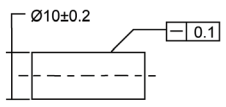
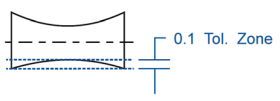
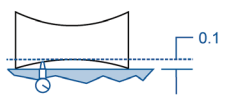
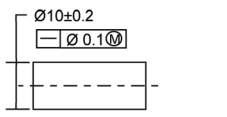
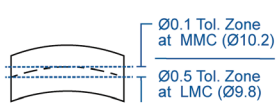
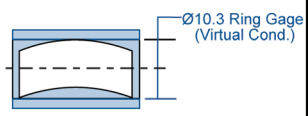
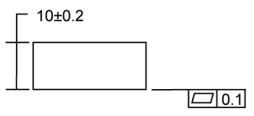
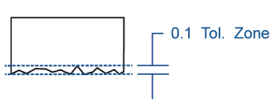
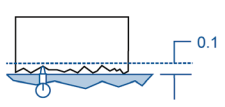
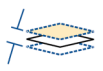
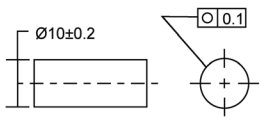
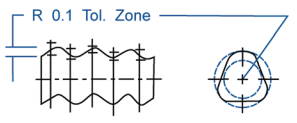
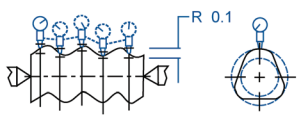
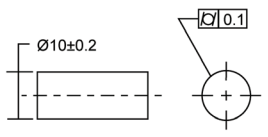
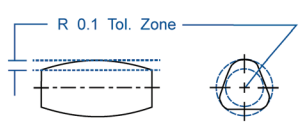
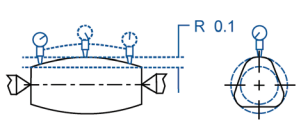
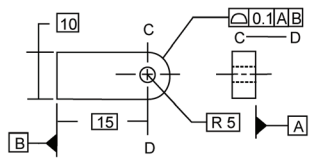
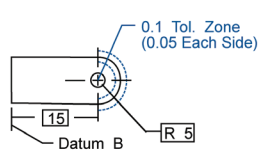
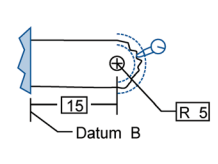
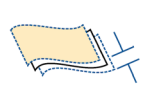
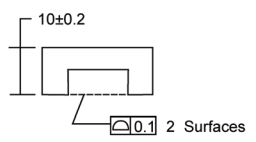
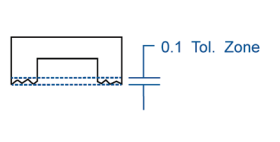
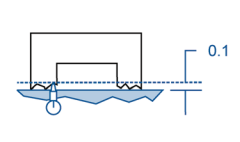
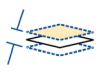
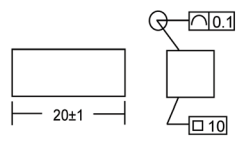
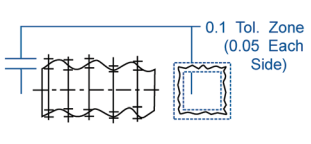
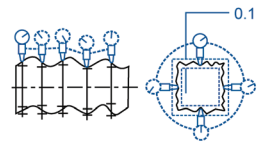
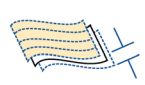
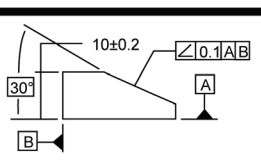
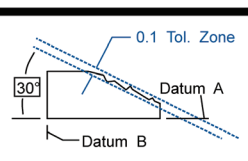
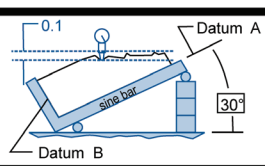
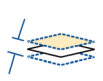
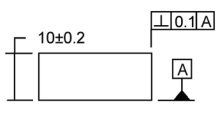
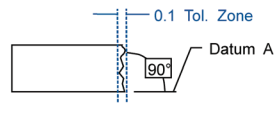
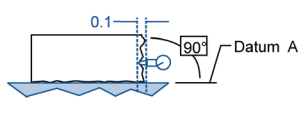
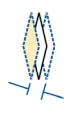
METROLOGY MATTERS

GD&T GUIDE

Geometric Dimensioning & Tolerancing per ASME Y14.5 - 2009

FEATURE CATEGORIES	TOLERANCE TYPES	ASME SYMBOL	DRAWING CALLOUT EXAMPLE	DRAWING CALLOUT MEANING	MANUAL OR FUNCTIONAL GAGING METHOD	PICTORIAL VIEW	TOLERANCE ZONE DEFINITION (FOR EXAMPLE)	ZONE MODIFIERS ALLOWED	DATUMS USED
FOR INDIVIDUAL FEATURES	FORM	Straightness					Parallel lines, within which the surface element must lie	No (Surface)	No
							Cylindrical boundary, within which the axis of the feature must lie (derived median line)	Yes (Axis)	No
		Flatness					Parallel planes, within which the elements of a surface must lie	No	No
		Circularity					Concentric circles, within which each circular element of the surface must lie	No	No
		Cylindricity					Concentric cylinders, within which all surface elements must lie	No	No
FOR INDIVIDUAL OR RELATED FEATURES	PROFILE	Profile of a Surface					A uniform boundary equally disposed along the true (theoretically exact) profile within which the elements of the surface must lie	No	Yes
							Parallel planes, within which the elements of both surfaces must lie simultaneously	No	No (In this example)
		Profile of a Line					A uniform boundary equally disposed along the true (theoretically exact) profile, within which the surface elements of each cross-section	No	No (In this example)
FOR RELATED FEATURES	ORIENTATION	Angularity					Parallel planes, at a specified basic angle from a datum plane(s) within which all surface elements must lie	No (Surface)	Yes
		Perpendicularity					Parallel planes, at 90° basic (perpendicular) to a datum plane(s) within which the elements of a surface must lie	No (Surface)	Yes
							Cylindrical boundary, at 90° basic (perpendicular) to a datum plane within which the axis of the feature must lie	Yes (Axis)	Yes
		Parallelism					Parallel planes, parallel to a datum plane (or axis) within which the elements of a surface must lie	No (Surface)	Yes
	LOCATION	Position					Cylindrical boundary, within which the center axis of a cylindrical feature of size is permitted to vary from the true (theoretically exact) position	Yes	Yes
							Parallel planes, within which the center plane of a slot is permitted to vary from the true (theoretically exact) position	Yes	Yes
		Concentricity					Cylindrical boundary, within which the axis of all cross-sectional elements of a surface of revolution are common to the axis of the datum feature	No	Yes
		Symmetry					Parallel planes, within which the median points of all opposed or correspondingly located elements of a surface(s) are common to the center plane of the datum feature	No	Yes
	RUNOUT	Circular Runout					Two concentric circles, within which each circular element must lie in relationship to the datum axis	No	Yes
		Total Runout					Two concentric cylinders, within which all circular elements must lie (simultaneously) in relationship to the datum axis	No	Yes

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