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Involute Splines and Inspection

Sponsored by
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400 Commonwealth Drive
Warrendale, PA 15096-0001
U.S.A.
Phone: (412) 776-4841
Fax: (412) 776-5760

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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_{Fo}	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_{Fo}	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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Secretariat:
Fred Kern
Society of Automotive Engineers, Inc.
400 Commonwealth Drive
Warrendale, PA 15096-0001

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 $\times$ 0.71

Tolerance Class 6 = Tolerance Class 5 $\times$ 1.40

Tolerance Class 7 = Tolerance Class 5 $\times$ 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.

CONTENTS

INVOLUTE SPLINES

1. Splines	1	5.2 Major Diameter Fit	5
1.1 General	1	5.2.1 Fillet Root	5
1.2 Purpose	1	6. Classes of Tolerances	5
1.3 Scope	1	7. Fillets and Chamfers	5
1.3.1 Spline Tooth Dimensions	1	7.1 Internal Splines with Flat Root	5
1.3.2 Units of Measurement	1	7.2 Fillets on 30° Pressure Angle Flat Root Splines	5
2. Spline Terms and Definitions	1	7.3 Fillets on 30° Pressure Angle Fillet Root Splines	5
2.1 Spline	1	7.3.1 Tabulated Dimensions	5
2.2 Internal Spline	1	7.4 Corner Clearance	6
2.3 External Spline	1	7.4.1 Standard Internal Splines	6
2.4 Involute Spline	1	8. Spline Variations	6
2.5 Fillet	1	8.1 Profile Variation	6
2.6 Fillet Root Spline	1	8.2 Lead Variations	6
2.7 Flat Root Spline	1	8.2.1 Lead Tolerance	6
2.8 Diametral Pitch	1	8.3 Out of Roundness	6
2.9 Stub Pitch	1	8.4 Eccentricity	6
2.10 Spline Pitch	1	8.4.1 Side Fit	6
2.11 Pitch Circle	1	8.4.2 Major Diameter Fit	6
2.12 Pitch Diameter	1	8.4.3 Alignment	6
2.13 Pitch Point	1	9. Effect of Spline Variations	6
2.14 Circular Pitch	1	9.1 Index Variations	6
2.15 Pressure Angle	1	9.2 Profile Variations	6
2.16 Standard (Main) Pressure Angle	1	9.3 Lead Variations	6
2.17 Base Circle	1	9.4 Variation Allowance	6
2.18 Base Diameter	1	10. Effective and Actual Dimensions	6
2.19 Major Circle	1	10.1 Effective and Actual Space Width	6
2.20 Major Diameter	1	10.2 Effective and Actual Tooth Thickness	6
2.21 Minor Circle	1	10.3 Effective Clearance	6
2.22 Minor Diameter	1	10.4 Space Width and Tooth Thickness Limits	7
2.23 Form Circle	1	10.4.1 Minimum and Maximum Effective Values	7
2.24 Form Diameter	1	11. Use of Effective and Actual Dimensions	8
2.25 Depth of Engagement	1	11.1 Minimum Effective Space Width and Maximum Effective Tooth Thickness	8
2.26 Basic Space Width	1	11.2 Minimum Actual Space Width and Maximum Actual Tooth Thickness	8
2.27 Actual Space Width	2	11.2.1 Taper	8
2.28 Effective Space Width	2	11.3 Maximum Actual Space Width and Minimum Actual Tooth Thickness	8
2.29 Actual Tooth Thickness	2	11.4 Maximum Effective Space Width and Minimum Effective Tooth Thickness	8
2.30 Effective Tooth Thickness	2	11.4.1 Alternate Method A	8
2.31 Effective Clearance	2	11.4.2 Alternate Method B	8
2.32 Theoretical Maximum Clearance	2	12. Spline Tables	8
2.33 Form Clearance	2	12.1 Dimensions and Tolerances	8
2.34 Total Index Variation	2	13. Drawing Data	8
2.35 Profile Variation	2	13.1 Spline Data and Reference Dimensions	8
2.36 Lead Variation	2	13.2 Combination of Types	8
2.37 Parallelism Variation	2	13.2.1 Flat Root Internal Used with Fillet Root External	8
2.38 Alignment Variation	2	13.2.2 Design Option	8
2.39 Out of Roundness	2	14. Internal 45° Pressure Angle Splines with Straight Sided Option	82
2.40 Effective Variation	2	14.1 Straight Profiles	82
2.41 Variation Allowance	2	14.2 Internal Form Angle	82
2.42 Machining Tolerance	2	14.3 Profile Tolerances	82
2.43 Total Tolerance	2		
2.44 Length of Engagement	2		
2.45 Active Spline Length	2		
2.46 Reference	2		
3. Symbols	2		
4. Pressure Angle (Standard)	5		
5. Type of Fit	5		
5.1 Side Fit	5		

INSPECTION

15. Purpose and Scope	83
15.1 Inspection Methods	83
15.1.1 Routine Inspection	83
15.1.2 Analytical Inspection	83
16. Inspection with Gages	83
16.1 Types of Gages	83
16.1.1 Composite Spline Gage	83
16.1.2 Sector Spline Gage	83
16.1.3 Paddle Gage	83
16.1.4 Snap Ring Gage	83
16.1.5 Progressive Gage	83
16.2 Go and Not Go Gages	83
16.2.1 Go Gages	83
16.2.2 Not Go Gages	83
16.3 Effective and Actual Dimensions	83
16.3.1 Effective Dimensions	83
16.3.2 Actual Dimensions	83
16.4 Function and Selection of Gages	84
16.4.1 Control Dimensions	84
16.5 Side Fit and Major Diameter Fit Gages	84
16.5.1 Side Fit Gage	84
16.5.2 Major Diameter Fit Gage	84
16.5.3 Independent Inspection	84
16.6 Gages for Involute Splines	84
16.7 Tolerances for Measurement with Pins	84
17. Gage Blanks	84
17.1 Standard Blanks	84
17.1.1 Pilots	84
17.2 Alignment Gage Blanks	84
18. Gages for Internal Splines	86
18.1 Go Composite Side Fit Plug Gage	86
18.2 Not Go Composite Plug Gage	86
18.3 Go Composite Major Diameter Fit Plug Gage	86
18.4 Not Go Sector Plug Gage	86
18.5 Major Diameter Plug Gage	89
18.5.1 Not Go Gage	89
18.5.2 Go Gage	89
18.6 Plug Gage with Tapered Teeth	89
18.6.1 Composite Side Fit Plug Gage	89
18.6.2 Sector Plug Gage	90
19. Gages for External Splines	90
19.1 Go Composite Side Fit Ring Gage	90
19.2 Not Go Composite Ring Gage	90
19.3 Go Composite Major Diameter Fit Ring Gage	90
19.3.1 Evaluation of Rejections	90
19.4 Not Go Sector Ring Gage	90
19.5 Tapered Tooth Master Plug Gage	91
19.5.1 Tapered Tooth Masters	91
19.6 Ring and Snap Gages for Major Diameter	91
19.6.1 Go Gages	91

