indicating devices.

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TABLE 75—INVOLUTE ROLL ANGLES

$\frac{D_z}{D_b}$	e_z	Diff.	$\frac{D_z}{D_b}$	e_z	Diff.	$\frac{D_z}{D_b}$	e_z	Diff.	$\frac{D_z}{D_b}$	e_z	Diff.	$\frac{D_z}{D_b}$	e_z	Diff.	$\frac{D_z}{D_b}$	e_z	Diff.
1.00001	0.26		1.0046	5.50		1.0280	13.65		1.0960	25.70		1.1860	36.53		1.2760	45.41	
		0.106			0.060			0.123			0.140			0.106			0.092
1.00002	0.36		1.0047	5.56		1.0285	13.78		1.0970	25.84		1.1870	36.64		1.2770	45.50	
		0.081			0.059			0.122			0.183			0.106			0.092
1.00003	0.44		1.0048	5.62		1.0290	13.90		1.0980	25.98		1.1880	36.75		1.2780	45.60	
		0.069			0.058			0.121			0.139			0.106			0.092
1.00004	0.51		1.0049	5.68		1.0295	14.02		1.0990	26.12		1.1890	36.85		1.2790	45.69	
		0.061			0.058			0.119			0.138			0.106			0.092
1.00005	0.57		1.0050	5.74		1.0300	14.14		1.1000	26.26		1.1900	36.96		1.2800	45.78	
		0.055			0.057			0.118			0.137			0.106			0.092
1.00006	0.63		1.0051	5.79		1.0305	14.26		1.1010	26.39		1.1910	37.06		1.2810	45.87	
		0.050			0.057			0.117			0.137			0.105			0.092
1.00007	0.68		1.0052	5.85		1.0310	14.38		1.1020	26.53		1.1920	37.17		1.2820	45.96	
		0.047			0.056			0.116			0.136			0.105			0.092
1.00008	0.72		1.0053	5.91		1.0315	14.49		1.1030	26.67		1.1930	37.28		1.3830	46.05	
		0.044			0.056			0.116			0.136			0.105			0.091
1.00009	0.77		1.0054	5.96		1.0320	14.61		1.1040	26.80		1.1940	37.38		1.2840	46.15	
		0.042			0.055			0.115			0.135			0.105			0.091
1.00010	0.81		1.0055	6.02		1.0325	14.73		1.1050	26.94		1.1950	37.49		1.2850	46.24	
		0.040			0.055			0.114			0.134			0.105			0.091
1.00011	0.85		1.0056	6.07		1.0330	14.84		1.1060	27.07		1.1960	37.59		1.2860	46.33	
		0.038			0.054			0.113			0.134			0.104			0.091
1.00012	0.89		1.0057	6.13		1.0335	14.95		1.1070	27.20		1.1970	37.69		1.2870	46.42	
		0.036			0.054			0.112			0.133			0.104			0.091
1.00013	0.92		1.0058	6.18		1.0340	15.07		1.1080	27.34		1.1980	37.80		1.2880	46.51	
		0.035			0.053			0.112			0.133			0.104			0.091
1.00014	0.96		1.0059	6.23		1.0345	15.18		1.1090	27.47		1.1990	37.90		1.2890	46.60	
		0.034			0.053			0.111			0.132			0.104			0.091
1.00015	0.99		1.0060	6.29		1.0350	15.29		1.1100	27.60		1.2000	38.01		1.2900	46.69	
		0.033			0.052			0.110			0.132			0.104			0.091
1.00016	1.03		1.0061	6.34		1.0355	15.40		1.1110	27.74		1.2010	38.11		1.2910	46.78	
		0.032			0.052			0.109			0.131			0.103			0.091
1.00017	1.06		1.0062	6.39		1.0360	15.51		1.1120	27.87		1.2020	38.22		1.2920	46.87	
		0.031			0.052			0.109			0.131			0.103			0.090
1.00018	1.09		1.0063	6.44		1.0365	15.62		1.1130	28.00		1.2030	38.32		1.2930	46.96	
		0.030			0.051			0.108			0.130			0.103			0.090
1.00019	1.12		1.0064	6.49		1.0370	15.73		1.1140	28.13		1.2040	38.42		1.2940	47.05	
		0.029			0.051			0.107			0.130			0.103			0.090
1.00020	1.15		1.0065	6.54		1.0375	15.84		1.1150	28.26		1.2050	38.52		1.2950	47.14	
		0.028			0.050			0.107			0.129			0.103			0.090
1.00021	1.17		1.0066	6.59		1.0380	15.94		1.1160	28.39		1.2060	38.62		1.2960	47.23	
		0.028			0.050			0.107			0.129			0.102			0.090
1.00022	1.20		1.0067	6.64		1.0385	16.05		1.1170	28.52		1.2070	38.73		1.2970	47.32	
		0.027			0.050			0.106			0.128			0.102			0.090
1.00023	1.23		1.0068	6.69		1.0390	16.16		1.1180	28.64		1.2080	38.83		1.2980	47.41	
		0.027			0.049			0.105			0.128			0.102			0.090
1.00024	1.26		1.0069	6.74		1.0395	16.26		1.1190	28.77		1.2090	38.93		1.2990	47.50	
		0.026			0.049			0.105			0.128			0.102			0.090
1.00025	1.28		1.0070	6.79		1.0400	16.37		1.1200	28.90		1.2100	39.03		1.3000	47.59	
		0.025			0.049			0.104			0.127			0.102			0.090
1.00026	1.31		1.0071	6.84		1.0405	16.47		1.1210	29.03		1.2110	39.13		1.3010	47.68	
		0.025			0.048			0.103			0.127			0.102			0.090
1.00027	1.33		1.0072	6.89		1.0410	16.57		1.1220	29.15		1.2120	39.24		1.3020	47.77	
		0.025			0.048			0.103			0.126			0.101			0.089
1.00028	1.36		1.0073	6.94		1.0415	16.68		1.1230	29.28		1.2130	39.24		1.3030	47.86	
		0.024			0.048			0.102			0.126			0.101			0.089
1.00029	1.38		1.0074	6.98		1.0420	16.78		1.1240	29.40		1.2140	39.44		1.3040	47.95	
		0.024			0.047			0.102			0.125			0.101			0.089
1.00030	1.40		1.0075	7.03		1.0425	16.88		1.1250	29.53		1.2150	39.54		1.3050	48.04	
		0.023			0.047			0.101			0.125			0.101			0.089
1.00031	1.43		1.0076	7.08		1.0430	16.98		1.1260	29.65		1.2160	39.64		1.3060	48.13	
		0.023			0.047			0.101			0.125			0.101			0.089
1.00032	1.45		1.0077	7.12		1.0435	17.08		1.1270	29.78		1.2170	39.74		1.3070	48.22	
		0.023			0.046			0.100			0.124			0.100			0.089
1.00033	1.47		1.0078	7.17		1.0440	17.18		1.1280	29.90		1.2180	39.84		1.3080	48.31	
		0.022			0.046			0.100			0.124			0.100			0.089
1.00034	1.49		1.0079	7.22		1.0445	17.28		1.1290	30.03		1.2190	39.94		1.3090	48.40	
		0.022			0.046			0.099			0.123			0.100			0.089
1.00035	1.52		1.0080	7.26		1.0450	17.38		1.1300	30.15		1.2200	40.04		1.3100	48.49	
		0.022			0.045			0.099			0.123			0.100			0.089
1.00036	1.54		1.0081	7.31		1.0455	17.48		1.1310	30.27		1.2210	40.14		1.3110	48.57	
		0.021			0.045			0.098			0.123			0.100			0.089
1.00037	1.56		1.0082	7.35		1.0460	17.58		1.1320	30.40		1.2220	40.24		1.3120	48.66	
		0.021			0.045			0.097			0.122			0.100			0.089
1.00038	1.58		1.0083	7.40		1.0465	17.67		1.1330	30.52		1.2230	40.34		1.3130	48.75	
		0.021			0.045			0.097			0.122			0.100			0.088
1.00039	1.60		1.0084	7.44		1.0470	17.77		1.1340	30.64		1.2240	40.44		1.3140	48.84	
		0.020			0.044			0.096			0.121			0.099			0.088
1.00040	1.62		1.0085	7.49		1.0475	17.87		1.1350	30.76		1.2250	40.54		1.3150	48.93	
		0.020			0.044			0.096			0.121			0.099			0.088
1.00041	1.64		1.0086	7.53		1.0480	17.96		1.1360	30.88		1.2260	40.64		1.3160	49.02	
		0.020			0.044			0.096			0.121			0.099			0.088
1.00042	1.66		1.0087	7.57		1.0485	18.06		1.1370	31.00		1.2270	40.74		1.3170	49.10	
		0.020			0.044			0.095			0.120			0.099			0.088
1.00043	1.68		1.0088	7.62		1.0490	18.15		1.1380	31.12		1.2280	40.84		1.3180	49.19	
		0.020			0.043			0.095			0.120			0.099			0.088
1.00044	1.70		1.0089	7.66		1.0495	18.25		1.1390	31.24		1.2290	40.94		1.3190	49.28	
		0.019			0.043			0.094			0.120			0.098			0.088
1.00045	1.72		1.0090	7.70		1.0500	18.34		1.1400	31.36		1.2300	41.03		1.3200	49.37	
		0.019			0.043			0.187			0.119			0.098			0.088
1.00046	1.74		1.0091	7.75		1.0510	18.53		1.1410	31.48		1.2310	41.13		1.3210	49.46	
		0.019			0.043			0.185			0.119			0.098			0.088
1.00047	1.76		1.0092	7.79		1.0520	18.72		1.1420	31.60		1.2320	41.23		1.3220	49.54	
		0.019			0.042			0.184			0.118			0.098			0.088
1.00048	1.78		1.0093	7.83		1.0530	18.90		1.1430	31.72		1.2330	41.33		1.3230	49.63	
		0.018			0.042			0.182			0.118			0.098			0.087
1.00049	1.79		1.0094	7.87		1.0540	19.08		1.1440	31.84		1.2340	41.43		1.3240	49.72	
		0.018			0.042			0.181			0.118			0.098			0.087
1.00050	1.81		1.0095	7.92		1.0550	19.26		1.1450	31.95		1.2350	41.52		1.3250	49.81	
		0.173			0.042			0.179			0.118			0.098			0.087
1.0006	1.99		1.0096	7.96		1.0560	19.44		1.1460	32.07		1.2360	41.62		1.3260	49.89	
		0.195			0.042			0.178			0.117			0.097			0.087
1.0007	2.14		1.0097	8.00		1.0570	19.62		1.1470	32.19		1.2370	41.72		1.3270	49.98	
		0.148			0.041			0.176			0.117			0.097			0.087
1.0008	2.29		1.0098	8.04		1.0580	19.80		1.1480	32.31		1.2380	41.82		1.3280	50.07	
		0.139			0.041			0.175			0.116			0.097			0.087
1.0009	2.43		1.0099	8.08		1.0590	19.97		1.1490	32.42		1.2390	41.91		1.3290	50.15	
		0.132			0.041			0.174			0.116			0.097			0.087
1.0010	2.56		1.0100	8.12		1.0600	20.14		1.1500	32.54		1.2400	42.01		1.3300	50.24	
		0.125			0.202			0.172			0.116			0.097			0.087
1.0011	2.69		1.0105	8.32		1.0610	20.32		1.1510	32.65		1.2410	42.11		1.3310	50.33	
		0.120			0.197			0.171			0.116			0.097			0.087
1.0012	2.81		1.0110	8.52		1.0620	20.49		1.1520	32.77		1.2420	42.20		1.3320	50.41	
		0.115			0.193			0.170			0.115			0.097			0.087
1.0013	2.92		1.0115	8.71		1.0630	20.66		1.1530	32.88		1.2430	42.30		1.3330	50.50	
		0.110			0.189			0.168			0.115			0.096			0.087
1.0014	3.03		1.0120	8.90		1.0640	20.82		1.1540	33.00		1.2440	42.40		1.3340	50.59	
		0.107			0.185			0.167			0.115			0.096			0.087
1.0015	3.14		1.0125	9.09		1.0650	20.99		1.1550	33.11		1.2450	42.49		1.3350	50.67	
		0.103			0.181			0.166			0.114			0.096			0.086
1.0016	3.24		1.0130	9.27		1.0660	21.16		1.1560	33.23		1.2460	42.59		1.3360	50.76	
		0.100			0.178			0.165			0.114			0.096			0.086
1.0017	3.34		1.0135	9.45		1.0670	21.32		1.1570	33.34		1.2470	42.68		1.3370	50.85	
		0.097			0.175			0.164			0.114			0.096			0.086
1.0018	3.44		1.0140	9.62		1.0680	21.49		1.1580	33.46		1.2480	42.78		1.3380	50.93	
		0.094			0.172			0.163			0.114			0.096			0.086
1.0019	3.53		1.0145	9.79		1.0690	21.65		1.1590	33.57		1.2490	42.88		1.3390	51.02	
		0.092			0.169			0.162			0.113			0.096			0.086
1.0020	3.63		1.0150	9.96		1.0700	21.81		1.1600	33.68		1.2500	42.97		1.3400	51.11	
		0.090			0.166			0.161			0.113			0.096			0.086
1.0021	3.72		1.0155	10.13		1.0710	21.97		1.1610	33.80		1.2510	43.07		1.3410	51.19	
		0.088			0.163			0.160			0.113			0.095			0.086
1.0022	3.80		1.0160	10.29		1.0720	22.13		1.1620	33.91		1.2520	43.16		1.3420	51.28	
		0.086			0.161			0.159			0.112			0.095			0.086
1.0023	3.89		1.0165	10.45		1.0730	22.29		1.1630	34.02		1.2530	43.26		1.3430	51.36	
		0.084			0.159			0.158			0.112			0.095			0.086
1.0024	3.97		1.0170	10.61		1.0740	22.45		1.1640	34.13		1.2540	43.35		1.3440	51.45	
		0.082			0.156			0.157			0.112			0.095			0.086
1.0025	4.05		1.0175	10.77		1.0750	22.60		1.1650	34.24		1.2550	43.45		1.3450	51.54	
		0.080			0.154			0.156			0.112			0.095			0.086
1.0026	4.13		1.0180	10.92		1.0760	22.76		1.1660	34.36		1.2560	43.54		1.3460	51.62	
		0.079			0.152			0.155			0.111			0.095			0.086
1.0027	4.21		1.0185	11.07		1.0770	22.91		1.1670	34.47		1.2570	43.64		1.3470	51.71	
		0.077			0.150			0.154			0.111			0.095			0.085
1.0028	4.29		1.0190	11.22		1.0780	23.07		1.1680	34.58		1.2580	43.73		1.3480	51.79	
		0.076			0.148			0.153			0.111			0.094			0.085
1.0029	4.37		1.0195	11.37		1.0790	23.22		1.1690	34.69		1.2590	43.83		1.3490	51.88	
		0.075			0.146			0.152			0.111			0.094			0.085
1.0030	4.44		1.0200	11.52		1.0800	23.37		1.1700	34.80		1.2600	43.92		1.3500	51.96	
		0.074			0.145			0.151			0.110			0.094			0.085
1.0031	4.52		1.0205	11.66		1.0810	23.52		1.1710	34.91		1.2610	44.01		1.3510	52.05	
		0.072			0.143			0.150			0.110			0.094			0.085
1.0032	4.59		1.0210	11.80		1.0820	23.67		1.1720	35.02		1.2620	44.11		1.3520	52.13	
		0.071			0.141			0.150			0.110			0.094			0.085
1.0033	4.66		1.0215	11.94		1.0830	23.82		1.1730	35.13		1.2630	44.20		1.3530	52.22	
		0.070			0.140			0.149			0.110			0.094			0.085
1.0034	4.73		1.0220	12.08		1.0840	23.97		1.1740	35.24		1.2640	44.30		1.3540	52.30	
		0.069			0.138			0.148			0.109			0.094			0.085
1.0035	4.80		1.0225	12.22		1.0850	24.12		1.1750	35.35		1.2650	44.39		1.3550	52.39	
		0.068			0.137			0.147			0.109			0.094			0.085
1.0036	4.87		1.0230	12.36		1.0860	24.27		1.1760	35.46		1.2660	44.48		1.3560	52.47	
		0.067			0.135			0.147			0.109			0.093			0.085
1.0037	4.93		1.0235	12.49		1.0870	24.41		1.1770	35.57		1.2670	44.58		1.3570	52.56	
		0.066			0.134			0.146			0.108			0.093			0.085
1.0038	5.00		1.0240	12.63		1.0880	24.56		1.1780	35.67		1.2680	44.67		1.3580	52.64	
		0.066			0.132			0.145			0.108			0.093			0.085
1.0039	5.07		1.0245	12.76		1.0890	24.71		1.1790	35.78		1.2690	44.76		1.3590	52.73	
		0.065			0.131			0.144			0.108			0.093			0.085
1.0040	5.13		1.0250	12.89		1.0900	24.85		1.1800	35.89		1.2700	44.86		1.3600	52.81	
		0.064			0.130			0.144			0.108			0.093			0.085
1.0041	5.19		1.0255	13.02		1.0910	24.99		1.1810	36.00		1.2710	44.95		1.3610	52.90	
		0.063			0.129			0.143			0.108			0.093			0.084
1.0042	5.26		1.0260	13.15		1.0920	25.14		1.1820	36.11		1.2720	45.04		1.3620	52.98	
		0.062			0.128			0.142			0.107			0.093			0.084
1.0043	5.32		1.0265	13.28		1.0930	25.28		1.1830	36.21		1.2730	45.13		1.3630	53.07	
		0.062			0.126			0.142			0.107			0.093			0.084
1.0044	5.38		1.0270	13.40		1.0940	25.42		1.1840	36.32		1.2740	45.23		1.3640	53.15	
		0.061			0.125			0.141			0.107			0.092			0.084
1.0045	5.44		1.0275	13.53		1.0950	25.56		1.1850	36.43		1.2750	45.32		1.3650	53.23	
		0.060			0.124			0.140			0.107			0.092			0.084

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TABLE 75—INVOLUTE ROLL ANGLES (CONTINUED)

$\frac{D_z}{D_b}$	ϵ_z	Diff.	$\frac{D_z}{D_b}$	ϵ_z	Diff.	$\frac{D_z}{D_b}$	ϵ_z	Diff.	$\frac{D_z}{D_b}$	ϵ_z	Diff.	$\frac{D_z}{D_b}$	ϵ_z	Diff.	$\frac{D_z}{D_b}$	ϵ_z	Diff.
1.3660	53.32	0.084	1.4310	58.65	0.080	1.4960	63.75	0.077	1.6220	73.17	0.146	1.7520	82.42	0.140	1.8820	91.35	0.135
1.3670	53.40	0.084	1.4320	58.73	0.080	1.4970	63.83	0.077	1.6240	73.32	0.145	1.7540	82.56	0.140	1.8840	91.48	0.135
1.3680	53.49	0.084	1.4330	58.81	0.080	1.4980	63.90	0.077	1.6260	73.46	0.145	1.7560	82.70	0.139	1.8860	91.62	0.135
1.3690	53.57	0.084	1.4340	58.89	0.080	1.4990	63.98	0.077	1.6280	73.61	0.145	1.7580	82.84	0.139	1.8880	91.75	0.135
1.3700	53.65	0.084	1.4350	58.97	0.080	1.5000	64.06	0.077	1.6300	73.75	0.145	1.7600	82.98	0.139	1.8900	91.89	0.135
1.3710	53.74	0.084	1.4360	59.05	0.080	1.5020	64.21	0.154	1.6320	73.90	0.145	1.7620	83.12	0.139	1.8920	92.02	0.135
1.3720	53.82	0.084	1.4370	59.13	0.080	1.5040	64.37	0.153	1.6340	74.04	0.145	1.7640	83.26	0.139	1.8940	92.16	0.135
1.3730	53.90	0.084	1.4380	59.21	0.080	1.5060	64.52	0.153	1.6360	74.19	0.145	1.7660	83.40	0.139	1.8960	92.29	0.135
1.3740	53.99	0.084	1.4300	59.29	0.080	1.5080	64.67	0.153	1.6380	74.33	0.145	1.7680	83.54	0.139	1.8980	92.43	0.135
1.3750	54.07	0.084	1.4400	59.37	0.080	1.5100	64.83	0.153	1.6400	74.48	0.145	1.7700	83.68	0.139	1.9000	92.56	0.135
1.3760	54.16	0.083	1.4410	59.45	0.080	1.5120	64.98	0.153	1.6420	74.62	0.145	1.7720	83.82	0.139	1.9020	92.70	0.135
1.3770	54.24	0.083	1.4420	59.53	0.080	1.5140	65.13	0.153	1.6440	74.76	0.144	1.7740	83.95	0.139	1.9040	92.83	0.135
1.3780	54.32	0.083	1.4430	59.61	0.079	1.5160	65.28	0.153	1.6460	74.91	0.144	1.7760	84.09	0.139	1.9060	92.97	0.135
1.3790	54.41	0.083	1.4440	59.68	0.079	1.5180	65.44	0.152	1.6480	75.05	0.144	1.7780	84.23	0.139	1.9080	93.10	0.135
1.3800	54.49	0.083	1.4450	59.76	0.079	1.5200	65.59	0.152	1.6500	75.20	0.144	1.7800	84.37	0.139	1.9100	93.24	0.135
1.3810	54.57	0.083	1.4460	59.84	0.079	1.5220	65.74	0.152	1.6520	75.34	0.144	1.7820	84.51	0.138	1.9120	93.37	0.134
1.3820	54.65	0.083	1.4470	59.92	0.079	1.5240	65.89	0.152	1.6540	75.49	0.144	1.7840	84.65	0.138	1.9140	93.51	0.134
1.3830	54.74	0.083	1.4480	60.00	0.079	1.5260	66.04	0.152	1.6560	75.63	0.144	1.7860	84.79	0.138	1.9160	93.64	0.134
1.3840	54.82	0.083	1.4490	60.08	0.079	1.5280	66.20	0.152	1.6580	75.77	0.144	1.7880	84.92	0.138	1.9180	93.77	0.134
1.3850	54.90	0.083	1.4500	60.16	0.079	1.5300	66.35	0.151	1.6600	75.92	0.144	1.7900	85.06	0.138	1.9200	93.91	0.134
1.3860	54.99	0.083	1.4510	60.24	0.079	1.5320	66.50	0.151	1.6620	76.06	0.144	1.7920	85.20	0.138	1.9220	94.04	0.134
1.3870	55.07	0.083	1.4520	60.32	0.079	1.5340	66.65	0.151	1.6640	76.20	0.143	1.7940	85.34	0.138	1.9240	94.18	0.134
1.3880	55.15	0.083	1.4530	60.40	0.079	1.5360	66.80	0.151	1.6660	76.35	0.143	1.7960	85.48	0.138	1.9260	94.31	0.134
1.3890	55.23	0.083	1.4540	60.48	0.079	1.5380	66.95	0.151	1.6680	76.49	0.143	1.7980	85.61	0.138	1.9280	94.45	0.134
1.3900	55.32	0.083	1.4550	60.56	0.079	1.5400	67.10	0.151	1.6700	76.63	0.143	1.8000	85.75	0.138	1.9300	94.58	0.134
1.3910	55.40	0.082	1.4560	60.63	0.079	1.5420	67.25	0.151	1.6720	76.78	0.143	1.8020	85.89	0.138	1.9320	94.71	0.134
1.3920	55.48	0.082	1.4570	60.71	0.079	1.5440	67.40	0.150	1.6740	76.92	0.143	1.8040	86.03	0.138	1.9340	94.85	0.134
1.3930	55.56	0.082	1.4580	60.79	0.079	1.5460	67.55	0.150	1.6760	77.06	0.143	1.8060	86.17	0.138	1.9360	94.98	0.134
1.3940	55.65	0.082	1.4590	60.87	0.079	1.5480	67.70	0.150	1.6780	77.20	0.143	1.8080	86.30	0.138	1.9380	95.12	0.134
1.3950	55.73	0.082	1.4600	60.95	0.079	1.5500	67.85	0.150	1.6800	77.35	0.143	1.8100	86.44	0.138	1.9400	95.25	0.134
1.3960	55.81	0.082	1.4610	61.03	0.079	1.5520	68.00	0.150	1.6820	77.49	0.143	1.8120	86.58	0.137	1.9420	95.38	0.134
1.3970	55.89	0.082	1.4620	61.11	0.079	1.5540	68.15	0.150	1.6840	77.63	0.142	1.8140	86.72	0.137	1.9440	95.52	0.134
1.3980	55.97	0.082	1.4630	61.18	0.079	1.5560	68.30	0.150	1.6860	77.77	0.142	1.8160	86.85	0.137	1.9460	95.65	0.134
1.3990	56.06	0.082	1.4640	61.26	0.078	1.5580	68.45	0.150	1.6880	77.92	0.142	1.8180	86.99	0.137	1.9480	95.78	0.134
1.4000	56.14	0.082	1.4650	61.34	0.078	1.5600	68.60	0.149	1.6900	78.06	0.142	1.8200	87.13	0.137	1.9500	95.92	0.134
1.4010	56.22	0.082	1.4660	61.42	0.078	1.5620	68.75	0.149	1.6920	78.20	0.142	1.8220	87.26	0.137	1.9520	96.05	0.133
1.4020	56.30	0.082	1.4670	61.50	0.078	1.5640	68.90	0.149	1.6940	78.34	0.142	1.8240	87.40	0.137	1.9540	96.18	0.133
1.4030	56.38	0.082	1.4680	61.58	0.078	1.5660	69.05	0.149	1.6960	78.49	0.142	1.8260	87.54	0.137	1.9560	96.32	0.133
1.4040	56.47	0.082	1.4690	61.66	0.078	1.5680	69.20	0.149	1.6980	78.63	0.142	1.8280	87.68	0.137	1.9580	96.45	0.133
1.4050	56.55	0.082	1.4700	61.73	0.078	1.5700	69.35	0.149	1.7000	78.77	0.142	1.8300	87.81	0.137	1.9600	96.58	0.133
1.4060	56.63	0.082	1.4710	61.81	0.078	1.5720	69.50	0.149	1.7020	78.91	0.142	1.8320	87.95	0.137	1.9620	96.72	0.133
1.4070	56.71	0.081	1.4720	61.89	0.078	1.5740	69.64	0.148	1.7040	79.05	0.142	1.8340	88.09	0.137	1.9640	96.85	0.133
1.4080	56.79	0.081	1.4730	61.97	0.078	1.5760	69.79	0.148	1.7060	79.19	0.141	1.8360	88.22	0.137	1.9660	96.98	0.133
1.4090	56.87	0.081	1.4740	62.05	0.078	1.5780	69.94	0.148	1.7080	79.33	0.141	1.8380	88.36	0.137	1.9680	97.12	0.133
1.4100	56.95	0.081	1.4750	62.12	0.078	1.5800	70.09	0.148	1.7100	79.48	0.141	1.8400	88.50	0.137	1.9700	97.25	0.133
1.4110	57.04	0.081	1.4760	62.20	0.078	1.5820	70.24	0.148	1.7120	79.62	0.141	1.8420	88.63	0.136	1.9720	97.38	0.133
1.4120	57.12	0.081	1.4770	62.28	0.078	1.5840	70.38	0.148	1.7140	79.76	0.141	1.8440	88.77	0.136	1.9740	97.52	0.133
1.4130	57.20	0.081	1.4780	62.36	0.078	1.5860	70.53	0.148	1.7160	79.90	0.141	1.8460	88.90	0.136	1.9760	97.65	0.133
1.4140	57.28	0.081	1.4790	62.44	0.078	1.5880	70.68	0.148	1.7180	80.04	0.141	1.8480	89.04	0.136	1.9780	97.78	0.133
1.4150	57.36	0.081	1.4800	62.51	0.078	1.5900	70.83	0.147	1.7200	80.18	0.141	1.8500	89.18	0.136	1.9800	97.91	0.133
1.4160	52.44	0.081	1.4810	62.59	0.078	1.5920	70.97	0.147	1.7220	80.32	0.141	1.8520	89.31	0.136	1.9820	98.05	0.133
1.4170	57.52	0.081	1.4820	62.67	0.078	1.5940	71.12	0.147	1.7240	80.46	0.141	1.8540	89.45	0.136	1.9840	98.18	0.133
1.4180	57.60	0.081	1.4830	62.75	0.078	1.5960	71.27	0.147	1.7260	80.60	0.141	1.8560	89.59	0.136	1.9860	98.31	0.133
1.4190	57.68	0.081	1.4840	62.82	0.078	1.5980	71.42	0.147	1.7280	80.74	0.141	1.8580	89.72	0.136	1.9880	98.44	0.133
1.4200	57.76	0.081	1.4850	62.90	0.078	1.6000	71.56	0.147	1.7300	80.88	0.140	1.8600	89.86	0.136	1.9900	98.58	0.133
1.4210	57.84	0.081	1.4860	62.98	0.077	1.6020	71.71	0.147	1.7320	81.02	0.140	1.8620	89.99	0.136	1.9920	98.71	0.133
1.4220	57.93	0.081	1.4870	63.06	0.077	1.6040	71.86	0.147	1.7340	81.17	0.140	1.8640	90.13	0.136	1.9940	98.84	0.132
1.4230	58.01	0.081	1.4880	63.13	0.077	1.6060	72.00	0.147	1.7360	81.31	0.140	1.8660	90.27	0.136	1.9960	98.97	0.132
1.4240	58.09	0.080	1.4890	63.21	0.077	1.6080	72.15	0.146	1.7380	81.45	0.140	1.8680	90.40	0.136	1.9980	99.11	0.132
1.4250	58.17	0.080	1.4900	63.29	0.077	1.6100	72.29	0.146	1.7400	81.59	0.140	1.8700	90.54	0.136	2.0000	99.24	0.132
1.4260	58.25	0.080	1.4910	63.37	0.077	1.6120	72.44	0.146	1.7420	81.73	0.140	1.8720	90.67	0.136	2.0020	99.37	0.132
1.4270	58.33	0.080	1.4920	63.44	0.077	1.6140	72.59	0.146	1.7440	81.87	0.140	1.8740	90.81	0.136	2.0040	99.50	0.132
1.4280	58.41	0.080	1.4930	63.52	0.077	1.6160	72.73	0.146	1.7460	82.01	0.140	1.8760	90.94	0.135	2.0060	99.64	0.132
1.4290	58.49	0.080	1.4940	63.60	0.077	1.6180	72.88	0.146	1.7480	82.15	0.140	1.8780	91.08	0.135	2.0080	99.77	0.132
1.4300	58.57	0.080	1.4950	63.67	0.077	1.6200	73.02	0.146	1.7500	82.28	0.140	1.8800	91.21	0.135	2.0100	99.90	0.132
															2.0120	100.03	0.132

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30 DEG PRESSURE ANGLE

TABLE 76—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 30 DEG PRESSURE ANGLE AND TOLERANCE CLASS 4, INTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	K_i \ d_i	0.6912	0.5760	0.4320	0.3456	0.2880	0.2160	0.1728	0.1440	0.1080	0.0864	0.0720	0.0540	0.0432	0.0360
6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	6.860	2.1184	1.7677	1.3277	1.0646	0.8870	0.6673	0.5354	0.4474	0.3371	0.2708	0.2263	0.1713	0.1381	0.1158
9	3.225	2.5013	2.0859	1.5654	1.2539	1.0451	0.7853	0.6290	0.5251	0.3950	0.3168	0.2645	0.1997	0.1607	0.1345
10	2.760	2.9648	2.4719	1.8550	1.4855	1.2379	0.9297	0.7447	0.6214	0.4669	0.3743	0.3124	0.2355	0.1892	0.1582
11	2.493	3.3323	2.7781	2.0845	1.6690	1.3908	1.0442	0.8363	0.6977	0.5243	0.4202	0.3504	0.2639	0.2119	0.1771
12	2.374	3.7001	3.1513	2.3642	1.8926	1.5772	1.1840	0.9481	0.7908	0.5941	0.4760	0.3969	0.2987	0.2398	0.2003
13	2.260	4.1492	3.4588	2.5950	2.0773	1.7311	1.2994	1.0402	0.8675	0.6516	0.5220	0.4352	0.3274	0.2627	0.2194
14	2.206	4.5884	3.8248	2.8695	2.2968	1.9140	1.4366	1.1499	0.9590	0.7201	0.5768	0.4811	0.3619	0.2903	0.2424
15	2.140	4.9604	4.1348	3.1018	2.4826	2.0689	1.5527	1.2430	1.0365	0.7781	0.6232	0.5197	0.3908	0.3134	0.2617
16	2.109	5.3939	4.4960	3.3728	2.6994	2.2495	1.6882	1.3514	1.1268	0.8458	0.6773	0.5649	0.4247	0.3405	0.2843
17	2.065	5.7685	4.8082	3.6069	2.8867	2.4056	1.8053	1.4449	1.2048	0.9043	0.7241	0.6038	0.4538	0.3638	0.3037
18	2.045	6.1979	5.1660	3.8753	3.1014	2.5845	1.9395	1.5522	1.2942	0.9713	0.7777	0.6485	0.4874	0.3906	0.3260
19	2.014	6.5745	5.4798	4.1106	3.2896	2.7414	2.0571	1.6463	1.3726	1.0303	0.8249	0.6877	0.5167	0.4141	0.3456
20	2.001	7.0009	5.8352	4.3770	3.5027	2.9190	2.1903	1.7531	1.4616	1.0969	0.8782	0.7321	0.5500	0.4408	0.3678
21	1.977	7.3794	6.1506	4.6137	3.6922	3.0769	2.3087	1.8476	1.5404	1.1560	0.9255	0.7715	0.5796	0.4644	0.3875
22	1.967	7.8030	6.5036	4.8785	3.9040	3.2534	2.4411	1.9535	1.6286	1.2222	0.9784	0.8158	0.6128	0.4910	0.4097
23	1.949	8.1834	6.8206	5.1161	4.0940	3.4117	2.5599	2.0486	1.7078	1.2816	1.0259	0.8553	0.6425	0.5148	0.4295
24	1.941	8.6049	7.1719	5.3795	4.3048	3.5874	2.6916	2.1539	1.7956	1.3474	1.0786	0.8992	0.6754	0.5411	0.4514
25	1.926	8.9867	7.4901	5.6182	4.4958	3.7466	2.8110	2.2495	1.8753	1.4070	1.1263	0.9390	0.7052	0.5649	0.4713
26	1.920	9.4065	7.8399	5.8806	4.7057	3.9215	2.9422	2.3545	1.9627	1.4728	1.1789	0.9827	0.7380	0.5912	0.4931
27	1.908	9.7894	8.1589	6.1199	4.8971	4.0810	3.0618	2.4501	2.0425	1.5326	1.2268	1.0226	0.7679	0.6151	0.5131
28	1.903	10.2079	8.5077	6.3815	5.1064	4.2553	3.1925	2.5547	2.1296	1.5980	1.2791	1.0661	0.8006	0.6412	0.5348
29	1.893	10.5918	8.8276	6.6214	5.2984	4.4154	3.3127	2.6507	2.2096	1.6579	1.3270	1.1063	0.8308	0.6654	0.5550
30	1.889	11.0089	9.1752	6.8821	5.5069	4.5892	3.4430	2.7551	2.2967	1.7231	1.3792	1.1497	0.8633	0.6914	0.5767
31	1.880	11.3940	9.4961	7.1227	5.6993	4.7496	3.5633	2.8513	2.3768	1.7832	1.4273	1.1898	0.8934	0.7155	0.5968
32	1.877	11.8099	9.8427	7.3828	5.9075	4.9229	3.6933	2.9553	2.4635	1.8482	1.4792	1.2331	0.9259	0.7415	0.6184
33	1.870	12.1958	10.1644	7.6239	6.1003	5.0838	3.8140	3.0518	2.5438	1.9085	1.5275	1.2733	0.9560	0.7656	0.6385
34	1.867	12.6108	10.5102	7.8832	6.3078	5.2567	3.9437	3.1555	2.6303	1.9735	1.5795	1.3165	0.9884	0.7915	0.6601
35	1.860	12.9973	10.8323	8.1248	6.5011	5.4177	4.0644	3.2521	2.7108	2.0339	1.6278	1.3568	1.0186	0.8157	0.6802
36	1.858	13.4116	11.1776	8.3838	6.7083	5.5903	4.1939	3.3558	2.7973	2.0986	1.6796	1.3999	1.0510	0.8415	0.7018
37	1.852	13.7988	11.5002	8.6258	6.9019	5.7518	4.3150	3.4526	2.8779	2.1591	1.7280	1.4404	1.0814	0.8659	0.7221
38	1.850	14.2122	11.8447	8.8842	7.1086	5.9240	4.4442	3.5560	2.9640	2.2237	1.7796	1.4835	1.1137	0.8917	0.7437
39	1.845	14.6002	12.1681	9.1267	7.3027	6.0856	4.5654	3.6529	3.0448	2.2843	1.8281	1.5239	1.1440	0.9160	0.7639
40	1.843	15.0129	12.5120	9.3847	7.5090	6.2575	4.6943	3.7561	3.1308	2.3487	1.8797	1.5669	1.1762	0.9418	0.7853
41	1.839	15.4015	12.8358	9.6274	7.7032	6.4196	4.8159	3.8533	3.2119	2.4096	1.9284	1.6073	1.2065	0.9660	0.8056
42	1.837	15.8135	13.1792	9.8849	7.9092	6.5912	4.9447	3.9564	3.2977	2.4740	1.9799	1.6502	1.2387	0.9918	0.8270
43	1.833	16.2024	13.5033	10.1282	8.1039	6.7533	5.0662	4.0536	3.3787	2.5347	2.0285	1.6907	1.2691	1.0161	0.8473
44	1.832	16.6141	13.8464	10.3854	8.3096	6.9247	5.1948	4.1564	3.4645	2.5990	2.0800	1.7338	1.3014	1.0420	0.8689
45	1.828	17.0035	14.1708	10.6287	8.5043	7.0872	5.3166	4.2538	3.5456	2.6599	2.1286	1.7743	1.3318	1.0663	0.8892
46	1.827	17.4144	14.5133	10.8856	8.7098	7.2584	5.4451	4.3567	3.6314	2.7241	2.1800	1.8171	1.3639	1.0920	0.9106
47	1.823	17.8045	14.8384	11.1294	8.9049	7.4208	5.5669	4.4542	3.7126	2.7850	2.2287	1.8577	1.3944	1.1163	0.9309
48	1.822	18.2150	15.1804	11.3860	9.1101	7.5919	5.6952	4.5568	3.7981	2.8493	2.2802	1.9005	1.4265	1.1420	0.9522
49	1.819	18.6054	15.5058	11.6299	9.3052	7.7546	5.8173	4.6543	3.8794	2.9103	2.3290	1.9411	1.4569	1.1664	0.9726
50	1.818	19.0154	15.8475	11.8863	9.5104	7.9255	5.9454	4.7569	3.9648	2.9743	2.3802	1.9839	1.4890	1.1920	0.9939
51	1.815	19.4060	16.1730	12.1305	9.7057	8.0882	6.0675	4.8547	4.0464	3.0354	2.4291	2.0247	1.5197	1.2166	1.0144
52	1.814	19.8159	16.5146	12.3865	9.9106	8.2589	6.1955	4.9571	4.1317	3.0994	2.4803	2.0674	1.5517	1.2422	1.0358
53	1.812	20.2068	16.8404	12.6308	10.1060	8.4220	6.3179	5.0548	4.2132	3.1605	2.5291	2.1081	1.5822	1.2666	1.0561
54	1.811	20.6162	17.1815	12.8868	10.3109	8.5926	6.4458	5.1572	4.2984	3.2244	2.5803	2.1508	1.6142	1.2922	1.0774
55	1.809	21.0076	17.5077	13.1314	10.5065	8.7556	6.5680	5.2550	4.3800	3.2855	2.6292	2.1915	1.6448	1.3167	1.0978
56	1.808	21.4166	17.8485	13.3870	10.7110	8.9260	6.6958	5.3572	4.4652	3.3496	2.6805	2.2341	1.6767	1.3422	1.1191
57	1.806	21.8083	18.1750	13.6317	10.9068	9.0893	6.8184	5.4553	4.5469	3.4108	2.7294	2.2749	1.7073	1.3667	1.1395
58	1.805	22.2170	18.5156	13.8873	11.1113	9.2596	6.9461	5.5574	4.6320	3.4747	2.7805	2.3175	1.7392	1.3922	1.1608
59	1.803	22.6088	18.8421	14.1322	11.3072	9.4228	7.0685	5.6554	4.7137	3.5359	2.8295	2.3584	1.7700	1.4169	1.1814
60	1.802	23.0173	19.1826	14.3874	11.5114	9.5930	7.1961	5.7575	4.7987	3.5997	2.8805	2.4010	1.8019	1.4424	1.2026

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30 DEG PRESSURE ANGLE

TABLE 77—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 30 DEG PRESSURE ANGLE AND TOLERANCE CLASS 5, INTERNAL INVOLUTE SPLINES, ALSO USED FOR 30 DEG PRESSURE ANGLE, MAJOR DIAMETER FIT

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	K_i \ d_i	0.6912	0.5760	0.4320	0.3456	0.2880	0.2160	0.1728	0.1440	0.1080	0.0864	0.0720	0.0540	0.0432	0.0360
6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	6.860	2.1240	1.7731	1.3324	1.0691	0.8911	0.6711	0.5386	0.4504	0.3399	0.2735	0.2286	0.1733	0.1400	0.1176
9	3.225	2.5047	2.0893	1.5684	1.2569	1.0475	0.7876	0.6314	0.5274	0.3972	0.3190	0.2664	0.2014	0.1624	0.1361
10	2.760	2.9677	2.4749	1.8577	1.4881	1.2402	0.9320	0.7468	0.6235	0.4689	0.3763	0.3141	0.2371	0.1909	0.1598
11	2.493	3.3352	2.7810	2.0870	1.6714	1.3929	1.0464	0.8382	0.6996	0.5259	0.4218	0.3520	0.2655	0.2135	0.1786
12	2.374	3.7827	3.1538	2.3668	1.8952	1.5792	1.1861	0.9499	0.7926	0.5956	0.4775	0.3984	0.3003	0.2413	0.2018
13	2.260	4.1519	3.4615	2.5973	2.0795	1.7331	1.3014	1.0422	0.8695	0.6531	0.5235	0.4367	0.3289	0.2642	0.2208
14	2.206	4.5910	3.8274	2.8717	2.2990	1.9160	1.4385	1.1519	0.9609	0.7218	0.5785	0.4826	0.3633	0.2917	0.2439
15	2.140	4.9630	4.1373	3.1042	2.4850	2.0708	1.5546	1.2447	1.0382	0.7798	0.6248	0.5212	0.3923	0.3148	0.2631
16	2.109	5.3965	4.4985	3.3751	2.7017	2.2516	1.6902	1.3530	1.1283	0.8475	0.6790	0.5663	0.4261	0.3419	0.2856
17	2.065	5.7710	4.8106	3.6090	2.8888	2.4075	1.8071	1.4467	1.2066	0.9059	0.7257	0.6052	0.4552	0.3652	0.3051
18	2.045	6.2005	5.1686	3.8775	3.1036	2.5863	1.9413	1.5540	1.2960	0.9729	0.7793	0.6499	0.4888	0.3920	0.3274
19	2.014	6.5771	5.4824	4.1128	3.2918	2.7434	2.0591	1.6481	1.3744	1.0319	0.8265	0.6893	0.5183	0.4157	0.3471
20	2.001	7.0035	5.8377	4.3794	3.5051	2.9210	2.1923	1.7546	1.4631	1.0985	0.8798	0.7336	0.5516	0.4423	0.3693
21	1.977	7.3819	6.1531	4.6159	3.6943	3.0786	2.3105	1.8494	1.5421	1.1576	0.9270	0.7730	0.5811	0.4659	0.3890
22	1.967	7.8058	6.5063	4.8806	3.9061	3.2553	2.4430	1.9553	1.6304	1.2238	0.9800	0.8171	0.6142	0.4924	0.4110
23	1.949	8.1859	6.8231	5.1184	4.0963	3.4137	2.5618	2.0503	1.7095	1.2831	1.0275	0.8567	0.6438	0.5161	0.4308
24	1.941	8.6076	7.1746	5.3819	4.3071	3.5893	2.6935	2.1557	1.7974	1.3492	1.0803	0.9008	0.6770	0.5426	0.4529
25	1.926	8.9892	7.4926	5.6205	4.4981	3.7485	2.8129	2.2512	1.8770	1.4088	1.1280	0.9405	0.7067	0.5664	0.4728
26	1.920	9.4092	7.8426	5.8829	4.7079	3.9234	2.9441	2.3562	1.9645	1.4743	1.1805	0.9842	0.7395	0.5927	0.4946
27	1.908	9.7920	8.1616	6.1221	4.8993	4.0829	3.0637	2.4518	2.0442	1.5341	1.2283	1.0241	0.7694	0.6166	0.5145
28	1.903	10.2105	8.5104	6.3838	5.1087	4.2574	3.1946	2.5566	2.1315	1.5995	1.2806	1.0676	0.8021	0.6427	0.5363
29	1.893	10.5945	8.8303	6.6237	5.3006	4.4173	3.3146	2.6526	2.2115	1.6596	1.3287	1.1078	0.8322	0.6669	0.5565
30	1.889	11.0117	9.1780	6.8844	5.5091	4.5913	3.4451	2.7568	2.2983	1.7248	1.3808	1.1512	0.8648	0.6929	0.5782
31	1.880	11.3966	9.4987	7.1251	5.7018	4.7516	3.5653	2.8530	2.3785	1.7849	1.4289	1.1913	0.8949	0.7170	0.5982
32	1.877	11.8127	9.8455	7.3850	5.9097	4.9249	3.6953	2.9572	2.4653	1.8499	1.4809	1.2346	0.9274	0.7429	0.6199
33	1.870	12.1985	10.1670	7.6263	6.1028	5.0858	3.8160	3.0536	2.5457	1.9102	1.5291	1.2748	0.9575	0.7670	0.6400
34	1.867	12.6136	10.5130	7.8857	6.3102	5.2587	3.9457	3.1573	2.6321	1.9750	1.5810	1.3180	0.9899	0.7930	0.6616
35	1.860	13.0003	10.8353	8.1272	6.5035	5.4198	4.0665	3.2540	2.7127	2.0356	1.6295	1.3584	1.0203	0.8173	0.6819
36	1.858	13.4144	11.1803	8.3862	6.7107	5.5925	4.1961	3.3577	2.7991	2.1002	1.6812	1.4016	1.0526	0.8432	0.7034
37	1.852	13.8018	11.5032	8.6282	6.9043	5.7538	4.3171	3.4545	2.8798	2.1607	1.7296	1.4419	1.0828	0.8674	0.7236
38	1.850	14.2151	11.8476	8.8866	7.1110	5.9260	4.4462	3.5578	2.9659	2.2253	1.7813	1.4849	1.1151	0.8932	0.7451
39	1.845	14.6032	12.1710	9.1291	7.3051	6.0878	4.5676	3.6549	3.0468	2.2859	1.8298	1.5253	1.1454	0.9174	0.7653
40	1.843	15.0158	12.5149	9.3870	7.5114	6.2597	4.6966	3.7581	3.1328	2.3506	1.8815	1.5685	1.1778	0.9434	0.7870
41	1.839	15.4044	12.8387	9.6300	7.7058	6.4216	4.8179	3.8552	3.2137	2.4112	1.9301	1.6090	1.2082	0.9677	0.8072
42	1.837	15.8164	13.1821	9.8875	7.9118	6.5934	4.9469	3.9582	3.2995	2.4756	1.9816	1.6519	1.2404	0.9934	0.8286
43	1.833	16.2055	13.5064	10.1306	8.1062	6.7555	5.0684	4.0556	3.3807	2.5364	2.0302	1.6924	1.2707	1.0177	0.8489
44	1.832	16.6170	13.8493	10.3879	8.3122	6.9269	5.1970	4.1584	3.4665	2.6007	2.0816	1.7352	1.3029	1.0434	0.8703
45	1.828	17.0066	14.1740	10.6313	8.5068	7.0893	5.3188	4.2558	3.5476	2.6617	2.1304	1.7760	1.3335	1.0679	0.8908
46	1.827	17.4175	14.5164	10.8881	8.7123	7.2606	5.4473	4.3585	3.6332	2.7259	2.1818	1.8188	1.3656	1.0936	0.9122
47	1.823	17.8076	14.8415	11.1320	8.9074	7.4230	5.5691	4.4562	3.7146	2.7868	2.2305	1.8594	1.3960	1.1180	0.9325
48	1.822	18.2181	15.1835	11.3885	9.1127	7.5942	5.6975	4.5588	3.8001	2.8509	2.2818	1.9021	1.4281	1.1436	0.9538
49	1.819	18.6085	15.5089	11.6326	9.3080	7.7568	5.8195	4.6563	3.8814	2.9119	2.3306	1.9428	1.4586	1.1680	0.9742
50	1.818	19.0187	15.8508	11.8889	9.5130	7.9278	5.9478	4.7590	3.9670	2.9762	2.3820	1.9857	1.4908	1.1938	0.9957
51	1.815	19.4093	16.1763	12.1330	9.7083	8.0906	6.0698	4.8567	4.0484	3.0372	2.4309	2.0263	1.5213	1.2182	1.0160
52	1.814	19.8192	16.5179	12.3892	9.9133	8.2613	6.1979	4.9591	4.1337	3.1012	2.4821	2.0690	1.5533	1.2438	1.0374
53	1.812	20.2101	16.8437	12.6336	10.1088	8.4244	6.3202	5.0568	4.2152	3.1623	2.5309	2.1097	1.5838	1.2682	1.0577
54	1.811	20.6196	17.1849	12.8895	10.3136	8.5949	6.4481	5.1593	4.3006	3.2262	2.5821	2.1524	1.6158	1.2938	1.0790
55	1.809	21.0109	17.5110	13.1341	10.5092	8.7579	6.5704	5.2571	4.3821	3.2873	2.6310	2.1931	1.6464	1.3183	1.0994
56	1.808	21.4200	17.8520	13.3897	10.7137	8.9285	6.6984	5.3594	4.4673	3.3514	2.6823	2.2359	1.6785	1.3440	1.1209
57	1.806	21.8116	18.1783	13.6346	10.9097	9.0916	6.8207	5.4573	4.5489	3.4126	2.7312	2.2767	1.7091	1.3685	1.1413
58	1.805	22.2204	18.5190	13.8900	11.1140	9.2619	6.9484	5.5596	4.6342	3.4765	2.7823	2.3192	1.7410	1.3940	1.1626
59	1.803	22.6122	18.8455	14.1349	11.3099	9.4254	7.0710	5.6576	4.7158	3.5377	2.8313	2.3601	1.7716	1.4185	1.1830
60	1.802	23.0208	19.1860	14.3903	11.5142	9.5955	7.1987	5.7596	4.8009	3.6015	2.8823	2.4026	1.8035	1.4440	1.2042

