Designation: D 5013 – 89 (Reapproved 1998)

Standard Practices for Sampling Wastes from Pipes and Other Point Discharges[1]

This standard is issued under the fixed designation D 5013; 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.

1. Scope

1.1 Those practices provide guidance for obtaining samples of waste at discharge points from pipes, sluiceways, conduits, and conveyor belts. The following are included:

	Sections
Practice A—Liquid or Slurry Discharges	7 through 9
Practice B—Solid or Semisolid Discharges	10 through 12

1.2 These practices are intended for situations in which there are no other applicable ASTM sampling methods (see Practices D 140 and D 75) for the specific industry.

1.3 These practices do not address flow and time-proportional samplers and other automatic sampling devices.

1.4 Samples are taken from a flowing waste stream or moving waste mass and, therefore, are descriptive only within a certain period. The length of the period for which a sample is descriptive will depend on the sampling frequency and compositing scheme.

1.5 It is recommended that these practices be used in conjunction with Guide D 4687.

1.6 *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.* See Section 5 for more information.

2. Referenced Documents

2.1 *ASTM Standards:*

D 75 Practice for Sampling Aggregates[2]

D 140 Practice for Sampling Bituminous Materials[2]

D 4687 Guide for General Planning of Waste Sampling[3]

E 882 Guide for Accountability and Quality Control in the Chemical Analysis Laboratory[4]

2.2 *Other Document:*

EPA-SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods[5]

[1] These practices are under the jurisdiction of ASTM Committee D34 on Waste Management and are the direct responsibility of Subcommittee D34.01.02 on Monitoring.

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[2] *Annual Book of ASTM Standards*, Vol 04.03.

[3] *Annual Book of ASTM Standards*, Vol 11.04.

[4] *Annual Book of ASTM Standards*, Vol 03.05.

[5] Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

3. Summary of Practices

3.1 The variability of the waste stream is first determined based on (*1*) knowledge of the processes producing the stream, or (*2*) the results of a preliminary investigation of the waste stream's variability. A sampling design is then developed that considers the waste stream's variability, the time frame the sample is to represent, and the precision and accuracy required for waste analysis or testing. The actual sampling procedure consists of obtaining several grab samples from the moving stream or mass for analysis or testing.

4. Significance and Use

4.1 The procedure outlined in these practices are guides for obtaining descriptive samples of solid, semisolid and liquid waste from flowing streams, and incorporate many of the same procedures and equipment covered in the Referenced Documents. These practices by themselves will not necessarily result in the collection of samples representative of the total waste mass. The degree to which samples describe a waste mass must be estimated by application of appropriate statistical methods and measures of quality assurance. It is recommended that those practices be used in conjunction with Guide D 4687.

5. Hazards

5.1 In all sampling practices, safety should be the first consideration. Personnel involved in the sampling should be fully aware of, and take precautions against, the presence of toxic or corrosive gases, the potential for contact with toxic or corrosive liquids or solids, and the dangers of moving belts, conveyors, or other mechanical equipment. Guidance on waste sampling safety can be found in Guide D 4687.

6. Sampling Design

6.1 The frequency of sampling and the number of composites required to obtain a sample of the waste will depend on the following:

6.1.1 Time variability of the waste composition,

6.1.2 Time span which the sample is to represent, and

6.1.3 Precision of waste analysis that is required, for example, if a hazardous constituent is present in the waste at levels near the regulatory limit or another limit of concern, then better precision will be required than if the levels are well below or well above the limits of concern.

6.2 The processes that produce the waste will largely dictate the variability in the composition of the waste. If the processes are known to be constant and reliable, then fewer samples should be required than from a highly variable process.

6.3 To obtain a descriptive sample of the waste, the concentration levels and approximate variation in the waste composition should first be estimated. In some cases, a rough estimate can be made based on knowledge of the processes that produce the waste. In other cases, results from previous sampling efforts can be used to estimate waste composition and variability. A preliminary pilot sampling effort may be necessary to establish the waste composition prior to designing the primary sampling program. Procedures for estimating sample variability and for establishing a sampling design are provided in Guide D 4687.

6.4 The sampling design should include quality assurance procedures. At the least, this should include the following:

6.4.1 Sample handling quality control by carrying a blank sample through all of the sampling and analytical steps, and

6.4.2 User should be aware of the laboratories' internal quality control procedures. More rigorous quality control/quality assurance procedures may be required depending on the particular goals of the sampling program. For further information on quality control/quality assurance, see Guide E 882 and EPA SW-846.

6.5 A sampling plan should be prepared prior to sampling. The plan should describe such things as (a) safety procedures; (*b*) sampling design, including number and location of samples; (*c*) quality assurance procedures; (*d*) apparatus; (*e*) sampling procedures; and (*f*) sampling labeling. The details of the sampling procedure should consider all aspects of the specific discharge, including pipe diameter, velocity, rate of discharge, solids content of the discharge, requirements for grab or composite samples, and ultimate use of the analytical data.

PRACTICE A—LIQUID OR SLURRY DISCHARGES

7. Apparatus

7.1 *Dipper Sampler*— For slurry and liquid discharges, a dipper type sampler should be employed. One example of this type of sampler is depicted in Fig. 1. The dipper can be varied in size depending on the flow rate from the pipe or sluiceway. This procedure should not be used for high stream flow velocities or rates (>100 gal/min) because problems will arise in physically holding the dipper in the stream. Stream dimensions, size and shape of pipe, should also be considered in addition to flow rate. The sample should be taken across the full opening of the stream in as short a time as possible. This will minimize the effect of changes in composition of the waste stream due to density differentiation, laminar flow, and the like.

