

Form and location tolerances according to DIN ISO 1101

Form and location tolerances are only required when the defined dimensional tolerances cannot on their own ensure the function. This primarily applies to coaxiality, symmetry and running deviations.

— Straightness

The actual edge of the prism must lie between two parallel planes spaced $t = 0.1$ mm apart. If a surface or line is toleranced, the minimum spacing between the indicating arrow or datum triangle and the dimensional line should not fall below 4 mm.

⊥ Perpendicularity

The actual surface must lie between two planes which are parallel and perpendicular to the reference surface A and are $t = 0.2$ mm apart.

— Straightness

The actual axis of the cylinder must lie within a cylinder of diameter $t = 0.05$ mm. In the case of tolerancing an axis or central plane, the indicating arrow or the datum triangle lies on an extension of the dimensional line.

∠ Slope

The actual surface must lie between two planes which are parallel and are inclined in relation to the reference surface A at the geometrically ideal angle of 45° , and are $t = 0.8$ mm apart.

▭ Flatness

The actual surface must lie between two parallel planes spaced $t = 0.02$ mm apart.

⊕ Position

The actual axis of the bored hole must lie within a cylinder of diameter $t = 0.01$ mm, the axis of which is located at the geometrically ideal location.

○ Roundness (circularity)

The actual circumference of each cross-section must lie between two concentric circles spaced $t = 0.08$ mm apart.

◎ Coaxiality Concentricity

The actual axis of the large diameter must lie within a cylinder which is coaxial with the reference axis A and has a diameter of $t = 0.03$ mm.

⊘ Cylindricity

The actual surface of the cylinder must lie between two coaxial cylinders which have a spacing of $t = 0.06$ mm. The cylindricity is the sum of tolerances for roundness and parallelism.

≡ Symmetry

The actual central plane of the groove must lie between two parallel planes spaced $t = 0.7$ mm apart, which are arranged symmetrically in relation to the central plane of the reference surface A.

⌒ Profile of any line

The actual line must lie between two envelope lines on circles having a diameter $t = 0.1$ mm.

↗ True running

When rotated about the reference axis A, the true-running deviation (run-out) must not exceed $t = 0.02$ mm. This tolerance is the sum of roundness and coaxiality tolerances.

⌒ Profile of any surface

The actual surface must lie between two envelope surfaces on spheres having a diameter $t = 0.07$ mm.

↗ Axial running

When rotated about the reference axis A, the axial running deviation (axial run-out) must not exceed the tolerance $t = 0.05$ mm.

∥ Parallelism

The actual surface must lie between two planes which are parallel to the reference surface and are spaced $t = 0.09$ mm apart.

↗ Total run-out

Given multiple rotation about the reference axis and axial displacement between workpiece and measuring instrument, all the measured points must lie within the overall run-out tolerance of $t = 0.01$ mm.

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