



SLOVENSKI STANDARD

SIST EN 16150:2012

01-junij-2012

Kakovost vode - Navodilo za vzorčenje bentoških nevretenčarjev v sorazmerju z zastopanostjo habitatov v prebrodljivih rekah

Water quality - Guidance on pro-rata Multi-Habitat sampling of benthic macro-invertebrates from wadeable rivers

Wasserbeschaffenheit - Anleitung für die pro-rata Multi-Habitat-Probenahme benthischer Makroinvertebraten in Flüssen geringer Tiefe (watbar)

Qualité de l'eau - Lignes directrices pour l'échantillonnage des macroinvertébrés benthiques en cours d'eau peu profonds au prorata des surfaces de recouvrement des habitats présents

<https://standards.iteh.ai/catalog/standards/sist/16d5928f-29bf-4fa7-b739-05ccfb07d04a/sist-en-16150-2012>

Ta slovenski standard je istoveten z: EN 16150:2012

ICS:

13.060.10	Voda iz naravnih virov	Water of natural resources
13.060.70	Preiskava bioloških lastnosti vode	Examination of biological properties of water

SIST EN 16150:2012

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 16150:2012

<https://standards.iteh.ai/catalog/standards/sist/16d5928f-29bf-4fa7-b739-05ccfb07d04a/sist-en-16150-2012>

EUROPEAN STANDARD

EN 16150

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2012

ICS 13.060.70

English Version

Water quality - Guidance on pro-rata Multi-Habitat sampling of benthic macro-invertebrates from wadeable rivers

Qualité de l'eau - Lignes directrices pour l'échantillonnage des macroinvertébrés benthiques en cours d'eau peu profonds au prorata des surfaces de recouvrement des habitats présents

Wasserbeschaffenheit - Anleitung für die pro-rata Multi-Habitat-Probenahme benthischer Makroinvertebraten in Flüssen geringer Tiefe (watbar)

This European Standard was approved by CEN on 16 March 2012.

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-CENELEC 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-CENELEC 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, Turkey and United Kingdom.

<https://standards.iteh.ai/catalog/standards/sist/16d5928f-29bf-4fa7-b739-05ccfb07d04a/sist-en-16150-2012>



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
4 Description of the sampling approach	6
5 Field sampling procedures	7
5.1 Factors limiting effective Multi-Habitat-Sampling (MHS).....	7
5.2 Estimation of habitat composition.....	7
5.3 Allocation of sampling units.....	7
6 Detailed description of sampling procedures	8
6.1 General recommendations for sampling.....	8
6.2 Megalithal (bedrock and boulders)	9
6.3 Macrolithal and mesolithal (cobbles, stones, pebbles)	9
6.4 Microlithal and smaller mineral substrates.....	9
6.5 Xylal (woody debris).....	9
6.6 Roots.....	10
6.7 Coarse Particulate Organic Matter (CPOM/leaf litter)	10
6.8 Macrophytes (emergent and submerged).....	10
6.9 Technolithal.....	10
7 Sample treatment.....	10
7.1 Removal of large material and sorting.....	10
7.2 Removal of large organisms.....	10
7.3 Storage.....	10
7.4 Labelling	10
7.5 Refining the site-protocol	11
Annex A (informative) Sampling protocols.....	12
Bibliography	14

Foreword

This document (EN 16150:2012) 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 October 2012, and conflicting national standards shall be withdrawn at the latest by October 2012.

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.

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, Turkey and the United Kingdom.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 16150:2012](https://standards.iteh.ai/catalog/standards/sist/16d5928f-29bf-4fa7-b739-05ccfb07d04a/sist-en-16150-2012)

<https://standards.iteh.ai/catalog/standards/sist/16d5928f-29bf-4fa7-b739-05ccfb07d04a/sist-en-16150-2012>

EN 16150:2012 (E)**1 Scope**

This European Standard gives guidance on procedures for the pro-rata Multi-Habitat-Sampling (MHS) of benthic macro-invertebrates in wadeable rivers and streams. The term "pro-rata" reflects the intention to sample adequate proportions of riverine habitats with reference to their percentage occurrence.

The pro-rata MHS technique does not replace other techniques, but is rather, alongside other applications, a fundamental requisite of some multi-metric assessment approaches used to evaluate the ecological status of running waters. The method described in this document is one of the possible techniques among the existing pro-rata MHS techniques.

The MHS methodology is based on Rapid Bioassessment Protocols [1], the procedures of the Environment Agency for England and Wales [2], the Austrian Guidelines for the Assessment of the Saprobiological Water Quality of Rivers and Streams [3], the AQEM sampling manual [4], the AQEM & STAR site protocol [5], EN 27828, the Austrian Standards M 6232 and M 6119-2 [6], [7], the German Standard DIN 38410-1 [8] and the French Standard XP T90-333 [9].

This European Standard also describes in a detailed manner how to sample different habitats that might be suitable for sampling approaches other than Multi-Habitat-Sampling.

