

EXPERIMENT NO. 3

Aim: To find the diameter of a given wire using a screw gauge and hence calculate its volume.

Apparatus: Screw gauge, wire.

Theory:

$$\text{Pitch of the screw} = \frac{\text{Distance moved by the screw}}{\text{Number of complete rotations}}$$

$$\text{Least Count} = \frac{\text{Pitch}}{\text{Number of divisions on the circular scale}}$$

- Procedure:**
1. Find the pitch of the screw.
 2. Calculate the value of least count.
 3. Calculate the zero error if any.
 4. Hold the ball between the stud and the screw.
 5. Note the main scale reading (M.S.R.) *i.e.*, the main scale reading immediately before the edge of the circular scale.
 6. Find the circular scale division that coincides with reference line.
 7. Calculate the C.S.R.
 8. Find the observed reading by adding the M.S.R. and the C.S. R.
 9. Subtract the zero error if any from the observed reading to get the correct reading.
 10. Record more observations taking different positions of the object.
 11. Find out the mean measurement.
 12. Apply the formula to calculate the volume of the object.

Result: Volume of the given wire = cm³

Precautions :

1. The screw should always be turned by the cap
2. The screw should move freely without any friction
3. The zero error , if any, should be noted with proper sign .
4. The screw should always be moved in the same direction to avoid backlash error.
5. As far as possible , error due to parallax should be avoided.

Sources of error :

1. Backlash error affects the result considerably
2. The graduation on the scale may not be evenly marked.
3. The circular scale divisions may not be evenly marked.
4. The screw may have friction.

Observation and calculation :

Distance traveled by the screw in 5 rotations = mm
 Number of divisions on circular scale =

Pitch of the screw = $\frac{\text{Distance traveled by the screw in 5 rotations}}{5}$ = mm

Number of divisions on circular scale = 100

Least count = $\frac{\text{Pitch}}{\text{Number of divisions on the circular scale}}$ = mm

Zero of the circular scale is below /above the line of graduation

Circular division coinciding with the reference line =
 Zero error = div
 Zero Correction = div

Readings for the diameter:

Sr. No.	LSR (mm)	CSD (n)		CSR = n x L.C (mm)	d = LSR + CSR (mm)
		Observed	Corrected		
1					
2					
3					

Mean :

Diameter of the wire = cm
 Radius of the wire = cm .

Volume of the given wire = $\pi r^2 l = \dots\dots\dots\text{cm}^3$