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30 DEG PRESSURE ANGLE

TABLE 78—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 30 DEG PRESSURE ANGLE AND TOLERANCE CLASS 6, INTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	K_i \ d_i	0.6912	0.5760	0.4320	0.3456	0.2880	0.2160	0.1728	0.1440	0.1080	0.0864	0.0720	0.0540	0.0432	0.0360
6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	6.860	2.1316	1.7804	1.3385	1.0748	0.8956	0.6753	0.5426	0.4542	0.3432	0.2765	0.2312	0.1758	0.1423	0.1198
9	3.225	2.5093	2.0938	1.5726	1.2610	1.0510	0.7910	0.6344	0.5304	0.3998	0.3216	0.2687	0.2036	0.1644	0.1381
10	2.760	2.9720	2.4792	1.8614	1.4918	1.2431	0.9348	0.7496	0.6262	0.4714	0.3787	0.3163	0.2392	0.1929	0.1618
11	2.493	3.3391	2.7849	2.0904	1.6747	1.3958	1.0492	0.8408	0.7021	0.5284	0.4243	0.3542	0.2676	0.2156	0.1807
12	2.374	3.7867	3.1578	2.3700	1.8984	1.5820	1.1888	0.9526	0.7953	0.5981	0.4800	0.4006	0.3024	0.2434	0.2039
13	2.260	4.1555	3.4650	2.6004	2.0826	1.7357	1.3040	1.0446	0.8719	0.6555	0.5258	0.4388	0.3310	0.2662	0.2228
14	2.206	4.5947	3.8311	2.8749	2.3022	1.9186	1.4411	1.1542	0.9632	0.7240	0.5806	0.4846	0.3654	0.2937	0.2458
15	2.140	4.9666	4.1409	3.1071	2.4879	2.0735	1.5573	1.2472	1.0407	0.7821	0.6271	0.5232	0.3943	0.3168	0.2651
16	2.109	5.4000	4.5021	3.3782	2.7048	2.2541	1.6927	1.3555	1.1309	0.8497	0.6812	0.5683	0.4281	0.3439	0.2876
17	2.065	5.7744	4.8141	3.6120	2.8918	2.4101	1.8098	1.4489	1.2088	0.9081	0.7279	0.6072	0.4572	0.3671	0.3070
18	2.045	6.2040	5.1721	3.8805	3.1066	2.5890	1.9439	1.5564	1.2984	0.9751	0.7815	0.6521	0.4909	0.3941	0.3295
19	2.014	6.5807	5.4860	4.1160	3.2950	2.7460	2.0617	1.6505	1.3768	1.0341	0.8287	0.6912	0.5202	0.4176	0.3490
20	2.001	7.0068	5.8411	4.3823	3.5081	2.9235	2.1948	1.7572	1.4657	1.1006	0.8819	0.7356	0.5535	0.4442	0.3712
21	1.977	7.3855	6.1567	4.6190	3.6974	3.0814	2.3132	1.8517	1.5445	1.1597	0.9292	0.7749	0.5830	0.4678	0.3909
22	1.967	7.8093	6.5099	4.8838	3.9092	3.2579	2.4456	1.9576	1.6327	1.2259	0.9821	0.8192	0.6163	0.4944	0.4131
23	1.949	8.1896	6.8268	5.1215	4.0994	3.4164	2.5645	2.0528	1.7120	1.2854	1.0297	0.8588	0.6459	0.5182	0.4328
24	1.941	8.6111	7.1781	5.3849	4.3102	3.5920	2.6962	2.1582	1.7998	1.3513	1.0824	0.9027	0.6788	0.5445	0.4548
25	1.926	8.9929	7.4962	5.6236	4.5011	3.7512	2.8156	2.2535	1.8793	1.4108	1.1301	0.9424	0.7086	0.5683	0.4746
26	1.920	9.4128	7.8462	5.8859	4.7110	3.9261	2.9468	2.3586	1.9669	1.4766	1.1827	0.9863	0.7416	0.5947	0.4967
27	1.908	9.7958	8.1654	6.1254	4.9026	4.0857	3.0666	2.4543	2.0466	1.5364	1.2305	1.0261	0.7714	0.6186	0.5166
28	1.903	10.2141	8.5140	6.3868	5.1117	4.2600	3.1973	2.5591	2.1340	1.6017	1.2828	1.0697	0.8041	0.6447	0.5383
29	1.893	10.5982	8.8341	6.6269	5.3038	4.4201	3.3174	2.6550	2.2139	1.6617	1.3308	1.1098	0.8343	0.6689	0.5585
30	1.889	11.0155	9.1818	6.8875	5.5123	4.5939	3.4477	2.7593	2.3008	1.7270	1.3831	1.1533	0.8668	0.6949	0.5802
31	1.880	11.4005	9.5027	7.1283	5.7049	4.7544	3.5681	2.8556	2.3811	1.7871	1.4312	1.1933	0.8969	0.7190	0.6002
32	1.877	11.8164	9.8493	7.3882	5.9129	4.9277	3.6981	2.9596	2.4678	1.8521	1.4831	1.2367	0.9294	0.7450	0.6219
33	1.870	12.2024	10.1709	7.6295	6.1059	5.0886	3.8188	3.0560	2.5481	1.9124	1.5313	1.2770	0.9597	0.7692	0.6421
34	1.867	12.6175	10.5169	7.8888	6.3134	5.2615	3.9485	3.1599	2.6347	1.9774	1.5834	1.3202	0.9921	0.7952	0.6637
35	1.860	13.0042	10.8392	8.1306	6.5068	5.4227	4.0694	3.2565	2.7152	2.0378	1.6317	1.3605	1.0223	0.8193	0.6839
36	1.858	13.4183	11.1842	8.3896	6.7140	5.5953	4.1988	3.3603	2.8017	2.1025	1.6834	1.4036	1.0546	0.8452	0.7054
37	1.852	13.8057	11.5071	8.6316	6.9076	5.7568	4.3200	3.4570	2.8823	2.1629	1.7318	1.4441	1.0850	0.8695	0.7257
38	1.850	14.2192	11.8517	8.8901	7.1145	5.9290	4.4492	3.5604	2.9684	2.2277	1.7837	1.4871	1.1173	0.8954	0.7473
39	1.845	14.6072	12.1751	9.1324	7.3084	6.0907	4.5705	3.6575	3.0494	2.2883	1.8321	1.5275	1.1476	0.9196	0.7675
40	1.843	15.0199	12.5189	9.3905	7.5149	6.2627	4.6995	3.7606	3.1354	2.3528	1.8837	1.5705	1.1798	0.9454	0.7889
41	1.839	15.4084	12.8428	9.6333	7.7091	6.4245	4.8208	3.8579	3.2164	2.4136	1.9324	1.6111	1.2103	0.9698	0.8093
42	1.837	15.8207	13.1863	9.8910	7.9153	6.5964	4.9498	3.9609	3.3023	2.4780	1.9839	1.6540	1.2425	0.9956	0.8308
43	1.833	16.2097	13.5106	10.1340	8.1097	6.7584	5.0713	4.0581	3.3833	2.5387	2.0325	1.6945	1.2729	1.0199	0.8510
44	1.832	16.6212	13.8535	10.3914	8.3156	6.9300	5.2001	4.1612	3.4692	2.6030	2.0839	1.7376	1.3052	1.0457	0.8726
45	1.828	17.0108	14.1781	10.6347	8.5103	7.0923	5.3217	4.2585	3.5503	2.6640	2.1328	1.7781	1.3356	1.0701	0.8929
46	1.827	17.4219	14.5208	10.8918	8.7160	7.2637	5.4503	4.3613	3.6359	2.7282	2.1842	1.8209	1.3677	1.0958	0.9143
47	1.823	17.8117	14.8456	11.1354	8.9109	7.4261	5.5721	4.4589	3.7173	2.7891	2.2329	1.8615	1.3982	1.1201	0.9346
48	1.822	18.2224	15.1879	11.3921	9.1163	7.5973	5.7006	4.5615	3.8028	2.8533	2.2842	1.9045	1.4304	1.1459	0.9562
49	1.819	18.6128	15.5133	11.6360	9.3114	7.7599	5.8225	4.6592	3.8843	2.9144	2.3331	1.9451	1.4609	1.1703	0.9765
50	1.818	19.0231	15.8552	11.8925	9.5166	7.9309	5.9509	4.7617	3.9697	2.9785	2.3844	1.9878	1.4929	1.1959	0.9978
51	1.815	19.4137	16.1806	12.1368	9.7121	8.0937	6.0729	4.8594	4.0511	3.0395	2.4332	2.0285	1.5234	1.2204	1.0182
52	1.814	19.8235	16.5222	12.3928	9.9169	8.2645	6.2011	4.9620	4.1366	3.1035	2.4844	2.0714	1.5556	1.2461	1.0397
53	1.812	20.2146	16.8482	12.6373	10.1125	8.4274	6.3233	5.0597	4.2180	3.1648	2.5334	2.1121	1.5861	1.2706	1.0600
54	1.811	20.6241	17.1894	12.8932	10.3172	8.5981	6.4514	5.1620	4.3033	3.2287	2.5846	2.1547	1.6181	1.2961	1.0814
55	1.809	21.0154	17.5155	13.1379	10.5130	8.7612	6.5736	5.2600	4.3850	3.2899	2.6335	2.1954	1.6487	1.3206	1.1017
56	1.808	21.4245	17.8565	13.3935	10.7175	8.9317	6.7016	5.3622	4.4702	3.3539	2.6848	2.2382	1.6808	1.3463	1.1232
57	1.806	21.8162	18.1829	13.6384	10.9134	9.0949	6.8240	5.4603	4.5519	3.4151	2.7337	2.2790	1.7114	1.3708	1.1436
58	1.805	22.2251	18.5237	13.8938	11.1178	9.2653	6.9518	5.5625	4.6371	3.4790	2.7848	2.3216	1.7433	1.3963	1.1649
59	1.803	22.6169	18.8502	14.1388	11.3138	9.4286	7.0743	5.6604	4.7187	3.5402	2.8338	2.3624	1.7739	1.4208	1.1853
60	1.802	23.0254	19.1907	14.3941	11.5180	9.5989	7.2021	5.7627	4.8039	3.6042	2.8850	2.4051	1.8060	1.4465	1.2067

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30 DEG PRESSURE ANGLE

TABLE 79—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 30 DEG PRESSURE ANGLE AND TOLERANCE CLASS 7, INTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	K_i \ d_i	0.6912	0.5760	0.4320	0.3456	0.2880	0.2160	0.1728	0.1440	0.1080	0.0864	0.0720	0.0540	0.0432	0.0360
6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	6.860	2.1412	1.7896	1.3465	1.0823	0.9023	0.6815	0.5479	0.4593	0.3475	0.2806	0.2350	0.1792	0.1455	0.1228
9	3.225	2.5165	2.1009	1.5787	1.2670	1.0558	0.7957	0.6390	0.5348	0.4036	0.3252	0.2720	0.2068	0.1674	0.1410
10	2.760	2.9784	2.4855	1.8669	1.4972	1.2477	0.9394	0.7536	0.6301	0.4752	0.3824	0.3197	0.2425	0.1960	0.1648
11	2.493	3.3449	2.7907	2.0954	1.6797	1.4001	1.0534	0.8447	0.7060	0.5318	0.4276	0.3573	0.2706	0.2184	0.1835
12	2.374	3.7922	3.1633	2.3749	1.9032	1.5861	1.1929	0.9562	0.7989	0.6016	0.4834	0.4038	0.3055	0.2464	0.2068
13	2.260	4.1610	3.4706	2.6052	2.0874	1.7397	1.3079	1.0482	0.8755	0.6588	0.5291	0.4419	0.3340	0.2691	0.2257
14	2.206	4.6002	3.8365	2.8797	2.3070	1.9226	1.4452	1.1580	0.9670	0.7273	0.5839	0.4875	0.3682	0.2965	0.2485
15	2.140	4.9718	4.1462	3.1117	2.4925	2.0775	1.5613	1.2507	1.0442	0.7853	0.6303	0.5262	0.3972	0.3197	0.2679
16	2.109	5.4054	4.5075	3.3827	2.7093	2.2580	1.6966	1.3592	1.1346	0.8530	0.6844	0.5713	0.4310	0.3467	0.2904
17	2.065	5.7798	4.8194	3.6167	2.8965	2.4140	1.8136	1.4526	1.2124	0.9113	0.7310	0.6101	0.4601	0.3700	0.3098
18	2.045	6.2093	5.1773	3.8852	3.1113	2.5930	1.9479	1.5600	1.3020	0.9785	0.7848	0.6550	0.4938	0.3970	0.3323
19	2.014	6.5859	5.4912	4.1204	3.2994	2.7498	2.0654	1.6540	1.3803	1.0372	0.8318	0.6941	0.5231	0.4204	0.3518
20	2.001	7.0122	5.8465	4.3869	3.5126	2.9275	2.1987	1.7607	1.4692	1.1039	0.8852	0.7386	0.5565	0.4472	0.3742
21	1.977	7.3908	6.1620	4.6235	3.7019	3.0853	2.3171	1.8552	1.5479	1.1630	0.9324	0.7780	0.5860	0.4708	0.3938
22	1.967	7.8146	6.5151	4.8884	3.9139	3.2617	2.4494	1.9613	1.6364	1.2291	0.9853	0.8221	0.6191	0.4972	0.4158
23	1.949	8.1948	6.8320	5.1259	4.1039	3.4202	2.5683	2.0562	1.7155	1.2886	1.0329	0.8618	0.6489	0.5211	0.4358
24	1.941	8.6165	7.1834	5.3896	4.3148	3.5960	2.7002	2.1618	1.8034	1.3545	1.0856	0.9057	0.6818	0.5474	0.4577
25	1.926	8.9984	7.5017	5.6282	4.5057	3.7552	2.8196	2.2573	1.8831	1.4142	1.1334	0.9455	0.7117	0.5714	0.4777
26	1.920	9.4184	7.8517	5.8907	4.7157	3.9300	2.9508	2.3622	1.9705	1.4798	1.1859	0.9893	0.7445	0.5976	0.4996
27	1.908	9.8013	8.1709	6.1301	4.9073	4.0897	3.0705	2.4581	2.0504	1.5396	1.2337	1.0291	0.7744	0.6215	0.5194
28	1.903	10.2198	8.5196	6.3915	5.1164	4.2642	3.2014	2.5626	2.1375	1.6051	1.2861	1.0728	0.8072	0.6478	0.5414
29	1.893	10.6039	8.8397	6.6316	5.3085	4.4241	3.3213	2.6587	2.2176	1.6650	1.3341	1.1128	0.8372	0.6718	0.5614
30	1.889	11.0211	9.1874	6.8924	5.5172	4.5980	3.4518	2.7630	2.3045	1.7302	1.3862	1.1562	0.8698	0.6978	0.5831
31	1.880	11.4061	9.5083	7.1331	5.7098	4.7585	3.5722	2.8593	2.3848	1.7905	1.4345	1.1965	0.9000	0.7220	0.6033
32	1.877	11.8222	9.8551	7.3931	5.9177	4.9318	3.7022	2.9633	2.4715	1.8554	1.4864	1.2398	0.9325	0.7480	0.6249
33	1.870	12.2081	10.1767	7.6343	6.1107	5.0927	3.8229	3.0599	2.5520	1.9159	1.5348	1.2801	0.9627	0.7723	0.6452
34	1.867	12.6233	10.5226	7.8938	6.3184	5.2658	3.9527	3.1636	2.6384	1.9807	1.5867	1.3233	0.9952	0.7982	0.6668
35	1.860	13.0099	10.8449	8.1356	6.5118	5.4270	4.0737	3.2604	2.7191	2.0411	1.6350	1.3636	1.0253	0.8223	0.6869
36	1.858	13.4242	11.1901	8.3944	6.7188	5.5995	4.2031	3.3639	2.8053	2.1059	1.6869	1.4069	1.0579	0.8484	0.7086
37	1.852	13.8116	11.5130	8.6365	6.9126	5.7610	4.3242	3.4609	2.8862	2.1664	1.7353	1.4472	1.0881	0.8726	0.7288
38	1.850	14.2251	11.8576	8.8950	7.1194	5.9334	4.4536	3.5644	2.9725	2.2310	1.7869	1.4902	1.1204	0.8984	0.7503
39	1.845	14.6131	12.1809	9.1376	7.3135	6.0950	4.5747	3.6613	3.0532	2.2917	1.8356	1.5308	1.1508	0.9228	0.7707
40	1.843	15.0259	12.5250	9.3955	7.5198	6.2671	4.7039	3.7647	3.1394	2.3562	1.8871	1.5738	1.1831	0.9486	0.7921
41	1.839	15.4145	12.8488	9.6384	7.7142	6.4291	4.8254	3.8617	3.2203	2.4171	1.9358	1.6144	1.2136	0.9730	0.8125
42	1.837	15.8269	13.1925	9.8961	7.9204	6.6007	4.9542	3.9649	3.3063	2.4814	1.9873	1.6573	1.2457	0.9988	0.8340
43	1.833	16.2160	13.5168	10.1393	8.1150	6.7630	5.0758	4.0621	3.3873	2.5422	2.0359	1.6978	1.2761	1.0231	0.8542
44	1.832	16.6276	13.8599	10.3965	8.3207	6.9346	5.2046	4.1652	3.4732	2.6066	2.0876	1.7408	1.3084	1.0489	0.8758
45	1.828	17.0172	14.1845	10.6400	8.5156	7.0970	5.3265	4.2625	3.5543	2.6675	2.1362	1.7814	1.3388	1.0733	0.8961
46	1.827	17.4283	14.5272	10.8970	8.7212	7.2682	5.4549	4.3654	3.6401	2.7317	2.1876	1.8242	1.3709	1.0990	0.9175
47	1.823	17.8183	14.8522	11.1409	8.9163	7.4308	5.5769	4.4629	3.7213	2.7928	2.2365	1.8649	1.4016	1.1235	0.9380
48	1.822	18.2290	15.1944	11.3974	9.1215	7.6020	5.7053	4.5657	3.8070	2.8569	2.2878	1.9077	1.4336	1.1491	0.9593
49	1.819	18.6193	15.5198	11.6415	9.3168	7.7646	5.8272	4.6632	3.8882	2.9180	2.3367	1.9485	1.4643	1.1737	0.9798
50	1.818	19.0296	15.8617	11.8979	9.5220	7.9356	5.9556	4.7659	3.9739	2.9821	2.3880	1.9912	1.4963	1.1993	1.0012
51	1.815	19.4204	16.1873	12.1422	9.7175	8.0985	6.0778	4.8637	4.0554	3.0431	2.4368	2.0319	1.5268	1.2237	1.0215
52	1.814	19.8302	16.5289	12.3984	9.9225	8.2692	6.2058	4.9661	4.1407	3.1073	2.4882	2.0747	1.5590	1.2495	1.0430
53	1.812	20.2213	16.8548	12.6428	10.1180	8.4323	6.3281	5.0640	4.2223	3.1684	2.5370	2.1155	1.5895	1.2739	1.0634
54	1.811	20.6308	17.1961	12.8988	10.3228	8.6030	6.4562	5.1663	4.3076	3.2325	2.5884	2.1583	1.6217	1.2997	1.0849
55	1.809	21.0222	17.5223	13.1435	10.5186	8.7662	6.5786	5.2643	4.3893	3.2936	2.6373	2.1990	1.6522	1.3241	1.1052
56	1.808	21.4314	17.8633	13.3992	10.7232	8.9366	6.7064	5.3666	4.4745	3.3575	2.6884	2.2416	1.6842	1.3497	1.1265
57	1.806	21.8231	18.1898	13.6439	10.9190	9.0999	6.8290	5.4646	4.5562	3.4189	2.7375	2.2826	1.7149	1.3743	1.1471
58	1.805	22.2319	18.5305	13.8995	11.1235	9.2704	6.9569	5.5668	4.6414	3.4827	2.7886	2.3251	1.7469	1.3999	1.1684
59	1.803	22.6241	18.8574	14.1446	11.3196	9.4336	7.0793	5.6649	4.7232	3.5439	2.8375	2.3659	1.7775	1.4243	1.1888
60	1.802	23.0326	19.1978	14.4000	11.5239	9.6039	7.2071	5.7670	4.8082	3.6079	2.8887	2.4087	1.8095	1.4500	1.2102

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30 DEG PRESSURE ANGLE

TABLE 80—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 30 DEG PRESSURE ANGLE AND TOLERANCE CLASS 4, EXTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	K_e \ d_e	0.7680	0.6400	0.4800	0.3840	0.3200	0.2400	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400
6	1.305	3.5430	2.9519	2.2134	1.7701	1.4751	1.1056	0.8841	0.7364	0.5518	0.4409	0.3673	0.2750	0.2196	0.1826
7	1.302	3.8692	3.2238	2.4173	1.9333	1.6110	1.2076	0.9657	0.8043	0.6028	0.4817	0.4011	0.3003	0.2399	0.1994
8	1.362	4.3540	3.6278	2.7203	2.1757	1.8130	1.3590	1.0869	0.9053	0.6785	0.5422	0.4515	0.3381	0.2701	0.2246
9	1.364	4.6975	3.9140	2.9351	2.3475	1.9560	1.4662	1.1728	0.9769	0.7322	0.5852	0.4873	0.3650	0.2915	0.2425
10	1.406	5.1618	4.3009	3.2251	2.5794	2.1495	1.6113	1.2887	1.0734	0.8047	0.6431	0.5356	0.4012	0.3205	0.2666
11	1.409	5.5161	4.5962	3.4466	2.7566	2.2971	1.7220	1.3772	1.1472	0.8599	0.6873	0.5725	0.4289	0.3426	0.2851
12	1.440	5.9676	4.9723	3.7288	2.9824	2.4852	1.8631	1.4901	1.2412	0.9304	0.7437	0.6195	0.4641	0.3708	0.3085
13	1.443	6.3292	5.2737	3.9546	3.1630	2.6357	1.9759	1.5805	1.3166	0.9869	0.7889	0.6572	0.4923	0.3934	0.3274
14	1.467	6.7722	5.6428	4.2315	3.3845	2.8203	2.1144	1.6912	1.4088	1.0561	0.8442	0.7032	0.5268	0.4209	0.3502
15	1.471	7.1389	5.9484	4.4608	3.5679	2.9732	2.2290	1.7828	1.4851	1.1134	0.8901	0.7414	0.5554	0.4438	0.3693
16	1.490	7.5758	6.3124	4.7338	3.7863	3.1552	2.3655	1.8920	1.5761	1.1816	0.9446	0.7868	0.5895	0.4711	0.3921
17	1.493	7.9465	6.6213	4.9654	3.9716	3.3095	2.4812	1.9847	1.6533	1.2396	0.9910	0.8255	0.6185	0.4943	0.4114
18	1.509	8.3787	6.9815	5.2355	4.1877	3.4896	2.6163	2.0927	1.7434	1.3071	1.0450	0.8705	0.6522	0.5213	0.4339
19	1.512	8.7526	7.2931	5.4693	4.3747	3.6454	2.7331	2.1862	1.8213	1.3653	1.0916	0.9094	0.6815	0.5446	0.4533
20	1.525	9.1811	7.6501	5.7371	4.5889	3.8240	2.8670	2.2932	1.9104	1.4323	1.1451	0.9540	0.7149	0.5714	0.4756
21	1.528	9.5575	7.9638	5.9723	4.7770	3.9807	2.9845	2.3873	1.9888	1.4911	1.1922	0.9933	0.7443	0.5949	0.4952
22	1.539	9.9832	8.3186	6.2383	4.9898	4.1580	3.1175	2.4937	2.0775	1.5576	1.2454	1.0374	0.7774	0.6214	0.5172
23	1.541	10.3616	8.6339	6.4749	5.1791	4.3158	3.2358	2.5883	2.1563	1.6168	1.2927	1.0769	0.8070	0.6450	0.5369
24	1.551	10.7849	8.9866	6.7395	5.3908	4.4921	3.3681	2.6941	2.2445	1.6829	1.3456	1.1209	0.8400	0.6715	0.5590
25	1.553	11.1651	9.3034	6.9770	5.5807	4.6504	3.4868	2.7890	2.3236	1.7423	1.3931	1.1605	0.8697	0.6952	0.5788
26	1.562	11.5864	9.6545	7.2403	5.7914	4.8260	3.6184	2.8944	2.4113	1.8080	1.4456	1.2044	0.9026	0.7215	0.6007
27	1.564	11.9681	9.9726	7.4789	5.9823	4.9850	3.7377	2.9898	2.4909	1.8676	1.4933	1.2442	0.9325	0.7454	0.6206
28	1.571	12.3876	10.3222	7.7410	6.1919	5.1599	3.8689	3.0947	2.5783	1.9332	1.5458	1.2879	0.9652	0.7716	0.6424
29	1.573	12.7707	10.6413	7.9804	6.3834	5.3193	3.9884	3.1905	2.6581	1.9930	1.5937	1.3276	0.9950	0.7954	0.6622
30	1.580	13.1889	10.9899	8.2418	6.5926	5.4936	4.1191	3.2950	2.7452	2.0584	1.6459	1.3712	1.0277	0.8215	0.6840
31	1.581	13.5729	11.3098	8.4819	6.7846	5.6536	4.2391	3.3909	2.8251	2.1184	1.6939	1.4112	1.0577	0.8455	0.7040
32	1.587	13.9899	11.6573	8.7423	6.9929	5.8274	4.3694	3.4951	2.9119	2.1835	1.7460	1.4546	1.0902	0.8716	0.7257
33	1.589	14.3748	11.9780	8.9830	7.1855	5.9877	4.4896	3.5914	2.9922	2.2437	1.7942	1.4947	1.1203	0.8956	0.7458
34	1.594	14.7907	12.3246	9.2430	7.3934	6.1610	4.6196	3.6954	3.0788	2.3085	1.8460	1.5380	1.1528	0.9216	0.7674
35	1.596	15.1766	12.6462	9.4842	7.5864	6.3218	4.7402	3.7918	3.1592	2.3688	1.8942	1.5782	1.1830	0.9458	0.7875
36	1.600	15.5914	12.9919	9.7434	7.7937	6.4947	4.8698	3.8954	3.2455	2.4336	1.9461	1.6215	1.2154	0.9717	0.8091
37	1.602	15.9782	13.3141	9.9850	7.9871	6.6556	4.9905	3.9921	3.3260	2.4941	1.9944	1.6616	1.2454	0.9957	0.8291
38	1.606	16.3923	13.6592	10.2439	8.1941	6.8282	5.1199	4.0956	3.4123	2.5588	2.0462	1.7047	1.2778	1.0216	0.8507
39	1.608	16.7795	13.9819	10.4858	8.3877	6.9896	5.2410	4.1925	3.4930	2.6193	2.0946	1.7451	1.3080	1.0458	0.8708
40	1.611	17.1929	14.3264	10.7442	8.5943	7.1618	5.3701	4.2958	3.5791	2.6839	2.1463	1.7881	1.3403	1.0716	0.8923
41	1.613	17.5807	14.6495	10.9867	8.7883	7.3233	5.4912	4.3926	3.6598	2.7443	2.1946	1.8285	1.3706	1.0958	0.9126
42	1.616	17.9934	14.9934	11.2446	8.9947	7.4953	5.6202	4.4958	3.7458	2.8088	2.2462	1.8715	1.4029	1.1216	0.9340
43	1.617	18.3819	15.3172	11.4873	9.1888	7.6572	5.7416	4.5929	3.8267	2.8695	2.2948	1.9120	1.4332	1.1459	0.9543
44	1.621	18.7938	15.6604	11.7448	9.3948	7.8288	5.8704	4.6959	3.9126	2.9339	2.3463	1.9547	1.4652	1.1715	0.9756
45	1.622	19.1829	15.9847	11.9880	9.5893	7.9908	5.9918	4.7932	3.9936	2.9947	2.3949	1.9953	1.4956	1.1958	0.9958
46	1.625	19.5944	16.3276	12.2452	9.7951	8.1623	6.1204	4.8959	4.0792	3.0590	2.4463	2.0381	1.5278	1.2215	1.0173
47	1.626	19.9838	16.6520	12.4885	9.9897	8.3246	6.2421	4.9933	4.1603	3.1198	2.4950	2.0787	1.5582	1.2459	1.0375
48	1.629	20.3948	16.9945	12.7453	10.1952	8.4958	6.3705	5.0960	4.2459	3.1839	2.5462	2.1215	1.5903	1.2716	1.0589
49	1.630	20.7846	17.3193	12.9891	10.3902	8.6581	6.4922	5.1935	4.3272	3.2448	2.5950	2.1621	1.6208	1.2959	1.0793
50	1.632	21.1951	17.6615	13.2456	10.5954	8.8292	6.6205	5.2962	4.4127	3.3090	2.6463	2.2049	1.6528	1.3216	1.1006
51	1.633	21.5855	17.9867	13.4894	10.7904	8.9918	6.7425	5.3936	4.4939	3.3699	2.6951	2.2455	1.6833	1.3460	1.1210
52	1.636	21.9954	18.3283	13.7458	10.9955	9.1627	6.8707	5.4961	4.5793	3.4340	2.7463	2.2881	1.7152	1.3714	1.1422
53	1.636	22.3861	18.6539	13.9900	11.1909	9.3253	6.9926	5.5938	4.6607	3.4951	2.7952	2.3288	1.7457	1.3959	1.1625
54	1.639	22.7958	18.9954	14.2459	11.3955	9.4960	7.1206	5.6962	4.7460	3.5591	2.8464	2.3715	1.7777	1.4215	1.1838
55	1.639	23.1867	19.3211	14.4903	11.5911	9.6590	7.2428	5.7940	4.8275	3.6202	2.8953	2.4122	1.8083	1.4459	1.2042
56	1.642	23.5961	19.6622	14.7461	11.7957	9.8295	7.3708	5.8963	4.9128	3.6840	2.9463	2.4548	1.8403	1.4715	1.2255
57	1.642	23.9873	19.9882	14.9907	11.9914	9.9924	7.4929	5.9940	4.9942	3.7451	2.9952	2.4956	1.8708	1.4959	1.2459
58	1.644	24.3963	20.3290	15.2462	12.1958	10.1629	7.6207	6.0962	5.0794	3.8090	3.0463	2.5382	1.9028	1.5215	1.2672
59	1.645	24.7879	20.6554	15.4910	12.3916	10.3260	7.7431	6.1941	5.1610	3.8702	3.0953	2.5788	1.9332	1.5458	1.2874
60	1.647	25.1965	20.9958	15.7464	12.5959	10.4963	7.8708	6.2963	5.2461	3.9341	3.1463	2.6214	1.9651	1.5713	1.3087

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30 DEG PRESSURE ANGLE

TABLE 81—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 30 DEG PRESSURE ANGLE AND TOLERANCE CLASS 5, EXTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	K_e \ d_e	0.7680	0.6400	0.4800	0.3840	0.3200	0.2400	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400
6	1.305	3.5416	2.9505	2.2122	1.7689	1.4740	1.1045	0.8831	0.7353	0.5509	0.4400	0.3663	0.2741	0.2187	0.1816
7	1.302	3.8678	3.2223	2.4160	1.9320	1.6100	1.2065	0.9647	0.8033	0.6019	0.4808	0.4003	0.2996	0.2391	0.1986
8	1.362	4.3525	3.6263	2.7190	2.1743	1.8118	1.3578	1.0858	0.9042	0.6774	0.5411	0.4506	0.3372	0.2691	0.2236
9	1.364	4.6960	3.9125	2.9337	2.3461	1.9549	1.4652	1.1717	0.9758	0.7311	0.5841	0.4864	0.3640	0.2906	0.2415
10	1.406	5.1603	4.2993	3.2237	2.5780	2.1483	1.6101	1.2875	1.0723	0.8035	0.6420	0.5346	0.4002	0.3195	0.2656
11	1.409	5.5145	4.5945	3.4451	2.7552	2.2958	1.7207	1.3761	1.1461	0.8589	0.6863	0.5715	0.4279	0.3416	0.2840
12	1.440	5.9660	4.9707	3.7272	2.9808	2.4839	1.8618	1.4889	1.2401	0.9294	0.7427	0.6185	0.4631	0.3698	0.3075
13	1.443	6.3275	5.2719	3.9532	3.1616	2.6344	1.9746	1.5792	1.3153	0.9859	0.7878	0.6562	0.4913	0.3924	0.3263
14	1.467	6.7705	5.6411	4.2300	3.3830	2.8190	2.1130	1.6899	1.4075	1.0549	0.8430	0.7021	0.5257	0.4199	0.3492
15	1.471	7.1372	5.9466	4.4592	3.5663	2.9718	2.2277	1.7816	1.4839	1.1122	0.8889	0.7403	0.5544	0.4428	0.3683
16	1.490	7.5740	6.3106	4.7322	3.7847	3.1537	2.3640	1.8908	1.5749	1.1804	0.9434	0.7858	0.5885	0.4701	0.3910
17	1.493	7.9447	6.6195	4.9639	3.9701	3.3082	2.4799	1.9833	1.6520	1.2384	0.9898	0.8244	0.6174	0.4932	0.4103
18	1.509	8.3767	6.9795	5.2339	4.1860	3.4882	2.6149	2.0913	1.7420	1.3059	1.0438	0.8694	0.6512	0.5202	0.4328
19	1.512	8.7507	7.2911	5.4676	4.3730	3.6439	2.7316	2.1848	1.8199	1.3641	1.0904	0.9082	0.6802	0.5434	0.4521
20	1.525	9.1791	7.6481	5.7353	4.5871	3.8225	2.8655	2.2919	1.9092	1.4311	1.1439	0.9528	0.7137	0.5702	0.4744
21	1.528	9.5556	7.9618	5.9706	4.7753	3.9793	2.9831	2.3859	1.9874	1.4899	1.1910	0.9920	0.7431	0.5937	0.4940
22	1.539	9.9811	8.3164	6.2366	4.9881	4.1565	3.1160	2.4923	2.0761	1.5564	1.2441	1.0363	0.7763	0.6203	0.5161
23	1.541	10.3596	8.6318	6.4730	5.1773	4.3142	3.2343	2.5869	2.1549	1.6155	1.2914	1.0758	0.8059	0.6439	0.5359
24	1.551	10.7828	8.9844	6.7376	5.3889	4.4906	3.3665	2.6927	2.2431	1.6815	1.3442	1.1197	0.8388	0.6702	0.5577
25	1.553	11.1630	9.3013	6.9753	5.5790	4.6489	3.4852	2.7876	2.3222	1.7409	1.3917	1.1593	0.8685	0.6940	0.5775
26	1.562	11.5842	9.6523	7.2384	5.7895	4.8244	3.6169	2.8930	2.4099	1.8067	1.4444	1.2032	0.9014	0.7203	0.5994
27	1.564	11.9659	9.9704	7.4770	5.9804	4.9835	3.7362	2.9884	2.4895	1.8663	1.4921	1.2429	0.9312	0.7441	0.6193
28	1.571	12.3854	10.3199	7.7391	6.1900	5.1582	3.8671	3.0931	2.5767	1.9319	1.5445	1.2866	0.9640	0.7704	0.6412
29	1.573	12.7685	10.6391	7.9785	6.3816	5.3177	3.9868	3.1889	2.6565	1.9916	1.5922	1.3264	0.9937	0.7941	0.6609
30	1.580	13.1865	10.9875	8.2399	6.5907	5.4920	4.1175	3.2934	2.7436	2.0569	1.6445	1.3699	1.0264	0.8202	0.6827
31	1.581	13.5706	11.3076	8.4798	6.7826	5.6519	4.2374	3.3895	2.8236	2.1169	1.6925	1.4099	1.0564	0.8443	0.7027
32	1.587	13.9875	11.6549	8.7404	6.9910	5.8256	4.3677	3.4935	2.9103	2.1821	1.7446	1.4533	1.0890	0.8703	0.7244
33	1.589	14.3726	11.9758	8.9809	7.1834	5.9859	4.4878	3.5898	2.9906	2.2422	1.7927	1.4934	1.1190	0.8944	0.7445
34	1.594	14.7883	12.3222	9.2409	7.3914	6.1592	4.6178	3.6938	3.0772	2.3072	1.8447	1.5368	1.1515	0.9203	0.7661
35	1.596	15.1741	12.6437	9.4821	7.5843	6.3200	4.7384	3.7902	3.1576	2.3674	1.8928	1.5768	1.1815	0.9443	0.7861
36	1.600	15.5890	12.9895	9.7413	7.7916	6.4927	4.8679	3.8938	3.2439	2.4322	1.9447	1.6200	1.2139	0.9702	0.8077
37	1.602	15.9756	13.3116	9.9830	7.9850	6.6539	4.9887	3.9905	3.3244	2.4926	1.9930	1.6603	1.2441	0.9944	0.8278
38	1.606	16.3897	13.6567	10.2418	8.1920	6.8264	5.1181	4.0940	3.4107	2.5573	2.0447	1.7034	1.2765	1.0203	0.8494
39	1.608	16.7769	13.9793	10.4837	8.3856	6.9876	5.2390	4.1907	3.4912	2.6178	2.0932	1.7438	1.3067	1.0445	0.8695
40	1.611	17.1903	14.3238	10.7421	8.5922	7.1599	5.3682	4.2940	3.5773	2.6822	2.1447	1.7866	1.3388	1.0701	0.8909
41	1.613	17.5781	14.6469	10.9844	8.7861	7.3215	5.4895	4.3910	3.6582	2.7429	2.1932	1.8271	1.3692	1.0944	0.9111
42	1.616	17.9908	14.9908	11.2423	8.9924	7.4933	5.6182	4.4942	3.7441	2.8073	2.2447	1.8700	1.4014	1.1202	0.9326
43	1.617	18.3792	15.3145	11.4852	9.1867	7.6552	5.7397	4.5911	3.8249	2.8680	2.2933	1.9105	1.4317	1.1444	0.9528
44	1.621	18.7912	15.6579	11.7425	9.3925	7.8269	5.8684	4.6942	3.9108	2.9324	2.3448	1.9534	1.4639	1.1702	0.9743
45	1.622	19.1801	15.9819	11.9857	9.5871	7.9888	5.9898	4.7914	3.9918	2.9930	2.3933	1.9938	1.4942	1.1943	0.9944
46	1.625	19.5916	16.3248	12.2429	9.7928	8.1603	6.1184	4.8943	4.0775	3.0573	2.4447	2.0366	1.5263	1.2201	1.0158
47	1.626	19.9810	16.6493	12.4862	9.9874	8.3226	6.2402	4.9915	4.1585	3.1182	2.4934	2.0772	1.5567	1.2444	1.0361
48	1.629	20.3920	16.9918	12.7431	10.1929	8.4937	6.3684	5.0942	4.2441	3.1824	2.5448	2.1200	1.5888	1.2701	1.0575
49	1.630	20.7818	17.3166	12.9866	10.3877	8.6562	6.4903	5.1917	4.3254	3.2433	2.5935	2.1606	1.6193	1.2944	1.0778
50	1.632	21.1923	17.6587	13.2432	10.5930	8.8272	6.6186	5.2944	4.4109	3.3075	2.6448	2.2034	1.6514	1.3201	1.0991
51	1.633	21.5825	17.9838	13.4872	10.7882	8.9897	6.7404	5.3918	4.4921	3.3683	2.6934	2.2439	1.6817	1.3443	1.1193
52	1.636	21.9925	18.3254	13.7433	10.9930	9.1606	6.8685	5.4943	4.5775	3.4324	2.7447	2.2866	1.7137	1.3700	1.1407
53	1.636	22.3832	18.6510	13.9875	11.1884	9.3232	6.9905	5.5920	4.6589	3.4934	2.7935	2.3273	1.7442	1.3944	1.1610
54	1.639	22.7927	18.9922	14.2434	11.3931	9.4939	7.1185	5.6942	4.7441	3.5574	2.8447	2.3700	1.7762	1.4200	1.1823
55	1.639	23.1838	19.3181	14.4878	11.5886	9.6568	7.2407	5.7920	4.8255	3.6185	2.8936	2.4107	1.8068	1.4444	1.2027
56	1.642	23.5929	19.6591	14.7436	11.7933	9.8272	7.3684	5.8943	4.9108	3.6823	2.9446	2.4532	1.8386	1.4698	1.2239
57	1.642	23.9843	19.9852	14.9881	11.9888	9.9903	7.4907	5.9922	4.9924	3.7435	2.9935	2.4939	1.8692	1.4943	1.2442
58	1.644	24.3932	20.3259	15.2437	12.1933	10.1607	7.6186	6.0943	5.0774	3.8074	3.0446	2.5365	1.9011	1.5198	1.2655
59	1.645	24.7848	20.6523	15.4885	12.3891	10.3237	7.7408	6.1922	5.1590	3.8686	3.0936	2.5773	1.9317	1.5443	1.2859
60	1.647	25.1933	20.9927	15.7438	12.5933	10.4940	7.8685	6.2943	5.2441	3.9324	3.1447	2.6199	1.9636	1.5699	1.3072

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30 DEG PRESSURE ANGLE

TABLE 82—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 30 DEG PRESSURE ANGLE AND TOLERANCE CLASS 6, EXTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	K_e \ d_e	0.7680	0.6400	0.4800	0.3840	0.3200	0.2400	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400
6	1.305	3.5396	2.9485	2.2104	1.7671	1.4726	1.1031	0.8818	0.7340	0.5496	0.4386	0.3651	0.2729	0.2174	0.1804
7	1.302	3.8658	3.2204	2.4143	1.9303	1.6084	1.2049	0.9632	0.8019	0.6006	0.4794	0.3990	0.2982	0.2377	0.1973
8	1.362	4.3503	3.6241	2.7170	2.1724	1.8103	1.3563	1.0843	0.9027	0.6760	0.5397	0.4493	0.3359	0.2678	0.2223
9	1.364	4.6940	3.9104	2.9318	2.3442	1.9533	1.4635	1.1702	0.9742	0.7297	0.5827	0.4851	0.3628	0.2893	0.2402
10	1.406	5.1580	4.2971	3.2217	2.5760	2.1466	1.6085	1.2860	1.0707	0.8021	0.6406	0.5334	0.3989	0.3182	0.2643
11	1.409	5.5122	4.5922	3.4432	2.7532	2.2941	1.7190	1.3745	1.1445	0.8573	0.6847	0.5701	0.4264	0.3402	0.2826
12	1.440	5.9637	4.9684	3.7252	2.9787	2.4822	1.8600	1.4872	1.2383	0.9278	0.7411	0.6171	0.4616	0.3683	0.3060
13	1.443	6.3251	5.2696	3.9512	3.1595	2.6327	1.9729	1.5776	1.3137	0.9843	0.7862	0.6547	0.4899	0.3909	0.3248
14	1.467	6.7680	5.6386	4.2278	3.3808	2.8172	2.1113	1.6883	1.4059	1.0534	0.8415	0.7006	0.5242	0.4184	0.3477
15	1.471	7.1347	5.9441	4.4571	3.5642	2.9699	2.2257	1.7798	1.4821	1.1106	0.8872	0.7388	0.5529	0.4413	0.3668
16	1.490	7.5714	6.3081	4.7299	3.7824	3.1519	2.3622	1.8890	1.5731	1.1788	0.9418	0.7843	0.5870	0.4685	0.3895
17	1.493	7.9421	6.6170	4.9617	3.9678	3.3062	2.4779	1.9817	1.6503	1.2367	0.9881	0.8229	0.6159	0.4917	0.4088
18	1.509	8.3741	6.9769	5.2316	4.1837	3.4863	2.6129	2.0895	1.7402	1.3042	1.0421	0.8677	0.6495	0.5185	0.4311
19	1.512	8.7479	7.2884	5.4652	4.3706	3.6419	2.7296	2.1830	1.8181	1.3624	1.0887	0.9067	0.6787	0.5419	0.4506
20	1.525	9.1765	7.6455	5.7330	4.5848	3.8205	2.8635	2.2899	1.9072	1.4294	1.1422	0.9513	0.7121	0.5686	0.4728
21	1.528	9.5528	7.9591	5.9681	4.7729	3.9772	2.9810	2.3841	1.9856	1.4882	1.1893	0.9905	0.7415	0.5921	0.4924
22	1.539	9.9783	8.3136	6.2341	4.9857	4.1545	3.1140	2.4904	2.0742	1.5547	1.2424	1.0346	0.7746	0.6186	0.5144
23	1.541	10.3567	8.6289	6.4706	5.1748	4.3121	3.2321	2.5849	2.1529	1.6136	1.2896	1.0741	0.8042	0.6422	0.5341
24	1.551	10.7800	8.9816	6.7351	5.3864	4.4884	3.3644	2.6907	2.2411	1.6798	1.3425	1.1181	0.8372	0.6686	0.5561
25	1.553	11.1601	9.2984	6.9726	5.5764	4.6467	3.4830	2.7858	2.3203	1.7392	1.3900	1.1577	0.8669	0.6924	0.5759
26	1.562	11.5812	9.6493	7.2359	5.7870	4.8222	3.6147	2.8909	2.4079	1.8048	1.4425	1.2014	0.8996	0.7185	0.5977
27	1.564	11.9628	9.9673	7.4743	5.9777	4.9811	3.7338	2.9863	2.4874	1.8645	1.4902	1.2412	0.9295	0.7424	0.6176
28	1.571	12.3825	10.3170	7.7366	6.1875	5.1560	3.8649	3.0911	2.5747	1.9300	1.5426	1.2849	0.9622	0.7686	0.6394
29	1.573	12.7653	10.6360	7.9758	6.3789	5.3154	3.9844	3.1868	2.6544	1.9898	1.5905	1.3246	0.9920	0.7924	0.6592
30	1.580	13.1834	10.9843	8.2372	6.5880	5.4896	4.1151	3.2914	2.7416	2.0550	1.6426	1.3681	1.0246	0.8185	0.6809
31	1.581	13.5673	11.3043	8.4771	6.7799	5.6495	4.2350	3.3872	2.8214	2.1150	1.6906	1.4082	1.0546	0.8425	0.7009
32	1.587	13.9843	11.6517	8.7377	6.9883	5.8232	4.3653	3.4915	2.9083	2.1802	1.7427	1.4516	1.0872	0.8685	0.7226
33	1.589	14.3692	11.9725	8.9782	7.1807	5.9835	4.4854	3.5877	2.9885	2.2403	1.7908	1.4915	1.1171	0.8924	0.7425
34	1.594	14.7850	12.3189	9.2382	7.3886	6.1568	4.6154	3.6915	3.0750	2.3051	1.8426	1.5348	1.1496	0.9184	0.7642
35	1.596	15.1707	12.6403	9.4792	7.5814	6.3174	4.7358	3.7880	3.1554	2.3654	1.8909	1.5750	1.1797	0.9425	0.7843
36	1.600	15.5857	12.9861	9.7384	7.7887	6.4903	4.8655	3.8916	3.2416	2.4303	1.9427	1.6182	1.2121	0.9684	0.8059
37	1.602	15.9722	13.3082	9.9801	7.9821	6.6513	4.9862	3.9882	3.3222	2.4907	1.9911	1.6583	1.2422	0.9924	0.8258
38	1.606	16.3862	13.6531	10.2387	8.1890	6.8238	5.1156	4.0917	3.4084	2.5552	2.0426	1.7015	1.2745	1.0183	0.8474
39	1.608	16.7734	13.9758	10.4808	8.3827	6.9851	5.2365	4.1884	3.4890	2.6157	2.0911	1.7418	1.3048	1.0425	0.8676
40	1.611	17.1867	14.3202	10.7390	8.5892	7.1573	5.3656	4.2917	3.5751	2.6803	2.1427	1.7849	1.3371	1.0683	0.8891
41	1.613	17.5746	14.6434	10.9815	8.7832	7.3189	5.4869	4.3887	3.6559	2.7408	2.1910	1.8251	1.3672	1.0924	0.9091
42	1.616	17.9871	14.9871	11.2392	8.9893	7.4907	5.6156	4.4917	3.7417	2.8052	2.2426	1.8681	1.3994	1.1182	0.9306
43	1.617	18.3755	15.3107	11.4821	9.1836	7.6526	5.7371	4.5889	3.8227	2.8659	2.2912	1.9086	1.4298	1.1425	0.9508
44	1.621	18.7875	15.6541	11.7395	9.3894	7.8241	5.8657	4.6917	3.9083	2.9303	2.3427	1.9515	1.4620	1.1682	0.9723
45	1.622	19.1764	15.9782	11.9826	9.5840	7.9862	5.9872	4.7890	3.9894	2.9909	2.3911	1.9918	1.4922	1.1924	0.9924
46	1.625	19.5877	16.3209	12.2396	9.7896	8.1575	6.1157	4.8918	4.0751	3.0552	2.4426	2.0347	1.5243	1.2181	1.0138
47	1.626	19.9773	16.6455	12.4831	9.9843	8.3198	6.2374	4.9891	4.1561	3.1161	2.4913	2.0753	1.5548	1.2424	1.0341
48	1.629	20.3881	16.9879	12.7398	10.1896	8.4909	6.3656	5.0918	4.2417	3.1803	2.5426	2.1179	1.5867	1.2679	1.0553
49	1.630	20.7779	17.3127	12.9835	10.3846	8.6534	6.4875	5.1891	4.3228	3.2410	2.5912	2.1585	1.6172	1.2923	1.0756
50	1.632	21.1882	17.6546	13.2399	10.5897	8.8243	6.6156	5.2917	4.4083	3.3052	2.6425	2.2013	1.6492	1.3180	1.0970
51	1.633	21.5786	17.9799	13.4837	10.7847	8.9869	6.7376	5.3893	4.4896	3.3662	2.6913	2.2419	1.6797	1.3423	1.1173
52	1.636	21.9885	18.3215	13.7400	10.9898	9.1576	6.8656	5.4917	4.5749	3.4302	2.7425	2.2845	1.7116	1.3678	1.1385
53	1.636	22.3791	18.6469	13.9841	11.1849	9.3204	6.9877	5.5894	4.6563	3.4911	2.7912	2.3252	1.7421	1.3922	1.1589
54	1.639	22.7886	18.9881	14.2401	11.3898	9.4909	7.1155	5.6918	4.7416	3.5551	2.8424	2.3678	1.7741	1.4178	1.1802
55	1.639	23.1797	19.3140	14.4844	11.5852	9.6539	7.2377	5.7894	4.8229	3.6162	2.8913	2.4086	1.8046	1.4423	1.2005
56	1.642	23.5888	19.6550	14.7402	11.7898	9.8243	7.3655	5.8917	4.9082	3.6802	2.9425	2.4510	1.8365	1.4677	1.2217
57	1.642	23.9800	19.9809	14.9846	11.9853	9.9873	7.4878	5.9894	4.9895	3.7412	2.9912	2.4918	1.8670	1.4921	1.2421
58	1.644	24.3889	20.3216	15.2402	12.1898	10.1576	7.6154	6.0916	5.0747	3.8051	3.0423	2.5344	1.8990	1.5177	1.2634
59	1.645	24.7805	20.6480	15.4849	12.3855	10.3208	7.7378	6.1895	5.1563	3.8663	3.0913	2.5752	1.9296	1.5422	1.2838
60	1.647	25.1890	20.9884	15.7403	12.5898	10.4909	7.8654	6.2915	5.2413	3.9299	3.1422	2.6176	1.9613	1.5675	1.3049

