



# Standard Practice for Sampling Phytoplankton with Pumps<sup>1</sup>

This standard is issued under the fixed designation D4133; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This practice covers the procedures for obtaining qualitative samples of a phytoplankton community by use of pumping systems.

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 Document

- 2.1 *ASTM Standards:*<sup>2</sup>  
[D4137 Practice for Preserving Phytoplankton Samples](#)

## 3. Summary of Practice

3.1 Water is pumped from a discrete depth and passed through a net. The captured phytoplankton are removed from the net and preserved as dictated by the objectives of the study.

## 4. Significance and Use

4.1 The *advantages* of a pumping phytoplankton sampler are as follows:

- 4.1.1 Sample size is more accurately controlled than with the use of a conical tow net.
- 4.1.2 Discrete samples from any depth are easily obtained.
- 4.1.3 Multiple or replicate samples are easily obtained.
- 4.1.4 They are adaptable to shallow ecosystems.

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<sup>1</sup> 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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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

4.1.5 They allow for a stable collecting efficiency.

4.2 The *disadvantages* of a pumping phytoplankton sampler are as follows:

4.2.1 They generally are bulky and frequently require an electrical source.

4.2.2 They generally are costly.

4.2.3 They collect only qualitative samples, or semiquantitative samples when used with a volume register.

4.3 There are several *special considerations* that shall be observed when using a pumping phytoplankton sampler. They are as follows:

4.3.1 Pumps can induce mortality of the organisms and damage the delicate forms.

4.3.2 If tubing is not properly cleaned after use, contamination of subsequent samples can ensue.

## 5. Apparatus

5.1 Pumping systems of various kinds have been used to collect qualitative or semiquantitative samples of phytoplankton. Several papers summarizing these techniques have been published.<sup>3,4</sup> Although a variety of pump apparatus have been used, the basic design consists of a pump, generally with a volume register, a base, and a concentrating net, such as a simple tow net sampler or Wisconsin net sampler.

## 6. Procedure

6.1 Pump water from a discrete depth and pass through a net. Remove the sample from the net. Preserve the plankton as described in Practice [D4137](#).

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<sup>3</sup> Aron, W., "The Use of a Large Capacity Portable Pump for Plankton Sampling, with Notes on Plankton Patchiness," *Journal of Marine Research*, Vol 16, 1958, pp. 158–174.

<sup>4</sup> Gibbons, S. G., and Fraser, J. H., "The Centrifugal Pump and Suction Base as a Method of Collecting Plankton Samples," *Journal of Conseil Permanent International Four L'Exploration De La Mer*, Vol 12, 1937, pp. 155–170.