***भारतीय मानक***

***Indian Standard***

**IS 3665 : 2024**

***इनवॉल्यूट साइडेड स्प्लाइन्स — आयाम***

*(* पहला पुनरीक्षण *)*

**Involute Sided Splines — Dimensions**

*( First Revision )*

ICS 21.120.10

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भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDARDS

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**May 2024 Price Group X**

Transmission Devices Sectional Committee, PGD 33

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Transmission Devices Sectional Committee had been approved by the Production and General Engineering Division Council.

This standard was first published in 1966. This revision has been taken up to keep pace with the latest technological developments and international practices.

Splined shafts generally have the following three types of applications:

1. Coupling shafts when relatively heavy torques are to be transmitted without slippage;
2. Transmitting power to floating or permanently fixed gears, pulleys and other rotating members; and
3. Coupling parts that may require frequent removal for indexing or change of angular position.

External and internal splines are extensively used in the automobile, machine tools and other industries. This standard has been formulated to rationalize the production and to facilitate interchangeability of external and internal splines.

This standard deals with involute sided splines of 30° pressure angle for general engineering purposes. Separate standards on straight sided splines have already been formulated (*see* IS 2327 : 1993 and IS 2610 : 1989).

The dimensions and fits given in the tables are based on the basic hole system. In this system the dimensions of the internal splines are the basis and variations in fit are obtained by varying the allowance on the external splines.

The tolerances for the spline tooth thickness and space width are given in Table 12. The instructions for the use of table is explained in Annex A. The tolerance on major and minor diameters shall be according to the system of limits and fits specified in IS 919 (Part 1) : 2014 and IS 919 (Part 2) : 2014.

Separate standards on gauging practice and the relevant manufacturing tools for splines are under preparation.

As far as possible, the major diameters of external splines are given, so as to end in numbers 0, 2, 5 and 8 which are standard diameters for ball bearings.

The composition of Committee responsible for formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*).’

*Indian Standard*

INVOLUTE SIDED SPLINES — DIMENSIONS

*( First Revision )*

**1 SCOPE**

**1.1** This standard specifies the dimensions, for straight involute spline of 30˚ pressure angle, with three different types of fits,namely,major diameter fit, minor diameter fit and side fit.

**1.2** Involute splines of modules (l), 1.25, (l.5), 2, (2.5), 3, (4), 5, (6), 8 and (10) are covered in this standard. The values given within brackets are non‒preferred.

**2 REFERENCES**

The following standards given below contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and encouraged to investigate the possibility of applying the most recent edition of these standards:

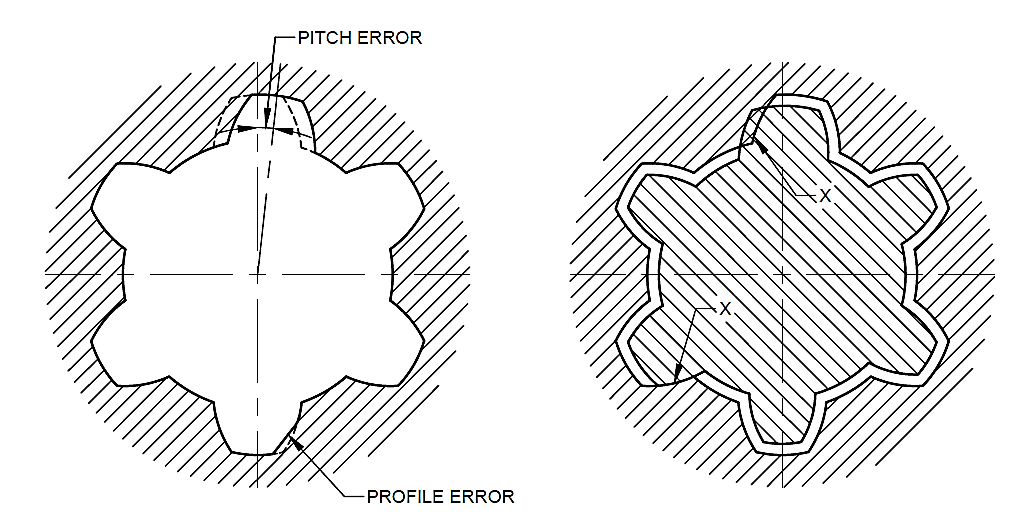
|  |  |
| --- | --- |
| *IS No.* | *Title* |
| IS 919 | Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes |
| (Part 1) : 2014 | Basis of tolerance, deviation and fits (*third revision*) |
| (Part 2) : 2014 | Tables of standard tolerance classes and limit deviation for holes and shafts (*second revision*) |
| IS 2327 : 1993 | Straight — Sided splines for cylindrical shafts with internal centering — Dimensions, tolerances and verification (*first revision*) |
| IS 2610 : 1989 | Power transmission — Straight sided splines for machine tools — Dimensions (*first revision*) |

**3 DEFINITIONS**

For the purpose of this standard, following definitions shall apply:

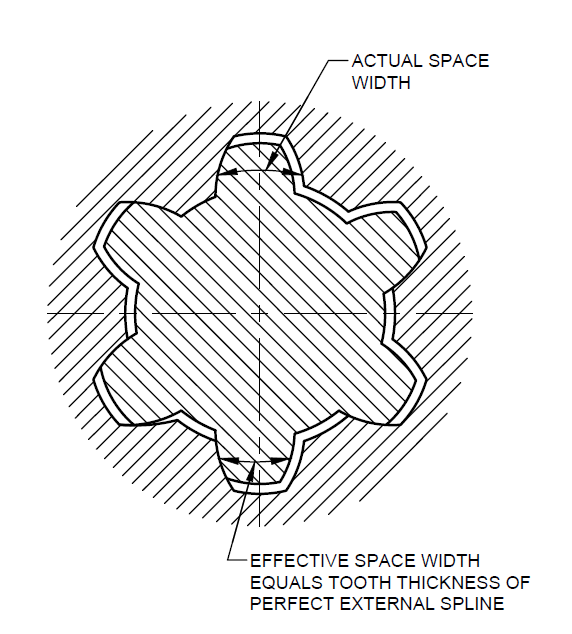
**3.1 Actual Space Width** — The circular width on the pitch circle of any single space (*see* Fig. 1).

**3.2 Actual Tooth Thickness —** The circular thickness on the pitch circle of any single tooth (*see* Fig. 2).



a) Each space is basic width b) Perfect external spline with basic

tooth thickness interferes at X



c)The perfect external spline fits in any position, if all spaces of the internal spline are widened by the amount of interference.

Fig. 1 Efffct of Internal Splinb Errors

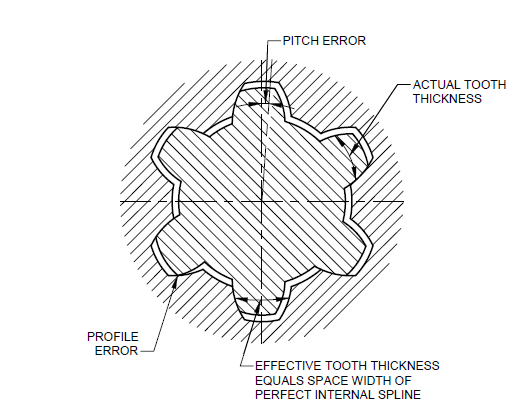


Fig. 2 Effect of External Spline Errors

**3.3** **Base Circle Diameter —** The diameter of the circle from which involute spline tooth profiles are constructed.

**3.4 Effective Clearance —** The difference between the effective space width of the internal spline and the effective tooth thickness of the mating external spline (*see* Fig.3).

**3.5 Effective Error —** The accumulated effect of the spline errors on the fit with the mating parts.

**3.6** **Effective Space Width of an Internal Spline —** The circular tooth thickness on the pitch circle of an imaginary perfect external spline which would fit the internal spline without looseness or interference (*see* Fig. 1).

**3.7 Effective Tooth Thickness of an External Spline —** The circular space width on the pitch circle of an imaginary perfect internal spline which would fit the external spline without looseness or interference (*see* Fig.2).

**3.8 Error Allowance —** The permissible effective error.

**3.9** **Involute Spline —** The spline having teeth with involute profiles.

**3.10** **Machining Tolerance —** The permissible variation in actual space width or actual tooth thickness (*see* Fig. 3).

**3.11** **Main Pressure Angle (** — The pressure angle at the pitch point.

**3.12 Major Diameter —** The diameter of the outermost surface of the spline. It is the root diameter of the internal spline or the tip diameter of the external spline.

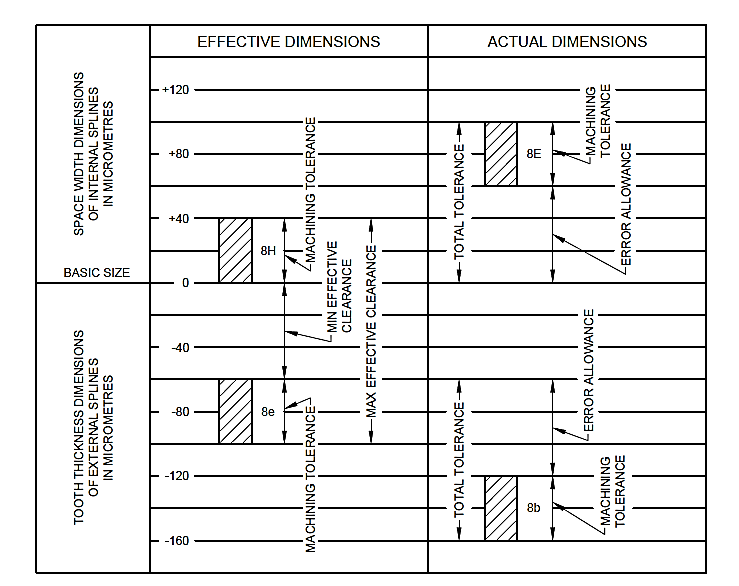


Fig. 3 Fit Diagram of Spline Assembly

120 114 38 8HE/8eb IS 3665

**3.13 Minor Diameter —** The diameter of the innermost surface of the spline. It is the tip diameter of the internal spline or the root diameter of the external spline.

**3.14** **Module (*m*) —** The ratio of the pitch circle diameter to the number of spline teeth.

**3.15 Nominal Clearance —** The difference between the actual space width of an internal spline and the actual tooth thickness of the mating external spline. This does not define the fit between the mating members, because of the effect of errors.

**3.16 Pitch Circle Diameter —** The diameter of an imaginary reference circle (pitch circle) from which all transverse dimensions are derived.

**3.17 Pitch Point —** The point of intersection of the spline tooth profile with the pitch circle.

**3.18 Pressure Angle —** The acute angle between a line tangent to a profile of the spline and a radial line through the point of tangency. Unless otherwise specified the pressure angle shall mean the main pressure angle.

**3.19 Profile Displacement (*xm*) —** The displacement of the basic rack either away or towards the reference cylinder and is denoted by *xm.*The former is taken as positive and latter as negative profile displacement.

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

**3.21 Total Tolerance —** The sum of the machining tolerance and the error allowance (*see* Fig. 3).

**4 TYPES**

**4.1 External Spline**

An involute spline whose tip surface is external to the root surface.

**4.2 Internal Spline**

An involute spline whose tip surface is internal to the root surface.

**5 EFFECTIVE AND ACTUAL DIMENSIONS**

The effective dimensions and actual dimensions together determine the fit of a spline assembly.

**6 DIMENSIONS, TOLERANCES AND FITS**

**6.1** Reference profile for the different pitches shall be as given in Fig. 4.

**6.2 Major Diameter of Internal Spline (*d1*)** — This is the reference diameter of the profile, and the value shall be according to Tables 1 to 11.

**6.3 Profile Displacement (xm) —** The value of the profile displacement shall be calculated from the following formula (*see* Tables 1 to 11):

*xm =* l/2 (*d*1 *‒‒ m.z ‒‒ l.1 m*)

The value shall be from *‒‒* 0.05 *m* to + 0.45 *m*

**6.4 Number of Teeth (z) —** The number of teeth shall be calculated from the following formula (*see* Tables 1 to 11):

z *=* (*d*1 *‒‒ 2 xm ‒‒* 1.1 *m*)

where

*d*1 = major diameter of the internal spline.

**6.5 Minor Diameter of the Internal Spline (*d*2*)* —** The value of the minor diameter of the internal spline shall be calculated from the following formula (*see* Tables 1 to 11):

*D*2 *= m.z +* 2 *xm ‒‒ 0.9 m*

*= d*1 *‒‒* 2 m

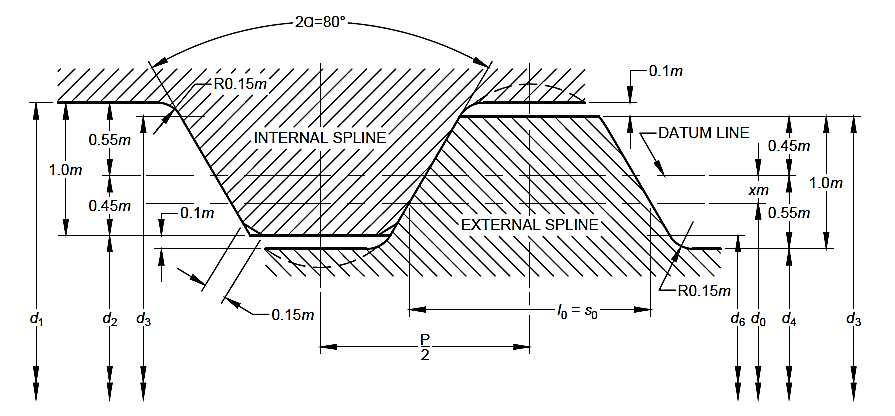


Fig. 4 Reference Profile

**6.6** **Major Diameter of the External Spline (*d*3***) —* The value of the major diameter of the external spline shall be calculated from the following formula (*see* Tables 1 to 11):

d3 = *m.z + 2xm + 0.9 m*

*= d*1 *‒‒* 0.2 *m*

**6.7 Minor Diameter of the External Spline s (d4*) —*** Minor diameter of the external splines shall be calculated from the following formula (*see* Tables 1 to 11):

*d*4*= m.z + 2 xm ‒‒* 1.1 *m*

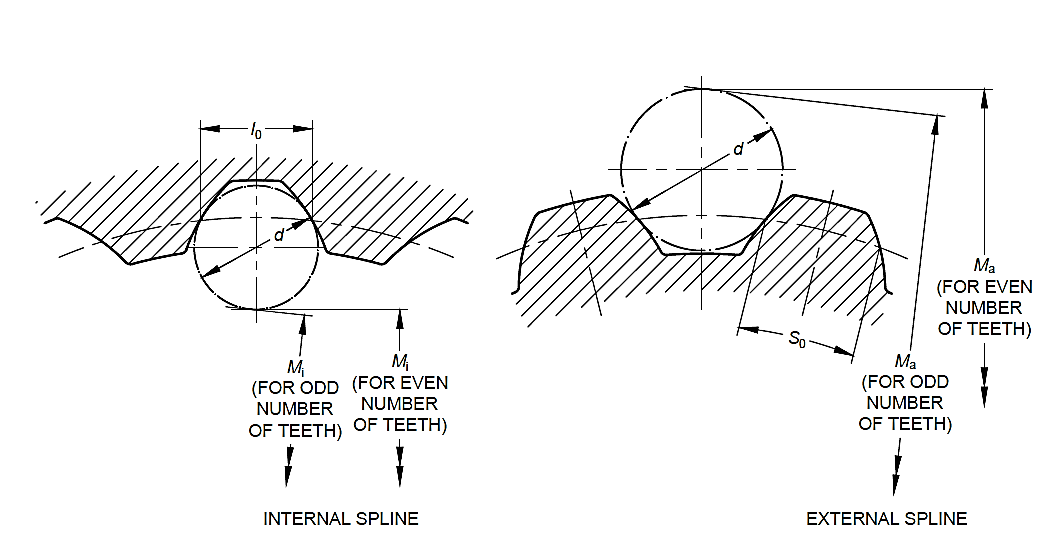
*= d*1  *‒‒  2.2 m*

**6.8 Space Width and Tooth Thickness *(l*oand *S*o*) —*** The value of the tooth thickness and space width shall be calculated from the following formula (*see* Tables 1 to 11):

and = *m* + 2. *xm*. tan

**6.9** The measuring pin diameter, the measurement over pins for the external splines and the measurement between pins for the internal splines shall be as given in Tables 1 to 11 (*see* Fig. 5).