20. Gage Tolerances	94
20.1 General	94
20.2 Part and Gage Tolerance Relationship	94
20.2.1 Establishment of Tolerance	94
20.2.2 Recommended Gage Tolerances	94
21. Measurements with Pins	95
21.1 General	95
21.1.1 Diameters of Pins	95
21.2 Measurements with Two Pins	95
21.2.1 Calculations	95
21.2.2 Special Problems	95
21.2.3 Use of Flatted Pins	95
21.3 Measurements with Three Pins	95
21.4 Pin Contact Diameter	95
21.5 Conditions for Measurements	96
21.5.1 Pressures for Measurement	96
21.5.2 Temperature for Measurement	96
22. Analytical Inspection	96
22.1 General	96
22.2 Measurements of Spline Variations	96
22.2.1 Total Index Variation	96
22.2.2 Profile Variation	98
22.2.3 Lead Variation	99
22.2.4 Out of Roundness	99
22.2.5 Eccentricity	99

APPENDIX A — INVOLUTE SPLINES

23. Corner Clearance	144
24. Calculation of Fillets	144
25. Modifications for Low Numbers of Teeth	144
25.1 Form Diameter of External Spline	144
25.1.1 Flat Root Type	144
25.1.2 Fillet Root Type	144
25.2 Minor Diameter of Internal Spline	146
25.3 Modified Dimensions	146
26. Interchangeability	146
26.1 External Splines	146
26.2 Internal Splines	146
26.3 Exceptions	146

APPENDIX B — INSPECTION

27. Change Factors	151
27.1 Derivation of Change Factors	151
27.1.1 Factor K_i Internal Splines	151
27.1.2 Factor K_e External Splines	151
27.1.3 N is Odd	151
Index	152

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_r —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

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

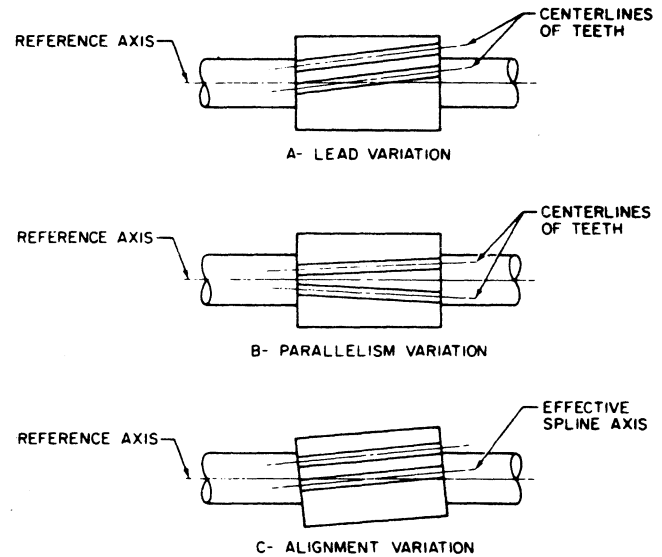


FIG. 1—LEAD VARIATIONS

which contacts the mating spline. On sliding splines it exceeds the length of engagement.

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:

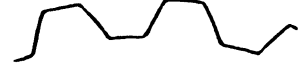
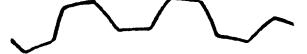
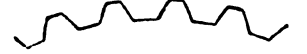
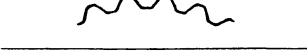
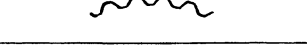
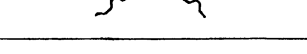
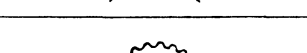
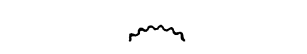
1. Repeated for drawing clarification.
2. Needed to define a nonfeature datum or basis from which a form or feature is generated.
3. Needed to define a nonfeature dimension from which other specifications or dimensions are developed.
4. Needed to define a nonfeature dimension at which toleranced sizes 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_{ct}	= 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

TABLE I—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

^aShown to illustrate the relative tooth sizes for the various spline pitches.

INVOLUTE SPLINES

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}	$\frac{N - 1.35}{P}$		$\frac{N - 1.8}{P}$	$\frac{N - 1.3}{P}$	$\frac{N - 1}{P}$
	16/32 spline pitch, and finer				$\frac{N - 2}{P}$		
	10/20 spline pitch, and finer						
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
 $\phi_{\alpha i}$ = pressure angle at pin contact diameter, internal spline
 $\phi_{\alpha e}$ = 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, contact

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

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

^aFor other tolerance classes:

Class 4 = $0.71 \times$ Tabulated value

Class 5 = As tabulated in table

Class 6 = $1.40 \times$ Tabulated value

Class 7 = $2.00 \times$ Tabulated value

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

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 maximum 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.

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 tolerances causes corresponding vari-

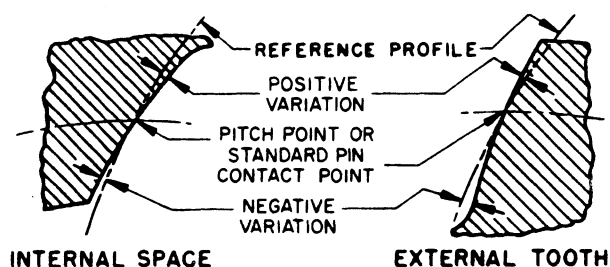
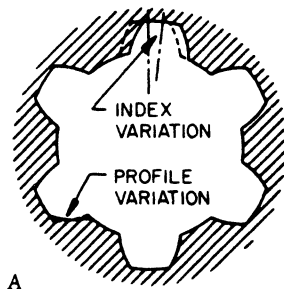


FIG. 2—PROFILE VARIATIONS

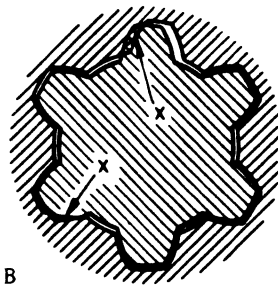
TABLE 4—SPECIFICATION GUIDE FOR SPACE WIDTH AND TOOTH THICKNESS

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

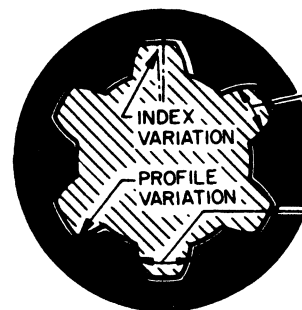
Note: The minimum effective clearance, c_v min, is greater than zero for major diameter fits. The maximum effective tooth thickness is less than the minimum effective space width for major diameter fits to allow for eccentricity variations.



A
EACH SPACE IS BASIC WIDTH.

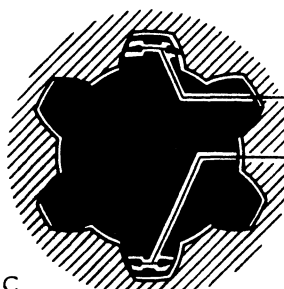


B
THE PERFECT EXTERNAL SPLINE WITH BASIC TOOTH THICKNESS INTERFERES AT X.



C
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



A
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

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 tooth thickness. Each of these has a definite function.

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 follow-

ing 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."

