

Total Suspended Solids Procedure, Mass Balance (Dried at 103-105°C)

1.0 Summary of Method

A well-mixed sample is filtered through a standard GF/F glass fiber filter, and the residue retained on the filter is dried to constant weight at 103-105°C.

2.0 Definitions

Total Suspended Solids is defined as those solids which are retained by a glass fiber filter and dried to constant weight at 103-105°C.

3.0 Sample Handling and Preservation

3.1 Non-representative particulates such as leaves, sticks, and paint chips should be excluded from the sample if it is determined that their inclusion is not desired in the final result.

3.2 Preservation of the sample is not practical; analysis should begin as soon as possible. Refrigeration or icing to 4°C, to minimize microbiological decomposition of solids, is required. The maximum holding time for sample is 7 days.

4.0 Interferences

4.1 Filtration apparatus, filter material, prewashing, postwashing, and drying temperature are specified because these variables have been shown to affect the results.

5.0 Apparatus

5.1.1 Glass microfiber filters discs, 47 mm, without organic binder, Whatman type GF/F (0.7 m).

5.1.2 Disposable aluminum dishes

5.1.3 Tweezers

5.1.4 Suction flask, 1000 mL

5.1.5 47 mm glass microanalysis filter holder (funnel, clamp, and base)

5.1.6 Magnetic stir plate with stir bar and stir bar retriever

5.1.7 Drying oven for operation at 103-105°C

5.1.8 Desiccator

5.1.9 Analytical balance, capable of weighing to 0.1 mg

5.1.10 Milli-Q reagent grade water (ASTM Type I water), Millipore Corp, Bedford, MA

6.0 Procedure for Total Suspended Solids

6.1 Preparation of the glass fiber filter disk: Insert the filter disk onto the base and clamp on funnel. While vacuum is applied, wash the disk with three successive 20 mL volumes of Milli-Q water. Remove all traces of water by continuing to apply vacuum after water has passed through. Dry in a oven at 103-105°C for one hour in aluminum dish. When needed, remove dish from the oven, desiccate, and weigh in dish.

6.2 Re-dry and re-weigh filter until weight change is less than 4% of previous weight or 0.5 mg.

6.3 Select a sample volume (max. of 200 mL) that will yield no more than 200 mg of total suspended solids.

6.4 Place the filter on the base and clamp on funnel and apply vacuum. Wet the filter with a small volume of Milli-Q water to seal the filter against the base.

6.5 Stir sample continuously while sub-sampling and quantitatively transfer the sample to the filter using a 100 mL graduated cylinder. Remove all traces of water by continuing to apply vacuum after sample has passed through.

6.6 Rinse the graduated cylinder onto the filter with 3, 20 mL portions of Milli-Q water. Remove all traces of water by continuing to apply vacuum after water has passed through.

6.7 Carefully remove the filter from the base. Dry at least one hour at 103-105°C. Cool in a desiccator and weigh.

6.8 Re-dry and re-weigh filter until weight change is less than 4% of previous weight or 0.5 mg.

7.0 Calculation of Total Suspended Solids

Calculate Total Suspended Solids as follows:

$$\text{Total Suspended Solids, mg/L} = (A-B) \times 1,000/C$$

Where: *A* = weight of filter and dish + residue in mg

B = weight of filter and dish in mg

C = volume of sample filtered in mL

8.0 Quality Assurance/ Quality Control

8.1 Glassware Cleaning Procedure

All glassware will be cleaned in an Alconox solution, triple rinsed with both tap water and Milli-Q water, dried in a 100^oF oven, then wrapped in aluminum foil.

8.2 One laboratory blank will be analyzed with each storm event. Follow the TSS procedure substituting MQ water for the “sample” when filtering.

8.3 In order to determine an appropriate sample size that will yield at least 2 mg of TSS residue, 100-200 mL will be tested prior to splitting each sample. If 2 mg are not captured using that maximum volume of 200 mL, there is not sufficient TSS in the runoff and the sample will not be processed for data.

8.4 Each one liter sample will be split into 4-5 smaller samples for quality assurance/ quality control purposes in the laboratory. Each split sample will be analyzed following the TSS procedure.

8.5 One duplicate sample will be collected per storm event and analyzed following the TSS procedure.

8.6 A balance check will be performed prior to beginning the TSS procedure . Known weights will be used to verify the balance is working properly.

9.0 Data Calculations and Reporting Units

9.1 Calculate the sample results according to Section 7 of this method.

9.2 Report sample results in concentration units of milligram per liter (mg/L) as total suspended solids. Report TSS concentrations that are less than 100 mg/L to 2 significant figures, and TSS concentrations that are greater than or equal to 100 mg/L to 3 significant figures.

10.0 References

10.1 Methods for the Chemical Analysis of Water and Wastewater, U.S.

Environmental Protection Agency, EPA 600/4-79-020, p. 160.2, (1979).

10.2 Standard Methods for the Examination of Water and Wastewater, 16th Edition, p. 96, Method 209C. (1985).