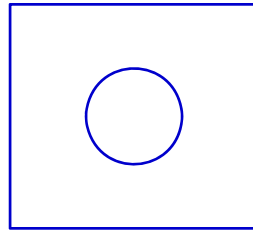
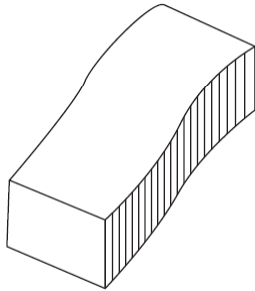
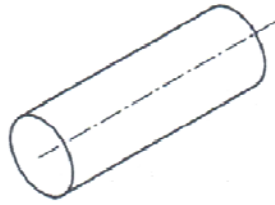


Geometrical tolerances

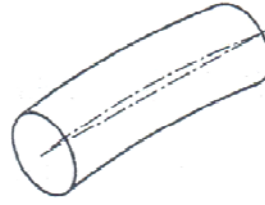
- Tolerance on size alone is not sufficient to ensure proper functioning of parts
- Accuracy on form and position as equally important
- Form variation: It is the variation of actual form from the geometrically ideal form
- Position variation: Variation of the actual position of the form feature from the geometrically ideal position with reference to another feature



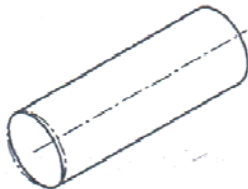
Geometrical shape variations



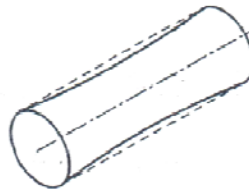
(A) Exact shape



(B) Bent



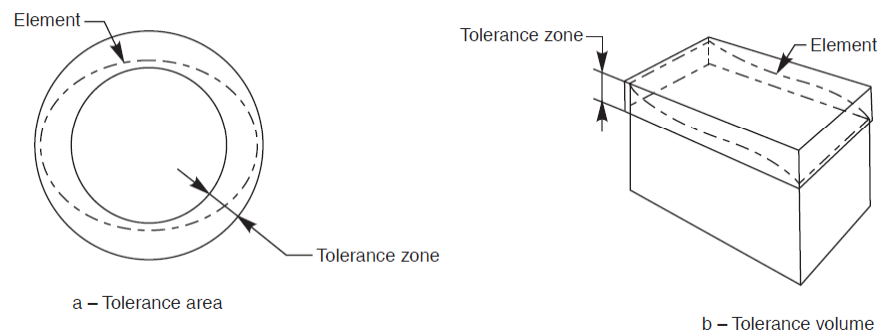
(C) Non-circular



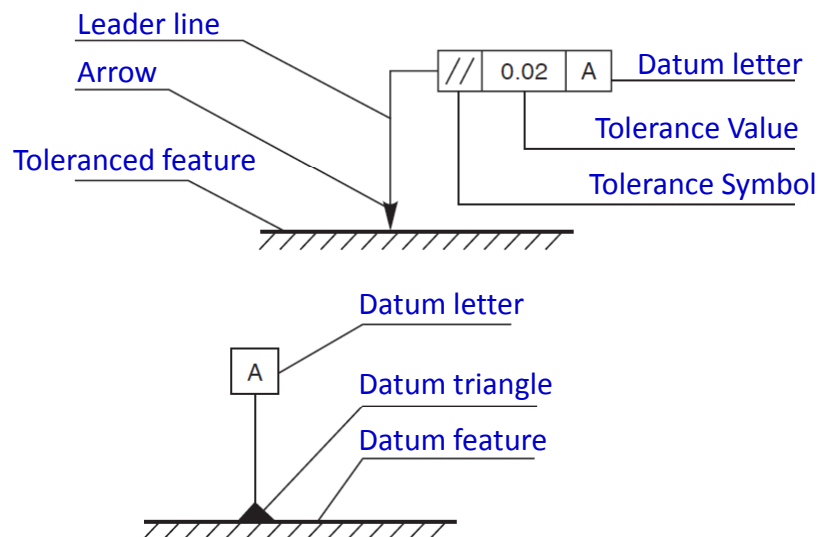
(D) Non-cylinder

Geometrical tolerances

- **Form tolerances limit the deviations of an individual feature from its ideal geometrical form**
- **Tolerance zone:** It is the imaginary area or volume within which the controlled feature of the manufactured part should be contained completely

