

Determination of Liquid Viscosity by Ostwald Viscometer

Practical 05 | Physical Pharmaceutics II

Aim

To determine Liquid Viscosity by Ostwald Viscometer, and interpret the recorded observations.

Principle

- For suitable Newtonian liquids in the same viscometer, flow time and density support a viscosity comparison at constant temperature.
- The property is obtained from a defined observable under controlled conditions.
- Replicate measurements, instrument checks and consistent units are needed before comparison.

Materials and Apparatus

- Ostwald viscometer, reference liquid, test liquid, timer and temperature control.
- Assigned test material and calibration or comparison material.
- The apparatus specified for this property, a balance or volumetric equipment where relevant, and a record sheet.

Method

1. Check that the assigned liquid is suitable for the comparison method and record temperature.
2. Measure the densities of the reference and test liquids or use the approved values.
3. Measure reference-liquid flow time between the stated marks.
4. Measure test-liquid flow time in the same viscometer at the same temperature.
5. Repeat readings and calculate the viscosity ratio from density and time.
6. Report viscosity with the reference value and controlled temperature.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Temperature	_____
Reference/test density	_____
Reference/test flow time	_____

Calculations and Interpretation

- $\eta_{\text{test}}/\eta_{\text{reference}} = (\rho_{\text{test}} \times t_{\text{test}})/(\rho_{\text{reference}} \times t_{\text{reference}})$.
- State the reference viscosity and temperature.

Worked Illustration

Illustration: $\eta_{\text{reference}} = 1.00 \text{ mPa s}$, $\rho_{\text{test}}/\rho_{\text{reference}} = 1.10$ and $t_{\text{test}}/t_{\text{reference}} = 1.50$ give $\eta_{\text{test}} = 1.65 \text{ mPa s}$.

The values in this illustration are for calculation practice.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Keep temperature and test conditions consistent across comparative readings.
- Record raw readings before rounding calculated values.
- Do not compare results obtained with different methods as if they were interchangeable.

Viva Questions

1. Why control the test conditions?

A change in conditions may alter the measured property independently of the intended variable.

2. Why retain replicate readings?

They show repeatability and help identify an anomalous measurement.

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