GD&T SYMBOLS QUICK REFERENCE

Geometric Dimensioning and Tolerancing | ASME Y14.5 & ISO 1101

TYPE	SYMBOL	CHARACTERISTIC	DATUM REQ.	DESCRIPTION
FORM	—	**Straightness**	NO	Controls the straightness of a surface or an axis.
	▱	**Flatness**	NO	Controls the flatness of a surface independently of any datum.
	○	**Circularity**	NO	Controls the roundness of any given cross-section of a cylinder or sphere.
	⌭	**Cylindricity**	NO	Controls the overall form of a cylindrical feature (combines circularity, straightness, and taper).
PROFILE	⌒	**Profile of a Line**	OPTIONAL	Controls the shape of a 2D cross-section or individual line elements.
	⌓	**Profile of a Surface**	OPTIONAL	Controls the size, form, orientation, and location of an entire 3D surface.

TYPE	SYMBOL	CHARACTERISTIC	DATUM REQ.	DESCRIPTION
ORIENTATION		**Parallelism**	YES	Ensures a feature is strictly parallel to a specified datum.
		Perpendicularity	YES	Ensures a feature is exactly 90° (perpendicular) to a specified datum.
		Angularity	YES	Ensures a feature is at a specified angle (other than 90°) to a datum.
LOCATION		**Position**	YES	Controls the exact location of a feature's center (e.g., hole, slot) relative to datums.
		Concentricity	YES	Controls the coaxility of multiple cylindrical features (often replaced by Position or Runout in newer standards).
		Symmetry	YES	Controls the symmetrical arrangement of features about a datum center plane.
RUNOUT		**Circular Runout**	YES	Controls the 2D variation of a surface as the part is rotated 360° about a datum axis.
		Total Runout	YES	Controls the 3D variation of an entire surface across its length as the part is rotated.

CRITICAL MODIFIERS & SUPPLEMENTAL SYMBOLS

Ⓜ **Maximum Material Condition (MMC)**
Indicates the condition where a feature contains the maximum amount of material (e.g., smallest hole, largest pin). Allows for bonus tolerance.

Ⓛ **Least Material Condition (LMC)**
Indicates the condition where a feature contains the least amount of material (e.g., largest hole, smallest pin). Often used to protect wall thickness.

Ⓟ **Projected Tolerance Zone**
Specifies that the tolerance zone extends above the surface of the part, ensuring proper alignment for mating parts like long bolts or pins.

Ⓕ **Free State**
Applies to non-rigid parts. Indicates that the geometric tolerance applies when the part is unrestrained by external forces.

Ⓤ **Unequally Disposed Profile**
Used with profile tolerances to indicate that the tolerance zone is not distributed equally on both sides of the true profile.

Ⓣ **Tangent Plane**
Indicates that the geometric tolerance applies only to a plane contacting the highest points of a specific surface.

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