



Designation: D 4556 – 02

Standard Guide for Selecting Stream-Net Sampling Devices for Collecting Benthic Macroinvertebrates¹

This standard is issued under the fixed designation D 4556; 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 The Surber, portable invertebrate box, Hess, Hess stream bottom, and stream-bed fauna samples are qualitative and most are reasonably quantitative collecting devices. They are operated by hand. They provide for outlining a definite unit-area, for collecting the macroinvertebrates within the area, and are equipped with a net to retain organisms. They are designed to be placed by hand onto or in some cases into mud, sand, gravel, or rubble substrate types, in shallow streams, or shallow areas of rivers.

1.2 The drift net sampler is a qualitative and quantitative collecting device used to capture drifting organisms in flowing waters.

1.3 *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.*

2. Referenced Documents

2.1 ASTM Standards:

D 1129 Terminology Relating to Water²

D 4557 Practice for Collecting Benthic Macroinvertebrates with Surber and Related Type Samplers³

D 4558 Practice for Collecting Benthic Macroinvertebrates with Drift Nets³

3. Terminology

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

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 **habitat**—the place where an organism lives, for example, mud, rocks, shoreline, twigs, riffle, pool, etc.

3.2.3 **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, and echinoderms.

3.2.4 **microhabitat**—a smaller and more restricted habitat, for example, certain position on a rock, certain particle size sediment, etc.

3.2.5 **stream-net sampler**—a lotic collecting device, fitted with a net of various sizes, that collect organisms into it by flowing water passing through the sampler.

4. Significance and Use

4.1 The significance of using stream-net samplers is to collect macrobenthos inhabiting a wide range of habitat types from shallow flowing streams or shallow areas in rivers. The stream-net devices (Surber, portable invertebrate box, Hess, Hess stream bottom, and stream-bed fauna samplers) are unit area samplers used for collecting benthic organisms in certain types of substrates. These devices are hand operated and permit collections of qualitative or reasonably quantitative samples of benthic macroinvertebrates from flowing shallow waters. They are used to obtain quantitative estimates of the standing crop, for example, biomass, number of individuals and number of taxa of benthic macroinvertebrates per unit area of stream bottom. Drift nets are another type of qualitative and quantitative sieving device that are useful for collecting benthic macroinvertebrates that either actively or passively enter the water column from all types of substrates in flowing waters. These devices are used to determine the drift of benthic organisms from a variety of substrate types at one time.

5. Description of Stream-Net Samplers

5.1 The Surber sampler (see Figs. 1 and 2) is designed to obtain a qualitative or quantitative sample of macroinvertebrates from a unit area. The device is used in shallow flowing streams and shallow areas of rivers with mud, sand, gravel, or rubble substrates. Modification of its basic design has resulted in other sampling devices, such as the portable invertebrate box sampler (see Fig. 3). The latter closed-box-type sampler is

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² Annual Book of ASTM Standards, Vol 11.01.

³ Annual Book of ASTM Standards, Vol 11.05.

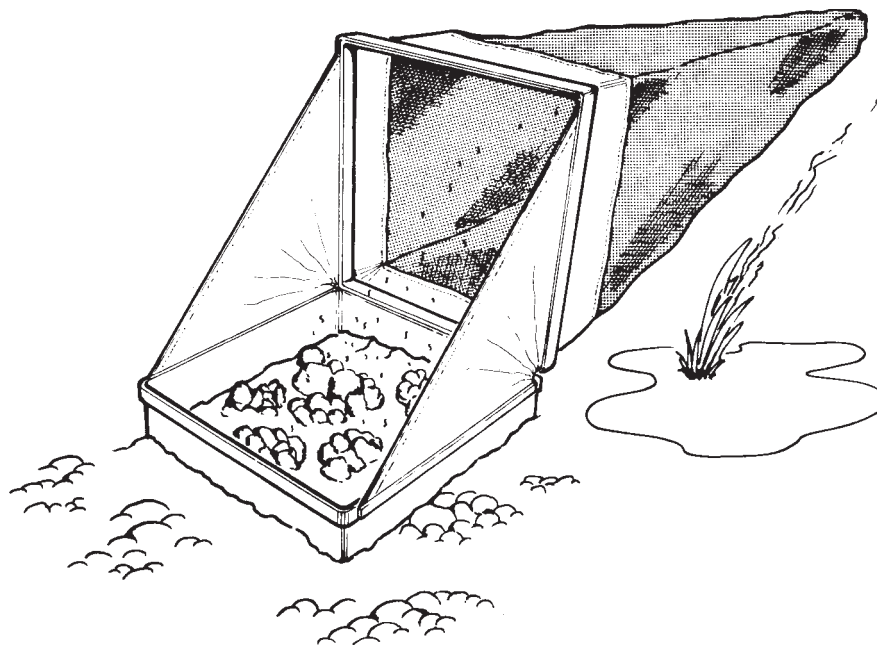


FIG. 1 Surber Sampler (Illustration courtesy of Kahl Scientific Instrument Corp., P.O. Box 1166, El Cajon, CA 92022-1166)

