METHOD #: 160.1   Approved for NPDES (Issued 1971)

TITLE: Residue, Filterable (Gravimetric, Dried at 180°C)

ANALYTE: Residue, Filterable

INSTRUMENTATION: Drying Oven

STORET No.   70300

1.0   Scope and Application

   1.1   This method is applicable to drinking, surface, and saline waters, domestic and
           industrial wastes.
   1.2   The practical range of the determination is 10 mg/L to 20,000 mg/L

2.0   Summary of Method

   2.1   A well-mixed sample is filtered through a standard glass fiber filter. The
           filtrate is evaporated and dried to constant weight at 180°C.
   2.2   If Residue, Non-Filterable is being determined, the filtrate from that method
           may be used for Residue, Filterable.

3.0   Definitions

   3.1   Filterable residue is defined as those solids capable of passing through a glass
           fiber filter and dried to constant weight at 180°C.

4.0   Sample Handling and Preservation

   4.1   Preservation of the sample is not practical; analysis should begin as possible.
           Refrigeration or icing to 4°C, to minimize micro-biological decomposition of
           solids, is recommended.

5.0   Interferences

   5.1   Highly mineralized waters containing significant concentrations of calcium,
           magnesium, chloride and/or sulfate may be hygroscopic and will require
           prolonged drying, desiccation and rapid weighing.
   5.2   Samples containing high concentrations of bicarbonate will require careful and
           possibly prolonged drying at 180°C to insure that all the bicarbonate is
           converted to carbonate.
   5.3   Too much residue in the evaporating dish will crust over and entrap water
           that will not be driven off during drying. Total residue should be limited to
           about 200 mg.

6.0   Apparatus

6.1 Glass fiber filter discs, 4.7 cm or 2.1 cm, without organic binder, Reeve Angel type 934-AH, Gelman type A/E, or equivalent
6.2 Filter holder, membrane filter funnel or Gooch crucible adapter
6.3 Suction flask, 500 mL
6.4 Gooch crucibles, 25 mL (if 2.1 cm filter is used)
6.5 Evaporating dishes, porcelain, 100 mL volume. (Vycor or platinum dishes may be substituted)
6.6 Steam bath
6.7 Drying oven, 180°C ± 2°C
6.8 Desiccator
6.9 Analytical balance, capable of weighing to 0.1 mg

7.0 Procedure

7.1 Preparation of glass fiber filter disc: Place the disc on the membrane filter apparatus or insert into bottom of a suitable Gooch crucible. While vacuum is applied, wash the disc with three successive 20 mL volumes of distilled water. Remove all traces of water by continuing to apply vacuum after water has passed through. Discard washings.
7.2 Preparation of evaporating dishes: If Volatile Residue is also to be measured heat the clean dish to 550 ± 50°C for one hour in a muffle furnace. If only Filterable Residue is to be measured heat the clean dish to 180 ± 2°C for one hour. Cool in desiccator and store until needed. Weigh immediately before use.
7.3 Assemble the filtering apparatus and begin suction. Shake the sample vigorously and rapidly transfer 100 mL to the funnel by means of a 100 mL graduated cylinder. If total filterable residue is low, a larger volume may be filtered.
7.4 Filter the sample through the glass fiber filter, rinse with three 10 mL portions of distilled water and continue to apply vacuum for about 3 minutes after filtration is complete to remove as much water as possible.
7.5 Transfer 100 mL (or a larger volume) of the filtrate to a weighed evaporating dish and evaporate to dryness on a steam bath.
7.6 Dry the evaporated sample for at least one hour at 180 plus or minus 2°C. Cool in a desiccator and weigh. Repeat the drying cycle until a constant weight is obtained or until weight loss is less than 0.5 mg.

8.0 Calculation

8.1 Calculate filterable residue as follows:

$$\text{Filterable residue, mg/L} = \frac{(A - B) \times 1,000}{C}$$

where:

A = weight of dried residue + dish in mg
B = weight of dish in mg
C = volume of sample used in mL

9.0   Precision and Accuracy

      9.1   Precision and accuracy are not available at this time.

Bibliography

1.   Standard Methods for the Examination of Water and Wastewater, 14th Edition, p 92, Method 208B, (1975).