



Designation: D6699 – 24

Standard Practice for Sampling Liquids Using Bailers¹

This standard is issued under the fixed designation D6699; 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 This practice covers the procedure for sampling stratified or un-stratified waters and liquid waste using bailers.

1.2 Three specific bailers are discussed in this practice. The bailers are the single and double check valve and differential pressure.

1.3 This standard does not cover all of the bailing devices available to the user. The bailers chosen for this practice are typical of those commercially available.

1.4 This practice should be used in conjunction with Guide D4687, Practice D5088, and Practice D5283.

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- D4448 Guide for Sampling Ground-Water Monitoring Wells
- D4687 Guide for General Planning of Waste Sampling
- D5088 Practice for Decontamination of Field Equipment Used at Waste Sites
- D5283 Practice for Generation of Environmental Data Related to Waste Management Activities: Quality Assurance and Quality Control Planning and Implementation
- D5681 Terminology for Waste and Waste Management

¹ This practice is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.01.03 on Sampling Equipment.

Current edition approved May 1, 2024. Published May 2024. Originally approved in 2001. Last previous edition approved in 2016 as D6699 – 16. DOI: 10.1520/D6699-24.

² 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.

D5792 Practice for Generation of Environmental Data Related to Waste Management Activities: Development of Data Quality Objectives

D6051 Guide for Composite Sampling and Field Subsampling for Environmental Waste Management Activities

D6232 Guide for Selection of Sampling Equipment for Waste and Contaminated Media Data Collection Activities

D6517 Guide for Field Preservation of Ground Water Samples

D6564/D6564M Guide for Field Filtration of Groundwater Samples

D6634/D6634M Guide for Selection of Purging and Sampling Devices for Groundwater Monitoring Wells (Withdrawn 2023)³

D6771 Practice for Low-Flow Purging and Sampling Used for Groundwater Monitoring

D7929 Guide for Selection of Passive Techniques for Sampling Groundwater Monitoring Wells

2.2 EPA Standard:

EPA SW 846 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods

3. Terminology

3.1 See Terminology D5681.

4. Summary of Practice

4.1 A clean bailer is lowered into the liquid to be sampled using a suspension line (see Fig. 1). The bailer chamber is allowed to fill with the sample. The check valve or valves on bailers close when the bailer stops. The bailer is raised to the surface where the sample is discharged into a clean sample container.

5. Significance and Use

5.1 A bailer is a device for obtaining a sample from stratified or un-stratified waters and liquid wastes. The most common use of a bailer is for sampling ground water from single-screened wells (Fig. 1) and well clusters (see Guide D4448).

³ The last approved version of this historical standard is referenced on www.astm.org.

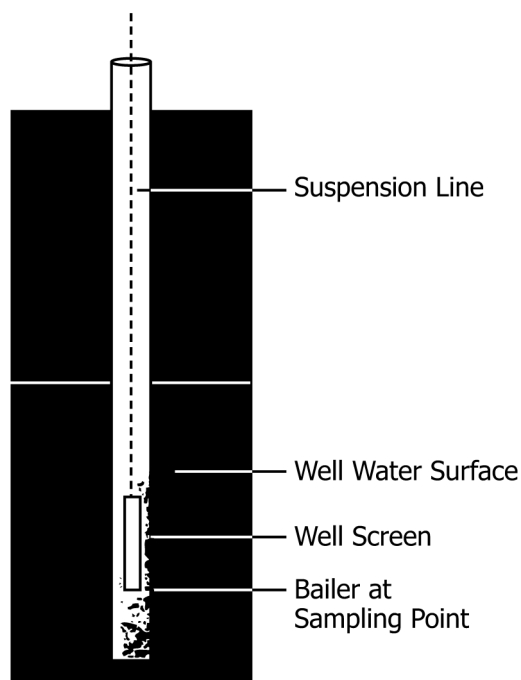


FIG. 1 Bailer Sampling a Screened Well

5.2 This practice is applicable to sampling water and liquid wastes. The sampling procedure will depend on sampling plan and the data quality objectives (DQOs) (Practice D5792).

5.3 Bailers may be used to sample waters and liquid wastes in underground and above ground tanks and surface impoundments. However, the design of the unit and associated piping should be well understood so that the bailer can access the desired compartment and depth. Any stratification of the liquid should be identified prior to sampling.

NOTE 1—Viscous liquids and suspended solids may interfere with a bailer's designed operation.

5.4 Bailers may disturb the water column and may cause changes to the parameters to be measured (for example, turbidity, gases, etc.).

5.5 The use of bailers in low flow wells for purging can result in increased agitation and turbidity in the sample and can introduce errors into the sample if the water surface level is drawn down below the top of the screen. In such cases, alternate methods of sampling such as Passive Sampling (Guide D7929) or Low Flow Sampling (Practice D6771) should be considered.

5.6 If samples are to be collected for the determination of per- and poly-fluorinated alkyl substances (PFAS), all sampling equipment should be made of fluorine-free materials. Other considerations for PFAS sampling may exist but are beyond the scope of this standard.

6. Sampling Equipment

6.1 Bailers are versatile devices constructed in different sizes and from a variety of materials. Some bailers are designed using a threaded section that allows the user to change the volume of the bailer by connecting additional

TABLE 1 General Advantages and Limitations of Bailers

Advantages	Limitations
Simple to use	Time consuming to use
Some have a low initial cost	Valves may leak
Can be made almost any size	Tend to expose sample to the atmosphere
Can be constructed of a variety of materials	May result in sample contamination
No external power source needed	Bailers are not suitable for sampling thin surface layers like thin layers of light non-aqueous phase liquids
	In low flow wells, errors can be introduced if the surface level is drawn down below the top of the screen or the sample waters are agitated the sample waters excessively
	May result in loss of VOCs when discharging sample

sections. When sampling for volatile organic compounds (VOCs) in liquids, specialized bailers that have a sample control or a draft valve near the bottom of the bailer are used. The control valve allows a sample to be drained from the bailer with minimal loss of volatile compounds.

6.2 Three general types of bailers are a single check valve bailer, a double check valve bailer, and a differential pressure bailer (hydrostatic pressure allows the bailer to fill through the lower tube and release displaced air through the upper tube). Advantages and limitations of bailers are found in Guides D6232 and D6634/D6634M. A description of the equipment and the advantages and limitations of bailers in general and specific limitations of the single and double check valve bailers and the differential pressure bailer are as follows:

6.2.1 General Description and Advantages and Limitations of Bailers:

6.2.1.1 Bailers are available commercially in different lengths, volumes, and check valve density and sample release arrangements. They are typically constructed of PTFE, polyvinyl chloride (PVC), stainless steel, and polyethylene (single use disposable bailer).

6.2.1.2 General advantages and limitations of bailers are listed in Table 1.

6.2.2 Single Valve Bailer (Fig. 2):

6.2.2.1 A single check valve bailer is a length of tubing with a check valve in the bottom. The bottom valve allows the bailer to fill and retain the sample.

6.2.2.2 The bottom-emptying bailers with controlled flow valves (Fig. 3) are used for collecting samples for volatile organic analyses.

6.2.2.3 Advantages—Low initial cost, and it is mechanically simple.

6.2.2.4 Limitations—Applicable to surface sampling only, disturbs the sample, and exposes the samples to the atmosphere.

6.2.3 Double Valve Bailers (Fig. 4):