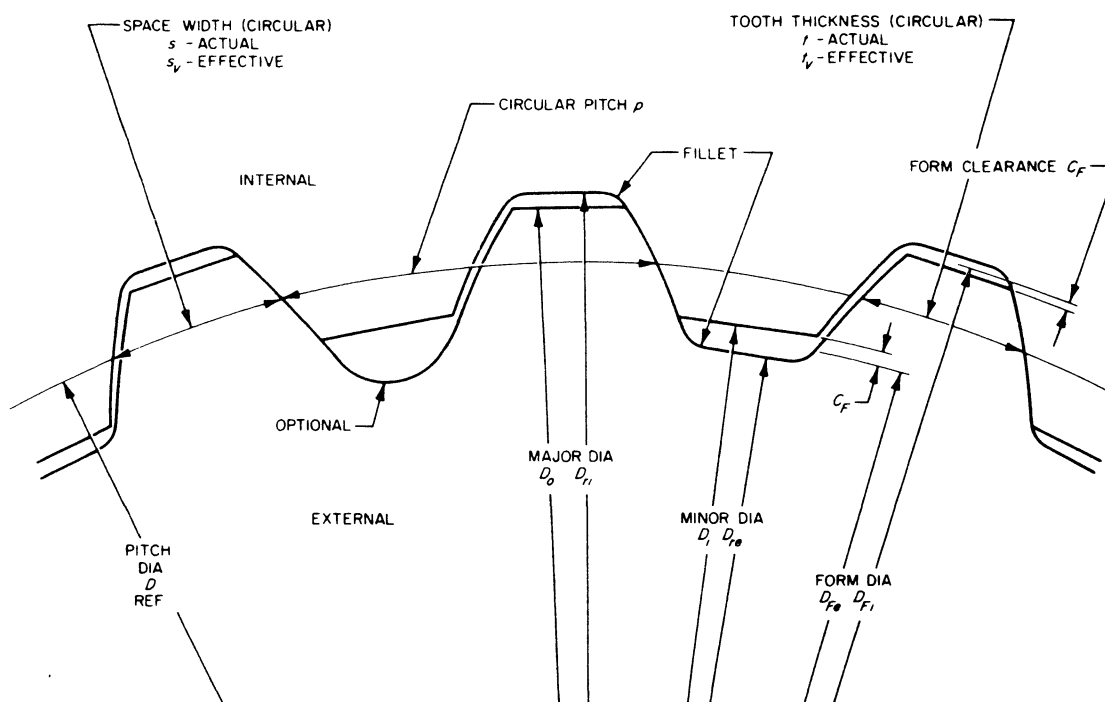


FIG. 5—SPLINE TERMS, SYMBOLS AND DRAWING DATA, 30 DEG PRESSURE ANGLE, FLAT ROOT SIDE FIT

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.

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 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 = 0.6283 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.6283 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						s				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	10.000000	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	10.400000	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	10.800000	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	11.200000	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	11.600000	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	12.000000	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	12.400000	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	12.800000	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	13.200000	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	13.600000	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	14.000000	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	14.400000	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	14.800000	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	15.200000	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	15.600000	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	16.000000	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	16.400000	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	16.800000	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	17.200000	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	17.600000	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	18.000000	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	18.400000	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	18.800000	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	19.200000	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	19.600000	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	20.000000	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	20.400000	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	20.800000	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	21.200000	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	21.600000	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	22.000000	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	22.400000	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	22.800000	19.74538	23.344	23.220	22.400	0.6411	0.6373	0.6347	0.6							

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 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 0.5236 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.5236 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						S				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	10.000000	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	10.333333	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	10.666667	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	11.000000	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	11.333333	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	11.666667	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	12.000000	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	12.333333	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	12.666667	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	13.000000	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	13.333333	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	13.666667	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	14.000000	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	14.333333	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	14.666667	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	15.000000	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	15.333333	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	15.666667	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	16.000000	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	16.333333	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	16.666667	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	17.000000	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	17.333333	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	17.666667	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	18.000000	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	18.333333	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	18.666667	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	19.000000	16.45448	19.454	19.354	18.667	0.5364	0.5326	0.5300	0							

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)									
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 0.3927 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness 0.3927 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.			
						S				t									
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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																	+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	10.000000	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	10.250000	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	10.500000	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	10.750000	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	11.000000	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	11.250000	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	11.500000	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	11.750000	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	12.000000	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	12.250000	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	12.500000	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	12.750000	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	13.000000	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	13.250000	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	13.500000	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	13.750000	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	14.000000	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	14.250000	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	14.500000	12.55737	14.842	14.770	14.250	0.4033	0.4001</												

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

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)						
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 0.3142 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.3142 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						s				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	10.000000	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	10.200000	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	10.400000	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	10.600000	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	10.800000	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	11.000000	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	11.200000	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	11.400000	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	11.600000	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	11.800000	10.21910	12.074	12.020	11.600	0.3249	0.3217	0.3195	0.3180	0.3104						

- 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

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 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 0.2618 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness 0.2618 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						S				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	10.000000	8														

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.

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)						
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 0.1963 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness 0.1963 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						S				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	1.0000000	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	1.1250000	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	1.2500000	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	1.3750000	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	1.5000000	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	1.6250000	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	1.7500000	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	1.8750000	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	2.0000000	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	2.1250000	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	2.2500000	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	2.3750000	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	2.5000000	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	2.6250000	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	2.7500000	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	2.8750000	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	3.0000000	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	3.1250000	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	3.2500000	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	3.3750000	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	3.5000000	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	3.6250000	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	3.7500000	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	3.8750000	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	4.0000000	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	4.1250000	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	4.2500000	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	4.3750000	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	4.5000000	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	4.6250000	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	4.7500000	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	4.8750000	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	5.0000000	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	5.1250000	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	5.2500000	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	5.3750000	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	5.5000000	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	5.6250000	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	5.7500000	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	5.8750000	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	6.0000000	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	6.1250000	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	6.2500000	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	6.3750000	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	6.5000000	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	6.6250000	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	6.7500000	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	6.8750000	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	7.0000000	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	7.1250000	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	7.2500000	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	7.3750000	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	7.5000000	6.495190	7.673	7.640	7.375	0.2057	0.202									

- 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

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 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 = 0.1571 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.1571 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						S				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	0.600000	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	0.700000	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	0.800000	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	0.900000	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						

30 DEG PRESSURE ANGLE

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

17

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 = 0.1309 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness 0.1309 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						S				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	1.0000000	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	1.0833333	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	1.1666667	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	1.2500000	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	1.3333333	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	1.4166667	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	1.5000000	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	1.5833333	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	1.6666667	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	1.7500000	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	1.8333333	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	1.9166667	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	2.0000000	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	2.0833333	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	2.1666667	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	2.2500000	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	2.3333333	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	2.4166667	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	2.5000000	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	2.5833333	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	2.6666667	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	2.7500000	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	2.8333333	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	2.9166667	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	3.0000000	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	3.0833333	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	3.1666667	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	3.2500000	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	3.3333333	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	3.4166667	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	3.5000000	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	3.5833333	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	3.6666667	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	3.7500000	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	3.8333333	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	3.9166667	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	4.0000000	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	4.0833333	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	4.1666667	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	4.2500000	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	4.3333333	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	4.4166667	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	4.5000000	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	4.5833333	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	4.6666667	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	4.7500000	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	4.8333333	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																