**6.9.1** *Tolerance on Measurement Over Pins* **—** The tolerance values on effective and actual measurement over pins shall be obtained by multiplying the tolerance values on the effective and actual tooth thickness by the deviation factor, *f* (Tables 1 to 11).

**6.9.2** *Tolerance on Measurement Between Pins* **—** The tolerance on effective and actual measurement between pins shall be obtained by multiplying the tolerance values on the effective and actual space width by the deviation factor (Tables 1 to 11).

**Internal Spline External Spline**

Fig. 5 Measurement Between Pins and Measurement Over Pins

**6.10** The thickness of external splines over a specified number of teeth shall be according to Tables 1 to 11.

The tolerance on the effective and actual thickness of external splines over a specified number of teeth shall be the product of the tolerance on the effective and actual tooth thickness and the deviation factor 0.866.

**6.11 Types of Fits**

**6.11.1** *Major Diameter Fit —* In this type of fit, the major diameter of the external and internal splines has the same nominal diameter *d*1. There shall be circular clearance between the internal spline space width and external spline tooth thickness.

**6.11.1.1** The recommended tolerance values for the internal spline minor diameters (d2) shall be Hl1 and the tolerance values for the external spline minor diameters (*d*4*)* shall be h14. An example of major diameter fit is given in Fig. 6.

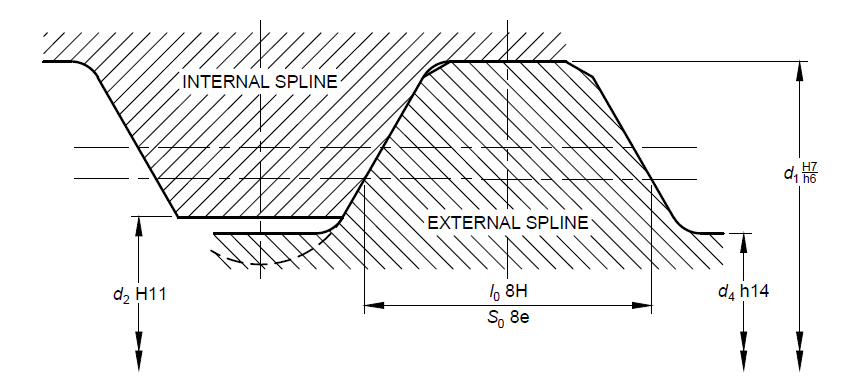


Fig.6 Example of Major Diameter Fit

**6.11.2** *Minor Diameter Fit* ***—*** In this type of fit, the minor diameter of the internal and external splines shall have the same nominal diameter *d*2. There shall be circular clearance between the internal spline space width and external spline tooth thickness.

**6.11.2.1** The recommended tolerance values for the internal spline major diameters (*d*1*)* shall be h14 and the tolerance values for the external spline major diameters (*d*3*)* shall be *hl1*. An example of minor diameter fit is given in Fig. 7.

**6.11.3** *Side Fit —* In this type of fit, the mating members contact on the sides of the teeth only. There shall be clearance between the major diameters and minor diameters. The tolerance values for spindle tooth thickness and space width for the spline qualities 7, 8, 9 and 10 shall be as given in Table 12.

NOTE — Instructions for the use of Table 12 is given in Annex A.

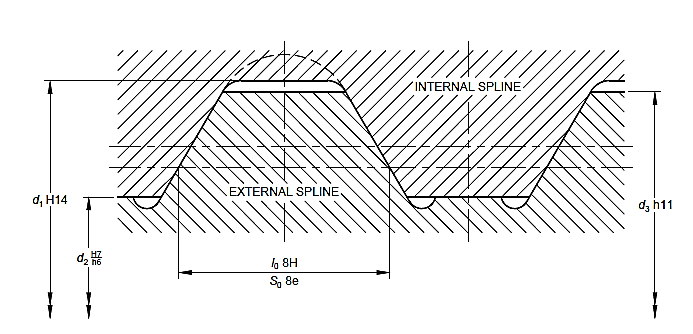


Fig. 7 Example of Minor Diameter Fit

**6.11.3.1** The recommended tolerance values for the major diameters of internal spline (*d*l***)*** shall be *h*14, the minor diameters of internal spline (*d*2***)*** shall be *h*11, the major diameters of external spline (*d*3***)*** shall be *h*11 and the minor diameters of external spline (*d*4***)*** shall be *h*14. An example of side fit is shown in Fig. 8.

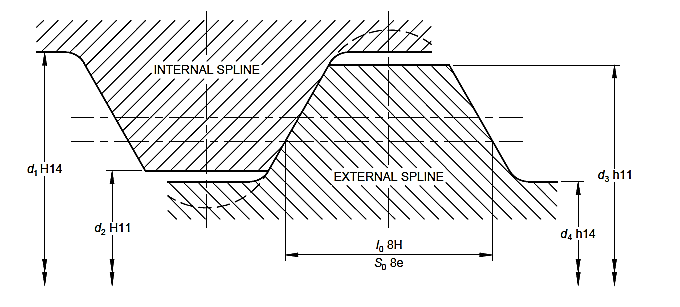


Fig. 8 Example of Side Fit

**6.11.4** A typical example of effective tooth thickness, effective space width, actual tooth thickness and the actual space width for three types of fits, namely, press fit, locating fit and sliding fit, is shown in Table 13.

**7 DESIGNATION**

**7.1 Side Fit**

**7.1.1** An involute sided spline of a spline assembly of side fit shall be designated by the type of spline, nominal size (*d*1*× d*2),number of teeth of the spline, the tolerance on the effective and actual dimensions; of space width for internal splines, and of tooth thickness for external spline, followed by the number of this standard.

*Example:* An external involute spline of nominal size 120 × 114 mm with 38 spline teeth, and with the tolerance symbols 8e and 8b on the effective and actual tooth thickness shall be designated as:

External Involute Spline 120 × 114 × 38 × 8eb IS 3665

**7.1.2** A side fitted spline assembly shall be designated by the nominal size, number of teeth, d, the spline, the effective and actual fit of the spline teeth and the number of this standard.

*Example:*

Aspline assembly of nominal size 120 × 114, with 38 spline teeth and the fit 8 HE/8eb on the effective and actual spline teeth shall be designated as:

Spline Assembly 120 ×114 × 38 ×8 HE/8eb IS: 3665

**7.2 Diameter Fit**

Spline assembly of major and minor diameter fit shall be designated as in **6.1.2** along with the value of fit on their respective diameters.

*Examples:*

1. A spline assembly of major diameter fit of H7/h6 of external involute spline, 120 × 114 × 38 × 8eb and internal involute spline 120 × 114 × 38 × 8 HE shall be designated as:

Spline Assembly 120 H7/h6 × 114 × 38 × 8 HE/8eb IS: 3665

1. A spline assembly of minor diameter fit of H7/h6 of external involute spline, 120 × 114 × 38 × 8eb and internal involute spline 120 × 114 × 38 × 8 HE shall be designated as:

Spline Assembly 120 × 114 H7/h6 × 38 × 8 HE/8eb IS: 3665

**8 BIS CERTIFICATION MARKING**

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

**Table 1 Dimensions for Involute Splines of Module 1**

(*Clauses* 6.2 to 6.10)

All dimensions in millimeters.

| **Sl No.** | **Nominal Size** |  | | | | | | | | | **Internal Spline** | | | **External Spline** | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | | | | | | | | | Pin Dia | Measur‒ement Between pine | Deviation Factor | Pin Dia | Measur‒ement Over Pins | Deviation Factor | Tooth Thickness Over z' Teeth | |
|  |  |  | | | | | | | | |  |  |  |  |  |  |  | Tooth Thickness Deviation Factor 0.866 |
|  | *d*1 × *d*2 | *z* | *d*0 | *d*b | *d*3 | *d*4 | *d*5 *Min* | *d*6 *Max* | *xm* | *l*o = *s*o | *d* | *M*i | *f*i | *d* | *M*a | *f*a | *Z*' |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 8 × 6  10 × 8 | 6  8 | 6  8 | 5.196  6.928 | 7.8  9.8 | 5.8  7.8 | 7.86  9.86 | 5.94  8.94 | + 0.45  + 0.45 | 2.090  2.090 | 1.75  1.75 | 4.367  6.368 | 1.64  1.66 | 4.00  3.00 | 14.173  14.103 | 1.01  1.11 | 2  2 | 4.810  4.903 |
|  | 12 × 10  15 × 13 | 10  13 | 10  13 | 8.660  11.258 | 11.8  14.8 | 9.8  12.8 | 11.86  14.87 | `9.94  12.93 | + 0.45  + 0.45 | 2.090  2.090 | 1.75  1.75 | 8.369  11.273 | 1.67  1.67 | 2.75  2.50 | 15.615  17.992 | 1.17  1.24 | ‒‒  3 | ‒‒  7.857 |
|  | 17 × 15  18 × 16 | 15  16 | 15  16 | 12.990  13.856 | 16.8  17.8 | 14.8  15.8 | 16.87  17.87 | 14.93  15.93 | + 0.45  + 0.45 | 2.090  2.090 | 1.75  1.75 | 13.286  14.369 | 1.68  1.69 | 2.25  2.25 | 19.431  20.541 | 1.31  1.33 | ‒‒  ‒‒ | ‒‒  ‒‒ |
|  | 20 × 18  22 × 20 | 18  20 | 18  20 | 15.588  17.321 | 19.8  21.8 | 17.8  19.8 | 19.87  21.87 | 17.93  19.93 | + 0.45  + 0.45 | 2.090  2.090 | 1.75  1.75 | 16.370  18.370 | 1.70  1.70 | 2.25  2.25 | 22.568  24.592 | 1.35  1.37 | 4  4 | 10.810  10.903 |
|  | 25 × 25  28 × 26 | 24  26 | 24  26 | 20.785  22.517 | 24.8  27.8 | 22.8  25.8 | 24.87  27.88 | 22.93  25.92 | ‒ 0.05  + 0.45 | 1.513  2.090 | 1.75  1.75 | 21.311  24.370 | 2.00  1.71 | 2.00  2.00 | 27.109  29.982 | 1.54  1.46 | ‒‒  5 | ‒‒  13.903 |
|  | 30 × 28  32 × 30 | 28  30 | 28  30 | 24.249  25.981 | 29.8  31.8 | 27.8  29.8 | 29.88  31.88 | 27.92  29.92 | + 0.45  + 0.45 | 2.090  2.090 | 1.75  1.75 | 26.370  28.370 | 1.71  1.71 | 2.00  2.00 | 31.992  34.002 | 1.47  1.48 | ‒‒  6 | ‒‒  16.810 |
|  | 35 × 33  37 × 35 | 34  36 | 34  36 | 29.445  31.177 | 34.8  36.8 | 32.8  34.8 | 34.88  36.88 | 32.92  34.92 | ‒ 0.05  ‒ 0.05 | 1.513  1.513 | 1.75  1.75 | 31.331  33.334 | 1.90  1.89 | 2.00  2.00 | 37.127  39.129 | 1.59  1.59 | 6  ‒‒ | 16.497  ‒‒ |
|  | 38 × 36  40 × 38 | 36  38 | 36  38 | 31.177  32.909 | 37.8  39.8 | 35.8  37.8 | 37.88  39.88 | 33.92  37.92 | +0.45  +0.45 | 2.090  2.090 | 1.75  1.75 | 34.370  36.370 | 1.72  1.72 | 2.00  2.00 | 40.025  42.032 | 1.51  1.52 | 7  7 | 19.810  19.903 |
|  | 42 × 40 | 40 | 40 | 34.641 | 41.8 | 39.8 | 41.88 | 39.92 | +0.45 | 2.090 | 1.75 | 38.370 | 1.72 | 2.00 | 44.038 | 1.53 | ‒‒ | ‒‒ |



| **Sl No.** | **Nominal size** |  | | | | | | | | | | **Internal Spline** | | | | | **External Spline** | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | Pin Dia | | Measurement Between Pine | | Deviation Factor | Pin Dia | Measurement Over Pins | Deviation Factor | Tooth Thickness Over Z' Teeth | | |
|  | | | | | | | | | |  | |  | |  |  |  |  |  | | Tooth Thickness Deviation Factor 0.866 |
|  | *d*1× *d*2 | *z* | *d*0 | *d*b | *d*3 | *d*4 | *d*5 *Min* | *d*6 *Max* | *xm* | *l*o = *s*o | *d* | | *M*i | | *f*i | | *d* | *M*a | *f*a | | *Z*' |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |  | |  |  |  | |  |  |
|  | 10 × 7.5  12 × 9.5 | 6  8 | 7.50  10.00 | 6.495  8.660 | 9.75  11.75 | 7.25  9.25 | 9.81  11.81 | 7.44  9.44 | + 0.5625  + 0.3125 | 2.613  2.324 | 2.25  2.25 | | 5.276  7.230 | | 1.71  2.13 | | 4.50  3.00 | 16.629  15.554 | 1.03  1.20 | | 2  2 | 6.013  5.879 |
|  | 15 × 12.5  17 × 14.5 | 10  12 | 12.50  15.00 | 10.825  12.990 | 14.75  16.75 | 12.25  14.25 | 14.82  16.82 | 12.43  14.43 | + 0.5625  + 0.3125 | 2.613  2.325 | 2.25  2.25 | | 10.276  12.249 | | 1.72  1.95 | | 3.25  2.75 | 19.075  20.059 | 1.19  1.31 | | ‒‒  3 | ‒‒  9.513 |
|  | 18 × 15.5  20 × 17.5 | 13  14 | 16.25  17.50 | 14.073  15.155 | 17.75  19.75 | 15.25  17.25 | 17.82  19.82 | 15.43  17.43 | + 0.1875  + 0.5625 | 2.180  2.613 | 2.25  2.25 | | 13.099  15.276 | | 2.08  1.72 | | 2.50  3.00 | 20.360  23.602 | 1.38  1.28 | | 3  3 | 9.446  9.876 |
|  | 22 × 19.5  25 × 22.5 | 16  18 | 20.00  22.50 | 17.321  19.486 | 21.75  24.75 | 19.25  22.25 | 21.82  24.82 | 19.43  22.43 | + 0.3125  + 0.5625 | 2.324  2.613 | 2.25  2.25 | | 17.257  20.276 | | 1.88  1.73 | | 2.5.  2.75 | 24.477  28.050 | 1.41  1.36 | | ‒‒  4 | ‒‒  13.513 |
|  | 28 × 25.5  30 × 27.5 | 21  22 | 26.25  27.50 | 22.733  23.816 | 27.75  29.75 | 25.25  27.25 | 27.83  29.83 | 24.42  27.42 | + 0.1875  + 0.5625 | 2.180  2.613 | 2.25  2.25 | | 23.170  25.276 | | 1.91  1.73 | | 2.50  2.75 | 30.481  33.103 | 1.47  1.40 | | 4  ‒‒ | 13.313  ‒‒ |
|  | 32 × 29.5  35 × 32.5 | 24  26 | 30.00  32.50 | 25.981  28.146 | 31.75  34.75 | 29.25  32.25 | 31.83  34.83 | 29.42  32.42 | + 0.3125  + 0.5625 | 2.324  2.613 | 2.25  2.25 | | 27.264  30.276 | | 1.83  1.73 | | 2.50  2.50 | 34.540  37.477 | 1.48  1.46 | | 5  5 | 17.013  17.379 |
|  | 37 × 34.5  38 × 35.5 | 28  29 | 35.00  36.25 | 30.311  31.393 | 36.75  37.75 | 34.25  35.25 | 36.83  37.83 | 34.42  35.42 | + 0.3125  + 0.1875 | 2.324  2.180 | 2.25  2.25 | | 32.266  33.200 | | 1.81  1.85 | | 2.50  2.50 | 39.561  40.540 | 1.51  1.53 | | ‒‒  ‒‒ | ‒‒  ‒‒ |
|  | 40 × 37.5  42 × 39.5 | 30  32 | 37.50  40.00 | 32.476  34.641 | 39.75  41.75 | 37.25  39.25 | 39.83  41.83 | 37.42  39.42 | + 0.5625  + 0.3125 | 2.613  2.324 | 2.25  2.25 | | 35.276  37.267 | | 1.73  1.80 | | 2.50  2.50 | 42.502  44.577 | 1.48  1053 | | 6  6 | 21.013  20.879 |
|  | 45 × 42.5  47 × 44.5 | 34  36 | 42.50  45.00 | 36.806  38.971 | 44.75  46.75 | 42.25  44.25 | 44.83  46.83 | 42.42  44.42 | + 0.5625  + 0.3125 | 2.613  2.324 | 2.25  2.25 | | 40.276  42.268 | | 1.73  1.79 | | 2.50  2.50 | 47.523  49.591 | 1.50  1.54 | | 7  7 | 24.647  24.513 |
|  | 48 × 45.5  50 × 47.5 | 37  38 | 46.25  47.50 | 40.054  41.136 | 47.75  49.75 | 45.25  47.25 | 47.83  49.83 | 45.42  47.42 | + 0.1875  + 0.5625 | 2.180  2.613 | 2.25  2.25 | | 43.216  45.276 | | 1.82  1.73 | | 2.50  2.50 | 50.576  52.540 | 1.56  1.52 | | 7  7 | 24.446  24.876 |
|  | 52 × 49.5 | 40 | 50.00 | 43.301 | 51.75 | 49.25 | 51.83 | 49.42 | + 0.3125 | 2.324 | 2.25 | | 47.269 | | 1.79 | | 2.50 | 54.602 | 1.56 | | ‒ | ‒ |



