



Designation: D 4387 – 02

Standard Guide for Selecting Grab Sampling Devices for Collecting Benthic Macroinvertebrates¹

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1. Scope

1.1 This guide covers selecting grab sampling devices for collecting benthic macroinvertebrates. (See Table 1)

1.2 The grab sampler when used correctly is a quantitative collecting device. It is designed to penetrate and grab or scoop a variety of substrates or sediment types from which macroinvertebrates are collected in freshwater, estuarine, and marine habitats.

2. Referenced Documents

2.1 ASTM Standards:

D 1129 Terminology Relating to Water²

D 4342 Practice for Collecting Benthic Macroinvertebrates with Ponar Grab Sampler³

D 4343 Practice for Collecting Benthic Macroinvertebrates with Ekman Grab Sampler³

D 4344 Practice for Collecting Benthic Macroinvertebrates with Smith-McIntyre Grab Sampler³

D 4345 Practice for Collecting Benthic Macroinvertebrates with Van Veen Grab Sampler³

D 4346 Practice for Collecting Benthic Macroinvertebrates with Okean 50 Grab Sampler³

D 4347 Practice for Collecting Benthic Macroinvertebrates with Shipek (Scoop) Grab Sampler³

D 4348 Practice for Collecting Benthic Macroinvertebrates with Holme (Scoop) Grab Sampler³

D 4401 Practice for Collecting Benthic Macroinvertebrates with Petersen Grab Sampler³

D 4407 Practice for Collecting Benthic Macroinvertebrates with Orange Peel Grab Sampler³

3. Terminology

3.1 *Definitions*—For definitions of terms used in this guide, refer to Terminology D 1129.

¹ This guide is under the jurisdiction of Committee E47 on Biological Effects and Environmental Fate and is the direct responsibility of Subcommittee E47.03 on Sediment Assessment and Toxicology.

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² *Annual Book of ASTM Standards*, Vol 11.01.

³ *Annual Book of ASTM Standards*, Vol 11.05.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *benthos*—the community of organisms living in or on the bottom or other substrate in an aquatic environment.

3.2.2 *grab*—any device designed to “bite” or “scoop” into the bottom sediment of a lake, stream, estuary, ocean, and similar habitats to sample the benthos. Grabs are samplers with jaws that are forced shut by weights, lever arms, springs, or cables. Scoops are grab samplers that scoop sediment with a rotating container.

3.2.3 *habitat*—the place where an organism lives, that is, mud, rock, shoreline, etc.

3.2.4 *macroinvertebrates*—benthic or substrate dwelling organisms visible to the unaided eye and retained on a U.S. Standard No. 30 (0.595-mm mesh openings) sieve. The standard sieve opening for marine benthic fauna is 1.0 mm, U.S. Standard No. 18 sieve. Examples of macroinvertebrates are aquatic insects, macrocrustaceans, mollusks, annelids, roundworms, flatworms, and echinoderms.

4. Significance and Use

4.1 Qualitative and quantitative samples of macroinvertebrates inhabiting sediments or substrates are usually taken by a grab sampler. Grab samplers, if used correctly, are devices that sample a unit area or volume of the habitat. They are used to obtain a quantitative estimate of the number of individuals and number of taxa of aquatic macroinvertebrates. In view of the advantages and limitations regarding the penetration of the sediment by many grab samplers and their closing mechanisms, it is not possible to recommend any single instrument as suitable for general use. However, the Petersen grab is considered the least effective bottom grab sampler and, therefore, has limited application. The type and size of the grab sampler or device selected for use will depend on such factors as the size of boat, hoisting gear available, the type of substrate or sediment to be sampled, depth of water, current velocity, and whether sampling is in sheltered areas or in open waters of large rivers, reservoirs, lakes, and oceans. A great variety of instruments have been described and choice of a grab sampler will depend largely on what is available, what is suitable for the sampling area, and what can be obtained without difficulty.