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 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 = 0.0982 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.0982 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						s				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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														+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	1.0000000	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	1.0625000	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	1.1250000	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	1.1875000	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	1.2500000	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	1.3125000	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	1.3750000	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	1.4375000	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	1.5000000	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	1.5625000	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	1.6250000	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	1.6875000	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	1.7500000	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	1.8125000	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	1.8750000	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	1.9375000	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	2.0000000	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	2.0625000	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	2.1250000	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	2.1875000	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	2.2500000	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	2.3125000	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	2.3750000	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	2.4375000	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	2.5000000	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	2.5625000	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	2.6250000	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	2.6875000	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	2.7500000	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	2.8125000	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	2.8750000	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	2.9375000	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	3.0000000	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	3.0625000	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	3.1250000	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	3.1875000	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	3.2500000	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	3.3125000	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	3.3750000	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	3.4375000	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	3.5000000	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	3.5625000	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	3.6250000	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	3.6875000	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	3.7500000	3.247595	3.838	3.												

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 1

30 DEG PRESSURE ANGLE

19

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 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 = 0.0785 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.0785 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	3.1	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	1.0000000	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	1.0500000	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	1.1000000	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	1.1500000	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	1.2000000	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	1.2500000	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	1.3000000	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	1.3500000	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	1.4000000	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	1.4500000	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	1.5000000	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	1.5500000	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	1.6000000	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	1.6500000	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	1.7000000	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	1.7500000	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	1.8000000	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	1.8500000	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	1.9000000	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	1.9500000	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	2.0000000	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	2.0500000	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	2.1000000	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	2.1500000	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	2.2000000	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	2.2500000	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	2.3000000	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	2.3500000	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	2.4000000	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	2.4500000	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	2.5000000	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	2.5500000	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	2.6000000	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	2.6500000	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	2.7000000	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	2.7500000	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	2.8000000	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	2.8500000	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	2.9000000	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	2.9500000	2.554775	3.022	3.006	2.900	0.0855	0.0834	0.0820	0.0810	0.0760	0.0750	0.0736				

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.

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 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 = 0.0654 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.0654 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						S				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	1.0000000	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	1.0416667	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	1.0833333	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	1.1250000	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	1.1666667	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	1.2083333	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	1.2500000	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	1.2916667	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	1.3333333	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	1.3750000	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	1.4166667	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	1.4583333	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	1.5000000	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	1.5416667	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	1.5833333	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	1.6250000	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	1.6666667	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	1.7083333	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	1.7500000	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	1.7916667	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	1.8333333	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	1.8750000	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	1.9166667	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	1.9583333	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	2.0000000	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	2.0416667	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	2.0833333	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	2.1250000	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	2.1666667	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	2.2083333	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	2.2500000	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	2.2916667	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	2.3333333	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	2.3750000	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	2.4166667	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	2.4583333	2.128979	2.519	2												

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.

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 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 0.0491 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness 0.0491 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.	
						S				t							
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	1.0000000	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	1.0312500	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	1.0625000	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	1.0937500	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	1.1250000	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	1.1562500	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	1.1875000	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	1.2187500	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	1.2500000	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	1.2812500	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	1.3125000	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	1.3437500	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	1.3750000	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	1.4062500	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	1.4375000	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	1.4687500	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	1.5000000	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	1.5312500	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	1.5625000	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	1.5937500	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	1.6250000	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	1.6562500	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	1.6875000	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	1.7187500	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	1.7500000	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	1.7812500	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	1.8125000	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	1.8437500	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</																	

- 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 6

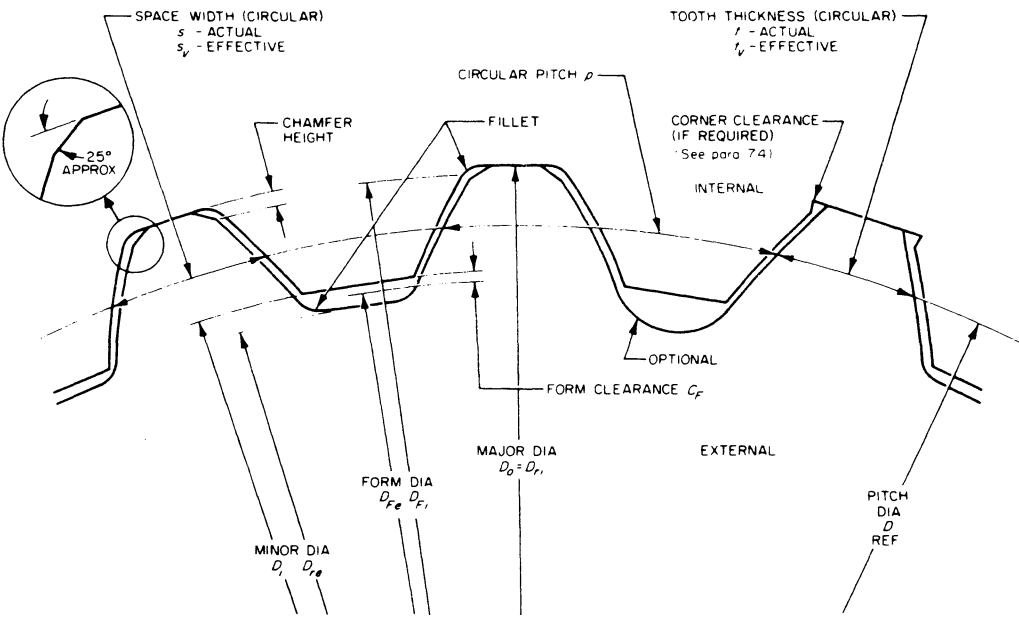
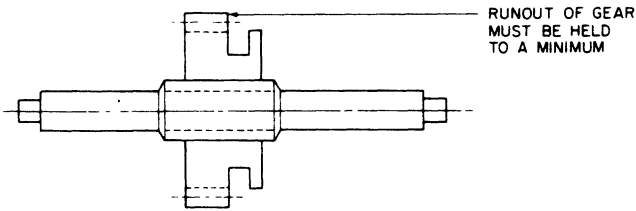


FIG. 6—SPLINE TERMS, SYMBOLS AND DRAWING DATA, 30 DEG PRESSURE ANGLE, FLAT ROOT MAJOR DIAMETER FIT

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	x.xxx/x.xxx	CHAMFER HEIGHT	x.xxx/x.xxx
(See Fig. 34.)			

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.