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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 3 Dimensions for Involute Splines of Module (1.5)**  (*Clauses* 6.2 to 6.10)  All dimensions in millimetres. | | | | | | | | | | | | | | | | | | | |
| **Sl No.** | **Nominal Size** |  | | | | | | | | | **Internal Spline** | | | | **External Spline** | | | | |
|  | | | | | | | | | Pin Dia | Measurement Between Pine | | Deviation Factor | Pin Dia | Measurement Over Pins | Deviation Factor | Tooth Thickness Over Z' Teeth | |
|  | | | | | | | | |  |  |  | |  |  |  |  | Tooth Thickness Deviation Factor 0.866 |
|  | *d*1× *d*2 | *z* | *d*0 | *d*b | *d*3 | *d*4 | *d*5 *Min* | *d*6 *Max* | *xm* | *l*o = *s*o | *d* | *M*i | *f*i | | *d* | *M*a | *f*a | *Z*' |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
|  | 12 × 9  15 × 12 | 6  8 | 9.0  12.0 | 7.794  10.392 | 11.7  14.7 | 8.7  11.7 | 11.76  14.76 | 8.94  11.94 | + 0.675  + 0.675 | 3.136  3.136 | 2.75  2.75 | 6.180  9.180 | 1.77  1.76 | | 5.50  4.50 | 2.173  21.155 | 1.02  1.11 | 2  2 | 7.216  7.355 |
|  | 17 × 14  18 × 15 | 10  10 | 15.0  15.0 | 12.990  12.990 | 16.7  17.7 | 13.7  14.7 | 16.77  17.77 | 13.93  14.93 | + 0.175  + 0.675 | 2.558  3.136 | 2.75  2.75 | 10.985  12.181 | 2.67  1.76 | | 3.25  4.00 | 2.0593  23.127 | 1.31  1.18 | 2  ‒ | 6.995  ‒ |
|  | 20 × 17  22 × 19 | 12  13 | 18.0  19.5 | 15.588  16.887 | 19.7  21.7 | 16.7  18.7 | 19.77  21.77 | 16.93  18.93 | + 0.175  + 0.425 | 2.558  2.847 | 2.75  2.75 | 14.038  16.014 | 2.33  1.91 | | 3.00  3.25 | 22.995  25.382 | 1.38  1.32 | 3  3 | 11.216  11.535 |
|  | 25 × 22  28 × 25 | 15  17 | 22.5  25.5 | 19.486  22.084 | 24.7  27.7 | 21.7  24.7 | 24.77  27. 78 | 21.93  24.92 | + 0.425  + 0.425 | 2.847  2.847 | 2.75  2.75 | 19.036  22.053 | 1.88  1.86 | | 3.25  3.25 | 28.446  31.498 | 1.35  1.37 | 3  4 | 11.675  15.896 |
|  | 30 × 27  32 × 29 | 18  20 | 27.0  30.0 | 23.383  25.81 | 29.7  31.7 | 26.7  28.7 | 29.78  31.78 | 26.92  28.92 | + 0.675  + 0.175 | 3.136  2.558 | 2.75  2.75 | 24.181  26.111 | 1.75  1.99 | | 3.25  3.00 | 33.532  35.078 | 1.36  1.48 | 4  4 | 16.216  15.855 |
|  | 35 × 32  37 × 34 | 22  23 | 33.0  34.5 | 28.579  29.878 | 34.7  36.7 | 31.7  33.7 | 34.78  36.78 | 31.92  33.92 | + 0.175  + 0.425 | 2.558  2.847 | 2.75  2.75 | 29.118  31.087 | 1.96  1.83 | | 3.00  3.00 | 38.092  39.939 | 1.49  1.46 | 4  5 | 15.995  20.396 |
|  | 38 × 35  40 × 37 | 24  25 | 36.0  37.5 | 31.177  32.476 | 37.7  39.7 | 34.7  36.7 | 37.78  39.78 | 34.92  36.92 | + 0.175  + 0.425 | 2.558  2.847 | 2.75  2.75 | 32.125  34.094 | 1.93  1.82 | | 3.00  3.00 | 41.103  42.961 | 1.51  1.48 | 5  5 | 20.216  20.535 |
|  | 42 × 39  45 × 42 | 26  28 | 39.0  42.0 | 33.775  36.373 | 41.7  44.7 | 38.7  41.7 | 41.78  44.78 | 38.92  41.92 | + 0.675  + 0.675 | 3.136  3.136 | 2.75  2.75 | 36.181  39.181 | 1.74  1.74 | | 3.00  3.00 | 44.972  47.988 | 1.46  1.47 | 5  6 | 20.855  25.076 |
|  | 47 × 44  48 × 45 | 30  30 | 45.0  45.0 | 38.971  38.971 | 46.7  47.7 | 43.7  44.7 | 46.78  47.78 | 43.92  44.92 | + 0.175  + 0.675 | 20558  30136 | 2.75  2.75 | 41.138  42.181 | 1.88  1.74 | | 3.00  3.00 | 50.130  51.003 | 1.54  1.48 | 6  6 | 24.716  25.216 |
|  | 50 × 47  (52 × 49) | 32  33 | 48.0  49.5 | 41.569  42.868 | 49.7  51.7 | 46.7  48.7 | 49.78  51.78 | 46.92  48.92 | + 0.175  + 0.425 | 2.558  2.847 | 2.75  2.75 | 44.141  46.115 | 1.87  1.80 | | 3.00  3.00 | 53.138  55.026 | 1.55  1.52 | 6  6 | 24.855  25.175 |
|  | 55 × 52  (58 × 55) | 35  37 | 52.5  55.5 | 45.466  48.064 | 54.7  57.7 | 51.7  54.7 | 54.79  57.79 | 51.91  54.91 | + 0.425  + 0.425 | 2.847  2.847 | 2.75  2.75 | 49.119  52.122 | 1.79  1.79 | | 3.00  3.00 | 58.038  61.049 | 1.53  1.54 | 7  7 | 29.396  29.535 |
|  | 60 × 57  (62 × 59) | 38  40 | 57.0  60.0 | 49.363  51.962 | 59.7  61.7 | 56.7  58.7 | 59.79  61.79 | 56.91  58.91 | + 0.675  + 0.175 | 3.136  2.558 | 2.75  2.75 | 54.181  56.150 | 1.75  1.84 | | 3.00  3.00 | 63.047  65.160 | 1052  1058 | 7  7 | 29.855  29.495 |



