

# Experiment NO-2

To determine area of cross section of a given wire by using micrometer screw guage.

## Apparatus:

Micrometer screw guage, piece of wire.

## Procedure:

- I found out the value of smallest scale division on the linear scale and total no. of divisions on the circular scale (vernier scale)
- I noted the pitch of screw and determined the least count of screw guage by using the formula

$$LC = \frac{\text{Pitch of screw}}{\text{No. of divisions on circular scale}}$$

- I determined the zero error of screw guage by bringing the two studs together.
- I placed the wire between two studs A and B and turned the screw.
- I read the linear scale reading "R" and noted the circular scale reading (N) facing the base line (L).
- I applied the zero correction and calculated the correct diameter.
- I calculated the area of cross-section of wire by using formula  $\therefore A = \pi r^2$

## Result:

Area of cross section of given wire = 1.42 sq. mm

$$= \frac{h}{N} = \frac{1}{100} = 0.01 \text{ mm}$$

### ❖ Zero Correction:

Zero error (i) 0 mm (ii) 0 mm (iii) 0 mm

Mean zero error = 0 mm

Zero correction =  $\pm 0$  mm



No. of Obs.	Linear Scale Reading R (mm)	No. of circular scale div. coinciding with index line "n"	Fraction to be added $y = n \times \text{L.C.}$ (mm)	Diameter	
				Observed $D = R + (n \times \text{L.C.})$ (mm)	Corrected $(D \pm \text{Z.C.})$ (mm)
1	0	41	0.41	0.41	0.41
2	0	41	0.41	0.41	0.41
3	0	41	0.41	0.41	0.41
4	0	40	0.40	0.40	0.40

$$\text{Mean Diameter} = \frac{0.41+0.41+0.41+0.40}{4} \text{ mm} = 0.408 \text{ mm}$$

### CALCULATIONS:

Mean diameter of the wire =  $D = 0.408 \text{ mm}$

Radius of the wire =  $r = D/2 = \frac{0.408}{2} \text{ mm} = 0.204 \text{ mm}$

Area of cross-section of the wire =  $\pi r^2 = 3.1416 \times (0.204)^2 \text{ mm}^2 = 0.1307 \text{ mm}^2$

### Result:

Area of cross-section of the wire =  $0.1307 \text{ mm}^2$

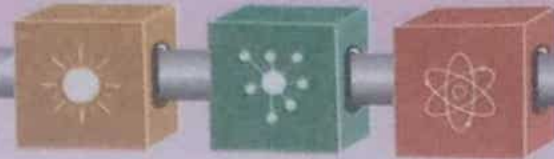
### PRECAUTIONS

- Do not press the screw too hard.
- Remove the kinks in the wire.
- The zero-correction should be applied.
- Always revolve the screw in the same direction to avoid back-lash error.
- Take two reading perpendicular to each other at each place on the wire.

### VIVA VOCE:

**Q:** What is meant by the pitch of a screw gauge?

**Ans:** The value of 1 smallest division on main scale is called pitch of screw gauge. Its value is 1mm.



**Q:** What is meant by least count?

**Ans:** The minimum measurement which can be made by the instrument is called its Least count.

**Q:** If pitch of the screw is 1 mm and the number of divisions on circular scale is 100 then find the least count of the screw gauge?

**Ans:** Least count =  $\frac{\text{Pitch of the screw}}{\text{No of divisions on the circular scale}}$

$$= \frac{h}{N} = \frac{1}{100} = 0.01\text{mm}$$

**Q:** What is the use of a screw gauge?

**Ans:** It can be used to measure the diameter of a thin wire or a small sphere,

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