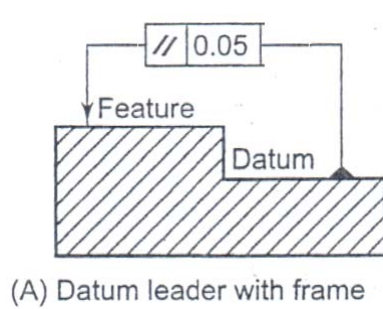


Indicating Geometrical Tolerances in Drawing

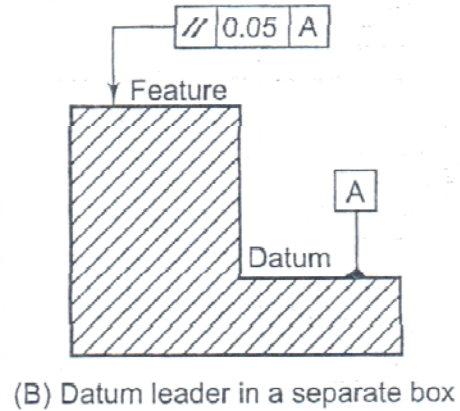


- **Datum:** It is a theoretically exact geometric reference (axis, plane, line) to which the tolerance features are related

Indicating Geometrical Tolerances in Drawing



The datum feature is near the tolerated feature

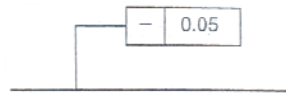


The datum feature is far off from the tolerated feature

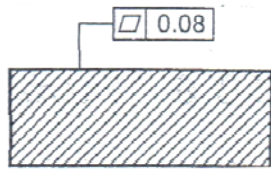
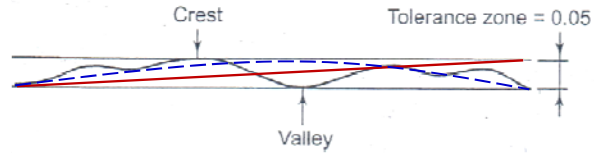
Geometrical tolerance symbols

Geometrical tolerance symbols				
Form tolerances	Straightness		Orientation tolerances	
	Flatness			
	Circularity			
	Cylindricity			
	Profile of line		Position tolerances	
	Profile of surface			
		Angularity		Position tolerances
		Perpendicularity		
		Parallelism		
		Concentricity		
		Position		
		Symmetry		

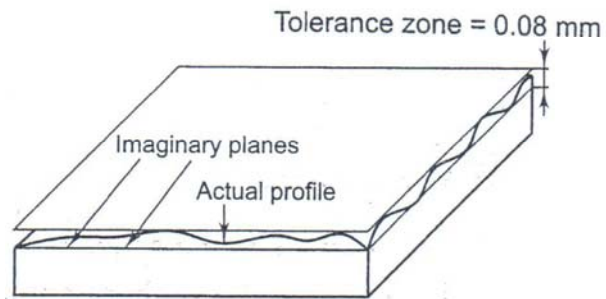
Geometrical Tolerances



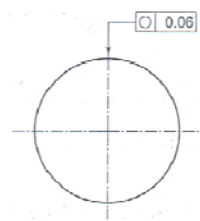
Straightness



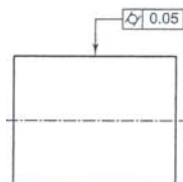
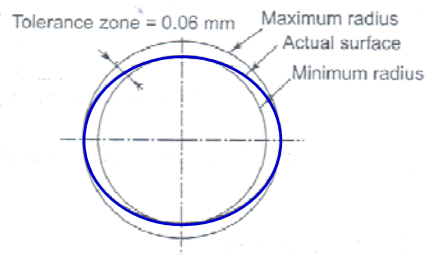
Flatness