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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 4 Dimensions for Involute Splines of Module 2**  (*Clauses* 6.2 to 6.10)  All dimensions in millimetres. | | | | | | | | | | | | | | | | | | |
| **Sl No.** | **Nominal Size** |  | | | | | | | | | **Internal Spline** | | | **External Spline** | | | | |
|  | | | | | | | | | Pin Dia | Measurement Between pine | Deviation Factor | Pin Dia | Measurement Over Pins | Deviation Factor | Tooth Thickness Over z' Teeth | |
|  | | | | | | | | |  |  |  |  |  |  |  | Tooth thickness deviation factor 0.866 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *d*1× *d*2 | *z* | *d*0 | *d*b | *d*3 | *d*4 | *d*5 *Min* | *d*6 *Max* | *xm* | *l*o = *s*o | *d* | *M*i | *f*i | *d* | *M*a | *f*a | *Z*' |  |
|  | 15 × 11  17 × 13 | 6  7 | 12  14 | 10.392  12.124 | 14.6  16.6 | 10.6  12.6 | 14.68  16.68 | 10.92  12.92 | + 0.4  + 0.4 | 3.603  3.603 | 3.5  3.5 | 7.629  9.324 | 2.42  2.19 | 5.5  5.0 | 22.212  22.695 | 1.11  1.13 | 2  2 | 9.121  9.214 |
|  | 18 × 14  20 × 16 | 7  8 | 14  16 | 12.124  13.856 | 17.6  19.6 | 13.6  15.6 | 17.68  19.68 | 13.92  15.92 | + 0.9  + 0.9 | 4.181  4.181 | 3.5  3.5 | 10.379  12.736 | 1.61  1.66 | 6.0  6.0 | 25.588  28.206 | 1.06  1.11 | 2  2 | 9.714  9.807 |
|  | 22 × 18  25 × 21 | 9  11 | 18  22 | 15.588  19.053 | 21.6  24.6 | 17.6  20.6 | 21.68  24.68 | 17.92  20.92 | + 0.9  + 0.4 | 4.181  3.603 | 3.5  3.5 | 14.460  17.478 | 1.64  1.96 | 5.5  4.5 | 28.790  29.898 | 1.13  1.28 | ‒  ‒ | ‒  ‒ |
|  | 28 × 24  30 × 26 | 12  14 | 24  28 | 20.785  24.249 | 27.6  29.6 | 23.6  25.6 | 27.68  29.69 | 23.92  25.91 | + 0.9  ‒ 0.1 | 4.181  3.026 | 3.5  3.5 | 20.738  22.484 | 1.68  2.41 | 5.0  4.0 | 34.161  34.144 | 1.23  1.46 | 3  3 | 15.621  14.807 |
|  | 32 × 28  35 × 31 | 14  16 | 28  32 | 24.249  27.713 | 31.6  34.6 | 27.6  30.6 | 31.69  34.69 | 27.91  30.91 | + 0.9  + 0.4 | 4.181  3.603 | 3.5  3.5 | 24.738  27.711 | 1.69  1.88 | 4.5  4.0 | 37.016  39.000 | 1.30  1.42 | 3  3 | 15.807  15.493 |
|  | 37 × 33  38 × 34 | 17  18 | 34  36 | 29.445  31.177 | 36.6  37.6 | 32.6  33.6 | 36.69  37.69 | 32.91  33.91 | + 0.4  ‒ 0.1 | 3.603  3.026 | 3.5  3.5 | 29.571  30.566 | 1.86  2.15 | 4.0  4.0 | 40.857  42.181 | 1.42  1.50 | 4  3 | 21.028  15.179 |
|  | 40 × 36  42 × 38 | 18  20 | 36  40 | 31.177  34.641 | 39.6  41.6 | 35.6  37.6 | 39.69  41.69 | 35.91  37.91 | + 0.9  ‒ 0.1 | 4.181  3.026 | 3.5  3.5 | 32.739  34.589 | 1.70  2.08 | 4.5  4.0 | 45.137  46.195 | 1.35  1.52 | 4  4 | 21.621  20.807 |
|  | 45 × 41  47 × 43 | 21  22 | 42  44 | 36.373  38.105 | 44.6  46.6 | 40.6  42.6 | 44.69  46.69 | 40.91  42.91 | + 0.4  + 0.4 | 3.603  3.603 | 3.5  3.5 | 37.604  39.720 | 1.84  1.84 | 4.0  4.0 | 48.938  51.074 | 1.46  1.47 | 4  4 | 21.400  21.493 |
|  | 48 × 44  50 × 46 | 22  24 | 44  48 | 38.105  41.569 | 47.6  49.6 | 43.6  45.6 | 47.69  49.69 | 43.91  45.91 | + 0.9  ‒ 0.1 | 4.181  3.026 | 3.5  3.5 | 40.740  42.621 | 1.70  2.00 | 4.0  4.0 | 51.912  54.218 | 1.43  1.54 | 5  4 | 27.435  21.179 |
|  | (52 × 48)  55 × 51 | 24  26 | 48  52 | 41.569  45.033 | 51.6  54.6 | 47.6  50.6 | 51.69  54.70 | 47.91  50.90 | + 0.9  + 0.4 | 4.181  3.603 | 3.5  3.5 | 44.740  47.724 | 1.71  1.82 | 4.0  4.0 | 55.939  59.109 | 1.44  1.50 | 5  5 | 27.621  27.307 |
|  | (58 × 54)  60 × 56 | 28  28 | 56  56 | 48.497  48.497 | 57.8  59.6 | 53.6  55.6 | 57.70  59.70 | 53.90  55.90 | ‒ 0.1  + 0.9 | 3.026  4.181 | 3.5  3.5 | 50.642  32.740 | 1.95  1.71 | 4.0  4.0 | 62.235  63.984 | 1.56  1.47 | 5  6 | 26.933  33.435 |
|  | (62 × 58)  65 × 61 | 30  31 | 60  62 | 51.962  53.694 | 61.6  64.6 | 54.6  60.6 | 61.70  64.70 | 57.90  60.90 | ‒ 0.1  + 0.4 | 3.026  3.603 | 3.5  3.5 | 54.650  57.648 | 1.93  1.80 | 4.0  4.0 | 66.242  69.058 | 1.57  1.53 | 5  6 | 27.179  33.214 |
|  | (68 × 64)  70 × 66 | 32  34 | 64  68 | 55.426  58.890 | 67.6  69.6 | 63.6  65.6 | 67.70  69.70 | 63.90  65.90 | + 0.9  ‒ 0.1 | 4.181  3.026 | 3.5  3.5 | 60.740  62.663 | 1.71  1.90 | 4.0  4.0 | 72.021  74.253 | 1.49  1.59 | 6  6 | 33.807  32.993 |
|  | (72 × 68)  75 × 71 | 34  36 | 68  72 | 58.890  62.354 | 71.6  74.6 | 67.6  70.6 | 71.70  74.70 | 67.90  70.90 | + 0.9  + 0.4 | 4.181  3.603 | 3.5  3.5 | 64.740  67.726 | 1.71  1.79 | 4.0  4.0 | 76035  79.166 | 1.50  1.55 | 7  7 | 39.435  39.121 |
|  | (78 × 74)  80 × 76 | 38  38 | 76  76 | 65.818  65.818 | 77.6  79.6 | 73.6  75.6 | 77.70  79.70 | 73.90  75.90 | ‒ 0.1  + 0.9 | 3.026  4.181 | 3.5  3.5 | 70.672  72.740 | 1.88  1.72 | 4.0  4.0 | 82.263  84.063 | 1.60  1.52 | 7  7 | 38.807  39.807 |
|  | (82 × 78) | 40 | 80 | 69.282 | 81.6 | 77.6 | 81.70 | 77.90 | ‒ 0.1 | 3.026 | 3.5 | 74.676 | 1.87 | 4.0 | 86.267 | 1.61 | 7 | 38.993 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 5 Dimensions for Involute Splines of Module 2.5**  (*Clauses* 6.2 to 6.10)  All dimensions in millimetres. | | | | | | | | | | | | | | | | | | |
| **Sl No.** | **Nominal Size** |  | | | | | | | | | **Internal Spline** | | | **External Spline** | | | | |
|  |  |  | | | | | | | | | **Pin Dia** | **Measurement Between pine** | **Deviation Factor** | **Pin Dia** | **Measurement Over Pins** | **Deviation Factor** | **Tooth Thickness Over z' Teeth** | |
|  |  |  | | | | | | | | |  |  |  |  |  |  |  | **Tooth Thickness Deviation Factor 0.866** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *d*1 × *d*2 | *z* | *d*0 | *d*b | *d*3 | *d*4 | *d*5 *Min* | *d*6 *Max* | *xm* | *l*o = *s*o | *d* | *M*i | *f*i | *d* | *M*a | *f*a | *Z*' |  |
|  | 20 × 15  22 × 17 | 6  7 | 15.0  17.5 | 12.990  15.155 | 19.5  21.5 | 14.5  16.5 | 19.58  21.38 | 14.92  16.92 | + 1.125  + 0.875 | 5.226  4.937 | 4.5  4.5 | 10.552  12.105 | 1.71  1.85 | 9.0  7.0 | 33.258  30.558 | 1.03  1.08 | 2  2 | 12.026  11.892 |
|  | 25 × 20  28 × 23 | 8  10 | 20.0  25.0 | 17.321  21.651 | 24.5  27.5 | 19.5  22.5 | 24.58  27.58 | 19.92  22.92 | + 1.125  + 0.125 | 5.226  4.071 | 4.5  4.25 | 15.552  19.116 | 1.72  2.30 | 7.0  5.0 | 34.113  33.006 | 1.13  1.37 | 2  2 | 12.259  11.491 |
|  | 30 × 25  32 × 27 | 10  11 | 25.0  27.5 | 21.651  23.816 | 29.5  31.5 | 24.5  26.5 | 29.58  31.59 | 24.92  26.91 | + 1.125  + 0.875 | 5.226  4.937 | 4.5  4.5 | 20.552  22.265 | 1.72  1.81 | 6.5  6.0 | 38.151  38.835 | 1.19  1.23 | 3  3 | 19.293  19.160 |
|  | 35 × 30  37 × 32 | 12  13 | 30.0  32.5 | 25.981  28.146 | 34.5  36.5 | 29.5  31.5 | 34.59  36.59 | 29.91  31.91 | + 1.125  + 0.875 | 5.226  4.937 | 4.5  4.5 | 25.552  27.308 | 1.72  1.80 | 6.0  5.5 | 42.093  42.764 | 1.25  1.30 | 3  3 | 19.526  19.392 |
|  | 38 × 33  40 × 35 | 14  14 | 35.0  35.0 | 30.311  30.311 | 37.5  39.5 | 32.5  34.5 | 37.59  39.53 | 32.91  34.91 | + 0.125  + 1.125 | 4.071  5.226 | 4.5  4.5 | 28.316  30.552 | 2.26  1.72 | 5.0  6.0 | 43.093  47.204 | 1.43  1.28 | 3  3 | 18.759  19.759 |
|  | 42 × 37  45 × 40 | 15  16 | 37.5  40.0 | 32.476  34.641 | 41.5  44.5 | 36.5  39.5 | 41.59  44.59 | 36.91  39.91 | + 0.875  + 1.125 | 4.937  5.226 | 4.5  4.5 | 32.340  35.552 | 1.79  1.73 | 5.5  5.5 | 47.881  51.035 | 1.33  1.33 | 3  4 | 19.625  26.793 |
|  | 47 × 42  48 × 43 | 17  18 | 42.5  45.0 | 36.806  38.971 | 46.5  47.5 | 41.5  42.5 | 46.59  47.59 | 41.91  42.91 | + 0.875  + 0.125 | 4.937  4.071 | 4.5  4.5 | 37.365  38.387 | 1.78  2.07 | 5.5  5.0 | 52.974  53.156 | 1.36  1.47 | 4  4 | 26.660  26.026 |
|  | 50 × 45  (52 × 47) | 18  19 | 45.0  47.5 | 38.971  41.136 | 49.5  51.5 | 44.5  46.5 | 49.59  51.59 | 44.91  46.91 | + 1.125  + 0.875 | 5.226  4.937 | 4.5  4.5 | 40.552  42.384 | 1.73  1.78 | 5.5  5.5 | 56.100  58.052 | 1.36  1.38 | 4  4 | 27.026  26.892 |
|  | 55 × 50  (58 × 53) | 20  22 | 50.0  55.0 | 43.301  74.631 | 54.5  57.5 | 49.5  52.5 | 54.59  57.60 | 49.91  52.90 | + 1.125  + 0.125 | 5.226  4.071 | 4.5  4.5 | 45.552  48.424 | 1.73  1.99 | 5.5  5.0 | 61.157  63.198 | 1.38  1.51 | 4  4 | 27.259  26.491 |
|  | 60 × 65  (62 × 57) | 22  23 | 55.0  57.0 | 47.631  49.796 | 59.5  61.5 | 54.5  56.5 | 59.60  61.60 | 54.90  56.90 | + 1.125  + 0.875 | 5.226  4.937 | 4.5  4.5 | 50.552  52.413 | 1.73  1.77 | 5.5  5.0 | 66.206  66.846 | 1.40  1.45 | 5  5 | 34.239  34.160 |
|  | 65×60  (68×63) | 24  26 | 60.0  65.0 | 51.962  56.292 | 64.5  67.5 | 59.5  62.5 | 64.60  67.60 | 59.90  62.90 | + 1.125  + 0.125 | 5.226  4.071 | 4.5  4.5 | 55.552  58.448 | 1.73  1.94 | 5.0  5.0 | 69.924  73.229 | 1.44  1.53 | 5  5 | 34.526  33.759 |
|  | 70×65  (72×67) | 26  27 | 65.0  67.5 | 56.292  58.457 | 69.5  71.5 | 64.5  66.5 | 69.60  71.60 | 64.90  66.90 | + 1.125  + 0.875 | 5.226  4.937 | 4.5  4.5 | 60.552  62.434 | 1.73  1.77 | 5.0  5.0 | 74.954  76.920 | 1.46  1.48 | 5  5 | 34.759  34.625 |
|  | 75×70  (78×73) | 28  30 | 70.0  75.0 | 60.622  64.952 | 74.5  77.5 | 69.5  72.5 | 74.60  77.60 | 69.90  72.90 | + 1.125  + 0.125 | 5.226  4.071 | 4.5  4.5 | 65.552  68.464 | 1.73  1.90 | 5.0  5.0 | 79.981  83.253 | 1.47  1.55 | 6  6 | 41.793  41.026 |
|  | 80×75  (82×77) | 30  31 | 75.0  77.5 | 64.952  67.117 | 79.5  81.5 | 74.5  76.5 | 79.60  81.60 | 74.90  76.90 | + 1.125  + 0.875 | 5.226  4.937 | 4.5  4.5 | 70.552  72.449 | 1.73  1.76 | 5.0  5.0 | 85.004  86.978 | 1.48  1.50 | 6  6 | 42.026  41.892 |
|  | 85×80  (88×83) | 32  34 | 80.0  85.0 | 69.282  73.612 | 84.5  87.5 | 79.5  82.5 | 84.60  87.60 | 79.90  82.90 | + 1.125  + 0.125 | 5.226  4.071 | 4.5  4.5 | 75.552  78.476 | 1.73  1.88 | 5.0  5.0 | 90.026  93.273 | 1.49  1.57 | 6  6 | 42.259  41.491 |
|  | 90×85  (92×87) | 34  35 | 85.0  87.5 | 73.612  75.777 | 89.5  91.5 | 84.5  86.5 | 89.60  91.60 | 84.90  86.90 | + 1.125  + 0.875 | 5.226  4.937 | 4.5  4.5 | 80.552  82.461 | 1.73  1.76 | 5.0  5.0 | 95.045  97.024 | 1.50  1.52 | 7  7 | 49.293  49.160 |
|  | 95×90  (98×93) | 36  38 | 90.0  95.0 | 77.942  82.272 | 94.5  97.5 | 89.5  92.5 | 94.60  97.60 | 89.90  92.90 | + 1.125  + 0.125 | 5.226  4.071 | 4.5  4.5 | 85.552  88.485 | 1.73  1.86 | 5.0  5.0 | 100.063  103.288 | 1.51  1.58 | 7  7 | 49.526  48.759 |
|  | 100×95  (105×100) | 38  40 | 95.0  100.0 | 82.272  86.603 | 99.5  104.5 | 94.5  99.5 | 99.60  104.60 | 94.90  99.90 | + 1.125  + 1.125 | 5.226  5.226 | 4.5  4.5 | 90.552  95.552 | 1.73  1.73 | 5.0  5.0 | 105.079  110.094 | 1.52  1.53 | 7  8 | 49.759  56.793 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 6 Dimensions for Involute Splines of Module 3**  (*Clauses* 6.2 to 6.10)  All dimensions in millimetres. | | | | | | | | | | | | | | | | | | |
| **Sl No.** | **Nominal Size** |  | | | | | | | | | **Internal Spline** | | | **External Spline** | | | | |
|  |  |  | | | | | | | | | **Pin Dia** | **Measurement Between pine** | **Deviation Factor** | **Pin Dia** | **Measurement Over Pins** | **Deviation Factor** | **Tooth Thickness Over z' Teeth** | |
|  |  |  | | | | | | | | |  |  |  |  |  |  |  | **Tooth thickness deviation factor 0.866** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *d*1 × *d*2 | *z* | *d*0 | *d*b | *d*3 | *d*4 | *d*5 *Min* | *d*6 *Max* | *xm* | *l*o = *s*o | *d* | *M*i | *f*i | *d* | *M*a | *f*a | *Z*' |  |
|  | 22 × 16  25 × 19 | 6  7 | 18  21 | 15.588  18.187 | 21.4  24.4 | 15.4  18.4 | 21.48  24.48 | 15.92  18.92 | + 0.35  + 0.35 | 5.117  5.177 | 5.00  5.00 | 11.694  14.235 | 2.42  2.18 | 7  7 | 30.099  32.544 | 1.17  1.17 | 2  2 | 13.431  13.571 |
|  | 28 × 22  30 × 24 | 8  8 | 24  24 | 20.785  20.785 | 27.4  29.4 | 21.4  23.4 | 27.48  29.48 | 21.92  23.92 | + 0.35  + 1.35 | 5.117  6.271 | 5.25  5.25 | 16.835  19.105 | 2.56  1.66 | 7  8 | 36.289  40.013 | 1.23  1.14 | 2  2 | 13.710  14.710 |
|  | 32 × 26  35 × 29 | 9  10 | 27  30 | 23.383  25.981 | 31.4  34.4 | 25.4  28.4 | 31.49  34.49 | 25.91  28.91 | + 0.85  + 0.85 | 5.694  5.694 | 5.25  5.25 | 20.686  24.089 | 1.85  1.86 | 7  7 | 39.577  43.158 | 1.21  1.25 | 2  2 | 14.350  14.490 |
|  | 39 × 31  38 × 32 | 11  11 | 33  33 | 28.579  28.579 | 36.4  37.4 | 30.4  31.4 | 36.49  37.49 | 30.91  31.91 | + 0.35  + 0.85 | 5.117  5.694 | 5.25  5.25 | 25.627  26.762 | 2.14  1.83 | 6  7 | 42.581  45.828 | 1.35  1.25 | 2  3 | 14.129  22.791 |
|  | 40 × 34  42 × 36 | 12  12 | 36  36 | 31.177  31.177 | 39.4  41.4 | 33.4  35.4 | 39.49  41.49 | 33.91  35.91 | + 0.35  + 1.35 | 5.117  6.271 | 5.25  5.25 | 28.964  31.107 | 2.10  1.68 | 6  7 | 45.989  50.023 | 1.38  1.26 | 3  3 | 22.431  23.431 |
|  | 45 × 39  47 × 41 | 14  14 | 42  42 | 36.373  36.373 | 44.4  46.4 | 38.4  40.4 | 44.49  46.49 | 38.91  40.91 | ‒ 0.15  + 0.85 | 4.539  5.694 | 5.25  5.25 | 33.726  36.096 | 2.41  1.82 | 6  6 | 51.216  52.848 | 1.46  1.37 | 3  3 | 22.210  23.210 |
|  | 48 × 42  50 × 44 | 14  15 | 42  45 | 36.373  38.971 | 47.4  49.4 | 41.4  43.4 | 47.49  49.49 | 41.91  43.91 | + 1.35  + 0.85 | 6.271  5.694 | 5.25  5.25 | 37.108  38.855 | 1.69  1.80 | 7  6 | 56.148  55.606 | 1.29  1.38 | 3  3 | 23.710  23.350 |
|  | (52 × 46)  (55 × 49) | 16  17 | 48  51 | 41.569  44.167 | 51.4  54.4 | 45.4  48.4 | 51.49  54.50 | 45.91  48.90 | + 0.35  + 0.35 | 5.117  5.117 | 5.25  5.25 | 41.010  43.807 | 1.97  1.95 | 6  6 | 58.088  60.873 | 1.44  1.44 | 3  3 | 22.990  23.129 |
|  | (58 × 52)  60 × 54) | 18  18 | 54  54 | 46.765  46.765 | 57.4  59.4 | 51.4  53.4 | 57.50  59.50 | 51.90  53.90 | + 0.35  + 1.35 | 5.117  6.271 | 5.25  5.25 | 47.024  49.109 | 1.94  1.70 | 6  7 | 64.125  68.343 | 1.46  1.34 | 4  4 | 31.431  32.431 |
|  | (62 × 56)  65× 59 | 19  20 | 57  60 | 49.363  51.962 | 61.4  64.4 | 55.4  58.4 | 61.50  64.50 | 55.90  58.90 | + 0.85  + 0.85 | 5.694  5.694 | 5.25  5.25 | 50.908  54.101 | 1.79  1.79 | 6  6 | 67.767  70.999 | 1.43  1.44 | 4  4 | 32.071  32.210 |
|  | (68 × 62)  70 × 64) | 21  22 | 63  66 | 54.560  57.158 | 67.4  69.4 | 61.4  63.4 | 67.50  69.50 | 61.90  63.90 | + 0.85  + 0.35 | 5.694  5.117 | 5.25  5.25 | 56.928  59.042 | 1.78  1.89 | 6  6 | 73.827  76.183 | 1.45  1.49 | 4  4 | 32.350  31.990 |
|  | (72 × 66)  75 × 69) | 22  24 | 66  72 | 57.158  62.354 | 71.4  74.4 | 65.4  68.4 | 71.50  74.50 | 65.90  68.90 | + 1.35  ‒ 0.15 | 6.271  4.539 | 5.25  5.25 | 61.109  63.932 | 1.70  2.00 | 6  6 | 77.868  81.326 | 1.43  1.54 | 5  4 | 41.152  31.769 |
|  | (78 × 72)  80 × 74) | 24  25 | 72  75 | 62.354  64.952 | 77.4  79.4 | 71.4  73.4 | 77.50  79.50 | 71.90  73.90 | + 1.35  + 0.85 | 6.271  5.694 | 5.25  5.25 | 67.110  68.957 | 1.71  1.78 | 6  6 | 83.909  85.923 | 1.44  1.48 | 5  5 | 41.431  41.071 |
|  | (82 × 76)  85 × 79) | 26  27 | 78  81 | 67.550  70.148 | 81.4  84.4 | 75.4  78.4 | 81.50  84.50 | 75.90  78.90 | + 0.35  + 0.35 | 5.117  5.117 | 5.25  5.25 | 71.054  73.923 | 1.86  1.85 | 6  6 | 88.227  91.092 | 1.52  1.52 | 5  5 | 40.710  40.850 |
|  | (88 × 82)  90 × 84) | 28  28 | 84  84 | 72.746  72.746 | 87.4  89.4 | 81.4  83.4 | 87.50  89.50 | 81.90  83.90 | + 0.35  + 1.35 | 5.117  6.271 | 5.25  5.25 | 77.059  79.110 | 1.85  1.71 | 6  6 | 94.254  95.977 | 1.53  1.47 | 5  6 | 40.990  50.152 |
|  | (92 × 86)  95 × 89) | 29  30 | 87  90 | 75.344  77.942 | 91.4  94.4 | 85.4  88.4 | 91.50  94.50 | 85.90  88.90 | + 0.85  + 0.85 | 5.694  5.694 | 5.25  5.25 | 80.978  84.105 | 1.77  1.77 | 6  6 | 97.995  101.141 | 1.49  1.51 | 6  6 | 49.791  49.931 |
|  | (98 × 92)  100 × 94) | 31  32 | 93  96 | 80.540  83.138 | 97.4  99.4 | 91.4  93.4 | 97.50  99.50 | 91.90  93.90 | + 0.85  +0 .35 | 5.694  5.117 | 5.25  5.25 | 86.987  89.066 | 1.77  1.83 | 6  6 | 104.025  106.275 | 1.51  1.55 | 6  6 | 50.071  49.710 |
|  | 105 × 99 110 × 101 | 34  35 | 102  105 | 88.335  90.933 | 104.4  109.4 | 98.4  103.4 | 104.51  109.51 | 98.90  103.89 | ‒ 0.15  + 0.85 | 4.539  5.694 | 5.25  5.25 | 93.994  99.001 | 1.90  1.76 | 6  6 | 111.380  116.076 | 1.59  1.53 | 6  7 | 49.490  58.791 |
|  | 120 × 114  130 × 124 | 38  42 | 114  126 | 98.727  109.119 | 119.4  129.4 | 113.4  123.4 | 119.51  129.51 | 113.89  123.89 | + 1.35  + 0.35 | 6.271  5.117 | 5.25  5.25 | 109.111  119.078 | 1.72  1.81 | 6  6 | 129.095  136.329 | 1.52  1.58 | 7  8 | 59.710  67.431 |
|  | 140 × 134  150 × 144 | 45  48 | 135  144 | 116.913  124.708 | 139.4  149.4 | 133.4  143.4 | 139.51  149.51 | 133.89  143.89 | + 0.85  + 1.35 | 5.694  6.271 | 5.25  5.25 | 129.026  139.111 | 1.76  1.72 | 6  6 | 146.168  156.172 | 1.57  1.55 | 8  9 | 68.350  77.431 |