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. V Eff. Circ. Space Width = 0.5236 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. 0.052 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	10.000000	8.660254	10.3334	10.283	9.667	0.5286	0.5212	0.5162	10.3332	9.646	9.529
31	10.333333	8.948929	10.6667	10.616	10.000	0.5286	0.5212	0.5161	10.6666	9.980	9.862
32	10.666667	9.237604	11.0000	10.950	10.334	0.5287	0.5212	0.5161	10.9999	10.313	10.195
33	11.000000	9.526279	11.3334	11.283	10.667	0.5287	0.5211	0.5160	11.3332	10.646	10.528
34	11.333333	9.814955	11.6667	11.616	11.000	0.5288	0.5211	0.5159	11.6666	10.980	10.861
35	11.666667	10.10363	12.0000	11.950	11.334	0.5289	0.5211	0.5158	11.9999	11.313	11.194
36	12.000000	10.39230	12.3334	12.283	11.667	0.5289	0.5211	0.5158	12.3332	11.646	11.528
37	12.333333	10.68098	12.6667	12.616	12.000	0.5290	0.5211	0.5157	12.6666	11.980	11.861
38	12.666667	10.96966	13.0000	12.950	12.334	0.5290	0.5210	0.5156	12.9999	12.313	12.194
39	13.000000	11.25833	13.3334	13.283	12.667	0.5291	0.5210	0.5156	13.3332	12.646	12.527
40	13.333333	11.54701	13.6667	13.616	13.000	0.5291	0.5210	0.5155	13.6666	12.980	12.860
41	13.666667	11.83568	14.0000	13.950	13.334	0.5292	0.5210	0.5154	13.9999	13.313	13.193
42	14.000000	12.12436	14.3334	14.283	13.667	0.5292	0.5210	0.5153	14.3332	13.646	13.527
43	14.333333	12.41303	14.6667	14.616	14.000	0.5293	0.5209	0.5153	14.6666	13.980	13.860
44	14.666667	12.70171	15.0000	14.950	14.334	0.5293	0.5209	0.5152	14.9999	14.313	14.193
45	15.000000	12.99038	15.3334	15.283	14.667	0.5294	0.5209	0.5151	15.3332	14.646	14.526
46	15.333333	13.27906	15.6667	15.616	15.000	0.5294	0.5209	0.5150	15.6666	14.980	14.859
47	15.666667	13.56773	16.0000	15.950	15.334	0.5295	0.5209	0.5150	15.9999	15.313	15.192
48	16.000000	13.85641	16.3334	16.283	15.667	0.5295	0.5208	0.5149	16.3332	15.646	15.525
49	16.333333	14.14508	16.6667	16.616	16.000	0.5296	0.5208	0.5148	16.6666	15.980	15.859
50	16.666667	14.43376	17.0000	16.950	16.334	0.5296	0.5208	0.5148	16.9999	16.313	16.192
51	17.000000	14.72243	17.3334	17.283	16.667	0.5297	0.5208	0.5147	17.3332	16.646	16.525
52	17.333333	15.01111	17.6667	17.616	17.000	0.5298	0.5208	0.5146	17.6666	16.980	16.858
53	17.666667	15.29978	18.0000	17.950	17.334	0.5298	0.5207	0.5145	17.9999	17.313	17.191
54	18.000000	15.58846	18.3334	18.283	17.667	0.5299	0.5207	0.5145	18.3332	17.646	17.524
55	18.333333	15.87713	18.6667	18.616	18.000	0.5299	0.5207	0.5144	18.6666	17.980	17.857
56	18.666667	16.16581	19.0000	18.950	18.334	0.5300	0.5207	0.5143	18.9999	18.313	18.191
57	19.000000	16.45448	19.3334	19.283	18.667	0.5300	0.5207	0.5142	19.3332	18.646	18.524
58	19.333333	16.74316	19.6667	19.616	19.000	0.5301	0.5206	0.5142	19.6666	18.980	18.857
59	19.666667	17.03183	20.0000	19.950	19.334	0.5301	0.5206	0.5141	19.9999	19.313	19.190
60	20.000000	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.

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.

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	D	D _b	D _{ri}	D _{Fi}	D _i	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. Chamfer Max. 0.041 Min. 0.027	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
No. of Teeth	Pitch Dia.	Base Dia.	Major Dia.	Form Dia.	Minor Dia.						
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	10.000000	8.660254	10.2500	10.216	9.750	0.3973	0.3905	0.3859	10.2499	9.730	9.642
41	10.250000	8.876760	10.5000	10.466	10.000	0.3974	0.3905	0.3858	10.4999	9.980	9.892
42	10.500000	9.093267	10.7500	10.716	10.250	0.3974	0.3905	0.3858	10.7499	10.230	10.142
43	10.750000	9.309773	11.0000	10.966	10.500	0.3974	0.3905	0.3857	10.9999	10.480	10.392
44	11.000000	9.526279	11.2500	11.216	10.750	0.3975	0.3904	0.3857	11.2499	10.730	10.642
45	11.250000	9.742786	11.5000	11.466	11.000	0.3975	0.3904	0.3856	11.4999	10.980	10.892
46	11.500000	9.959292	11.7500	11.716	11.250	0.3975	0.3904	0.3856	11.7499	11.230	11.142
47	11.750000	10.17580	12.0000	11.966	11.500	0.3976	0.3904	0.3855	11.9999	11.480	11.392
48	12.000000	10.39230	12.2500	12.216	11.750	0.3976	0.3904	0.3855	12.2499	11.730	11.641
49	12.250000	10.60881	12.5000	12.466	12.000	0.3977	0.3904	0.3854	12.4999	11.980	11.891
50	12.500000	10.82532	12.7500	12.716	12.250	0.3977	0.3904	0.3854	12.7499	12.230	12.141
51	12.750000	11.04182	13.0000	12.966	12.500	0.3977	0.3903	0.3853	12.9999	12.480	12.391
52	13.000000	11.25833	13.2500	13.216	12.750	0.3978	0.3903	0.3852	13.2499	12.730	12.641
53	13.250000	11.47484	13.5000	13.466	13.000	0.3978	0.3903	0.3852	13.4999	12.980	12.891
54	13.500000	11.69134	13.7500	13.716	13.250	0.3979	0.3903	0.3851	13.7499	13.230	13.141
55	13.750000	11.90785	14.0000	13.966	13.500	0.3979	0.3903	0.3851	13.9999	13.480	13.391
56	14.000000	12.12436	14.2500	14.216	13.750	0.3979	0.3903	0.3850	14.2499	13.730	13.640
57	14.250000	12.34086	14.5000	14.466	14.000	0.3980	0.3902	0.3850	14.4999	13.980	13.890
58	14.500000	12.55737	14.7500	14.716	14.250	0.3980	0.3902	0.3849	14.7499	14.230	14.140
59	14.750000	12.77387	15.0000	14.966	14.500	0.3980	0.3902	0.3849	14.9999	14.480	14.390
60	15.000000	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.

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 Min. Eff. Circ. Space Width = 0.3142 Notes c & d	^{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	
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.

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. See Table 105, items 15 and 16.

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.	$\frac{S_v}{S_s}$ Min. Eff. Circ. Space Width = 0.2618 Notes c & d $\frac{S_s}{S_v}$ 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	2.006	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	10.000000	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.

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.

30 DEG PRESSURE ANGLE

27

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.	$\frac{S_v}{\text{Min. Eff. Circ. Space Width}} = 0.1963 \frac{\text{Notes c \& d}}{S_5 \text{ Max. Actual Circ. Space Width}}$	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	
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	

- 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.
- For REF minimum actual space width, and REF maximum actual tooth thickness, see Table 64.
- See Table 105.