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30 DEG PRESSURE ANGLE

TABLE 83—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 30 DEG PRESSURE ANGLE AND TOLERANCE CLASS 7, EXTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	K_e \ d_e	0.7680	0.6400	0.4800	0.3840	0.3200	0.2400	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400
6	1.305	3.5367	2.9457	2.2077	1.7645	1.4703	1.1008	0.8797	0.7319	0.5476	0.4366	0.3633	0.2710	0.2155	0.1785
7	1.302	3.8630	3.2175	2.4117	1.9277	1.6062	1.2027	0.9611	0.7997	0.5984	0.4773	0.3971	0.2963	0.2358	0.1954
8	1.362	4.3473	3.6211	2.7143	2.1696	1.8078	1.3538	1.0821	0.9005	0.6739	0.5376	0.4474	0.3339	0.2659	0.2203
9	1.364	4.6907	3.9072	2.9289	2.3413	1.9510	1.4612	1.1678	0.9719	0.7276	0.5806	0.4832	0.3608	0.2873	0.2382
10	1.406	5.1546	4.2937	3.2187	2.5731	2.1441	1.6059	1.2837	1.0684	0.7998	0.6383	0.5312	0.3967	0.3160	0.2621
11	1.409	5.5088	4.5888	3.4402	2.7502	2.2916	1.7165	1.3721	1.1421	0.8552	0.6825	0.5681	0.4244	0.3381	0.2805
12	1.440	5.9601	4.9648	3.7221	2.9757	2.4796	1.8574	1.4849	1.2360	0.9254	0.7387	0.6149	0.4594	0.3661	0.3038
13	1.443	6.3215	5.2660	3.9480	3.1563	2.6301	1.9703	1.5751	1.3112	0.9819	0.7839	0.6525	0.4876	0.3887	0.3226
14	1.467	6.7643	5.6349	4.2246	3.3776	2.8144	2.1084	1.6856	1.4032	1.0510	0.8391	0.6985	0.5221	0.4163	0.3455
15	1.471	7.1310	5.9404	4.4538	3.5610	2.9673	2.2231	1.7773	1.4796	1.1082	0.8848	0.7366	0.5506	0.4390	0.3645
16	1.490	7.5676	6.3042	4.7266	3.7791	3.1490	2.3593	1.8863	1.5704	1.1764	0.9394	0.7820	0.5847	0.4662	0.3872
17	1.493	7.9382	6.6131	4.9582	3.9644	3.3034	2.4751	1.9790	1.6476	1.2343	0.9857	0.8206	0.6136	0.4894	0.4065
18	1.509	8.3702	6.9730	5.2281	4.1803	3.4832	2.6099	2.0868	1.7374	1.3016	1.0395	0.8654	0.6472	0.5162	0.4287
19	1.512	8.7440	7.2845	5.4618	4.3672	3.6390	2.7267	2.1803	1.8153	1.3600	1.0862	0.9044	0.6764	0.5395	0.4482
20	1.525	9.1724	7.6414	5.7295	4.5813	3.8174	2.8604	2.2872	1.9044	1.4267	1.1396	0.9488	0.7096	0.5661	0.4703
21	1.528	9.5487	7.9549	5.9646	4.7693	3.9741	2.9779	2.3813	1.9828	1.4856	1.1866	0.9880	0.7390	0.5896	0.4899
22	1.539	9.9741	8.3095	6.2304	4.9820	4.1514	3.1109	2.4875	2.0713	1.5520	1.2398	1.0323	0.7722	0.6162	0.5120
23	1.541	10.3525	8.6247	6.4670	5.1712	4.3090	3.2290	2.5821	2.1501	1.6110	1.2869	1.0715	0.8017	0.6397	0.5316
24	1.551	10.7756	8.9773	6.7314	5.3827	4.4851	3.3611	2.6877	2.2381	1.6771	1.3398	1.1156	0.8347	0.6661	0.5536
25	1.553	11.1557	9.2940	6.9689	5.5726	4.6436	3.4799	2.7828	2.3173	1.7365	1.3873	1.1552	0.8644	0.6898	0.5734
26	1.562	11.5767	9.6448	7.2320	5.7831	4.8189	3.6114	2.8879	2.4049	1.8021	1.4398	1.1989	0.8971	0.7160	0.5951
27	1.564	11.9583	9.9627	7.4704	5.9738	4.9778	3.7305	2.9832	2.4843	1.8618	1.4875	1.2386	0.9269	0.7398	0.6150
28	1.571	12.3777	10.3122	7.7327	6.1836	5.1525	3.8614	3.0881	2.5717	1.9271	1.5397	1.2822	0.9595	0.7659	0.6366
29	1.573	12.7606	*10.6312	7.9719	6.3749	5.3121	3.9811	3.1837	2.6513	1.9870	1.5876	1.3221	0.9894	0.7898	0.6566
30	1.580	13.1786	10.9796	8.2331	6.5838	5.4861	4.1116	3.2882	2.7384	2.0523	1.6399	1.3656	1.0221	0.8159	0.6783
31	1.581	13.5626	11.2995	8.4730	6.7757	5.6460	4.2315	3.3840	2.8182	2.1122	1.6877	1.4054	1.0519	0.8397	0.6982
32	1.587	13.9794	11.6468	8.7336	6.9842	5.8197	4.3618	3.4883	2.9051	2.1773	1.7398	1.4488	1.0844	0.8658	0.7199
33	1.589	14.3643	11.9675	8.9741	7.1766	5.9800	4.4819	3.5844	2.9851	2.2373	1.7878	1.4888	1.1144	0.8897	0.7398
34	1.594	14.7800	12.3139	9.2338	7.3843	6.1531	4.6117	3.6883	3.0717	2.3022	1.8397	1.5321	1.1468	0.9156	0.7614
35	1.596	15.1658	12.6354	9.4749	7.5771	6.3139	4.7323	3.7846	3.1520	2.3625	1.8880	1.5723	1.1770	0.9397	0.7815
36	1.600	15.5805	12.9810	9.7342	7.7846	6.4866	4.8618	3.8883	3.2384	2.4272	1.9396	1.6153	1.2092	0.9655	0.8029
37	1.602	15.9671	13.3031	9.9757	7.9778	6.6476	4.9825	3.9848	3.3188	2.4876	1.9880	1.6556	1.2394	0.9897	0.8230
38	1.606	16.3810	13.6480	10.2344	8.1846	6.8200	5.1117	4.0882	3.4049	2.5523	2.0397	1.6987	1.2717	1.0155	0.8446
39	1.608	16.7682	13.9706	10.4763	8.3781	6.9814	5.2327	4.1850	3.4856	2.6126	2.0880	1.7389	1.3018	1.0396	0.8646
40	1.611	17.1814	14.3149	10.7346	8.5848	7.1534	5.3617	4.2882	3.5715	2.6772	2.1396	1.7819	1.3341	1.0654	0.8861
41	1.613	17.5692	14.6381	10.9770	8.7786	7.3149	5.4828	4.3852	3.6523	2.7377	2.1879	1.8222	1.3643	1.0895	0.9061
42	1.616	17.9816	14.9816	11.2347	8.9848	7.4868	5.6117	4.4882	3.7381	2.8021	2.2395	1.8651	1.3965	1.1152	0.9276
43	1.617	18.3699	15.3052	11.4774	9.1789	7.6486	5.7330	4.5853	3.8191	2.8628	2.2881	1.9056	1.4268	1.1395	0.9479
44	1.621	18.7818	15.6484	11.7349	9.3849	7.8201	5.8616	4.6881	3.9047	2.9270	2.3394	1.9484	1.4588	1.1651	0.9691
45	1.622	19.1707	15.9725	11.9779	9.5793	7.9822	5.9832	4.7854	3.9858	2.9878	2.3880	1.9889	1.4892	1.1894	0.9894
46	1.625	19.5820	16.3152	12.2349	9.7848	8.1535	6.1116	4.8881	4.0713	3.0521	2.4395	2.0317	1.5214	1.2151	1.0108
47	1.626	19.9714	16.6397	12.4782	9.9794	8.3156	6.2331	4.9855	4.1525	3.1128	2.4880	2.0721	1.5516	1.2393	1.0309
48	1.629	20.3822	16.9820	12.7351	10.1849	8.4867	6.3614	5.0880	4.2379	3.1770	2.5393	2.1149	1.5837	1.2649	1.0523
49	1.630	20.7720	17.3068	12.9786	10.3797	8.6491	6.4832	5.1855	4.3192	3.2378	2.5879	2.1554	1.6140	1.2891	1.0725
50	1.632	21.1824	17.6487	13.2350	10.5848	8.8200	6.6114	5.2880	4.4045	3.3019	2.6392	2.1981	1.6461	1.3148	1.0938
51	1.633	21.5725	17.9738	13.4788	10.7798	8.9825	6.7332	5.3854	4.4857	3.3629	2.6880	2.2388	1.6766	1.3392	1.1141
52	1.636	21.9825	18.3154	13.7349	10.9847	9.1533	6.8613	5.4879	4.5711	3.4268	2.7391	2.2813	1.7084	1.3646	1.1353
53	1.636	22.3730	18.6408	13.9791	11.1800	9.3160	6.9832	5.5854	4.6523	3.4878	2.7879	2.3220	1.7389	1.3891	1.1557
54	1.639	22.7825	18.9821	14.2350	11.3847	9.4865	7.1111	5.6878	4.7376	3.5517	2.8390	2.3645	1.7708	1.4145	1.1768
55	1.639	23.1734	19.3078	14.4793	11.5801	9.6494	7.2333	5.7854	4.8189	3.6128	2.8878	2.4053	1.8013	1.4389	1.1972
56	1.642	23.5826	19.6487	14.7349	11.7845	9.8198	7.3610	5.8877	4.9042	3.6767	2.9390	2.4479	1.8333	1.4645	1.2185
57	1.642	23.9738	19.9747	14.9795	11.9802	9.9827	7.4832	5.9854	4.9856	3.7377	2.9877	2.4885	1.8637	1.4888	1.2387
58	1.644	24.3826	20.3153	15.2350	12.1845	10.1530	7.6108	6.0876	5.0708	3.8016	3.0388	2.5311	1.8956	1.5143	1.2600
59	1.645	24.7739	20.6414	15.4796	12.3802	10.3161	7.7332	6.1854	5.1522	3.8628	3.0878	2.5719	1.9262	1.5388	1.2804
60	1.647	25.1824	20.9818	15.7348	12.5844	10.4863	7.8607	6.2876	5.2373	3.9265	3.1387	2.6143	1.9580	1.5642	1.3015

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30 DEG PRESSURE ANGLE

TABLE 84—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 30 DEG PRESSURE ANGLE AND TOLERANCE CLASS 5, MAJOR DIAMETER FIT, EXTERNAL INVOLUTE SPLINES

Spline Pitch		3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32
N	K_e \ d_e	0.6400	0.4800	0.3840	0.3200	0.2400	0.1920	0.1600	0.1200
6	1.305	2.9480	2.2100	1.7667	1.4720	1.1026	0.8813	0.7335	0.5489
7	1.302	3.2199	2.4138	1.9298	1.6080	1.2046	0.9629	0.8015	0.5999
8	1.362	3.6235	2.7166	2.1720	1.8097	1.3557	1.0837	0.9021	0.6753
9	1.364	3.9098	2.9313	2.3436	1.9529	1.4631	1.1696	0.9737	0.7290
10	1.406	4.2965	3.2213	2.5756	2.1462	1.6080	1.2855	1.0703	0.8014
11	1.409	4.5916	3.4426	2.7526	2.2937	1.7186	1.3740	1.1439	0.8567
12	1.440	4.9677	3.7247	2.9783	2.4818	1.8596	1.4868	1.2379	0.9272
13	1.443	5.2690	3.9506	3.1590	2.6323	1.9725	1.5772	1.3132	0.9837
14	1.467	5.6380	4.2274	3.3804	2.8168	2.1108	1.6877	1.4053	1.0527
15	1.471	5.9435	4.4565	3.5636	2.9695	2.2253	1.7794	1.4817	1.1100
16	1.490	6.3073	4.7295	3.7820	3.1514	2.3617	1.8885	1.5726	1.1782
17	1.493	6.6164	4.9611	3.9672	3.3058	2.4775	1.9811	1.6497	1.2361
18	1.509	6.9763	5.2310	4.1831	3.4858	2.6125	2.0891	1.7397	1.3036
19	1.512	7.2878	5.4647	4.3701	3.6415	2.7292	2.1825	1.8176	1.3618
20	1.525	7.6447	5.7324	4.5842	3.8200	2.8630	2.2895	1.9067	1.4288
21	1.528	7.9585	5.9677	4.7724	3.9769	2.9807	2.3836	1.9851	1.4876
22	1.539	8.3130	6.2335	4.9851	4.1540	3.1135	2.4900	2.0738	1.5540
23	1.541	8.6283	6.4701	5.1743	4.3118	3.2318	2.5844	2.1525	1.6132
24	1.551	8.9809	6.7345	5.3858	4.4879	3.3639	2.6902	2.2406	1.6791
25	1.553	9.2978	6.9721	5.5759	4.6464	3.4827	2.7853	2.3198	1.7385
26	1.562	9.6487	7.2353	5.7864	4.8218	3.6142	2.8904	2.4074	1.8043
27	1.564	9.9666	7.4739	5.9773	4.9808	3.7335	2.9859	2.4869	1.8640
28	1.571	10.3163	7.7360	6.1869	5.1555	3.8644	3.0906	2.5742	1.9295
29	1.573	10.6353	7.9754	6.3784	5.3151	3.9841	3.1864	2.6540	1.9892
30	1.580	10.9837	8.2366	6.5873	5.4893	4.1148	3.2909	2.7411	2.0545
31	1.581	11.3036	8.4766	6.7794	5.6492	4.2347	3.3867	2.8209	2.1145
32	1.587	11.6511	8.7371	6.9877	5.8229	4.3650	3.4910	2.9078	2.1797
33	1.589	11.9718	8.9778	7.1802	5.9832	4.4851	3.5872	2.9880	2.2398
34	1.594	12.3182	9.2375	7.3880	6.1565	4.6151	3.6910	3.0745	2.3048
35	1.596	12.6397	9.4786	7.5808	6.3171	4.7355	3.7875	3.1549	2.3649
36	1.600	12.9855	9.7379	7.7883	6.4900	4.8652	3.8912	3.2413	2.4298
37	1.602	13.3076	9.9794	7.9814	6.6510	4.9859	3.9877	3.3217	2.4902
38	1.606	13.6525	10.2382	8.1885	6.8235	5.1152	4.0913	3.4080	2.5549
39	1.608	13.9753	10.4802	8.3820	6.9847	5.2361	4.1881	3.4887	2.6154
40	1.611	14.3196	10.7385	8.5887	7.1570	5.3653	4.2913	3.5746	2.6798
41	1.613	14.6427	10.9808	8.7825	7.3186	5.4865	4.3883	3.6554	2.7404
42	1.616	14.9865	11.2388	8.9888	7.4904	5.6153	4.4914	3.7414	2.8049
43	1.617	15.3103	11.4814	9.1829	7.6523	5.7367	4.5884	3.8222	2.8656
44	1.621	15.6535	11.7390	9.3890	7.8238	5.8653	4.6914	3.9080	2.9300
45	1.622	15.9775	11.9820	9.5833	7.9859	5.9869	4.7887	3.9890	2.9906
46	1.625	16.3203	12.2391	9.7891	8.1572	6.1153	4.8914	4.0746	3.0549
47	1.626	16.6449	12.4824	9.9837	8.3195	6.2371	4.9887	4.1558	3.1157
48	1.629	16.9872	12.7393	10.1892	8.4906	6.3653	5.0915	4.2414	3.1800
49	1.630	17.3120	12.9829	10.3840	8.6531	6.4872	5.1888	4.3224	3.2409
50	1.632	17.6541	13.2394	10.5892	8.8241	6.6155	5.2914	4.4080	3.3050
51	1.633	17.9792	13.4832	10.7842	8.9866	6.7373	5.3890	4.4893	3.3658
52	1.636	18.3208	13.7394	10.9891	9.1574	6.8654	5.4913	4.5745	3.4299
53	1.636	18.6462	13.9836	11.1845	9.3201	6.9874	5.5890	4.6559	3.4910
54	1.639	18.9876	14.2395	11.3891	9.4908	7.1154	5.6914	4.7413	3.5550
55	1.639	19.3134	14.4839	11.5847	9.6536	7.2374	5.7890	4.8226	3.6161
56	1.642	19.6543	14.7395	11.7892	9.8241	7.3653	5.8914	4.9078	3.6799
57	1.642	19.9803	14.9841	11.9848	9.9870	7.4875	5.9892	4.9894	3.7410
58	1.644	20.3211	15.2396	12.1892	10.1574	7.6153	6.0913	5.0744	3.8049
59	1.645	20.6473	15.4844	12.3850	10.3204	7.7375	6.1892	5.1560	3.8661
60	1.647	20.9877	15.7396	12.5892	10.4907	7.8652	6.2914	5.2411	3.9299

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37.5 DEG PRESSURE ANGLE

TABLE 85—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 37.5 DEG PRESSURE ANGLE AND TOLERANCE CLASS 4, INTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	d_i / K_i	0.6912	0.5760	0.4320	0.3456	0.2880	0.2160	0.1728	0.1440	0.1080	0.0864	0.0720	0.0540	0.0432	0.0360
6	1.910	1.4069	1.1732	0.8808	0.7056	0.5880	0.4418	0.3541	0.2956	0.2224	0.1785	0.1490	0.1124	0.0906	0.0759
7	1.678	1.7537	1.4621	1.0973	0.8787	0.7322	0.5499	0.4405	0.3675	0.2763	0.2216	0.1850	0.1394	0.1121	0.0938
8	1.625	2.2223	1.8527	1.3901	1.1129	0.9275	0.6963	0.5576	0.4651	0.3494	0.2801	0.2337	0.1760	0.1414	0.1182
9	1.541	2.5760	2.1474	1.6110	1.2896	1.0748	0.8068	0.6459	0.5386	0.4046	0.3242	0.2705	0.2035	0.1634	0.1365
10	1.525	3.0293	2.5251	1.8945	1.5164	1.2637	0.9484	0.7593	0.6332	0.4754	0.3808	0.3177	0.2389	0.1917	0.1601
11	1.480	3.3895	2.8252	2.1196	1.6964	1.4137	1.0610	0.8493	0.7082	0.5317	0.4259	0.3551	0.2670	0.2141	0.1788
12	1.473	3.8333	3.1951	2.3969	1.9183	1.5986	1.1996	0.9602	0.8006	0.6010	0.4814	0.4013	0.3016	0.2418	0.2019
13	1.444	4.1988	3.4997	2.6254	2.1011	1.7510	1.3139	1.0516	0.8767	0.6581	0.5270	0.4394	0.3301	0.2646	0.2209
14	1.440	4.6359	3.8639	2.8986	2.3197	1.9331	1.4505	1.1608	0.9678	0.7264	0.5816	0.4850	0.3644	0.2921	0.2438
15	1.421	5.0056	4.1720	3.1295	2.5044	2.0871	1.5660	1.2533	1.0449	0.7841	0.6278	0.5235	0.3933	0.3152	0.2630
16	1.419	5.4378	4.5322	3.3997	2.7205	2.2671	1.7010	1.3614	1.1349	0.8516	0.6818	0.5685	0.4270	0.3422	0.2855
17	1.404	5.8108	4.8430	3.6328	2.9071	2.4226	1.8177	1.4546	1.2126	0.9099	0.7284	0.6073	0.4561	0.3655	0.3049
18	1.403	6.2393	5.2001	3.9006	3.1213	2.6012	1.9516	1.5617	1.3018	0.9768	0.7820	0.6520	0.4896	0.3922	0.3272
19	1.392	6.6148	5.5130	4.1353	3.3090	2.7576	2.0689	1.6556	1.3801	1.0356	0.8290	0.6911	0.5189	0.4157	0.3468
20	1.391	7.0404	5.8677	4.4013	3.5218	2.9349	2.2019	1.7621	1.4688	1.1021	0.8822	0.7354	0.5522	0.4423	0.3689
21	1.382	7.4181	6.1825	4.6374	3.7108	3.0924	2.3200	1.8565	1.5475	1.1611	0.9294	0.7747	0.5817	0.4659	0.3886
22	1.381	7.8412	6.5351	4.9019	3.9223	3.2687	2.4523	1.9623	1.6357	1.2272	0.9823	0.8189	0.6149	0.4925	0.4108
23	1.374	8.2209	6.8515	5.1391	4.1121	3.4268	2.5709	2.0571	1.7147	1.2865	1.0297	0.8585	0.6445	0.5162	0.4305
24	1.374	8.6420	7.2024	5.4023	4.3227	3.6023	2.7025	2.1624	1.8025	1.3523	1.0824	0.9023	0.6774	0.5425	0.4525
25	1.368	9.0233	7.5201	5.6406	4.5133	3.7612	2.8217	2.2578	1.8820	1.4119	1.1300	0.9420	0.7072	0.5663	0.4723
26	1.368	9.4427	7.8697	5.9028	4.7231	3.9360	2.9528	2.3627	1.9694	1.4775	1.1826	0.9857	0.7399	0.5925	0.4941
27	1.363	9.8252	8.1884	6.1418	4.9143	4.0953	3.0723	2.4583	2.0490	1.5373	1.2304	1.0255	0.7698	0.6164	0.5141
28	1.362	10.2433	8.5369	6.4032	5.1234	4.2695	3.2029	2.5628	2.1361	1.6026	1.2826	1.0691	0.8025	0.6425	0.5358
29	1.358	10.6269	8.8565	6.6429	5.3152	4.4295	3.3229	2.6587	2.2160	1.6625	1.3306	1.1092	0.8326	0.6666	0.5559
30	1.358	11.0437	9.2039	6.9035	5.5236	4.6032	3.4532	2.7630	2.3030	1.7277	1.3827	1.1526	0.8651	0.6927	0.5776
31	1.354	11.4285	9.5245	7.1438	5.7159	4.7634	3.5733	2.8592	2.3831	1.7877	1.4307	1.1926	0.8952	0.7167	0.5977
32	1.354	11.8442	9.8710	7.4038	5.9239	4.9366	3.7033	2.9631	2.4697	1.8527	1.4827	1.2359	0.9276	0.7427	0.6193
33	1.351	12.2299	10.1924	7.6447	6.1167	5.0974	3.8239	3.0595	2.5500	1.9129	1.5309	1.2761	0.9577	0.7668	0.6394
34	1.351	12.6447	10.5380	7.9040	6.3241	5.2702	3.9535	3.1632	2.6365	1.9779	1.5829	1.3193	0.9902	0.7927	0.6610
35	1.348	13.0310	10.8599	8.1454	6.5172	5.4312	4.0742	3.2598	2.7169	2.0382	1.6312	1.3595	1.0203	0.8169	0.6811
36	1.348	13.4451	11.2050	8.4043	6.7243	5.6037	4.2036	3.3634	2.8033	2.1029	1.6829	1.4027	1.0527	0.8427	0.7027
37	1.345	13.8321	11.5276	8.6462	6.9179	5.7651	4.3246	3.4601	2.8839	2.1634	1.7313	1.4431	1.0830	0.8670	0.7230
38	1.345	14.2453	11.8719	8.9044	7.1245	5.9372	4.4538	3.5634	2.9700	2.2280	1.7829	1.4862	1.1153	0.8929	0.7445
39	1.343	14.6331	12.1951	9.1469	7.3184	6.0988	4.5749	3.6604	3.0508	2.2885	1.8314	1.5265	1.1456	0.9171	0.7647
40	1.343	15.0456	12.5389	9.4047	7.5247	6.2706	4.7038	3.7635	3.1367	2.3530	1.8830	1.5695	1.1778	0.9429	0.7862
41	1.341	15.4340	12.8626	9.6474	7.7188	6.4326	4.8253	3.8607	3.2178	2.4138	1.9316	1.6099	1.2082	0.9671	0.8064
42	1.341	15.8460	13.2058	9.9048	7.9248	6.6042	4.9540	3.9637	3.3036	2.4781	1.9831	1.6529	1.2403	0.9929	0.8278
43	1.339	16.2348	13.5298	10.1479	8.1193	6.7662	5.0755	4.0609	3.3846	2.5389	2.0317	1.6934	1.2707	1.0172	0.8481
44	1.339	16.6463	13.8728	10.4051	8.3250	6.9376	5.2041	4.1637	3.4703	2.6032	2.0831	1.7363	1.3030	1.0430	0.8696
45	1.337	17.0355	14.1972	10.6484	8.5196	7.0999	5.3258	4.2610	3.5514	2.6640	2.1318	1.7769	1.3334	1.0674	0.8899
46	1.337	17.4464	14.5396	10.9052	8.7251	7.2711	5.4542	4.3639	3.6371	2.7282	2.1831	1.8197	1.3655	1.0930	0.9113
47	1.336	17.8363	14.8645	11.1489	8.9201	7.4335	5.5760	4.4613	3.7183	2.7891	2.2319	1.8603	1.3959	1.1174	0.9316
48	1.336	18.2467	15.2065	11.4054	9.1253	7.6045	5.7043	4.5639	3.8038	2.8533	2.2833	1.9030	1.4280	1.1430	0.9530
49	1.335	18.6370	15.5317	11.6492	9.3204	7.7672	5.8263	4.6614	3.8851	2.9143	2.3321	1.9437	1.4585	1.1674	0.9733
50	1.335	19.0470	15.8734	11.9056	9.5255	7.9380	5.9545	4.7639	3.9705	2.9784	2.3833	1.9864	1.4905	1.1930	0.9946
51	1.333	19.4375	16.1988	12.1497	9.7207	8.1007	6.0765	4.8617	4.0520	3.0394	2.4321	2.0272	1.5212	1.2176	1.0151
52	1.333	19.8472	16.5403	12.4057	9.9255	8.2714	6.2045	4.9641	4.1373	3.1034	2.4833	2.0699	1.5532	1.2432	1.0365
53	1.332	20.2381	16.8660	12.6499	10.1210	8.4344	6.3268	5.0618	4.2187	3.1644	2.5322	2.1106	1.5837	1.2676	1.0568
54	1.332	20.6473	17.2071	12.9059	10.3257	8.6049	6.4547	5.1641	4.3040	3.2284	2.5833	2.1532	1.6157	1.2932	1.0781
55	1.331	21.0386	17.5332	13.1504	10.5213	8.7679	6.5769	5.2619	4.3855	3.2895	2.6322	2.1939	1.6462	1.3176	1.0985
56	1.331	21.4476	17.8739	13.4059	10.7258	8.9383	6.7047	5.3642	4.4707	3.3535	2.6835	2.2365	1.6782	1.3432	1.1198
57	1.330	21.8392	18.2003	13.6506	10.9215	9.1016	6.8272	5.4622	4.5524	3.4147	2.7324	2.2773	1.7087	1.3677	1.1402
58	1.330	22.2478	18.5408	13.9061	11.1260	9.2718	6.9549	5.5643	4.6375	3.4786	2.7835	2.3199	1.7407	1.3932	1.1615
59	1.329	22.6396	18.8673	14.1510	11.3218	9.4350	7.0773	5.6622	4.7191	3.5398	2.8325	2.3608	1.7714	1.4178	1.1820
60	1.329	23.0480	19.2077	14.4062	11.5260	9.6052	7.2049	5.7643	4.8042	3.6036	2.8835	2.4034	1.8033	1.4433	1.2033

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37.5 DEG PRESSURE ANGLE

TABLE 86—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 37.5 DEG PRESSURE ANGLE AND TOLERANCE CLASS 5, INTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	K_i \ d_i	0.6912	0.5760	0.4320	0.3456	0.2880	0.2160	0.1728	0.1440	0.1080	0.0864	0.0720	0.0540	0.0432	0.0360
6	1.910	1.4089	1.1753	0.8825	0.7073	0.5895	0.4433	0.3556	0.2970	0.2236	0.1798	0.1502	0.1137	0.0918	0.0771
7	1.678	1.7555	1.4640	1.0989	0.8803	0.7336	0.5512	0.4418	0.3688	0.2774	0.2227	0.1859	0.1404	0.1131	0.0948
8	1.625	2.2241	1.8544	1.3918	1.1146	0.9289	0.6977	0.5589	0.4664	0.3507	0.2813	0.2348	0.1771	0.1424	0.1193
9	1.541	2.5777	2.1491	1.6126	1.2912	1.0761	0.8080	0.6471	0.5399	0.4058	0.3254	0.2715	0.2045	0.1644	0.1375
10	1.525	3.0310	2.5268	1.8960	1.5179	1.2650	0.9498	0.7605	0.6344	0.4766	0.3820	0.3187	0.2399	0.1927	0.1611
11	1.480	3.3913	2.8270	2.1210	1.6979	1.4151	1.0623	0.8505	0.7094	0.5327	0.4269	0.3561	0.2680	0.2151	0.1798
12	1.473	3.8349	3.1967	2.3985	1.9199	1.5999	1.2009	0.9614	0.8018	0.6021	0.4824	0.4023	0.3026	0.2428	0.2029
13	1.444	4.2005	3.5014	2.6268	2.1026	1.7523	1.3152	1.0529	0.8780	0.6591	0.5280	0.4404	0.3311	0.2656	0.2219
14	1.440	4.6376	3.8656	2.9000	2.3211	1.9344	1.4518	1.1621	0.9691	0.7275	0.5828	0.4860	0.3654	0.2931	0.2448
15	1.421	5.0073	4.1737	3.1311	2.5060	2.0883	1.5672	1.2545	1.0460	0.7852	0.6289	0.5245	0.3942	0.3161	0.2640
16	1.419	5.4395	4.5339	3.4012	2.7221	2.2686	1.7024	1.3625	1.1360	0.8528	0.6829	0.5695	0.4280	0.3432	0.2865
17	1.404	5.8125	4.8447	3.6342	2.9085	2.4239	1.8189	1.4558	1.2138	0.9110	0.7295	0.6083	0.4571	0.3664	0.3059
18	1.403	6.2411	5.2019	3.9022	3.1228	2.6024	1.9528	1.5630	1.3031	0.9779	0.7831	0.6529	0.4906	0.3932	0.3282
19	1.392	6.6166	5.5148	4.1368	3.3106	2.7590	2.0703	1.6568	1.3813	1.0367	0.8301	0.6922	0.5200	0.4168	0.3479
20	1.391	7.0422	5.8695	4.4029	3.5235	2.9363	2.2033	1.7632	1.4699	1.1032	0.8833	0.7365	0.5533	0.4434	0.3700
21	1.382	7.4199	6.1843	4.6390	3.7123	3.0937	2.3213	1.8577	1.5488	1.1622	0.9305	0.7758	0.5828	0.4670	0.3897
22	1.381	7.8432	6.5370	4.9034	3.9239	3.2701	2.4536	1.9635	1.6369	1.2283	0.9834	0.8199	0.6158	0.4934	0.4117
23	1.374	8.2227	6.8533	5.1407	4.1137	3.4282	2.5722	2.0584	1.7160	1.2876	1.0308	0.8594	0.6454	0.5171	0.4315
24	1.374	8.6440	7.2044	5.4040	4.3243	3.6037	2.7038	2.1637	1.8037	1.3536	1.0836	0.9034	0.6785	0.5436	0.4535
25	1.368	9.0250	7.5219	5.6423	4.5150	3.7626	2.8230	2.2591	1.8832	1.4131	1.1312	0.9431	0.7082	0.5674	0.4734
26	1.368	9.4446	7.8716	5.9044	4.7247	3.9374	2.9541	2.3639	1.9706	1.4786	1.1837	0.9868	0.7410	0.5936	0.4952
27	1.363	9.8271	8.1903	6.1434	4.9159	4.0967	3.0736	2.4595	2.0503	1.5384	1.2315	1.0266	0.7709	0.6175	0.5151
28	1.362	10.2452	8.5388	6.4048	5.1251	4.2710	3.2044	2.5642	2.1375	1.6037	1.2837	1.0702	0.8035	0.6436	0.5369
29	1.358	10.6288	8.8584	6.6446	5.3169	4.4308	3.3243	2.6601	2.2174	1.6638	1.3318	1.1102	0.8336	0.6677	0.5570
30	1.358	11.0458	9.2059	6.9051	5.5253	4.6047	3.4546	2.7643	2.3042	1.7289	1.3839	1.1537	0.8662	0.6938	0.5787
31	1.354	11.4304	9.5264	7.1456	5.7177	4.7649	3.5748	2.8604	2.3843	1.7890	1.4320	1.1937	0.8962	0.7178	0.5987
32	1.354	11.8463	9.8730	7.4054	5.9256	4.9381	3.7047	2.9645	2.4711	1.8539	1.4839	1.2370	0.9287	0.7438	0.6204
33	1.351	12.2317	10.1942	7.6465	6.1184	5.0989	3.8253	3.0608	2.5514	1.9142	1.5321	1.2772	0.9588	0.7679	0.6405
34	1.351	12.6467	10.5400	7.9057	6.3258	5.2717	3.9550	3.1645	2.6378	1.9790	1.5840	1.3204	0.9912	0.7938	0.6621
35	1.348	13.0331	10.8621	8.1472	6.5190	5.4327	4.0757	3.2611	2.7183	2.0395	1.6324	1.3608	1.0215	0.8181	0.6823
36	1.348	13.4471	11.2071	8.4060	6.7261	5.6053	4.2052	3.3647	2.8047	2.1041	1.6841	1.4039	1.0539	0.8439	0.7039
37	1.345	13.8342	11.5297	8.6479	6.9196	5.7665	4.3261	3.4615	2.8853	2.1646	1.7325	1.4442	1.0841	0.8681	0.7240
38	1.345	14.2474	11.8741	8.9062	7.1262	5.9387	4.4552	3.5648	2.9714	2.2292	1.7841	1.4872	1.1164	0.8939	0.7456
39	1.343	14.6352	12.1972	9.1486	7.3202	6.1004	4.5765	3.6618	3.0523	2.2897	1.8326	1.5276	1.1467	0.9182	0.7657
40	1.343	15.0478	12.5410	9.4064	7.5264	6.2723	4.7054	3.7650	3.1382	2.3543	1.8843	1.5707	1.1790	0.9441	0.7874
41	1.341	15.4362	12.8647	9.6492	7.7207	6.4340	4.8268	3.8620	3.2191	2.4150	1.9328	1.6111	1.2094	0.9683	0.8076
42	1.341	15.8481	13.2080	9.9067	7.9267	6.6058	4.9556	3.9650	3.3049	2.4793	1.9843	1.6541	1.2415	0.9941	0.8290
43	1.339	16.2370	13.5321	10.1497	8.1211	6.7678	5.0771	4.0623	3.3860	2.5401	2.0329	1.6946	1.2719	1.0184	0.8493
44	1.339	16.6484	13.8749	10.4069	8.3269	6.9392	5.2057	4.1652	3.4717	2.6044	2.0843	1.7374	1.3041	1.0441	0.8707
45	1.337	17.0378	14.1995	10.6502	8.5215	7.1015	5.3274	4.2625	3.5528	2.6653	2.1331	1.7781	1.3346	1.0686	0.8911
46	1.337	17.4487	14.5419	10.9070	8.7270	7.2727	5.4558	4.3652	3.6384	2.7295	2.1845	1.8209	1.3667	1.0942	0.9125
47	1.336	17.8386	14.8667	11.1507	8.9219	7.4351	5.5776	4.4628	3.7198	2.7904	2.2332	1.8615	1.3971	1.1186	0.9328
48	1.336	18.2490	15.2088	11.4072	9.1272	7.6063	5.7060	4.5654	3.8053	2.8545	2.2845	1.9042	1.4292	1.1442	0.9542
49	1.335	18.6392	15.5340	11.6512	9.3223	7.7688	5.8279	4.6629	3.8865	2.9155	2.3333	1.9449	1.4597	1.1686	0.9745
50	1.335	19.0494	15.8758	11.9075	9.5273	7.9398	5.9562	4.7655	3.9721	2.9797	2.3846	1.9877	1.4918	1.1944	0.9960
51	1.333	19.4399	16.2012	12.1515	9.7226	8.1025	6.0782	4.8632	4.0534	3.0407	2.4334	2.0284	1.5223	1.2188	1.0163
52	1.333	19.8496	16.5427	12.4077	9.9275	8.2731	6.2062	4.9656	4.1388	3.1047	2.4846	2.0710	1.5543	1.2444	1.0376
53	1.332	20.2405	16.8684	12.6519	10.1230	8.4361	6.3285	5.0633	4.2202	3.1658	2.5335	2.1118	1.5849	1.2688	1.0580
54	1.332	20.6499	17.2096	12.9079	10.3277	8.6067	6.4564	5.1657	4.3056	3.2297	2.5847	2.1544	1.6169	1.2944	1.0793
55	1.331	21.0410	17.5356	13.1523	10.5233	8.7697	6.5786	5.2635	4.3871	3.2908	2.6336	2.1951	1.6474	1.3188	1.0997
56	1.331	21.4501	17.8765	13.4079	10.7278	8.9402	6.7066	5.3657	4.4723	3.3549	2.6848	2.2379	1.6795	1.3445	1.1211
57	1.330	21.8416	18.2027	13.6527	10.9236	9.1033	6.8289	5.4636	4.5538	3.4160	2.7337	2.2786	1.7101	1.3690	1.1415
58	1.330	22.2503	18.5433	13.9081	11.1279	9.2735	6.9566	5.5659	4.6391	3.4799	2.7848	2.3212	1.7420	1.3945	1.1628
59	1.329	22.6421	18.8698	14.1530	11.3238	9.4369	7.0791	5.6638	4.7207	3.5411	2.8338	2.3620	1.7726	1.4190	1.1832
60	1.329	23.0505	19.2102	14.4083	11.5281	9.6070	7.2067	5.7659	4.8058	3.6049	2.8848	2.4045	1.8045	1.4445	1.2045

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37.5 DEG PRESSURE ANGLE

TABLE 87—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 37.5 DEG PRESSURE ANGLE AND TOLERANCE CLASS 6, INTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	d_i / K_i	0.6912	0.5760	0.4320	0.3456	0.2880	0.2160	0.1728	0.1440	0.1080	0.0864	0.0720	0.0540	0.0432	0.0360
6	1.910	1.4118	1.1781	0.8851	0.7099	0.5915	0.4453	0.3574	0.2988	0.2254	0.1815	0.1518	0.1152	0.0933	0.0785
7	1.678	1.7580	1.4665	1.1011	0.8825	0.7355	0.5532	0.4436	0.3706	0.2790	0.2243	0.1875	0.1419	0.1146	0.0963
8	1.625	2.2267	1.8570	1.3940	1.1168	0.9307	0.6995	0.5606	0.4681	0.3523	0.2829	0.2362	0.1784	0.1438	0.1206
9	1.541	2.5800	2.1514	1.6147	1.2933	1.0779	0.8099	0.6488	0.5415	0.4073	0.3269	0.2728	0.2059	0.1657	0.1388
10	1.525	3.0334	2.5292	1.8981	1.5200	1.2667	0.9515	0.7622	0.6361	0.4780	0.3835	0.3200	0.2412	0.1940	0.1624
11	1.480	3.3936	2.8294	2.1231	1.7000	1.4168	1.0640	0.3521	0.7110	0.5343	0.4285	0.3576	0.2694	0.2165	0.1812
12	1.473	3.8374	3.1992	2.4005	1.9219	1.6017	1.2027	0.9632	0.8035	0.6037	0.4840	0.4038	0.3041	0.2443	0.2043
13	1.444	4.2028	3.5037	2.6288	2.1046	1.7540	1.3169	1.0544	0.8796	0.6607	0.5296	0.4418	0.3325	0.2670	0.2233
14	1.440	4.6400	3.8680	2.9021	2.3232	1.9361	1.4535	1.1637	0.9706	0.7290	0.5842	0.4874	0.3668	0.2945	0.2462
15	1.421	5.0097	4.1761	3.1331	2.5080	2.0902	1.5691	1.2562	1.0477	0.7868	0.6305	0.5259	0.3956	0.3175	0.2654
16	1.419	5.4419	4.5363	3.4033	2.7242	2.2703	1.7041	1.3642	1.1377	0.8543	0.6845	0.5709	0.4294	0.3445	0.2879
17	1.404	5.8148	4.8471	3.6363	2.9106	2.4257	1.8207	1.4574	1.2154	0.9125	0.7311	0.6097	0.4585	0.3678	0.3072
18	1.403	6.2435	5.2043	3.9043	3.1249	2.6042	1.9546	1.5646	1.3048	0.9795	0.7846	0.6545	0.4921	0.3947	0.3297
19	1.392	6.6191	5.5173	4.1391	3.3128	2.7608	2.0721	1.6585	1.3830	1.0383	0.8316	0.6935	0.5214	0.4182	0.3492
20	1.391	7.0446	5.8719	4.4050	3.5256	2.9381	2.2051	1.7650	1.4717	1.1047	0.8848	0.7379	0.5546	0.4447	0.3714
21	1.382	7.4224	6.1868	4.6412	3.7145	3.0956	2.3232	1.8594	1.5504	1.1637	0.9320	0.7772	0.5841	0.4683	0.3910
22	1.381	7.8457	6.5395	4.9056	3.9261	3.2719	2.4554	1.9652	1.6386	1.2298	0.9849	0.8214	0.6173	0.4949	0.4132
23	1.374	8.2253	6.8559	5.1429	4.1159	3.4301	2.5741	2.0602	1.7177	1.2893	1.0325	0.8609	0.6469	0.5186	0.4330
24	1.374	8.6464	7.2068	5.4061	4.3265	3.6056	2.7057	2.1654	1.8055	1.3551	1.0851	0.9048	0.6798	0.5449	0.4549
25	1.368	9.0276	7.5245	5.6444	4.5172	3.7645	2.8249	2.2607	1.8848	1.4146	1.1327	0.9445	0.7096	0.5687	0.4747
26	1.368	9.4472	7.8742	5.9066	4.7269	3.9393	2.9560	2.3657	1.9724	1.4803	1.1853	0.9883	0.7425	0.5951	0.4967
27	1.363	9.8298	8.1930	6.1457	4.9182	4.0987	3.0757	2.4613	2.0520	1.5400	1.2331	1.0281	0.7724	0.6190	0.5166
28	1.362	10.2478	8.5414	6.4070	5.1272	4.2729	3.2063	2.5659	2.1392	1.6053	1.2853	1.0717	0.8050	0.6451	0.5384
29	1.358	10.6315	8.8611	6.6469	5.3192	4.4329	3.3263	2.6618	2.2191	1.6652	1.3333	1.1117	0.8351	0.6692	0.5585
30	1.358	11.0485	9.2086	6.9074	5.5276	4.6066	3.4565	2.7660	2.3060	1.7305	1.3855	1.1551	0.8677	0.6952	0.5802
31	1.354	11.4332	9.5293	7.1479	5.7200	4.7669	3.5768	2.8623	2.3862	1.7906	1.4336	1.1952	0.8977	0.7193	0.6002
32	1.354	11.8490	9.8757	7.4077	5.9279	4.9402	3.7068	2.9662	2.4728	1.8555	1.4855	1.2385	0.9302	0.7452	0.6219
33	1.351	12.2346	10.1971	7.6488	6.1207	5.1009	3.8274	3.0626	2.5531	1.9158	1.5337	1.2788	0.9604	0.7695	0.6421
34	1.351	12.6495	10.5429	7.9080	6.3281	5.2737	3.9570	3.1664	2.6397	1.9807	1.5857	1.3220	0.9928	0.7954	0.6637
35	1.348	13.0359	10.8649	8.1496	6.5214	5.4348	4.0778	3.2630	2.7202	2.0411	1.6340	1.3622	1.0230	0.8195	0.6838
36	1.348	13.4499	11.2099	8.4085	6.7285	5.6073	4.2072	3.3666	2.8065	2.1057	1.6857	1.4053	1.0553	0.8454	0.7053
37	1.345	13.8371	11.5325	8.6503	6.9220	5.7687	4.3283	3.4634	2.8872	2.1662	1.7341	1.4458	1.0857	0.8697	0.7256
38	1.345	14.2504	11.8770	8.9087	7.1288	5.9409	4.4574	3.5667	2.9732	2.2309	1.7859	1.4888	1.1180	0.8955	0.7471
39	1.343	14.6382	12.2002	9.1510	7.3226	6.1025	4.5787	3.6637	3.0541	2.2915	1.8343	1.5292	1.1483	0.9198	0.7673
40	1.343	15.0507	12.5440	9.4090	7.5290	6.2744	4.7076	3.7668	3.1401	2.3559	1.8859	1.5722	1.1805	0.9455	0.7888
41	1.341	15.4391	12.8677	9.6516	7.7231	6.4362	4.8289	3.8640	3.2211	2.4167	1.9346	1.6127	1.2110	0.9699	0.8092
42	1.341	15.8512	13.2111	9.9092	7.9292	6.6079	4.9578	3.9670	3.3069	2.4811	1.9860	1.6557	1.2431	0.9957	0.8306
43	1.339	16.2401	13.5352	10.1522	8.1236	6.7699	5.0793	4.0642	3.3879	2.5418	2.0346	1.6962	1.2735	1.0200	0.8509
44	1.339	16.6515	13.8780	10.4095	8.3294	6.9415	5.2079	4.1672	3.4737	2.6061	2.0861	1.7391	1.3058	1.0458	0.8724
45	1.337	17.0409	14.2025	10.6528	8.5241	7.1037	5.3296	4.2645	3.5548	2.6671	2.1348	1.7797	1.3362	1.0701	0.8927
46	1.337	17.4519	14.5451	10.9097	8.7296	7.2750	5.4581	4.3672	3.6404	2.7313	2.1862	1.8225	1.3683	1.0958	0.9141
47	1.336	17.8416	14.8698	11.1533	8.9245	7.4374	5.5799	4.4648	3.7218	2.7921	2.2349	1.8631	1.3987	1.1202	0.9344
48	1.336	18.2522	15.2120	11.4099	9.1298	7.6085	5.7083	4.5674	3.8073	2.8563	2.2862	1.9060	1.4309	1.1460	0.9559
49	1.335	18.6424	15.5372	11.6537	9.3249	7.7711	5.8302	4.6650	3.8887	2.9174	2.3351	1.9466	1.4614	1.1703	0.9762
50	1.335	19.0526	15.8790	11.9101	9.5300	7.9420	5.9585	4.7675	3.9741	2.9814	2.3864	1.9893	1.4934	1.1960	0.9976
51	1.333	19.4431	16.2044	12.1543	9.7254	8.1047	6.0805	4.8652	4.0554	3.0424	2.4352	2.0300	1.5239	1.2204	1.0179
52	1.333	19.8528	16.5459	12.4103	9.9302	8.2755	6.2086	4.9677	4.1409	3.1064	2.4864	2.0728	1.5561	1.2461	1.0394
53	1.332	20.2438	16.8717	12.6547	10.1258	8.4384	6.3308	5.0654	4.2223	3.1676	2.5354	2.1135	1.5866	1.2705	1.0597
54	1.332	20.6532	17.2129	12.9105	10.3304	8.6091	6.4588	5.1677	4.3076	3.2316	2.5865	2.1561	1.6186	1.2961	1.0810
55	1.331	21.0444	17.5389	13.1551	10.5261	8.7720	6.5810	5.2656	4.3892	3.2927	2.6354	2.1969	1.6491	1.3205	1.1014
56	1.331	21.4534	17.8798	13.4107	10.7306	8.9426	6.7089	5.3679	4.4744	3.3567	2.6867	2.2396	1.6812	1.3462	1.1228
57	1.330	21.8450	18.2062	13.6555	10.9264	9.1057	6.8313	5.4659	4.5561	3.4179	2.7356	2.2804	1.7118	1.3707	1.1432
58	1.330	22.2538	18.5468	13.9109	11.1307	9.2761	6.9591	5.5680	4.6412	3.4817	2.7867	2.3229	1.7437	1.3962	1.1645
59	1.329	22.6455	18.8733	14.1559	11.3268	9.4393	7.0815	5.6660	4.7228	3.5430	2.8356	2.3637	1.7743	1.4207	1.1849
60	1.329	23.0540	19.2137	14.4111	11.5309	9.6096	7.2093	5.7682	4.8080	3.6069	2.8868	2.4064	1.8064	1.4464	1.2063