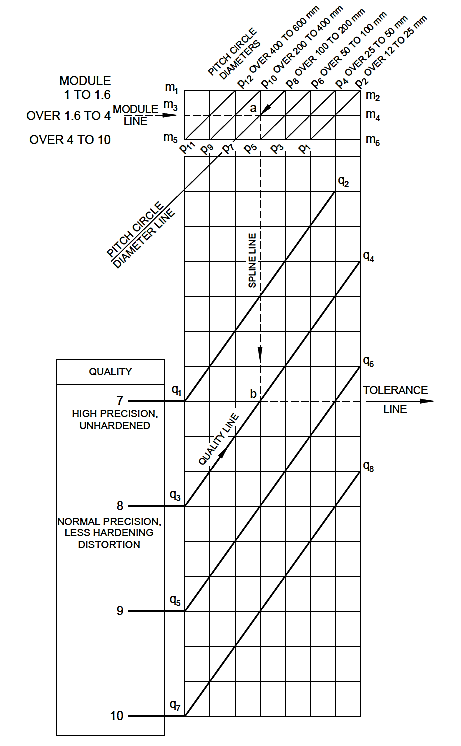
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 7 Dimensions for Involute Splines of Module 4**  (*Clauses* 6.2 to 6.10)  All dimensions in millimetres. | | | | | | | | | | | | | | | | | | |
| **Sl No.** | **Nominal Size** |  | | | | | | | | | **Internal Spline** | | | **External Spline** | | | | |
|  | | | | | | | | | **Pin Dia** | **Measur‒**  **ement Between pine** | **Devia‒**  **tion Factor** | **Pin Dia** | **Measur‒ement Over Pins** | **Devia‒**  **tion Factor** | **Tooth Thickness Over z' Teeth** | |
|  | | | | | | | | |  |  |  |  |  |  |  | **Tooth Thickness Deviation Factor 0.866** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *d*1 × *d*2 | *z* | *d*0 | *d*b | *d*3 | *d*4 | *d*5  *Min* | *d*6 *Max* | *xm* | *l*o = *s*o | *d* | *M*i | *f*i | *d* | *M*a | *f*a | *Z*' |  |
|  | 32 × 23  35 × 27 | 6  7 | 24  28 | 20.785  24.249 | 31.2  34.2 | 23.2  26.2 | 31.28  34.29 | 23.92  26.91 | + 1.8  + 1.3 | 8.362  7.784 | 7  7 | 17.470  19.778 | 1.64  1.80 | 15  11 | 54.521  48.316 | 1.02  1.09 | 2  2 | 19.241  18.928 |
|  | 37 × 29  38 × 30 | 8  8 | 32  32 | 27.713  27.713 | 36.2  37.2 | 28.2  29.2 | 36.29  37.29 | 28.91  29.91 | + 0.3  + 0.8 | 6.630  7.207 | 6.75  7 | 22.935  23.337 | 2.42  2.13 | 9  10 | 47.335  50.447 | 1.25  1.19 | 2  2 | 18.114  18.614 |
|  | 40 × 32  42 × 34 | 8  9 | 32  36 | 27.713  31.177 | 39.2  41.2 | 31.2  33.2 | 39.29  41.29 | 31.91  33.91 | + 1.8  + 0.8 | 8.362  7.207 | 7  7 | 25.473  26.837 | 1.66  2.03 | 12  9 | 56.413  51.497 | 1.11  1.23 | 2  2 | 19.614  18.800 |
|  | 45 × 37  47 × 39 | 10  10 | 40  40 | 34.641  34.641 | 44.2  46.2 | 36.2  38.2 | 44.29  46.29 | 36.91  38.91 | + 0.3  + 1.3 | 6.630  7.784 | 7  7 | 30.113  32.472 | 2.41  1.81 | 8  10 | 52.967  59.393 | 1.36  1.21 | 2  2 | 18.486  19.486 |
|  | 48 × 40  50 × 42 | 10  11 | 40  44 | 34.641  38.105 | 47.2  49.2 | 39.2  41.2 | 47.29  49.29 | 39.91  41.91 | + 1.8  + 0.8 | 8.362  7.207 | 7  7 | 33.475  34.955 | 1.67  1.96 | 10  9 | 60.090  59.979 | 1.20  1.28 | 3  3 | 30.869  30.055 |
|  | (52 × 44)  55 × 47 | 11  12 | 44  48 | 38.105  41.569 | 51.2  54.2 | 43.2  46.2 | 51.29  54.29 | 43.91  46.91 | + 1.8  + 1.3 | 8.362  7.784 | 7  7 | 37.023  40.474 | 1.66  1.79 | 10  9 | 63.660  65.139 | 1.21  1.29 | 3  3 | 31.055  30.741 |
|  | (58 × 50)  60 × 52 | 13  14 | 52  56 | 45.033  48.497 | 57.2  59.2 | 49.2  51.2 | 57.30  59.30 | 49.90  51.90 | + 0.8  ‒ 0.2 | 7.207  6.052 | 7  7 | 43.037  44.967 | 1.91  2.41 | 8  8 | 65.470  68.288 | 1.37  1.46 | 3  3 | 30.428  29.614 |
|  | (62 × 54)  65 × 67 | 14  15 | 56  60 | 48.497  51.962 | 61.2  64.2 | 53.2  56.2 | 61.30  64.30 | 53.90  56.90 | + 0.8  + 0.3 | 7.207  6.630 | 7  7 | 47.411  49.965 | 1.91  2.05 | 8  8 | 69.932  72.791 | 1.39  1.43 | 3  3 | 30.614  30.300 |
|  | (68 × 60)  70 × 62 | 16  16 | 64  64 | 55.426  55.426 | 67.2  69.2 | 59.2  61.2 | 67.30  69.30 | 59.90  61.90 | ‒ 0.2  + 0.8 | 6.052  7.207 | 7  7 | 53.066  55.421 | 2.25  1.88 | 8  8 | 76.329  78.001 | 1.48  1.42 | 3  3 | 29.986  30.986 |
|  | (72 × 64)  75 × 67 | 16  17 | 64  68 | 55.426  58.890 | 71.2  74.2 | 63.2  66.2 | 71.30  74.30 | 63.90  66.90 | + 1.8  + 1.3 | 8.362  7.784 | 7  7 | 57.478  60.189 | 1.69  1.77 | 9  9 | 82.163  85.115 | 1.33  1.35 | 4  4 | 42.896  42.555 |
|  | (78 × 70)  80 × 72 | 18  18 | 72  72 | 62.354  62.354 | 77.2  79.2 | 69.2  71.2 | 77.30  79.30 | 69.90  71.90 | + 0.8  + 1.8 | 7.207  8.362 | 7  7 | 63.429  65.478 | 1.86  1.70 | 8  9 | 86.058  90.273 | 1.44  1.35 | 4  4 | 42.241  43.241 |
|  | (82 × 74)  85 × 77 | 19  20 | 76  80 | 65.818  69.282 | 81.2  84.2 | 73.2  76.2 | 81.30  84.30 | 73.90  76.90 | + 0.8  + 0.3 | 7.207  6.630 | 7  7 | 67.178  70.341 | 1.85  1.95 | 8  8 | 89.803  93.257 | 1.44  1.49 | 4  4 | 42.428  42.114 |
|  | (88 × 80)  90 × 82 | 20  21 | 80  84 | 69.282  72.746 | 87.2  89.2 | 79.2  81.2 | 87.30  89.30 | 79.90  81.90 | + 1.8  + 0.8 | 8.362  7.207 | 7  7 | 73.479  75.207 | 1.70  1.84 | 9  8 | 98.368  97.877 | 1.37  1.46 | 4  4 | 43.614  42.800 |
|  | (92 × 84)  95 × 87 | 22  22 | 88  88 | 76.210  76.210 | 91.2  94.2 | 83.2  86.2 | 91.30  94.30 | 83.90  86.90 | ‒ 0.2  + 1.3 | 6.052  7.784 | 7  7 | 77.215  80.478 | 2.04  1.76 | 8  8 | 100.415  102.993 | 1.53  1.45 | 4  4 | 41.986  43.486 |
|  | (98 × 90)  100 × 92 | 23  24 | 92  96 | 79.674  83.138 | 97.2  99.2 | 89.2  91.2 | 97.30  99.30 | 89.90  91.90 | + 0.8  ‒ 0.2 | 7.207  6.052 | 7  7 | 83.231  85.243 | 1.83  2.00 | 8  8 | 105.939  108.435 | 1.48  1.54 | 5  4 | 54.055  42.359 |
|  | 105 × 97  110 × 102 | 25  26 | 100  104 | 86.603  90.067 | 104.2  109.2 | 96.2  101.2 | 104.30  109.31 | 96.90  101.90 | + 0.3  + 0.8 | 6.630  7.207 | 7  7 | 90.181  95.447 | 1.89  1.82 | 8  8 | 113.123  118.217 | 1.52  1.50 | 5  5 | 53.928  54.614 |
|  | 120 × 112  130 × 122 | 28  31 | 112  124 | 96.995  107.387 | 119.2  129.2 | 111.2  121.2 | 119.31  129.31 | 111.90  121.90 | + 1.8  + 0.8 | 8.362  7.207 | 7  7 | 105.480  115.296 | 1.71  1.80 | 8  8 | 127.969  138.115 | 1.47  1.53 | 6  6 | 66.869  66.428 |
|  | 140 × 132  150 × 142 | 34  36 | 136  144 | 117.779  124.708 | 139.2  149.2 | 131.2  141.2 | 139.31  149.31 | 131.90  141.90 | ‒ 0.2  + 0.8 | 6.052  7.207 | 7  7 | 125.325  135.458 | 1.90  1.79 | 8  8 | 148.507  158.332 | 1.59  1.55 | 6  7 | 65.986  78.241 |
|  | 160 × 152  170 × 162 | 38  41 | 152  164 | 131.636  142.028 | 159.2  169.2 | 151.2  161.2 | 159.31  169.31 | 151.90  161.90 | + 1.8  +0.8 | 8.362  7.207 | 7  7 | 145.481  155.342 | 1.72  1.78 | 8  8 | 168.127  178.247 | 1.52  1.57 | 7  8 | 79.614  90.055 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 8 Dimensions for Involute Splines of Module 5**  (*Clauses* 6.2 to 6.10)  All dimensions in millimetres. | | | | | | | | | | | | | | | | | | |
| **Sl No.** | **Nominal Size** |  | | | | | | | | | **Internal Spline** | | | **External Spline** | | | | |
|  | | | | | | | | | **Pin Dia** | **Measur‒ement Between pine** | **Devia‒**  **tion Factor** | **Pin Dia** | **Measur‒ement Over Pins** | **Devia‒**  **tion Factor** | **Tooth Thickness Over z' Teeth** | |
|  | | | | | | | | |  |  |  |  |  |  |  | **Tooth Thickness Deviation Factor 0.866** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *d*1 × *d*2 | *z* | *d*0 | *d*b | *d*3 | *d*4 | *d*5 *Min* | *d*6 *Max* | *xm* | *l*o = *s*o | *d* | *M*i | *f*i | *d* | *M*a | *f*a | *Z*' |  |
|  | 40 × 30  42 × 32 | 6  7 | 30  35 | 25.981  30.318 | 39  41 | 29  31 | 39.10  41.10 | 29.90  31.90 | + 2.25  + 0.75 | 10.452  8.720 | 9.0  8.5 | 21.103  23.559 | 1.71  2.18 | 18  12 | 66.516  55.246 | 1.03  1.16 | 2  2 | 24.052  22.785 |
|  | 45 × 35  47 × 37 | 7  8 | 35  40 | 30.318  34.641 | 44  46 | 34  36 | 44.10  46.10 | 34.90  36.90 | + 2.25  + 0.75 | 10.452  8.720 | 9.0  9.0 | 25.223  27.554 | 1.67  2.71 | 16  12 | 66.185  61.519 | 1.04  1.21 | 2  2 | 24.285  23.017 |
|  | 48 × 38  50 × 40 | 8  8 | 40  40 | 34.641  34.641 | 47  49 | 37  39 | 47.10  49.10 | 37.90  39.90 | + 1.25  + 2.25 | 9.297  10.452 | 9.0  9.0 | 28.922  31.103 | 2.13  1.72 | 12  14 | 62.214  68.226 | 1.20  1.13 | 2  2 | 23.517  24.517 |
|  | (52 × 42)  55 × 45 | 9  9 | 45  45 | 38.971  38.971 | 51  54 | 41  44 | 51.10  54.10 | 41.90  44.90 | + 0.75  + 2.25 | 8.720  10.452 | 9.0  9.0 | 32.028  35.418 | 2.41  1.69 | 11  14 | 63.404  72.552 | 1.25  1.13 | 2  2 | 23.250  24.750 |
|  | (58 × 48)  60 × 50 | 10  10 | 50  50 | 43.301  43.301 | 57  59 | 47  49 | 57.10  59.10 | 47.90  49.90 | + 1.25  + 2.25 | 9.297  10.452 | 9.0  9.0 | 38.968  41.103 | 2.01  1.72 | 12  14 | 72.502  78.660 | 1.24  1.17 | 2  3 | 23.983  38.586 |
|  | (62 × 52)  65 × 55 | 11  11 | 55  55 | 47.631  47.631 | 61  64 | 51  54 | 61.11  64.11 | 51.89  54.89 | + 0.75  + 2.25 | 8.720  10.452 | 9.0  9.0 | 42.254  45.542 | 2.19  1.70 | 11  12 | 73.752  78.376 | 1.30  1.22 | 2  3 | 23.716  38.819 |
|  | (68 × 58)  70 × 60 | 12  12 | 60  60 | 51.962  51.962 | 67  69 | 57  59 | 67.11  69.11 | 57.89  59.89 | + 1.25  + 2.25 | 9.297  10.452 | 9.0  9.0 | 48.996  51.103 | 1.95  1.72 | 11  12 | 80.236  84.186 | 1.31  1.25 | 3  3 | 38.052  39.052 |
|  | (72 × 62)  75 × 65 | 13  14 | 65  70 | 56.292  60.622 | 71  74 | 61  64 | 71.11  74.11 | 61.89  64.89 | + 0.75  ‒ 0.25 | 8.720  7.565 | 9.0  9.0 | 52.398  55.235 | 2.08  2.62 | 10  10 | 81.440  85.360 | 1.38  1.46 | 3  3 | 37.785  37.017 |
|  | (78 × 68)  80 × 70 | 14  14 | 70  70 | 60.622  60.622 | 77  79 | 67  69 | 77.11  79.11 | 67.89  69.89 | + 1.25  + 2.25 | 9.297  10.452 | 9.0  9.0 | 59.014  61.103 | 1.91  1.72 | 11  12 | 90.386  94.408 | 1.34  1.28 | 3  3 | 38.517  39.517 |
|  | (82 × 72)  85 × 75 | 15  16 | 75  80 | 64.952  69.282 | 81  84 | 71  74 | 81.11  84.11 | 71.89  74.89 | + 0.75  ‒ 0.25 | 8.720  7.565 | 9.0  9.0 | 62.489  65.416 | 2.01  2.37 | 10  10 | 91.603  95.411 | 1.41  1.48 | 3  3 | 38.250  37.483 |
|  | (88 × 78)  90 × 80 | 16  16 | 80  80 | 69.282  69.282 | 87  89 | 77  79 | 87.11  89.11 | 77.89  79.89 | + 1.25  + 2.25 | 9.297  10.452 | 9.0  9.0 | 69.027  71.103 | 1.88  1.73 | 10  11 | 97.909  102.069 | 1.41  1.33 | 3  4 | 38.983  53.586 |
|  | (92 × 82)  95 × 85 | 17  18 | 85  90 | 73.612  77.942 | 91  94 | 81  84 | 91.11  94.11 | 81.89  84.89 | + 0.75  ‒ 0.25 | 8.720  7.565 | 9.0  9.0 | 72.574  75.532 | 1.96  2.24 | 10  10 | 101.731  105.453 | 1.43  1.50 | 3  3 | 38.716  37.948 |
|  | (98 × 88)  100 × 90 | 18  18 | 90  90 | 77.942  77.942 | 97  99 | 87  89 | 97.11  99.11 | 87.89  89.89 | + 1.25  + 2.25 | 9.297  10.452 | 9.0  9.0 | 79.036  81.103 | 1.86  1.73 | 10  11 | 107.987  112.210 | 1.43  1.36 | 4  4 | 53.052  54.052 |
|  | 105 × 95  110 × 100 | 20  21 | 100  105 | 86.603  90.933 | 104  109 | 94  99 | 104.11  109.12 | 94.89  99.89 | ‒ 0.25  ‒ 0.25 | 7.565  7.565 | 9.0  9.0 | 85.613  90.366 | 2.15  2.11 | 10  10 | 115.488  120.195 | 1.52  1.52 | 4  4 | 52.017  52.250 |
|  | 120 × 110  130 × 120 | 22  24 | 110  120 | 95.263  103.923 | 119  129 | 109  119 | 119.12  129.12 | 109.88  119.88 | + 2.25  + 2.25 | 10.452  10.452 | 9.0  9.0 | 101.104  111.104 | 1.73  1.73 | 10  10 | 129.781  139.848 | 1.43  1.44 | 5  5 | 68.586  69.052 |
|  | 140 × 130  150 × 140 | 26  28 | 130  140 | 112.583  121.244 | 139  149 | 129  139 | 139.12  149.12 | 129.88  139.88 | + 2.25  + 2.25 | 10.452  10.452 | 9.0  9.0 | 121.104  131.104 | 1.73  1.73 | 10  10 | 149.908  159.961 | 1.46  1.47 | 5  6 | 69.517  83.586 |
|  | 160 × 150  170 × 160 | 30  32 | 150  160 | 129.904  138.564 | 159  169 | 149  159 | 159.12  169.12 | 149.88  159.88 | + 2 .25  + 2.25 | 10.452  10.452 | 9.0  9.0 | 141.104  151.104 | 1.73  1.73 | 10  10 | 170.009  180.052 | 1.48  1.49 | 6  6 | 84.052  84.517 |
|  | 180 × 170  190 × 180 | 34  36 | 170  180 | 147.224  155.885 | 179  189 | 169  179 | 179.12  189.12 | 169.88  179.88 | + 2.25  + 2.25 | 10.452  10.452 | 9.0  9.0 | 161.104  171.104 | 1.73  1.73 | 10  10 | 190.091  200.126 | 1.50  1.51 | 7  7 | 98.586  99.052 |
|  | 200 × 190  210 × 200 | 38  40 | 190  200 | 164.545  173.205 | 199  209 | 189  199 | 199.12  209.12 | 189.88  199.88 | + 2.25  + 2.25 | 10.452  10.452 | 9.0  9.0 | 181.104  191.104 | 1.73  1.73 | 10  10 | 210.158  220.188 | 1.52  1.53 | 7  8 | 99.517  113.586 |
|  | 220 × 210  240 × 230 | 42  46 | 210  230 | 181.865  199.186 | 219  239 | 209  229 | 219.14  239.14 | 209.86  229.86 | + 2.25  + 2.25 | 10.452  10.452 | 9.0  9.0 | 201.104  221.104 | 1.73  1.73 | 10  10 | 230.216  250.264 | 1.54  1.55 | 8  9 | 114.052  128.586 |
|  | 250 × 240  260 × 250 | 48  50 | 240  250 | 207.846  216.506 | 249  259 | 239  249 | 249.14  258.14 | 239.86  249.86 | + 2.25  + 2.25 | 10.452  10.452 | 9.0  9.0 | 231.104  241.104 | 1.73  1.73 | 10  10 | 260.286  270.307 | 1.55  1.56 | 9  9 | 129.052  129.517 |
|  | 280 × 270 | 54 | 270 | 233.827 | 279 | 269 | 279.14 | 269.86 | + 2.25 | 10.452 | 9.0 | 261.104 | 1.73 | 10 | 290.344 | 1.57 | 10 | 144.052 |

