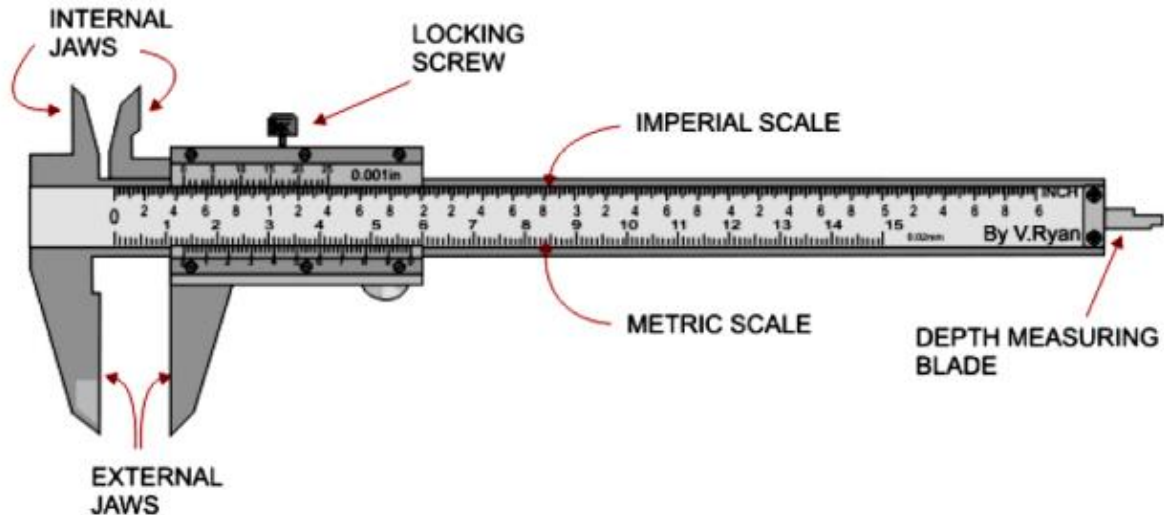


CALIBRATION OF VERNIER CALIPER USING SLIP GAUGE

Aim: To calibrate the given Vernier Caliper using Slip Gauge

Apparatus Required: 1. Surface Plate, 2. Vernier scale, 3. Slip Gauge.



Construction: The Vernier caliper consists of two scales: One is fixed while other is movable. The fixed scale called main scale is calibrated on L shaped frame and carries a fixed jaw. The movable scale called Vernier scale slides over the main scale and carries a movable jaw. In addition, an arrangement is provided to lock the sliding scale on the fixed main scale. For the precise setting of movable jaw, an adjustment screw is provided. The least count of Vernier caliper is 0.02mm

Principle: Vernier Caliper is the most commonly used instrument for measuring outer and inner diameters. It works on the principle of Vernier Scale which is some fixed units of length (e.g. 49mm) divided into 1 less or 1 more parts of the unit (e.g. 49mm are divided into 50 parts). The exact measurement with up to 0.02mm accuracy can be determined by the coinciding line between Main Scale and Vernier Scale.

$$\text{Total Reading} = \text{M.S.R} + \text{L.C} \times \text{V.C}$$

Procedure for Calibration

1. The measuring instrument is placed on the surface plate and set for zero
2. Clean the Vernier caliper fixed and movable jaws and slip gauges to be measured with cloth
3. Vernier is checked for zero error
4. Slip gauge is clamped between the jaws and the Vernier scale is tightened by screws
5. Main scale and Vernier scale coincidence are noted for 5 different slip gauges
6. Calculate the error and percentage error
7. Plot the graph between
 - (i) Slip gauge reading vs Total reading (Vernier caliper)
 - (ii) Slip gauge reading vs Error

Result

Thus the Vernier caliper was calibrated using slip gauges

Error range = _____ mm

Specification

Formulae: Least Count = 1 Main Scale Division – 1 Vernier Scale Division

Vernier Scale Reading = Vernier Scale Coincidence X Least Count

Total Reading = Main Scale Reading + Vernier Scale Reading

Error = Slip gauge reading - Verniercaliper Reading

$$\% \text{ Error} = \frac{\text{Error}}{\text{Actual reading}} \times 100$$

Tabular column:

Sl. No.	Slip Gauge Reading, mm	Verniercaliper Reading MSR+(VSD x LC), mm	Error	%Error
1				
2				
3				
4				
5				

1. Error = Slip gauge reading - Total reading = 1.8-1.8 = 0

2. % Error = (Slip gauge reading - Total reading) / Slip gauge reading = 1.8-1.8 / 1.8 = 0

Results :

Thus the VerniercaliperReading was calibrated using slip gauges.

Error range = 0 - 0.16 mm

Model Graphs:

