Designation: D 4401 – 84 (Reapproved 1995)

Standard Practice for Collecting Benthic Macroinvertebrates With Petersen Grab Sampler[1]

This standard is issued under the fixed designation D 4401; 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 a qualitative sample of macroinvertebrates inhabiting sand, gravel, mud, clay, and similar substrates.

1.2 This grab sampler has limited application, and is not recommended for quantitative benthic work.

1.3 The grab must be used with due consideration of its defects when quantitative estimates are attempted.

1.4 This device is used primarily in freshwater lakes and reservoirs and is adaptable to river, estuarine, and ocean habitats.

1.5 For the advantages and disadvantages, see Guide D 4387.

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.* For specific hazards, see Section 5.

2. Referenced Documents

2.1 *ASTM Standards:*

D 4387 Guide for Selecting Grab Sampling Devices for Collecting Benthic Macroinvertebrates[2]

3. Summary of Practice

3.1 The Petersen grab sampler has paired jaws that must penetrate the intended substrate without disturbing the water surface boundary layer of the substrate, close when positioned properly on the bottom, and retain the sample of sediment while it is brought to the surface for processing.

3.2 The standard Petersen grab has been modified to improve its efficiency and reliability.

3.3 Newer versions of the Petersen grab sampler may have a screened window at the top of each jaw to allow water to escape while the grab is descending and closing.

3.4 While some modifications may close or function better, the sampling characteristics remain the same.

3.5 Most of the modified versions are intended for use in estuarine and marine waters.

3.6 A small version can be hauled aboard by hand and held with one hand for washing procedures.

4. Significance and Use

4.1 The Petersen grab sampler is used to collect qualitative samples from different aquatic habitats containing benthic macroinvertebrates living on or in various types of substrates.

4.2 The organisms in the sample are used to define macroinvertebrate community characteristics in water quality studies and ecological assessments.

5. Hazards

5.1 The Petersen grab sampler should be inspected for mechanical defects prior to use.

5.2 This grab sampler cannot be used under adverse weather conditions.

5.3 It is advisable to use a winch and cable to lower and raise the sampler.

5.4 Ideally a stationary boat or platform should be used when taking samples.

5.5 Auxiliary weights can be added to each jaw to increase its weight for penetrating certain hard substrates.

5.6 The modified Petersen devices are designed to be quite heavy and require heavy gear and a large vessel for efficient operation.

6. Procedure

6.1 The sampler is slowly lowered to the bottom when open to avoid disturbing lighter materials of the substrate.

6.2 When the lowering line is slackened, a catch is released, the two scoops close, and a semicircular bite of the sediment is taken.

6.3 Raise the sampler at a slow but steady rate to prevent sample loss or washout.

6.4 Once the grab is aboard the vessel, empty the sample either into a suitable container or a sieving device directly for processing.

6.5 Thoroughly wash or hose the device with water, so that all the sample is included in the sample processing before a replicate sample is taken.

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[1] This practice is under the jurisdiction of ASTM Committee E47 on Biological Effects and Environmental Fate and is the direct responsibility of Subcommittee E47.03 on Terrestrial Assessment and Toxicology.

Current edition approved Sept. 28, 1984. Published November 1984.

[2] *Annual Book of ASTM Standards*, Vol 11.05.