1.SCREW GAUGE

AIM: Use of screw gauge to measure diameter of a given wire.

APPARATUS REQUIRED : Wire, screw gauge.

PRINCIPLE:

The least count of screw gauge is the minimum distance that can be measured by using it. It is equal to the distance through which the tip of the screw advances for one division of rotation of the head scale.

Least count L.C = $\frac{Pitch}{No.of\ divisions\ on\ head\ scale}$

L.C of the screw gauge is 0.01 mm.

Pitch of the screw gauge is the distance through which the tip of the screw advances for one complete rotation of the head scale.

The measured value using screw gauge is given by

Total reading = PSR + (Corrected HSR x LC)

PSR =Pitch scale reading (observed reading on the pitch scale)

HSR =Head scale reading (the division on head scale where reference line coincides)

Zero Error -If zero of head scale coincides with the reference line, then there is no zero error. If zero on the head scale is above the reference line, zero correction is positive, and if zero is below the reference line, zero correction is negative.

PROCEDURE:

1. Pitch and LC of screw gauge is determined.
2. To find zero correction, the head scale is completely rotated till the tips of the studs are gently touching each other. If zero of the head scale coincides with the reference line,

then there is no zero error. If zero on the head scale is above the reference line, zero correction is positive, and if zero is below the reference line, zero correction is negative.

3. The given wire is gripped between the studs of the screw gauge .
4. PSR, HSR readings are taken.
   Corrected HSR = observed HSR + zero correction
   Diameter of wire = PSR + (Corrected HSR x LC)
5. The experiment is repeated for different positions of the wire. The mean diameter and radius is found out.

RESULT:

Diameter of the wire=.....m

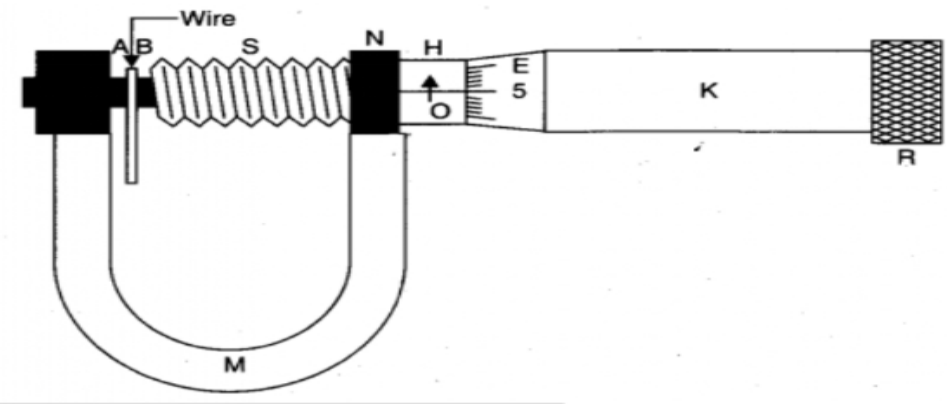
PRECAUTIONS:

1. Ratchet arrangement in screw gauge must be utilized to avoid undue pressure on the wire as this may change the diameter.
2. Move the screw in one direction else the screw may develop "play".
3. Screw should move freely without friction.
4. Reading should be taken at least at four different points along the length of the wire.
5. View all the reading keeping the eye perpendicular to the scale to avoid error due to parallax.

SOURCES OF ERROR:

1. The wire may not be of uniform cross-section.
2. Error due to backlash though can be minimized but cannot be completely eliminated.

Diagram



Observation:

Magnitude of one pitch scale division = 1 mm

Distance moved for 4 rotations S = 4 mm

Pitch = $\frac{S}{4}=\frac{4\ mm}{4}$ = 1 mm

Least Count (LC) = $\frac{Pitch}{No.of\ divisions\ on\ the\ head\ scale} = \frac{1mm}{100}$ = 0.01mm

Zero coincidence = ...

Zero correction Z = ...

Diameter of the wire					
Sl No	PSR (mm)	Observed HSR	Corrected HSR (HSR+Z)	Corrected HSR X LC (mm)	Total Reading = PSR + (Corrected HSR x LC) (mm)
1					$d_1 =$
2					$d_2 =$
3					$d_3 =$
4					$d_4 =$
5					$d_5 =$
6					$d_6 =$

Calculation:

Mean diameter of the wire,d=$\frac{d_1+d_2+d_3+d_4+d_5+d_6}{6}$.....mm