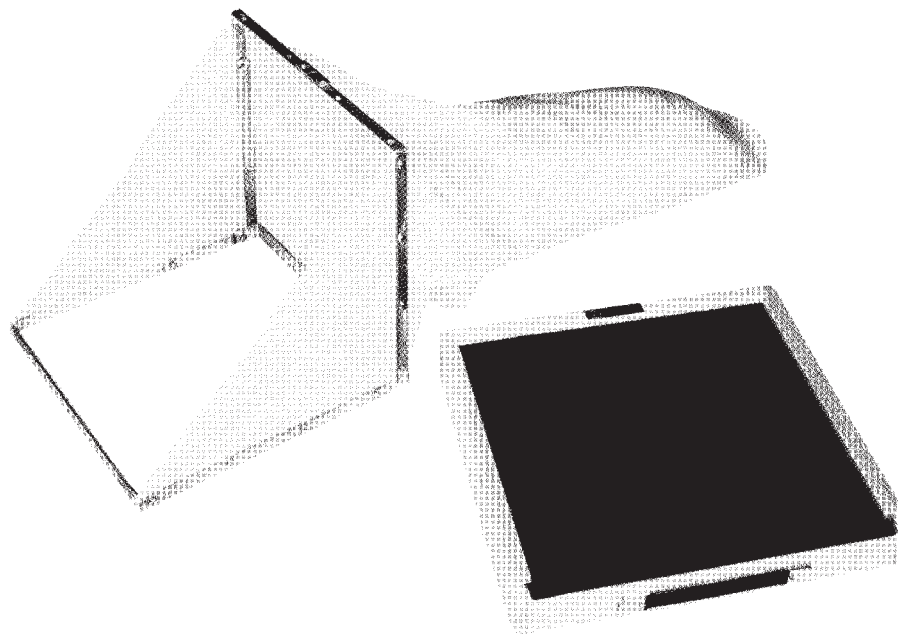


FIG. 2 Surber Sampler (Photograph courtesy of Wildlife Supply Co., 301 Cass St., Saginaw, MI 48602)

preferred, if available. A variety of mesh sizes is available and mesh size should be selected based on the objectives of the study; the finer the mesh, the more organisms (instars) will be collected. These devices sample an area of 0.1 m². For operating procedures, see Practice D 4557.

5.2 The Hess (cylindrical) sampler (see Fig. 4) is designed to obtain a qualitative or quantitative sample of macroinvertebrates from a unit area. The device is used in shallow flowing streams and shallow areas of rivers with mud, sand, gravel, or rubble substrates. Modification of its basic design has resulted in other sampling devices, such as the Hess stream bottom

sampler (see Fig. 5) and stream-bed fauna sampler (see Fig. 6). A variety of mesh sizes is available, and mesh size should be selected based on the objectives of the study; the finer the mesh, the more organisms (instars) will be collected. The area sampled by these devices is dependent on their diameter and is comparable to 5.1. These devices sample an area of 0.1 m². For operating procedures, see Practice D 4557.

5.3 The drift net sampler (see Figs. 7 and 8) is designed to obtain qualitative and quantitative samples of macroinvertebrates which drift in flowing streams and rivers with a velocity of not less than 0.05 m/s. Drift nets vary in size, but they are

