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Standard Test Methods for Determining Sediment Concentration in Water Samples[1]

This standard is issued under the fixed designation D3977; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

ε[1] NOTE—Editorial corrections made to Table 1 in January 2014.

1. Scope

1.1 These test methods cover the determination of sediment concentrations in water and wastewater samples collected from lakes, reservoirs, ponds, streams, and other water bodies. In lakes and other quiescent-water bodies, concentrations of sediment in samples are nearly equal to concentrations at sampling points; in most instances, sample concentrations are not strongly influenced by collection techniques. In rivers and other flowing-water bodies, concentrations of sediment in samples depend upon the manner in which the samples are collected. Concentrations in isokinetically-collected samples can be multiplied by water discharges to obtain sediment discharges in the vicinity of the sampling points.

1.2 The procedures given in these test methods are used by the Agricultural Research Service, Geological Survey, National Resources Conservation Service, Bureau of Reclamation, and other agencies responsible for studying water bodies. These test methods are adapted from a laboratory-procedure manual[2] and a quality-assurance plan.[3]

1.3 These test methods include:

	Sections
Test Method A—Evaporation	8 to 13
Test Method B—Filtration	14 to 19
Test Method C—Wet-sieving-filtration	20 to 25

1.4 Test Method A can be used only on sediments that settle within the allotted storage time of the samples which usually ranges from a few days to a few weeks. A correction factor must be applied if dissolved-solids concentration exceeds about 10 % of the sediment concentration.

1.5 Test Method B can be used only on samples containing sand concentrations less than about 10 000 ppm and clay concentrations less than about 200 ppm. The sediment need not be settleable because filters are used to separate water from the sediment. Correction factors for dissolved solids are not required.

1.6 Test Method C can be used if two concentration values are required: one for sand-size particles and one for the combination of silt and clay-size particles. The silt-clay fraction need not be settleable.

1.7 These test methods must not be confused with turbidity measurements discussed in Test Method D1889. Turbidity is the optical property of a sample that causes light rays to be scattered and absorbed; it is not an accurate measure of the mass or concentration of sediment in the sample.

1.8 These test methods contain some procedures similar to those in Test Methods D1888 which pertains to measuring particulate and dissolved matter in water.

1.9 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.10 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[4]

D1129 Terminology Relating to Water

D1193 Specification for Reagent Water

D1888 Methods Of Test for Particulate and Dissolved Matter in Water (Withdrawn 1989)[5]

D1889 Test Method for Turbidity of Water (Withdrawn 2007)[5]

D2777 Practice for Determination of Precision and Bias of

[1] These test methods are under the jurisdiction of ASTM Committee D19 on Water and are the direct responsibility of Subcommittee D19.07 on Sediments, Geomorphology, and Open-Channel Flow.

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[2] Guy, H. P., "Laboratory Theory and Methods for Sediment Analysis," *Techniques of Water Resources Investigations*, U.S. Geological Survey, Book 5, Chapter C1, 1941.

[3] Matthes, W. J., Jr., Sholar, C., J., and George, J. R., "Quality-Assurance Plan for the Analysis of Fluvial Sediment," *U.S. Geological Survey Open File Report*, Vol 90, 1990.

[4] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[5] The last approved version of this historical standard is referenced on www.astm.org.

Applicable Test Methods of Committee D19 on Water
D4410 Terminology for Fluvial Sediment
D4411 Guide for Sampling Fluvial Sediment in Motion
E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

3. Terminology

3.1 *Definitions*—For definitions of water-related terms used in these test methods refer to Terminologies D1129 and D4410.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *dissolved solids*—soluble constituents in water. The quantity is determined by evaporating a water sample to visible dryness at a temperature slightly below boiling. The temperature is then raised to 105°C and held for about 2 h. This is followed by cooling in a desiccator and weighing the residue.

3.2.2 *fluvial sediment*—particles that are (a) derived from rocks or biological materials and (b) transported by flowing water.

3.2.3 *sediment concentration*—(a) the ratio of the mass of dry sediment in a water-sediment mixture to the mass of the mixture or (b) the ratio of the mass of dry sediment in a water-sediment mixture to the volume of the mixture. As indicated by Table 1, the two ratios differ except at concentrations less than 8000 mg/L.

3.2.4 *supernate*—clear, overlying liquid in a sediment sample.

3.2.5 *suspended sediment*—sediment supported by turbulent currents in flowing water or by Brownian movement.