- For REF maximum effective space width, and REF minimum effective tooth thickness, see Table 64.
- Figures in bold type are modified values, see Section 25.
- See Table 105, items 15 and 16.

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	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	0.600000	0.5196152	0.7000	0.680	0.534	0.1598	0.1557	0.1530	0.6999	0.529	0.452
7	0.700000	0.6062178	0.8000	0.780	0.622	0.1598	0.1557	0.1530	0.7999	0.617	0.552
8	0.800000	0.6928203	0.9000	0.880	0.717	0.1598	0.1556	0.1529	0.8999	0.712	0.652
9	0.900000	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.
- 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.

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 Min. V. Eff. Circ. Space Width = 0.1309 Notes c & d ^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	1.0000000	0.8660254	1.0834	1.067	0.922	0.1337	0.1294	0.1266	1.0832	0.917	0.874
13	1.0833333	0.9381941	1.1667	1.150	1.005	0.1338	0.1294	0.1266	1.1666	1.000	0.957
14	1.1666667	1.010363	1.2500	1.234	1.087	0.1338	0.1294	0.1265	1.2499	1.082	1.040
15	1.2500000	1.082532	1.3334	1.317	1.169	0.1338	0.1294	0.1265	1.3332	1.164	1.123
16	1.3333333	1.154701	1.4167	1.400	1.252	0.1338	0.1294	0.1265	1.4166	1.247	1.207
17	1.4166667	1.226869	1.5000	1.484	1.334	0.1339	0.1294	0.1264	1.4999	1.329	1.290
18	1.5000000	1.299038	1.5834	1.567	1.417	0.1339	0.1294	0.1264	1.5832	1.412	1.373
19	1.5833333	1.371207	1.6667	1.650	1.500	0.1339	0.1294	0.1264	1.6666	1.496	1.456
20	1.6666667	1.443376	1.7500	1.734	1.584	0.1339	0.1294	0.1263	1.7499	1.579	1.540
21	1.7500000	1.515544	1.8334	1.817	1.667	0.1340	0.1294	0.1263	1.8332	1.662	1.623
22	1.8333333	1.587713	1.9167	1.900	1.750	0.1340	0.1293	0.1263	1.9166	1.746	1.706
23	1.9166667	1.659882	2.0000	1.984	1.834	0.1340	0.1293	0.1262	1.9999	1.829	1.789
24	2.0000000	1.732051	2.0834	2.067	1.917	0.1340	0.1293	0.1262	2.0832	1.912	1.873
25	2.0833333	1.804220	2.1667	2.151	2.000	0.1341	0.1293	0.1262	2.1666	1.995	1.956
26	2.1666667	1.876388	2.2500	2.234	2.084	0.1341	0.1293	0.1261	2.2499	2.079	2.039
27	2.2500000	1.948557	2.3334	2.318	2.167	0.1341	0.1293	0.1261	2.3332	2.162	2.122
28	2.3333333	2.020726	2.4167	2.401	2.250	0.1342	0.1293	0.1260	2.4166	2.245	2.206
29	2.4166667	2.092895	2.5000	2.485	2.334	0.1342	0.1293	0.1260	2.4999	2.328	2.289
30	2.5000000	2.165064	2.5834	2.568	2.417	0.1342	0.1293	0.1260	2.5832	2.411	2.372
31	2.5833333	2.237232	2.6667	2.652	2.500	0.1342	0.1293	0.1259	2.6666	2.494	2.455
32	2.6666667	2.309401	2.7500	2.735	2.584	0.1343	0.1293	0.1259	2.7499	2.578	2.539
33	2.7500000	2.381570	2.8334	2.819	2.667	0.1343	0.1293	0.1259	2.8332	2.661	2.622
34	2.8333333	2.453739	2.9167	2.902	2.750	0.1343	0.1293	0.1258	2.9166	2.744	2.705
35	2.9166667	2.525907	3.0000	2.986	2.834	0.1343	0.1293	0.1258	2.9999	2.827	2.788
36	3.0000000	2.598076	3.0834	3.069	2.917	0.1344	0.1292	0.1258	3.0832	2.910	2.871
37	3.0833333	2.670245	3.1667	3.153	3.000	0.1344	0.1292	0.1257	3.1666	2.993	2.955
38	3.1666667	2.742414	3.2500	3.236	3.084	0.1344	0.1292	0.1257	3.2499	3.077	3.038
39	3.2500000	2.814583	3.3334	3.320	3.167	0.1345	0.1292	0.1257	3.3332	3.160	3.121
40	3.3333333	2.886751	3.4167	3.403	3.250	0.1345	0.1292	0.1256	3.4166	3.243	3.204
41	3.4166667	2.958920	3.5000	3.487	3.334	0.1345	0.1292	0.1256	3.4999	3.326	3.288
42	3.5000000	3.031089	3.5834	3.570	3.417	0.1345	0.1292	0.1256	3.5832	3.409	3.371
43	3.5833333	3.103258	3.6667	3.654	3.500	0.1346	0.1292	0.1255	3.6666	3.492	3.454
44	3.6666667	3.175426	3.7500	3.737	3.584	0.1346	0.1292	0.1255	3.7499	3.576	3.537
45	3.7500000	3.247595	3.8334	3.821	3.667	0.1346	0.1292	0.1255	3.8332	3.659	3.621
46	3.8333333	3.319764	3.9167	3.904	3.750	0.1346	0.1292	0.1254	3.9166	3.742	3.704
47	3.9166667	3.391933	4.0000	3.988	3.834	0.1347	0.1292	0.1254	3.9999	3.825	3.787
48	4.0000000	3.464102	4.0834	4.071	3.917	0.1347	0.1292	0.1254	4.0832	3.908	3.870
49	4.0833333	3.536270	4.1667	4.155	4.000	0.1347	0.1292	0.1253	4.1666	3.991	3.954
50	4.1666667	3.608439	4.2500	4.238	4.084	0.1347	0.1292	0.1253	4.2499	4.075	4.037
51	4.2500000	3.680608	4.3334	4.322	4.167	0.1348	0.1291	0.1253	4.3332	4.158	4.120
52	4.3333333	3.752777	4.4167	4.405	4.250	0.1348	0.1291	0.1252	4.4166	4.241	4.203
53	4.4166667	3.824946	4.5000	4.489	4.334	0.1348	0.1291	0.1252	4.4999	4.324	4.287
54	4.5000000	3.897114	4.5834	4.572	4.417	0.1349	0.1291	0.1252	4.5832	4.407	4.370