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| **Table 9 Dimensions for Involute Splines of Module 6**  (*Clauses* 6.2 to 6.10)  All dimensions in millimetres. | | | | | | | | | | | | | | | | | | |
| **Sl No.** | **Nominal Size** |  | | | | | | | | | **Internal Spline** | | | **External Spline** | | | | |
|  | | | | | | | | | **Pin Dia** | **Measurement Between pine** | **Deviation Factor** | **Pin Dia** | **Measurement Over Pins** | **Deviation Factor** | **Tooth Thickness Over z' Teeth** | |
|  | | | | | | | | |  |  |  |  |  |  |  | **Tooth Thickness Deviation Factor 0.866** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *d*1 × *d*2 | *z* | *d*0 | *d*b | *d*3 | *d*4 | *d*5 *Min* | *d*6 *Max* | *xm* | *l*o = *s*o | *d* | *M*i | *f*i | *d* | *M*a | *f*a | *Z*' |  |
|  | 48 × 36  50 × 38 | 6  7 | 36  42 | 31.177  36.373 | 46.8  48.8 | 34.8  36.8 | 46.90  48.90 | 35.90  37.90 | + 2.7  + 0.7 | 12.542  10.233 | 10.5  10.5 | 26.204  28.471 | 1.64  2.18 | 22  14 | 80.692  65.089 | 1.02  1.17 | 2  2 | 28.862  27.141 |
|  | (52 × 40)  55 × 43 | 7  8 | 42  48 | 36.373  41.569 | 50.8  53.8 | 38.8  41.8 | 50.90  53.90 | 39.90  42.90 | + 1.7  + 0.2 | 11.388  9.653 | 10.5  10.5 | 29.136  34.169 | 1.89  2.56 | 16  12 | 71.023  66.901 | 1.10  1.33 | 2  2 | 28.414  26.921 |
|  | (58 × 46)  60 × 48 | 8  8 | 48  48 | 41.569  41.569 | 56.8  58.8 | 44.8  46.8 | 56.90  58.90 | 45.90  47.90 | + 1.7  + 2.7 | 11.388  12.542 | 10.5  10.5 | 36.165  38.209 | 1.91  1.66 | 16  18 | 78.701  84.619 | 1.16  1.11 | 2  2 | 28.421  29.421 |
|  | (62 × 50)  65 × 53 | 9  9 | 54  54 | 46.765  46.765 | 60.8  63.8 | 48.8  51.8 | 60.91  63.91 | 49.89  52.89 | + 0.7  + 2.2 | 10.233  11.967 | 10.5  10.5 | 39.007  42.406 | 2.32  1.73 | 14  16 | 77.745  84.551 | 1.23  1.15 | 2  2 | 27.700  29.200 |
|  | (68 × 56)  70 × 58 | 10  10 | 60  60 | 51.962  51.962 | 66.8  68.8 | 54.8  56.8 | 66.91  68.91 | 55.89  57.89 | + 0.7  + 1.7 | 10.233  11.388 | 10.5  10.5 | 45.840  48.179 | 2.24  1.86 | 14  14 | 84.862  86.315 | 1.27  1.25 | 2  2 | 27.979  28.979 |
|  | (72 × 60)  75 × 63 | 10  11 | 60  66 | 51.962  57.158 | 70.8  73.8 | 58.8  61.8 | 70.91  73.91 | 59.89  62.89 | + 2.7  + 1.2 | 12.542  10.810 | 10.5  10.5 | 50.212  52.433 | 1.67  1.96 | 16  14 | 92.508  90.930 | 1.18  1.27 | 3  3 | 46.304  45.083 |
|  | (78 × 66)  80 × 68 | 12  12 | 72  72 | 62.354  62.354 | 76.8  78.8 | 64.8  66.8 | 76.91  78.91 | 65.89  67.89 | ‒ 0.3  + 0.7 | 9.078  10.233 | 10.5  10.5 | 55.200  57.928 | 2.75  2.10 | 12  12 | 90.355  91.978 | 1.43  1.38 | 2  3 | 27.538  44.862 |
|  | (82 × 70)  85 × 73 | 12  13 | 72  78 | 62.354  67.550 | 80.8  83.8 | 68.8  71.8 | 80.91  83.91 | 69.89  72.89 | + 1.7  + 0.2 | 11.388  9.653 | 10.5  10.5 | 60.187  62.185 | 1.84  2.23 | 14  12 | 98.580  96.601 | 1.28  1.41 | 3  3 | 45.862  44.641 |
|  | (88 × 76)  90 × 78 | 13  14 | 78  84 | 67.550  72.746 | 86.8  88.8 | 74.8  76.8 | 86.91  88.91 | 75.89  77.89 | + 1.7  ‒ 0.3 | 11.388  9.078 | 10.5  10.5 | 65.631  67.451 | 1.82  2.41 | 14  12 | 104.032  102.432 | 1.29  1.46 | 3  3 | 46.141  44.421 |
|  | (92 × 80)  95 × 83 | 14  14 | 84  84 | 72.746  72.746 | 90.8  93.8 | 78.8  81.8 | 90.91  93.91 | 79.89  82.89 | + 0.7  + 2.2 | 10.233  11.967 | 10.5  10.5 | 69.982  73.233 | 2.02  1.75 | 12  14 | 104.088  111.550 | 1.41  1.30 | 3  3 | 45.421  46.921 |
|  | (98 × 86)  100 × 88 | 15  15 | 90  90 | 77.942  77.942 | 96.8  98.8 | 84.8  86.8 | 96.91  98.91 | 85.89  87.89 | + 0.7  + 1.7 | 10.233  11.388 | 10.5  10.5 | 75.529  77.709 | 1.99  1.80 | 12  12 | 109.597  111.211 | 1.42  1.38 | 3  3 | 45.700  46.700 |
|  | 105 × 93  110 × 98 | 16  17 | 96  102 | 83.138  88.335 | 103.8  108.8 | 91.8  96.8 | 103.91  108.92 | 92.89  97.88 | + 1.2  + 0.7 | 10.810  10.233 | 10.5  10.5 | 83.132  87.614 | 1.88  1.95 | 12  12 | 117.001  121.745 | 1.42  1.44 | 3  3 | 46.479  46.259 |
|  | 120 × 108  130 × 118 | 18  20 | 108  120 | 93.531  103.923 | 118.8  128.8 | 106.8  116.8 | 118.92  128.92 | 107.88  117.88 | + 2.7  + 1.7 | 12.542  11.388 | 10.5  10.5 | 98.217  108.230 | 1.70  1.79 | 14  12 | 136.686  141.998 | 1.34  1.44 | 4  4 | 64.862  64.421 |
|  | 140 × 128  150 × 138 | 22  24 | 132  144 | 114.315  124.708 | 138.8  148.8 | 126.8  136.8 | 138.92  148.92 | 127.88  137.88 | + 0.7  ‒ 0.3 | 10.233  9.078 | 10.5  10.5 | 118.085  127.864 | 1.89  2.00 | 12  12 | 152.367  162.653 | 1.49  1.54 | 4  4 | 63.979  63.538 |
|  | 160 × 148  170 × 158 | 25  27 | 150  162 | 129.904  140.296 | 158.8  168.8 | 146.8  156.8 | 158.92  168.92 | 147.88  157.88 | + 1 .7  + 0.7 | 11.388  10.233 | 10.5  10.5 | 137.914  147.845 | 1.78  1.85 | 12  12 | 171.846  182.184 | 1.48  1.52 | 5  5 | 82.141  81.700 |
|  | 180 × 168  190 × 178 | 28  30 | 168  180 | 145.492  155.885 | 178.8  188.8 | 166.8  176.8 | 178.92  188.92 | 167.88  177.88 | + 2.7  + 1.7 | 12.542  11.388 | 10.5  10.5 | 158.220  168.210 | 1.71  1.77 | 12  12 | 191.953  202.282 | 1.47  1.51 | 6  6 | 100.304  99.862 |
|  | 200 × 188  210 × 198 | 32  34 | 192  204 | 106.277  176.669 | 198.8  208.8 | 186.8  196.8 | 198.92  208.94 | 187.88  197.86 | + 0.7  ‒ 0.3 | 10.233  9.078 | 10.5  10.5 | 178.133  187.988 | 1.83  1.90 | 12  12 | 212.550  222.760 | 1.55  1.59 | 6  6 | 99.421  98.979 |
|  | 220 × 208  240 ×228 | 35  38 | 210  228 | 181.865  197.454 | 218.8  238.8 | 206.8  226.8 | 218.94  238.94 | 207.86  227.86 | + 1.7  + 2.7 | 11.388  12.542 | 10.5  10.5 | 198.002  218.221 | 1.76  1.72 | 12  12 | 232.152  252.190 | 1.53  1.52 | 7  7 | 117.583  119.421 |
|  | 250 × 238  260 × 248 | 40  42 | 240  252 | 207.840  218.238 | 248.8  258.8 | 236.8  246.8 | 218.94  258.94 | 237.86  247.86 | + 1.7  + 0.7 | 11.388  10.233 | 10.5  10.5 | 228.214  238.156 | 1.76  1.81 | 12  12 | 262.447  272.658 | 1.55  1.58 | 7  8 | 118.979  134.862 |
|  | 280 × 268 | 45 | 270 | 233.827 | 278.8 | 266.8 | 278.94 | 267.86 | + 1.7 | 11.388 | 10.5 | 258.052 | 1.76 | 12 | 292.335 | 1.57 | 8 | 136.700 |