3.2.6 *tare*—weights of empty containers used in analysis procedure.

4. Significance and Use

4.1 Suspended-sediment samples contain particles with a wide variety of physical characteristics. By presenting alternate approaches, these test methods allow latitude in selecting analysis methods that work best with the particular samples under study.

4.2 Sediment-concentration data are used for many purposes that include: (*1*) computing suspended-sediment discharges of streams or sediment yields of watersheds, (*2*) scheduling treatments of industrial and domestic water supplies, and (*3*) estimating discharges of pesticides, plant nutrients, and heavy metals transported on surfaces or inside sediment particles.

TABLE 1 Factors for Conversion of Sediment Concentration in Parts per Million (ppm) to Grams per Cubic Metre (g/m^3)[A] or Milligrams per Litre (mg/L)

Range of Concentration, 1000 ppm	Multiply By	Range of Concentration, 1000 ppm	Multiply By	Range of Concentration, 1000 ppm	Multiply By
0–7.95	1.00	153–165	1.11	362–380	1.30
8.0–23.7	1.01	166–178	1.12	381–398	1.32
23.8–39.1	1.02	179–191	1.13	399–416	1.34
39.2–54.3	1.03	192–209	1.14	417–434	1.36
54.4–69.2	1.04	210–233	1.16	435–451	1.38
69.3–83.7	1.05	234–256	1.18	452–467	1.40
83.8–97.9	1.06	257–278	1.20	468–483	1.42
98.0–111	1.07	279–300	1.22	484–498	1.44
112–125	1.08	301–321	1.24	499–513	1.46
126–139	1.09	322–341	1.26	514–528	1.48
140–152	1.10	342–361	1.28	529–542	1.50

[A] Based on water density of 1.000 g/mL and specific gravity of sediment of 2.65. The following equation also applies:†

$$C_1 = C/(1.0 - C\ 622 \times 10^{-9})$$

where:

C_1 = sediment concentration, mg/L, and
C = sediment concentration, ppm.

† Table Footnote A was corrected editorially.

5. Reagents and Materials

5.1 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water as defined by Type III of Specification D1193.

5.1.1 Requirements can usually be met by passing tap water through a mixed cation-anion exchange resin or by distillation.

6. Sampling

6.1 Flows and concentrations in river cross sections are usually unsteady; consequently, in a strict sense, samples represent conditions only at the time and location of sample collection.

6.2 A sample may consist of a single container of a water-sediment mixtures collected at (*1*) a specific point in a river cross section, (*2*) a specific vertical in a cross section (a depth-integrated sample), or (*3*) several verticals in a cross-section. If the verticals are equally spaced and the sample is collected at equal transit rates, it is referred to as an EWI sample. The acronym EWI (equal-width-increment) is synonymous with ETR (equal-transit-rate) which appears in many older reports. A sample may also consist of several containers filled at different points or verticals in a cross-section. If the containers are filled at centroids of equal discharge in a cross section, they are referred to as EDI samples. Details on sampling are given in Guide D4411.

7. Sample Handling

7.1 When samples arrive at the laboratory, group them according to gaging stations and then arrange each group in chronological order according to times of sample collection. Separate the samples to be analyzed for concentration from those to be analyzed for particle-size distribution or other properties. A data sheet should then be completed for each concentration sample. Examples of three commonly used forms are shown on Fig. 1. Expanded notes can be written on the front of the forms in spaces reserved for other bottles or, if even more space is needed, remarks can be written on the back of the forms along with reference numbers keyed to the appropriate bottles.

7.2 Check each sample for: (*1*) loss of water caused by leakage or evaporation, (*2*) loss of sediment which is sometimes revealed by the presence of particles on the outside of the sample bottle, (*3*) accuracy of sample-identification notes, and (*4*) a container tare which is usually etched on the bottle. Enter all appropriate notes, observations, and data on the laboratory form. Be particularly careful to enter the etched tare reading on the form under the heading Weight of Sample—Tare.

