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The Tangent Plane Applied to Perpendicularity[1]

Definition

A tangent plane is a plane that contacts the high points of the specified feature surface.

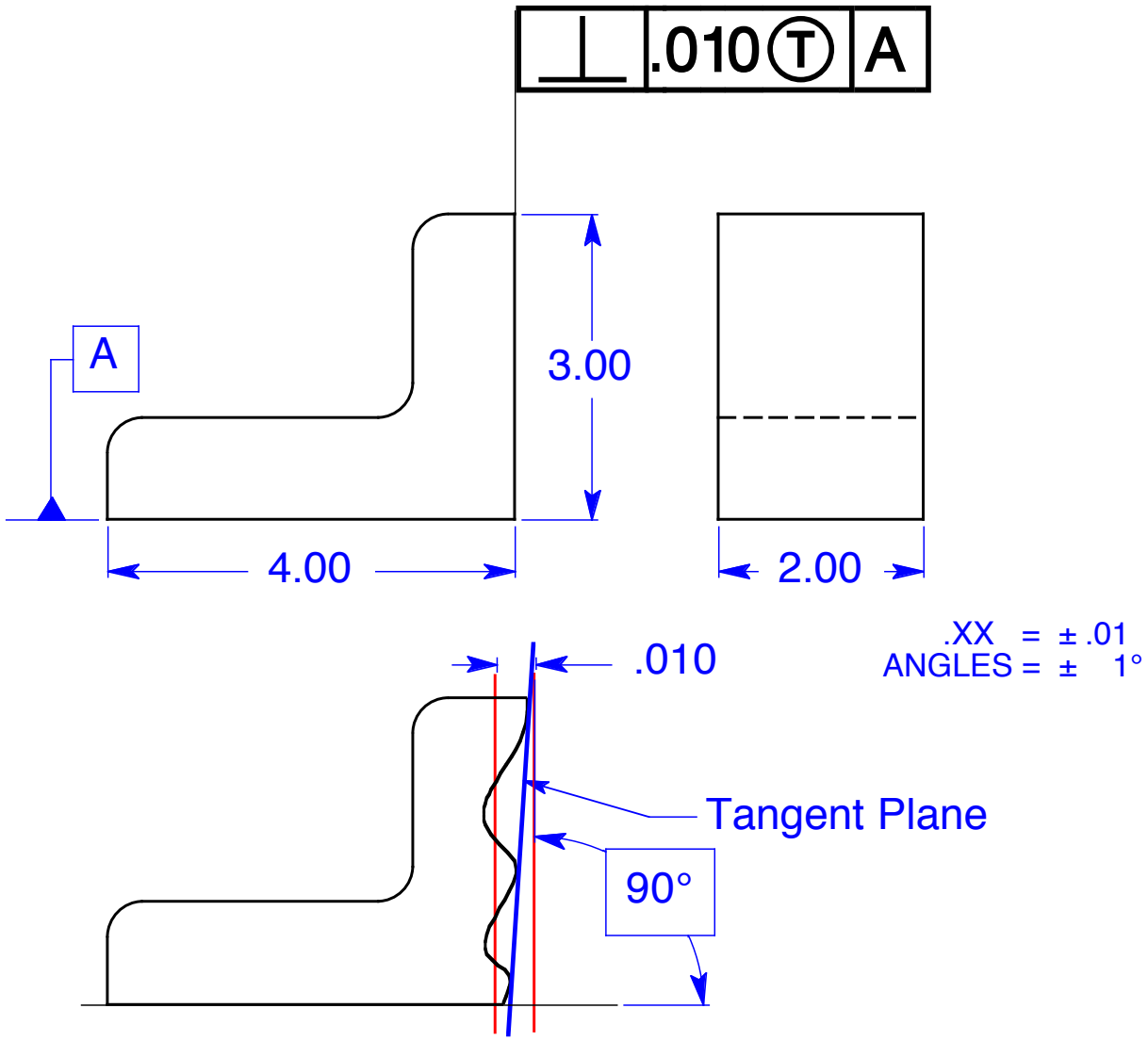

Figure 6-3 The tangent plane symbol, the circle T, is specified in the feature control frame following the tolerance.

[1]Cogorno, Gene R., ***Geometric Dimensioning and Tolerancing for Mechanical Design, Second Edition***, McGraw-Hill, New York, 2011, p. 91.

The tangent plane symbol, the circle T, in the feature control frame, specifies that the tolerance applies to a precision plane that contacts the high points of the surface.
Even though the surface irregularities exceed the perpendicularity tolerance, if a precision plane contacting the high points of a surface falls inside the specified tolerance zone, the surface is in tolerance. The surface irregularities in Fig. 6-3 exceed the perpendicularity tolerance, but the tangent plane lies inside the tolerance zone, consequently the feature is within tolerance. The circle T modifier maintains the tighter orientation tolerance, but allows the flatness to be controlled by Rule #1. The tangent plane symbol may be applied to any orientation control of a planar surface. The tangent plane concept allows the acceptance of more parts and reduced costs.