

JIS

JAPANESE INDUSTRIAL STANDARD

System of Cone Tolerances

JIS B 0614—1987

Translated and Published

by

Japanese Standards Association

In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

JAPANESE INDUSTRIAL STANDARD

J I S

System of Cone Tolerances

B 0614-1987

1. Scope

This Japanese Industrial Standard specifies the cone tolerances system applicable to rigid conical workpieces of $1/3$ to $1/500$ in taper ratio and over 6 mm up to 630 mm in cone length. This Standard, however, is not applicable to the cone tolerances for rolling bearings.

Furthermore, the taper angle tolerances specified in this Standard are also applicable to the prism workpieces.

Remark: This Standard is in accordance with the conical tolerances system specified in ISO 1947-1973 (System of cone tolerances for conical workpieces from $c = 1 : 3$ to $1 : 500$ and lengths from 6 to 630 mm).

2. Definitions

For the purposes of this Standard, the definitions in JIS B 0154 and JIS B 0021 apply.

3. Quantitative Symbols

For the purposes of this Standard, the following quantitative symbols apply.

AT : Taper angle tolerances

Remark: The symbol AT is also used for expressing the grade of taper angle tolerance. In that case, a digit expressing the grade shall be suffixed to the symbol AT .

AT_D : Taper angle tolerance expressed in unit of length.

AT_α : Taper angle tolerance expressed in unit of angle.

C : Basic taper ratio

D : Basic largest diameter

$D_{\max}$: Maximum permissible largest diameter

$D_{\min}$: Minimum permissible largest diameter

d : Basic smallest diameter

Applicable Standards, Corresponding International Standard and Reference Standards: See page 11.

2
B 0614-1987

$d_{\max}$: Maximum permissible smallest diameter

$d_{\min}$: Minimum permissible smallest diameter

D_s : Basic cone diameter at specified axial position

D_{sa} : Actual cone diameter at specified axial position

$D_{s\max}$: Maximum permissible cone diameter at specified axial direction

$D_{s\min}$: Minimum permissible cone diameter at specified axial direction

L : Basic cone length

T_D : Cone diameter tolerance

T_{DS} : Cone section diameter tolerance

T_F : Conical shape tolerance

α : Basic taper angle

$\alpha_{\max}$: Maximum permissible taper angle

$\alpha_{\min}$: Minimum permissible taper angle

$\Delta\alpha$: Maximum taper resulting from cone section diameter tolerance T_D

4. Cone Tolerance System

4.1 Basis of Cone Tolerance System The cone tolerance system shall be based on the cone diameter tolerance, taper angle tolerance, cone form tolerance and cone section diameter tolerance.

4.2 Cone Diameter Tolerance The cone diameter tolerance T_D is applicable to all the actual cone diameters within the cone length L , and is generally selected from the standard tolerances based on JIS B 0401 according to the largest diameter D of the cone.

Remark: The cone diameter tolerance T_D takes a fixed value for all sections normal to axis.

4.3 Taper Angle Tolerances The taper angle tolerances shall be in accordance with the following:

- (1) Grades of Taper Angle Tolerance The taper angle tolerance AT shall be classified into 12 grades of AT 1 to AT 12 corresponding to the steps of cone lengths (see Attached Table). However, grades AT 0, AT 01 or AT 13 may be used, as required.
- (2) Values of Taper Angle Tolerance The values of the taper angle tolerances AT_α and AT_D for respective grades corresponding to the steps of cone length L shall be in accordance with Attached Table.

AT_D shall be the value in μm unit calculated from the constant AT_a within the steps of one cone length, and it shall be applied to the difference $4(D-d)$ between the diametral difference of both ends normal to a cone and the basic value $D-d$.

Remarks 1. The value of AT_a (μrad unit) for the grade AT_n shall be the preferred number R 10 nearest to the value calculated from the following formula:

$$AT_a = \frac{140}{\sqrt{Le}} \times 10^{\frac{n-1}{5}}$$

where Le : geometrical mean of two cone length values dividing the steps of cone length L (in accordance with preferred number R 5.) (mm)

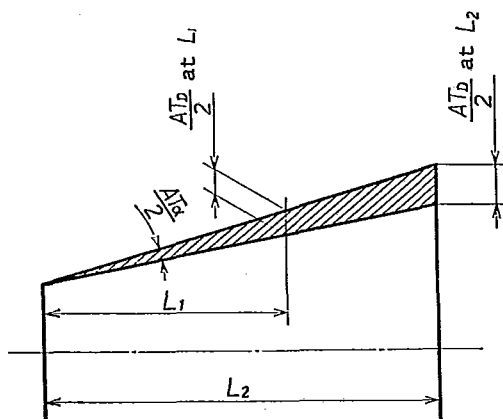
n : digit expressing grade

2. There shall be the following relation between AT_D (μm unit) and AT_a (mrad unit) (L in mm unit).

$$AT_D = AT_a \times L$$

The values of AT_D corresponding to cone lengths L_1 and L_2 dividing the step of a cone length shall vary as given in Fig. 1.

Fig. 1. Variation of AT_D within Steps (L_1 to L_2) of a Cone Length



Furthermore, the values of grade AT 0 and grade AT 01 shall be 1/10 of the values of AT 5 and AT 4, respectively.

Also, the values of respective grades AT 13 to AT 17 shall be 10 times the values of respective grades AT 8 to AT 12.

- (3) **Tolerances for Taper Angle** The tolerances for taper angle shall be expressed by the one side tolerance of plus or minus in respect to the basic taper angle, or both side tolerances of plus and minus.