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37.5 DEG PRESSURE ANGLE

TABLE 88—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 37.5 DEG PRESSURE ANGLE AND TOLERANCE CLASS 7, INTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	d_i / K_i	0.6912	0.5760	0.4320	0.3456	0.2880	0.2160	0.1728	0.1440	0.1080	0.0864	0.0720	0.0540	0.0432	0.0360
6	1.910	1.4159	1.1821	0.8888	0.7135	0.5946	0.4483	0.3602	0.3017	0.2280	0.1841	0.1541	0.1175	0.0955	0.0807
7	1.678	1.7617	1.4701	1.1044	0.8857	0.7383	0.5559	0.4462	0.3732	0.2815	0.2268	0.1897	0.1440	0.1167	0.0983
8	1.625	2.2302	1.8605	1.3972	1.1200	0.9335	0.7023	0.5631	0.4706	0.3546	0.2852	0.2384	0.1805	0.1459	0.1227
9	1.541	2.5837	2.1550	1.6179	1.2965	1.0805	0.8124	0.6513	0.5441	0.4095	0.3291	0.2749	0.2079	0.1677	0.1408
10	1.525	3.0370	2.5328	1.9013	1.5232	1.2694	0.9542	0.7646	0.6384	0.4804	0.3858	0.3222	0.2434	0.1962	0.1645
11	1.480	3.3971	2.8329	2.1262	1.7030	1.4194	1.0667	0.8546	0.7134	0.5365	0.4307	0.3596	0.2714	0.2185	0.1831
12	1.473	3.8409	3.2027	2.4036	1.9250	1.6043	1.2053	0.9655	0.8058	0.6060	0.4863	0.4059	0.3062	0.2464	0.2064
13	1.444	4.2064	3.5073	2.6320	2.1077	1.7566	1.3195	1.0569	0.8820	0.6629	0.5318	0.4439	0.3346	0.2691	0.2253
14	1.440	4.6436	3.8716	2.9053	2.3264	1.9388	1.4562	1.1663	0.9732	0.7312	0.5864	0.4894	0.3688	0.2964	0.2481
15	1.421	5.0132	4.1796	3.1362	2.5111	2.0929	1.5718	1.2586	1.0501	0.7890	0.6327	0.5280	0.3977	0.3196	0.2674
16	1.419	5.4456	4.5399	3.4064	2.7273	2.2729	1.7068	1.3667	1.1403	0.8566	0.6867	0.5730	0.4315	0.3466	0.2899
17	1.404	5.8185	4.8507	3.6395	2.9138	2.4284	1.8234	1.4599	1.2179	0.9147	0.7333	0.6118	0.4605	0.3698	0.3093
18	1.403	6.2471	5.2079	3.9075	3.1282	2.6070	1.9574	1.5671	1.3073	0.9818	0.7870	0.6565	0.4941	0.3968	0.3317
19	1.392	6.6227	5.5209	4.1421	3.3158	2.7634	2.0747	1.6610	1.3854	1.0405	0.8338	0.6956	0.5234	0.4202	0.3513
20	1.391	7.0483	5.8756	4.4082	3.5287	2.9409	2.2078	1.7675	1.4742	1.1071	0.8872	0.7401	0.5568	0.4469	0.3736
21	1.382	7.4261	6.1905	4.6443	3.7177	3.0983	2.3259	1.8619	1.5529	1.1661	0.9343	0.7794	0.5863	0.4705	0.3932
22	1.381	7.8494	6.5432	4.9089	3.9294	3.2746	2.4582	1.9678	1.6412	1.2322	0.9872	0.8234	0.6193	0.4969	0.4152
23	1.374	8.2290	6.8596	5.1461	4.1191	3.4329	2.5769	2.0626	1.7202	1.2916	1.0348	0.8631	0.6491	0.5208	0.4351
24	1.374	8.6503	7.2107	5.4094	4.3298	3.6085	2.7086	2.1680	1.8081	1.3574	1.0874	0.9069	0.6820	0.5471	0.4570
25	1.368	9.0316	7.5285	5.6477	4.5204	3.7674	2.8278	2.2634	1.8876	1.4170	1.1352	0.9468	0.7119	0.5710	0.4770
26	1.368	9.4512	7.8782	5.9100	4.7303	3.9421	2.9589	2.3683	1.9749	1.4826	1.1876	0.9905	0.7447	0.5972	0.4988
27	1.363	9.8337	8.1969	6.1491	4.9216	4.1016	3.0785	2.4640	2.0547	1.5423	1.2354	1.0303	0.7745	0.6211	0.5187
28	1.362	10.2519	8.5455	6.4104	5.1306	4.2759	3.2093	2.5685	2.1418	1.6077	1.2878	1.0739	0.8073	0.6474	0.5407
29	1.358	10.6356	8.8652	6.6503	5.3225	4.4357	3.3291	2.6645	2.2218	1.6677	1.3357	1.1139	0.8373	0.6713	0.5606
30	1.358	11.0526	9.2127	6.9109	5.5311	4.6095	3.4595	2.7687	2.3087	1.7328	1.3878	1.1573	0.8698	0.6974	0.5823
31	1.354	11.4373	9.5333	7.1514	5.7235	4.7699	3.5798	2.8650	2.3889	1.7930	1.4360	1.1975	0.9000	0.7215	0.6025
32	1.354	11.8531	9.8799	7.4112	5.9314	4.9431	3.7097	2.9689	2.4755	1.8580	1.4880	1.2408	0.9325	0.7475	0.6241
33	1.351	12.2388	10.2013	7.6523	6.1242	5.1039	3.8303	3.0654	2.5560	1.9183	1.5363	1.2811	0.9627	0.7717	0.6443
34	1.351	12.6537	10.5471	7.9117	6.3318	5.2768	3.9601	3.1691	2.6424	1.9831	1.5881	1.3243	0.9951	0.7977	0.6659
35	1.348	13.0401	10.8691	8.1532	6.5250	5.4379	4.0809	3.2658	2.7230	2.0435	1.6364	1.3645	1.0253	0.8218	0.6860
36	1.348	13.4542	11.2142	8.4120	6.7320	5.6104	4.2103	3.3693	2.8092	2.1083	1.6883	1.4078	1.0577	0.8478	0.7077
37	1.345	13.8414	11.5368	8.6540	6.9256	5.7718	4.3313	3.4662	2.8900	2.1687	1.7366	1.4481	1.0880	0.8720	0.7279
38	1.345	14.2547	11.8813	8.9124	7.1324	5.9441	4.4606	3.5696	2.9762	2.2333	1.7883	1.4911	1.1203	0.8978	0.7494
39	1.343	14.6425	12.2045	9.1548	7.3263	6.1056	4.5817	3.6665	3.0569	2.2940	1.8369	1.5316	1.1507	0.9221	0.7697
40	1.343	15.0552	12.5484	9.4126	7.5326	6.2776	4.7108	3.7698	3.1430	2.3585	1.8884	1.5746	1.1829	0.9479	0.7912
41	1.341	15.4435	12.8721	9.6554	7.7269	6.4395	4.8322	3.8668	3.2239	2.4193	1.9371	1.6151	1.2133	0.9723	0.8115
42	1.341	15.8557	13.2156	9.9130	7.9330	6.6112	4.9610	3.9700	3.3099	2.4836	1.9886	1.6581	1.2455	0.9981	0.8330
43	1.339	16.2447	13.5397	10.1561	8.1275	6.7733	5.0826	4.0671	3.3908	2.5444	2.0372	1.6985	1.2759	1.0224	0.8532
44	1.339	16.6562	13.8827	10.4132	8.3332	6.9448	5.2113	4.1701	3.4767	2.6088	2.0887	1.7415	1.3082	1.0482	0.8748
45	1.337	17.0456	14.2072	10.6566	8.5279	7.1071	5.3331	4.2674	3.5578	2.6696	2.1374	1.7821	1.3386	1.0725	0.8951
46	1.337	17.4566	14.5497	10.9136	8.7335	7.2783	5.4615	4.3703	3.6435	2.7338	2.1887	1.8249	1.3707	1.0982	0.9165
47	1.336	17.8464	14.8746	11.1573	8.9285	7.4408	5.5834	4.4677	3.7247	2.7948	2.2376	1.8656	1.4012	1.1227	0.9369
48	1.336	18.2570	15.2168	11.4138	9.1337	7.6120	5.7118	4.5704	3.8103	2.8589	2.2889	1.9083	1.4333	1.1483	0.9583
49	1.335	18.6472	15.5420	11.6577	9.3289	7.7745	5.8337	4.6680	3.8916	2.9200	2.3378	1.9491	1.4639	1.1728	0.9787
50	1.335	19.0574	15.8838	11.9141	9.5340	7.9455	5.9619	4.7706	3.9771	2.9841	2.3890	1.9918	1.4959	1.1985	1.0001
51	1.333	19.4480	16.2093	12.1583	9.7294	8.1083	6.0841	4.8683	4.0586	3.0451	2.4378	2.0325	1.5264	1.2229	1.0204
52	1.333	19.8577	16.5508	12.4144	9.9343	8.2790	6.2121	4.9708	4.1440	3.1092	2.4892	2.0753	1.5586	1.2486	1.0419
53	1.332	20.2487	16.8767	12.6587	10.1297	8.4420	6.3343	5.0686	4.2255	3.1703	2.5380	2.1160	1.5891	1.2730	1.0622
54	1.332	20.6581	17.2178	12.9146	10.3345	8.6126	6.4624	5.1709	4.3108	3.2344	2.5893	2.1588	1.6212	1.2987	1.0837
55	1.331	21.0494	17.5440	13.1593	10.5302	8.7758	6.5847	5.2688	4.3924	3.2955	2.6382	2.1995	1.6518	1.3232	1.1040
56	1.331	21.4585	17.8848	13.4150	10.7348	8.9461	6.7125	5.3711	4.4776	3.3594	2.6893	2.2421	1.6837	1.3487	1.1253
57	1.330	21.8501	18.2112	13.6596	10.9306	9.1094	6.8350	5.4691	4.5593	3.4207	2.7384	2.2830	1.7144	1.3733	1.1458
58	1.330	22.2588	18.5519	13.9151	11.1350	9.2798	6.9628	5.5712	4.6444	3.4845	2.7894	2.3256	1.7464	1.3989	1.1671
59	1.329	22.6509	18.8786	14.1601	11.3310	9.4430	7.0852	5.6693	4.7261	3.5457	2.8384	2.3664	1.7770	1.4234	1.1875
60	1.329	23.0593	19.2190	14.4155	11.5353	9.6133	7.2130	5.7714	4.8112	3.6097	2.8896	2.4090	1.8090	1.4490	1.2089

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37.5 DEG PRESSURE ANGLE

TABLE 89—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 37.5 DEG PRESSURE ANGLE AND TOLERANCE CLASS 4, EXTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	K_e \ d_e	0.7680	0.6400	0.4800	0.3840	0.3200	0.2400	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400
6	1.069	3.6061	3.0046	2.2530	1.8019	1.5016	1.1256	0.9002	0.7498	0.5619	0.4491	0.3742	0.2802	0.2239	0.1862
7	1.061	3.9299	3.2744	2.4554	1.9639	1.6366	1.2268	0.9812	0.8173	0.6126	0.4896	0.4078	0.3054	0.2440	0.2030
8	1.104	4.4155	3.6790	2.7589	2.2066	1.8389	1.3785	1.1025	0.9184	0.6884	0.5503	0.4584	0.3433	0.2743	0.2282
9	1.101	4.7573	3.9639	2.9726	2.3776	1.9812	1.4853	1.1880	0.9896	0.7418	0.5930	0.4940	0.3700	0.2957	0.2461
10	1.130	5.2219	4.3510	3.2628	2.6098	2.1748	1.6304	1.3040	1.0863	0.8144	0.6511	0.5423	0.4063	0.3247	0.2702
11	1.129	5.5750	4.6453	3.4836	2.7863	2.3219	1.7408	1.3923	1.1598	0.8694	0.6951	0.5791	0.4339	0.3467	0.2886
12	1.150	6.0266	5.0216	3.7658	3.0121	2.5101	1.8819	1.5052	1.2539	0.9400	0.7515	0.6261	0.4691	0.3749	0.3121
13	1.149	6.3873	5.3222	3.9912	3.1924	2.6603	1.9945	1.5954	1.3290	0.9963	0.7966	0.6637	0.4973	0.3975	0.3309
14	1.165	6.8303	5.6913	4.2680	3.4139	2.8448	2.1329	1.7061	1.4213	1.0655	0.8519	0.7097	0.5318	0.4250	0.3538
15	1.166	7.1963	5.9963	4.4969	3.5969	2.9974	2.2473	1.7975	1.4975	1.1227	0.8977	0.7479	0.5604	0.4479	0.3729
16	1.178	7.6331	6.3603	4.7699	3.8153	3.1794	2.3838	1.9067	1.5885	1.1910	0.9523	0.7933	0.5945	0.4752	0.3956
17	1.178	8.0032	6.6687	5.0011	4.0003	3.3335	2.4994	1.9993	1.6656	1.2488	0.9986	0.8319	0.6234	0.4983	0.4149
18	1.189	8.4354	7.0288	5.2712	4.2164	3.5136	2.6344	2.1073	1.7556	1.3163	1.0526	0.8769	0.6571	0.5253	0.4374
19	1.189	8.8088	7.3401	5.5046	4.4031	3.6692	2.7511	2.2007	1.8334	1.3746	1.0991	0.9158	0.6863	0.5487	0.4568
20	1.198	9.2372	7.6970	5.7724	4.6174	3.8477	2.8850	2.3077	1.9226	1.4415	1.1527	0.9604	0.7198	0.5754	0.4791
21	1.198	9.6133	8.0104	6.0074	4.8053	4.0043	3.0024	2.4017	2.0009	1.5003	1.1997	0.9996	0.7492	0.5989	0.4987
22	1.205	10.0389	8.3651	6.2734	5.0181	4.1816	3.1354	2.5081	2.0896	1.5667	1.2529	1.0438	0.7823	0.6254	0.5208
23	1.206	10.4170	8.6801	6.5097	5.2072	4.3392	3.2536	2.6026	2.1683	1.6258	1.3002	1.0832	0.8118	0.6491	0.5405
24	1.212	10.8402	9.0328	6.7743	5.4188	4.5156	3.3859	2.7084	2.2565	1.6920	1.3531	1.1273	0.8449	0.6755	0.5625
25	1.212	11.2201	9.3493	7.0116	5.6086	4.6738	3.5045	2.8033	2.3355	1.7513	1.4005	1.1669	0.8746	0.6992	0.5823
26	1.217	11.6413	9.7004	7.2749	5.8193	4.8493	3.6361	2.9086	2.4233	1.8170	1.4531	1.2107	0.9075	0.7256	0.6042
27	1.218	12.0228	10.0183	7.5133	6.0100	5.0082	3.7553	3.0040	2.5028	1.8766	1.5008	1.2505	0.9373	0.7494	0.6241
28	1.223	12.4423	10.3678	7.7754	6.2197	5.1831	3.8864	3.1089	2.5902	1.9422	1.5532	1.2942	0.9700	0.7756	0.6459
29	1.223	12.8251	10.6868	8.0147	6.4111	5.3424	4.0059	3.2045	2.6699	2.0020	1.6011	1.3339	0.9998	0.7994	0.6657
30	1.227	13.2432	11.0353	8.2760	6.6201	5.5167	4.1366	3.3091	2.7570	2.0673	1.6533	1.3775	1.0325	0.8255	0.6875
31	1.228	13.6270	11.3551	8.5160	6.8121	5.6766	4.2566	3.4049	2.8369	2.1273	1.7013	1.4175	1.0625	0.8495	0.7075
32	1.231	14.0440	11.7025	8.7764	7.0204	5.8503	4.3869	3.5092	2.9238	2.1924	1.7534	1.4609	1.0951	0.8756	0.7292
33	1.232	14.4287	12.0232	9.0170	7.2129	6.0106	4.5070	3.6054	3.0039	2.2526	1.8015	1.5010	1.1251	0.8997	0.7493
34	1.235	14.8446	12.3697	9.2769	7.4208	6.1839	4.6370	3.7094	3.0906	2.3174	1.8534	1.5443	1.1576	0.9256	0.7709
35	1.235	15.2304	12.6912	9.5180	7.6137	6.3446	4.7575	3.8058	3.1709	2.3777	1.9016	1.5845	1.1877	0.9497	0.7910
36	1.238	15.6451	13.0368	9.7772	7.8210	6.5175	4.8872	3.9094	3.2573	2.4425	1.9535	1.6277	1.2202	0.9757	0.8126
37	1.238	16.0317	13.3589	10.0188	8.0143	6.6784	5.0078	4.0060	3.3378	2.5029	2.0018	1.6678	1.2502	0.9997	0.8326
38	1.241	16.4457	13.7040	10.2776	8.2213	6.8509	5.1372	4.1095	3.4240	2.5676	2.0535	1.7110	1.2826	1.0256	0.8542
39	1.241	16.8329	14.0266	10.5195	8.4148	7.0123	5.2583	4.2064	3.5047	2.6281	2.1019	1.7513	1.3128	1.0498	0.8743
40	1.244	17.2462	14.3710	10.7778	8.6215	7.1845	5.3874	4.3097	3.5908	2.6927	2.1536	1.7943	1.3451	1.0756	0.8959
41	1.244	17.6339	14.6941	11.0202	8.8154	7.3460	5.5085	4.4065	3.6715	2.7532	2.2020	1.8348	1.3754	1.0999	0.9161
42	1.246	18.0466	15.0379	11.2781	9.0217	7.5179	5.6374	4.5097	3.7575	2.8177	2.2535	1.8777	1.4076	1.1256	0.9376
43	1.246	18.4350	15.3617	11.5208	9.2158	7.6798	5.7588	4.6068	3.8384	2.8784	2.3021	1.9182	1.4380	1.1499	0.9578
44	1.248	18.8469	15.7049	11.7783	9.4218	7.8514	5.8876	4.7098	3.9242	2.9427	2.3536	1.9610	1.4700	1.1755	0.9791
45	1.249	19.2359	16.0290	12.0214	9.6163	8.0134	6.0090	4.8070	4.0053	3.0035	2.4022	2.0015	1.5004	1.1998	0.9994
46	1.251	19.6473	16.3719	12.2785	9.8220	8.1848	6.1376	4.9098	4.0908	3.0678	2.4536	2.0444	1.5326	1.2256	1.0208
47	1.251	20.0366	16.6963	12.5218	10.0166	8.3471	6.2593	5.0071	4.1720	3.1286	2.5023	2.0849	1.5630	1.2499	1.0411
48	1.253	20.4476	17.0388	12.7787	10.2221	8.5183	6.3877	5.1099	4.2576	3.1927	2.5536	2.1277	1.5951	1.2756	1.0625
49	1.253	20.8373	17.3635	13.0223	10.4170	8.6806	6.5094	5.2073	4.3388	3.2536	2.6023	2.1683	1.6256	1.2999	1.0828
50	1.254	21.2478	17.7056	13.2789	10.6223	8.8517	6.6377	5.3099	4.4243	3.3178	2.6536	2.2111	1.6576	1.3256	1.1042
51	1.255	21.6381	18.0308	13.5227	10.8173	9.0143	6.7596	5.4074	4.5055	3.3788	2.7024	2.2517	1.6881	1.3500	1.1245
52	1.256	22.0480	18.3724	13.7790	11.0223	9.1851	6.8878	5.5099	4.5909	3.4428	2.7536	2.2943	1.7200	1.3755	1.1457
53	1.256	22.4387	18.6980	14.0231	11.2176	9.3478	7.0097	5.6076	4.6723	3.5039	2.8025	2.3350	1.7505	1.3999	1.1661
54	1.258	22.8484	19.0394	14.2790	11.4224	9.5185	7.1378	5.7100	4.7577	3.5679	2.8537	2.3777	1.7826	1.4255	1.1874
55	1.258	23.2392	19.3650	14.5234	11.6178	9.6814	7.2599	5.8077	4.8391	3.6290	2.9025	2.4184	1.8131	1.4499	1.2078
56	1.259	23.6485	19.7061	14.7792	11.8225	9.8519	7.3878	5.9101	4.9244	3.6928	2.9536	2.4611	1.8451	1.4755	1.2291
57	1.259	24.0397	20.0321	15.0238	12.0181	10.0149	7.5100	6.0078	5.0058	3.7539	3.0025	2.5018	1.8756	1.5000	1.2495
58	1.260	24.4487	20.3729	15.2793	12.2225	10.1853	7.6378	6.1100	5.0910	3.8178	3.0536	2.5444	1.9076	1.5255	1.2708
59	1.261	24.8403	20.6992	15.5240	12.4183	10.3484	7.7602	6.2079	5.1726	3.8790	3.1026	2.5851	1.9381	1.5499	1.2910
60	1.262	25.2488	21.0397	15.7794	12.6226	10.5187	7.8879	6.3101	5.2577	3.9429	3.1536	2.6277	1.9700	1.5754	1.3123

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37.5 DEG PRESSURE ANGLE

TABLE 90—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 37.5 DEG PRESSURE ANGLE AND TOLERANCE CLASS 5, EXTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	K_e \ d_e	0.7680	0.6400	0.4800	0.3840	0.3200	0.2400	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400
6	1.069	3.6049	3.0034	2.2520	1.8010	1.5008	1.1247	0.8994	0.7489	0.5612	0.4484	0.3734	0.2795	0.2231	0.1855
7	1.061	3.9287	3.2732	2.4544	1.9628	1.6357	1.2260	0.9803	0.8164	0.6118	0.4889	0.4072	0.3048	0.2434	0.2024
8	1.104	4.4142	3.6778	2.7578	2.2055	1.8379	1.3775	1.1017	0.9175	0.6875	0.5494	0.4576	0.3425	0.2735	0.2275
9	1.101	4.7561	3.9627	2.9715	2.3765	1.9804	1.4844	1.1872	0.9887	0.7409	0.5921	0.4932	0.3692	0.2949	0.2453
10	1.130	5.2206	4.3498	3.2617	2.6086	2.1739	1.6295	1.3031	1.0853	0.8134	0.6501	0.5415	0.4055	0.3239	0.2694
11	1.129	5.5737	4.6440	3.4824	2.7852	2.3209	1.7397	1.3914	1.1589	0.8686	0.6943	0.5783	0.4331	0.3460	0.2878
12	1.150	6.0253	5.0203	3.7646	3.0109	2.5091	1.8808	1.5043	1.2530	0.9392	0.7507	0.6253	0.4683	0.3741	0.3113
13	1.149	6.3859	5.3208	3.9900	3.1912	2.6592	1.9934	1.5943	1.3280	0.9955	0.7958	0.6629	0.4965	0.3967	0.3301
14	1.165	6.8289	5.6899	4.2669	3.4127	2.8438	2.1319	1.7051	1.4203	1.0646	0.8510	0.7089	0.5309	0.4242	0.3530
15	1.166	7.1949	5.9949	4.4956	3.5956	2.9964	2.2463	1.7966	1.4965	1.1218	0.8968	0.7470	0.5595	0.4471	0.3721
16	1.178	7.6317	6.3589	4.7686	3.8140	3.1782	2.3826	1.9058	1.5875	1.1900	0.9513	0.7925	0.5936	0.4744	0.3948
17	1.178	8.0018	6.6673	5.0000	3.9991	3.3325	2.4983	1.9982	1.6645	1.2479	0.9976	0.8311	0.6226	0.4975	0.4141
18	1.189	8.4338	7.0273	5.2699	4.2151	3.5125	2.6333	2.1062	1.7545	1.3154	1.0516	0.8761	0.6563	0.5245	0.4365
19	1.189	8.8073	7.3385	5.5033	4.4018	3.6680	2.7499	2.1996	1.8323	1.3736	1.0982	0.9149	0.6854	0.5477	0.4559
20	1.198	9.2357	7.6955	5.7710	4.6159	3.8465	2.8838	2.3067	1.9216	1.4405	1.1517	0.9595	0.7188	0.5745	0.4782
21	1.198	9.6117	8.0089	6.0060	4.8040	4.0032	3.0013	2.4006	1.9998	1.4993	1.1987	0.9986	0.7482	0.5980	0.4978
22	1.205	10.0372	8.3634	6.2720	5.0167	4.1804	3.1342	2.5070	2.0885	1.5658	1.2519	1.0430	0.7814	0.6246	0.5199
23	1.206	10.4154	8.6786	6.5083	5.2057	4.3380	3.2524	2.6015	2.1673	1.6249	1.2992	1.0824	0.8110	0.6482	0.5396
24	1.212	10.8385	9.0311	6.7728	5.4173	4.5143	3.3846	2.7073	2.2554	1.6909	1.3520	1.1263	0.8439	0.6745	0.5615
25	1.212	11.2185	9.3478	7.0103	5.6073	4.6725	3.5033	2.8022	2.3345	1.7502	1.3995	1.1659	0.8736	0.6983	0.5813
26	1.217	11.6396	9.6987	7.2734	5.8178	4.8481	3.6349	2.9075	2.4222	1.8160	1.4521	1.2098	0.9065	0.7246	0.6032
27	1.218	12.0211	10.0166	7.5119	6.0085	5.0070	3.7541	3.0029	2.5017	1.8756	1.4998	1.2495	0.9363	0.7484	0.6231
28	1.223	12.4406	10.3661	7.7740	6.2182	5.1817	3.8851	3.1076	2.5890	1.9412	1.5522	1.2932	0.9691	0.7746	0.6449
29	1.223	12.8233	10.6851	8.0132	6.4096	5.3412	4.0047	3.2033	2.6687	2.0009	1.5999	1.3329	0.9988	0.7984	0.6647
30	1.227	13.2414	11.0335	8.2746	6.6187	5.5154	4.1354	3.3079	2.7558	2.0662	1.6522	1.3765	1.0315	0.8246	0.6865
31	1.228	13.6253	11.3534	8.5144	6.8105	5.6753	4.2552	3.4038	2.8358	2.1262	1.7002	1.4165	1.0615	0.8486	0.7065
32	1.231	14.0421	11.7007	8.7750	7.0190	5.8490	4.3855	3.5079	2.9225	2.1913	1.7523	1.4599	1.0941	0.8746	0.7282
33	1.232	14.4270	12.0214	9.0154	7.2113	6.0092	4.5057	3.6042	3.0027	2.2515	1.8004	1.5000	1.1241	0.8987	0.7483
34	1.235	14.8427	12.3679	9.2753	7.4192	6.1825	4.6356	3.7081	3.0893	2.3164	1.8524	1.5433	1.1566	0.9246	0.7699
35	1.235	15.2284	12.6892	9.5164	7.6121	6.3432	4.7562	3.8046	3.1697	2.3766	1.9005	1.5834	1.1866	0.9486	0.7899
36	1.238	15.6433	13.0350	9.7756	7.8194	6.5160	4.8857	3.9082	3.2560	2.4414	1.9523	1.6266	1.2190	0.9746	0.8115
37	1.238	16.0297	13.3569	10.0172	8.0127	6.6770	5.0065	4.0048	3.3365	2.5018	2.0007	1.6668	1.2492	0.9987	0.8316
38	1.241	16.4438	13.7020	10.2760	8.2197	6.8496	5.1359	4.1083	3.4228	2.5665	2.0524	1.7100	1.2816	1.0246	0.8532
39	1.241	16.8309	14.0246	10.5179	8.4132	7.0108	5.2568	4.2050	3.5033	2.6270	2.1008	1.7503	1.3118	1.0488	0.8733
40	1.244	17.2442	14.3690	10.7762	8.6199	7.1830	5.3859	4.3083	3.5894	2.6915	2.1523	1.7932	1.3440	1.0745	0.8947
41	1.244	17.6319	14.6921	11.0185	8.8137	7.3446	5.5071	4.4053	3.6703	2.7521	2.2008	1.8336	1.3743	1.0987	0.9149
42	1.246	18.0446	15.0360	11.2764	9.0200	7.5164	5.6359	4.5084	3.7562	2.8165	2.2524	1.8766	1.4065	1.1245	0.9364
43	1.246	18.4329	15.3595	11.5191	9.2142	7.6783	5.7573	4.6054	3.8370	2.8772	2.3010	1.9171	1.4369	1.1488	0.9567
44	1.248	18.8449	15.7029	11.7765	9.4201	7.8499	5.8861	4.7084	3.9228	2.9416	2.3525	1.9600	1.4690	1.1745	0.9781
45	1.249	19.2337	16.0269	12.0196	9.6146	8.0119	6.0075	4.8057	4.0039	3.0023	2.4009	2.0004	1.4993	1.1987	0.9982
46	1.251	19.6452	16.3698	12.2768	9.8203	8.1833	6.1361	4.9085	4.0896	3.0665	2.4524	2.0432	1.5314	1.2244	1.0197
47	1.251	20.0345	16.6942	12.5201	10.0149	8.3456	6.2578	5.0057	4.1706	3.1274	2.5011	2.0838	1.5619	1.2488	1.0400
48	1.253	20.4455	17.0366	12.7769	10.2204	8.5167	6.3861	5.1085	4.2562	3.1916	2.5524	2.1266	1.5940	1.2745	1.0613
49	1.253	20.8352	17.3614	13.0205	10.4152	8.6791	6.5079	5.2059	4.3374	3.2525	2.6012	2.1672	1.6244	1.2988	1.0817
50	1.254	21.2457	17.7035	13.2770	10.6204	8.8502	6.6362	5.3086	4.4229	3.3166	2.6525	2.2100	1.6565	1.3245	1.1030
51	1.255	21.6358	18.0286	13.5209	10.8155	9.0127	6.7580	5.4060	4.5041	3.3775	2.7011	2.2505	1.6869	1.3487	1.1232
52	1.256	22.0458	18.3702	13.7771	11.0204	9.1835	6.8862	5.5085	4.5896	3.4416	2.7524	2.2932	1.7189	1.3744	1.1446
53	1.256	22.4364	18.6957	14.0212	11.2158	9.3462	7.0081	5.6062	4.6709	3.5026	2.8012	2.3339	1.7494	1.3988	1.1649
54	1.258	22.8460	19.0370	14.2772	11.4205	9.5168	7.1361	5.7085	4.7562	3.5666	2.8524	2.3766	1.7814	1.4244	1.1863
55	1.258	23.2370	19.3628	14.5215	11.6160	9.6798	7.2583	5.8062	4.8376	3.6277	2.9013	2.4173	1.8120	1.4488	1.2066
56	1.259	23.6461	19.7037	14.7773	11.8206	9.8502	7.3861	5.9085	4.9229	3.6915	2.9523	2.4598	1.8438	1.4743	1.2278
57	1.259	24.0374	20.0298	15.0218	12.0161	10.0132	7.5084	6.0064	5.0044	3.7527	3.0012	2.5006	1.8744	1.4987	1.2482
58	1.260	24.4463	20.3705	15.2774	12.2206	10.1836	7.6362	6.1085	5.0895	3.8166	3.0523	2.5432	1.9063	1.5243	1.2695
59	1.261	24.8379	20.6968	15.5221	12.4164	10.3467	7.7584	6.2064	5.1711	3.8778	3.1013	2.5839	1.9369	1.5488	1.2899
60	1.262	25.2464	21.0373	15.7774	12.6206	10.5169	7.8861	6.3085	5.2562	3.9416	3.1524	2.6265	1.9688	1.5743	1.3112

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37.5 DEG PRESSURE ANGLE

TABLE 91—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 37.5 DEG PRESSURE ANGLE AND TOLERANCE CLASS 6, EXTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	K_e \ d_e	0.7680	0.6400	0.4800	0.3840	0.3200	0.2400	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400
6	1.069	3.6033	3.0018	2.2505	1.7995	1.4996	1.1236	0.8983	0.7479	0.5601	0.4473	0.3725	0.2785	0.2221	0.1845
7	1.061	3.9271	3.2717	2.4530	1.9614	1.6344	1.2247	0.9792	0.8153	0.6107	0.4878	0.4061	0.3037	0.2423	0.2013
8	1.104	4.4125	3.6760	2.7562	2.2040	1.8366	1.3763	1.1004	0.9163	0.6864	0.5483	0.4566	0.3415	0.2725	0.2264
9	1.101	4.7545	3.9611	2.9700	2.3750	1.9790	1.4831	1.1859	0.9875	0.7398	0.5910	0.4922	0.3682	0.2939	0.2443
10	1.130	5.2188	4.3480	3.2601	2.6070	2.1725	1.6281	1.3019	1.0841	0.8123	0.6490	0.5405	0.4044	0.3228	0.2684
11	1.129	5.5719	4.6421	3.4808	2.7836	2.3195	1.7384	1.3902	1.1577	0.8674	0.6930	0.5772	0.4319	0.3448	0.2867
12	1.150	6.0235	5.0185	3.7630	3.0093	2.5077	1.8795	1.5029	1.2516	0.9379	0.7494	0.6242	0.4671	0.3730	0.3101
13	1.149	6.3841	5.3189	3.9884	3.1896	2.6579	1.9921	1.5931	1.3267	0.9942	0.7945	0.6617	0.4953	0.3955	0.3289
14	1.165	6.8269	5.6879	4.2651	3.4109	2.8424	2.1305	1.7038	1.4190	1.0634	0.8498	0.7077	0.5298	0.4230	0.3518
15	1.166	7.1929	5.9929	4.4939	3.5940	2.9948	2.2448	1.7952	1.4951	1.1205	0.8955	0.7459	0.5584	0.4459	0.3709
16	1.178	7.6297	6.3569	4.7668	3.8122	3.1768	2.3812	1.9044	1.5861	1.1887	0.9500	0.7913	0.5925	0.4732	0.3936
17	1.178	7.9998	6.6653	4.9982	3.9974	3.3309	2.4968	1.9969	1.6632	1.2466	0.9963	0.8299	0.6214	0.4963	0.4129
18	1.189	8.4318	7.0253	5.2681	4.2133	3.5110	2.6318	2.1048	1.7531	1.3140	1.0503	0.8748	0.6550	0.5232	0.4352
19	1.189	8.8052	7.3364	5.5014	4.3999	3.6665	2.7484	2.1982	1.8309	1.3723	1.0969	0.9137	0.6842	0.5465	0.4547
20	1.198	9.2336	7.6934	5.7692	4.6141	3.8450	2.8823	2.3051	1.9200	1.4392	1.1504	0.9583	0.7176	0.5733	0.4770
21	1.198	9.6096	8.0067	6.0041	4.8020	4.0016	2.9997	2.3992	1.9984	1.4980	1.1974	0.9974	0.7470	0.5968	0.4965
22	1.205	10.0350	8.3612	6.2701	5.0148	4.1789	3.1326	2.5055	2.0870	1.5644	1.2506	1.0416	0.7801	0.6232	0.5186
23	1.206	10.4131	8.6763	6.5064	5.2038	4.3363	3.2507	2.6000	2.1657	1.6234	1.2977	1.0810	0.8096	0.6469	0.5383
24	1.212	10.8363	9.0289	6.7709	5.4154	4.5126	3.3829	2.7057	2.2538	1.6895	1.3506	1.1251	0.8427	0.6733	0.5603
25	1.212	11.2162	9.3455	7.0082	5.6052	4.6708	3.5016	2.8007	2.3330	1.7489	1.3981	1.1647	0.8724	0.6970	0.5801
26	1.217	11.6373	9.6964	7.2715	5.8158	4.8464	3.6332	2.9059	2.4206	1.8146	1.4506	1.2084	0.9051	0.7232	0.6019
27	1.218	12.0187	10.0141	7.5098	6.0065	5.0052	3.7523	3.0013	2.5001	1.8742	1.4983	1.2481	0.9349	0.7471	0.6217
28	1.223	12.4382	10.3638	7.7720	6.2162	5.1800	3.8834	3.1060	2.5874	1.9397	1.5508	1.2918	0.9677	0.7733	0.6436
29	1.223	12.8209	10.6826	8.0111	6.4075	5.3394	4.0029	3.2017	2.6671	1.9995	1.5986	1.3316	0.9975	0.7971	0.6634
30	1.227	13.2389	11.0310	8.2725	6.6166	5.5136	4.1335	3.3063	2.7542	2.0647	1.6507	1.3751	1.0301	0.8232	0.6852
31	1.228	13.6227	11.3508	8.5123	6.8084	5.6734	4.2534	3.4021	2.8341	2.1247	1.6987	1.4151	1.0601	0.8472	0.7051
32	1.231	14.0396	11.6982	8.7729	7.0169	5.8471	4.3837	3.5063	2.9209	2.1899	1.7508	1.4585	1.0927	0.8732	0.7269
33	1.232	14.4244	12.0188	9.0133	7.2092	6.0074	4.5038	3.6026	3.0011	2.2500	1.7989	1.4985	1.1226	0.8972	0.7468
34	1.235	14.8401	12.3653	9.2732	7.4171	6.1806	4.6338	3.7064	3.0876	2.3148	1.8508	1.5418	1.1551	0.9232	0.7684
35	1.235	15.2258	12.6866	9.5142	7.6099	6.3413	4.7542	3.8028	3.1680	2.3751	1.8990	1.5820	1.1853	0.9473	0.7885
36	1.238	15.6407	13.0323	9.7734	7.8172	6.5141	4.8838	3.9064	3.2543	2.4399	1.9508	1.6252	1.2177	0.9732	0.8101
37	1.238	16.0271	13.3543	10.0150	8.0104	6.6751	5.0045	4.0031	3.3348	2.5003	1.9992	1.6654	1.2477	0.9972	0.8301
38	1.241	16.4410	13.6993	10.2736	8.2173	6.8476	5.1339	4.1066	3.4211	2.5649	2.0508	1.7085	1.2801	1.0231	0.8517
39	1.241	16.8281	14.0218	10.5156	8.4110	7.0088	5.2548	4.2032	3.5016	2.6254	2.0992	1.7488	1.3103	1.0473	0.8718
40	1.244	17.2414	14.3663	10.7738	8.6175	7.1810	5.3839	4.3066	3.5877	2.6900	2.1508	1.7919	1.3426	1.0731	0.8934
41	1.244	17.6292	14.6894	11.0162	8.8114	7.3426	5.5051	4.4035	3.6685	2.7504	2.1992	1.8321	1.3728	1.0972	0.9134
42	1.246	18.0417	15.0331	11.2740	9.0176	7.5144	5.6339	4.5066	3.7543	2.8149	2.2508	1.8751	1.4050	1.1230	0.9349
43	1.246	18.4300	15.3567	11.5168	9.2118	7.6763	5.7553	4.6037	3.8353	2.8756	2.2993	1.9156	1.4354	1.1473	0.9551
44	1.248	18.8420	15.7000	11.7742	9.4177	7.8478	5.8840	4.7065	3.9210	2.9400	2.3508	1.9585	1.4675	1.1730	0.9766
45	1.249	19.2309	16.0240	12.0173	9.6122	8.0099	6.0055	4.8038	4.0020	3.0006	2.3993	1.9989	1.4978	1.1972	0.9967
46	1.251	19.6422	16.3668	12.2743	9.8178	8.1812	6.1340	4.9066	4.0877	3.0649	2.4507	2.0417	1.5299	1.2229	1.0182
47	1.251	20.0316	16.6913	12.5177	10.0125	8.3435	6.2556	5.0039	4.1687	3.1258	2.4994	2.0823	1.5604	1.2473	1.0384
48	1.253	20.4425	17.0336	12.7744	10.2178	8.5146	6.3839	5.1066	4.2543	3.1900	2.5508	2.1250	1.5923	1.2728	1.0597
49	1.253	20.8322	17.3584	13.0181	10.4128	8.6770	6.5058	5.2039	4.3354	3.2508	2.5994	2.1656	1.6228	1.2972	1.0800
50	1.254	21.2426	17.7003	13.2745	10.6179	8.8479	6.6339	5.3066	4.4209	3.3149	2.6507	2.2083	1.6549	1.3228	1.1014
51	1.255	21.6328	18.0256	13.5183	10.8129	9.0105	6.7559	5.4041	4.5022	3.3759	2.6995	2.2490	1.6854	1.3472	1.1217
52	1.256	22.0428	18.3671	13.7746	11.0179	9.1812	6.8839	5.5065	4.5875	3.4399	2.7507	2.2916	1.7173	1.3727	1.1429
53	1.256	22.4333	18.6926	14.0186	11.2131	9.3440	7.0060	5.6042	4.6689	3.5008	2.7994	2.3323	1.7478	1.3971	1.1633
54	1.258	22.8428	19.0338	14.2746	11.4179	9.5146	7.1339	5.7066	4.7543	3.5648	2.8506	2.3749	1.7798	1.4227	1.1846
55	1.258	23.2338	19.3596	14.5189	11.6133	9.6775	7.2560	5.8042	4.8356	3.6259	2.8995	2.4157	1.8103	1.4472	1.2050
56	1.259	23.6430	19.7006	14.7747	11.8180	9.8479	7.3838	5.9065	4.9209	3.6899	2.9507	2.4582	1.8422	1.4726	1.2262
57	1.259	24.0342	20.0266	15.0191	12.0135	10.0109	7.5061	6.0042	5.0023	3.7509	2.9995	2.4989	1.8727	1.4971	1.2465
58	1.260	24.4430	20.3672	15.2747	12.2180	10.1812	7.6338	6.1065	5.0875	3.8148	3.0506	2.5415	1.9047	1.5226	1.2678
59	1.261	24.8346	20.6936	15.5194	12.4136	10.3444	7.7561	6.2044	5.1690	3.8760	3.0995	2.5823	1.9353	1.5471	1.2882
60	1.262	25.2431	21.0340	15.7748	12.6180	10.5145	7.8839	6.3064	5.2540	3.9397	3.1505	2.6247	1.9671	1.5725	1.3094

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37.5 DEG PRESSURE ANGLE

TABLE 92—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 37.5 DEG PRESSURE ANGLE AND TOLERANCE CLASS 7, EXTERNAL INVOLUTE SPLINES

