

**Water quality - Guidance for the identification and enumeration of benthic diatom samples from rivers and lakes**

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English Version

## Water quality - Guidance for the identification and enumeration of benthic diatom samples from rivers and lakes

Qualité de l'eau - Guide pour l'identification et le  
dénombrement des échantillons de diatomées benthiques  
de rivières et de lacs

Wasserbeschaffenheit - Anleitung zur Bestimmung und  
Zählung von benthischen Kieselalgen in Fließgewässern  
und Seen

This European Standard was approved by CEN on 20 December 2013.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## Foreword

This document (EN 14407:2014) 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of an identical text or by endorsement, at the latest by September 2014 and conflicting national standards shall be withdrawn at the latest by September 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14407:2004.

This document contains the following technical changes compared with the previous edition:

- This European Standard is now also applicable for the identification, enumeration and interpretation of benthic diatoms in lakes, i.e. not only rivers.
- Informative Annex A "Example for quality assurance of diatom analyses from the UK" was added.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

Diatoms are an important component of aquatic ecosystems and constitute a water quality monitoring tool where the primary objective is either a measure of ecological status or the impact 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 identification and enumeration of the relative abundance of diatom taxa on prepared slides and of data interpretation relevant to assessment of water quality.

The use of diatoms as indicators of river and lake 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 [4] to [6]). The methodologies for evaluating the diatom data vary but the sampling and preparation processes are similar [1].

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

All numerical values given in this standard are approximate.

**WARNING — Persons using this European Standard should be familiar with usual laboratory practice. This European 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.**

## 1 Scope

This European Standard specifies methods for the identification and enumeration of relative proportions of diatom taxa on prepared slides and of data interpretation relevant to assessments of water quality in rivers and lakes. It is suitable for use with indices and assessment methods based on the relative abundance of taxa. The methods for identification and enumeration may also be applied to the study of benthic diatoms in other habitats provided that data interpretation methods appropriate to these habitats are used.

## 2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 2.1

#### **benthic diatoms**

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

### 2.2

#### **ecological status**

measure of the structure and functioning of aquatic communities

### 2.3

#### **expected natural assemblage**

assemblage present at a site when only natural stresses (e.g. floods) occur and man-made stress is not significant

### 2.4

#### **eyepiece graticule**

measuring device, inserted into one eyepiece of a microscope, permitting measurements of the size of objects

Note 1 to entry: The relationship between each division on the eyepiece graticule and the actual size of the object will depend upon the magnification of the microscope.

### 2.5

#### **frustule**

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

### 2.6

#### **habitat**

specific environment in which an organism lives

### 2.7

#### **prepared slide**

slide plus coverslip on which has been mounted a sub-sample of diatoms

### 2.8

#### **stage micrometer**

special graticule in the form of a scale carried at natural size on a microscope slide which is used as an absolute standard of length for calibrating microscope measuring systems

[SOURCE: ISO 10934-1:2002, 2.96.1]

### 2.9

#### **taxon (pl. taxa)**

taxonomic units, for example families, genera or species