Loss on Drying (LOD)

USP sodium chloride Loss on Drying is performed by drying a 1.000 g sample at 105 °C for 2 hours and calculating the percent weight loss; the monograph limit is not more than 0.5% loss.

Loss on Drying Overview

What the test measures Loss on Drying determines the amount of volatile matter (usually water) driven off under specified conditions; for Sodium Chloride the USP directs drying at **105 °C for 2 hours** and reports the result as percent weight loss.

Step by Step Procedure for the Chemistry Lab

Preparation

1. **Equipment and materials**
   - Oven capable of maintaining **105 °C ±2 °C**, calibrated.
   - **Glass-stoppered shallow weighing bottles** (dried under the same conditions).
   - Analytical balance (readability 0.1 mg or better).
   - Desiccator with fresh desiccant.
   - Crucible tongs, spatula, gloves, lab coat, eye protection.
2. **Sample preparation**
   - If crystals are large, **crush quickly** to ~2 mm particle size. Use a representative portion.

Weighing and Drying

3. **Tare and load**
   - Dry the empty glass-stoppered weighing bottle for 30 minutes under the same drying conditions, cool in desiccator, and tare. Place **1.000 g** of the test sample into the bottle and record the initial mass m0.
4. **Distribute sample**
   - Gently side-shake to spread the sample to a depth of about **5 mm** (not more than 10 mm for bulky materials).
5. **Drying**
   - Remove the stopper, place the bottle in the oven, and dry at **105 °C for 2 hours** (USP tolerance ±2 °C). After drying, promptly replace the stopper while still in the oven chamber, admit dry air, then transfer the closed bottle to the desiccator to cool to room temperature.
6. **Final weighing**

- When cooled, weigh the bottle and dried sample to obtain final mass mf. Repeat drying and weighing if required by lab SOP until constant weight is achieved per your lab’s repeatability criteria.

Calculation

7. **Percent loss on drying**
   - Compute percent loss as:

$$\text{Loss on Drying (\%)} = \frac{m_0 - m_f}{m_0} \times 100$$

- For Sodium Chloride the USP acceptance criterion is **not more than 0.5%** (on a 1.000 g sample).

Tips and Practical Notes

- **Use duplicate or triplicate determinations** to confirm reproducibility.
- **Oven calibration** and temperature uniformity checks are essential; the USP allows ±2 °C around the stated temperature.
- **Particle size** affects drying rate; reduce large crystals to ~2 mm for representative results.
- If the substance melts below the drying temperature, follow the USP guidance to pre-heat at a lower temperature then dry at the specified temperature.

Cautions and Safety

- **Handle hot glassware with tongs and heat-resistant gloves.**
- Avoid inhalation of fine salt dust when crushing; use local exhaust or a fume hood if needed.
- Ensure the desiccant is fresh and the desiccator is dry to prevent re-absorption of moisture.

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