Spline Pitch		2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
N	d_e / K_e	0.7680	0.6400	0.4800	0.3840	0.3200	0.2400	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400
6	1.069	3.6010	2.9995	2.2484	1.7973	1.4978	1.1217	0.8966	0.7461	0.5585	0.4457	0.3710	0.2770	0.2206	0.1830
7	1.061	3.9248	3.2693	2.4509	1.9593	1.6326	1.2229	0.9775	0.8135	0.6090	0.4861	0.4046	0.3022	0.2408	0.1998
8	1.104	4.4100	3.6736	2.7540	2.2018	1.8346	1.3743	1.0987	0.9145	0.6847	0.5466	0.4550	0.3399	0.2709	0.2249
9	1.101	4.7518	3.9584	2.9677	2.3727	1.9772	1.4812	1.1841	0.9856	0.7382	0.5894	0.4907	0.3667	0.2923	0.2427
10	1.130	5.2161	4.3453	3.2577	2.6047	2.1705	1.6261	1.3001	1.0823	0.8105	0.6472	0.5388	0.4027	0.3211	0.2666
11	1.129	5.5692	4.6394	3.4785	2.7812	2.3175	1.7363	1.3882	1.1557	0.8657	0.6913	0.5756	0.4303	0.3432	0.2850
12	1.150	6.0206	5.0156	3.7605	3.0068	2.5056	1.8774	1.5011	1.2497	0.9360	0.7476	0.6224	0.4654	0.3712	0.3083
13	1.149	6.3812	5.3161	3.9859	3.1871	2.6558	1.9900	1.5911	1.3248	0.9924	0.7927	0.6600	0.4936	0.3938	0.3271
14	1.165	6.8240	5.6850	4.2625	3.4084	2.8402	2.1282	1.7017	1.4169	1.0615	0.8480	0.7061	0.5281	0.4214	0.3501
15	1.166	7.1900	5.9900	4.4914	3.5914	2.9927	2.2426	1.7932	1.4931	1.1186	0.8936	0.7441	0.5566	0.4441	0.3691
16	1.178	7.6266	6.3538	4.7642	3.8096	3.1745	2.3790	1.9022	1.5840	1.1868	0.9481	0.7895	0.5907	0.4714	0.3918
17	1.178	7.9968	6.6622	4.9955	3.9947	3.3287	2.4945	1.9948	1.6611	1.2447	0.9944	0.8281	0.6196	0.4945	0.4111
18	1.189	8.4287	7.0222	5.2654	4.2105	3.5086	2.6294	2.1026	1.7510	1.3120	1.0483	0.8730	0.6532	0.5214	0.4334
19	1.189	8.8021	7.3333	5.4988	4.3973	3.6642	2.7461	2.1960	1.8288	1.3704	1.0950	0.9119	0.6824	0.5447	0.4529
20	1.198	9.2304	7.6902	5.7665	4.6114	3.8426	2.8799	2.3030	1.9179	1.4372	1.1484	0.9563	0.7157	0.5713	0.4750
21	1.198	9.6063	8.0035	6.0014	4.7993	3.9992	2.9973	2.3970	1.9962	1.4959	1.1954	0.9955	0.7451	0.5948	0.4946
22	1.205	10.0318	8.3580	6.2672	5.0119	4.1764	3.1302	2.5032	2.0847	1.5624	1.2485	1.0398	0.7783	0.6214	0.5167
23	1.206	10.4099	8.6730	6.5036	5.2010	4.3339	3.2483	2.5978	2.1635	1.6214	1.2957	1.0791	0.8077	0.6449	0.5363
24	1.212	10.8329	9.0255	6.7679	5.4125	4.5101	3.3804	2.7034	2.2515	1.6875	1.3485	1.1231	0.8407	0.6713	0.5583
25	1.212	11.2128	9.3421	7.0053	5.6023	4.6684	3.4991	2.7984	2.3307	1.7468	1.3960	1.1627	0.8704	0.6951	0.5781
26	1.217	11.6338	9.6928	7.2684	5.8128	4.8438	3.6306	2.9036	2.4183	1.8125	1.4485	1.2065	0.9032	0.7213	0.5999
27	1.218	12.0151	10.0106	7.5067	6.0034	5.0026	3.7497	2.9988	2.4976	1.8721	1.4962	1.2462	0.9330	0.7451	0.6198
28	1.223	12.4346	10.3601	7.7690	6.2132	5.1773	3.8807	3.1037	2.5850	1.9375	1.5485	1.2897	0.9656	0.7712	0.6415
29	1.223	12.8172	10.6790	8.0081	6.4044	5.3368	4.0003	3.1993	2.6647	1.9973	1.5964	1.3296	0.9955	0.7951	0.6614
30	1.227	13.2353	11.0273	8.2693	6.6134	5.5109	4.1308	3.3038	2.7518	2.0626	1.6486	1.3732	1.0282	0.8212	0.6832
31	1.228	13.6190	11.3471	8.5091	6.8052	5.6707	4.2507	3.3997	2.8316	2.1225	1.6965	1.4130	1.0580	0.8451	0.7030
32	1.231	14.0358	11.6944	8.7697	7.0137	5.8444	4.3809	3.5039	2.9184	2.1876	1.7486	1.4564	1.0906	0.8711	0.7247
33	1.232	14.4206	12.0150	9.0101	7.2060	6.0047	4.5011	3.6000	2.9985	2.2476	1.7966	1.4964	1.1205	0.8951	0.7447
34	1.235	14.8363	12.3614	9.2699	7.4138	6.1778	4.6309	3.7039	3.0851	2.3126	1.8485	1.5397	1.1530	0.9210	0.7663
35	1.235	15.2219	12.6828	9.5108	7.6065	6.3385	4.7515	3.8002	3.1654	2.3729	1.8968	1.5799	1.1831	0.9451	0.7864
36	1.238	15.6367	13.0284	9.7701	7.8140	6.5113	4.8810	3.9039	3.2518	2.4376	1.9485	1.6230	1.2154	0.9709	0.8079
37	1.238	16.0231	13.3504	10.0116	8.0071	6.6722	5.0016	4.0004	3.3322	2.4980	1.9968	1.6632	1.2456	0.9951	0.8280
38	1.241	16.4371	13.6953	10.2703	8.2140	6.8446	5.1309	4.1038	3.4183	2.5626	2.0485	1.7064	1.2780	1.0210	0.8495
39	1.241	16.8242	14.0179	10.5122	8.4075	7.0059	5.2519	4.2006	3.4990	2.6230	2.0968	1.7466	1.3081	1.0450	0.8696
40	1.244	17.2373	14.3621	10.7705	8.6141	7.1780	5.3809	4.3038	3.5850	2.6876	2.1485	1.7896	1.3404	1.0709	0.8911
41	1.244	17.6251	14.6852	11.0128	8.8079	7.3395	5.5020	4.4008	3.6658	2.7481	2.1968	1.8299	1.3705	1.0950	0.9112
42	1.246	18.0375	15.0288	11.2705	9.0141	7.5114	5.6309	4.5038	3.7516	2.8125	2.2484	1.8729	1.4028	1.1207	0.9327
43	1.246	18.4258	15.3524	11.5132	9.2082	7.6731	5.7522	4.6009	3.8325	2.8732	2.2970	1.9133	1.4331	1.1450	0.9529
44	1.248	18.8377	15.6956	11.7707	9.4142	7.8447	5.8808	4.7038	3.9182	2.9375	2.3483	1.9561	1.4652	1.1706	0.9742
45	1.249	19.2265	16.0196	12.0136	9.6086	8.0068	6.0024	4.8010	3.9992	2.9982	2.3969	1.9966	1.4955	1.1949	0.9945
46	1.251	19.6378	16.3624	12.2707	9.8141	8.1781	6.1308	4.9038	4.0848	3.0625	2.4484	2.0395	1.5277	1.2207	1.0159
47	1.251	20.0271	16.6868	12.5139	10.0087	8.3402	6.2524	5.0011	4.1660	3.1232	2.4969	2.0799	1.5580	1.2449	1.0360
48	1.253	20.4379	17.0291	12.7708	10.2142	8.5113	6.3807	5.1037	4.2514	3.1874	2.5483	2.1227	1.5901	1.2705	1.0574
49	1.253	20.8277	17.3539	13.0143	10.4090	8.6737	6.5025	5.2012	4.3327	3.2482	2.5969	2.1632	1.6204	1.2948	1.0776
50	1.254	21.2380	17.6958	13.2707	10.6141	8.8446	6.6307	5.3037	4.4180	3.3124	2.6482	2.2059	1.6525	1.3204	1.0990
51	1.255	21.6282	18.0209	13.5145	10.8091	9.0071	6.7525	5.4011	4.4992	3.3733	2.6970	2.2466	1.6830	1.3448	1.1193
52	1.256	22.0381	18.3625	13.7707	11.0140	9.1780	6.8806	5.5036	4.5846	3.4373	2.7481	2.2892	1.7149	1.3703	1.1405
53	1.256	22.4286	18.6879	14.0148	11.2093	9.3406	7.0026	5.6011	4.6659	3.4983	2.7969	2.3299	1.7454	1.3947	1.1609
54	1.258	22.8382	19.0292	14.2707	11.4140	9.5112	7.1305	5.7036	4.7512	3.5622	2.8480	2.3724	1.7772	1.4202	1.1821
55	1.258	23.2290	19.3549	14.5150	11.6094	9.6741	7.2526	5.8012	4.8326	3.6233	2.8969	2.4131	1.8078	1.4446	1.2024
56	1.259	23.6382	19.6958	14.7707	11.8139	9.8445	7.3804	5.9035	4.9178	3.6872	2.9480	2.4558	1.8398	1.4702	1.2238
57	1.259	24.0294	20.0218	15.0152	12.0096	10.0074	7.5026	6.0012	4.9992	3.7482	2.9968	2.4964	1.8702	1.4945	1.2440
58	1.260	24.4382	20.3624	15.2707	12.2139	10.1777	7.6302	6.1034	5.0844	3.8121	3.0479	2.5390	1.9021	1.5201	1.2653
59	1.261	24.8295	20.6885	15.5153	12.4096	10.3408	7.7526	6.2012	5.1659	3.8733	3.0969	2.5798	1.9327	1.5446	1.2857
60	1.262	25.2381	21.0289	15.7706	12.6138	10.5110	7.8802	6.3034	5.2510	3.9371	3.1478	2.6222	1.9645	1.5700	1.3068

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45 DEG PRESSURE ANGLE

TABLE 93—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 4, INTERNAL INVOLUTE SPLINES

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_i / K_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
6	1.390	0.3034	0.2533	0.1905	0.1528	0.1275	0.0961	0.0774	0.0648			
7	1.238	0.3912	0.3264	0.2453	0.1966	0.1641	0.1235	0.0993	0.0831			
8	1.208	0.5079	0.4237	0.3182	0.2549	0.2127	0.1600	0.1285	0.1074			
9	1.152	0.5969	0.4978	0.3738	0.2994	0 2498	0.1877	0.1507	0.1258			
10	1.144	0.7100	0.5921	0.4444	0.3559	0.2968	0.2231	0.1789	0.1494			
11	1.113	0.8005	0.6674	0.5010	0.4012	0.3345	0.2513	0.2015	0.1682	0.1264	0.1014	0.0639
12	1.110	0.9112	0.7597	0.5702	0.4565	0.3806	0.2859	0.2291	0.1912	0.1437	0.1152	0.0725
13	1.090	1.0028	0.8361	0.6275	0.5023	0.4188	0.3145	0.2520	0.2103	0.1580	0.1267	0.0796
14	1.089	1.1119	0.9270	0.6957	0.5569	0.4644	0.3487	0.2794	0.2332	0.1751	0.1403	0.0882
15	1.075	1.2046	1.0043	0.7535	0.6032	0.5029	0.3776	0.3026	0.2524	0.1895	0.1519	0.0954
16	1.075	1.3126	1.0942	0.8210	0.6571	0.5479	0.4114	0.3295	0.2749	0.2064	0.1654	0.1038
17	1.065	1.4059	1.1720	0.8794	0.7038	0.5868	0.4405	0.3529	0.2944	0.2209	0.1770	0.1111
18	1.064	1.5130	1.2612	0.9462	0.7573	0.6314	0.4740	0.3796	0.3167	0.2378	0.1905	0.1195
19	1.057	1.6070	1.3395	1.0051	0.8044	0.6706	0.5033	0.4031	0.3362	0.2525	0.2022	0.1269
20	1.057	1.7134	1.4282	1.0715	0.8576	0.7148	0.5366	0.4297	0.3584	0.2691	0.2155	0.1352
21	1.051	1.8079	1.5070	1.1306	0.9048	0.7542	0.5661	0.4533	0.3781	0.2838	0.2273	0.1426
22	1.051	1.9136	1.5951	1.1967	0.9577	0.7984	0.5992	0.4798	0.4002	0.3003	0.2405	0.1509
23	1.046	2.0086	1.6742	1.2560	1.0052	0.8379	0.6289	0.5036	0.4200	0.3152	0.2524	0.1583
24	1.046	2.1138	1.7619	1.3218	1.0578	0.8818	0.6618	0.5299	0.4419	0.3316	0.2656	0.1665
25	1.042	2.2093	1.8415	1.3814	1.1055	0.9215	0.6916	0.5537	0.4617	0.3465	0.2775	
26	1.042	2.3141	1.9288	1.4470	1.1580	0.9652	0.7243	0.5799	0.4836	0.3629	0.2906	
27	1.038	2.4098	2.0085	1.5068	1.2058	1.0050	0.7542	0.6038	0.5035	0.3779	0.3026	
28	1.038	2.5142	2.0956	1.5721	1.2580	1.0486	0.7869	0.6300	0.5253	0.3943		
29	1.035	2.6102	2.1756	1.6321	1.3060	1.0887	0.8170	0.6540	0.5454	0.4093		
30	1.035	2.7144	2.2625	1.6972	1.3581	1.1321	0.8495	0.6801	0.5671	0.4255		
31	1.033	2.8106	2.3426	1.7573	1.4062	1.1721	0.8796	0.7041	0.5871	0.4406		
32	1.033	2.9146	2.4292	1.8222	1.4582	1.2154	0.9120	0.7301	0.6087			
33	1.031	3.0110	2.5096	1.8825	1.5064	1.2556	0.9422	0.7542	0.6288			
34	1.031	3.1146	2.5960	1.9474	1.5583	1.2988	0.9746	0.7801	0.6504			
35	1.029	3.2113	2.6765	2.0078	1.6066	1.3391	1.0048	0.8043	0.6706			
36	1.029	3.3148	2.7628	2.0724	1.6583	1.3822	1.0371	0.8301	0.6921			
37	1.027	3.4116	2.8435	2.1329	1.7067	1.4226	1.0674	0.8544	0.7124			
38	1.027	3.5149	2.9295	2.1975	1.7584	1.4656	1.0997	0.8803	0.7339			
39	1.026	3.6118	3.0103	2.2581	1.8068	1.5060	1.1300	0.9045	0.7541			
40	1.026	3.7150	3.0962	2.3225	1.8584	1.5490	1.1622	0.9303	0.7756			
41	1.024	3.8121	3.1772	2.3833	1.9070	1.5894	1.1926	0.9545	0.7958			
42	1.024	3.9151	3.2631	2.4476	1.9585	1.6323	1.2247	0.9803	0.8172			
43	1.023	4.0123	3.3441	2.5084	2.0071	1.6729	1.2551	1.0046	0.8375			
44	1.023	4.1152	3.4298	2.5727	2.0586	1.7158	1.2874	1.0304	0.8590			
45	1.022	4.2125	3.5109	2.6335	2.1072	1.7564	1.3178	1.0547	0.8793			
46	1.022	4.3153	3.5966	2.6977	2.1586	1.7992	1.3499	1.0804	0.9007			
47	1.021	4.4128	3.6778	2.7586	2.2073	1.8398	1.3803	1.1048	0.9210			
48	1.021	4.5154	3.7633	2.8228	2.2587	1.8825	1.4124	1.1304	0.9424			
49	1.020	4.6129	3.8446	2.8838	2.3075	1.9231	1.4429	1.1548	0.9627			
50	1.020	4.7154	3.9300	2.9479	2.3587	1.9659	1.4749	1.1804	0.9840			
51	1.019	4.8131	4.0114	3.0089	2.4075	2.0066	1.5055	1.2049	1.0045			
52	1.019	4.9155	4.0968	3.0729	2.4587	2.0493	1.5375	1.2305	1.0258			
53	1.019	5.0133	4.1782	3.1340	2.5076	2.0900	1.5680	1.2550	1.0462			
54	1.019	5.1156	4.2635	3.1979	2.5587	2.1326	1.6000	1.2805	1.0675			
55	1.018	5.2134	4.3450	3.2590	2.6077	2.1734	1.6306	1.3050	1.0879			
56	1.018	5.3156	4.4302	3.3230	2.6589	2.2160	1.6625	1.3305	1.1092			
57	1.017	5.4136	4.5118	3.3842	2.7078	2.2568	1.6931	1.3550	1.1296			
58	1.017	5.5157	4.5969	3.4480	2.7589	2.2993	1.7250	1.3806	1.1508			
59	1.017	5.6137	4.6786	3.5093	2.8079	2.3403	1.7557	1.4051	1.1713			
60	1.017	5.7157	4.7636	3.5731	2.8589	2.3828	1.7876	1.4307	1.1926			

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45 DEG PRESSURE ANGLE

TABLE 93—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 4, INTERNAL INVOLUTE SPLINES (Cont.)

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	K_i \ d_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
61	1.016	5.8138	4.8453	3.6343	2.9079	2.4236	1.8183	1.4552	1.2130			
62	1.016	5.9159	4.9304	3.6981	2.9589	2.4661	1.8502	1.4807	1.2343			
63	1.016	6.0140	5.0122	3.7595	3.0080	2.5070	1.8808	1.5052	1.2547			
64	1.016	6.1159	5.0971	3.8232	3.0590	2.5495	1.9127	1.5307	1.2759			
65	1.015	6.2140	5.1789	3.8845	3.1081	2.5904	1.9433	1.5552	1.2964			
66	1.015	6.3159	5.2638	3.9482	3.1590	2.6329	1.9753	1.5808	1.3177			
67	1.015	6.4142	5.3457	4.0096	3.2081	2.6738	2.0059	1.6053	1.3382			
68	1.015	6.5160	5.4306	4.0732	3.2590	2.7162	2.0378	1.6308	1.3594			
69	1.014	6.6143	5.5124	4.1346	3.3082	2.7572	2.0685	1.6553	1.3799			
70	1.014	6.7161	5.5973	4.1982	3.3590	2.7996	2.1003	1.6808	1.4011			
71	1.014	6.8144	5.6792	4.2598	3.4083	2.8405	2.1310	1.7054	1.4215			
72	1.014	6.9162	5.7640	4.3233	3.4592	2.8829	2.1628	1.7308	1.4427			
73	1.013	7.0145	5.8460	4.3848	3.5083	2.9239	2.1935	1.7554	1.4632			
74	1.013	7.1162	5.9307	4.4483	3.5592	2.9664	2.2254	1.7809	1.4845			
75	1.013	7.2146	6.0127	4.5098	3.6084	3.0074	2.2561	1.8055	1.5050			
76	1.013	7.3162	6.0974	4.5734	3.6592	3.0497	2.2879	1.8309	1.5262			
77	1.013	7.4147	6.1795	4.6349	3.7084	3.0907	2.3186	1.8555	1.5467			
78	1.013	7.5163	6.2642	4.6985	3.7593	3.1330	2.3504	1.8809	1.5678			
79	1.012	7.6148	6.3462	4.7600	3.8085	3.1741	2.3812	1.9055	1.5884			
80	1.012	7.7163	6.4309	4.8235	3.8593	3.2164	2.4129	1.9309	1.6095			
81	1.012	7.8148	6.5129	4.8850	3.9085	3.2575	2.4438	1.9556	1.6301			
82	1.012	7.9164	6.5975	4.9485	3.9593	3.2998	2.4755	1.9810	1.6513			
83	1.012	8.0150	6.6797	5.0101	4.0086	3.3409	2.5063	2.0056	1.6718			
84	1.012	8.1165	6.7643	5.0735	4.0593	3.3832	2.5380	2.0310	1.6929			
85	1.011	8.2150	6.8465	5.1352	4.1087	3.4242	2.5688	2.0557	1.7135			
86	1.011	8.3165	6.9310	5.1986	4.1594	3.4665	2.6005	2.0810	1.7346			
87	1.011	8.4151	7.0132	5.2602	4.2087	3.5076	2.6313	2.1057	1.7552			
88	1.011	8.5166	7.0978	5.3236	4.2594	3.5498	2.6630	2.1310	1.7763			
89	1.011	8.6152	7.1800	5.3852	4.3087	3.5910	2.6939	2.1558	1.7969			
90	1.011	8.7166	7.2644	5.4486	4.3594	3.6333	2.7256	2.1811	1.8181			
91	1.011	8.8153	7.3467	5.5103	4.4087	3.6744	2.7564	2.2058	1.8386			
92	1.011	8.9166	7.4311	5.5736	4.4594	3.7166	2.7881	2.2311	1.8597			
93	1.010	9.0154	7.5135	5.6354	4.5089	3.7577	2.8190	2.2558	1.8803			
94	1.010	9.1167	7.5979	5.6987	4.5595	3.8000	2.8506	2.2811	1.9014			
95	1.010	9.2154	7.6802	5.7604	4.6089	3.8411	2.8815	2.3053	1.9220			
96	1.010	9.3167	7.7646	5.8237	4.6595	3.8834	2.9132	2.3312	1.9432			
97	1.010	9.4155	7.8469	5.8854	4.7089	3.9245	2.9441	2.3559	1.9637			
98	1.010	9.5168	7.9313	5.9487	4.7595	3.9667	2.9757	2.3812	1.9848			
99	1.010	9.6156	8.0136	6.0105	4.8089	4.0079	3.0066	2.4059	2.0054			
100	1.010	9.7169	8.0980	6.0738	4.8596	4.0501	3.0382	2.4312	2.0265			

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45 DEG PRESSURE ANGLE

TABLE 94—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 5, INTERNAL INVOLUTE SPLINES

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	K_i \ d_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
6	1.390	0.3045	0.2544	0.1914	0.1537	0.1285	0.0971	0.0783	0.0657			
7	1.238	0.3922	0.3274	0.2461	0.1974	0.1649	0.1243	0.1000	0.0838			
8	1.208	0.5089	0.4246	0.3192	0.2559	0.2136	0.1608	0.1293	0.1082			
9	1.152	0.5978	0.4987	0.3747	0.3003	0.2506	0.1885	0.1514	0.1266			
10	1.144	0.7109	0.5930	0.4453	0.3568	0.2976	0.2238	0.1797	0.1502			
11	1.113	0.8014	0.6683	0.5018	0.4020	0.3353	0.2521	0.2022	0.1690	0.1271	0.1020	0.0644
12	1.110	0.9121	0.7606	0.5710	0.4573	0.3814	0.2867	0.2299	0.1920	0.1444	0.1159	0.0732
13	1.090	1.0038	0.8370	0.6282	0.5031	0.4196	0.3153	0.2528	0.2111	0.1587	0.1273	0.0803
14	1.089	1.1129	0.9280	0.6965	0.5578	0.4651	0.3495	0.2802	0.2339	0.1757	0.1409	0.0888
15	1.075	1.2055	1.0051	0.7544	0.6040	0.5037	0.3784	0.3033	0.2532	0.1901	0.1525	0.0960
16	1.075	1.3134	1.0951	0.8219	0.6580	0.5487	0.4121	0.3303	0.2757	0.2071	0.1661	0.1045
17	1.065	1.4069	1.1730	0.8802	0.7047	0.5875	0.4413	0.3536	0.2951	0.2217	0.1777	0.1117
18	1.064	1.5139	1.2622	0.9471	0.7582	0.6321	0.4747	0.3804	0.3174	0.2384	0.1911	0.1201
19	1.057	1.6079	1.3405	1.0059	0.8053	0.6714	0.5042	0.4040	0.3371	0.2531	0.2029	0.1274
20	1.057	1.7142	1.4291	1.0724	0.8584	0.7157	0.5374	0.4305	0.3592	0.2697	0.2162	0.1358
21	1.051	1.8088	1.5079	1.1314	0.9057	0.7551	0.5669	0.4541	0.3789	0.2845	0.2280	0.1432
22	1.051	1.9146	1.5960	1.1975	0.9585	0.7991	0.6000	0.4806	0.4009	0.3011	0.2413	0.1515
23	1.046	2.0095	1.6752	1.2569	1.0060	0.8387	0.6296	0.5043	0.4207	0.3159	0.2531	0.1589
24	1.046	2.1148	1.7629	1.3227	1.0587	0.8826	0.6626	0.5307	0.4427	0.3324	0.2663	0.1671
25	1.042	2.2102	1.8424	1.3823	1.1064	0.9223	0.6924	0.5545	0.4626	0.3472	0.2782	
26	1.042	2.3150	1.9298	1.4478	1.1588	0.9660	0.7252	0.5808	0.4844	0.3636	0.2913	
27	1.038	2.4107	2.0095	1.5076	1.2066	1.0059	0.7551	0.6047	0.5043	0.3786	0.3033	
28	1.038	2.5153	2.0966	1.5729	1.2589	1.0494	0.7877	0.6308	0.5261	0.3949		
29	1.035	2.6112	2.1766	1.6330	1.3069	1.0895	0.8178	0.6549	0.5462	0.4100		
30	1.035	2.7154	2.2634	1.6981	1.3590	1.1329	0.8503	0.6809	0.5679	0.4263		
31	1.033	2.8116	2.3436	1.7582	1.4071	1.1730	0.8804	0.7050	0.5879	0.4413		
32	1.033	2.9156	2.4303	1.8232	1.4591	1.2163	0.9129	0.7309	0.6096			
33	1.031	3.0120	2.5106	1.8834	1.5073	1.2564	0.9430	0.7550	0.6297			
34	1.031	3.1157	2.5970	1.9482	1.5591	1.2996	0.9754	0.7809	0.6513			
35	1.029	3.2123	2.6775	2.0087	1.6075	1.3400	1.0057	0.8052	0.6715			
36	1.029	3.3158	2.7638	2.0734	1.6593	1.3831	1.0380	0.8311	0.6930			
37	1.027	3.4126	2.8445	2.1338	1.7077	1.4234	1.0683	0.8553	0.7132			
38	1.027	3.5159	2.9305	2.1984	1.7593	1.4665	1.1005	0.8811	0.7347			
39	1.026	3.6130	3.0114	2.2590	1.8078	1.5068	1.1308	0.9053	0.7549			
40	1.026	3.7161	3.0974	2.3235	1.8594	1.5499	1.1632	0.9312	0.7765			
41	1.024	3.8132	3.1783	2.3842	1.9080	1.5904	1.1935	0.9555	0.7967			
42	1.024	3.9161	3.2641	2.4486	1.9594	1.6333	1.2257	0.9812	0.8182			
43	1.023	4.0135	3.3452	2.5093	2.0081	1.6738	1.2560	1.0055	0.8384			
44	1.023	4.1163	3.4309	2.5736	2.0595	1.7166	1.2882	1.0312	0.8598			
45	1.022	4.2136	3.5120	2.6345	2.1082	1.7573	1.3187	1.0557	0.8802			
46	1.022	4.3163	3.5976	2.6987	2.1596	1.8001	1.3508	1.0813	0.9016			
47	1.021	4.4139	3.6789	2.7596	2.2083	1.8407	1.3812	1.1057	0.9219			
48	1.021	4.5165	3.7644	2.8238	2.2596	1.8834	1.4133	1.1313	0.9433			
49	1.020	4.6140	3.8457	2.8847	2.3084	1.9241	1.4438	1.1557	0.9636			
50	1.020	4.7166	3.9312	2.9489	2.3597	1.9669	1.4759	1.1814	0.9851			
51	1.019	4.8143	4.0126	3.0099	2.4086	2.0076	1.5064	1.2059	1.0054			
52	1.019	4.9166	4.0979	3.0739	2.4598	2.0502	1.5384	1.2315	1.0267			
53	1.019	5.0144	4.1793	3.1350	2.5086	2.0909	1.5690	1.2559	1.0471			
54	1.019	5.1168	4.2647	3.1989	2.5598	2.1336	1.6009	1.2815	1.0684			
55	1.018	5.2146	4.3462	3.2600	2.6087	2.1743	1.6315	1.3059	1.0888			
56	1.018	5.3168	4.4314	3.3240	2.6599	2.2170	1.6635	1.3316	1.1102			
57	1.017	5.4147	4.5129	3.3852	2.7088	2.2578	1.6941	1.3560	1.1306			
58	1.017	5.5169	4.5982	3.4491	2.7599	2.3004	1.7261	1.3816	1.1519			
59	1.017	5.6149	4.6798	3.5103	2.8089	2.3412	1.7567	1.4061	1.1723			
60	1.017	5.7170	4.7648	3.5741	2.8599	2.3837	1.7886	1.4316	1.1935			

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45 DEG PRESSURE ANGLE

TABLE 94—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 5, INTERNAL INVOLUTE SPLINES (Cont.)

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	K_i \ di	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
61	1.016	5.8150	4.8465	3.6354	2.9090	2.4246	1.8193	1.4562	1.2140			
62	1.016	5.9171	4.9316	3.6992	2.9600	2.4671	1.8512	1.4817	1.2353			
63	1.016	6.0152	5.0134	3.7605	3.0091	2.5080	1.8818	1.5062	1.2557			
64	1.016	6.1171	5.0983	3.8242	3.0600	2.5505	1.9137	1.5317	1.2770			
65	1.015	6.2154	5.1802	3.8855	3.1091	2.5914	1.9443	1.5562	1.2974			
66	1.015	6.3172	5.2651	3.9493	3.1601	2.6339	1.9763	1.5818	1.3187			
67	1.015	6.4154	5.3469	4.0107	3.2092	2.6748	2.0070	1.6063	1.3392			
68	1.015	6.5173	5.4318	4.0743	3.2601	2.7173	2.0388	1.6318	1.3604			
69	1.014	6.6156	5.5138	4.1357	3.3093	2.7582	2.0695	1.6564	1.3809			
70	1.014	6.7174	5.5986	4.1993	3.3602	2.8006	2.1013	1.6818	1.4021			
71	1.014	6.8157	5.6805	4.2608	3.4093	2.8416	2.1320	1.7064	1.4225			
72	1.014	6.9174	5.7653	4.3244	3.4603	2.8840	2.1639	1.7319	1.4438			
73	1.013	7.0158	5.8473	4.3859	3.5094	2.9250	2.1946	1.7565	1.4643			
74	1.013	7.1175	5.9320	4.4495	3.5603	2.9674	2.2264	1.7819	1.4855			
75	1.013	7.2159	6.0140	4.5109	3.6095	3.0084	2.2571	1.8065	1.5060			
76	1.013	7.3176	6.0988	4.5745	3.6603	3.0507	2.2889	1.8319	1.5272			
77	1.013	7.4160	6.1808	4.6361	3.7096	3.0918	2.3198	1.8566	1.5478			
78	1.013	7.5176	6.2655	4.6996	3.7604	3.1342	2.3515	1.8820	1.5690			
79	1.012	7.6161	6.3475	4.7611	3.8096	3.1752	2.3823	1.9066	1.5895			
80	1.012	7.7178	6.4323	4.8246	3.8604	3.2175	2.4140	1.9320	1.6106			
81	1.012	7.8163	6.5144	4.8861	3.9096	3.2585	2.4448	1.9566	1.6311			
82	1.012	7.9178	6.5989	4.9497	3.9605	3.3009	2.4766	1.9821	1.6524			
83	1.012	8.0163	6.6811	5.0113	4.0098	3.3420	2.5074	2.0068	1.6729			
84	1.012	8.1179	6.7657	5.0747	4.0605	3.3843	2.5391	2.0321	1.6941			
85	1.011	8.2165	6.8479	5.1363	4.1098	3.4253	2.5699	2.0568	1.7146			
86	1.011	8.3179	6.9324	5.1997	4.1605	3.4676	2.6016	2.0821	1.7357			
87	1.011	8.4165	7.0146	5.2614	4.2099	3.5088	2.6325	2.1069	1.7564			
88	1.011	8.5180	7.0992	5.3248	4.2606	3.5511	2.6642	2.1322	1.7775			
89	1.011	8.6166	7.1814	5.3865	4.3099	3.5922	2.6950	2.1569	1.7980			
90	1.011	8.7180	7.2659	5.4498	4.3606	3.6344	2.7267	2.1822	1.8192			
91	1.011	8.8168	7.3482	5.5115	4.4100	3.6755	2.7576	2.2069	1.8397			
92	1.011	8.9181	7.4326	5.5748	4.4606	3.7177	2.7892	2.2322	1.8608			
93	1.010	9.0168	7.5149	5.6366	4.5101	3.7590	2.8202	2.2570	1.8815			
94	1.010	9.1181	7.5993	5.6999	4.5607	3.8012	2.8518	2.2823	1.9026			
95	1.010	9.2170	7.6817	5.7616	4.6101	3.8423	2.8827	2.3070	1.9232			
96	1.010	9.3182	7.7661	5.8249	4.6607	3.8845	2.9143	2.3323	1.9443			
97	1.010	9.4170	7.8484	5.8867	4.7101	3.9256	2.9452	2.3570	1.9648			
98	1.010	9.5183	7.9328	5.9500	4.7608	3.9679	2.9769	2.3824	1.9860			
99	1.010	9.6171	8.0152	6.0118	4.8102	4.0091	3.0078	2.4071	2.0066			
100	1.010	9.7184	8.0995	6.0750	4.8608	4.0513	3.0394	2.4324	2.0277			

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45 DEG PRESSURE ANGLE

TABLE 95—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 6, INTERNAL INVOLUTE SPLINES

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_i / K_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
6	1.390	0.3059	0.2558	0.1928	0.1551	0.1297	0.0982	0.0795	0.0669			
7	1.238	0.3935	0.3287	0.2473	0.1986	0.1661	0.1255	0.1012	0.0850			
8	1.208	0.5102	0.4259	0.3203	0.2571	0.2146	0.1619	0.1303	0.1092			
9	1.152	0.5991	0.5000	0.3758	0.3014	0.2516	0.1896	0.1525	0.1276			
10	1.144	0.7122	0.5943	0.4465	0.3579	0.2987	0.2249	0.1807	0.1512			
11	1.113	0.8026	0.6696	0.5030	0.4032	0.3364	0.2532	0.2033	0.1700	0.1279	0.1029	0.0653
12	1.110	0.9134	0.7619	0.5722	0.4585	0.3825	0.2877	0.2310	0.1931	0.1452	0.1167	0.0739
13	1.090	1.0050	0.8382	0.6294	0.5043	0.4206	0.3163	0.2539	0.2121	0.1596	0.1283	0.0811
14	1.089	1.1141	0.9292	0.6976	0.5588	0.4662	0.3505	0.2812	0.2350	0.1767	0.1419	0.0897
15	1.075	1.2068	1.0064	0.7556	0.6052	0.5047	0.3794	0.3044	0.2542	0.1911	0.1534	0.0969
16	1.075	1.3147	1.0963	0.8230	0.6592	0.5497	0.4132	0.3313	0.2767	0.2080	0.1669	0.1053
17	1.065	1.4081	1.1741	0.8814	0.7058	0.5886	0.4423	0.3547	0.2961	0.2225	0.1786	0.1126
18	1.064	1.5152	1.2634	0.9483	0.7593	0.6333	0.4759	0.3815	0.3185	0.2394	0.1921	0.1209
19	1.057	1.6092	1.3417	1.0071	0.8064	0.6724	0.5052	0.4050	0.3381	0.2540	0.2038	0.1284
20	1.057	1.7156	1.4304	1.0735	0.8596	0.7167	0.5384	0.4316	0.3603	0.2706	0.2171	0.1367
21	1.051	1.8101	1.5092	1.1326	0.9068	0.7561	0.5680	0.4552	0.3799	0.2854	0.2289	0.1440
22	1.051	1.9158	1.5973	1.1987	0.9597	0.8003	0.6011	0.4817	0.4021	0.3020	0.2422	0.1523
23	1.046	2.0109	1.6765	1.2581	1.0073	0.8398	0.6308	0.5054	0.4218	0.3168	0.2541	0.1597
24	1.046	2.1161	1.7642	1.3239	1.0599	0.8837	0.6637	0.5318	0.4438	0.3333	0.2672	0.1680
25	1.042	2.2114	1.8437	1.3835	1.1075	0.9234	0.6934	0.5556	0.4636	0.3482	0.2791	
26	1.042	2.3164	1.9311	1.4491	1.1601	0.9672	0.7263	0.5819	0.4855	0.3645	0.2922	
27	1.038	2.4120	2.0108	1.5089	1.2079	1.0070	0.7562	0.6058	0.5055	0.3796	0.3043	
28	1.038	2.5166	2.0980	1.5742	1.2601	1.0505	0.7888	0.6319	0.5272	0.3959		
29	1.035	2.6126	2.1779	1.6341	1.3081	1.0906	0.8189	0.6560	0.5473	0.4109		
30	1.035	2.7167	2.2647	1.6993	1.3603	1.1340	0.8515	0.6820	0.5690	0.4272		
31	1.033	2.8130	2.3450	1.7594	1.4084	1.1741	0.8815	0.7061	0.5891	0.4423		
32	1.033	2.9169	2.4316	1.8244	1.4603	1.2174	0.9140	0.7321	0.6107			
33	1.031	3.0133	2.5119	1.8846	1.5085	1.2577	0.9442	0.7563	0.6309			
34	1.031	3.1171	2.5984	1.9495	1.5605	1.3009	0.9766	0.7822	0.6525			
35	1.029	3.2137	2.6789	2.0099	1.6088	1.3411	1.0068	0.8063	0.6726			
36	1.029	3.3173	2.7653	2.0746	1.6605	1.3842	1.0391	0.8322	0.6942			
37	1.027	3.4141	2.8459	2.1351	1.7089	1.4246	1.0695	0.8565	0.7144			
38	1.027	3.5174	2.9320	2.1997	1.7606	1.4677	1.1018	0.8823	0.7359			
39	1.026	3.6144	3.0129	2.2603	1.8091	1.5081	1.1321	0.9065	0.7561			
40	1.026	3.7175	3.0988	2.3248	1.8607	1.5510	1.1643	0.9323	0.7776			
41	1.024	3.8147	3.1798	2.3855	1.9093	1.5916	1.1947	0.9567	0.7979			
42	1.024	3.9177	3.2656	2.4499	1.9608	1.6345	1.2269	0.9824	0.8194			
43	1.023	4.0149	3.3466	2.5107	2.0094	1.6750	1.2573	1.0067	0.8396			
44	1.023	4.1178	3.4324	2.5749	2.0608	1.7179	1.2895	1.0325	0.8612			
45	1.022	4.2152	3.5135	2.6359	2.1096	1.7585	1.3199	1.0569	0.8814			
46	1.022	4.3179	3.5991	2.7001	2.1609	1.8013	1.3520	1.0825	0.9028			
47	1.021	4.4154	3.6804	2.7610	2.2096	1.8419	1.3825	1.1069	0.9231			
48	1.021	4.5180	3.7659	2.8251	2.2609	1.8847	1.4146	1.1327	0.9446			
49	1.020	4.6157	3.8473	2.8861	2.3098	1.9254	1.4451	1.1570	0.9649			
50	1.020	4.7181	3.9327	2.9502	2.3611	1.9681	1.4771	1.1827	0.9863			
51	1.019	4.8158	4.0141	3.0112	2.4099	2.0088	1.5076	1.2071	1.0066			
52	1.019	4.9183	4.0995	3.0752	2.4611	2.0515	1.5397	1.2328	1.0281			
53	1.019	5.0160	4.1810	3.1364	2.5100	2.0923	1.5703	1.2572	1.0484			
54	1.019	5.1183	4.2662	3.2003	2.5612	2.1349	1.6023	1.2828	1.0697			
55	1.018	5.2162	4.3478	3.2615	2.6101	2.1756	1.6328	1.3072	1.0901			
56	1.018	5.3184	4.4330	3.3255	2.6613	2.2183	1.6649	1.3329	1.1115			
57	1.017	5.4164	4.5147	3.3866	2.7102	2.2591	1.6954	1.3574	1.1319			
58	1.017	5.5186	4.5998	3.4505	2.7613	2.3017	1.7274	1.3829	1.1532			
59	1.017	5.6165	4.6814	3.5117	2.8103	2.3425	1.7580	1.4074	1.1736			
60	1.017	5.7187	4.7666	3.5756	2.8614	2.3851	1.7900	1.4330	1.1949			

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45 DEG PRESSURE ANGLE

TABLE 95—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 6, INTERNAL INVOLUTE SPLINES (Cont.)

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	K_i \ d_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
61	1.016	5.8167	4.8483	3.6369	2.9104	2.4260	1.8206	1.4575	1.2154			
62	1.016	5.9187	4.9333	3.7006	2.9614	2.4685	1.8525	1.4830	1.2366			
63	1.016	6.0169	5.0151	3.7619	3.0105	2.5094	1.8832	1.5076	1.2571			
64	1.016	6.1188	5.1000	3.8257	3.0615	2.5519	1.9151	1.5331	1.2784			
65	1.015	6.2171	5.1819	3.8871	3.1106	2.5928	1.9458	1.5576	1.2988			
66	1.015	6.3190	5.2668	3.9507	3.1616	2.6352	1.9776	1.5831	1.3200			
67	1.015	6.4172	5.3487	4.0121	3.2107	2.6763	2.0084	1.6078	1.3406			
68	1.015	6.5191	5.4336	4.0758	3.2617	2.7187	2.0402	1.6332	1.3618			
69	1.014	6.6173	5.5155	4.1372	3.3108	2.7596	2.0709	1.6578	1.3823			
70	1.014	6.7191	5.6003	4.2009	3.3617	2.8020	2.1027	1.6832	1.4035			
71	1.014	6.8175	5.6823	4.2623	3.4108	2.8431	2.1335	1.7079	1.4241			
72	1.014	6.9192	5.7671	4.3260	3.4618	2.8855	2.1653	1.7333	1.4453			
73	1.013	7.0177	5.8491	4.3874	3.5110	2.9264	2.1960	1.7579	1.4657			
74	1.013	7.1193	5.9339	4.4510	3.5618	2.9688	2.2278	1.7833	1.4869			
75	1.013	7.2177	6.0158	4.5126	3.6111	3.0099	2.2587	1.8080	1.5075			
76	1.013	7.3194	6.1006	4.5761	3.6619	3.0522	2.2904	1.8334	1.5287			
77	1.013	7.4179	6.1827	4.6376	3.7111	3.0932	2.3212	1.8580	1.5492			
78	1.013	7.5195	6.2673	4.7011	3.7619	3.1357	2.3530	1.8835	1.5705			
79	1.012	7.6180	6.3495	4.7627	3.8112	3.1767	2.3838	1.9081	1.5910			
80	1.012	7.7196	6.4341	4.8262	3.8620	3.2190	2.4155	1.9335	1.6121			
81	1.012	7.8182	6.5163	4.8878	3.9113	3.2601	2.4463	1.9582	1.6327			
82	1.012	7.9197	6.6009	4.9512	3.9620	3.3025	2.4781	1.9836	1.6539			
83	1.012	8.0182	6.6830	5.0129	4.0114	3.3435	2.5089	2.0083	1.6744			
84	1.012	8.1198	6.7676	5.0763	4.0621	3.3858	2.5406	2.0336	1.6956			
85	1.011	8.2184	6.8498	5.1379	4.1114	3.4269	2.5714	2.0583	1.7161			
86	1.011	8.3199	6.9344	5.2013	4.1621	3.4692	2.6032	2.0837	1.7373			
87	1.011	8.4185	7.0166	5.2630	4.2115	3.5103	2.6340	2.1084	1.7579			
88	1.011	8.5199	7.1011	5.3264	4.2622	3.5526	2.6657	2.1337	1.7790			
89	1.011	8.6187	7.1834	5.3881	4.3116	3.5937	2.6966	2.1584	1.7996			
90	1.011	8.7200	7.2679	5.4515	4.3623	3.6360	2.7283	2.1838	1.8208			
91	1.011	8.8187	7.3501	5.5132	4.4117	3.6771	2.7592	2.2085	1.8413			
92	1.011	8.9201	7.4346	5.5765	4.4623	3.7193	2.7908	2.2338	1.8624			
93	1.010	9.0188	7.5169	5.6382	4.5117	3.7606	2.8218	2.2586	1.8831			
94	1.010	9.1203	7.6014	5.7016	4.5624	3.8028	2.8534	2.2839	1.9042			
95	1.010	9.2190	7.6837	5.7633	4.6118	3.8439	2.8843	2.3086	1.9248			
96	1.010	9.3203	7.7681	5.8267	4.6625	3.8861	2.9159	2.3339	1.9459			
97	1.010	9.4191	7.8505	5.8884	4.7118	3.9274	2.9469	2.3587	1.9666			
98	1.010	9.5204	7.9349	5.9518	4.7626	3.9696	2.9786	2.3841	1.9876			
99	1.010	9.6191	8.0172	6.0135	4.8119	4.0107	3.0094	2.4087	2.0082			
100	1.010	9.7205	8.1016	6.0768	4.8626	4.0529	3.0411	2.4341	2.0293			

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45 DEG PRESSURE ANGLE

TABLE 96—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 7, INTERNAL INVOLUTE SPLINES

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	K_i \ d_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
6	1.390	0.3080	0.2579	0.1948	0.1570	0.1315	0.1000	0.0812	0.0686			
7	1.238	0.3955	0.3307	0.2493	0.2006	0.1677	0.1271	0.1028	0.0866			
8	1.208	0.5121	0.4278	0.3221	0.2588	0.2163	0.1635	0.1320	0.1108			
9	1.152	0.6010	0.5019	0.3775	0.3031	0.2532	0.1911	0.1540	0.1292			
10	1.144	0.7140	0.5961	0.4483	0.3597	0.3003	0.2265	0.1824	0.1528			
11	1.113	0.8045	0.6714	0.5047	0.4048	0.3379	0.2547	0.2048	0.1716	0.1293	0.1043	0.0665
12	1.110	0.9152	0.7637	0.5740	0.4603	0.3841	0.2894	0.2326	0.1947	0.1466	0.1181	0.0752
13	1.090	1.0068	0.8401	0.6312	0.5060	0.4222	0.3179	0.2555	0.2137	0.1609	0.1295	0.0823
14	1.089	1.1161	0.9311	0.6994	0.5606	0.4677	0.3520	0.2827	0.2365	0.1779	0.1432	0.0909
15	1.075	1.2086	1.0082	0.7573	0.6069	0.5063	0.3810	0.3059	0.2558	0.1925	0.1548	0.0981
16	1.075	1.3166	1.0983	0.8247	0.6609	0.5513	0.4148	0.3329	0.2783	0.2093	0.1683	0.1065
17	1.065	1.4100	1.1760	0.8831	0.7075	0.5902	0.4439	0.3562	0.2977	0.2239	0.1799	0.1138
18	1.064	1.5171	1.2653	0.9501	0.7611	0.6349	0.4775	0.3831	0.3201	0.2407	0.1934	0.1223
19	1.057	1.6111	1.3436	1.0088	0.8081	0.6740	0.5068	0.4066	0.3397	0.2554	0.2051	0.1296
20	1.057	1.7175	1.4323	1.0753	0.8614	0.7184	0.5401	0.4332	0.3619	0.2720	0.2184	0.1379
21	1.051	1.8120	1.5111	1.1344	0.9086	0.7578	0.5696	0.4569	0.3816	0.2868	0.2303	0.1453
22	1.051	1.9178	1.5993	1.2005	0.9615	0.8018	0.6027	0.4833	0.4036	0.3034	0.2436	0.1536
23	1.046	2.0128	1.6784	1.2599	1.0090	0.8415	0.6324	0.5071	0.4235	0.3182	0.2554	0.1610
24	1.046	2.1181	1.7662	1.3257	1.0617	0.8853	0.6653	0.5334	0.4454	0.3347	0.2687	0.1693
25	1.042	2.2135	1.8457	1.3853	1.1094	0.9251	0.6952	0.5573	0.4654	0.3496	0.2806	
26	1.042	2.3184	1.9331	1.4508	1.1618	0.9688	0.7280	0.5835	0.4872	0.3660	0.2937	
27	1.038	2.4141	2.0129	1.5106	1.2096	1.0087	0.7578	0.6074	0.5071	0.3810	0.3057	
28	1.038	2.5186	2.1000	1.5760	1.2620	1.0523	0.7906	0.6337	0.5290	0.3974		
29	1.035	2.6146	2.1800	1.6360	1.3099	1.0923	0.8206	0.6576	0.5490	0.4123		
30	1.035	2.7188	2.2668	1.7011	1.3620	1.1357	0.8531	0.6837	0.5707	0.4287		
31	1.033	2.8151	2.3471	1.7613	1.4102	1.1758	0.8833	0.7078	0.5908	0.4437		
32	1.033	2.9190	2.4337	1.8262	1.4622	1.2191	0.9157	0.7338	0.6124			
33	1.031	3.0155	2.5141	1.8866	1.5105	1.2594	0.9460	0.7580	0.6326			
34	1.031	3.1192	2.6005	1.9514	1.5623	1.3026	0.9784	0.7839	0.6542			
35	1.029	3.2159	2.6811	2.0118	1.6106	1.3429	1.0085	0.8081	0.6743			
36	1.029	3.3193	2.7673	2.0765	1.6624	1.3861	1.0410	0.8340	0.6960			
37	1.027	3.4162	2.8481	2.1370	1.7108	1.4264	1.0712	0.8582	0.7162			
38	1.027	3.5196	2.9342	2.2016	1.7625	1.4694	1.1035	0.8840	0.7377			
39	1.026	3.6165	3.0150	2.2623	1.8110	1.5099	1.1339	0.9084	0.7580			
40	1.026	3.7198	3.1011	2.3267	1.8626	1.5529	1.1661	0.9342	0.7794			
41	1.024	3.8169	3.1820	2.3875	1.9112	1.5934	1.1965	0.9585	0.7998			
42	1.024	3.9199	3.2679	2.4518	1.9627	1.6363	1.2287	0.9843	0.8212			
43	1.023	4.0171	3.3489	2.5126	2.0113	1.6768	1.2591	1.0086	0.8415			
44	1.023	4.1201	3.4347	2.5770	2.0628	1.7198	1.2913	1.0344	0.8630			
45	1.022	4.2174	3.5158	2.6378	2.1115	1.7603	1.3218	1.0587	0.8833			
46	1.022	4.3202	3.6015	2.7020	2.1629	1.8031	1.3538	1.0844	0.9047			
47	1.021	4.4177	3.6827	2.7630	2.2117	1.8438	1.3844	1.1088	0.9251			
48	1.021	4.5204	3.7683	2.8271	2.2630	1.8866	1.4165	1.1345	0.9464			
49	1.020	4.6179	3.8496	2.8882	2.3118	1.9273	1.4470	1.1590	0.9669			
50	1.020	4.7205	3.9351	2.9522	2.3631	1.9700	1.4791	1.1846	0.9882			
51	1.019	4.8182	4.0165	3.0133	2.4119	2.0107	1.5096	1.2090	1.0085			
52	1.019	4.9206	4.1019	3.0774	2.4632	2.0535	1.5417	1.2347	1.0300			
53	1.019	5.0184	4.1834	3.1384	2.5121	2.0942	1.5722	1.2591	1.0503			
54	1.019	5.1208	4.2686	3.2025	2.5633	2.1369	1.6043	1.2848	1.0718			
55	1.018	5.2187	4.3503	3.2636	2.6122	2.1777	1.6348	1.3093	1.0921			
56	1.018	5.3209	4.4354	3.3275	2.6633	2.2203	1.6668	1.3348	1.1134			
57	1.017	5.4189	4.5171	3.3888	2.7124	2.2611	1.6975	1.3594	1.1339			
58	1.017	5.5210	4.6022	3.4526	2.7634	2.3037	1.7294	1.3849	1.1552			
59	1.017	5.6191	4.6840	3.5138	2.8124	2.3445	1.7600	1.4094	1.1756			
60	1.017	5.7211	4.7690	3.5777	2.8636	2.3871	1.7920	1.4350	1.1970			

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45 DEG PRESSURE ANGLE

TABLE 96—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 7, INTERNAL INVOLUTE SPLINES (Cont.)