Stream and location _____

Date		
Time		
Gage height		
Discharge		
Temperature		
Sampling Sta.		
WEIGHT OF SAMPLE — Gross		
Tare		
Net		
Container no.		
WEIGHT OF SEDIMENT — Gross		
Tare		
Net		
D.S. Corr.		
Net		
Conc. (ppm)		

pH		
SPECIFIC CONDUCTANCE — R (KCl)		
R (sample)		
Temp. °C		
Micromhos at 25°C		
DISSOLVED SOLIDS — Vol (ml)		
Gross Wt.		
Tare Wt.		
Net Wt.		
D.S. (mg/l)		

Stream and location _____

Date		
Time		
Gage height		
Sampling Sta.		
Temp. and Spec. Cond.	/	/
Remarks		
WEIGHT OF SAMPLE — Gross		
Tare		
Net		
Container no.		
WEIGHT OF SEDIMENT — Gross		
Tare		
Net		
D.S Corr.		
Net		
Conc. (ppm)		

Date		
Time		
Gage height		
Sampling Sta.		
Temp. and Spec. Cond.	/	/
Remarks		
WEIGHT OF SAMPLE — Gross		
Tare		
Net		
Container no.		
WEIGHT OF SEDIMENT — Gross		
Tare		
Net		
D.S Corr.		
Net		
Conc. (ppm)		

Stream and location _____

Date		
Time		
Gage height		
Discharge		
Sampling Sta.		
Temperature		
Sampling depth. ft		
Total depth. ft		
Filling time, sec		
WEIGHT OF SAMPLE — Gross		
Tare		
Net		
Filling rate, cc/sec		
Nozzle size		
Velocity, ft/sec		
Specific conductance		
Container no.		
WEIGHT OF SEDIMENT — Gross		
Tare		
Net		
D.S Corr.		
Net		
Concentration (ppm)		

FIG. 1 Alternate Forms for Recording Field and Laboratory Data for Sediment Samples

7.3 Remove the bottle caps then weigh each container along with its water-sediment mixture to the nearest 0.5 g. Record each reading on the corresponding bottle and on the laboratory form under the heading Weight of Sample—Gross.

7.4 Replace the caps then store the samples in a cool, dark place to minimize microbiological and algal growth. Inspect the bottles frequently; if the sediment does not settle within about 14 days, use Test Method B (filtration procedure) for the analysis. If settling proceeds at an acceptably rapid rate, use Test Methods A, B, or C.

TEST METHOD A—EVAPORATION

8. Scope

8.1 This test method can be used only with sediments that settle under the influence of gravity. This test method is applicable to samples ranging from 0.2 to 20 L in volume, from 5 to 550 000 mg/L in sediment concentration, and having less than 35 000 mg/L in dissolved-solid concentration.

9. Summary of Test Method

9.1 After the sediment has settled, most of the supernatant water is poured or siphoned away. The volume of water-sediment mixture remaining is measured so that a dissolved-solids correction can be applied later. The sediment is then dried and weighed. Sediment concentration is calculated in accordance with Section 12.

10. Apparatus

10.1 *Evaporating Dishes or Beakers*—Preweighed containers of porcelain or glass with capacities of about 150 mL are needed for holding the sediment and water during drying.

10.2 *Vacuum System,* trapped to prevent sample carry-over to the vacuum source during removal of supernate.

10.3 *Drying Oven,* equipped with a 90 to 120°C thermostat is needed to control temperatures while evaporating water from the sediment. A gravity-convection type oven is preferred but a mechanically ventilated (forced draft) style can be used if air-flow rates are low.

10.4 *Desiccator,* for preventing air-borne moisture from collecting in the sediment specimens while they are cooling.

10.5 *Laboratory Balance,* top-loading type with a resolution of 0.0001 g and a capacity of 150 g is needed for weighing the dry sediments.

10.6 *Laboratory Balance,* top-loading type with a resolution of 0.1 g and a capacity of about 4000 g is needed for weighing sample bottles containing water and sediment.

11. Procedure

11.1 After the sediment has settled, decant or vacuum away as much supernate as possible without disturbing the sediment. This can be accomplished by connecting a J-shaped plastic, copper, or glass tube to the vacuum line and lowering the tube

until the curved section is near the bottom of the sample bottle. Supernate enters the upward-facing end of the tube and thereby flows away without creating currents and eddies in the sediment layer. Save the supernate for a dissolved-solids correction factor to be determined later.

11.2 After decanting, about 40 to 70 mL of water-sediment mixture should be left. To determine the exact volume, place the sample bottle on a level support then mark the liquid surface an the outside of the bottle. Use water to wash all of the sediment and supernate into an evaporating dish, then refill the sample bottle to the mark with water from a small graduate. Record the volume added to the sample bottle on the sample-data form.

