Designation: D4136 – 82 (Reapproved 2012)

Standard Practice for Sampling Phytoplankton with Water-Sampling Bottles[1]

This standard is issued under the fixed designation D4136; 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 procedures for obtaining quantitative samples of a phytoplankton community by use of water-sampling bottles.

1.2 *This standard does not purport to address all of the safety problems, 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:*[2]

D4137 Practice for Preserving Phytoplankton Samples

3. Summary of Practice

3.1 A sampler is lowered to a specified depth and closed by a messenger. The sampler is retrieved and the sample is removed. The phytoplankton are preserved as dictated by the objectives of the study.

4. Significance and Use

4.1 The *advantages* of water-sampling bottles are as follows:

4.1.1 Samples of known volume can be obtained from a precise depth.

4.1.2 A quantitative sample is obtained. Nanno- and ultraplankton are not lost from the sampling device.

4.1.3 A sampler of almost any desired volume or construction material can be obtained.

4.1.4 The sampler is light-weight and can be used without auxiliary equipment.

4.1.5 There is a free flow of water through the cylinder of the sampler when it is being lowered.

4.1.6 Samplers can be arranged serially to facilitate sampling at several depths almost simultaneously.

4.1.7 The sampler can be used in most depths of water.

4.2 The *disadvantages* of water-sampling bottles are as follows:

4.2.1 Samples are obtained from only discrete depths; they cannot be obtained from horizontal or vertical strata of water.

4.2.2 The samplers cannot be used satisfactorily in fast-flowing water.

4.3 There are several *special considerations* that shall be observed when using water-sampling bottles. They are as follows:

4.3.1 The samplers should be protected from damage, which commonly results in leakage.

4.3.2 Following use, the samplers should be hung open in a horizontal position to allow for thorough drying.

4.3.3 The end stoppers should be inspected periodically for signs of wear or deterioration and replaced as necessary (Fig. 1*a, b, c).*

5. Apparatus

5.1 Most water-sampling bottles, (Fig. 1*a, b, c, d),* consist of a cylindrical tube with stoppers at each end and a closing device activated by a messenger. The most commonly used samplers that operate on this principle are the Kemmerer, Van Dorn, Nansen, and Fjarlie bottles. The Kemmerer and Van Dorn bottles are similar in design and differ only in the design of the closure mechanism. The Nansen bottle is a reversing bottle in that when it is tripped, valves at each end close and the bottle rotates 180°. The rotation releases a second messenger that trips another sampler at a lower depth and so on. The Fjarlie bottle, designed for sampling from great depths, is also a series-type sampler and contains an auxiliary assembly for mounting reversing thermometers. Most water-sampling bottles are available in a variety of construction materials (for example, brass, clear acrylic, and polyvinyl chloride). They may be TFE-fluorocarbon-lined. The volume of the samplers varies from about 0.2 to over 30 L.

[1] This practice is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.24 on Water Microbiology.

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[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.

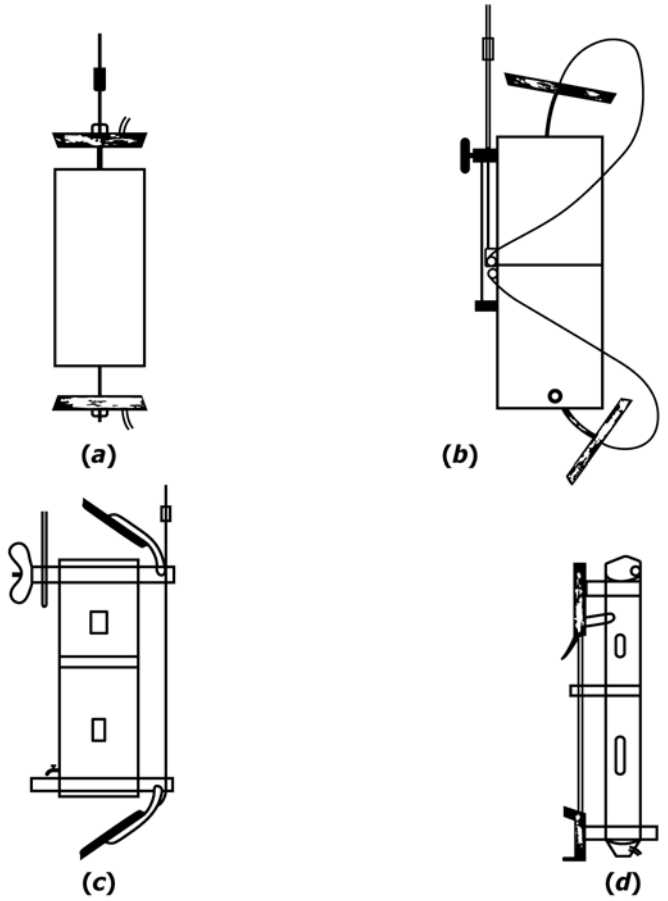

FIG. 1 Water-Sampling Bottles (*a*) Kemmerer (*b*) Van Dorn (*c*) Nansen (*d*) Fjarlie (Illustration by J. W. Steiner and W. G. Hester, U.S. Geological Survey, Doraville, GA)

6. Procedure

6.1 Lower the sampler in the open position to a desired depth, trip, and retrieve. The enclosed volume of water contains the trapped organisms. Preserve the plankton as described in Practice D4137.