8. Procedure

8.1 Clean the beaker and container for compositing sample by methods appropriate for the analysis to be performed. Cleaning the equipment is especially important to prevent cross contamination between different waste types. In some cases, it may be necessary or simpler to dedicate equipment to a specific waste type.

8.2 Assemble the sampler by clamping the beaker to the pole.

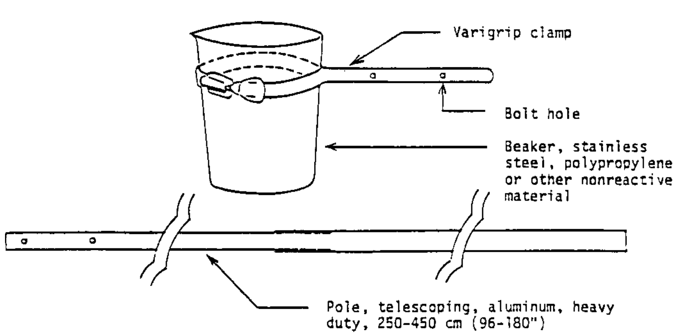

FIG. 1 Dipper Sampler (Source: Test Methods for Evaluating Solid Wastes, U.S. EPA, S2–846, July 1982)

8.3 Make sure that the sampler matches the dimensions of the discharge stream if at all possible. If not, pass the dipper in one sweeping motion through the discharge stream at a rate such that the dipper is filled in one pass. Make enough passes to cover the entire cross sectional area of the discharge stream.

8.4 If the entire discharge width cannot be covered in one pass additional passes will be needed. Begin each additional pass at the ending point of the previous pass. It may be necessary to make a few trial passes or practice runs before actually sampling the discharge. If compositing of samples is required by the sampling plan it may be preferable and sometimes necessary to have compositing performed in the laboratory. Include specific procedures for compositing in the sampling plan. If samples have not been appropriately composited in the field, clearly indicate this information on the sample label, in the field log book, and on the analytical request form.

8.5 In cases of high flow (>100 gal/min), a probe may be inserted upstream of the discharge to obtain a sample. Design the probe to collect a representative cross section of the flowing stream. See Fig. 2 for an example sampling probe.

8.6 Use preservation techniques appropriate for the analyses or testing to be conducted.

9. Packaging and Package Marking

9.1 An indelible label should be secured to the container identifying the sample. The label should contain or reference the following information:

9.1.1 Name and location of site,

9.1.2 Date and time of sampling,

9.1.3 Location of sampling,

9.1.4 Sample number,

9.1.5 Description and disposition of sample,

9.1.6 Name of sampling personnel,

9.1.7 Type of preservative, and

9.1.8 Sampling conditions, and analytical requirements.

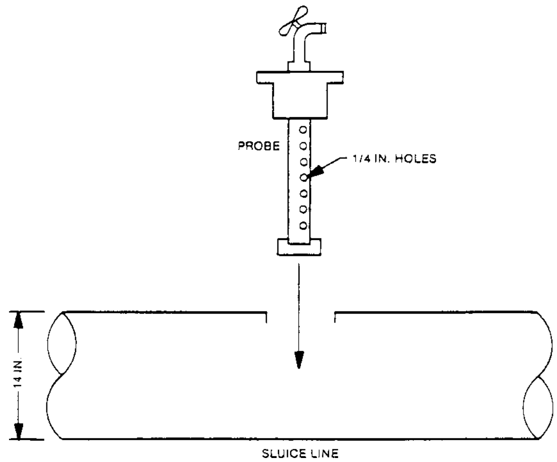

FIG. 2 In–Pipe Sampling Probe

9.2 Pack the sample container securely in a shipping container. If required for preservation of analytes, the sample container should be packed in ice and cooled to 4°C. A minimum-maximum thermometer should be packed with the samples.

9.3 Follow DOT (Department of Transportation) shipping regulations.

9.4 Make arrangements for handling, logging in, adequate storage and analysis of the sample at its destination. If warranted, follow chain-of-custody protocol.

PRACTICE B—SOLID OR SEMISOLID DISCHARGES

10. Apparatus

10.1 *Scoop or Shovel Sampler*—For solid or semisolid discharges from belts, a scoop or shovel should be used, made of material compatible with the waste stream and inert to the analytes. Where routine sampling is to be performed, a scoop may be designed to match the width and contour of the belt. In this way, a single time increment sample may be taken in one scoop.

11. Procedure

11.1 Clean the scoop or shovel as appropriate for the desired chemical analysis to prevent cross contamination. In some cases, it may be necessary to dedicate equipment to specific waste types or waste strata.

11.2 Sample at a convenient point along the belt.

11.3 Sample the waste with the scoop or shovel making sure to sample across the entire width of the belt. Be sure all fines and any liquid are also included representatively in the scooped sample.

11.4 Repeat sampling depending on the uniformity of the waste. Composite the grab samples and transfer a well-mixed portion to a chemically compatible container and seal. It may be preferable or necessary to have compositing performed in the laboratory. Include specific procedures for compositing in the sampling plan.

11.5 If compositing has not been appropriately accomplished prior to shipment, clearly indicate on the sample label, in the field log book, and on the analytical request form.

12. Sampling Labeling and Shipping

12.1 Refer to Section 9.