11.3 Place the evaporating dish in the oven with the temperature set slightly below boiling. Maintain this temperature until all visible traces of water have evaporated. Then raise and hold the temperature at 105°C for about 2 h.

11.4 Transfer the dish from the oven to the desiccator; allow the sediment to cool to room temperature.

11.5 Weigh the dish to the nearest 0.0001 g as quickly an possible to minimize absorption of moisture from the air. Record the weight of the dish and its contents and also the tare weight of the dish on the laboratory form. Subtract the tare from the gross, then record the net weight on the form.

11.6 For nearly all sediment samples, a single drying cycle is sufficient to obtain stable weight; however, a few samples, principally those containing high concentrations of organic materials, may have to be dried a second time. If weight shifts occur, the specimens should be dried and weighed a third time to verify that the weights are stable.

11.7 Determine the dissolved-solids correction factor by using a volumetric pipet to transfer an aliquot (measured volume) of supernate into an evaporating dish. Record the aliquot volume in millilitres on the laboratory form.

11.8 Set the oven temperature slightly below the boiling point of water and evaporate the supernate to visible dryness. Then raise and maintain the oven temperature at 105°C for at least 2 h. After this, cool the dish in a desiccator. Then weigh the dish and its contents to the nearest 0.0001 g. Record this gross weight and also the tare weight of the dish on the form. Subtract the tare from the gross and record the net weight of dissolved solids in grams.

12. Calculation

12.1 Determine the dissolved-solids correction according to Eq 1:

$$DSc = (DS/Va) \times Vs \quad (1)$$

where:

DSc = dissolved-solids correction, g,
DS = net weight of dissolved solids determined in 11.7, g,
Va = aliquot volume taken for dissolved solids in 11.7, mL, and
Vs = volume of supernate remaining with the sediment in 11.2, mL.

In Eq 1, *DS/Va* is the concentration of dissolved solids in the supernate (see 11.7). This concentration is multiplied by *Vs* to obtain the dissolved-solids weight in the dry sediment (see 11.5). Enter the value of *DSc* on the laboratory form under the heading D. S. Corr.

12.2 Subtract the value of *DSc* in 12.1 from the net weight determined in 11.5. Record the difference on the laboratory form under the second heading labeled Weight of Sediment—Net. Notice each laboratory form has two rows with this heading.

12.3 Divide the Net Weight of Sediment (second entry) by the Net Weight of Sample. Both weights must be in the same units, preferably grams. Multiply the quotient by one million, then enter the result under the heading Conc. (ppm) on the laboratory form.

12.4 Modern practice calls for reporting sediment concentrations in milligrams per litre instead of ppm as determined in 12.3. Conversion can be made with the aid of Table 1. For example, consider a sediment concentration of 41 000 ppm. The multiplier obtained from Table 1 is 1.03; therefore, the concentration is 41 000 × 1.03 = 42 400 mg/L. The equation[6] immediately following Table 1 can be used instead of the multipliers. Eq 1 is easier to use in computer programs and is applicable to concentrations beyond the range in the table.

13. Precision and Bias for Test Method A (Evaporation) [7]

13.1 These precision and bias data meet requirements of Practice D2777.

13.2 Samples for collaborative testing were prepared by dispersing a specially prepared dry powder in approximately 350 mL of distilled water. Mixtures were shipped in sealed glass containers to the nine participating laboratories where three Youden pairs at each of three concentrations were tested.

13.3 Bias was influenced not only by analytical procedures such as decanting, drying, and weighing but also by failure to remove all sediment from the containers and by losing particles through dissolution.

13.4 The following table shows the precision and bias for Test Method A:

Concentration Added, mg/L	Concentration Recovered, mg/L	Standard Deviation of Test Method (St)	Standard Deviation of Single Operator (So)	Bias, %
10	9.4	2.5	2.3	–6
1000	976	36.8	15.9	–2.4
100 000	100 294	532	360	0.3

[6] Williams, D. T., "The Relationship of Milligrams Per Liter to Parts per Million," *Sediment Transport Modeling*, Ed. by Sam S. Y. Wang, *Proceedings of the International Symposium*, American Society of Civil Engineers, August 1989, pp. 428–433.

[7] Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:D19-1162. Contact ASTM Customer Service at service@astm.org.

