SLOVENSKI STANDARD
SIST EN 15843:2010

01-julij-2010

Kakovost vode - Smerni standard za določanje stopnje spreminjanja hidromorfoloških značilnosti vodotokov

Water quality - Guidance standard on determining the degree of modification of river hydromorphology

Wasserbeschaffenheit - Anleitung zur Beurteilung von Veränderungen der hydromorphologischen Eigenschaften von Fließgewässern

Qualité de l'eau - Guide pour la détermination du degré de modification de l'hydromorphologie des rivières

Ta slovenski standard je istoveten z: **EN 15843:2010**

ICS:

13.060.45	Preiskava vode na splošno	Examination of water in general

SIST EN 15843:2010 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15843

January 2010

ICS 13.060.45

English Version

Water quality - Guidance standard on determining the degree of modification of river hydromorphology

Qualité de l'eau - Guide pour la détermination du degré de modification de l'hydromorphologie des rivières

Wasserbeschaffenheit - Anleitung zur Beurteilung von Veränderungen der hydromorphologischen Eigenschaften von Fließgewässern

This European Standard was approved by CEN on 28 November 2009.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, 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 United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword

This document (EN 15843:2010) 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 July 2010, and conflicting national standards shall be withdrawn at the latest by July 2010.

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 — Safety issues are paramount when surveying rivers. Surveyors should conform to EU and national Health and Safety legislation, and any additional guidelines appropriate for working in or near rivers.

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, 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

This European Standard will enable broad comparisons to be made of river hydromorphological modifications throughout Europe (e.g. for reporting by the European Environment Agency). The assessment of river "quality" in Europe has evolved over the past 20 years. From its original focus on organic pollution it now relies on methods for analysing a range of chemical and biological attributes. More recently, several European countries have developed systems for evaluating the hydromorphological features of rivers. The EC Water Framework Directive (WFD) has reinforced the need for this broader view of river "quality" through its requirement for determining "ecological status" based on macrophytes, phytobenthos, invertebrates and fish. The Directive also requires that hydromorphological and physico-chemical conditions should be suitable for supporting biological communities, although hydromorphology is only classified at high status. EN 14614, *Water Quality — Guidance standard for assessing the hydromorphological features of rivers* describes a protocol for field survey and feature recording, whereas this standard gives guidance on assessing the modification of river hydromorphological features. It focuses especially on human pressures that affect rivers; thus, it may be helpful for implementing the WFD by indicating the extent to which these pressures might have caused a departure from hydromorphological reference conditions. Although the procedure described in this standard enables the hydromorphological characterization of rivers, it does not attempt either to describe methods for defining high status for hydromorphology under the WFD or to link broadscale hydromorphological classification to assessments of ecological status. In addition to its relevance to the WFD, this standard has applications also for nature conservation, environmental impact assessment, river basin management, flood risk assessment (e.g. the EC Floods Directive) and setting targets for river restoration work.

1 Scope

This European Standard provides guidance on characterizing the modifications of river hydromorphological features described in EN 14614. Both standards focus more on morphology than on hydrology and continuity, and on lateral and longitudinal continuity rather than on vertical continuity which is difficult to measure. This standard will enable consistent comparisons of hydromorphology between rivers within a country and between different countries in Europe, providing a method for broad-based characterization across a wide spectrum of hydromorphological modification of river channels, banks, riparian zones and floodplains. Its primary aim is to assess "departure from naturalness" as a result of human pressures on river hydromorphology, and it suggests suitable sources of information (see Table A.1) which may contribute to characterizing the modification of hydromorphological features.

In doing so, it does not replace methods that have been developed for local assessment and reporting. Decisions on river management for individual reaches or catchments require expert local knowledge and vary according to river type.

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.

EN 14614, *Water quality — Guidance standard for assessing the hydromorphological features of rivers*

3 Terms and definitions

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

3.1
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

NOTE This definition includes plants associated with open water or wetlands with shallow water.

[EN 14614:2004, 2.1]

3.2
attribute
specific recorded element of a hydromorphological feature (e.g. "boulders" and "silt" are substrate attributes; "sheet piling" and "gabions" are attributes of engineered banks)

[EN 14614:2004, 2.2]

3.3
bank
permanent side of a river or island, which is above the normal water level and only submerged during periods of high river flow

[EN 14614:2004, 2.4]

NOTE In the context of this European Standard, the top is marked by the first major break in slope, above which cultivation or development is possible.

3.4
berm
natural or artificial shelf within a river that is exposed above water level during low flows, but is submerged during high flows

[EN 14614:2004, 2.6]

3.5
bog
wetland, fed by atmospheric precipitation, in which the vegetation communities (frequently dominated by *Sphagnum* mosses) form peat over long periods of time

[EN 14614:2004, 2.7]

3.6
braiding
course of a river naturally divided by deposited sediment accumulations, characterised by at least two channels which often change their course regularly

[EN 14614:2004, 2.8]

3.7
compaction
consolidation of the river bed through physical, chemical or biological processes

[EN 14614:2004, 2.10]

3.8
culvert
arched, enclosed or piped structure constructed to carry water under roads, railways and buildings

3.9
ecological status
expression of the quality of the structure and functioning of aquatic ecosystems, expressed by comparing the prevailing conditions with reference conditions

NOTE As classified in accordance with Annex V of the EC Water Framework Directive.

