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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Practice for Collecting Benthic-Macroinvertebrates with Smith-McIntyre Grab Sampler[1]

This standard is issued under the fixed designation D 4344; 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 qualitative or quantitative samples of macroinvertebrates inhabiting sand, gravel, mud, clay, and similar substrates.

1.2 This device is used for collecting bottom samples from estuarine and marine bodies of water and large rivers.

1.3 This device is useful under adverse weather conditions.

1.4 For advantages and limitations of grab sampling devices, see Guide D 4387.

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 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 Smith-McIntyre grab sampler has paired jaws that are forced to penetrate into the intended substrate by two "loaded" springs, must close when positioned properly on the bottom, and retain discrete samples of sediment while it is brought to the surface for processing.

3.2 The Smith-McIntyre grab sampler is fitted with gauze panels or free swinging panels on the top to reduce the shock wave during descent.

3.3 Larger Smith-McIntyre grabs can be constructed depending on the type of bottom to be sampled and additional weights can be fitted to the frame of the grab sampler for additional penetration into the sediment.

4. Significance and Use

4.1 The Smith-McIntyre grab sampler is used to collect qualitative and quantitative 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 spring-loaded jaws of the Smith-McIntyre grab must be considered a hazard and caution must be exercised when using the device.

5.2 Due to the weight and size, this device must be used from a vessel with boom and lifting capabilities.

5.3 Do not handle this device in the loaded mode except just prior to sampling.

6. Procedures

6.1 The Smith-McIntyre grab is "loaded" by compressing the large coil springs mounted on the instrument using the loading bar.

6.2 As soon as the spring is loaded, insert the safety pins to prevent the accidental triggering of the bottom plates.

6.3 Once the device is overboard, just prior to being lowered to the bottom, remove the safety pins.

6.4 Exercise caution to stand clear of the cocked jaws.

6.5 The Smith-McIntyre is lowered slowly but at a steady rate by cable until the trigger plates contact the bottom.

6.6 Pressure on these plates releases the two coiled springs that drive the buckets (jaws) into the sediment.

6.7 Applying tension to the lifting cable completes the closure of the jaws, and the sampler may then be returned to the surface.

6.8 Closure of the sampler is made at the side, rather than at the bottom.

6.9 After closure the sample is given optimum protection from washout during return trip by the cylindrical configuration of the sampler.

6.10 This device may be fitted with a hydraulic closure device that facilitates sampling in hard-packed bottoms, such as clay.

6.11 Once on deck, place the sampler on a stand; the sample buckets can be disengaged from the rest of the device by releasing two retaining latches at each end of the upper semicylinder, and the sample is dumped into a large basin or washtub and prepared for processing.

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[1] This practice is under the jurisdiction of ASTM Committee E-47 on Biological Effects and Environmental Fate and is the direct responsibility of Subcommittee E47.08 on Biological Field Testing.

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