TEST METHOD B—FILTRATION

14. Scope

14.1 Test Method B can be used only on samples containing sand concentrations less than about 10 000 ppm and clay concentrations less than about 200 ppm. The sediment need not be settleable because filters are used to separate water from the sediment. Correction factors for dissolved solids are not required.

14.2 Even though a high-concentration sample may filter slowly, users should not divide the sample and use two or more filters. Instead, the entire sample should be filtered through one disk.

15. Summary of Test Method

15.1 The sample consisting of river water, sediment, and dissolved solids is weighed and then filtered through a glass-fiber disk. The disk and sediment are dried and weighed, then the sediment concentration is calculated in accordance with Section 18.

16. Apparatus

16.1 *Gooch Crucibles*—Porcelain or borosilicate glass crucibles with fritted glass bases are required for holding the filters. Capacities of the crucibles are optional; sizes in the 25 to 130-mL range work best with 1-L samples. Small crucibles have the advantage of requiring less oven space during drying and absorbing less moisture during weighing; large crucibles are needed if filtering proceeds slowly.

16.2 *Glass-fiber Filter Disks*—Filter diameter and filter retention rating, sometimes referred to as filter pore size, are critical to this analysis. The sediment that accumulates on a filter traps some particles that are smaller than the filter's retention rating. As filtration proceeds and the sediment layer thickens, the retention rating of the sediment and filter acting as a unit gradually decreases. Users should use filters with retention ratings of 1.5 µm to agree with practices in many sediment laboratories.[8] Filter diameters should equal or exceed 24 mm. Filters as large as 42 mm may be required to avoid filter plugging at high concentrations. Record filter retention rating in micrometres and filter diameter in millimetres at a convenient place on the laboratory form.

16.3 *Vacuum System*—See 10.2.

16.4 *Drying Oven*—See 10.3.

16.5 *Desiccator*—See 10.4.

16.6 *Laboratory Balances*—See 10.5 and 10.6.

17. Procedure

17.1 Wash the filter with water to remove soluble compounds; then dry the filter and its crucible at 105°C for at least 1 h.

17.2 Transfer the crucible and filter to the desiccator, then, after the parts have cooled to room temperature, weigh them to the nearest 0.0001 g and record the reading on the laboratory form under the heading Weight of Sediment—Tare.

17.3 While a vacuum is being applied to the bottom of the crucible, decant supernate from the sample into the crucible. Flush the inner surfaces of the sample bottle with water to complete the transfer.

17.4 As filtering proceeds, inspect the filtrate. If it is turbid, pour the filtrate back through the filter a second and possibly a third time. If the filtrate is still turbid, the filter may be leaking. In this case, substitute a new filter and repeat the process. If the filtrate is transparent but discolored, a natural dye is present; refiltration is not necessary.

17.5 When filtration is complete, place the crucible and its contents in the drying oven set for 105°C.

17.6 When the crucible and its contents are dry, transfer to a desiccator. After the crucible has cooled, weigh to the nearest 0.0001 g and record the reading on the laboratory form under the heading Weight of Sediment—Gross.

17.7 Refer to 11.6 for a discussion of multiple drying and weighing cycles.

18. Calculation

18.1 Subtract Weight of Sediment—Tare from Weight of Sediment—Gross and record the difference under the heading Weight of Sediment—Net. No dissolved-solids correction is required.

18.2 Refer to 12.3 and 12.4 for computations.

19. Precision and Bias for Test Method B (Filtration)

19.1 These precision and bias data meet requirements of Practice D2777.

19.2 Samples for collaborative testing were prepared by dispersing a specially prepared dry powder in approximately 350 mL of water. Mixtures were shipped in sealed glass containers to the nine participating laboratories where three Youden pairs at each of three concentrations were tested.

19.3 Bias was influenced not only by analytical procedures such as filtering, drying, and weighing but also by failure to remove all sediment from the containers and by losing particles through dissolution.

19.4 The following table shows precision and bias for Test Method B:

Concentration Added, mg/L	Concentration Recovered, mg/L	Standard Deviation of Test Method (St)	Standard Deviation of Single Operator (So)	Bias, %
10	8	2.6	2	–20
100	91	5.3	5.1	–9
1000	961	20.4	14.1	–3.9

TEST METHOD C—WET-SIEVING-FILTRATION

20. Scope

20.1 This test method covers concentration measurements of two particle-size fractions. The term fine fraction refers to

[8] The sole source of supply of the apparatus known to the committee at this time is Whatman type 934-AH, Whatman Lab Sales Inc., Hillsboro, OR. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

particles small enough to pass through a sieve with 62 or 63-µm apertures; coarse fraction refers to particles large enough to be retained on the sieve. The fine fraction need not be settleable. This test method is useful when large samples must be collected in the field but only small subsamples, typically 300 to 500 mL, can be shipped back to the laboratory.