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	K_i \ d_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
61	1.016	5.8192	4.8508	3.6390	2.9126	2.4280	1.8226	1.4595	1.2174			
62	1.016	5.9213	4.9358	3.7028	2.9637	2.4706	1.8546	1.4851	1.2387			
63	1.016	6.0194	5.0176	3.7641	3.0127	2.5114	1.8853	1.5096	1.2592			
64	1.016	6.1215	5.1027	3.8278	3.0637	2.5539	1.9171	1.5351	1.2804			
65	1.015	6.2196	5.1845	3.8893	3.1128	2.5949	1.9479	1.5598	1.3009			
66	1.015	6.3216	5.2695	3.9530	3.1638	2.6374	1.9797	1.5852	1.3222			
67	1.015	6.4198	5.3513	4.0143	3.2129	2.6783	2.0104	1.6098	1.3426			
68	1.015	6.5217	5.4362	4.0781	3.2639	2.7208	2.0423	1.6353	1.3639			
69	1.014	6.6200	5.5181	4.1395	3.3130	2.7617	2.0730	1.6599	1.3844			
70	1.014	6.7218	5.6030	4.2032	3.3640	2.8042	2.1049	1.6854	1.4057			
71	1.014	6.8201	5.6849	4.2646	3.4131	2.8452	2.1356	1.7100	1.4262			
72	1.014	6.9219	5.7698	4.3282	3.4640	2.8876	2.1674	1.7354	1.4474			
73	1.013	7.0203	5.8518	4.3898	3.5133	2.9287	2.1983	1.7601	1.4680			
74	1.013	7.1221	5.9366	4.4533	3.5641	2.9710	2.2300	1.7855	1.4891			
75	1.013	7.2205	6.0187	4.5149	3.6134	3.0121	2.2609	1.8102	1.5097			
76	1.013	7.3222	6.1034	4.5784	3.6642	3.0545	2.2926	1.8356	1.5309			
77	1.013	7.4207	6.1855	4.6399	3.7134	3.0955	2.3234	1.8603	1.5514			
78	1.013	7.5223	6.2701	4.7035	3.7643	3.1379	2.3552	1.8857	1.5727			
79	1.012	7.6209	6.3523	4.7651	3.8136	3.1789	2.3860	1.9104	1.5932			
80	1.012	7.7224	6.4369	4.8285	3.8643	3.2212	2.4177	1.9358	1.6144			
81	1.012	7.8210	6.5191	4.8902	3.9137	3.2624	2.4486	1.9605	1.6350			
82	1.012	7.9225	6.6037	4.9536	3.9644	3.3047	2.4804	1.9859	1.6561			
83	1.012	8.0212	6.6859	5.0153	4.0138	3.3458	2.5112	2.0106	1.6767			
84	1.012	8.1226	6.7705	5.0787	4.0645	3.3881	2.5430	2.0360	1.6979			
85	1.011	8.2213	6.8527	5.1403	4.1138	3.4292	2.5738	2.0606	1.7184			
86	1.011	8.3227	6.9373	5.2038	4.1647	3.4716	2.6056	2.0861	1.7397			
87	1.011	8.4214	7.0195	5.2655	4.2140	3.5126	2.6364	2.1107	1.7602			
88	1.011	8.5230	7.1041	5.3289	4.2647	3.5549	2.6681	2.1361	1.7813			
89	1.011	8.6216	7.1863	5.3906	4.3141	3.5961	2.6990	2.1608	1.8020			
90	1.011	8.7231	7.2709	5.4540	4.3648	3.6383	2.7307	2.1862	1.8231			
91	1.011	8.8217	7.3531	5.5157	4.4142	3.6795	2.7616	2.2109	1.8437			
92	1.011	8.9232	7.4377	5.5791	4.4649	3.7218	2.7933	2.2363	1.8649			
93	1.010	9.0219	7.5199	5.6407	4.5142	3.7629	2.8241	2.2609	1.8854			
94	1.010	9.1233	7.6045	5.7042	4.5650	3.8052	2.8559	2.2864	1.9066			
95	1.010	9.2220	7.6867	5.7659	4.6143	3.8463	2.8867	2.3110	1.9272			
96	1.010	9.3234	7.7712	5.8292	4.6650	3.8885	2.9184	2.3364	1.9483			
97	1.010	9.4221	7.8535	5.8910	4.7144	3.9298	2.9493	2.3612	1.9690			
98	1.010	9.5235	7.9380	5.9543	4.7651	3.9720	2.9810	2.3865	1.9901			
99	1.010	9.6223	8.0203	6.0161	4.8146	4.0132	3.0119	2.4113	2.0107			
100	1.010	9.7236	8.1048	6.0794	4.8652	4.0554	3.0436	2.4366	2.0318			

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45 DEG PRESSURE ANGLE

TABLE 97—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 4, EXTERNAL INVOLUTE SPLINES

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_e / K_e	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
6	0.872	0.9147	0.7620	0.5711	0.4565	0.3804	0.2849	0.2277	0.1895			
7	0.861	0.9950	0.8289	0.6214	0.4967	0.4138	0.3100	0.2477	0.2062			
8	0.893	1.1165	0.9302	0.6973	0.5575	0.4644	0.3479	0.2781	0.2314			
9	0.887	1.2016	1.0011	0.7505	0.6000	0.4999	0.3745	0.2993	0.2492			
10	0.908	1.3177	1.0978	0.8231	0.6581	0.5483	0.4108	0.3284	0.2734			
11	0.904	1.4057	1.1711	0.8780	0.7020	0.5849	0.4383	0.3504	0.2917	0.2186	0.1745	0.1087
12	0.919	1.5186	1.2652	0.9485	0.7584	0.6320	0.4735	0.3786	0.3152	0.2362	0.1886	0.1175
13	0.917	1.6086	1.3402	1.0048	0.8034	0.6694	0.5017	0.4011	0.3339	0.2503	0.1999	0.1245
14	0.928	1.7193	1.4325	1.0740	0.8588	0.7155	0.5361	0.4286	0.3569	0.2676	0.2137	0.1331
15	0.926	1.8106	1.5085	1.1311	0.9045	0.7536	0.5647	0.4515	0.3759	0.2818	0.2251	0.1403
16	0.935	1.9198	1.5995	1.1993	0.9590	0.7990	0.5988	0.4788	0.3987	0.2989	0.2388	0.1488
17	0.934	2.0122	1.6765	1.2571	1.0053	0.8376	0.6277	0.5019	0.4179	0.3133	0.2503	0.1560
18	0.941	2.1202	1.7665	1.3246	1.0593	0.8826	0.6614	0.5289	0.4404	0.3301	0.2637	0.1644
19	0.940	2.2135	1.8442	1.3828	1.1058	0.9214	0.6906	0.5522	0.4599	0.3447	0.2754	0.1716
20	0.945	2.3205	1.9334	1.4497	1.1593	0.9660	0.7241	0.5790	0.4822	0.3614	0.2888	0.1800
21	0.945	2.4144	2.0117	1.5084	1.2063	1.0052	0.7534	0.6024	0.5017	0.3761	0.3005	0.1873
22	0.950	2.5208	2.1003	1.5749	1.2595	1.0494	0.7865	0.6289	0.5238	0.3927	0.3138	0.1956
23	0.949	2.6152	2.1790	1.6339	1.3067	1.0888	0.8161	0.6526	0.5435	0.4075	0.3256	0.2030
24	0.953	2.7210	2.2672	1.7001	1.3596	1.1328	0.8491	0.6790	0.5655	0.4240	0.3388	0.2113
25	0.953	2.8159	2.3462	1.7594	1.4071	1.1724	0.8788	0.7027	0.5853	0.4388	0.3507	
26	0.956	2.9212	2.4339	1.8251	1.4596	1.2163	0.9117	0.7290	0.6072	0.4553	0.3639	
27	0.956	3.0165	2.5134	1.8847	1.5073	1.2560	0.9415	0.7529	0.6271	0.4701	0.3757	
28	0.959	3.1214	2.6008	1.9502	1.5597	1.2997	0.9742	0.7791	0.6489	0.4865		
29	0.959	3.2170	2.6805	2.0100	1.6075	1.3394	1.0040	0.8029	0.6688	0.5014		
30	0.961	3.3215	2.7676	2.0753	1.6598	1.3830	1.0367	0.8290	0.6905	0.5177		
31	0.961	3.4174	2.8474	2.1353	1.7078	1.4229	1.0667	0.8530	0.7105	0.5327		
32	0.963	3.5216	2.9343	2.2004	1.7599	1.4664	1.0992	0.8791	0.7322			
33	0.963	3.6178	3.0144	2.2605	1.8080	1.5064	1.1293	0.9031	0.7523			
34	0.965	3.7217	3.1011	2.3254	1.8598	1.5498	1.1618	0.9291	0.7739			
35	0.965	3.8181	3.1814	2.3857	1.9080	1.5899	1.1919	0.9532	0.7940			
36	0.967	3.9217	3.2677	2.4505	1.9599	1.6331	1.2243	0.9791	0.8156			
37	0.967	4.0183	3.3482	2.5109	2.0082	1.6733	1.2544	1.0032	0.8356			
38	0.968	4.1218	3.4345	2.5755	2.0600	1.7164	1.2868	1.0291	0.8572			
39	0.968	4.2186	3.5151	2.6360	2.1083	1.7567	1.3170	1.0533	0.8774			
40	0.970	4.3219	3.6012	2.7006	2.1600	1.7998	1.3493	1.0791	0.8989			
41	0.970	4.4188	3.6819	2.7611	2.2084	1.8402	1.3796	1.1033	0.9191			
42	0.971	4.5219	3.7679	2.8256	2.2599	1.8832	1.4118	1.1291	0.9406			
43	0.971	4.6190	3.8488	2.8862	2.3085	1.9236	1.4422	1.1534	0.9608			
44	0.972	4.7220	3.9346	2.9506	2.3600	1.9664	1.4742	1.1790	0.9821			
45	0.972	4.8192	4.0156	3.0114	2.4086	2.0069	1.5046	1.2033	1.0024			
46	0.973	4.9220	4.1012	3.0757	2.4600	2.0498	1.5368	1.2290	1.0238			
47	0.973	5.0193	4.1824	3.1365	2.5087	2.0904	1.5672	1.2534	1.0441			
48	0.974	5.1221	4.2680	3.2006	2.5600	2.1332	1.5993	1.2791	1.0655			
49	0.974	5.2195	4.3492	3.2615	2.6087	2.1738	1.6297	1.3034	1.0858			
50	0.975	5.3221	4.4347	3.3256	2.6600	2.2165	1.6618	1.3291	1.1072			
51	0.975	5.4196	4.5159	3.3866	2.7088	2.2572	1.6923	1.3535	1.1275			
52	0.976	5.5221	4.6013	3.4507	2.7600	2.2998	1.7242	1.3790	1.1488			
53	0.976	5.6197	4.6827	3.5117	2.8088	2.3405	1.7547	1.4034	1.1691			
54	0.977	5.7221	4.7680	3.5757	2.8600	2.3831	1.7867	1.4290	1.1904			
55	0.977	5.8199	4.8495	3.6368	2.9089	2.4239	1.8173	1.4534	1.2108			
56	0.978	5.9222	4.9347	3.7007	2.9600	2.4665	1.8493	1.4790	1.2321			
57	0.978	6.0199	5.0161	3.7618	3.0089	2.5072	1.8798	1.5035	1.2525			
58	0.979	6.1222	5.1013	3.8257	3.0600	2.5498	1.9118	1.5290	1.2738			
59	0.979	6.2200	5.1829	3.8869	3.1089	2.5905	1.9423	1.5534	1.2941			
60	0.979	6.3222	5.2680	3.9507	3.1600	2.6331	1.9742	1.5789	1.3154			

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45 DEG PRESSURE ANGLE

TABLE 97—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 4, EXTERNAL INVOLUTE SPLINES (Cont.)

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	K_e \ d_e	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
61	0.979	6.4202	5.3497	4.0119	3.2090	2.6739	2.0048	1.6034	1.3358			
62	0.980	6.5221	5.4346	4.0757	3.2600	2.7164	2.0367	1.6289	1.3570			
63	0.980	6.6202	5.5163	4.1369	3.3090	2.7573	2.0673	1.6534	1.3775			
64	0.980	6.7222	5.6013	4.2007	3.3600	2.7998	2.0992	1.6790	1.3987			
65	0.980	6.8203	5.6831	4.2620	3.4090	2.8407	2.1299	1.7035	1.4192			
66	0.981	6.9222	5.7680	4.3257	3.4600	2.8830	2.1616	1.7289	1.4403			
67	0.981	7.0203	5.8497	4.3870	3.5091	2.9239	2.1923	1.7534	1.4607			
68	0.981	7.1222	5.9346	4.4507	3.5600	2.9664	2.2241	1.7789	1.4820			
69	0.981	7.2204	6.0165	4.5121	3.6091	3.0073	2.2548	1.8034	1.5024			
70	0.982	7.3222	6.1013	4.5757	3.6600	3.0497	2.2866	1.8289	1.5236			
71	0.982	7.4204	6.1832	4.6370	3.7090	3.0907	2.3173	1.8534	1.5441			
72	0.982	7.5221	6.2679	4.7007	3.7599	3.1331	2.3491	1.8789	1.5653			
73	0.982	7.6204	6.3498	4.7621	3.8091	3.1740	2.3799	1.9035	1.5858			
74	0.983	7.7222	6.4346	4.8257	3.8599	3.2163	2.4116	1.9288	1.6069			
75	0.983	7.8205	6.5166	4.8871	3.9091	3.2573	2.4423	1.9534	1.6274			
76	0.983	7.9222	6.6013	4.9507	3.9600	3.2997	2.4741	1.9788	1.6486			
77	0.983	8.0205	6.6832	5.0122	4.0092	3.3407	2.5048	2.0034	1.6691			
78	0.984	8.1221	6.7679	5.0756	4.0599	3.3830	2.5366	2.0288	1.6902			
79	0.984	8.2205	6.8499	5.1371	4.1091	3.4240	2.5673	2.0534	1.7107			
80	0.984	8.3221	6.9346	5.2006	4.1599	3.4664	2.5991	2.0788	1.7319			
81	0.984	8.4206	7.0166	5.2622	4.2091	3.5073	2.6298	2.1033	1.7523			
82	0.984	8.5222	7.1013	5.3256	4.2599	3.5496	2.6615	2.1287	1.7735			
83	0.984	8.6206	7.1833	5.3872	4.3091	3.5906	2.6923	2.1533	1.7940			
84	0.985	8.7221	7.2679	5.4506	4.3599	3.6329	2.7240	2.1787	1.8151			
85	0.985	8.8206	7.3500	5.5121	4.4091	3.6740	2.7548	2.2034	1.8357			
86	0.985	8.9221	7.4345	5.5756	4.4598	3.7163	2.7865	2.2287	1.8568			
87	0.985	9.0207	7.5167	5.6372	4.5091	3.7574	2.8173	2.2534	1.8773			
88	0.985	9.1220	7.6011	5.7006	4.5598	3.7996	2.8490	2.2787	1.8985			
89	0.985	9.2206	7.6833	5.7622	4.6091	3.8406	2.8797	2.3033	1.9189			
90	0.986	9.3220	7.7678	5.8256	4.6598	3.8829	2.9114	2.3286	1.9401			
91	0.986	9.4207	7.8500	5.8872	4.7092	3.9240	2.9422	2.3533	1.9606			
92	0.986	9.5221	7.9345	5.9506	4.7598	3.9662	2.9739	2.3786	1.9817			
93	0.986	9.6206	8.0166	6.0122	4.8091	4.0073	3.0048	2.4033	2.0023			
94	0.986	9.7220	8.1011	6.0755	4.8598	4.0496	3.0364	2.4286	2.0234			
95	0.986	9.8207	8.1833	6.1372	4.9091	4.0907	3.0673	2.4533	2.0440			
96	0.987	9.9220	8.2678	6.2005	4.9598	4.1328	3.0988	2.4786	2.0650			
97	0.987	10.0207	8.3500	6.2622	5.0091	4.1739	3.1297	2.5032	2.0855			
98	0.987	10.1219	8.4343	6.3255	5.0598	4.2161	3.1613	2.5286	2.1066			
99	0.987	10.2207	8.5166	6.3873	5.1091	4.2573	3.1922	2.5532	2.1272			
100	0.987	10.3219	8.6010	6.4504	5.1597	4.2995	3.2238	2.5786	2.1483			

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45 DEG PRESSURE ANGLE

TABLE 98—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 5, EXTERNAL INVOLUTE SPLINES

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_e / K_e	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
6	0.872	0.9140	0.7613	0.5705	0.4559	0.3798	0.2843	0.2271	0.1889			
7	0.861	0.9943	0.8282	0.6208	0.4961	0.4133	0.3094	0.2472	0.2057			
8	0.893	1.1158	0.9294	0.6966	0.5567	0.4638	0.3473	0.2774	0.2308			
9	0.887	1.2009	1.0004	0.7498	0.5993	0.4993	0.3739	0.2987	0.2486			
10	0.908	1.3170	1.0971	0.8223	0.6573	0.5476	0.4101	0.3277	0.2727			
11	0.904	1.4050	1.1704	0.8774	0.7014	0.5843	0.4376	0.3497	0.2911	0.2180	0.1740	0.1082
12	0.919	1.5179	1.2645	0.9479	0.7578	0.6313	0.4729	0.3779	0.3146	0.2357	0.1881	0.1169
13	0.917	1.6077	1.3394	1.0041	0.8028	0.6688	0.5010	0.4004	0.3333	0.2497	0.1993	0.1239
14	0.928	1.7185	1.4316	1.0732	0.8580	0.7148	0.5355	0.4280	0.3563	0.2670	0.2132	0.1326
15	0.926	1.8098	1.5078	1.1303	0.9037	0.7529	0.5641	0.4508	0.3753	0.2813	0.2246	0.1397
16	0.935	1.9190	1.5987	1.1986	0.9583	0.7984	0.5982	0.4781	0.3980	0.2982	0.2381	0.1482
17	0.934	2.0113	1.6757	1.2563	1.0045	0.8369	0.6270	0.5012	0.4173	0.3127	0.2497	0.1554
18	0.941	2.1193	1.7657	1.3238	1.0585	0.8819	0.6608	0.5282	0.4398	0.3295	0.2632	0.1639
19	0.940	2.2126	1.8434	1.3820	1.1050	0.9207	0.6898	0.5514	0.4591	0.3441	0.2748	0.1712
20	0.945	2.3197	1.9326	1.4490	1.1586	0.9653	0.7233	0.5782	0.4814	0.3608	0.2882	0.1794
21	0.945	2.4135	2.0108	1.5077	1.2055	1.0044	0.7526	0.6017	0.5010	0.3755	0.2999	0.1868
22	0.950	2.5199	2.0995	1.5741	1.2587	1.0487	0.7859	0.6283	0.5231	0.3920	0.3131	0.1951
23	0.949	2.6144	2.1782	1.6332	1.3060	1.0881	0.8154	0.6519	0.5428	0.4068	0.3249	0.2024
24	0.953	2.7202	2.2663	1.6992	1.3588	1.1321	0.8484	0.6782	0.5647	0.4233	0.3382	0.2107
25	0.953	2.8150	2.3453	1.7585	1.4062	1.1716	0.8780	0.7020	0.5845	0.4382	0.3500	
26	0.956	2.9203	2.4331	1.8243	1.4589	1.2155	0.9109	0.7283	0.6065	0.4546	0.3632	
27	0.956	3.0156	2.5125	1.8839	1.5065	1.2552	0.9407	0.7521	0.6263	0.4695	0.3751	
28	0.959	3.1204	2.5998	1.9495	1.5589	1.2989	0.9735	0.7783	0.6482	0.4859		
29	0.959	3.2160	2.6795	2.0091	1.6067	1.3387	1.0033	0.8021	0.6680	0.5007		
30	0.961	3.3206	2.7666	2.0745	1.6589	1.3822	1.0359	0.8283	0.6898	0.5170		
31	0.961	3.4165	2.8466	2.1344	1.7069	1.4222	1.0659	0.8522	0.7097	0.5320		
32	0.963	3.5206	2.9333	2.1996	1.7590	1.4656	1.0985	0.8783	0.7314			
33	0.963	3.6168	3.0135	2.2597	1.8071	1.5057	1.1285	0.9023	0.7515			
34	0.965	3.7207	3.1001	2.3246	1.8591	1.5490	1.1610	0.9283	0.7731			
35	0.965	3.8172	3.1804	2.3848	1.9072	1.5891	1.1910	0.9523	0.7931			
36	0.967	3.9208	3.2668	2.4496	1.9590	1.6323	1.2234	0.9783	0.8147			
37	0.967	4.0174	3.3473	2.5100	2.0073	1.6725	1.2536	1.0024	0.8349			
38	0.968	4.1209	3.4335	2.5747	2.0591	1.7156	1.2860	1.0283	0.8564			
39	0.968	4.2176	3.5141	2.6352	2.1075	1.7560	1.3162	1.0525	0.8766			
40	0.970	4.3209	3.6002	2.6996	2.1590	1.7989	1.3484	1.0782	0.8980			
41	0.970	4.4178	3.6810	2.7602	2.2075	1.8393	1.3787	1.1024	0.9182			
42	0.971	4.5210	3.7669	2.8247	2.2591	1.8823	1.4109	1.1282	0.9397			
43	0.971	4.6180	3.8477	2.8854	2.3076	1.9227	1.4413	1.1525	0.9599			
44	0.972	4.7210	3.9335	2.9497	2.3591	1.9657	1.4735	1.1782	0.9814			
45	0.972	4.8182	4.0146	3.0104	2.4076	2.0061	1.5037	1.2024	1.0015			
46	0.973	4.9210	4.1003	3.0747	2.4591	2.0489	1.5359	1.2282	1.0229			
47	0.973	5.0183	4.1813	3.1355	2.5077	2.0895	1.5663	1.2525	1.0432			
48	0.974	5.1210	4.2669	3.1997	2.5591	2.1323	1.5984	1.2782	1.0646			
49	0.974	5.2184	4.3481	3.2606	2.6078	2.1729	1.6289	1.3025	1.0849			
50	0.975	5.3211	4.4336	3.3248	2.6591	2.2156	1.6609	1.3282	1.1063			
51	0.975	5.4185	4.5148	3.3856	2.7078	2.2562	1.6913	1.3525	1.1265			
52	0.976	5.5210	4.6002	3.4497	2.7590	2.2989	1.7233	1.3781	1.1479			
53	0.976	5.6187	4.6816	3.5107	2.8079	2.3396	1.7539	1.4025	1.1682			
54	0.977	5.7210	4.7668	3.5747	2.8591	2.3822	1.7859	1.4281	1.1896			
55	0.977	5.8187	4.8483	3.6358	2.9079	2.4230	1.8164	1.4525	1.2099			
56	0.978	5.9210	4.9336	3.6997	2.9590	2.4655	1.8483	1.4780	1.2311			
57	0.978	6.0188	5.0151	3.7608	3.0079	2.5063	1.8788	1.5025	1.2515			
58	0.979	6.1210	5.1002	3.8247	3.0590	2.5489	1.9108	1.5280	1.2728			
59	0.979	6.2189	5.1817	3.8859	3.1080	2.5896	1.9414	1.5525	1.2932			
60	0.979	6.3210	5.2669	3.9497	3.1590	2.6322	1.9733	1.5780	1.3145			

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45 DEG PRESSURE ANGLE

TABLE 98—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 5, EXTERNAL INVOLUTE SPLINES (Cont.)

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_e / K_e	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
61	0.979	6.4190	5.3485	4.0109	3.2079	2.6729	2.0038	1.6024	1.3348			
62	0.980	6.5210	5.4335	4.0747	3.2590	2.7155	2.0357	1.6280	1.3561			
63	0.980	6.6190	5.5152	4.1359	3.3080	2.7563	2.0663	1.6525	1.3765			
64	0.980	6.7210	5.6002	4.1997	3.3590	2.7988	2.0982	1.6780	1.3977			
65	0.980	6.8190	5.6818	4.2610	3.4080	2.8397	2.1289	1.7025	1.4182			
66	0.981	6.9209	5.7668	4.3246	3.4589	2.8821	2.1606	1.7279	1.4393			
67	0.981	7.0191	5.8485	4.3859	3.5080	2.9229	2.1913	1.7524	1.4598			
68	0.981	7.1210	5.9335	4.4496	3.5589	2.9654	2.2231	1.7779	1.4810			
69	0.981	7.2191	6.0152	4.5110	3.6080	3.0063	2.2538	1.8024	1.5014			
70	0.982	7.3209	6.1001	4.5746	3.6589	3.0487	2.2857	1.8279	1.5227			
71	0.982	7.4192	6.1819	4.6361	3.7081	3.0897	2.3164	1.8525	1.5431			
72	0.982	7.5209	6.2667	4.6996	3.7588	3.1320	2.3481	1.8778	1.5642			
73	0.982	7.6191	6.3486	4.7610	3.8080	3.1730	2.3788	1.9024	1.5847			
74	0.983	7.7209	6.4333	4.8246	3.8589	3.2153	2.4106	1.9278	1.6059			
75	0.983	7.8192	6.5153	4.8860	3.9080	3.2563	2.4413	1.9524	1.6264			
76	0.983	7.9208	6.5999	4.9496	3.9589	3.2987	2.4731	1.9778	1.6476			
77	0.983	8.0192	6.6819	5.0110	4.0080	3.3396	2.5037	2.0023	1.6680			
78	0.984	8.1208	6.7666	5.0745	4.0588	3.3819	2.5355	2.0277	1.6891			
79	0.984	8.2193	6.8486	5.1360	4.1080	3.4229	2.5662	2.0523	1.7096			
80	0.984	8.3208	6.9332	5.1995	4.1588	3.4653	2.5980	2.0777	1.7308			
81	0.984	8.4192	7.0153	5.2611	4.2080	3.5063	2.6288	2.1023	1.7513			
82	0.984	8.5208	7.0999	5.3245	4.2587	3.5485	2.6604	2.1276	1.7724			
83	0.984	8.6193	7.1820	5.3860	4.3080	3.5896	2.6912	2.1523	1.7929			
84	0.985	8.7207	7.2665	5.4495	4.3587	3.6319	2.7229	2.1776	1.8141			
85	0.985	8.8192	7.3486	5.5111	4.4080	3.6729	2.7537	2.2023	1.8346			
86	0.985	8.9207	7.4332	5.5745	4.4587	3.7152	2.7854	2.2276	1.8557			
87	0.985	9.0193	7.5153	5.6360	4.5079	3.7562	2.8161	2.2522	1.8762			
88	0.985	9.1206	7.5998	5.6994	4.5586	3.7984	2.8478	2.2775	1.8973			
89	0.985	9.2193	7.6819	5.7610	4.6079	3.8395	2.8786	2.3022	1.9178			
90	0.986	9.3207	7.7664	5.8244	4.6587	3.8818	2.9103	2.3276	1.9390			
91	0.986	9.4192	7.8485	5.8861	4.7080	3.9229	2.9412	2.3522	1.9595			
92	0.986	9.5206	7.9330	5.9494	4.7587	3.9651	2.9728	2.3776	1.9806			
93	0.986	9.6193	8.0152	6.0110	4.8079	4.0061	3.0036	2.4021	2.0011			
94	0.986	9.7206	8.0997	6.0743	4.8586	4.0484	3.0352	2.4275	2.0222			
95	0.986	9.8192	8.1818	6.1360	4.9079	4.0895	3.0661	2.4521	2.0428			
96	0.987	9.9205	8.2663	6.1993	4.9586	4.1317	3.0977	2.4775	2.0639			
97	0.987	10.0192	8.3485	6.2610	5.0079	4.1728	3.1286	2.5021	2.0844			
98	0.987	10.1205	8.4330	6.3243	5.0585	4.2149	3.1602	2.5274	2.1054			
99	0.987	10.2192	8.5152	6.3860	5.1079	4.2561	3.1910	2.5521	2.1260			
100	0.987	10.3205	8.5995	6.4493	5.1585	4.2983	3.2227	2.5774	2.1471			

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45 DEG PRESSURE ANGLE

TABLE 99—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 6, EXTERNAL INVOLUTE SPLINES

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	K_e \ d_e	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
6	0.872	0.9131	0.7604	0.5697	0.4551	0.3790	0.2835	0.2263	0.1881			
7	0.861	0.9934	0.8273	0.6199	0.4953	0.4124	0.3086	0.2463	0.2048			
8	0.893	1.1148	0.9285	0.6957	0.5558	0.4630	0.3464	0.2766	0.2300			
9	0.887	1.1999	0.9994	0.7489	0.5984	0.4985	0.3731	0.2979	0.2478			
10	0.908	1.3160	1.0961	0.8214	0.6564	0.5468	0.4093	0.3269	0.2719			
11	0.904	1.4040	1.1694	0.8764	0.7004	0.5834	0.4367	0.3488	0.2901	0.2173	0.1733	0.1075
12	0.919	1.5168	1.2634	0.9469	0.7568	0.6304	0.4720	0.3770	0.3136	0.2349	0.1873	0.1162
13	0.917	1.6067	1.3383	1.0031	0.8018	0.6679	0.5001	0.3995	0.3324	0.2489	0.1985	0.1232
14	0.928	1.7174	1.4306	1.0723	0.8571	0.7139	0.5346	0.4271	0.3553	0.2662	0.2123	0.1318
15	0.926	1.8087	1.5067	1.1293	0.9027	0.7520	0.5631	0.4499	0.3744	0.2804	0.2237	0.1390
16	0.935	1.9179	1.5976	1.1975	0.9573	0.7974	0.5972	0.4772	0.3971	0.2975	0.2374	0.1475
17	0.934	2.0103	1.6746	1.2553	1.0035	0.8360	0.6261	0.5003	0.4163	0.3119	0.2489	0.1547
18	0.941	2.1182	1.7645	1.3228	1.0575	0.8809	0.6597	0.5272	0.4387	0.3287	0.2623	0.1631
19	0.940	2.2115	1.8423	1.3810	1.1040	0.9197	0.6885	0.5505	0.4582	0.3433	0.2740	0.1703
20	0.945	2.3185	1.9314	1.4479	1.1575	0.9643	0.7223	0.5772	0.4805	0.3600	0.2873	0.1787
21	0.945	2.4124	2.0097	1.5066	1.2045	1.0035	0.7517	0.6007	0.5000	0.3747	0.2991	0.1860
22	0.950	2.5188	2.0983	1.5731	1.2577	1.0477	0.7848	0.6272	0.5221	0.3912	0.3123	0.1943
23	0.949	2.6132	2.1769	1.6320	1.3048	1.0870	0.8144	0.6508	0.5418	0.4059	0.3241	0.2017
24	0.953	2.7189	2.2651	1.6982	1.3577	1.1311	0.8474	0.6773	0.5638	0.4225	0.3373	0.2098
25	0.953	2.8139	2.3442	1.7575	1.4052	1.1707	0.8771	0.7010	0.5836	0.4373	0.3492	
26	0.956	2.9191	2.4318	1.8232	1.4577	1.2144	0.9099	0.7272	0.6054	0.4537	0.3623	
27	0.956	3.0144	2.5113	1.8828	1.5054	1.2542	0.9397	0.7511	0.6253	0.4685	0.3741	
28	0.959	3.1191	2.5986	1.9483	1.5578	1.2978	0.9724	0.7773	0.6471	0.4849		
29	0.959	3.2148	2.6783	2.0081	1.6056	1.3376	1.0022	0.8011	0.6669	0.4999		
30	0.961	3.3193	2.7654	2.0733	1.6578	1.3811	1.0349	0.8272	0.6887	0.5162		
31	0.961	3.4151	2.8452	2.1333	1.7057	1.4211	1.0649	0.8512	0.7087	0.5311		
32	0.963	3.5194	2.9321	2.1984	1.7578	1.4645	1.0974	0.8772	0.7304			
33	0.963	3.6155	3.0122	2.2585	1.8059	1.5045	1.1274	0.9012	0.7503			
34	0.965	3.7194	3.0987	2.3234	1.8578	1.5478	1.1599	0.9272	0.7720			
35	0.965	3.8158	3.1791	2.3836	1.9060	1.5880	1.1900	0.9513	0.7921			
36	0.967	3.9194	3.2654	2.4484	1.9579	1.6312	1.2224	0.9772	0.8137			
37	0.967	4.0160	3.3459	2.5088	2.0062	1.6714	1.2525	1.0012	0.8337			
38	0.968	4.1195	3.4322	2.5734	2.0578	1.7145	1.2848	1.0271	0.8552			
39	0.968	4.2162	3.5127	2.6339	2.1062	1.7548	1.3151	1.0513	0.8754			
40	0.970	4.3195	3.5988	2.6985	2.1579	1.7978	1.3473	1.0771	0.8969			
41	0.970	4.4165	3.6796	2.7590	2.2062	1.8381	1.3775	1.1013	0.9170			
42	0.971	4.5195	3.7654	2.8234	2.2578	1.8811	1.4098	1.1271	0.9385			
43	0.971	4.6166	3.8464	2.8841	2.3064	1.9216	1.4401	1.1513	0.9587			
44	0.972	4.7195	3.9321	2.9485	2.3578	1.9645	1.4723	1.1771	0.9802			
45	0.972	4.8167	4.0131	3.0091	2.4064	2.0049	1.5026	1.2013	1.0003			
46	0.973	4.9196	4.0988	3.0734	2.4578	2.0477	1.5347	1.2270	1.0218			
47	0.973	5.0168	4.1798	3.1343	2.5065	2.0883	1.5651	1.2513	1.0421			
48	0.974	5.1195	4.2654	3.1985	2.5578	2.1310	1.5971	1.2769	1.0634			
49	0.974	5.2169	4.3465	3.2593	2.6064	2.1716	1.6276	1.3013	1.0837			
50	0.975	5.3195	4.4321	3.3234	2.6577	2.2144	1.6596	1.3269	1.1050			
51	0.975	5.4170	4.5133	3.3844	2.7065	2.2550	1.6901	1.3513	1.1254			
52	0.976	5.5195	4.5987	3.4484	2.7578	2.2976	1.7221	1.3768	1.1466			
53	0.976	5.6171	4.6800	3.5094	2.8065	2.3383	1.7526	1.4012	1.1670			
54	0.977	5.7195	4.7654	3.5734	2.8577	2.3810	1.7846	1.4268	1.1883			
55	0.977	5.8171	4.8467	3.6345	2.9066	2.4217	1.8151	1.4513	1.2086			
56	0.978	5.9195	4.9320	3.6984	2.9577	2.4642	1.8470	1.4768	1.2299			
57	0.978	6.0172	5.0134	3.7594	3.0065	2.5050	1.8776	1.5012	1.2502			
58	0.979	6.1194	5.0986	3.8233	3.0576	2.5476	1.9095	1.5268	1.2715			
59	0.979	6.2173	5.1802	3.8845	3.1066	2.5884	1.9401	1.5512	1.2919			
60	0.979	6.3194	5.2652	3.9483	3.1576	2.6308	1.9719	1.5767	1.3131			

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45 DEG PRESSURE ANGLE

TABLE 99—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 6, EXTERNAL INVOLUTE SPLINES (Cont.)

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_e / K_e	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
61	0.979	6.4173	5.3468	4.0095	3.2065	2.6716	2.0025	1.6012	1.3335			
62	0.980	6.5194	5.4319	4.0733	3.2576	2.7142	2.0344	1.6267	1.3548			
63	0.980	6.6173	5.5135	4.1345	3.3066	2.7549	2.0650	1.6511	1.3751			
64	0.980	6.7193	5.5985	4.1982	3.3575	2.7974	2.0968	1.6766	1.3964			
65	0.980	6.8173	5.6801	4.2595	3.4066	2.8383	2.1275	1.7011	1.4168			
66	0.981	6.9193	5.7651	4.3232	3.4575	2.8808	2.1594	1.7266	1.4380			
67	0.981	7.0174	5.8469	4.3846	3.5066	2.9216	2.1899	1.7510	1.4584			
68	0.981	7.1192	5.9317	4.4482	3.5574	2.9640	2.2218	1.7765	1.4796			
69	0.981	7.2174	6.0135	4.5095	3.6065	3.0049	2.2525	1.8011	1.5001			
70	0.982	7.3192	6.0984	4.5732	3.6575	3.0474	2.2843	1.8265	1.5213			
71	0.982	7.4174	6.1802	4.6346	3.7066	3.0882	2.3149	1.8510	1.5416			
72	0.982	7.5192	6.2650	4.6981	3.7574	3.1306	2.3467	1.8764	1.5628			
73	0.982	7.6174	6.3468	4.7595	3.8065	3.1716	2.3774	1.9010	1.5833			
74	0.983	7.7191	6.4316	4.8231	3.8574	3.2140	2.4092	1.9264	1.6045			
75	0.983	7.8174	6.5135	4.8845	3.9065	3.2548	2.4398	1.9509	1.6249			
76	0.983	7.9190	6.5982	4.9480	3.9573	3.2972	2.4716	1.9763	1.6461			
77	0.983	8.0174	6.6801	5.0095	4.0065	3.3382	2.5023	2.0009	1.6666			
78	0.984	8.1191	6.7648	5.0730	4.0573	3.3805	2.5340	2.0262	1.6877			
79	0.984	8.2174	6.8468	5.1345	4.1064	3.4215	2.5648	2.0508	1.7082			
80	0.984	8.3190	6.9314	5.1980	4.1572	3.4638	2.5965	2.0762	1.7293			
81	0.984	8.4173	7.0134	5.2595	4.2065	3.5048	2.6273	2.1009	1.7498			
82	0.984	8.5189	7.0980	5.3230	4.2572	3.5470	2.6589	2.1262	1.7709			
83	0.984	8.6174	7.1801	5.3844	4.3064	3.5881	2.6897	2.1508	1.7914			
84	0.985	8.7188	7.2646	5.4479	4.3571	3.6304	2.7214	2.1762	1.8126			
85	0.985	8.8174	7.3467	5.5095	4.4064	3.6714	2.7522	2.2008	1.8331			
86	0.985	8.9188	7.4312	5.5729	4.4572	3.7136	2.7838	2.2261	1.8541			
87	0.985	9.0173	7.5133	5.6344	4.5063	3.7547	2.8146	2.2507	1.8747			
88	0.985	9.1188	7.5979	5.6978	4.5571	3.7970	2.8463	2.2761	1.8958			
89	0.985	9.2173	7.6799	5.7594	4.6064	3.8381	2.8772	2.3007	1.9164			
90	0.986	9.3187	7.7645	5.8227	4.6570	3.8802	2.9087	2.3260	1.9374			
91	0.986	9.4173	7.8467	5.8844	4.7063	3.9213	2.9396	2.3506	1.9579			
92	0.986	9.5186	7.9310	5.9477	4.7570	3.9635	2.9713	2.3760	1.9791			
93	0.986	9.6173	8.0133	6.0094	4.8063	4.0046	3.0020	2.4005	1.9995			
94	0.986	9.7185	8.0976	6.0727	4.8569	4.0468	3.0337	2.4259	2.0206			
95	0.986	9.8172	8.1799	6.1343	4.9062	4.0879	3.0645	2.4506	2.0412			
96	0.987	9.9185	8.2643	6.1977	4.9569	4.1301	3.0962	2.4759	2.0623			
97	0.987	10.0172	8.3465	6.2594	5.0063	4.1712	3.1269	2.5005	2.0828			
98	0.987	10.1185	8.4309	6.3226	5.0568	4.2134	3.1586	2.5258	2.1039			
99	0.987	10.2172	8.5132	6.3843	5.1062	4.2545	3.1894	2.5505	2.1244			
100	0.987	10.3184	8.5975	6.4476	5.1568	4.2967	3.2211	2.5758	2.1455			

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45 DEG PRESSURE ANGLE

TABLE 100—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 7, EXTERNAL INVOLUTE SPLINES

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_e / K_e	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
6	0.872	0.9117	0.7590	0.5683	0.4537	0.3778	0.2823	0.2251	0.1869			
7	0.861	0.9920	0.8259	0.6185	0.4939	0.4112	0.3074	0.2451	0.2036			
8	0.893	1.1134	0.9270	0.6943	0.5545	0.4617	0.3452	0.2754	0.2287			
9	0.887	1.1984	0.9979	0.7475	0.5971	0.4972	0.3718	0.2967	0.2465			
10	0.908	1.3145	1.0946	0.8200	0.6550	0.5454	0.4079	0.3255	0.2705			
11	0.904	1.4024	1.1679	0.8750	0.6990	0.5821	0.4354	0.3475	0.2889	0.2161	0.1721	0.1064
12	0.919	1.5153	1.2619	0.9454	0.7553	0.6290	0.4706	0.3756	0.3122	0.2337	0.1861	0.1151
13	0.917	1.6052	1.3368	1.0016	0.8003	0.6665	0.4987	0.3981	0.3310	0.2478	0.1974	0.1222
14	0.928	1.7158	1.4289	1.0708	0.8556	0.7126	0.5333	0.4257	0.3540	0.2650	0.2112	0.1307
15	0.926	1.8071	1.5051	1.1278	0.9012	0.7506	0.5617	0.4485	0.3730	0.2792	0.2225	0.1378
16	0.935	1.9162	1.5959	1.1960	0.9558	0.7960	0.5958	0.4758	0.3957	0.2963	0.2361	0.1463
17	0.934	2.0086	1.6730	1.2538	1.0020	0.8346	0.6247	0.4989	0.4149	0.3107	0.2477	0.1535
18	0.941	2.1165	1.7628	1.3212	1.0559	0.8794	0.6583	0.5258	0.4373	0.3275	0.2611	0.1619
19	0.940	2.2098	1.8406	1.3795	1.1025	0.9183	0.6875	0.5491	0.4567	0.3420	0.2727	0.1692
20	0.945	2.3168	1.9297	1.4463	1.1559	0.9628	0.7208	0.5757	0.4789	0.3587	0.2861	0.1775
21	0.945	2.4107	2.0080	1.5050	1.2029	1.0019	0.7502	0.5992	0.4985	0.3733	0.2977	0.1848
22	0.950	2.5170	2.0965	1.5715	1.2561	1.0463	0.7834	0.6258	0.5206	0.3899	0.3110	0.1930
23	0.949	2.6114	2.1752	1.6304	1.3032	1.0855	0.8128	0.6493	0.5402	0.4047	0.3228	0.2004
24	0.953	2.7171	2.2633	1.6965	1.3561	1.1296	0.8459	0.6757	0.5623	0.4211	0.3359	0.2087
25	0.953	2.8120	2.3424	1.7559	1.4035	1.1691	0.8755	0.6995	0.5820	0.4359	0.3478	
26	0.956	2.9172	2.4300	1.8216	1.4561	1.2129	0.9083	0.7257	0.6039	0.4524	0.3610	
27	0.956	3.0125	2.5094	1.8811	1.5037	1.2526	0.9381	0.7495	0.6237	0.4672	0.3728	
28	0.959	3.1173	2.5967	1.9466	1.5561	1.2962	0.9708	0.7756	0.6455	0.4836		
29	0.959	3.2129	2.6764	2.0064	1.6039	1.3361	1.0007	0.7995	0.6654	0.4985		
30	0.961	3.3174	2.7634	2.0717	1.6561	1.3796	1.0333	0.8257	0.6871	0.5147		
31	0.961	3.4132	2.8433	2.1315	1.7040	1.4195	1.0632	0.8495	0.7070	0.5297		
32	0.963	3.5174	2.9301	2.1967	1.7561	1.4629	1.0958	0.8756	0.7287			
33	0.963	3.6135	3.0102	2.2567	1.8041	1.5029	1.1257	0.8995	0.7487			
34	0.965	3.7175	3.0968	2.3216	1.8561	1.5462	1.1582	0.9255	0.7703			
35	0.965	3.8138	3.1770	2.3819	1.9043	1.5863	1.1883	0.9496	0.7904			
36	0.967	3.9175	3.2635	2.4466	1.9560	1.6295	1.2206	0.9754	0.8119			
37	0.967	4.0140	3.3439	2.5070	2.0043	1.6697	1.2508	0.9996	0.8320			
38	0.968	4.1174	3.4300	2.5717	2.0561	1.7128	1.2832	1.0255	0.8536			
39	0.968	4.2142	3.5107	2.6321	2.1044	1.7531	1.3133	1.0496	0.8737			
40	0.970	4.3174	3.5967	2.6966	2.1560	1.7961	1.3456	1.0754	0.8952			
41	0.970	4.4143	3.6775	2.7571	2.2044	1.8364	1.3758	1.0995	0.9153			
42	0.971	4.5174	3.7633	2.8216	2.2560	1.8794	1.4080	1.1253	0.9368			
43	0.971	4.6145	3.8442	2.8823	2.3045	1.9198	1.4384	1.1496	0.9570			
44	0.972	4.7173	3.9299	2.9465	2.3559	1.9626	1.4704	1.1752	0.9783			
45	0.972	4.8146	4.0110	3.0073	2.4045	2.0031	1.5008	1.1995	0.9986			
46	0.973	4.9173	4.0966	3.0716	2.4559	2.0460	1.5330	1.2252	1.0200			
47	0.973	5.0147	4.1777	3.1323	2.5045	2.0865	1.5633	1.2495	1.0402			
48	0.974	5.1173	4.2632	3.1965	2.5559	2.1293	1.5954	1.2751	1.0616			
49	0.974	5.2147	4.3444	3.2573	2.6045	2.1698	1.6257	1.2994	1.0818			
50	0.975	5.3173	4.4298	3.3215	2.6558	2.2125	1.6578	1.3251	1.1032			
51	0.975	5.4147	4.5110	3.3824	2.7046	2.2532	1.6883	1.3494	1.1235			
52	0.976	5.5172	4.5964	3.4464	2.7557	2.2958	1.7202	1.3750	1.1447			
53	0.976	5.6148	4.6777	3.5074	2.8045	2.3364	1.7507	1.3994	1.1651			
54	0.977	5.7172	4.7630	3.5713	2.8556	2.3790	1.7826	1.4249	1.1863			
55	0.977	5.8148	4.8444	3.6324	2.9045	2.4197	1.8132	1.4493	1.2067			
56	0.978	5.9171	4.9296	3.6963	2.9557	2.4624	1.8451	1.4749	1.2280			
57	0.978	6.0148	5.0110	3.7574	3.0045	2.5030	1.8756	1.4992	1.2483			
58	0.979	6.1171	5.0962	3.8213	3.0556	2.5456	1.9075	1.5248	1.2696			
59	0.979	6.2148	5.1777	3.8825	3.1045	2.5864	1.9381	1.5493	1.2900			
60	0.979	6.3170	5.2628	3.9462	3.1555	2.6289	1.9700	1.5747	1.3111			

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45 DEG PRESSURE ANGLE

TABLE 100—MEASUREMENT OVER PINS FOR MINIMUM ACTUAL TOOTH THICKNESS, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 7, EXTERNAL INVOLUTE SPLINES (Cont.)

