

True Position Locator Gauge Demonstration

True Position Locators are commonly accepted in industry as the best way to measure the location of the pitch diameter of a threaded hole. Unfortunately, it has been our experience that these gauges are not nearly as accurate as they are believed to be.

In the FAQ section of their website, LaVeZZi has the following: “How repeatable are your locators? Tests at LaVeZZi and a third-party testing lab have proven that the straight Tru-Pos Locators are repeatable within .0001"..." That may well be true, but repeatability does not prove accuracy.

They also have this explanation: “When the locator is seated, the upward force exerted against the thread flanks causes the locator to position itself on the centerline of the tapped hole.” Conceptually, this is great, but in practice, it doesn’t work out so well.

Testing

This testing was carried out with a LaVeZZi #12-24 Tru-Pos gauge (not tapered). When seating the locator against the shoulder, it was only finger-tightened. The measurements were taken on a Zeiss Micura with a VastXT head, with the probing force turned down to 15mN (instead of the usual 200 mN).

First, the location of the locator was measured twice while seated against the shoulder, and then it was measured three times while not seated against the shoulder, loosening approximately a quarter turn between each measurement. Then the process was repeated, rotating the setup on the CMM by 180°.

The idea behind measuring with the locator not seated is that gravity pulls the locator down against the flanks the same way they claim seating it against the shoulder pulls it up against the flanks. Gravity is obviously not as strong a force, which is why such a low probing force had to be used. Close attention was given to the diameter results measured on the locator to monitor how much the force of the probe was causing it to move. All measured diameters were in a range of .00075”, with only one result outside a range of .00034”.

Results

For the two setup orientations, the three loosened locations fell inside a diameter of .00073” and .00047”. In both cases, the loosened locations differed from the seated locations an average of .0031”. For the two orientations, the shift was in opposite directions in relation to the CMM, as expected. It moved with the orientation of the setup, ruling out errors from inconsistencies in the way the CMM probed a loosened gauge in different directions.

Conclusion

While the repeatability of the results with the locator not seated was less than ideal, this was to be expected, and the trends observed were still strong enough to support the conclusion that seating the

locator does *not* accurately position the locator on the centerline of the flanks. There are other forces at play when the locator is snugged up that have significant adverse effects on the results.