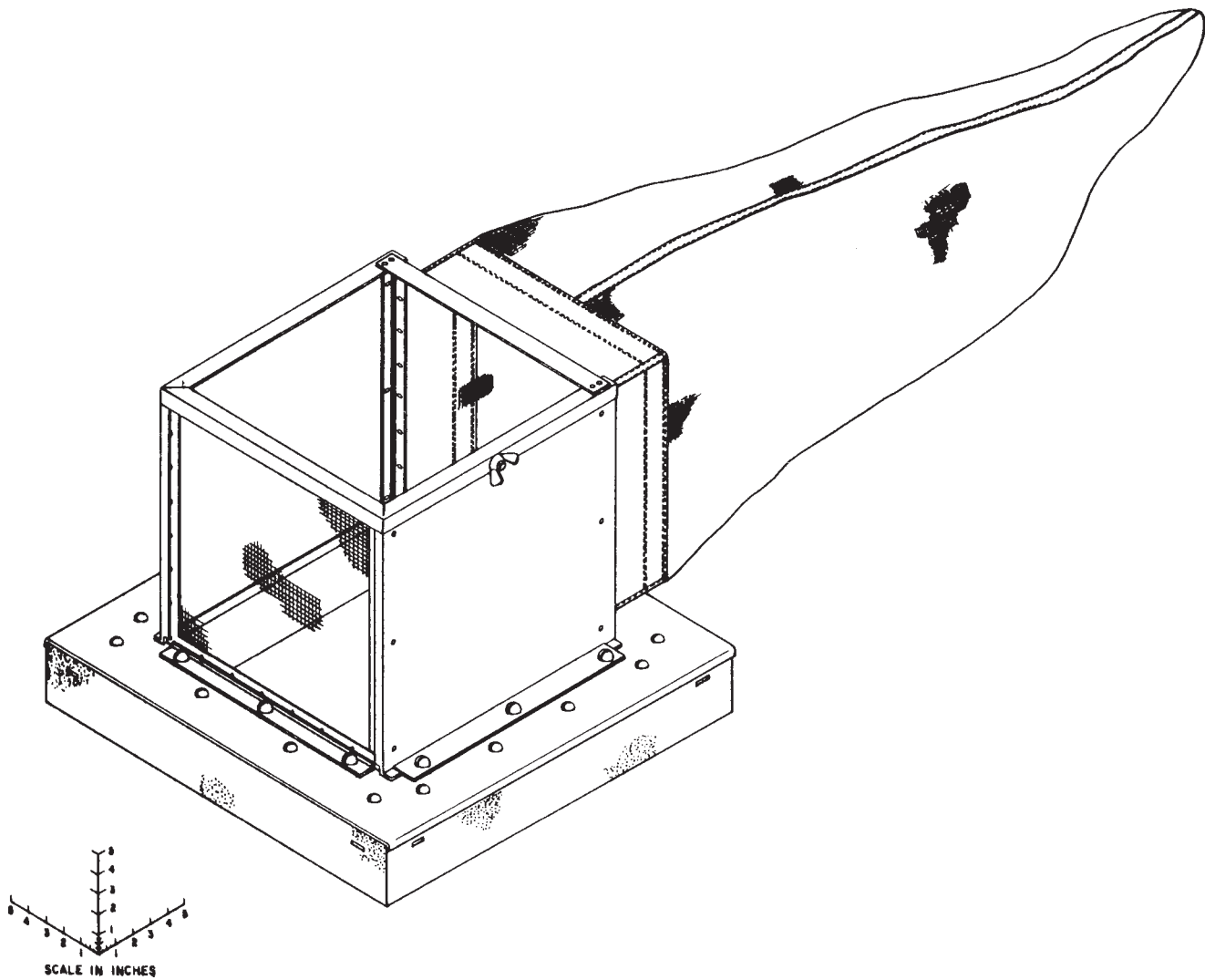


FIG. 3 Portable Invertebrate Box Sampler (Illustration courtesy of Ellis-Rutter Associates, P.O. Box 401, Punta Gorda, FL 33950)

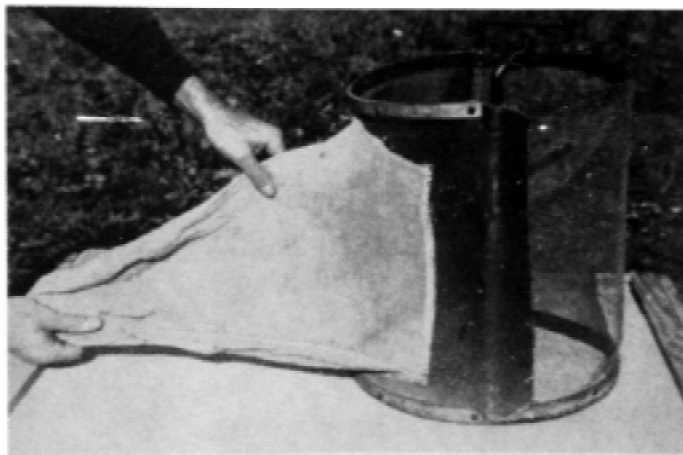


FIG. 4 Hess Sampler (Photograph courtesy of Billy G. Isom)

recommended for use in water pollution surveys or other ecological assessments has an upstream opening of 15 by 30

cm, and the collection bag is 1.3 m long. A variety of mesh sizes is available, and mesh size should be selected based on