

Influence of form deviation to diameter measurement of cylindrical master

Wednesday, May 20, 2015 3:45 PM (15 minutes)

Cylindrical masters such as plug gauges and ring gauges are commonly used in manufacturing process as the physical diameter standard. Diameter of the cylinder is defined in the JIS B 7420 by means of distance between two opposite edges measured by the length measuring instrument. The standard method described that length shall be measured two directions perpendicular each other in the cross section in multiple layers. And the diameter is calculated from the arithmetic mean between all measured values. However, the mean diameter does not represent the diameter when it is used for working gauge inspection because form deviations have an effect to gage wear. This paper investigates the influence of form deviation of the cylindrical masters by using roundness tester, universal length measuring machine (ULM) and coordinate measuring machine (CMM). The results show the form deviation effect to the diameter of cylindrical masters and error should be included in uncertainty of measurement of mean diameter.

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Session Classification: Instrumentation, Metrology and Standards

Track Classification: Instrumentation, Metrology and Standards