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	K_e \ d_e	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
61	0.979	6.4149	5.3444	4.0074	3.2045	2.6697	2.0006	1.5992	1.3316			
62	0.980	6.5169	5.4294	4.0711	3.2554	2.7121	2.0324	1.6246	1.3527			
63	0.980	6.6149	5.5110	4.1324	3.3044	2.7530	2.0630	1.6491	1.3731			
64	0.980	6.7168	5.5959	4.1961	3.3554	2.7955	2.0949	1.6746	1.3944			
65	0.980	6.8149	5.6777	4.2574	3.4044	2.8362	2.1254	1.6990	1.4147			
66	0.981	6.9167	5.7625	4.3211	3.4554	2.8787	2.1573	1.7245	1.4360			
67	0.981	7.0149	5.8443	4.3824	3.5044	2.9196	2.1880	1.7491	1.4564			
68	0.981	7.1167	5.9291	4.4460	3.5553	2.9620	2.2197	1.7744	1.4775			
69	0.981	7.2148	6.0110	4.5074	3.6044	3.0029	2.2504	1.7990	1.4980			
70	0.982	7.3166	6.0957	4.5709	3.6552	3.0452	2.2821	1.8243	1.5191			
71	0.982	7.4148	6.1776	4.6323	3.7043	3.0861	2.3128	1.8489	1.5396			
72	0.982	7.5165	6.2623	4.6959	3.7552	3.1286	2.3446	1.8744	1.5608			
73	0.982	7.6148	6.3442	4.7573	3.8043	3.1694	2.3752	1.8988	1.5812			
74	0.983	7.7164	6.4289	4.8208	3.8551	3.2118	2.4070	1.9243	1.6023			
75	0.983	7.8148	6.5109	4.8823	3.9043	3.2528	2.4378	1.9488	1.6228			
76	0.983	7.9164	6.5955	4.9458	3.9550	3.2950	2.4694	1.9742	1.6439			
77	0.983	8.0147	6.6774	5.0073	4.0042	3.3360	2.5002	1.9988	1.6644			
78	0.984	8.1163	6.7621	5.0707	4.0549	3.3783	2.5318	2.0241	1.6855			
79	0.984	8.2146	6.8440	5.1322	4.1042	3.4193	2.5626	2.0487	1.7060			
80	0.984	8.3162	6.9287	5.1957	4.1550	3.4616	2.5943	2.0741	1.7272			
81	0.984	8.4146	7.0106	5.2571	4.2041	3.5026	2.6250	2.0986	1.7476			
82	0.984	8.5161	7.0953	5.3206	4.2549	3.5449	2.6568	2.1240	1.7687			
83	0.984	8.6146	7.1772	5.3821	4.3040	3.5858	2.6874	2.1485	1.7892			
84	0.985	8.7161	7.2618	5.4455	4.3548	3.6281	2.7192	2.1739	1.8103			
85	0.985	8.8145	7.3439	5.5071	4.4040	3.6692	2.7500	2.1985	1.8308			
86	0.985	8.9160	7.4284	5.5704	4.4547	3.7114	2.7816	2.2238	1.8519			
87	0.985	9.0145	7.5105	5.6320	4.5040	3.7524	2.8124	2.2484	1.8724			
88	0.985	9.1158	7.5949	5.6954	4.5547	3.7947	2.8441	2.2738	1.8935			
89	0.985	9.2144	7.6771	5.7570	4.6039	3.8357	2.8748	2.2983	1.9140			
90	0.986	9.3157	7.7615	5.8204	4.6546	3.8779	2.9065	2.3237	1.9351			
91	0.986	9.4144	7.8437	5.8819	4.7038	3.9189	2.9372	2.3483	1.9556			
92	0.986	9.5157	7.9281	5.9453	4.7545	3.9612	2.9689	2.3736	1.9767			
93	0.986	9.6143	8.0103	6.0069	4.8039	4.0023	2.9997	2.3983	1.9972			
94	0.986	9.7156	8.0947	6.0702	4.8544	4.0444	3.0313	2.4235	2.0183			
95	0.986	9.8143	8.1769	6.1319	4.9038	4.0855	3.0621	2.4482	2.0388			
96	0.987	9.9155	8.2612	6.1952	4.9544	4.1278	3.0938	2.4735	2.0599			
97	0.987	10.0142	8.3435	6.2568	5.0037	4.1688	3.1245	2.4981	2.0804			
98	0.987	10.1154	8.4278	6.3201	5.0543	4.2110	3.1562	2.5234	2.1015			
99	0.987	10.2142	8.5101	6.3817	5.1036	4.2520	3.1870	2.5480	2.1220			
100	0.987	10.3153	8.5944	6.4450	5.1543	4.2942	3.2186	2.5733	2.1431			

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45 DEG PRESSURE ANGLE

TABLE 101—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 4, INTERNAL STRAIGHT SIDED SPLINES

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
6		0.3042	0.2540	0.1911	0.1534	0.1280	0.0966	0.0777	0.0652			
7		0.3926	0.3276	0.2462	0.1974	0.1648	0.1242	0.0998	0.0836			
8		0.5096	0.4251	0.3193	0.2559	0.2135	0.1607	0.1290	0.1079			
9		0.5987	0.4993	0.3750	0.3004	0.2506	0.1885	0.1512	0.1264			
10		0.7119	0.5937	0.4456	0.3569	0.2977	0.2238	0.1795	0.1499			
11		0.8023	0.6690	0.5022	0.4022	0.3353	0.2520	0.2020	0.1687	0.1268	0.1018	0.0642
12		0.9130	0.7613	0.5714	0.4576	0.3815	0.2866	0.2297	0.1917	0.1441	0.1156	0.0728
13		1.0046	0.8376	0.6286	0.5033	0.4196	0.3152	0.2525	0.2108	0.1583	0.1270	0.0799
14		1.1137	0.9285	0.6968	0.5579	0.4652	0.3494	0.2799	0.2336	0.1754	0.1407	0.0884
15		1.2063	1.0057	0.7546	0.6041	0.5037	0.3783	0.3030	0.2529	0.1898	0.1522	0.0956
16		1.3142	1.0956	0.8221	0.6581	0.5486	0.4120	0.3300	0.2753	0.2067	0.1657	0.1041
17		1.4075	1.1733	0.8804	0.7047	0.5875	0.4411	0.3533	0.2948	0.2212	0.1773	0.1113
18		1.5145	1.2625	0.9472	0.7582	0.6321	0.4746	0.3800	0.3170	0.2381	0.1908	0.1197
19		1.6084	1.3408	1.0060	0.8053	0.6712	0.5039	0.4035	0.3366	0.2527	0.2025	0.1271
20		1.7148	1.4294	1.0725	0.8584	0.7155	0.5371	0.4301	0.3587	0.2693	0.2158	0.1354
21		1.8093	1.5081	1.1315	0.9056	0.7548	0.5666	0.4537	0.3784	0.2841	0.2276	0.1428
22		1.9150	1.5962	1.1975	0.9585	0.7990	0.5998	0.4802	0.4005	0.3006	0.2408	0.1511
23		2.0099	1.6753	1.2569	1.0059	0.8385	0.6294	0.5039	0.4203	0.3154	0.2527	0.1585
24		2.1151	1.7630	1.3226	1.0585	0.8824	0.6623	0.5302	0.4422	0.3318	0.2658	0.1667
25		2.2105	1.8425	1.3822	1.1062	0.9221	0.6921	0.5541	0.4621	0.3467	0.2777	
26		2.3153	1.9298	1.4478	1.1587	0.9657	0.7248	0.5802	0.4839	0.3631	0.2908	
27		2.4109	2.0095	1.5075	1.2065	1.0056	0.7547	0.6041	0.5038	0.3781	0.3029	
28		2.5154	2.0965	1.5728	1.2587	1.0491	0.7873	0.6303	0.5256	0.3945		
29		2.6113	2.1765	1.6328	1.3067	1.0891	0.8174	0.6543	0.5456	0.4094		
30		2.7155	2.2634	1.6978	1.3587	1.1325	0.8499	0.6804	0.5673	0.4257		
31		2.8117	2.3435	1.7579	1.4068	1.1726	0.8800	0.7044	0.5874	0.4407		
32		2.9156	2.4301	1.8229	1.4587	1.2159	0.9124	0.7304	0.6090			
33		3.0120	2.5104	1.8831	1.5069	1.2560	0.9426	0.7545	0.6291			
34		3.1156	2.5968	1.9480	1.5589	1.2992	0.9750	0.7804	0.6507			
35		3.2122	2.6773	2.0084	1.6072	1.3395	1.0051	0.8045	0.6708			
36		3.3158	2.7636	2.0730	1.6589	1.3826	1.0375	0.8304	0.6923			
37		3.4125	2.8442	2.1335	1.7073	1.4230	1.0678	0.8547	0.7126			
38		3.5158	2.9303	2.1980	1.7589	1.4660	1.1001	0.8805	0.7341			
39		3.6127	3.0110	2.2586	1.8074	1.5064	1.1304	0.9047	0.7543			
40		3.7158	3.0969	2.3231	1.8589	1.5494	1.1626	0.9305	0.7758			
41		3.8130	3.1779	2.3838	1.9075	1.5898	1.1929	0.9548	0.7960			
42		3.9159	3.2637	2.4482	1.9590	1.6327	1.2251	0.9805	0.8174			
43		4.0131	3.3447	2.5089	2.0076	1.6732	1.2555	1.0048	0.8377			
44		4.1160	3.4304	2.5732	2.0590	1.7161	1.2877	1.0306	0.8592			
45		4.2133	3.5115	2.6340	2.1077	1.7567	1.3181	1.0549	0.8795			
46		4.3161	3.5972	2.6982	2.1590	1.7995	1.3502	1.0806	0.9009			
47		4.4135	3.6784	2.7591	2.2077	1.8401	1.3806	1.1050	0.9212			
48		4.5161	3.7639	2.8233	2.2591	1.8828	1.4127	1.1306	0.9426			
49		4.6136	3.8452	2.8843	2.3079	1.9235	1.4432	1.1550	0.9629			
50		4.7161	3.9306	2.9483	2.3591	1.9662	1.4752	1.1806	0.9842			
51		4.8138	4.0120	3.0093	2.4080	2.0069	1.5058	1.2051	1.0047			
52		4.9162	4.0973	3.0733	2.4591	2.0496	1.5378	1.2307	1.0260			
53		5.0139	4.1788	3.1344	2.5080	2.0903	1.5683	1.2551	1.0463			
54		5.1162	4.2640	3.1983	2.5592	2.1329	1.6003	1.2807	1.0677			
55		5.2140	4.3455	3.2594	2.6081	2.1737	1.6309	1.3052	1.0880			
56		5.3162	4.4307	3.3234	2.6593	2.2163	1.6628	1.3307	1.1093			
57		5.4142	4.5124	3.3846	2.7082	2.2571	1.6934	1.3552	1.1297			
58		5.5164	4.5975	3.4484	2.7593	2.2996	1.7253	1.3807	1.1510			
59		5.6143	4.6791	3.5096	2.8082	2.3405	1.7560	1.4053	1.1715			
60		5.7164	4.7641	3.5734	2.8593	2.3830	1.7879	1.4308	1.1928			

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45 DEG PRESSURE ANGLE

TABLE 101—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 4, INTERNAL STRAIGHT SIDED SPLINES (Cont.)

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
61		5.8144	4.8458	3.6347	2.9083	2.4239	1.8185	1.4553	1.2132			
62		5.9165	4.9309	3.6984	2.9593	2.4664	1.8504	1.4808	1.2344			
63		6.0145	5.0126	3.7598	3.0084	2.5072	1.8811	1.5053	1.2549			
64		6.1165	5.0976	3.8235	3.0594	2.5497	1.9129	1.5308	1.2761			
65		6.2146	5.1794	3.8849	3.1084	2.5906	1.9436	1.5553	1.2965			
66		6.3165	5.2643	3.9486	3.1594	2.6332	1.9755	1.5809	1.3179			
67		6.4148	5.3462	4.0099	3.2085	2.6741	2.0062	1.6055	1.3383			
68		6.5166	5.4310	4.0736	3.2594	2.7165	2.0380	1.6309	1.3595			
69		6.6148	5.5129	4.1350	3.3085	2.7574	2.0687	1.6555	1.3800			
70		6.7166	5.5977	4.1986	3.3594	2.7998	2.1005	1.6809	1.4012			
71		6.8149	5.6796	4.2601	3.4086	2.8408	2.1312	1.7055	1.4217			
72		6.9167	5.7645	4.3237	3.4595	2.8832	2.1630	1.7309	1.4429			
73		7.0150	5.8464	4.3851	3.5086	2.9241	2.1937	1.7555	1.4633			
74		7.1167	5.9311	4.4487	3.5595	2.9666	2.2256	1.7810	1.4846			
75		7.2151	6.0131	4.5101	3.6087	3.0076	2.2564	1.8056	1.5051			
76		7.3167	6.0978	4.5737	3.6595	3.0499	2.2881	1.8310	1.5263			
77		7.4152	6.1799	4.6352	3.7087	3.0909	2.3189	1.8556	1.5468			
78		7.5168	6.2646	4.6988	3.7596	3.1333	2.3506	1.8810	1.5680			
79		7.6153	6.3466	4.7603	3.8088	3.1743	2.3814	1.9056	1.5885			
80		7.7168	6.4313	4.8238	3.8596	3.2166	2.4131	1.9310	1.6096			
81		7.8153	6.5133	4.8853	3.9088	3.2577	2.4440	1.9557	1.6302			
82		7.9168	6.5979	4.9488	3.9596	3.3000	2.4757	1.9811	1.6514			
83		8.0155	6.6801	5.0104	4.0089	3.3411	2.5065	2.0058	1.6719			
84		8.1169	6.7647	5.0738	4.0596	3.3834	2.5382	2.0311	1.6931			
85		8.2155	6.8468	5.1355	4.1090	3.4244	2.5690	2.0558	1.7136			
86		8.3169	6.9314	5.1989	4.1597	3.4667	2.6007	2.0811	1.7347			
87		8.4155	7.0135	5.2605	4.2090	3.5078	2.6315	2.1058	1.7553			
88		8.5170	7.0981	5.3239	4.2597	3.5500	2.6632	2.1311	1.7764			
89		8.6157	7.1803	5.3855	4.3090	3.5912	2.6941	2.1559	1.7970			
90		8.7170	7.2648	5.4489	4.3597	3.6335	2.7258	2.1812	1.8182			
91		8.8157	7.3470	5.5105	4.4090	3.6746	2.7566	2.2059	1.8387			
92		8.9170	7.4315	5.5739	4.4597	3.7168	2.7883	2.2312	1.8598			
93		9.0158	7.5138	5.6357	4.5091	3.7579	2.8192	2.2559	1.8804			
94		9.1172	7.5982	5.6990	4.5598	3.8001	2.8508	2.2812	1.9015			
95		9.2159	7.6805	5.7607	4.6092	3.8413	2.8817	2.3059	1.9221			
96		9.3172	7.7649	5.8240	4.6598	3.8836	2.9134	2.3313	1.9433			
97		9.4159	7.8472	5.8857	4.7092	3.9247	2.9443	2.3560	1.9638			
98		9.5173	7.9317	5.9490	4.7598	3.9669	2.9759	2.3813	1.9849			
99		9.6160	8.0140	6.0107	4.8092	4.0081	3.0068	2.4060	2.0055			
100		9.7173	8.0983	6.0741	4.8599	4.0502	3.0384	2.4313	2.0266			

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45 DEG PRESSURE ANGLE

TABLE 102—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 5, INTERNAL STRAIGHT SIDED SPLINES

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
6		0.3054	0.2552	0.1921	0.1544	0.1290	0.0976	0.0788	0.0662			
7		0.3936	0.3287	0.2471	0.1984	0.1656	0.1250	0.1006	0.0844			
8		0.5107	0.4261	0.3204	0.2570	0.2145	0.1616	0.1299	0.1088			
9		0.5997	0.5003	0.3760	0.3014	0.2515	0.1894	0.1521	0.1272			
10		0.7129	0.5947	0.4466	0.3579	0.2986	0.2247	0.1803	0.1508			
11		0.8033	0.6700	0.5031	0.4031	0.3362	0.2529	0.2029	0.1695	0.1275	0.1025	0.0648
12		0.9140	0.7622	0.5722	0.4584	0.3823	0.2874	0.2305	0.1926	0.1448	0.1163	0.0735
13		1.0057	0.8386	0.6294	0.5042	0.4204	0.3160	0.2534	0.2116	0.1590	0.1277	0.0806
14		1.1147	0.9295	0.6977	0.5588	0.4660	0.3502	0.2807	0.2344	0.1761	0.1413	0.0891
15		1.2072	1.0066	0.7555	0.6050	0.5045	0.3791	0.3038	0.2537	0.1905	0.1529	0.0963
16		1.3151	1.0965	0.8230	0.6590	0.5494	0.4128	0.3308	0.2761	0.2075	0.1665	0.1048
17		1.4085	1.1743	0.8813	0.7056	0.5883	0.4419	0.3541	0.2955	0.2220	0.1781	0.1120
18		1.5155	1.2635	0.9481	0.7591	0.6329	0.4753	0.3808	0.3178	0.2387	0.1915	0.1204
19		1.6094	1.3418	1.0069	0.8062	0.6721	0.5048	0.4044	0.3375	0.2534	0.2032	0.1277
20		1.7157	1.4303	1.0733	0.8593	0.7164	0.5380	0.4310	0.3596	0.2700	0.2165	0.1361
21		1.8103	1.5091	1.1324	0.9065	0.7557	0.5675	0.4546	0.3793	0.2847	0.2283	0.1435
22		1.9160	1.5972	1.1984	0.9593	0.7997	0.6005	0.4810	0.4013	0.3013	0.2416	0.1517
23		2.0109	1.6763	1.2577	1.0068	0.8393	0.6302	0.5047	0.4210	0.3162	0.2534	0.1591
24		2.1161	1.7639	1.3236	1.0595	0.8832	0.6631	0.5311	0.4431	0.3326	0.2666	0.1673
25		2.2115	1.8435	1.3831	1.1071	0.9229	0.6929	0.5549	0.4629	0.3475	0.2785	
26		2.3163	1.9308	1.4486	1.1595	0.9666	0.7257	0.5811	0.4847	0.3639	0.2916	
27		2.4119	2.0105	1.5084	1.2073	1.0064	0.7555	0.6050	0.5047	0.3788	0.3035	
28		2.5164	2.0976	1.5737	1.2596	1.0499	0.7882	0.6311	0.5264	0.3951		
29		2.6123	2.1775	1.6337	1.3076	1.0900	0.8182	0.6552	0.5465	0.4102		
30		2.7165	2.2643	1.6988	1.3597	1.1334	0.8508	0.6812	0.5682	0.4265		
31		2.8126	2.3445	1.7589	1.4078	1.1734	0.8808	0.7053	0.5882	0.4415		
32		2.9166	2.4311	1.8238	1.4597	1.2167	0.9133	0.7312	0.6099			
33		3.0130	2.5115	1.8841	1.5079	1.2569	0.9434	0.7553	0.6299			
34		3.1167	2.5978	1.9488	1.5597	1.3001	0.9758	0.7812	0.6515			
35		3.2133	2.6783	2.0093	1.6081	1.3404	1.0061	0.8055	0.6717			
36		3.3168	2.7646	2.0740	1.6598	1.3835	1.0384	0.8313	0.6933			
37		3.4136	2.8453	2.1344	1.7082	1.4238	1.0686	0.8555	0.7134			
38		3.5168	2.9313	2.1990	1.7598	1.4669	1.1009	0.8813	0.7350			
39		3.6139	3.0122	2.2596	1.8083	1.5072	1.1312	0.9056	0.7551			
40		3.7170	3.0981	2.3241	1.8599	1.5503	1.1635	0.9314	0.7767			
41		3.8140	3.1790	2.3848	1.9085	1.5907	1.1938	0.9557	0.7969			
42		3.9170	3.2648	2.4491	1.9600	1.6336	1.2260	0.9814	0.8184			
43		4.0143	3.3459	2.5099	2.0086	1.6741	1.2564	1.0057	0.8386			
44		4.1171	3.4316	2.5741	2.0600	1.7170	1.2885	1.0314	0.8601			
45		4.2144	3.5127	2.6350	2.1087	1.7576	1.3190	1.0559	0.8804			
46		4.3171	3.5982	2.6992	2.1601	1.8004	1.3511	1.0815	0.9018			
47		4.4147	3.6795	2.7601	2.2088	1.8410	1.3816	1.1059	0.9221			
48		4.5172	3.7650	2.8242	2.2601	1.8838	1.4136	1.1315	0.9435			
49		4.6148	3.8463	2.8852	2.3088	1.9244	1.4441	1.1559	0.9638			
50		4.7174	3.9318	2.9493	2.3602	1.9672	1.4762	1.1816	0.9853			
51		4.8150	4.0132	3.0104	2.4090	2.0079	1.5067	1.2061	1.0056			
52		4.9174	4.0985	3.0743	2.4602	2.0505	1.5387	1.2316	1.0269			
53		5.0151	4.1799	3.1354	2.5090	2.0912	1.5693	1.2561	1.0473			
54		5.1175	4.2653	3.1994	2.5602	2.1339	1.6012	1.2816	1.0686			
55		5.2153	4.3468	3.2605	2.6091	2.1746	1.6318	1.3061	1.0890			
56		5.3175	4.4319	3.3245	2.6603	2.2173	1.6638	1.3317	1.1104			
57		5.4154	4.5135	3.3856	2.7092	2.2581	1.6944	1.3562	1.1307			
58		5.5176	4.5987	3.4495	2.7603	2.3006	1.7263	1.3817	1.1520			
59		5.6155	4.6803	3.5107	2.8093	2.3414	1.7569	1.4062	1.1724			
60		5.7176	4.7654	3.5745	2.8603	2.3840	1.7888	1.4317	1.1937			

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45 DEG PRESSURE ANGLE

TABLE 102—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 5, INTERNAL STRAIGHT SIDED SPLINES (Cont.)

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
61		5.8156	4.8470	3.6358	2.9094	2.4249	1.8196	1.4563	1.2142			
62		5.9177	4.9321	3.6996	2.9604	2.4674	1.8514	1.4818	1.2355			
63		6.0158	5.0139	3.7609	3.0094	2.5083	1.8821	1.5064	1.2559			
64		6.1177	5.0988	3.8246	3.0604	2.5507	1.9139	1.5318	1.2771			
65		6.2160	5.1807	3.8859	3.1095	2.5916	1.9446	1.5564	1.2976			
66		6.3178	5.2656	3.9497	3.1605	2.6342	1.9765	1.5819	1.3189			
67		6.4160	5.3474	4.0110	3.2096	2.6751	2.0072	1.6065	1.3393			
68		6.5178	5.4323	4.0747	3.2605	2.7175	2.0390	1.6319	1.3606			
69		6.6162	5.5142	4.1361	3.3096	2.7584	2.0697	1.6565	1.3810			
70		6.7179	5.5990	4.1997	3.3605	2.8009	2.1015	1.6819	1.4022			
71		6.8162	5.6809	4.2611	3.4096	2.8418	2.1322	1.7065	1.4227			
72		6.9179	5.7657	4.3248	3.4606	2.8843	2.1641	1.7320	1.4440			
73		7.0164	5.8477	4.3862	3.5098	2.9253	2.1949	1.7566	1.4645			
74		7.1180	5.9325	4.4498	3.5606	2.9676	2.2266	1.7820	1.4857			
75		7.2164	6.0145	4.5113	3.6098	3.0086	2.2574	1.8066	1.5061			
76		7.3182	6.0992	4.5748	3.6606	3.0510	2.2891	1.8320	1.5273			
77		7.4166	6.1813	4.6364	3.7099	3.0921	2.3200	1.8568	1.5479			
78		7.5182	6.2659	4.6999	3.7607	3.1344	2.3517	1.8821	1.5691			
79		7.6166	6.3480	4.7614	3.8099	3.1754	2.3825	1.9068	1.5896			
80		7.7183	6.4327	4.8249	3.8607	3.2177	2.4142	1.9321	1.6108			
81		7.8168	6.5148	4.8865	3.9100	3.2588	2.4450	1.9568	1.6313			
82		7.9183	6.5994	4.9500	3.9608	3.3012	2.4768	1.9822	1.6525			
83		8.0168	6.6815	5.0116	4.0101	3.3422	2.5076	2.0069	1.6730			
84		8.1184	6.7661	5.0750	4.0608	3.3845	2.5393	2.0322	1.6942			
85		8.2169	6.8483	5.1366	4.1101	3.4256	2.5701	2.0569	1.7147			
86		8.3184	6.9328	5.2000	4.1608	3.4678	2.6018	2.0822	1.7359			
87		8.4170	7.0150	5.2617	4.2102	3.5090	2.6328	2.1070	1.7565			
88		8.5185	7.0996	5.3251	4.2609	3.5513	2.6644	2.1323	1.7776			
89		8.6171	7.1818	5.3867	4.3102	3.5924	2.6953	2.1570	1.7982			
90		8.7185	7.2662	5.4501	4.3609	3.6346	2.7269	2.1823	1.8193			
91		8.8172	7.3485	5.5118	4.4102	3.6757	2.7578	2.2070	1.8398			
92		8.9186	7.4330	5.5751	4.4609	3.7179	2.7894	2.2323	1.8610			
93		9.0173	7.5152	5.6369	4.5104	3.7591	2.8204	2.2571	1.8816			
94		9.1186	7.5997	5.7002	4.5610	3.8014	2.8520	2.2824	1.9027			
95		9.2174	7.6820	5.7619	4.6104	3.8425	2.8829	2.3071	1.9233			
96		9.3187	7.7664	5.8252	4.6610	3.8847	2.9145	2.3324	1.9444			
97		9.4174	7.8487	5.8869	4.7104	3.9258	2.9454	2.3571	1.9650			
98		9.5187	7.9331	5.9503	4.7611	3.9681	2.9771	2.3825	1.9862			
99		9.6176	8.0155	6.0120	4.8105	4.0093	3.0080	2.4072	2.0067			
100		9.7188	8.0999	6.0753	4.8611	4.0515	3.0396	2.4325	2.0278			

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45 DEG PRESSURE ANGLE

TABLE 103—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 6, INTERNAL STRAIGHT SIDED SPLINES

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
6		0.3069	0.2567	0.1936	0.1559	0.1304	0.0990	0.0802	0.0676			
7		0.3951	0.3301	0.2485	0.1997	0.1670	0.1264	0.1020	0.0857			
8		0.5121	0.4276	0.3217	0.2583	0.2156	0.1628	0.1311	0.1100			
9		0.6011	0.5017	0.3772	0.3027	0.2526	0.1905	0.1532	0.1284			
10		0.7143	0.5960	0.4479	0.3592	0.2997	0.2258	0.1814	0.1519			
11		0.8046	0.6713	0.5044	0.4044	0.3374	0.2540	0.2041	0.1707	0.1285	0.1035	0.0657
12		0.9154	0.7636	0.5736	0.4597	0.3835	0.2886	0.2317	0.1938	0.1457	0.1173	0.0744
13		1.0069	0.8399	0.6307	0.5054	0.4216	0.3172	0.2545	0.2128	0.1601	0.1288	0.0816
14		1.1160	0.9308	0.6989	0.5600	0.4671	0.3513	0.2819	0.2356	0.1771	0.1424	0.0901
15		1.2086	1.0079	0.7568	0.6063	0.5056	0.3802	0.3050	0.2548	0.1915	0.1539	0.0972
16		1.3165	1.0978	0.8242	0.6602	0.5506	0.4139	0.3319	0.2773	0.2084	0.1674	0.1057
17		1.4098	1.1756	0.8825	0.7068	0.5894	0.4430	0.3552	0.2967	0.2229	0.1790	0.1129
18		1.5168	1.2648	0.9493	0.7603	0.6341	0.4766	0.3821	0.3190	0.2397	0.1925	0.1213
19		1.6108	1.3431	1.0081	0.8074	0.6732	0.5059	0.4055	0.3386	0.2544	0.2042	0.1287
20		1.7171	1.4317	1.0745	0.8605	0.7175	0.5391	0.4321	0.3607	0.2710	0.2175	0.1370
21		1.8116	1.5104	1.1336	0.9077	0.7568	0.5686	0.4557	0.3804	0.2857	0.2292	0.1443
22		1.9173	1.5985	1.1996	0.9605	0.8009	0.6017	0.4822	0.4025	0.3023	0.2426	0.1526
23		2.0123	1.6777	1.2590	1.0081	0.8405	0.6314	0.5059	0.4222	0.3171	0.2544	0.1600
24		2.1175	1.7654	1.3248	1.0607	0.8843	0.6642	0.5322	0.4442	0.3336	0.2676	0.1683
25		2.2128	1.8448	1.3843	1.1083	0.9240	0.6940	0.5560	0.4640	0.3484	0.2794	
26		2.3177	1.9322	1.4499	1.1608	0.9678	0.7268	0.5823	0.4859	0.3648	0.2925	
27		2.4133	2.0119	1.5097	1.2086	1.0076	0.7567	0.6062	0.5058	0.3799	0.3046	
28		2.5178	2.0990	1.5749	1.2608	1.0511	0.7893	0.6323	0.5276	0.3962		
29		2.6137	2.1789	1.6349	1.3088	1.0912	0.8194	0.6564	0.5477	0.4111		
30		2.7179	2.2657	1.7001	1.3610	1.1346	0.8520	0.6824	0.5694	0.4274		
31		2.8141	2.3459	1.7602	1.4090	1.1746	0.8820	0.7064	0.5894	0.4425		
32		2.9180	2.4325	1.8251	1.4610	1.2179	0.9145	0.7324	0.6110			
33		3.0144	2.5128	1.8853	1.5092	1.2582	0.9447	0.7566	0.6312			
34		3.1182	2.5993	1.9502	1.5611	1.3013	0.9771	0.7825	0.6528			
35		3.2147	2.6798	2.0106	1.6094	1.3416	1.0072	0.8066	0.6729			
36		3.3183	2.7661	2.0752	1.6611	1.3847	1.0396	0.8325	0.6944			
37		3.4150	2.8467	2.1357	1.7095	1.4251	1.0699	0.8568	0.7147			
38		3.5183	2.9328	2.2003	1.7612	1.4681	1.1022	0.8826	0.7362			
39		3.6153	3.0137	2.2609	1.8097	1.5085	1.1325	0.9068	0.7564			
40		3.7184	3.0996	2.3254	1.8612	1.5515	1.1647	0.9326	0.7779			
41		3.8156	3.1806	2.3861	1.9098	1.5920	1.1951	0.9570	0.7982			
42		3.9186	3.2663	2.4505	1.9613	1.6349	1.2273	0.9827	0.8196			
43		4.0158	3.3473	2.5112	2.0099	1.6754	1.2576	1.0070	0.8399			
44		4.1187	3.4331	2.5755	2.0613	1.7183	1.2899	1.0328	0.8614			
45		4.2160	3.5142	2.6364	2.1101	1.7589	1.3203	1.0571	0.8817			
46		4.3187	3.5998	2.7006	2.1614	1.8017	1.3524	1.0828	0.9031			
47		4.4162	3.6811	2.7615	2.2101	1.8423	1.3828	1.1071	0.9234			
48		4.5188	3.7666	2.8256	2.2614	1.8851	1.4150	1.1329	0.9448			
49		4.6164	3.8480	2.8866	2.3103	1.9257	1.4455	1.1573	0.9652			
50		4.7189	3.9334	2.9507	2.3615	1.9684	1.4775	1.1829	0.9865			
51		4.8165	4.0147	3.0117	2.4103	2.0091	1.5080	1.2073	1.0068			
52		4.9190	4.1001	3.0757	2.4615	2.0519	1.5401	1.2330	1.0283			
53		5.0167	4.1816	3.1369	2.5105	2.0926	1.5706	1.2574	1.0486			
54		5.1190	4.2668	3.2008	2.5616	2.1352	1.6026	1.2830	1.0699			
55		5.2169	4.3484	3.2619	2.6105	2.1760	1.6331	1.3074	1.0903			
56		5.3191	4.4336	3.3259	2.6617	2.2186	1.6652	1.3331	1.1117			
57		5.4171	4.5152	3.3871	2.7107	2.2594	1.6958	1.3576	1.1321			
58		5.5192	4.6004	3.4509	2.7617	2.3020	1.7277	1.3831	1.1534			
59		5.6172	4.6820	3.5121	2.8107	2.3428	1.7583	1.4076	1.1738			
60		5.7194	4.7671	3.5760	2.8618	2.3854	1.7903	1.4332	1.1951			

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45 DEG PRESSURE ANGLE

TABLE 103—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 6, INTERNAL STRAIGHT SIDED SPLINES (Cont.)

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
61		5.8174	4.8488	3.6373	2.9108	2.4263	1.8209	1.4577	1.2155			
62		5.9194	4.9338	3.7010	2.9618	2.4688	1.8528	1.4832	1.2368			
63		6.0175	5.0156	3.7623	3.0109	2.5097	1.8835	1.5078	1.2573			
64		6.1195	5.1006	3.8261	3.0619	2.5522	1.9154	1.5333	1.2786			
65		6.2177	5.1824	3.8874	3.1110	2.5931	1.9460	1.5578	1.2990			
66		6.3196	5.2673	3.9511	3.1619	2.6355	1.9779	1.5833	1.3202			
67		6.4178	5.3492	4.0125	3.2110	2.6765	2.0087	1.6079	1.3408			
68		6.5197	5.4341	4.0762	3.2620	2.7190	2.0405	1.6334	1.3620			
69		6.6179	5.5160	4.1376	3.3112	2.7599	2.0712	1.6579	1.3825			
70		6.7197	5.6008	4.2012	3.3620	2.8023	2.1030	1.6834	1.4037			
71		6.8181	5.6828	4.2627	3.4112	2.8433	2.1338	1.7081	1.4242			
72		6.9198	5.7675	4.3263	3.4621	2.8857	2.1656	1.7335	1.4454			
73		7.0182	5.8496	4.3878	3.5113	2.9267	2.1963	1.7581	1.4659			
74		7.1179	5.9343	4.4513	3.5621	2.9691	2.2281	1.7835	1.4871			
75		7.2183	6.0163	4.5129	3.6114	3.0101	2.2589	1.8082	1.5077			
76		7.3200	6.1011	4.5764	3.6623	3.0525	2.2907	1.8336	1.5289			
77		7.4184	6.1831	4.6379	3.7115	3.0935	2.3214	1.8582	1.5494			
78		7.5200	6.2678	4.7014	3.7622	3.1359	2.3533	1.8837	1.5706			
79		7.6186	6.3499	4.7631	3.8116	3.1769	2.3840	1.9083	1.5911			
80		7.7201	6.4345	4.8265	3.8624	3.2193	2.4158	1.9337	1.6123			
81		7.8187	6.5167	4.8881	3.9116	3.2603	2.4466	1.9583	1.6328			
82		7.9202	6.6013	4.9515	3.9624	3.3027	2.4784	1.9838	1.6541			
83		8.0187	6.6834	5.0132	4.0117	3.3437	2.5092	2.0084	1.6746			
84		8.1203	6.7681	5.0766	4.0625	3.3860	2.5409	2.0338	1.6957			
85		8.2189	6.8502	5.1382	4.1117	3.4271	2.5717	2.0584	1.7163			
86		8.3204	6.9348	5.2016	4.1625	3.4695	2.6035	2.0839	1.7375			
87		8.4190	7.0170	5.2634	4.2119	3.5105	2.6343	2.1085	1.7580			
88		8.5204	7.1015	5.3267	4.2626	3.5528	2.6660	2.1339	1.7792			
89		8.6191	7.1838	5.3884	4.3119	3.5939	2.6968	2.1585	1.7997			
90		8.7205	7.2683	5.4518	4.3627	3.6362	2.7286	2.1840	1.8209			
91		8.8192	7.3505	5.5135	4.4120	3.6773	2.7594	2.2086	1.8415			
92		8.9206	7.4350	5.5768	4.4627	3.7196	2.7911	2.2340	1.8626			
93		9.0193	7.5173	5.6385	4.5120	3.7608	2.8220	2.2588	1.8832			
94		9.1207	7.6018	5.7019	4.5628	3.8030	2.8537	2.2841	1.9044			
95		9.2194	7.6841	5.7636	4.6121	3.8441	2.8845	2.3088	1.9249			
96		9.3207	7.7685	5.8269	4.6628	3.8863	2.9162	2.3341	1.9460			
97		9.4196	7.8509	5.8887	4.7121	3.9276	2.9471	2.3589	1.9667			
98		9.5208	7.9352	5.9520	4.7629	3.9698	2.9788	2.3842	1.9878			
99		9.6196	8.0175	6.0138	4.8122	4.0109	3.0096	2.4089	2.0084			
100		9.7209	8.1020	6.0770	4.8629	4.0531	3.0413	2.4342	2.0294			

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45 DEG PRESSURE ANGLE

TABLE 104—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 7, INTERNAL STRAIGHT SIDED SPLINES

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
6		0.3093	0.2591	0.1959	0.1582	0.1325	0.1011	0.0823	0.0697			
7		0.3973	0.3323	0.2507	0.2019	0.1689	0.1283	0.1039	0.0876			
8		0.5142	0.4297	0.3237	0.2603	0.2175	0.1647	0.1330	0.1119			
9		0.6032	0.5038	0.3791	0.3046	0.2544	0.1922	0.1550	0.1301			
10		0.7162	0.5980	0.4498	0.3612	0.3015	0.2276	0.1833	0.1537			
11		0.8066	0.6733	0.5062	0.4062	0.3391	0.2557	0.2057	0.1724	0.1300	0.1050	0.0672
12		0.9173	0.7655	0.5755	0.4616	0.3853	0.2904	0.2335	0.1955	0.1473	0.1188	0.0758
13		1.0089	0.8419	0.6326	0.5073	0.4233	0.3189	0.2563	0.2145	0.1615	0.1302	0.0828
14		1.1181	0.9328	0.7007	0.5618	0.4687	0.3530	0.2835	0.2372	0.1785	0.1438	0.0914
15		1.2105	1.0099	0.7586	0.6081	0.5073	0.3819	0.3067	0.2565	0.1930	0.1554	0.0986
16		1.3185	1.0999	0.8260	0.6620	0.5523	0.4156	0.3336	0.2790	0.2098	0.1688	0.1070
17		1.4118	1.1776	0.8843	0.7086	0.5911	0.4447	0.3569	0.2983	0.2244	0.1805	0.1143
18		1.5189	1.2668	0.9512	0.7622	0.6358	0.4782	0.3837	0.3207	0.2412	0.1939	0.1227
19		1.6128	1.3451	1.0099	0.8091	0.6749	0.5075	0.4072	0.3402	0.2558	0.2056	0.1300
20		1.7191	1.4337	1.0764	0.8624	0.7192	0.5409	0.4338	0.3625	0.2724	0.2189	0.1383
21		1.8136	1.5124	1.1354	0.9096	0.7586	0.5703	0.4574	0.3821	0.2872	0.2308	0.1456
22		1.9193	1.6006	1.2015	0.9624	0.8026	0.6034	0.4838	0.4041	0.3038	0.2440	0.1540
23		2.0142	1.6796	1.2609	1.0099	0.8422	0.6331	0.5076	0.4240	0.3186	0.2558	0.1614
24		2.1195	1.7674	1.3266	1.0625	0.8860	0.6660	0.5339	0.4459	0.3351	0.2691	0.1696
25		2.2149	1.8469	1.3863	1.1103	0.9258	0.6958	0.5578	0.4658	0.3500	0.2810	
26		2.3197	1.9342	1.4517	1.1626	0.9695	0.7286	0.5840	0.4876	0.3663	0.2940	
27		2.4154	2.0140	1.5115	1.2104	1.0093	0.7584	0.6079	0.5075	0.3814	0.3061	
28		2.5199	2.1010	1.5769	1.2628	1.0529	0.7912	0.6341	0.5294	0.3977		
29		2.6159	2.1811	1.6368	1.3107	1.0929	0.8211	0.6581	0.5494	0.4126		
30		2.7200	2.2678	1.7019	1.3628	1.1363	0.8537	0.6841	0.5711	0.4290		
31		2.8163	2.3481	1.7621	1.4109	1.1764	0.8838	0.7082	0.5912	0.4440		
32		2.9201	2.4346	1.8270	1.4629	1.2197	0.9163	0.7342	0.6128			
33		3.0166	2.5150	1.8873	1.5112	1.2600	0.9465	0.7584	0.6330			
34		3.1203	2.6014	1.9521	1.5630	1.3031	0.9789	0.7843	0.6546			
35		3.2169	2.6820	2.0125	1.6113	1.3434	1.0090	0.8084	0.6747			
36		3.3204	2.7682	2.0772	1.6631	1.3866	1.0415	0.8344	0.6963			
37		3.4173	2.8489	2.1377	1.7115	1.4269	1.0717	0.8586	0.7165			
38		3.5206	2.9351	2.2022	1.7631	1.4699	1.1040	0.8844	0.7380			
39		3.6175	3.0159	2.2629	1.8116	1.5104	1.1343	0.9087	0.7583			
40		3.7207	3.1019	2.3273	1.8632	1.5533	1.1666	0.9345	0.7798			
41		3.8178	3.1828	2.3881	1.9118	1.5939	1.1970	0.9588	0.8001			
42		3.9209	3.2686	2.4525	1.9633	1.6368	1.2292	0.9846	0.8215			
43		4.0180	3.3496	2.5132	2.0119	1.6773	1.2595	1.0089	0.8418			
44		4.1210	3.4354	2.5776	2.0634	1.7202	1.2918	1.0347	0.8633			
45		4.2183	3.5165	2.6384	2.1121	1.7608	1.3222	1.0590	0.8836			
46		4.3211	3.6022	2.7026	2.1634	1.8035	1.3542	1.0847	0.9049			
47		4.4185	3.6834	2.7636	2.2122	1.8442	1.3848	1.1091	0.9253			
48		4.5212	3.7690	2.8277	2.2635	1.8870	1.4168	1.1348	0.9467			
49		4.6187	3.8502	2.8887	2.3124	1.9277	1.4474	1.1592	0.9671			
50		4.7213	3.9357	2.9528	2.3636	1.9704	1.4794	1.1849	0.9885			
51		4.8190	4.0172	3.0138	2.4124	2.0111	1.5099	1.2093	1.0088			
52		4.9214	4.1025	3.0779	2.4637	2.0538	1.5420	1.2350	1.0302			
53		5.0192	4.1840	3.1389	2.5126	2.0946	1.5726	1.2594	1.0506			
54		5.1215	4.2693	3.2030	2.5638	2.1373	1.6046	1.2851	1.0720			
55		5.2194	4.3509	3.2641	2.6127	2.1780	1.6352	1.3095	1.0924			
56		5.3216	4.4361	3.3280	2.6638	2.2206	1.6671	1.3351	1.1137			
57		5.4196	4.5177	3.3892	2.7128	2.2615	1.6978	1.3596	1.1342			
58		5.5217	4.6028	3.4531	2.7639	2.3040	1.7297	1.3852	1.1554			
59		5.6198	4.6845	3.5143	2.8129	2.3449	1.7603	1.4096	1.1758			
60		5.7218	4.7696	3.5782	2.8640	2.3875	1.7923	1.4353	1.1972			

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45 DEG PRESSURE ANGLE

TABLE 104—MEASUREMENT BETWEEN PINS FOR MAXIMUM ACTUAL SPACE WIDTH, FOR 45 DEG PRESSURE ANGLE AND TOLERANCE CLASS 7, INTERNAL STRAIGHT SIDED SPLINES (Cont.)

Spline Pitch		10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96	64/128	80/160	128/256
N	d_i	0.1920	0.1600	0.1200	0.0960	0.0800	0.0600	0.0480	0.0400	0.0300	0.0240	0.0150
61		5.8199	4.8514	3.6394	2.9130	2.4283	1.8230	1.4597	1.2176			
62		5.9219	4.9364	3.7033	2.9641	2.4709	1.8549	1.4853	1.2390			
63		6.0201	5.0182	3.7646	3.0131	2.5118	1.8856	1.5099	1.2594			
64		6.1221	5.1032	3.8283	3.0641	2.5542	1.9174	1.5353	1.2806			
65		6.2203	5.1850	3.8897	3.1133	2.5952	1.9482	1.5600	1.3012			
66		6.3222	5.2700	3.9534	3.1642	2.6377	1.9800	1.5854	1.3224			
67		6.4204	5.3518	4.0147	3.2133	2.6786	2.0107	1.6100	1.3428			
68		6.5223	5.4368	4.0785	3.2643	2.7211	2.0426	1.6355	1.3642			
69		6.6206	5.5186	4.1399	3.3134	2.7620	2.0733	1.6601	1.3846			
70		6.7225	5.6035	4.2036	3.3644	2.8045	2.1052	1.6856	1.4059			
71		6.8207	5.6855	4.2650	3.4135	2.8455	2.1359	1.7102	1.4264			
72		6.9226	5.7703	4.3286	3.4644	2.8879	2.1677	1.7356	1.4476			
73		7.0209	5.8523	4.3901	3.5137	2.9289	2.1986	1.7603	1.4682			
74		7.1227	5.9371	4.4537	3.5645	2.9713	2.2303	1.7857	1.4893			
75		7.2211	6.0192	4.5153	3.6138	3.0124	2.2612	1.8104	1.5099			
76		7.3228	6.1039	4.5788	3.6646	3.0547	2.2929	1.8358	1.5311			
77		7.4213	6.1860	4.6403	3.7138	3.0957	2.3237	1.8604	1.5516			
78		7.5229	6.2706	4.7039	3.7647	3.1382	2.3555	1.8859	1.5729			
79		7.6214	6.3528	4.7654	3.8139	3.1792	2.3863	1.9105	1.5934			
80		7.7230	6.4374	4.8289	3.8647	3.2215	2.4180	1.9359	1.6145			
81		7.8216	6.5196	4.8905	3.9141	3.2626	2.4489	1.9607	1.6352			
82		7.9231	6.6042	4.9540	3.9648	3.3049	2.4806	1.9860	1.6563			
83		8.0217	6.6864	5.0157	4.0142	3.3461	2.5115	2.0108	1.6769			
84		8.1232	6.7709	5.0791	4.0649	3.3884	2.5432	2.0361	1.6981			
85		8.2218	6.8532	5.1407	4.1142	3.4294	2.5740	2.0608	1.7186			
86		8.3233	6.9377	5.2042	4.1650	3.4718	2.6058	2.0862	1.7398			
87		8.4220	7.0200	5.2658	4.2143	3.5129	2.6366	2.1109	1.7604			
88		8.5235	7.1046	5.3292	4.2650	3.5551	2.6683	2.1362	1.7815			
89		8.6221	7.1868	5.3909	4.3144	3.5963	2.6992	2.1610	1.8021			
90		8.7236	7.2713	5.4543	4.3651	3.6386	2.7309	2.1863	1.8233			
91		8.8222	7.3535	5.5160	4.4145	3.6798	2.7618	2.2111	1.8439			
92		8.9237	7.4381	5.5794	4.4652	3.7220	2.7935	2.2364	1.8650			
93		9.0224	7.5203	5.6411	4.5145	3.7631	2.8244	2.2611	1.8856			
94		9.1238	7.6049	5.7045	4.5653	3.8054	2.8561	2.2865	1.9068			
95		9.2225	7.6871	5.7662	4.6147	3.8466	2.8870	2.3112	1.9274			
96		9.3239	7.7716	5.8295	4.6653	3.8888	2.9186	2.3365	1.9485			
97		9.4226	7.8539	5.8913	4.7148	3.9300	2.9496	2.3613	1.9691			
98		9.5240	7.9384	5.9546	4.7654	3.9722	2.9812	2.3866	1.9902			
99		9.6227	8.0207	6.0164	4.8149	4.0135	3.0122	2.4114	2.0109			
100		9.7241	8.1052	6.0797	4.8655	4.0556	3.0438	2.4367	2.0320			

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APPENDIX A

23. Corner Clearance—In major diameter fits, it is always necessary to provide corner clearance at the major diameter of the spline coupling. This is usually effected by providing a chamfer on the top corners of the external member. This method may not be possible or feasible because:

(a) If the external member is roll formed by plastic deformation, a chamfer cannot be provided by the process.

(b) A semi-topping cutter may not be available.

(c) When cutting external splines with small numbers of teeth, a semitopping cutter may reduce the width of the top land to a prohibitive point.

In such cases the corner clearance can be provided on the internal spline as shown in Fig. 34.

