

# Matrix of Geometric Attributes vs. Y14.5-2009 Tools

		Geometric Attributes			
		No datum references required		Datum references required	
		Size	Form	Orientation	Location
ASME Y14.5-2009 Dimensioning & Tolerancing Tools	Size	✓ Always controls size	Rule #1: ✓ Any feature of size (ISO requires Envelope modifier)  Independency Modifier (I) (ISO default); or whenever Rule #1 does not apply	✓ Rule #1: Parallelism of two opposed parallel planes  Size does not control any other type of orientation; does not control parallelism of two parallel planes without Rule #1	✗ Does not control location
	Form	✗ Does not control size	✓ Always controls form	✗ Does not control orientation	✗ Does not control location
	Orientation	✗ Does not control size	When applied to a flat surface ✓ (and no Tangent Plane Only Modifier used)  When applied to FOS (or to a flat surface with Tangent Plane Only Modifier) (T)	✓ Always controls orientation	✗ Does not control location
	Location	✗ Does not control size	✗ Does not control form (although may control balance)	✓ Always controls orientation	✓ Always controls location
	Runout	✗ Does not control size	✓ Always controls form	✓ Always controls orientation (or at least wobble)	✓ Controls coaxiality when applied to a surface of revolution  ✗ When applied to a surface that is 90° to the datum axis
	Profile	With all around/over (or with datum reference AND basic distance to datum) ✓  Without all around/over (and without datum reference AND basic distance to datum) ✗	✓ Almost always  ✗ Maybe not (If Tangent Plane Only Modifier is used) (T)	With datum reference (or when applied to multiple or some complex surfaces) ✓  Without datum reference (or when applied to single or simple surfaces) ✗	With datum reference AND basic distance to datum ✓  Without datum reference OR basic distance to datum ✗