55	4.5833333	3.969283	4.6667	4.656	4.500	0.1349	0.1291	0.1251	4.6666	4.490	4.453
56	4.6666667	4.041452	4.7500	4.739	4.584	0.1349	0.1291	0.1251	4.7499	4.574	4.536
57	4.7500000	4.113621	4.8334	4.823	4.667	0.1349	0.1291	0.1251	4.8332	4.657	4.620
58	4.8333333	4.185789	4.9167	4.906	4.750	0.1350	0.1291	0.1250	4.9166	4.740	4.703
59	4.9166667	4.257958	5.0000	4.990	4.834	0.1350	0.1291	0.1250	4.9999	4.823	4.786
60	5.0000000	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 _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. 0.014 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	1.0000000	0.8660254	1.0625	1.050	0.939	0.1009	0.0967	0.0940	1.0624	0.934	0.902
17	1.0625000	0.9201520	1.1250	1.113	1.001	0.1009	0.0967	0.0940	1.1249	0.996	0.965
18	1.1250000	0.9742786	1.1875	1.175	1.063	0.1009	0.0967	0.0940	1.1874	1.058	1.027
19	1.1875000	1.028405	1.2500	1.238	1.125	0.1010	0.0967	0.0939	1.2499	1.121	1.090
20	1.2500000	1.082532	1.3125	1.300	1.188	0.1010	0.0967	0.0939	1.3124	1.183	1.152
21	1.3125000	1.136658	1.3750	1.363	1.250	0.1010	0.0967	0.0939	1.3749	1.246	1.214
22	1.3750000	1.190785	1.4375	1.425	1.313	0.1010	0.0967	0.0939	1.4374	1.308	1.277
23	1.4375000	1.244912	1.5000	1.488	1.375	0.1010	0.0967	0.0939	1.4999	1.371	1.339
24	1.5000000	1.299038	1.5625	1.550	1.438	0.1011	0.0967	0.0938	1.5624	1.433	1.402
25	1.5625000	1.353165	1.6250	1.613	1.500	0.1011	0.0967	0.0938	1.6249	1.496	1.464
26	1.6250000	1.407291	1.6875	1.675	1.563	0.1011	0.0967	0.0938	1.6874	1.558	1.527
27	1.6875000	1.461418	1.7500	1.738	1.625	0.1011	0.0967	0.0938	1.7499	1.621	1.589
28	1.7500000	1.515544	1.8125	1.800	1.688	0.1011	0.0967	0.0938	1.8124	1.683	1.651
29	1.8125000	1.569671	1.8750	1.863	1.750	0.1012	0.0967	0.0937	1.8749	1.746	1.714
30	1.8750000	1.623798	1.9375	1.925	1.813	0.1012	0.0967	0.0937	1.9374	1.808	1.776
31	1.9375000	1.677924	2.0000	1.988	1.875	0.1012	0.0967	0.0937	1.9999	1.871	1.839
32	2.0000000	1.732051	2.0625	2.050	1.938	0.1012	0.0967	0.0937	2.0624	1.933	1.901
33	2.0625000	1.786177	2.1250	2.113	2.000	0.1012	0.0967	0.0937	2.1249	1.995	1.964
34	2.1250000	1.840304	2.1875	2.176	2.063	0.1012	0.0967	0.0937	2.1874	2.058	2.026
35	2.1875000	1.894431	2.2500	2.238	2.125	0.1013	0.0967	0.0936	2.2499	2.120	2.089
36	2.2500000	1.948557	2.3125	2.301	2.188	0.1013	0.0967	0.0936	2.3124	2.183	2.151
37	2.3125000	2.002684	2.3750	2.364	2.250	0.1013	0.0967	0.0936	2.3749	2.245	2.213
38	2.3750000	2.056810	2.4375	2.426	2.313	0.1013	0.0967	0.0936	2.4374	2.307	2.276
39	2.4375000	2.110937	2.5000	2.489	2.375	0.1013	0.0967	0.0936	2.4999	2.370	2.338
40	2.5000000	2.165064	2.5625	2.551	2.438	0.1014	0.0967	0.0935	2.5624	2.432	2.401
41	2.5625000	2.219190	2.6250	2.614	2.500	0.1014	0.0967	0.0935	2.6249	2.494	2.463
42	2.6250000	2.273317	2.6875	2.677	2.563	0.1014	0.0967	0.0935	2.6874	2.557	2.526
43	2.6875000	2.327443	2.7500	2.739	2.625	0.1014	0.0967	0.0935	2.7499	2.619	2.588
44	2.7500000	2.381570	2.8125	2.802	2.688	0.1014	0.0967	0.0935	2.8124	2.682	2.650
45	2.8125000	2.435696	2.8750	2.865	2.750	0.1015	0.0967	0.0934	2.8749	2.744	2.713
46	2.8750000	2.489823	2.9375	2.927	2.813	0.1015	0.0967	0.0934	2.9374	2.806	2.775
47	2.9375000	2.543950	3.0000	2.990	2.875	0.1015	0.0967	0.0934	2.9999	2.869	2.838
48	3.0000000	2.598076	3.0625	3.052	2.938	0.1015	0.0967	0.0934	3.0624	2.931	2.900
49	3.0625000	2.652203	3.1250	3.115	3.000	0.1015	0.0967	0.0934	3.1249	2.993	2.963
50	3.1250000	2.706329	3.1875	3.178	3.063	0.1015	0.0967	0.0934	3.1874	3.056	3.025
51	3.1875000	2.760456	3.2500	3.240	3.125	0.1016	0.0967	0.0933	3.2499	3.118	3.087
52	3.2500000	2.814583	3.3125	3.303	3.188	0.1016	0.0967	0.0933	3.3124	3.181	3.150
53	3.3125000	2.868709	3.3750	3.366	3.250	0.1016	0.0967	0.0933	3.3749	3.243	3.212
54	3.3750000	2.922836	3.4375	3.428	3.313	0.1016	0.0967	0.0933	3.4374	3.305	3.275
55	3.4375000	2.976962	3.5000	3.491	3.375	0.1016	0.0967	0.0933	3.4999	3.368	3.337
56	3.5000000	3.031089	3.5625	3.553	3.438	0.1017	0.0967	0.0932	3.5624	3.430	3.400
57	3.5625000	3.085215	3.6250	3.616	3.500	0.1017	0.0967	0.0932	3.6249	3.492	3.462
58	3.6250000	3.139342	3.6875	3.679	3.563	0.1017	0.0967	0.0932	3.6874	3.555	3.524
59	3.6875000	3.193469	3.7500	3.741	3.625	0.1017	0.0967	0.0932	3.7499	3.617	3.587
60	3.7500000	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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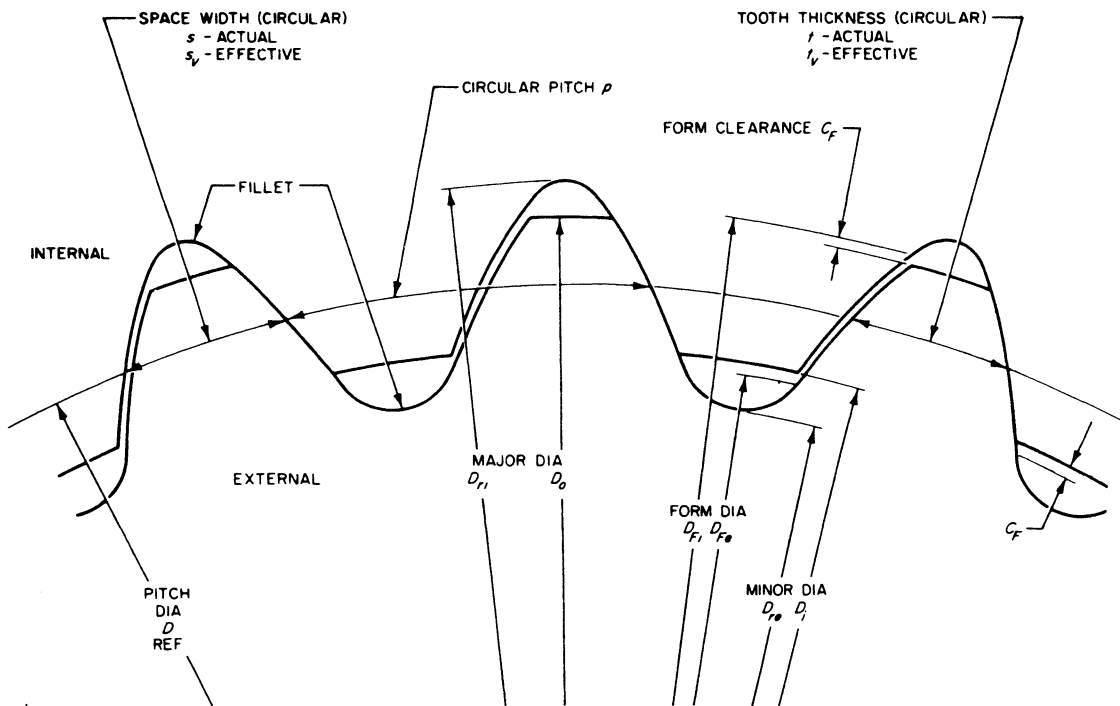


