Solids, residue on evaporation at 105°C, dissolved, gravimetric

Parameter and Code:
Solids, residue at 105°C, dissolved, I-1749-85 (mg/L): 00515

1. Application

The residue-on-evaporation method is applicable to all water regardless of concentration, provided that the residue layer in the evaporating dish is kept sufficiently thin.

2. Summary of method

2.1 A volume of filtered sample that will yield less than 200 mg residue is evaporated just to dryness on a steam bath. The residue is dried at 105°C for 2.0 h, cooled in a desiccator, and immediately weighed.

2.2 The weight of the residue is limited to 200 mg to ensure subjection of all the residue to the full effects of drying at 105°C. Voluminous residues will often seal over during the evaporation process and entrap pockets of water that will not be completely vaporized during the drying process. Massive residues also release their water of crystallization more slowly than do thin films of residue. The chemical composition of the sample has a marked effect on the dissolved-solids value obtained, but the percentage of error incurred for any given chemical type of water is independent of the total concentration if the residue film is kept thin.

2.3 Because many of the salts in the residue are hygroscopic, an efficient desiccant must be used. Silica gel (indicating), anyhydrous $Mg(ClO_4)_2$ or $CaSO_4$, and $Mg(ClO_4)_2 \cdot 3H_2O$ are satisfactory and recommended. $CaCl_2$ is not suitable. Under no circumstances should the dried residues be allowed to stand for long periods of time before weighing.

3. Interferences

There are no known interferences to this method.

4. Apparatus

4.1 *Desiccator,* charged with indicating silica gel or other efficient desiccant.

4.2 *Oven,* 105°C, uniform temperature throughout.

4.3 *Platinum evaporating dishes,* 75- to 125-mL capacity, weighing less than 50g, or zirconium dishes. Platinum or zirconium is recommended for precise work because the change in weight of glass or porcelain dishes may introduce appreciable error into the determination.

4.4 *Steam bath.*

5. Reagents

None required.

6. Procedure

6.1 Pipet a volume of filtered sample containing 10 to 200 mg dissolved solids (500 mL max) into a tared platinum dish.

6.2 Evaporate the sample just to dryness on a steam bath.

6.3 Dry in an oven at 105°C for 2.0 h.

6.4 Cool in a desiccator and immediately weigh. Record the weight to the nearest 0.1 mg.

7. Calculations

$$\text{Dissolved solids (mg/L)} = \frac{1{,}000}{\text{mL sample}} \times \text{mg residue}$$

8. Report

Report solids, residue on evaporation at 105°C, dissolved (00515), concentrations as follows: less than 1,000 mg/L, whole numbers; 1,000 mg/L and above, three significant figures.

9. Precision

It is estimated that the percent relative standard deviation of this method is greater than 8 percent at 59 mg/L and greater than 3 percent at 1760 mg/L.

Reference

American Public Health Association and others, 1980, Standard methods for the examination of water and wastewater [15th ed.]: Washington, D.C., p. 92-4.