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| **Table 10 Dimensions for Involute Splines of Module 8**  (*Clauses* 6.2 6.2 6.10)  All dimensions in millimetres. | | | | | | | | | | | | | | | | | | |
| **Sl NO.** | **Nominal Size** |  | | | | | | | | | **Internal Spline** | | | **External Spline** | | | | |
|  | | | | | | | | | **Pin Dia** | **Measure‒**  **ment Between Pine** | **Deviati‒on Factor** | **Pin Dia** | **Measurement Over Pins** | **Deviation Factor** | **Tooth Thickness Over z' Teeth** | |
|  | | | | | | | | |  |  |  |  |  |  |  | **Tooth Thickness Deviation Factor 0.866** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *d*1 × *d*2 | *z* | *d*0 | *d*b | *d*3 | *d*4 | *d*5 *Min* | *d*6 *Max* | *xm* | *l*o = *s*o | *d* | *M*i | *f*i | *d* | *M*a | *f*a | *Z*' |  |
|  | 60 × 44  65 × 49 | 6  7 | 48  56 | 41.569  48.497 | 58.4  63.4 | 42.4  47.4 | 58.50  63.51 | 43.90  48.89 | + 1.6  + 0.1 | 14.414  12.686 | 14  13 | 30.516  36.925 | 2.42  2.63 | 22  16 | 88.848  79.195 | 1.11  1.27 | 2  2 | 36.483  35.355 |
|  | 70 × 54  75 × 59 | 7  8 | 56  64 | 48.497  55.426 | 68.4  73.4 | 52.4  57.4 | 68.51  73.51 | 53.89  58.89 | + 2.6  + 1.1 | 15.569  13.841 | 14  14 | 39.557  45.371 | 1.80  2.42 | 22  18 | 996.632  95.390 | 1.09  1.24 | 2  2 | 37.855  36.728 |
|  | 80 × 64  85 × 69 | 8  9 | 64  72 | 55.426  62.354 | 78.4  83.4 | 62.4  67.4 | 78.51  83.51 | 63.89  68.89 | + 3.6  + 2.1 | 16.723  14.996 | 14  14 | 50.945  54.803 | 1.66  1.89 | 22  20 | 108.241  108.481 | 1.13  1.18 | 2  2 | 39.228  38.100 |
|  | 90 × 74  95 × 79 | 10  10 | 80  80 | 69.282  69.282 | 88.4  93.4 | 72.4  77.4 | 88.51  93.51 | 73.89  78.89 | + 0.6  + 3.1 | 13.259  16.151 | 14  14 | 60.226  65.966 | 2.41  1.73 | 16  20 | 105.933  119.486 | 1.36  1.21 | 2  3 | 36.927  61.238 |
|  | 100 × 84  105 × 89 | 11  12 | 88  96 | 76.210  83.138 | 98.4  103.4 | 82.4  87.4 | 98.51  103.51 | 83.89  88.89 | + 1.6  + 0.1 | 14.414  12.686 | 14  14 | 69.911  75.080 | 1.96  2.41 | 18  16 | 119.594  121.294 | 1.28  1.41 | 2  2 | 38.345  37.217 |
|  | 110 × 94  120 × 104 | 12  14 | 96  112 | 83.138  96.995 | 108.4  118.4 | 92.4  102.4 | 108.51  118.51 | 93.89  103.89 | + 2.6  ‒ 0.4 | 15.569  12.104 | 14  14 | 80.948  89.935 | 1.76  2.41 | 18  16 | 130.279  136.575 | 1.29  1.46 | 3  3 | 61.483  59.228 |
|  | 130 × 114  140 × 124 | 15  16 | 120  128 | 103.923  110.851 | 128.4  138.4 | 112.4  122.4 | 128.51  138.52 | 113.89  123.89 | + 0.6  + 1.6 | 13.259  14.414 | 14  14 | 99.929  110.843 | 2.05  1.88 | 16  16 | 145.582  156.001 | 1.43  1.42 | 3  3 | 60.600  61.972 |
|  | 150 × 134  160 × 144 | 17  18 | 136  144 | 117.779  124.708 | 148.4  158.4 | 132.4  142.4 | 148.51  158.51 | 133.89  143.89 | + 2.6  + 3.6 | 15.569  16.723 | 14  14 | 120.378  130.956 | 1.77  1.70 | 16  16 | 170.231  180.546 | 1.35  1.35 | 4  4 | 85.110  86.483 |
|  | 170 × 154  180 × 164 | 20  21 | 160  168 | 138.564  145.492 | 168.4  178.4 | 152.4  162.4 | 168.51  178.51 | 153.89  163.89 | + 0.6  + 1.6 | 13.259  14.414 | 14  14 | 140.681  150.414 | 1.95  1.84 | 16  16 | 186.514  195.753 | 1.49  1.46 | 4  4 | 84.228  85.600 |
|  | 190 × 174  200 × 184 | 22  24 | 176  192 | 152.420  166.277 | 188.4  198.4 | 172.4  182.4 | 188.51  198.51 | 173.89  183.89 | + 2.6  ‒ 0.4 | 15.569  12.104 | 14  14 | 160.957  170.486 | 1.76  2.00 | 16  16 | 205.987  216.870 | 1.45  1.54 | 4  4 | 86.972  84.717 |
|  | 210 × 194  220 × 204 | 25  26 | 200  208 | 173.205  180.133 | 208.4  218.4 | 192.4  202.4 | 208.52  218.54 | 193.89  203.86 | + 0.6  + 1.6 | 13.259  14.414 | 14  14 | 180.363  190.894 | 1.89  1.82 | 16  16 | 226.246  236.435 | 1.52  1.50 | 5  5 | 107.855  109.228 |
|  | 240 × 224  250 × 234 | 28  30 | 224  240 | 193.990  207.846 | 238.4  248.4 | 222.4  232.4 | 238.54  248.54 | 223.86  233.86 | + 3.6  + 0.6 | 16.723  13.259 | 14  14 | 210.960  220.788 | 1.71  1.86 | 16  16 | 255.938  266.768 | 1.47  1.55 | 6  6 | 133.738  131.483 |
|  | 260 × 244  280 × 264 | 31  34 | 248  272 | 214.774  235.559 | 258.4  278.4 | 242.4  262.4 | 258.54  278.54 | 243.86  263.86 | + 1.6  ‒ 0.4 | 14.414  12.104 | 14  14 | 230.592  250.651 | 1.80  1.90 | 16  16 | 276.231  297.014 | 1.53  1.59 | 6  6 | 132.855  131.973 |
|  | 300 × 284  320 × 304 | 36  38 | 288  304 | 249.415  263.272 | 298.4  318.4 | 282.4  302.4 | 298.54  318.54 | 283.86  303.86 | + 1.6  + 3.6 | 14.414  16.723 | 14  14 | 270.915  290.961 | 1.79  1.72 | 16  16 | 316.665  336.253 | 1.55  1.52 | 7  7 | 156.483  159.228 |
|  | 340 × 324  360 × 344 | 41  44 | 328  352 | 284.056  304.841 | 338.4  358.4 | 322.4  342.4 | 338.54  358.54 | 323.86  343.86 | + 1.6  ‒ 0.4 | 14.414  12.104 | 14  14 | 310.684  330.731 | 1.78  1.85 | 16  16 | 356.494  377.099 | 1.57  1.62 | 7  8 | 158.345  179.228 |
|  | 380 × 364  400 × 384 | 46  48 | 368  384 | 318.697  332.554 | 378.4  398.4 | 362.4  382.4 | 378.54  398.54 | 363.86  383.86 | + 1.6  + 3.6 | 14.414  16.723 | 14  14 | 350.972  370.963 | 1.78  1.72 | 16  16 | 396.809  416.458 | 1.58  1.55 | 8  9 | 181.973  206.483 |
|  | 420 × 404  440 × 424 | 51  54 | 408  432 | 353.338  374.123 | 418.4  438.4 | 402.4  422.4 | 418.56  438.56 | 403.84  423.84 | + 1.6  ‒ 0.4 | 14.414  12.104 | 14  14 | 390.739  410.779 | 1.77  1.83 | 16  16 | 436.662  437.155 | 1.59  163 | 9  9 | 205.600  204.717 |
|  | 450 × 434  460 × 444 | 55  56 | 440  448 | 381.051  387.979 | 448.4  458.4 | 432.4  442.4 | 448.56  458.56 | 433.84  443.84 | + 0.6  + 1.6 | 13.259  14.414 | 14  14 | 420.697  430.934 | 1.80  1.77 | 16  16 | 466.855  476.907 | 1.62  1.60 | 10  10 | 227.855  229.228 |
|  | 480 × 464  500 × 484 | 58  61 | 464  488 | 401.836  422.620 | 478.4  438.4 | 462.4  482.4 | 478.56  498.56 | 463.84  483.84 | + 3.6  + 1.6 | 16.723  14.414 | 14  14 | 450.963  470.776 | 1.72  1.77 | 16  16 | 496.602  516.779 | 1.58  1.61 | 11  11 | 253.738  252.855 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Table 11 Dimensions for Involute Splines of Module 10**  (*Clauses* 6.2 to 6.10) | | | | | | | | | | | | | | | | | |
|  | All dimensions in millimetres. | | | | | | | | | | | | | | | | | |
| **Sl No.** | **Nominal Size** |  | | | | | | | | | **Internal Spline** | | | **External Spline** | | | | |
|  | | | | | | | | | **Pin Dia** | **Measure‒**  **ment Between pine** | **Deviation Factor** | **Pin Dia** | **Measurement Over Pins** | **Deviation Factor** | **Tooth Thickness Over z' Teeth** | |
|  | | | | | | | | |  |  |  |  |  |  |  | **Tooth Thickness Deviation Factor 0.866** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *d*1 × *d*2 | *z* | *d*0 | *d*b | *d*3 | *d*4 | *d*5 *Min* | *d*6 *Max* | *xm* | *l*o = *s*o | *d* | *M*i | *f*i | *d* | *M*a | *f*a | *Z*' |  |
|  | 80 × 60  85 × 65 | 6  7 | 60  70 | 51.962  60.622 | 78  83 | 58  63 | 78.11  83.11 | 59.89  64.89 | + 4.5  + 2.0 | 20.904  18.017 | 18  18 | 42.206  44.776 | 1.71  2.50 | 35  25 | 130.845  113.476 | 1.03  1.13 | 2  2 | 48.104  46.069 |
|  | 90 × 70  95 × 75 | 7  8 | 70  80 | 60.622  69.282 | 88  93 | 68  73 | 88.11  93.11 | 69.89  74.89 | + 4.5  + 2.0 | 20.904  18.071 | 18  18 | 50.446  56.557 | 1.67  2.34 | 30  25 | 127.942  126.117 | 1.06  1.19 | 2  2 | 48.569  46.535 |
|  | 100 × 80  105 × 85 | 8  9 | 80  90 | 69.282  77.942 | 98  103 | 78  83 | 93.11  103.11 | 79.89  84.89 | + 4.5  + 2.0 | 20.904  18.017 | 18  18 | 62.206  65.378 | 1.72  218 | 28  25 | 136.452  134.743 | 1.13  1.19 | 2  2 | 49.035  47.000 |
|  | 110 × 90  120 × 100 | 9  10 | 90  100 | 77.942  86.603 | 108  118 | 88  98 | 108.11  118.11 | 89.89  99.89 | + 4.5  + 4.5 | 20.904  20.904 | 18  18 | 70.836  82.207 | 1.69  1.72 | 28  25 | 145.104  150.226 | 1.13  1.20 | 2  3 | 49.500  77.173 |
|  | 130 × 110  140 × 120 | 12  12 | 120  120 | 103.923  103.923 | 128  138 | 108  118 | 128.12  138.12 | 109.88  119.88 | ‒ 0.5  + 4.5 | 15.131  20.904 | 16  18 | 97.638  102.207 | 2.14  1.72 | 20  25 | 150.592  170.806 | 1.43  1.23 | 2  3 | 45.897  78.104 |
|  | 150 × 130  160 × 140 | 14  14 | 140  140 | 121.244  121.244 | 148  158 | 128  138 | 148.12  158.12 | 129.88  139.88 | ‒ 0.5  + 4.5 | 15.131  20.904 | 18  18 | 110.471  122.207 | 2.62  1.72 | 20  25 | 170.719  191.284 | 1.46  1.27 | 3  3 | 74.035  79.035 |
|  | 170 × 150  180 × 160 | 16  16 | 160  160 | 138.564  138.564 | 168  178 | 148  158 | 168.12  178.12 | 149.88  159.88 | ‒ 0.5  + 4.5 | 15.131  20.904 | 18  18 | 130.832  142.207 | 2.37  1.73 | 20  22 | 190.821  204.139 | 1.48  1.33 | 3  4 | 74.966  107.173 |
|  | 190 × 170  200 × 180 | 18  18 | 180  180 | 155.885  155.885 | 188  198 | 168  178 | 188.12  198.12 | 169.88  179.88 | ‒ 0.5  + 4.5 | 15.313  20.904 | 18  18 | 151.063  162.207 | 2.24  1.73 | 20  22 | 210.906  224.401 | 1.50  1.36 | 3  4 | 75.897  108.104 |
|  | 210 × 190  220 × 230 | 20  20 | 200  200 | 173.205  173.205 | 208  218 | 188  198 | 208.12  218.12 | 189.88  199.88 | ‒ 0.5  + 4.5 | 15.131  20.904 | 18  18 | 171.225  182.207 | 2.15  1.73 | 20  22 | 230.976  244.627 | 1.52  1.38 | 4  4 | 104.035  109.035 |
|  | 260 × 240  280 × 260 | 22  24 | 220  240 | 190.526  207.846 | 238  248 | 218  228 | 238.14  248.14 | 219.89  229.86 | + 4.5  ‒ 0.5 | 20.904  15.131 | 18  18 | 202.207  211.440 | 1.73  2.04 | 22  20 | 264.823  271.088 | 1.40  1.54 | 5  4 | 137.173  105.897 |
|  | 260 × 240  280 × 260 | 24  26 | 240  260 | 207.846  225.167 | 258  278 | 238  258 | 258.14  278.14 | 239.86  259.86 | + 4.5  + 4.5 | 20.904  20.904 | 18  18 | 222.207  242.207 | 1.73  1.73 | 20  20 | 279.696  299.816 | 1.44  1.46 | 5  5 | 138.104  139.035 |
|  | 300 × 280  320 × 300 | 28  30 | 280  300 | 242.487  259.808 | 298  318 | 278  298 | 298.14  318.14 | 279.86  299.86 | + 4.5  + 4.5 | 20.904  20.904 | 18  18 | 262.207  282.207 | 1.73  1.73 | 20  20 | 319.922  340.017 | 1.47  1.48 | 6  6 | 167.173  168.104 |
|  | 340 × 320  360 × 340 | 32  34 | 320  340 | 277.128  294.449 | 338  358 | 318  338 | 338.14  358.14 | 319.86  339.86 | + 4.5  + 4.5 | 20.904  20.904 | 18  18 | 302.207  322.207 | 1.73  1.73 | 20  20 | 360.103  380.181 | 1.49  1.50 | 6  7 | 169.035  197.173 |
|  | 380 × 360  400 × 380 | 36  38 | 360  380 | 311.769  329.090 | 378  398 | 358  378 | 378.14  398.14 | 356.86  379.86 | + 4.5  + 4.5 | 20.904  20.904 | 18  18 | 342.207  362.207 | 1.73  1.73 | 20  20 | 400.252  420.317 | 1.51  1.52 | 7  7 | 198.104  199.035 |
|  | 420 × 400  440 × 420 | 40  42 | 400  420 | 346.410  363.731 | 418  438 | 398  418 | 418.14  438.14 | 399.86  419.84 | + 4.5  + 4.5 | 20.904  20.904 | 18  18 | 382.207  402.207 | 1.73  1.73 | 20  20 | 440.376  460.431 | 1.53  1.54 | 8  8 | 227.173  228.104 |
|  | 450 × 430  460 × 440 | 44  44 | 440  440 | 381.051  381.051 | 448  458 | 428  438 | 448.16  458.1 6 | 429.84  439.84 | ‒ 0.5  + 4.5 | 15.131  20.904 | 18  18 | 411.838  422.207 | 1.87  1.73 | 20  20 | 417.374  480.482 | 1.62  1.54 | 8  8 | 224.035  229.035 |
|  | 480 × 460  500 × 480 | 46  48 | 460  480 | 398.372  415.692 | 478  498 | 458  478 | 478.16  498.16 | 459.84  479.84 | + 4.5  + 4.5 | 20.904  20.904 | 18  18 | 442.207  462.207 | 1.73  1.73 | 20  20 | 500.529  520.572 | 1.55  1.55 | 9  9 | 257.173  258.104 |