[EN 14614:2004, 2.12]

3.10
floodplain
valley floor adjacent to a river that is (or was historically) inundated periodically by flood waters

[EN 14614:2004, 2.14]

3.11
gabion
wire basket containing stones, used for river-bed or bank protection

[EN 14614:2004, 2.16]

3.12
hard materials/engineering
bank protection using artificial materials such as concrete, sheet piling or bricks

NOTE See "soft materials".

3.13
hydromorphology
physical and hydrological characteristics of rivers including the underlying processes from which they result

[EN 14614:2004, 2.18]

3.14
hydro-peaking
rapid and frequent fluctuations in flow resulting from hydropower generation to meet peak demands in electricity

3.15
lateral connectivity
freedom for water to move between the channel and the floodplain

[EN 14614:2004, 2.19]

3.16
lateral movement
freedom for a river channel to move across a floodplain

[EN 14614:2004, 2.20]

3.17
planform
view of river pattern from above (e.g. sinuous, straight)

[EN 14614:2004, 2.22]

3.18
reach
major sub-division of a river, defined by physical, hydrological, and chemical character that distinguishes it from other parts of the river system upstream and downstream

[EN 14614:2004, 2.25]

3.19
reference conditions
conditions representing a totally undisturbed state, lacking human impact, or near-natural with only minor evidence of distortion

NOTE For waters not designated as heavily modified or artificial, synonymous with "high ecological status" in the Water Framework Directive.

[EN 14614:2004, 2.26]

3.20
regrading
river widening and deepening and modifying the bed and bank profiles to accommodate increased flows

3.21
reinforcement
strengthening of river beds and banks for various purposes (e.g. ford construction, erosion control) using materials such as boulders, sheet piling, geotextiles, etc.

3.22
residual flow
flow remaining in a river after abstraction (e.g. for hydropower generation, water supply, etc.)

NOTE A minimum residual flow may be set to protect downstream uses, below which abstraction is not permitted.

3.23
riparian zone
area of land adjoining a river channel (including the river bank) capable of directly influencing the condition of the aquatic ecosystem (e.g. by shading and leaf litter input)

[EN 14614:2004, 2.29]

NOTE In this European Standard, the term "riparian zone" does not include the wider floodplain.

3.24
river type
group of rivers that can be broadly differentiated from other groups on the basis of their physical and chemical characteristics (e.g. lowland chalk streams; upland ultra-oligotrophic rivers)

[EN 14614:2004, 2.32]

3.25
sheet piling
material used for vertical bank protection (e.g. corrugated metal sheets)

[EN 14614:2004, 2.34]

3.26
sinuosity
degree of deviation from a straight line, defined as channel length/valley length

[EN 14614:2004, 2.36]

3.27
soft materials/engineering
bank protection using biodegradable materials such as brushwood, reeds or live willows

NOTE See "hard materials".

3.28
substrate
material making up the bed of a river

[EN 14614:2004, 2.40]

3.29
weir
structure used for controlling flow and upstream surface level, or for measuring discharge

[EN 14614:2004, 2.41]

3.30
willow spiling
method of soft engineering used for strengthening river banks using retaining walls constructed of woven willow stems from which trees will sprout

3.31
woody debris
dead woody material that falls into rivers and streams, ranging in size from leaf fragments (fine woody debris) to branches or whole trees (coarse woody debris)

4 Principle

4.1 A standard protocol is described for assessing the extent to which the hydromorphological features of river channels, banks, riparian zones and floodplains are modified. These features have been divided into two groups – a larger group of "core features" and a smaller group of "subsidiary features". Core features are used to establish "departure from naturalness" as a result of human pressures on river hydromorphology. Subsidiary features also include some that contribute to habitat quality assessment. The former can be determined without reference to river type using data from field survey, remote sensing, maps or local knowledge, whereas the latter require an understanding of the features to be expected in different types of river.

Both this European Standard and EN 14614 focus attention on river features as surrogates for river processes. Those making assessments, therefore, do not need to be trained geomorphologists, although some geomorphological input may be useful in determining the contribution made by subsidiary, type-specific features.

4.2 The principal output from this standard is an assessment of the modification of hydromorphological features of an entire river reach. A definition of the term "river reach" and its relationship with survey units is given in EN 14614. However, the principles in the standard may also be applied to much shorter stretches, such as those requiring restoration, or where near-natural conditions need to be protected.

4.3 To ensure consistency in approach, the main feature categories are the same as those in EN 14614. However, some minor adjustments have been made to the details to help facilitate scoring.

5 Determining the hydromorphological modifications of rivers

5.1 Feature categories

Assessments are made for all of the feature categories listed in EN 14614, some of which have been sub-divided into core and subsidiary features (Table 1).

Table 1 — Categories of "core" and "subsidiary" features for determining modification

Category	Core	Subsidiary
1. Channel geometry		
1a Planform	✓	
1b Channel section (long-section and cross-section)	✓	
2. Substrates		
2a Extent of artificial material	✓	
2b "Natural" substrate mix or character altered		✓
3. Channel vegetation and organic debris		
3a Aquatic vegetation management		✓
3b Extent of woody debris if expected		✓
4. Erosion/deposition character		✓
5. Flow		
5a Impacts of artificial in-channel structures within the reach	✓	
5b Effects of catchment-wide modifications to natural flow character	✓	