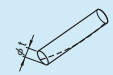
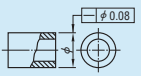
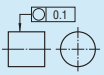
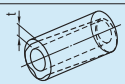
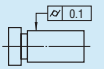
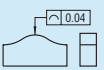
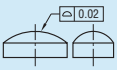
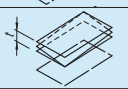
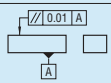
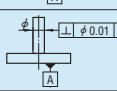
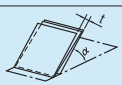
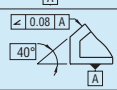
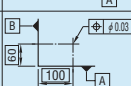
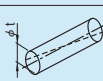
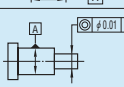
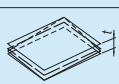
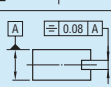
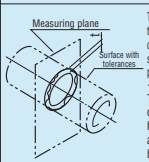
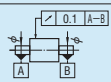
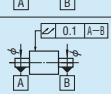
■Types and symbols of geometrical tolerances

Type of tolerance		Symbol	Definition of tolerance range		Examples of drawings and their interpretations	
Shape tolerances	Straightness tolerance	—		If the symbol ϕ is attached before the numerical value that indicates the tolerance range, this tolerance range is the range within a cylinder of diameter t.		If a tolerance frame is connected to a dimension that indicates the diameter of a cylinder, the axis line of the cylinder shall be contained within a cylinder of 0.08mm diameter.
	Flatness tolerance	▱		The tolerance range is the area between two parallel planes separated by distance t.		This surface shall be contained within two parallel planes separated by 0.08mm.
	Circularity tolerance	○		The tolerance range in the considered plane is the area between two concentric circles separated by distance t.		The circumference in any section normal to the axis shall be contained between two concentric circles separated by 0.1mm on the same plane.
	Cylindricity tolerance	⌭		The tolerance range is the range contained between two coaxial cylinder surfaces separated by distance t.		The considered surface shall be contained between two coaxial cylinder surfaces separated by 0.1mm.
	Profile tolerance of line	⌒		The tolerance range is the range contained between the two envelope curves formed by a circle with diameter t, the center of which is situated on the theoretically correct profile curve.		In any cross-section parallel to the projection plane, the considered profile shall be contained between the two envelope curves formed by a 0.04mm diameter circle, the center of which is situated on the theoretically correct profile curve.
	Profile tolerance of surface	⌓		The tolerance range is the range contained between the two enveloping surfaces formed by a sphere with diameter t, the center of which is situated on the theoretically correct profile surface.		The considered surface shall be contained between the two enveloping surfaces formed by a 0.02mm diameter sphere, the center of which is situated on the surface containing the theoretically correct profile.
Orientation tolerances	Parallelism tolerance	//		The tolerance range is the range contained between two planes parallel to the datum plane and separated by distance t.		The surface shown by the arrow of the indicator line shall be contained between two planes parallel to the datum plane A and separated by 0.01mm in the direction of the arrow of the indicator line.
	Perpendicularity tolerance	⊥		If symbol ϕ is attached before the numerical value indicating the tolerance range, this tolerance range is the range contained within a cylinder of diameter t that is perpendicular to the datum plane.		The axis of the cylinder shown by the arrow of the indicator line shall be contained within a cylinder of diameter 0.01mm that is perpendicular to the datum plane A.
	Angularity tolerance	∠		The tolerance range is the range contained between two parallel planes inclined at a specified angle to the datum plane and separated from each other by distance t.		The surface shown by the arrow of the indicator line shall be contained between two parallel planes which are inclined with theoretical exactness by 40 degrees to the datum plane A, and which are separated by 0.08mm in the direction of the arrow of the leader line.
Positional tolerances	Positional tolerance	⌖		The tolerance range is the range contained within a circle or sphere of diameter t with its center situated at the theoretically exact location of the considered point (hereafter referred to as the "true location").		The point shown by the indicator line shall be contained within a 0.03mm diameter circle with its center situated at the true location 60mm from datum line A and 100mm from datum line B.
	Coaxiality tolerance or concentricity tolerance	◎		If symbol ϕ is attached before the numerical value that indicates the tolerance, the tolerance range is the range within a cylinder of diameter t whose axis matches the datum axis line.		The axis of the cylinder shown by the arrow of the indicator line shall be contained within a cylinder of diameter 0.01mm whose axis matches datum axis line A.
	Symmetry	⌯		The tolerance range is the range contained between two parallel planes separated by distance t and arranged symmetrically with respect to the datum center plane.		The center plane shown by the arrow of the indicator line shall be contained between two parallel planes separated by 0.08mm and arranged symmetrically with respect to the datum center plane A.
Run-out tolerances	Circular run-out tolerance	↗		The tolerance range is the range contained between two concentric circles separated in the axial direction by distance t and the centers of which are situated on the datum axis line on any measuring plane normal to the datum axis line.		The radial run-out of the cylinder surface shown by the arrow of the indicator line shall not exceed 0.1mm on any measuring plane normal to the datum axis line when the cylinder is rotated by one rotation about the datum axis line A—B.
	Total run-out tolerance	⌰		The tolerance range is the range contained between two coaxial cylinders having axes agreeing with the datum axis line and separated from each other by distance t in the radial direction.		The total radial run-out of the cylinder surface shown by the arrow of the indicator line shall not exceed 0.1mm at any point on the cylinder surface when the cylindrical part is rotated about the datum axis line A—B.

The meanings of the lines used in the drawings in the "definition of tolerance range" column are as follows.
Thick solid or broken line: Shape Thin dash-dot line: Center line Thick dash-dot line: Datum
Thin alternating long and two short dashes line: Supplementary projection plane or section plane Thin solid or broken line: Tolerance range
Thick alternating long and two short dashes line: Projection of shape onto supplementary plane or section plane