

Water quality — Guidance standard for the routine sampling and pretreatment of benthic diatoms from rivers

The European Standard EN 13946:2003 has the status of a
British Standard

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National foreword

This British Standard is the official English language version of EN 13946:2003.

The UK participation in its preparation was entrusted by Technical Committee EH/3, Water quality, to Subcommittee EH/3/5, Biological methods, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This is one of a series of standards on water quality, others of which have been, or will be, published as Sections of BS 6068. The various Sections of BS 6068 are comprised within Parts 1 to 7, which are listed below.

- Part 1 *Glossary*
- Part 2 *Physical, chemical and biochemical methods*
- Part 3 *Radiological methods*
- Part 4 *Microbiological methods*
- Part 5 *Biological methods*
- Part 6 *Sampling*
- Part 7 *Precision and accuracy*

NOTE The tests described in this British Standard should only be carried out by suitably qualified persons with an appropriate level of biological expertise. Standard biological procedures should be followed throughout.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

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Summary of pages

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Water quality - Guidance standard for the routine sampling and pretreatment of benthic diatoms from rivers

Qualité de l'eau - Guide pour l'échantillonnage en routine et le prétraitement des diatomées benthiques de rivières

Wasserbeschaffenheit - Leitfaden zur Probenahme und Probenaufbereitung von benthischen Kieselalgen in Fließgewässern

This European Standard was approved by CEN on 21 February 2003.

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Foreword

This document (EN 13946:2003) has been prepared by Technical Committee CEN/TC 230 “Water analysis”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2003, and conflicting national standards shall be withdrawn at the latest by November 2003.

Annex A is informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

WARNING — Persons using this European Standard should be familiar with normal laboratory practice. 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 to establish appropriate health and safety practices and to ensure compliance with any national regulatory conditions.

Diatoms are an important component of aquatic ecosystems and constitute a water quality monitoring tool where the primary objective is either a measure of general water quality or of specific components of water quality (e.g. eutrophication, acidification). The requirement for the monitoring of such processes is inherent in the Water Framework Directive (2000/60/EC) and Urban Waste Water Treatment Directive (91/271/EEC) in addition to other EU Directives and international agreements. This European Standard covers aspects of sampling and pre-treatment relevant to assessment of water quality using benthic diatoms. Some aspects may also be relevant to measures of ecological integrity. These sampling instructions will result in samples suitable for quantifying relative numbers of benthic diatom taxa present. If it is necessary to quantify absolute numbers of taxa, or fresh weight per unit area, modifications to the method are required, which are not within the scope of this standard.

The use of diatoms as indicators of river water quality is widely accepted both in Europe and the USA. The methodology is based on the fact that all diatom species have tolerance limits and optima with respect to their preference for environmental conditions such as nutrients, organic pollution and acidity. Polluted waters will tend to support an increased abundance of those species whose optima correspond with the levels of the pollutant in question. Conversely, certain species are intolerant of elevated levels of one or more pollutants, whilst others can occur in a wide range of water qualities.

Methods using diatoms to assess water quality have been developed in several European countries (recent work is summarized in the proceedings of three symposia [1 to 3]. The methodologies for evaluating the diatom data vary but the sampling and pre-treatment processes are similar [4].

According to the precise usage to which this standard is to be put it is essential for specifiers and users to agree on any necessary variations or optional procedural details prior to use.

All numerical values given in this standard are approximate.

1 Scope

This guidance European Standard establishes a method for the sampling and laboratory preparation of benthic diatoms for water quality assessments. Data produced by this method are suitable for production of water quality indices based on the relative abundance of taxa. With appropriate modifications the method can be applied to the study of benthic diatoms in lakes.

2 Principle

Benthic diatoms from submerged hard surfaces or submerged macrophytes in rivers or streams are sampled in order to produce representative collections of the diatom assemblage indicative of water quality. Samples are cleaned using strong oxidizing agents in order to prepare diatoms for identification and enumeration.

The data obtained from the microscopic analysis of these samples are suitable for the production of diatom-based water quality indices (see references 1, 2, and 3).

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply:

3.1

artificial substratum

substratum introduced into river by operator specifically for colonisation by diatoms

3.2

benthic diatoms

diatoms living on substrata, rather than suspended in the water column

3.3

boulder

mineral substratum with a diameter > 256 mm

3.4

cobble

mineral substratum with a diameter > 64 mm and ≤ 256 mm

3.5

euphotic zone

the part of the water column in which there is sufficient light for photosynthesis

3.6

frustule

cell wall of diatoms, composed of silica and consisting of two valves linked by two or more girdle bands

3.7

habitat

the specific environment in which an organism lives

3.8

pebble

mineral substratum with a diameter > 16 , ≤ 64 mm

3.9

riffle

shallow part of a stream with swift flow, usually with a broken surface

3.10

substratum

natural or non-natural material from which benthic diatoms are sampled

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