



**Geometric Stackup**  
GD&T SYMBOLS

## Symbols used in GD&T

Characteristics	Symbol
At maximum material condition	
At least material condition	
Projected tolerance zone	
Free state	
Tangent Plane	
Diameter	
Spherical Diameter	
Radius	R
Spherical Radius	SR
Controlled Radius	CR
Reference	( )
Arc Length	
Statistical Tolerance	
Between	

## Tolerance Symbols

It is a graphical representation of a toleranced feature. Fourteen different types of geometric tolerance and symbols have been standardized and are shown in Table 2. Subsequent sections describe the use of these tolerances. Form tolerances are divided in the following three categories:

- A. Single Feature Tolerances:** Tolerances related to a standalone feature. E.g. Straightness, Flatness, Circularity, Cylindricity, Profile of a line and Profile of a Surface.

- B. Related Features Tolerances:** E.g. Parallelism, Perpendicularity, Angularity, Concentricity, Symmetry and Position.
- C. Runout Tolerances:** It is used to control the location of a circular part feature relative to its axis. This is different than circularity, which controls overall roundness.

GD&T Symbol	Control Type	Name	Summary Description
	Form	Straightness	Controls the straightness of a feature in relation to its own perfect form
	Form	Flatness	Controls the flatness of a surface in relation to its own perfect form
	Form	Circularity	Controls the form of a revolved surface in relation to its own perfect form by independent cross sections
	Form	Cylindricity	Like circularity, but applies simultaneously to entire surface
	Profile	Profile of a Surface	Controls size and form of a feature. In addition it controls the location and orientation when a datum reference frame is used.
	Profile	Profile of a Line	Similar to profile of a surface, applies to cross sections of a feature
	Orientation	Perpendicularity	Controls the orientation of a feature which is nominally perpendicular to the primary datum of its datum reference frame

GD&T Symbol	Control Type	Name	Summary Description
	Orientation	Angularity	Controls orientation of a feature at a specific angle in relation to the primary datum of its datum reference frame
	Orientation	Parallelism	Controls orientation of a feature which is nominally parallel to the primary datum of its datum reference frame
	Location	Position	Controls the location and orientation of a feature in relation to its datum reference frame
	Location	Concentricity	Controls concentricity of a surface of revolution to a central datum
	Location	Symmetry	Controls the symmetry of two surfaces about a central datum
	Runout	Circular runout	Controls circularity and coaxiality of each circular segment of a surface independently about a coaxial datum
	Runout	Total runout	Controls circularity, straightness, coaxiality, and taper of a cylindrical surface about a coaxial datum

Geometric Stackup provides a simple solution to calculate tolerances on complex parts and assemblies with unprecedented ease, speed and accuracy – reducing stack up calculation time from hours to minutes.

To learn more about Geometric Stackup, contact us at [gs.mktg@geometricglobal.com](mailto:gs.mktg@geometricglobal.com)