



Institut luxembourgeois de la normalisation  
de l'accréditation, de la sécurité et qualité  
des produits et services

**ILNAS-EN 15460:2007**

**Water quality - Guidance standard for  
the surveying of macrophytes in lakes**

Qualité de l'eau - Guide pour l'étude des  
macrophytes dans les lacs

Wasserbeschaffenheit - Anleitung zur  
Erfassung von Makrophyten in Seen

**10/2007**



## National Foreword

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Makrophyten in Seen

This European Standard was approved by CEN on 1 September 2007.

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## Foreword

This document (EN 15460:2007) 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of an identical text or by endorsement, at the latest by April 2008, and conflicting national standards shall be withdrawn at the latest by April 2008.

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.

**WARNING — Working in or around water is inherently dangerous. This standard does not purport to address the safety problems associated with its use. It is the responsibility of the user to establish appropriate health and safety practices and to ensure compliance with national regulatory conditions where they exist.**

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

## Introduction

Macrophytes are an important component of aquatic ecosystems and can be used to facilitate monitoring of ecological status. The requirement for the use of macrophytes in monitoring is inherent in numerous European and national directives, e.g. Urban Waste water Treatment Directive (91/271/EEC), and the Nitrates Directive (91/676/EEC). Macrophytes are one of four obligatory biological quality elements identified in the Water Framework Directive (Council Directive establishing a framework for a community action in the field of water policy, 2000/60/EC), and should be used in the ecological classification of all lakes.

In addition to their important ecological role, the use of macrophytes as indicators of ecological status in standing waters is based on the fact that certain species and species groups are indicators for specific standing water types and are adversely affected by anthropogenic impact. In certain situations the lack of macrophytes is also a natural characteristic of certain types of aquatic habitat. For example, in lakes with high humic content or high turbidity, macrophytes may be virtually absent due to the reduction in light penetration. Many lakes show alternating states with clear water in some years and turbid water in others associated with the dominance or absence of macrophytes but with the same anthropogenic impact.

A wide range of sampling and survey methodologies have been developed for specific applications including conservation, drainage impact, management, ecological habitat, enhancement etc. The methodology of this guidance standard is recommended specifically for the surveying of macrophytes in both natural and artificial fresh water lakes, for the purpose of monitoring ecological status or the status of the macrophyte vegetation itself. It could be used, however, as the basis for general monitoring of water quality or other applications.

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

## 1 Scope

This guidance standard defines a method for surveying aquatic macrophytes in lakes - primarily for the purpose of assessing ecological status, using these organisms as an element of biological quality. The information provided by this method includes the composition and abundance of the aquatic macrophyte flora.

For a complete assessment of ecological status, other elements of biological quality should also be assessed.

The general principle of the approach described in this European Standard may also form the basis for the monitoring and assessment of macrophytes in lakes, for example, for conservation purposes.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Not applicable

## 3 Terms and definitions

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

### 3.1

#### **amphiphyte**

plant that can grow submerged in the water up to completely above the water, typically under fluctuating water level conditions

### 3.2

#### **aquatic macrophytes**

larger plants of fresh water which are easily seen with the naked eye, including all aquatic vascular plants, bryophytes, stoneworts (Characeae) and macro-algal growths (see EN 14184)

**NOTE** For this method, this term is taken to include macrophytes growing in the water and in the wash zone, including hydrophytes, helophytes, amphiphytes, as well as supra-littoral species in the wash zone (such as *Carex*).

### 3.3

#### **belt transect**

band of defined width oriented at right angles to the shoreline or bank, which starts at the water line including the wash and inundation zones starting at the highest seasonal waterline and in lakes extends to the lowermost limit of the aquatic macrophyte vegetation

**NOTE 1** The aquatic vegetation (species composition, abundance, cover) is analysed within this transect. The transect can be virtual or physically delineated.

**NOTE 2** The lowermost limit can change over years, either the belt transect is then extended to the lowermost limit that can be expected ever, or the lowermost limit or the belt transect is left variable through the years.

### 3.4

#### **ecological status**

expression of the quality of the structure and functioning of aquatic ecosystems, expressed by comparing the prevailing conditions with reference conditions (see EN 14184)

**NOTE** As classified in accordance with Annex V of the EC Water Framework Directive (2000/60/EC).