

RESIDUE ON EVAPORATION OF ACETONE

UOP Method 810-84

SCOPE

This method is for determining the residue on evaporation of acetone at 100 C. The lower limit of detection is 10 mass-ppm.

OUTLINE OF METHOD

A 500-mL volume of the acetone sample is added, in several aliquots, to a weighed Pyrex dish and evaporated at 100 C to dryness. The dish is then heated in an oven at 100 C for thirty minutes, cooled in a desiccator and weighed. The mass-ppm residue is calculated from the mass of the acetone sample and the mass of residue.

APPARATUS

Balance, readability 0.1 mg

Desiccator

Dish, evaporating, Pyrex, 195-mL, Sargent-Welch Scientific Co., Cat. No. S-25595-G, or equivalent

Hot plate

Oven, gravity-convection, Sargent-Welch Scientific Co., Cat. No. S-63995, or equivalent

Pipets, 50- and 100-mL

Transite, 15-mm thick, to fit the top of the hot plate

PROCEDURE

Prepare the evaporating dish by heating in an oven at 100 ± 1 C for 30 minutes. Remove the dish from the oven and place it in a desiccator to cool. When cool remove the dish from the desiccator and weigh to 0.1 mg. Add 150 mL of the acetone sample into the dish with a pipet.

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Place a piece of transite on the hot plate, which should be located in a hood or well vented area, and adjust the surface temperature to 100 ± 5 C. Place the dish containing the sample on the hot plate and when most of the acetone has evaporated add, by pipet, additional sample in several aliquots until a total of 500 mL has been added.

When the sample has evaporated, place the dish containing any residue in an oven at 100 ± 1 C for 30 minutes. Remove the dish from the oven and place it in a desiccator to cool. The cooling interval here should be the same as that used before weighing the empty dish. Remove the dish from the desiccator and weigh to 0.1 mg.

The relative density of the sample can be determined using ASTM D 4052 or other accepted techniques.

CALCULATION

Calculate the residue on evaporation at 100 C for acetone as follows:

$$\text{Residue on evaporation, mass-ppm} = 10^6 \frac{M_2 - M_1}{VD}$$

where:

- D** = relative density of sample at the sampling temperature
- M₁** = mass of empty dish, g
- M₂** = mass of dish and residue, g
- V** = volume of acetone sample, mL
- 10⁶** = conversion factor to calculate mass-ppm

Report data to the nearest ppm.

PRECISION

Based on 6 replicate determinations, the estimated standard deviation (esd) for residue at the 50 mass-ppm level was calculated to be 0.9 mass-ppm. Duplicate results by the same operator should not differ by more than 3.3 mass-ppm (95% probability) at the stated level.

TIME FOR ANALYSIS

The elapsed time for one analysis is 3.0 hours. The labor requirement is 0.5 hour.

SUGGESTED SUPPLIER

Sargent-Welch Scientific Co., 7300 N. Linder Ave., Skokie, IL 60077