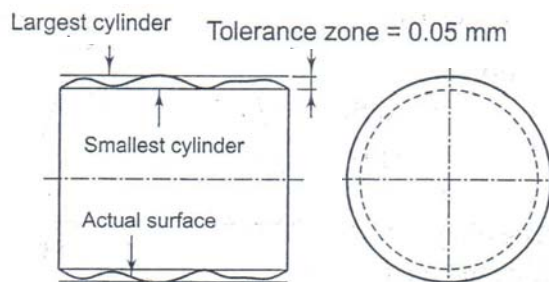
Geometrical Tolerances



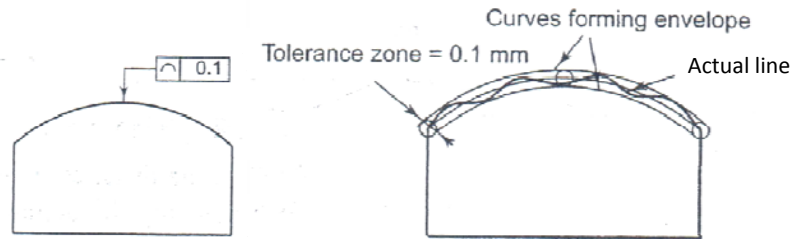
Circularity



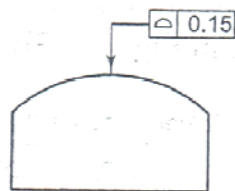
Cylindricity



Geometrical Tolerances

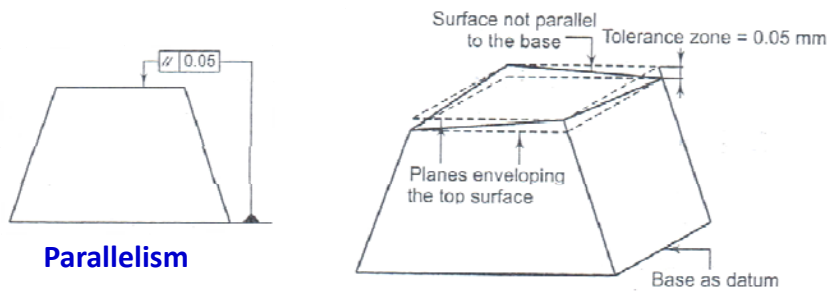


Profile of line

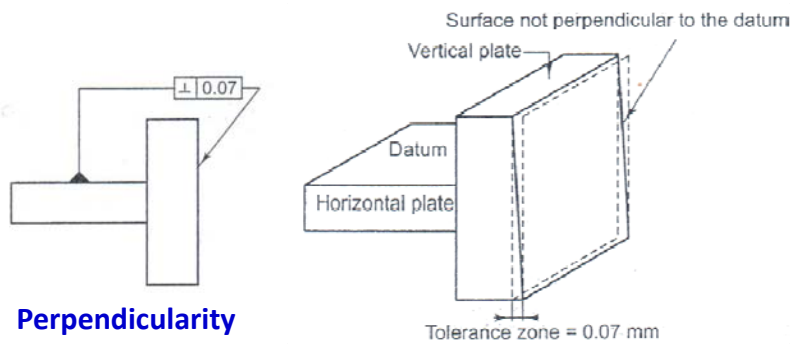


Profile of surface

Geometrical Tolerances

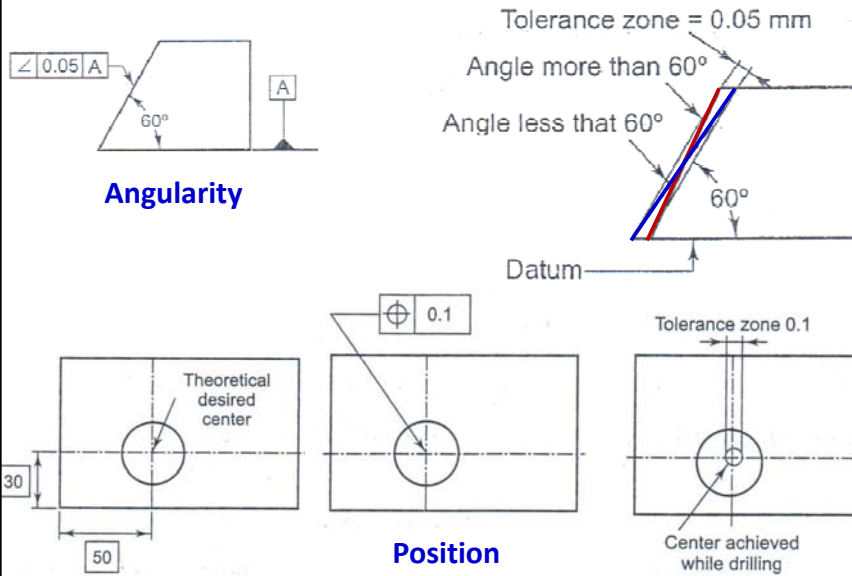


Parallelism



Perpendicularity

Geometrical Tolerances



Geometrical Tolerances

