
















CHARACTERISTICS OF GEOMETRIC TOLERANCES¹

TYPE OF TOLERANCE	CHARACTERISTIC	SYMBOL	ASME Y14.5M PARA.	CONTROLS		FEATURES	APPLICABILITY OF FEATURE MODIFIERS (M), (L) OR (S) ²	DATUMS	APPLICABILITY OF DATUM MODIFIERS	2D OR 3D	SHAPE OF TOLERANCE ZONE	
				AXIS OR MEDIAN PLANE	SURF							
FORM	STRAIGHTNESS LINE ELEMENT		6.4.1		X	FOR INDIVIDUAL FEATURES	NO	DATUMS NOT ALLOWED	NOT APPLICABLE	2D	2 PARALLEL LINES	
	STRAIGHTNESS AXIS OR MEDIAN PLANE		6.4.1	X			YES ³			3D	2 PARALLEL PLANES OR CYLINDRICAL	
	FLATNESS		6.4.2		X		NO			3D	2 PARALLEL PLANES	
	CIRCULARITY (ROUNDNESS)		6.4.3		X		NO			2D	2 CONCENTRIC CIRCLES	
	CYLINDRICITY		6.4.4		X		NO			3D	2 CONCENTRIC CYLINDERS	
PROFILE (LOCATION OF SURFACES)	PROFILE OF A LINE		6.5.2(b)		X	FOR INDIVIDUAL OR RELATED FEATURES	NO	DATUMS REQD EXCEPT SPECIAL CASES	NOT APPLICABLE	3D	2D UNIFORM BOUNDARY	
	PROFILE OF A SURFACE		6.5.2(a)		X		NO			3D	3D UNIFORM BOUNDARY	
ORIENTATION	ANGULARITY		6.6.2	X	X	FOR RELATED FEATURES	YES, BUT ONLY IF FEATURES OF SIZE	DATUMS REQD	YES, BUT ONLY IF FEATURES OF SIZE	3D	2 PARALLEL LINES 2 PARALLEL PLANES CYLINDRICAL	
	PERPENDICULARITY		6.6.4	X	X							
	PARALLELISM		6.6.3	X	X							
LOCATION	POSITION		5.2	X	X	FOR RELATED FEATURES	YES	DATUMS REQD (EXCEPT SPECIAL CASES)	YES, IF FEATURES OF SIZE	3D	2 PAR PLANES CYLINDRICAL SPHERICAL CONICAL, BOUNDARY	
	CONCENTRICITY		5.11.3	X			NO (ALWAYS RFS)			NO	3D	CYLINDRICAL
	SYMMETRY		5.13	X			NO (ALWAYS RFS)			NO	3D	2 PARALLEL PLANES
RUNOUT	CIRCULAR RUNOUT		6.7.1.2.1		X	FOR RELATED FEATURES	NO (ALWAYS RFS)	DATUMS REQD	NO	2D	SEE NOTE 4	
	TOTAL RUNOUT		6.7.1.2.2		X		NO (ALWAYS RFS)			NO	3D	SEE NOTE 5

NOTES:

1. AMSE Y14.5M, 2.7.1: LIMITS OF SIZE CONTROL FORM AS WELL AS SIZE AND DEFINE A BOUNDARY OF PERFECT FORM AT MMC.
2. (S) MODIFIER NOT REQD, BUT PERMITTED PER AMSE Y14.5M, PARA. 2.8 (b). 3. TOL VIOLATES PERFECT FORM BOUNDARY. VIRTUAL CONDITION = SIZE TOL + CONTROL TOL.
4. 2 CONCENTRIC CIRCLES ABOUT A DATUM AXIS; 2 CONCENTRIC CIRCULAR LINE ELEMENTS ABOUT DATUM AXIS.
5. 2 CONCENTRIC CYLINDERS ABOUT A DATUM AXIS; 2 PARALLEL PLANES ABOUT A DATUM AXIS.