When this option is used, the form diameter may fall in the protuberance area.

24. Calculation of Fillets

24.1 **Minimum Fillet Radius Values**—Values for minimum fillet radius were established by comparing the generated fillets produced by hobbing, shaping, and form cutting with full rounded tip cutting tools. It was found that smallest fillets are generated by pinion type shaper cutters. (See paragraph 7.3.)

A calculation program was then set up to calculate the tip radius for these shaper cutters normally used and to calculate the minimum radius of fillet curvature that these cutters would produce. These results were multiplied by 80% for 8/16 spline pitch and finer and reduced 0.010 in for 6/12 spline pitch and coarser, to allow for tool tolerances, rounded to three decimal places and listed as minimum fillet radius specifications in Table 108.

24.2 **Internal Splines**—Internal splines with less than 12 teeth for 24/48 spline pitch and coarser, less than 14 teeth for 32/64 spline pitch, less than 16 teeth for 40/80 spline pitch, and less than 18 teeth for 48/96 spline pitch were considered impractical to manufacture by shaping with a generating cutter. It was assumed that internal splines with these low numbers of teeth would almost always be cut by broach. Calculations for these internal splines were made by the method shown in Fig. 35 using mean major diameter for D_{ri}. These results were also reduced 0.010 in for 6/12 spline pitch and coarser or multiplied by 80% for 8/16 spline pitch and finer before listing as minimum fillet radius specifications in Table 108.

24.3 **External Splines**—Formulas for establishing a full fillet radius for an external spline are shown in Fig. 36 for information only. However, these are not the formulas used for calculating the values shown in Table 108.

25. Form and Minor Diameter Modifications for Low Numbers of Teeth

25.1 **Form Diameter of External Spline**—The form diameter for all types of external splines cannot be less than the base diameter plus 0.010 in for 2.5/5 through 20/40 spline pitches, and not less than the base diameter plus 0.006 in for finer spline pitches.

25.1.1 For the flat root type, the form diameter cannot be less than the value obtained by calculation from the formula:

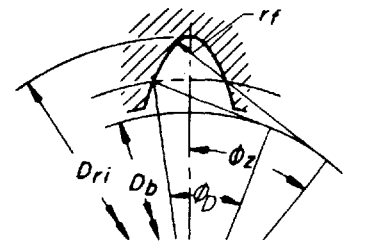
$$D_{Fe} = \frac{\sqrt{3N^2 + (N - 0.016P - 4.5)^2}}{2P}$$

which is applied where it becomes larger than the calculated value obtained from paragraph 25.1, and until it becomes smaller than the calculated value obtained by the formula in Table 105.

25.1.2 For the fillet root type, the form diameter cannot be less than the value obtained by calculation from the formula.

$$D_{Fe} = \frac{\sqrt{3N^2 + (N - 5.359)^2}}{2P}$$

which is applied as in paragraph 25.1.1.



$$\text{sevolute } \phi_z = \frac{D_{ri}}{D_b} - \left(\frac{s}{D} + \text{inv } \phi_D\right)$$

SEE TABLE 109

$$r_f = 0.5(D_{ri} - D_b \sec \phi_z)$$

FIG. 35—FILLET FOR FILLET ROOT INTERNAL SPLINE

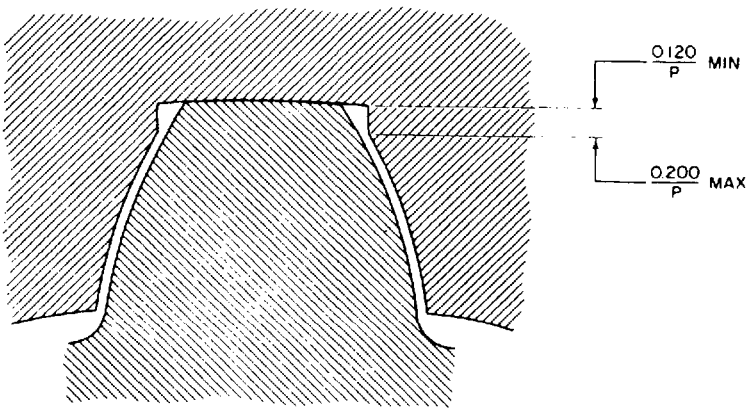
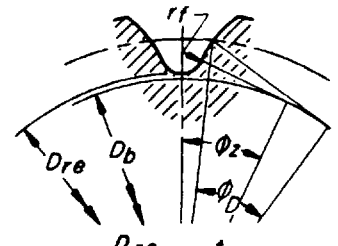


FIG. 34—INTERNAL CORNER CLEARANCE



$$\text{sevolute } \phi_z = \frac{D_{re}}{D_b} - \left(\frac{t}{D} + \text{inv } \phi_D\right) + \frac{\pi}{N}$$

SEE TABLE 109

$$r_f = 0.5(D_b \sec \phi_z - D_{re})$$

FIG. 36—FILLET FOR FILLET ROOT EXTERNAL SPLINE

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TABLE 105—FORMULAS FOR DIMENSIONS AND TOLERANCES IN TABLES 5 TO 63

Item Number	Item Dimension Symbol	Formula
2	D	$\frac{N}{P}$
3.1	D_b	$D \cos 30°$
3.2	D_b	$D \cos 37.5°$
3.3	D_b	$D \cos 45°$
4.1	D_{ri}	$\frac{N + 1.35}{P} + 0.004$
4.2	D_{ri}	$\frac{N + 1.9}{P} + \Delta D_{ri}$
4.3	D_{ri}	$\frac{N + 1}{P}$
4.4	D_{ri}	$\frac{N + 1.7}{P} + \Delta D_{ri}$
4.5	D_{ri}	$\frac{N + 1.5}{P} + \Delta D_{ri}$
5.1	D_{Fi}	$\frac{N + 1}{P} + 2c_F$ (Note 1)
5.2	D_{Fi}	$\frac{N + 0.8}{P} - 0.004 + 2c_F$ (Note 1)
6.1	D_i	$\frac{N - 1}{P}$ (Note 2)
6.2	D_i	$\frac{N - 0.8}{P}$
6.3	D_i	$\frac{N - 0.6}{P}$
8.7	s_7 max	$s_v\text{min} + 2(m + \lambda)$ (Note 5)
8.6	s_6 max	$s_v\text{min} + 1.4(m + \lambda)$ (Note 5)
8.5	s_5 max	$s_v\text{min} + (m + \lambda)$ (Note 5)
8.4	s_4 max	$s_v\text{min} + 0.71(m + \lambda)$ (Note 5)
30 deg pressure angle	s_v min	$0.5p$ or $\frac{\pi}{2P}$
37.5 deg pressure angle	s_v min	$\frac{0.5\pi + 0.10}{P}$
45 deg pressure angle	s_v min	$\frac{0.5\pi + 0.20}{P}$

Item Number	Item Dimension Symbol	Formula
10	t_v max	$\frac{\pi}{2P} - c_v$ (Note 6)
30 deg pressure angle, except major dia fit	t_v max	$0.5p$ or $\frac{\pi}{2P}$
37.5 deg pressure angle	t_v max	$\frac{0.5\pi + 0.10}{P}$
45 deg pressure angle	t_v max	$\frac{0.5\pi + 0.20}{P}$
11	t min	$t_v\text{max} - (m + \lambda)$
11.4	t_4 min	$t_v\text{max} - 0.71(m + \lambda)$
11.5	t_5 min	$t_v\text{max} - (m + \lambda)$
11.6	t_6 min	$t_v\text{max} - 1.4(m + \lambda)$
11.7	t_7 min	$t_v\text{max} - 2(m + \lambda)$
14.1	D_o	$\frac{N + 1}{P}$
14.2	D_o	$\frac{N + 1}{P} - 0.0001$
15	ch max	$\frac{0.14}{P} + 0.006$
16	ch min	$\frac{0.1}{P} + 0.002$
17.1	D_{Fe}	$\frac{N - 1}{P} - 2c_F$ (Note 3)
17.2	D_{Fe}	$\frac{N - 0.8}{P} - 2c_F$ (Note 4)
17.3	D_{Fe}	$\frac{N - 0.6}{P} - 2c_F$ (Note 4)
18.1	D_{re}	$\frac{N - 1.35}{P} - 0.004 - \frac{2(m + \lambda)}{\tan 30°}$
18.2	D_{re}	For spline pitches from 2.5/5 thru 12/24: $\frac{N - 1.9}{P} - \Delta D_{re}$
	D_{re}	For spline pitches from 16/32 thru 48/96: $\frac{N - 2.1}{P} - \Delta D_{re}$
18.3	D_{re}	$\frac{N - 1.4}{P} - \Delta D_{re}$
18.4	D_{re}	$\frac{N - 1.1}{P} - \Delta D_{re}$

NOTES:

1. $c_F = 0.001D$, with max of 0.010 and min of 0.002.
2. See paragraph 25.2.
3. See paragraph 25.1.1.
4. See paragraph 25.1.2.
5. Values obtained by the formulas for clearances, tolerances and variation allowances are rounded off to the ten thousandth below when the value of the hundred thousandth is less than 5, and to the ten thousandth above when the value of the hundred thousandth is 5 or more.

$\Delta D_{ri}, \Delta D_{re} = \frac{2(m + \lambda)}{\tan \phi D}$ where m and λ are taken from Table 106 for tolerance Class 5.

These formulas allow for the maximum variations in D_{ri} and D_{re} encountered with Class 7 "s" and "t" tolerances.

6. See paragraph 5.2 and table 107a.

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25.2 Minor Diameter of Internal Spline—The minor diameter for all types of internal splines is calculated by adding twice the form clearance from Table 2 to the form diameter as calculated in paragraph 25.1.

25.3 Modified Dimensions—In the applicable tables, the modified dimensions are shown in bold type.

26. Interchangeability—Splines made to this standard may interchange with splines made to older standards. Exceptions are listed below.

26.1 External Splines—These will mate with older internal splines as follows:

Year	Major Dia. Fit	Flat Root Side Fit	Fillet Root Side Fit
1946	Yes	No (A)[c]	No (A)
1950[a]	Yes (B)	Yes (B)	Yes (C)
1950[b]	Yes (B)	No (A)	Yes (C)
1957 SAE	Yes	No (A)	Yes (C)
1960	Yes	No (A)	Yes (C)

[a]Full dedendum.
[b]Short dedendum.
[c]See paragraph 26.3 for exceptions A, B, C.

TABLE 106—FORMULAS FOR MACHINING AND VARIATION ALLOWANCES FOR SPACE WIDTH AND TOOTH THICKNESS—CLASS 5[a]
Ten thousandths (20 = 0.0020)
(Calculate and use values for m and lambda to 5 decimal places)

Spline Pitch	m	λ
2.5/5 and 3/6	0.18N + 14	0.35N + 20
4/8 and 5/10	0.15N + 13	0.23N + 18
6/12 and 8/16	0.15N + 11	0.20N + 15
10/20 and 12/24	0.10N + 11	0.17N + 14
16/32 and 20/40	0.07N + 11	0.12N + 13
24/48 thru 48/96	0.07N + 11	0.12N + 11
64/128 and 80/160	0.06N + 9	0.10N + 10
128/256	0.05N + 9	0.08N + 9

[a]For other tolerance classes:

Class 4 = 0.71 × Tabulated value
Class 5 = As tabulated in table
Class 6 = 1.40 × Tabulated value
Class 7 = 2.00 × Tabulated value

26.2 Internal Splines—These will mate with older external splines as follows:

Year	Major Dia. Fit	Flat Root Side Fit	Fillet Root Side Fit
1946	No (D)[a]	No (E)	No (D)
1950	Yes (F)	Yes	Yes (C)
1957 SAE	Yes (G)	Yes	Yes
1960	Yes (G)	Yes	Yes

[a]See paragraph 26.3 for exceptions C, D, E, F, G.

26.3 Exceptions

A—The external major diameter, unless chamfered or reduced, may interfere with the internal form diameter on flat root side fit splines. Internal splines made to the 1957 and 1960 standards had the same dimensions as shown for the major diameter fit splines in this standard.

B—For 15 teeth or less, the minor diameter of the internal spline, unless chamfered, will interfere with the form diameter of the external spline.

C—For 9 teeth or less, the minor diameter of the internal spline, unless chamfered, will interfere with form diameter of the external spline.

D—The internal minor diameter, unless chamfered, will interfere with the external form diameter.

E—The internal minor diameter, unless chamfered, will interfere with the external form diameter.

F—For 10 teeth or less, the minimum chamfer on the major diameter of the external spline may not clear the internal form diameter.

G—Depending upon the pitch of the spline, the minimum chamfer on the major diameter may not clear the internal form diameter.

TABLE 107—MAJOR AND MINOR DIAMETER TOLERANCES
Ten thousandths (20 = 0.0020)

Item	Number	6.1 6.2 6.3	Tolerances			
			14.1		14.2	4.3
	Dim. Symbol	D_i	D_o		D_o	D_{ri}
	Spline Pitch		Flat Root Side Fit	Fillet Root Side Fit		
		Plus	Minus	Minus	Minus	Plus
	2.5/5	200	2000/P + 250	200	—	—
	3/6	150	2000/P + 200	150	↑	↑
	4/8	100	2000/P + 150	100		
	5/10	80	2000/P + 130	80		
	6/12	50		50	a	b
	8/16	50		50		
	10/20	50		50		
	12/24	50	2000/P + 100	50	↓	↓
	16/32	50		50	—	—
	20/40	50		50	—	—
	24/48	50		50	—	—
	32/64	30		30	—	—
	40/80	30	2000/P + 80	30	—	—
	48/96	30		30	—	—
	64/128	20		20	—	—
	80/160	20	2000/P + 70	20	—	—
	128/256	20		20	—	—

[a]3 + 2D, with min of 5, 2.5/5 thru 16/32 spline pitch.
[b]10 + 3D, 2.5/5 thru 16/32 spline pitch.

TABLE 107a—MINIMUM EFFECTIVE CLEARANCE FOR USE WITH MAJOR DIA FIT SPLINES
Ten Thousandths (20 = 0.0020)

Pitch	2.5/5 and 3/6	4/8 and 5/10	6/12 and 8/16	10/20 and 12/24	16/32 thru 48/96
c_v	0.20N + 18	0.15N + 16	0.10N + 14	0.07N + 14	15

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TABLE 108—MINIMUM FILLET RADIUS FOR FILLET ROOT SIDE FIT 30 DEG PRESSURE ANGLE SPLINE

External

N \ P	2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
8	0.183	0.148	0.109	0.085	0.069	0.047	0.037	0.031	0.020	0.016	0.013	0.010	0.008	0.007
9	0.181	0.146	0.107	0.083	0.068	0.047	0.037	0.030	0.020	0.015	0.013	0.010	0.008	0.006
10	0.179	0.144	0.106	0.082	0.068	0.046	0.036	0.030	0.019	0.015	0.013	0.010	0.008	0.006
11	0.177	0.143	0.105	0.082	0.067	0.046	0.036	0.030	0.019	0.014	0.012	0.009	0.007	0.006
12	0.176	0.142	0.104	0.081	0.066	0.045	0.036	0.029	0.018	0.014	0.012	0.009	0.007	0.006
13	0.175	0.141	0.103	0.080	0.066	0.045	0.036	0.029	0.018	0.014	0.012	0.009	0.007	0.006
14	0.174	0.140	0.103	0.080	0.065	0.045	0.035	0.029	0.018	0.014	0.012	0.009	0.007	0.006
15	0.173	0.139	0.102	0.079	0.065	0.044	0.035	0.029	0.017	0.013	0.011	0.009	0.007	0.005
16	0.173	0.139	0.102	0.079	0.065	0.044	0.035	0.029	0.017	0.013	0.011	0.009	0.007	0.005
17	0.172	0.138	0.101	0.079	0.064	0.044	0.035	0.029	0.017	0.013	0.011	0.009	0.007	0.005
18–19	0.171	0.137	0.101	0.078	0.064	0.044	0.034	0.028	0.017	0.013	0.011	0.009	0.007	0.005
20–21	0.170	0.136	0.100	0.078	0.064	0.044	0.034	0.028	0.016	0.012	0.011	0.008	0.006	0.005
22–25	0.169	0.135	0.099	0.077	0.063	0.043	0.034	0.028	0.016	0.012	0.010	0.008	0.006	0.005
26–28	0.168	0.135	0.099	0.076	0.063	0.043	0.034	0.028	0.016	0.012	0.010	0.008	0.006	0.005
29–34	0.167	0.134	0.098	0.076	0.063	0.043	0.034	0.027	0.015	0.012	0.010	0.008	0.006	0.005
35–41	0.166	0.133	0.097	0.075	0.062	0.042	0.033	0.027	0.015	0.011	0.010	0.008	0.006	0.005
42–49	0.165	0.132	0.097	0.075	0.061	0.042	0.033	0.027	0.015	0.011	0.010	0.008	0.006	0.004
50→	0.164	0.131	0.096	0.074	0.060	0.041	0.032	0.026	0.014	0.010	0.009	0.007	0.005	0.004

Internal

N \ P	2.5/5	3/6	4/8	5/10	6/12	8/16	10/20	12/24	16/32	20/40	24/48	32/64	40/80	48/96
8	0.123	0.100	0.071	0.054	0.044	0.030	0.023	0.017	0.011	0.007	0.007	0.006	0.004	0.002
9	0.128	0.104	0.074	0.057	0.046	0.032	0.024	0.019	0.012	0.008	0.007	0.006	0.004	0.002
10	0.132	0.108	0.077	0.059	0.048	0.033	0.025	0.020	0.013	0.009	0.008	0.006	0.004	0.003
11	0.135	0.110	0.079	0.061	0.049	0.033	0.026	0.020	0.014	0.009	0.008	0.007	0.005	0.003
12	0.130	0.106	0.076	0.058	0.047	0.032	0.024	0.019	0.014	0.008	0.008	0.007	0.005	0.003
13	0.132	0.108	0.077	0.059	0.048	0.033	0.025	0.020	0.014	0.009	0.008	0.007	0.005	0.004
14	0.133	0.109	0.078	0.060	0.048	0.033	0.025	0.020	0.014	0.009	0.008	0.007	0.005	0.004
15	0.135	0.110	0.078	0.060	0.049	0.034	0.026	0.020	0.014	0.009	0.008	0.007	0.005	0.004
16	0.136	0.111	0.079	0.061	0.049	0.034	0.026	0.020	0.014	0.009	0.008	0.007	0.005	0.004
17	0.140	0.111	0.080	0.063	0.050	0.034	0.027	0.021	0.015	0.010	0.009	0.007	0.005	0.004
18	0.141	0.112	0.080	0.064	0.052	0.034	0.027	0.022	0.015	0.010	0.009	0.007	0.005	0.004
19	0.142	0.113	0.081	0.064	0.052	0.035	0.027	0.022	0.015	0.011	0.009	0.007	0.005	0.004
20	0.142	0.113	0.083	0.064	0.053	0.036	0.027	0.022	0.015	0.011	0.010	0.007	0.006	0.004
21	0.143	0.118	0.084	0.065	0.053	0.036	0.028	0.022	0.016	0.011	0.010	0.008	0.006	0.004
22	0.145	0.118	0.084	0.066	0.053	0.036	0.028	0.022	0.016	0.011	0.010	0.008	0.006	0.004
23–24	0.146	0.119	0.087	0.066	0.054	0.037	0.028	0.023	0.016	0.011	0.010	0.008	0.006	0.004
25–27	0.147	0.120	0.088	0.067	0.055	0.037	0.029	0.023	0.016	0.011	0.010	0.008	0.006	0.004
28–31	0.148	0.120	0.088	0.069	0.056	0.038	0.029	0.023	0.017	0.012	0.010	0.008	0.006	0.005
32–36	0.149	0.121	0.089	0.069	0.057	0.039	0.029	0.024	0.017	0.013	0.011	0.008	0.006	0.005
37–43	0.150	0.122	0.089	0.070	0.057	0.040	0.030	0.025	0.017	0.013	0.011	0.009	0.006	0.005
44–50	0.151	0.123	0.090	0.070	0.058	0.040	0.031	0.025	0.018	0.013	0.011	0.009	0.007	0.005
50→	0.152	0.124	0.091	0.070	0.059	0.041	0.032	0.025	0.018	0.014	0.011	0.009	0.007	0.005

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TABLE 109—SEVOLUTES OF ANGLES[a]

ϕ_z	Sevolute	Diff.	ϕ_z	Sevolute	Diff.	ϕ_z	Sevolute	Diff.	ϕ_z	Sevolute	Diff.
0.0	1.00000		6.5	1.00598		13.0	1.02233		19.5	1.04707	
0.1	1.00000	00	6.6	1.00616	18	13.2	1.02265	32	19.6	1.04751	44
0.2	1.00001	01	6.7	1.00634	18	13.1	1.02297	32	19.7	1.04795	44
0.3	1.00001	00	6.8	1.00652	18	13.3	1.02330	33	19.8	1.04839	44
0.4	1.00002	01	6.9	1.00671	19	13.4	1.02363	33	19.9	1.04883	44
		02			19			33			44
0.5	1.00004		7.0	1.00690		13.5	1.02396		20.0	1.04927	
0.6	1.00005	01	7.1	1.00709	19	13.6	1.02429	33	20.1	1.04972	45
0.7	1.00007	02	7.2	1.00728	19	13.7	1.02462	33	20.2	1.05017	45
0.8	1.00010	03	7.3	1.00748	20	13.8	1.02496	34	20.3	1.05061	44
0.9	1.00012	02	7.4	1.00768	20	13.9	1.02529	33	20.4	1.05107	46
		03			20			34			45
1.0	1.00015		7.5	1.00788		14.0	1.02563		20.5	1.05152	
1.1	1.00018	03	7.6	1.00808	20	14.1	1.02597	34	20.6	1.05197	45
1.2	1.00022	03	7.7	1.00828	20	14.2	1.02632	35	20.7	1.05243	46
1.3	1.00025	03	7.8	1.00849	21	14.3	1.02666	34	20.8	1.05288	45
1.4	1.00029	04	7.9	1.00870	21	14.4	1.02701	35	20.9	1.05334	46
		05			21			35			46
1.5	1.00034		8.0	1.00891		14.5	1.02736		21.0	1.05380	
1.6	1.00038	04	8.1	1.00913	22	14.6	1.02771	35	21.1	1.05426	46
1.7	1.00043	05	8.2	1.00934	21	14.7	1.02806	35	21.2	1.05472	46
1.8	1.00048	05	8.3	1.00956	22	14.8	1.02841	35	21.3	1.05519	47
1.9	1.00054	06	8.4	1.00978	22	14.9	1.02877	36	21.4	1.05565	46
		06			23			36			47
2.0	1.00060		8.5	1.01001		15.0	1.02913		21.5	1.05612	
2.1	1.00066	06	8.6	1.01023	22	15.1	1.02949	36	21.6	1.05659	47
2.2	1.00072	06	8.7	1.01046	23	15.2	1.02985	36	21.7	1.05706	47
2.3	1.00078	06	8.8	1.01069	23	15.3	1.03021	36	21.8	1.05753	47
2.4	1.00085	07	8.9	1.01093	24	15.4	1.03058	37	21.9	1.05801	48
		08			23			36			47
2.5	1.00093		9.0	1.01116		15.5	1.03094		22.0	1.05848	
2.6	1.00100	07	9.1	1.01140	24	15.6	1.03131	37	22.1	1.05896	48
2.7	1.00108	08	9.2	1.01164	24	15.7	1.03168	37	22.2	1.05944	48
2.8	1.00116	08	9.3	1.01188	24	15.8	1.03206	38	22.3	1.05991	47
2.9	1.00124	08	9.4	1.01212	24	15.9	1.03243	37	22.4	1.06040	49
		08			25			38			48
3.0	1.00132		9.5	1.01237		16.0	1.03281		22.5	1.06088	
3.1	1.00141	09	9.6	1.01262	25	16.1	1.03318	37	22.6	1.06136	48
3.2	1.00150	09	9.7	1.01287	25	16.2	1.03356	38	22.7	1.06185	49
3.3	1.00160	10	9.8	1.01312	25	16.3	1.03395	39	22.8	1.06233	48
3.4	1.00169	09	9.9	1.01338	26	16.4	1.03433	38	22.9	1.06282	49
		10			25			38			49
3.5	1.00179		10.0	1.01363		16.5	1.03471		23.0	1.06331	
3.6	1.00189	10	10.1	1.01389	26	16.6	1.03510	39	23.1	1.06380	49
3.7	1.00200	11	10.2	1.01415	26	16.7	1.03549	39	23.2	1.06429	49
3.8	1.00211	11	10.3	1.01442	27	16.8	1.03588	39	23.3	1.06479	50
3.9	1.00222	11	10.4	1.01468	26	16.9	1.03627	39	23.4	1.06528	49
		11			27			40			50
4.0	1.00233		10.5	1.01495		17.0	1.03667		23.5	1.06578	
4.1	1.00244	11	10.6	1.01522	27	17.1	1.03706	39	23.6	1.06628	50
4.2	1.00256	12	10.7	1.01549	27	17.2	1.03746	40	23.7	1.06678	50
4.3	1.00268	12	10.8	1.01577	28	17.3	1.03786	40	23.8	1.06728	50
4.4	1.00280	12	10.9	1.01604	27	17.4	1.03826	40	23.9	1.06778	50
		13			28			40			51
4.5	1.00293		11.0	1.01632		17.5	1.03866		24.0	1.06829	
4.6	1.00306	13	11.1	1.01660	28	17.6	1.03907	41	24.1	1.06879	50
4.7	1.00319	13	11.2	1.01689	29	17.7	1.03947	40	24.2	1.06930	51
4.8	1.00332	13	11.3	1.01717	28	17.8	1.03988	41	24.3	1.06981	51
4.9	1.00346	14	11.4	1.01746	29	17.9	1.04029	41	24.4	1.07032	51
		14			29			41			51
5.0	1.00360		11.5	1.01775		18.0	1.04070		24.5	1.07083	
5.1	1.00374	14	11.6	1.01804	29	18.1	1.04111	41	24.6	1.07134	51
5.2	1.00388	14	11.7	1.01833	29	18.2	1.04153	42	24.7	1.07185	51
5.3	1.00403	15	11.8	1.01863	30	18.3	1.04195	42	24.8	1.07237	52
5.4	1.00418	15	11.9	1.01892	29	18.4	1.04236	41	24.9	1.07288	51
		15			30			42			52
5.5	1.00433		12.0	1.01922		18.5	1.04278		25.0	1.07340	
5.6	1.00448	15	12.1	1.01953	31	18.6	1.04320	42	25.1	1.07392	52
5.7	1.00464	16	12.2	1.01983	30	18.7	1.04363	43	25.2	1.07444	52
5.8	1.00480	16	12.3	1.02013	30	18.8	1.04405	42	25.3	1.07496	52
5.9	1.00496	16	12.4	1.02044	31	18.9	1.04448	43	25.4	1.07549	53
		16			31			43			52
6.0	1.00512		12.5	1.02075		19.0	1.04491		25.5	1.07601	
6.1	1.00529	17	12.6	1.02106	31	19.1	1.04534	43	25.6	1.07654	53
6.2	1.00546	17	12.7	1.02138	32	19.2	1.04577	43	25.7	1.07707	53
6.3	1.00563	17	12.8	1.02169	31	19.3	1.04620	43	25.8	1.07759	52
6.4	1.00580	17	12.9	1.02201	32	19.4	1.04663	43	25.9	1.07812	53
		18			32			44			53

[a] $\text{Sevolute}\,\phi_z = \sec\phi_z - (\tan\phi_z - \text{arc}\,\phi_z)$
$= \sec\phi_z - \text{inv}\,\phi_z$

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TABLE 109—SEVOLUTES OF ANGLES[a] (CONTINUED)

ϕ_z	Sevolute	Diff.	ϕ_z	Sevolute	Diff.	ϕ_z	Sevolute	Diff.	ϕ_z	Sevolute	Diff.
26.0	1.07865		32.5	1.11585		39.0	1.15765		45.5	1.20324	
		54			61			68			72
26.1	1.07919		32.6	1.11646		39.1	1.15833		45.6	1.20396	
		53			61			67			73
26.2	1.07972		32.7	1.11707		39.2	1.15900		45.7	1.20469	
		54			62			68			73
26.3	1.08026		32.8	1.11769		39.3	1.15968		45.8	1.20542	
		53			61			68			73
26.4	1.08079		32.9	1.11830		39.4	1.16036		45.9	1.20615	
		54			61			68			73
26.5	1.08133		33.0	1.11891		39.5	1.16104		46.0	1.20688	
		54			62			67			73
26.6	1.08187		33.1	1.11953		39.6	1.16171		46.1	1.20761	
		54			62			68			73
26.7	1.08241		33.2	1.12015		39.7	1.16239		46.2	1.20834	
		54			62			69			73
26.8	1.08295		33.3	1.12077		39.8	1.16308		46.3	1.20907	
		55			61			68			73
26.9	1.08350		33.4	1.12138		39.9	1.16376		46.4	1.20980	
		54			62			68			74
27.0	1.08404		33.5	1.12200		40.0	1.16444		46.5	1.21054	
		55			63			68			73
27.1	1.08459		33.6	1.12263		40.1	1.16512		46.6	1.21127	
		54			62			69			74
27.2	1.08513		33.7	1.12325		40.2	1.16581		46.7	1.21201	
		55			62			68			73
27.3	1.08568		33.8	1.12387		40.3	1.16649		46.8	1.21274	
		55			63			69			74
27.4	1.08623		33.9	1.12450		40.4	1.16718		46.9	1.21348	
		55			62			68			74
27.5	1.08678		34.0	1.12512		40.5	1.16786		47.0	1.21422	
		55			63			69			73
27.6	1.08733		34.1	1.12575		40.6	1.16855		47.1	1.21495	
		56			63			69			74
27.7	1.08789		34.2	1.12638		40.7	1.16924		47.2	1.21569	
		55			62			69			74
27.8	1.08844		34.3	1.12700		40.8	1.16993		47.3	1.21643	
		56			63			69			74
27.9	1.08900		34.4	1.12763		40.9	1.17062		47.4	1.21717	
		55			63			69			74
28.0	1.08955		34.5	1.12826		41.0	1.17131		47.5	1.21791	
		56			64			69			74
28.1	1.09011		34.6	1.12890		41.1	1.17200		47.6	1.21865	
		56			63			70			74
28.2	1.09067		34.7	1.12953		41.2	1.17270		47.7	1.21939	
		56			63			69			75
28.3	1.09123		34.8	1.13016		41.3	1.17339		47.8	1.22014	
		56			64			69			74
28.4	1.09179		34.9	1.13080		41.4	1.17408		47.9	1.22088	
		57			63			70			74
28.5	1.09236		35.0	1.13143		41.5	1.17478		48.0	1.22162	
		56			64			69			75
28.6	1.09292		35.1	1.13207		41.6	1.17547		48.1	1.22237	
		57			64			70			74
28.7	1.09349		35.2	1.13271		41.7	1.17617		48.2	1.22311	
		56			64			70			75
28.8	1.09405		35.3	1.13335		41.8	1.17687		48.3	1.22386	
		57			64			70			74
28.9	1.09462		35.4	1.13399		41.9	1.17757		48.4	1.22460	
		57			64			70			75
29.0	1.09519		35.5	1.13463		42.0	1.17827		48.5	1.22535	
		57			64			70			75
29.1	1.09576		35.6	1.13527		42.1	1.17897		48.6	1.22610	
		57			64			70			75
29.2	1.09633		35.7	1.13591		42.2	1.17967		48.7	1.22685	
		58			64			70			75
29.3	1.09691		35.8	1.13655		42.3	1.18037		48.8	1.22760	
		57			65			70			75
29.4	1.09748		35.9	1.13720		42.4	1.18107		48.9	1.22835	
		57			64			71			75
29.5	1.09805		36.0	1.13784		42.5	1.18178		49.0	1.22910	
		58			65			70			75
29.6	1.09863		36.1	1.13849		42.6	1.18248		49.1	1.22985	
		58			65			70			75
29.7	1.09921		36.2	1.13914		42.7	1.18318		49.2	1.23060	
		58			65			71			75
29.8	1.09979		36.3	1.13979		42.8	1.18389		49.3	1.23135	
		58			65			71			75
29.9	1.10037		36.4	1.14044		42.9	1.18460		49.4	1.23210	
		58			65			70			76
30.0	1.10095		36.5	1.14109		43.0	1.18530		49.5	1.23286	
		58			65			71			75
30.1	1.10153		36.6	1.14174		43.1	1.18601		49.6	1.23361	
		58			65			71			76
30.2	1.10211		36.7	1.14239		43.2	1.18672		49.7	1.23437	
		59			65			71			75
30.3	1.10270		36.8	1.14304		43.3	1.18743		49.8	1.23512	
		59			66			71			76
30.4	1.10329		36.9	1.14370		43.4	1.18814		49.9	1.23588	
		58			65			71			75
30.5	1.10387		37.0	1.14435		43.5	1.18885				
		59			66			71			
30.6	1.10446		37.1	1.14501		43.6	1.18956				
		59			66			72			
30.7	1.10505		37.2	1.14567		43.7	1.19028				
		59			65			71			
30.8	1.10564		37.3	1.14632		43.8	1.19099				
		59			66			71			
30.9	1.10623		37.4	1.14698		43.9	1.19170				
		59			66			72			
31.0	1.10682		37.5	1.14764		44.0	1.19242				
		60			66			72			
31.1	1.10742		37.6	1.14830		44.1	1.19314				
		59			67			71			
31.2	1.10801		37.7	1.14897		44.2	1.19385				
		60			66			72			
31.3	1.10861		37.8	1.14963		44.3	1.19457				
		60			66			72			
31.4	1.10921		37.9	1.15029		44.4	1.19529				
		60			67			72			
31.5	1.10981		38.0	1.15096		44.5	1.19601				
		60			66			72			
31.6	1.11041		38.1	1.15162		44.6	1.19673				
		60			67			72			
31.7	1.11101		38.2	1.15229		44.7	1.19745				
		60			67			72			
31.8	1.11161		38.3	1.15296		44.8	1.19817				
		60			67			72			
31.9	1.11221		38.4	1.15363		44.9	1.19889				
		60			66			72			
32.0	1.11281		38.5	1.15429		45.0	1.19961				
		61			67			73			
32.1	1.11342		38.6	1.15496		45.1	1.20034				
		61			68			72			
32.2	1.11403		38.7	1.15564		45.2	1.20106				
		60			67			72			
32.3	1.11463		38.8	1.15631		45.3	1.20178				
		61			67			73			
32.4	1.11524		38.9	1.15698		45.4	1.20251				
		61			67			73			

[a] $\text{Sevolute}\phi_z = \sec\phi_z - (\tan\phi_z - \text{arc}\phi_z)$
$= \sec\phi_z - \text{inv}\phi_z$

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TABLE 110—NUMBER OF TEETH AND NOMINAL MAJOR DIAMETERS UNDER BEARING BORE

Bearing Bore		Spline Pitch																					
		32/64		40/80		48/96		5/10		6/12		8/16		10/20		12/24		16/32		20/40		24/48	
mm	in	N	Dia	N	Dia	N	Dia	N	Dia	N	Dia	N	Dia	N	Dia	N	Dia	N	Dia	N	Dia	N	Dia
—	0.1900	—	—	6	0.175	8	0.188	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	0.2500	6	0.219	8	0.225	10	0.229	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6	0.292
—	0.3125	8	0.281	11	0.300	13	0.292	—	—	—	—	—	—	—	—	—	—	—	—	6	0.350	7	0.333
—	0.3750	10	0.344	13	0.350	16	0.354	—	—	—	—	—	—	—	—	—	—	—	—	6	0.350	8	0.375
10	0.3937	11	0.375	14	0.375	17	0.375	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12	0.4724	14	0.469	17	0.450	21	0.458	—	—	—	—	—	—	—	—	—	—	6	0.438	8	0.450	10	0.458
—	0.5000	14	0.469	18	0.475	22	0.479	—	—	—	—	—	—	—	—	—	—	6	0.438	8	0.450	10	0.458
15	0.5906	17	0.563	22	0.575	27	0.583	—	—	—	—	—	—	—	—	6	0.583	8	0.563	10	0.550	13	0.583
—	0.6250	18	0.594	23	0.600	28	0.604	—	—	—	—	—	—	—	—	6	0.583	8	0.563	11	0.600	13	0.583
17	0.6693	20	0.656	25	0.650	31	0.667	—	—	—	—	—	—	—	—	7	0.667	9	0.625	12	0.650	15	0.667
—	0.7500	22	0.719	28	0.725	34	0.729	—	—	—	—	—	—	6	0.700	7	0.667	10	0.688	13	0.700	16	0.708
20	0.7874	24	0.781	30	0.775	36	0.771	—	—	—	—	—	—	6	0.700	8	0.750	11	0.750	14	0.750	17	0.750
25	0.9843	30	0.969	38	0.975	46	0.979	—	—	—	—	6	0.875	8	0.900	10	0.917	14	0.938	18	0.950	22	0.958
—	1.0000	30	0.969	38	0.975	46	0.979	—	—	—	—	6	0.875	8	0.900	10	0.917	14	0.938	18	0.950	22	0.958
30	1.1811	36	1.156	46	1.175	55	1.167	—	—	6	1.167	8	1.125	10	1.100	13	1.167	17	1.125	22	1.150	27	1.167
—	1.2500	38	1.219	48	1.225	58	1.229	—	—	6	1.167	8	1.125	11	1.200	13	1.167	18	1.188	23	1.200	28	1.208
—	1.3130	40	1.281	51	1.300	61	1.292	—	—	6	1.167	9	1.250	12	1.300	14	1.250	19	1.250	25	1.300	30	1.292
35	1.3780	43	1.375	54	1.375	65	1.375	—	—	7	1.333	10	1.375	12	1.300	15	1.333	21	1.375	26	1.350	32	1.375
—	1.4380	44	1.406	56	1.425	67	1.417	—	—	7	1.333	10	1.375	13	1.400	16	1.417	21	1.375	27	1.400	33	1.417
—	1.5630	48	1.541	61	1.550	73	1.542	—	—	8	1.500	11	1.500	14	1.500	17	1.500	23	1.500	30	1.550	36	1.542
40	1.5748	49	1.563	61	1.550	74	1.563	6	1.400	8	1.500	11	1.500	14	1.500	17	1.500	24	1.563	30	1.550	36	1.542
45	1.7717	55	1.750	69	1.750	83	1.750	7	1.600	9	1.667	13	1.750	16	1.700	20	1.750	27	1.750	34	1.750	41	1.750
—	1.8130	56	1.781	71	1.800	85	1.792	8	1.800	9	1.667	13	1.750	17	1.800	20	1.750	27	1.750	35	1.800	42	1.792
50	1.9685	62	1.968	77	1.950	93	1.958	8	1.800	10	1.833	14	1.875	18	1.900	22	1.917	30	1.938	38	1.950	46	1.958
—	2.0630	64	2.031	81	2.050	97	2.042	9	2.000	11	2.000	15	2.000	19	2.000	23	2.000	31	2.000	40	2.050	48	2.042
						4/8																	
55	2.1654	68	2.156	85	2.150	7	2.000	9	2.000	11	2.000	16	2.125	20	2.100	24	2.083	33	2.125	42	2.150	50	2.125
—	2.3130	72	2.281	91	2.300	8	2.250	10	2.200	12	2.167	17	2.250	22	2.300	26	2.250	35	2.250	45	2.300	54	2.292
60	2.3622	74	2.343	93	2.350	8	2.250	10	2.200	13	2.333	17	2.250	22	2.300	27	2.333	36	2.313	46	2.350	55	2.333
65	2.5591	80	2.531	—	—	9	2.500	11	2.400	14	2.500	19	2.500	24	2.500	29	2.500	39	2.500	50	2.550	60	2.542
70	2.7559	87	2.750	—	—	10	2.750	12	2.600	15	2.667	21	2.750	26	2.700	32	2.750	43	2.750	54	2.750	65	2.750
				3/6																			
—	2.9380	92	2.906	7	2.667	10	2.750	13	2.800	16	2.833	22	2.875	28	2.900	34	2.917	45	2.875	57	2.900	69	2.917
75	2.9528	93	2.938	7	2.667	10	2.750	13	2.800	16	2.833	22	2.875	28	2.900	34	2.917	46	2.938	58	2.950	69	2.917
—	3.0630	96	3.031	8	3.000	11	3.000	14	3.000	17	3.000	23	3.000	29	3.000	35	3.000	47	3.000	60	3.050	72	3.042
80	3.1496	99	3.125	8	3.000	11	3.000	14	3.000	17	3.000	24	3.125	30	3.100	36	3.083	49	3.125	61	3.100	74	3.125
85	3.3465	—	—	9	3.333	12	3.250	15	3.200	19	3.333	25	3.250	32	3.300	39	3.333	52	3.313	65	3.300	79	3.333
		2.5/5																					
90	3.5433	7	3.200	9	3.333	13	3.500	16	3.400	20	3.500	27	3.500	34	3.500	41	3.500	55	3.500	69	3.500	83	3.542
95	3.7402	8	3.600	10	3.667	13	3.500	17	3.600	21	3.667	28	3.625	36	3.700	43	3.667	58	3.688	73	3.700	88	3.708
100	3.9370	8	3.600	10	3.667	14	3.750	18	3.800	22	3.833	30	3.875	38	3.900	46	3.917	61	3.875	77	3.900	93	3.917
105	4.1339	9	4.000	11	4.000	15	4.000	19	4.000	23	4.000	32	4.125	40	4.100	48	4.083	65	4.125	81	4.100	98	4.125
110	4.3307	9	4.000	11	4.000	16	4.250	20	4.200	24	4.167	33	4.250	42	4.300	50	4.250	68	4.312	85	4.300	—	—
120	4.7244	10	4.400	13	4.667	17	4.500	22	4.600	27	4.667	36	4.625	46	4.700	55	4.667	74	4.688	93	4.700	—	—
130	5.1181	11	4.800	14	5.000	19	5.000	24	5.000	29	5.000	39	5.000	50	5.100	60	5.083	80	5.062	—	—	—	—
140	5.5118	12	5.200	15	5.333	21	5.500	26	5.400	32	5.500	43	5.500	54	5.500	65	5.500	87	5.500	—	—	—	—
150	5.9055	13	5.600	16	5.667	22	5.750	28	5.800	34	5.833	46	5.875	58	5.900	69	5.833	93	5.875	—	—	—	—
160	6.2992	14	6.000	17	6.000	24	6.250	30	6.200	36	6.167	49	6.250	61	6.200	74	6.250	99	6.250	—	—	—	—
170	6.6828	15	6.400	19	6.667	25	6.500	32	6.600	39	6.667	52	6.625	65	6.600	79	6.667	—	—	—	—	—	—
180	7.0866	16	6.800	20	7.000	27	7.000	34	7.000	41	7.000	55	7.000	69	7.000	84	7.083	—	—	—	—	—	—
190	7.4803	17	7.200	21	7.333	28	7.250	36	7.400	43	7.333	58	7.375	73	7.400	88	7.417	—	—	—	—	—	—
200	7.8740	18	7.600	22	7.667	30	7.750	38	7.800	46	7.833	61	7.750	77	7.800	93	7.833	—	—	—	—	—	—
210	8.2677	19	8.000	23	8.000	32	8.250	40	8.200	48	8.167	65	8.250	81	8.200	98	8.250	—	—	—	—	—	—
220	8.6614	20	8.400	24	8.333	33	8.500	42	8.600	50	8.500	68	8.625	85	8.600	—	—	—	—	—	—	—	—
230	9.0551	21	8.800	26	9.000	35	9.000	44	9.000	53	9.000	71	9.000	89	9.000	—	—	—	—	—	—	—	—
240	9.4488	22	9.200	27	9.333	36	9.250	46	9.400	55	9.333	74	9.375	93	9.400	—	—	—	—	—	—	—	—
250	9.8425	23	9.600	28	9.667	38	9.750	48	9.800	58	9.833	77	9.750	97	9.800	—	—	—	—	—	—	—	—
260	10.2362	24	10.000	29	10.000	39	10.000	50	10.200	60	10.167	80	10.125	—	—	—	—	—	—	—	—	—	—
280	11.0236	26	10.800	32	11.000	43	11.000	54	11.000	65	11.000	87	11.000	—	—	—	—	—	—	—	—	—	—
320	12.5984	30	12.400	36	12.333	49	12.500	61	12.400	74	12.500	99	12.500	—	—	—	—	—	—	—	—	—	—

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APPENDIX B

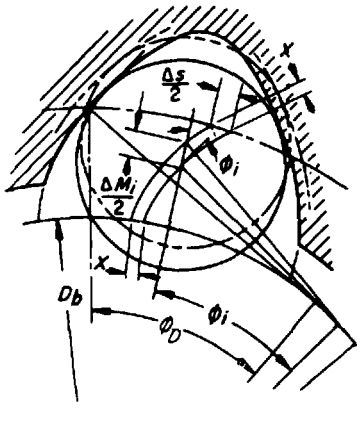
27. *Change Factors*–The change factor (K) as shown in the measurement with pins tables is the ratio of the measurement with pins change to the space width or tooth thickness change. In all cases, the use of the tabulated K factor is an approximation. These K values are calculated for basic space width and tooth thickness and are most accurate when applied to these basic dimensions. Figs. 37 and 38 show the derivation formulas for these K factors. It is suggested that K factors be used for approximation only. When accuracy is desired, use the measurement with pins formulas as described in Section 21. The approximation is more accurate where the given K factor is applied to a measurement with pins from a table closest to the specific condition.

27.1 Derivation of Change Factors

27.1.1 FACTOR K_i FOR INTERNAL SPLINES–In Fig. 37, the original position of the pin is indicated by the solid line and the second position by the phantom line where s has been increased. Involutes are drawn through the pin center and are parallel, and X on the base circle is equal to the side opposite ϕ_i in the small triangle at the pin center.

27.1.2 FACTOR K_e FOR EXTERNAL SPLINES–In Fig. 38, the original position of the pin is indicated by the solid line and the second position by the phantom line. Involutes are drawn through the pin center and are parallel, and X on the base circle is equal to the side opposite ϕ_e in the small triangle at the pin center. At the pitch circle, X forms an angle with the tangent where the change of space width measurement applies.

27.1.3 Where N is odd, the measurement is affected by the angle $90°/N$. See Figs. 23 and 25.



$$X\ (approx) = \frac{\Delta M_i}{2} \sin \phi_i\ *$$

$$\frac{\Delta s}{2} = \frac{X}{\cos \phi_D}$$

$$= \frac{\Delta M_i \sin \phi_i}{2 \cos \phi_D}$$

$$\frac{\Delta M_i}{\Delta s} = \frac{\cos \phi_D}{\sin \phi_i} = K_i$$

WHERE N IS ODD:

$$K_i = \frac{\cos \phi_D}{\sin \phi_i} \cos \frac{90°}{N}$$

*FOR ϕ_i, SEE FIG. 23

FIG. 37–MEASUREMENT CHANGE FACTOR K_i FOR INTERNAL SPLINES

$$X\ (approx) = \frac{\Delta M_e}{2} \sin \phi_e\ *$$

$$\frac{\Delta f}{2} = \frac{X}{\cos \phi_D}$$

$$= \frac{\Delta M_e \sin \phi_e}{2 \cos \phi_D}$$

$$\frac{\Delta M}{\Delta f} = \frac{\cos \phi_D}{\sin \phi_e} = K_e$$

WHERE N IS ODD:

$$K_e = \frac{\cos \phi_D}{\sin \phi_e} \cos \frac{90°}{N}$$

*FOR ϕ_e, SEE FIG. 25

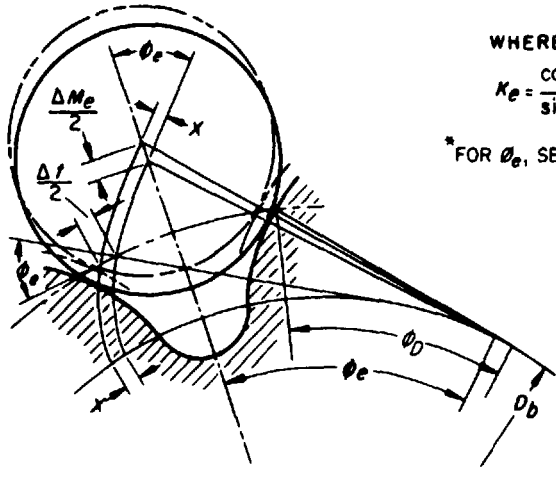


FIG. 38–MEASUREMENT CHANGE FACTOR K_e FOR EXTERNAL SPLINES

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