21. Summary of Test Method

21.1 The sample is poured onto a sieve with 62 or 63-µm openings. Analysis includes the entire coarse fraction but only a small, measured aliquot of the fine fraction. Sieving and aliquot extraction can be performed either at the sampling site or in the laboratory.

22. Apparatus

22.1 *Sieve,* fitted with a screen fabric having 62 or 63-µm square apertures. An 8-in. diameter sieve is recommended for samples larger than 3L; a 3-in. diameter sieve is recommended for all other samples. (See Specification E11.)

22.2 *Splitter,* for extracting an aliquot of the fines.[9]

22.3 Additional apparatus are listed in Section 16.

23. Procedure

23.1 Measure the gross and tare weight of each sample and record the readings on the laboratory form. (See 7.2 and 7.3.) Hold the sieve over a beaker or large, shallow dish while pouring the sample through the sieve. Some sediments require vigorous rinsing with water to disaggregate clumps retained on the sieve. Use a minimum amount of water, and retain in the dish along with the fine fraction.

23.2 Wash the coarse fraction from the sieve into a pre-weighed evaporating dish. Dry, desiccate, and weigh the sediment in accordance with 11.3 through 11.5. Record the net weight of the coarse fraction on the laboratory form.

23.3 If possible, the sample received at the laboratory should be analyzed in its entirety, but if the sample volume is unwieldy, it may be reduced by splitting. Mix the fine fraction by vigorously shaking and stirring then, without pausing, pour the mixture through the splitter and into a clean tray. Several splitting passes are required if the aliquot is to consist of only a small fraction, typically 300 to 500 mL, of the original mixture.

23.4 Determine the net weight of the aliquot to the nearest 0.1 g and record the reading on the laboratory form.

23.5 The aliquot is usually analyzed by the filtration method, but it can be analyzed by the evaporation method. If filtration is used, follow the procedure in 17.1 through 17.6; if evaporation is used, follow the procedure in 11.1 through 12.4.

24. Calculation

24.1 Calculate the coarse-fraction concentration as:

$$C_{cf} = C \times 10^6/S \quad (2)$$

where:

C_{cf} = coarse fraction concentration, ppm,
C = mass of sediment in the coarse fraction, g, and
S = mass of entire sample, g.

24.2 Calculate the fine-fraction concentration as:

$$C_{ff} = F \times 10^6/W \quad (3)$$

where:

C_{ff} = fine-fraction concentration, ppm,
F = mass of sediment in the aliquot, g, and
W = mass of the aliquot, g.

24.3 Convert C_{cf} and C_{ff} from ppm to mg/L in accordance with 12.4.

25. Precision and Bias for Test Method C (Wet-Sieving-Filtration)

25.1 These precision and bias data meet requirements of Practice D2777.

25.2 Samples for collaborative testing were prepared by dispersing a specially prepared dry powder in approximately 350 mL of distilled water. Mixtures were shipped in sealed glass containers to the nine participating laboratories where three Youden pairs at each of three concentrations were tested.

25.3 Bias was influenced not only by analytical procedures such as sieving, filtering, drying, and weighing but also by failure to remove all sediment from the containers and by losing particles through dissolution.

25.4 The following table shows precision and bias for Test Method C:

Mixture Number	Part Sieve Diameter,µm	Concentration Added, mg/L	Concentration Recovered, mg/L	Standard Deviation of Test Method (St)	Standard Deviation of Single Operator (So)	Bias, %
1	>62 (sand)	1	3.4	2.8	2.4	240
1	<62 (fines)	10	8.7	4.3	2.9	–13
2	>62 (sand)	9	5	5.9	1.9	–44
2	<62 (fines)	91	79	15.2	11	–13
3	>62 (sand)	91	107	12.3	5.9	18
3	<62 (fines)	909	832	87.2	61	–8

26. Keywords

26.1 fluvial sediment; sediment; sediment concentration

[9] A Federal Interagency Sedimentation Project US72A or a Jones Ott splitter have been found to be satisfactory.