|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 12 Tolerance for Spline Tooth Thickness and Space Width**  (*Clauses* 6 *and* 6.11.3)  **Values in Micrometres** | | | | | | | | | | | | | | | |
| **Sl No.** | **Internal Spline**  **Deviations of Space Width**  **Upper ES**  **Lower EI** | | | | | **External Spline**  **Deviation of Tooth Thickness**  **Upper ES**  **Lower EI** | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | E | F | G | H | m | k | j | h | g | f | e | d | c | b | A |
|  | + 45  + 27 | + 36  + 18 | + 27  + 9 | + 18  0 | + 27  + 9 | + 18  0 | + 9  ‒ 9 | 0  ‒ 18 | ‒ 9  ‒ 27 | ‒ 18  ‒ 36 | ‒ 27  ‒ 45 | ‒ 36  ‒ 54 | ‒ 45  ‒ 63 | ‒ 54  ‒ 72 | ‒ 63  ‒ 81 |
|  | + 50  + 30 | + 40  + 40 | + 30  + 10 | + 20  0 | + 30  + 10 | + 20  0 | + 10  ‒ 10 | 0  ‒ 20 | ‒ 10  ‒ 30 | ‒ 20  ‒ 40 | ‒ 30  ‒ 50 | ‒ 40  ‒ 60 | ‒ 50  ‒ 70 | ‒ 60  ‒ 80 | ‒ 70  ‒ 90 |
|  | + 55  + 33 | + 44  + 22 | + 33  + 11 | + 22  0 | + 33  + 11 | + 22  0 | + 11  ‒ 11 | 0  ‒ 22 | ‒ 11  ‒ 33 | ‒ 22  ‒ 44 | ‒ 33  ‒ 55 | ‒ 44  ‒ 66 | ‒ 55  ‒ 77 | ‒ 66  ‒ 88 | ‒ 77  ‒ 99 |
|  | + 62  + 37 | + 50  + 25 | + 37  + 12 | + 25  0 | + 37  + 12 | + 25  0 | + 12  ‒ 13 | 0  ‒ 25 | ‒ 12  ‒ 37 | ‒ 25  ‒ 50 | ‒ 37  ‒ 62 | ‒ 50  ‒ 75 | ‒ 62  ‒ 87 | ‒ 75  ‒ 100 | ‒ 87  ‒ 112 |
|  | + 70  + 42 | + 56  + 28 | + 42  + 14 | + 28  0 | + 42  + 14 | + 28  0 | + 14  ‒ 14 | 0  ‒ 28 | ‒ 14  ‒ 42 | ‒ 28  ‒ 56 | ‒ 42  ‒ 70 | ‒ 56  ‒ 84 | ‒ 70  ‒ 98 | ‒ 84  ‒ 112 | ‒ 98  ‒ 126 |
|  | + 80  + 48 | + 64  + 32 | + 48  + 16 | + 32  0 | + 48  + 16 | + 32  0 | + 16  ‒ 16 | 0  ‒ 32 | ‒ 16  ‒ 48 | ‒ 32  ‒ 64 | ‒ 48  ‒ 80 | ‒ 64  ‒ 96 | ‒ 80  ‒ 112 | ‒ 96  ‒ 128 | ‒ 112  ‒ 144 |
|  | + 90  + 54 | + 72  + 36 | + 54  + 18 | + 36  0 | + 54  + 18 | + 36  0 | + 18  ‒ 18 | 0  ‒ 36 | ‒ 18  ‒ 54 | ‒ 36  ‒ 72 | ‒ 54  ‒ 90 | ‒ 72  ‒ 108 | ‒ 90  ‒ 126 | ‒ 108  ‒ 144 | ‒ 126  ‒ 162 |
|  | + 100  + 60 | + 80  + 40 | + 60  + 20 | + 40  0 | + 60  + 20 | + 40  0 | + 20  ‒ 20 | 0  ‒ 40 | ‒ 20  ‒ 60 | ‒ 40  ‒ 80 | ‒ 60  ‒ 100 | ‒ 80  ‒ 120 | ‒ 100  ‒ 140 | ‒ 120  ‒ 160 | ‒ 140  ‒ 180 |
|  | + 112  + 67 | + 90  + 45 | + 67  + 22 | + 45  0 | + 67  + 22 | + 45  0 | + 22  ‒ 23 | 0  ‒ 45 | ‒ 22  ‒ 67 | ‒ 45  ‒ 90 | ‒ 67  ‒ 112 | ‒ 90  ‒ 135 | ‒ 112  ‒ 157 | ‒ 135  ‒ 180 | ‒ 157  ‒ 202 |
|  | + 125  + 75 | + 100  + 50 | + 75  + 25 | + 50  0 | + 75  + 25 | + 50  0 | + 25  ‒ 25 | 0  ‒ 50 | ‒ 25  ‒ 75 | ‒ 50  ‒ 100 | ‒ 75  ‒ 125 | ‒ 100  ‒ 150 | ‒ 125  ‒ 175 | ‒ 150  ‒ 200 | ‒ 175  ‒ 225 |
|  | +140  + 84 | + 112  + 56 | +84  + 28 | + 56  0 | + 84  + 28 | + 56  0 | + 28  ‒ 28 | 0  ‒ 56 | ‒ 28  ‒ 84 | ‒ 56  ‒ 112 | ‒ 84  ‒ 140 | ‒ 112  ‒ 168 | ‒ 140  ‒ 196 | ‒ 168  ‒ 224 | ‒ 196  ‒ 252 |
|  | + 158  + 95 | + 126  + 63 | + 95  + 32 | + 63  0 | + 95  + 32 | + 63  0 | + 32  ‒ 31 | 0  ‒ 63 | ‒ 32  ‒ 95 | ‒ 63  ‒ 126 | ‒ 95  ‒ 158 | ‒ 126  ‒ 189 | ‒ 158  ‒ 221 | ‒ 189  ‒ 252 | ‒ 221  ‒ 284 |
|  | + 178  + 107 | + 142  + 71 | + 07  + 36 | + 71  0 | + 107  ‒ 36 | + 71  0 | + 36  ‒ 35 | 0  ‒ 71 | ‒ 36  ‒ 107 | ‒ 71  ‒ 142 | ‒ 107  ‒ 178 | ‒ 142  ‒ 213 | ‒ 178  ‒ 249 | ‒ 213  ‒ 284 | ‒ 249  ‒ 320 |
|  | + 200  + 120 | + 160  + 80 | + 20  + 40 | + 80  0 | + 120  + 40 | + 80  0 | + 40  ‒ 40 | 0  ‒ 80 | ‒ 40  ‒ 120 | ‒ 80  ‒ 160 | ‒ 120  ‒ 200 | ‒ 160  ‒ 240 | ‒ 200  ‒ 280 | ‒ 240  ‒ 320 | ‒ 280  ‒ 360 |
|  | + 225  + 135 | + 180  + 90 | + 35  + 45 | + 90  0 | + 135  + 45 | + 90  0 | + 45  ‒ 45 | 0  ‒ 90 | ‒ 45  ‒ 135 | ‒ 90  ‒ 180 | ‒ 135  ‒ 225 | ‒ 180  ‒ 270 | ‒ 225  ‒ 315 | ‒ 270  ‒ 360 | ‒ 315  ‒ 405 |
|  | + 250  + 150 | + 200  + 100 | + 50  + 50 | + 100  0 | + 150  + 50 | + 100  0 | + 50  ‒ 50 | 0  ‒ 100 | ‒ 50  ‒ 150 | ‒ 100  ‒ 200 | ‒ 150  ‒ 250 | ‒ 200  ‒ 300 | ‒ 250  ‒ 350 | ‒ 300  ‒ 400 | ‒ 350  ‒ 450 |
|  | + 275  + 165 | + 200  + 110 | + 65  + 55 | + 110  0 | + 165  + 55 | + 110  0 | + 55  ‒ 55 | 0  ‒ 110 | ‒ 55  ‒ 165 | ‒ 110  ‒ 220 | ‒ 165  ‒ 275 | ‒ 220  ‒ 330 | ‒ 275  ‒ 385 | ‒ 330  ‒ 440 | ‒ 385  ‒ 495 |

**Table 13 Example of Effective and Actual Dimensions, Tolerances for Different Fits**

**(***Clause* 6.11.4)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl No.** | **Spline**  **Type** | **Tolerances Zone** | | **Fit** |
|  |  |  |  |  |
|  |  | Effective | Actual |  |
|  | Internal Spline | H | E |  |
|  |  | m | h |  |
|  |  | k | g | Press fits |
|  |  | j | f |  |
|  | External Spline | h | e | Locating fit |
|  |  | g | d |  |
|  |  | f | c | Sliding fits |
|  |  | e | b |  |

**ANNEX A**

(*Clause* 6.11.3)

**INSTRUCTIONS FOR USING TABLE 12**

**A‒l GENERAL**

**A‒l.1** This annex covers the method for reading the tolerance values on space width and tooth thickness of four qualities of involute splines, represented by the quality lines ql,q2,q3,q4*,* etc. The modules up to 10 have been divided into three ranges, represented by module lines m1m2, m3m4 and m5m6*.* The pitch circle diameters up to 800 mm have been divided into 6 ranges, represented by the lines p1, p2, p3, p4, etc.

**A‒2 PROCEDURE FOR USING THE TABLE**

**A‒2.1** Theprocedure has been explained with a particular example of external spline of module 2, pitch circle diameter 120 mm, quality 8 and tolerance m.

**A‒2.2** The module line for the spline of module 2 is m3m4. The pitch circle diameter line for 120 mm is p7p8. The pitch the module line m3m4 and pitch circle diameter line p7 p8 meet at a point ‘*a*’, and from the point ‘*a*’, a spline line leads down to the quality line q3qa, corresponding to quality 8, meeting at point ‘*b*’. The tolerance value is read under the tolerance symbol m against the point ‘*b*’. The tolerance value for the tooth thickness of the spline is + 60 mm and + 20 mm.

**ANNEX B**

(*Foreword*)

**COMMITTEE COMPOSITION**

Transmission Devices Sectional Committee, PGD 33

|  |  |
| --- | --- |
| *Organization* | *Representative(s)* |
| Maruti Suzuki India Limited, Gurugram | Shri Vikas Chopra **(*Chairperson*)** |
| Elecon Engineering Company Limited, Gujarat | Shri Vrajlal Senjaliya  Shri Vilas B. Kalyan (*Alternate*)  Shri Prayasvin B. Patel (*Alternate* II) |
| Forech India Limited, Sonipat | Shri I. K. Bahl  Shri Timir Bhattacharyya (*Alternate*) |
| Honda Motorcycle and Scooter India Private Limited, Gurugram | Shri Arpan Shukla |
| Indian Institute of Technology, Indore | Shri Neelesh Kumar Jain  Dr P. P. Chattaraj (*Alternate* I)  Prof I. A. Palani (*Alternate* II) |
| Kirloskar Pneumatic Company Limited, Pune | Shri Kannan Loganathan |
| LG Balakrishnan and Bros Limited, Coimbatore | Shri Prabakaran P.  Shri Subbiah P. (*Alternate* I)  Shri Pannerselvan M. (*Alternate* II) |
| Lohia Corp Limited, Kanpur | Shri Prakash Kumar  Shri Mahendran M. (*Alternate* I)  Shri Dev Kanth (*Alternate* II)  Shri Amit Jaiswal (*Alternate* III) |
| Mahindra and Mahindra Limited, Mumbai | Shri Jibin K. Paul |
| Maruti Suzuki India Limited, Gurugram | Shri Amit Talwar  Shri Gururaj Ravi (*Alternate*) |
| Research Designs and Standards Organization (RDSO), Lucknow | Shri Vjay Kumar Goel  Shri C. K. Bhatt (*Alternate* I)  Shri S. Panwar (*Alternate* II) |
| Shanthi Gears Limited, Coimbatore | Shri Muthumadhavan V. |
| Suzlon Energy Limited, New Delhi | Shri Mohamed Naseeruddin |
| TIDC India Limited, Chennai | Shri B. Srinivas  Dr K. Krishna Kumar |
| VE Commercial Vehicles Limited, Dewas | Shri Arvind Manohar  Shri Mahendran Mohan (*Alternate* I)  Shri Saptharishi Iyer (*Alternate* II) |
|  |  |
| In Personal Capacity (*D‒*1, *Kailashpuri Complex, Kusum Vihar. Phase‒2, Koylanagar, Dhanbad )* | Shri K. K. S. Sinha |
|  |  |
| BIS Directorate General | Shri R. R. Singh, Scientist ‘F’/SENIOR DIRECTOR and Head (Production and General Engineering) [Representing Director General (*Ex‒officio*)] |

*Member Secretary*

Shri Vichitra Vir Singh

Scientist ‘D’/Joint Director

(Production and General Engineering), BIS