FACULTY OF ENGINEERING Design and production engineering department

Credit hour system Metrology lab II

Assignment on

Thread Measurement



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Example No. 1 Derive an expression to calculate included angle using wires.

Example No. 2 Derive an expression to calculate the effective diameter using three wires.

Two wires of 1.366 and 1.943 mm diameters were used to check the flank angles of a 24 mm metric thread of 3 mm pitch. The oversize readings were 24.320 and 26.058 mm respectively. Find out the included angle of the thread.

Find out the simple effective diameter of M16-2 screw if the reading under 3 wires placed in the thread is 14.319 mm. The wires having 1.35 mm diameter.

Solution

The following readings were also taken when measuring the effective diameter of the screw whose pitch is 4:

- micrometer reading over 14.372 mm standard cylinder is 22.001 mm.
- micrometer reading over screw with 1.7485 mm wires in position is 13.427 mm.
- ➢ Find the simple effective diameter of the screw.

<u>Solution</u>

The following readings were also taken when measuring the effective diameter of the screw whose pitch is 4:

- > micrometer reading over 15.003mm standard cylinder is 25.0033mm.
- ➤ three wire with nominal size 3.2 where used.
- The wire size was measured using micrometer and the reading were 13.2007, 13.2002 and 13.200 mm.
- The readings of the thread were taken while three wire in position were 64.0274, 64.027 and 64.027 mm.
- > Find the simple effective diameter of the screw.

<u>Solution</u>

Simple effective diameter (De) = {T + (P/2) $\cot\theta$ - d ($\csc\theta$ -1)} + c -e

Device calibration (find zero setting)

Reading of standard cylinder on machine = 25.0033 mm Standard size of cylinder = 15.003 mm

Calculate the actual size of wire

Nominal size of wire = 3.2 mm The initial reading (zero setting) =10.0003 mm Readings over the wires are 13.2007 13.2002 13.2000 mm Average size = mm

<u>Calculate the Oversize reading average</u> Screw reading with the wire in place are 64.0274, 64.027 and 64.027 Average reading =

Eliminating zero setting y=64.0271 - 10.0003 = 54.0268 mm

<u>Calculate the effective diameter of the thread</u>

Effective diameter (De) = T + (p/2) $\cot \theta$ - d ($\csc \theta$ - 1)