

The projected tolerance zone is typically used above threaded holes. The minimum height of the zone is specified on the drawing. This height is the maximum thickness or area above the threaded hole(s) that the part which is screwed into the threaded hole can occupy when parts are assembled. The following are two reasons for using a projected tolerance zone:

- Manufacturing will have a larger thread positional tolerance, but they will need to control the perpendicularity by calculating the maximum angle permitted of the tolerance size and length.
e.g. Using the drawing below: $\text{Arctan of } .015/.188 = 4.56^\circ (\pm 2.28^\circ)$.
- Inspection typically measures the position of a threaded hole by inserting the largest possible gage pin into the hole and then measuring the pin above the hole. The drawing tells inspection how high up the pin to measure.

Specifying an Ⓜ Modifier Versus RFS

Specifying an Ⓜ modifier in a feature control frame for a threaded hole rather than specifying RFS, is the way it is done because there is no way inspection can measure the position of the axis for all possible sizes of the pitch cylinder, particularly with a small thread size. Also using the Ⓜ modifier will permit the use of functional gaging.

Projected Tolerance Zone Example

Choose thread diameter size such as .500 as shown below.

Choose a positional tolerance size for the clearance hole such as .010 as shown below.

Choose a positional tolerance size for the threaded hole such as .015 as shown below.

Calculate the maximum material condition size of the clearance hole. $.500 + .015 + .010 = .525$

There are two ways to specify a projected tolerance zone. The best way is to draw a chain line to show direction and the minimum length of the tolerance zone as shown on the left. The other way is to show the minimum length within the feature control frame as shown on the right.