FIG. 7—SPLINE TERMS, SYMBOLS AND DRAWING DATA, 30 DEG PRESSURE ANGLE, FILLET ROOT SIDE FIT

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.

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 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 = 0.6283 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.6283 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	3.1	4.2	5.1	6.1	8.7	8.6			
			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	10.000000	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	10.400000	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	10.800000	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	11.200000	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	11.600000	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	12.000000	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	12.400000	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	12.800000	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	13.200000	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	13.600000	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	14.000000	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	14.400000	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	14.800000	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	15.200000	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	15.600000	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	16.000000	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	16.400000	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	16.800000	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	17.200000	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	17.600000	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	18.000000	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	18.400000	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	18.800000	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	19.200000	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	19.600000	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	20.000000	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	20.400000	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	20.800000	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	21.200000	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	21.600000	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	22.000000	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	22.400000	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	22.800000	19.74538	23.582	23.220	22.400	0.6411	0.6373	0.6347	0.6329	0.6237	0.6219	0.6193	0.6155			

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.

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 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 = 0.5236 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.5236 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						S				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	10.000000	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	10.333333	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	10.666667	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	11.000000	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	11.333333	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	11.666667	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	12.000000	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	12.333333	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	12.666667	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	13.000000	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	13.333333	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	13.666667	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	14.000000	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	14.333333	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	14.666667	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	15.000000	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	15.333333	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	15.666667	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	16.000000	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	16.333333	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	16.666667	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	17.000000	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	17.333333	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	17.666667	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	18.000000	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	18.333333	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	18.666667	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	19.000000	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	19.333333	16.74316	19.989	19.687	19.000	0.53										

- 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.

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

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 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 = 0.3927 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.3927 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						S				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	10.000000	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	10.250000	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	10.500000	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	10.750000	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	11.000000	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	11.250000	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	11.500000	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	11.750000	10.175800	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	12.000000	10.392300	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	12.250000	10.608810	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	12.500000	10.825320	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	12.750000	11.041820	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	13.000000	11.258330	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	13.250000	11.474840	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	13.500000	11.691340	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	13.750000	11.907850	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	14.000000	12.124360	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	14.250000	12.340860	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	14.500000	12.557370	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	

- 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.

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

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)						
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 = 0.3142 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.3142 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						s				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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

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 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 = 0.2618 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.2618 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						s				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	10.000000	8.660														

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.

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

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 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 = 0.1963 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.1963 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						s				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	0.750000	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	0.875000	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.						

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.

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

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 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 = 0.1571 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.1571 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						s				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	0.600000	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	0.700000	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	0.800000	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	0.900000	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	0.1489	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										

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.

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

30 DEG PRESSURE ANGLE

39

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 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 = 0.1309 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.1309 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						S				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	1.0000000	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	1.0833333	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	1.1666667	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	1.2500000	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	1.3333333	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	1.4166667	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	1.5000000	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	1.5833333	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	1.6666667	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	1.7500000	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	1.8333333	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	1.9166667	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	2.0000000	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	2.0833333	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	2.1666667	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	2.2500000	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	2.3333333	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	2.4166667	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	2.5000000	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	2.5833333	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	2.6666667	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	2.7500000	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	2.8333333	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	2.9166667	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	3.0000000	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	3.0833333	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	3.1666667	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	3.2500000	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	3.3333333	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	3.4166667	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	3.5000000	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	3.5833333	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	3.6666667	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	3.7500000	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	3.8333333	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	3.9166667	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	4.0000000	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	4.0833333	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	4.1666667	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	4.2500000	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	4.3333333	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	4.4166667	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	4.5000000	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	4.5833333	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	4.6666667	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	4.7500000	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	4.8333333	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	4.9166667	4.257958	5.089	5.010	4.834	0.1391	0.1366	0.1350	0.1338	0.1280	0.1268	0.1252	0.1227			

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.

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 tab

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)						
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 = 0.0982 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness = 0.0982 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						S Max. Actual Circ. Space Width				t Min. Actual Circ. Tooth Thickness						
						for Tolerance Class				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	3.1	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	1.0000000	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	1.0625000	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	1.1250000	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	1.1875000	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	1.2500000	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	1.3125000	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	1.3750000	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	1.4375000	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	1.5000000	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	1.5625000	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	1.6250000	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	1.6875000	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	1.7500000	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	1.8125000	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	1.8750000	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	1.9375000	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	2.0000000	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	2.0625000	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	2.1250000	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	2.1875000	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	2.2500000	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	2.3125000	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	2.3750000	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	2.4375000	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	2.5000000	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	2.5625000	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	2.6250000	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	2.6875000	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	2.7500000	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	2.8125000	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	2.8750000	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	2.9375000	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	3.0000000	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	3.0625000	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	3.1250000	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	3.1875000	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	3.2500000	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	3.3125000	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	3.3750000	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	3.4375000	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	3.5000000	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	3.5625000	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	3.6250000	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	3.6875000	3.193469	3.818	3.758	3.625	0.1052	0.1031	0.1017	0.1007	0.0957	0.0947	0.0933				

- 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.

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.

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 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 0.0785 Notes c & d				t _v Max. Eff. Circ. Tooth Thickness 0.0785 Notes c & d				D _o Major Dia.	D _{Fe} Form Dia.	D _{re} Minor Dia. Min.
						S				t						
						Max. Actual Circ. Space Width for Tolerance Class				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	3.1	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	1.0392320	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	0.0						

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.

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 for the External Major Diameter if the mating internal spline is per this standard or ANSI B5.15—1950 full addendum 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