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Swelling Power of Bentonite

Experiment 10 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To assess bentonite swelling under the prescribed test conditions and report the correct volume basis.

Principle

Bentonite hydrates and expands in water. Swelling depends on mineral composition, particle handling, water quality and time. The monograph may specify a settled or swollen volume for a fixed mass rather than a normalised mL/g value; use the exact stated reporting basis.

Requirements

- Bentonite, prescribed water, balance and specified graduated cylinder.
- Timer and vibration-free standing area.

Procedure

1. Identify the method

Record the prescribed bentonite mass, cylinder capacity, water amount, addition sequence and reading time.

2. Disperse

Add small portions at the stated intervals to allow wetting. Do not dump a large dry lump into the water and call it a valid dispersion.

3. Stand

Keep under the prescribed conditions for the defined period. Avoid changing agitation or temperature during comparison.

4. Read

Read the stated swollen or settled volume at the defined endpoint. Distinguish material volume from the total liquid volume.

5. Report

Compare the specified volume result with the IP criterion supplied for the material. Calculate mL/g only if required or clearly label it as an additional derived value.

Observations and Record

Item	Condition / measurement	Record
Material / water	____ g / ____ mL	_____
Time / cylinder	_____	_____
Swollen volume	Defined endpoint	____ mL

Worked Example

The numbers below are illustrative; enter your own observations in the record.

- Illustrative measurement: 2.0 g bentonite occupies 28 mL under the stated method. Report 28 mL for 2.0 g when that is the prescribed basis.
- An additional derived swelling value is 28 ÷ 2.0 = 14 mL/g. It must not replace a criterion expressed as volume for a fixed portion without explanation.

Result

Swelling power = ____ mL for ____ g at ____ time, under the prescribed conditions. Comparison with the specified criterion: ____.

Precautions

- Use the stated water quality, addition sequence and standing time.
- A trapped dry clump is not a valid fully hydrated portion.
- Read the defined volume consistently and avoid vibration.

Viva Questions and Answers

1. Why add gradually?

It supports reproducible wetting and reduces dry lumps.

2. Why state the mass basis?

Volume for a fixed portion and volume per gram are different report formats.

3. Does swelling alone establish all bentonite quality attributes?

No; other identity and purity tests may also be required.

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