2 Normative references

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

EN 27828, *Water quality — Methods of biological sampling — Guidance on handnet sampling of aquatic benthic macro-invertebrates (ISO 7828)* [SIST EN 16150:2012](https://standards.iteh.ai/catalog/standards/sist/16d5928f-29bf-4fa7-b739-05ccfb07d04a/sist-en-16150-2012)

<https://standards.iteh.ai/catalog/standards/sist/16d5928f-29bf-4fa7-b739-05ccfb07d04a/sist-en-16150-2012>

3 Terms and definitions

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

- 3.1**
akal
fine to medium-sized gravel; grain diameter > 0,2 cm to 2 cm
- 3.2**
argyllal
silt, loam, clay
- 3.3**
debris
organic and inorganic matter deposited within the splash zone area by wave-motion and changing water levels
- 3.4**
hygropetric sites
thin water layer on solid (rocky) substrates
- 3.5**
investigation site
specific area of an investigated river reach for sampling benthic organisms

3.6**macro-algae**

strands of filamentous algae and algal tufts

3.7**macrolithal**

coarse blocks, cobbles, gravel and sand; grain diameter > 20 cm to 40 cm

3.8**megalithal**

upper sizes of large cobbles, boulders, blocks and bedrock; grain diameter > 40 cm

3.9**mesolithal**

fist to hand-sized cobbles with a variable percentage of gravel and sand; grain diameter > 6 cm to 20 cm

3.10**micro-algae**

algal films

3.11**microlithal**

coarse gravel (size of a pigeon egg to a child's fist) with variable percentages of medium to fine gravel; grain diameter > 2 cm to 6 cm

3.12**pelal**

mud and sludge; grain diameter < 0,06 mm

3.13**psammal**

sand; grain diameter 0,06 mm to 2 mm

3.14**psammopelal**

sand and mud

3.15**sampling unit**

benthic sample of a specific habitat

Note 1 to entry: One Multi-Habitat sample usually consists of a fixed number of sampling units.

3.16**sewage bacteria and fungi**

filaments, tufts or coverage of bacteria and fungi, to be seen with the naked eye

EXAMPLE Sphaerotilus, Leptomitius, Beggiatoa, Thiothrix.

3.17**xylal**

tree trunks (dead wood), branches, roots

3.18**technolithal**

solid material (usually stones) or geotextiles inserted into a river for the purposes of river engineering

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 16150:2012

<https://standards.iteh.ai/catalog/standards/sist/16d5928f-29bf-4fa7-b739-05ccfb07d04a/sist-en-16150-2012>

4 Description of the sampling approach

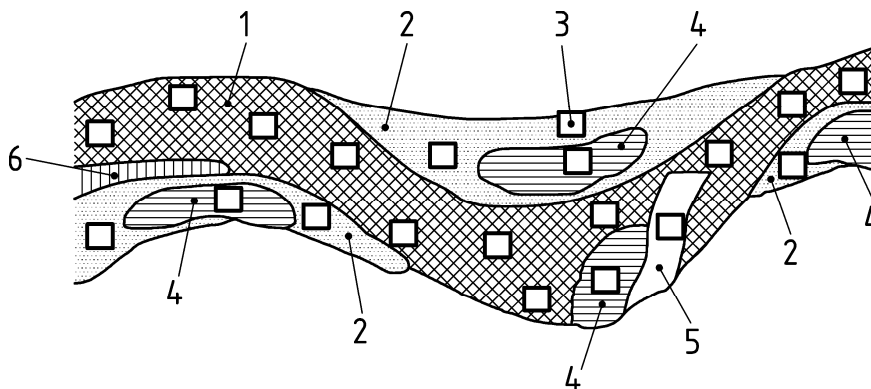
The method focuses on a multi-habitat approach, designed for sampling major habitats in proportion to their presence within a sampling reach. A sample consists of a number of sampling units (SU) taken from habitat types in relation to their spatial percentage cover. The AQEM and STAR projects [5] identified 20 "sampling units" taken from all habitat types at an investigation site, each with a share of at least 5 % spatial coverage, to be the optimum approach for ecological status assessment of wadeable rivers. Where habitat diversity is very low or taxa diversity within habitats is low and using 20 units would be an excessive repetitive sampling burden, fewer than 20 "sampling units" may be required to gain a good assessment of the ecological status. Where fewer than 20 units are used, the minimum spatial coverage should be adjusted accordingly: for example, 10 sampling units would have a minimum of 10 % spatial coverage. Throughout the rest of this document, the example of 20 "sampling units" is used to describe the approach; users should adjust numbers of unit accordingly in cases of low habitat or taxa diversity.

A "sampling unit" is a sample performed by positioning the net and disturbing the substrate in a quadratic area that equals the frame-size upstream of the net (EN 27828). Sediments are disturbed to an adequate depth that ensures capture of all species present depending on substrate diameter, compactness and 'shape' (organic substrata). For example, sediments should be disturbed to a depth of approximately

- 5 cm to 10 cm for finer substrates (psammal, pelal, fine particulate organic matter (FPOM)),
- 10 cm to 15 cm for intermediate sized substrates (akal, microlithal, coarse particulate organic matter (CPOM)), or
- 15 cm to 20 cm for larger substrates (macrolithal; living parts of terrestrial plants).

A distribution of 20 sampling units proportional to the share of habitats means if the total habitat in the sampling area consists of 50 % psammal (sand), then 10 "sampling units" are withdrawn from this substrate. The categories of habitat composition follow the descriptions given in Clause 3.

If a square net of 25 cm × 25 cm is used, the sampling procedure equals a sampled area of approximately 1,25 m² of the stream bed (Figure 1).



Key

- 1 lithal (55 % = 11 replicates)
- 2 psammal (25 % = 5 replicates)
- 3 replicate
- 4 CPOM (15 % = 3 replicates)
- 5 xylal (5 % = 1 replicate)
- 6 akal (< 5 % = 0 replicates)

Figure 1 — Example of sampling unit position in a theoretical investigation site according to the "Multi-Habitat-Sampling" method [1]

5 Field sampling procedures

5.1 Factors limiting effective Multi-Habitat-Sampling (MHS)

The effective use of the MHS procedure may be impaired under the following conditions which should be avoided and from which samples should not be taken (if possible):

- during or shortly after floods; consider allowing a recovery period of four to six weeks after a spate;
- during or shortly after droughts (completely dry river sections);
- during any other natural or man-induced disturbances, e.g. if unnatural turbidity prevents a proper estimation of the habitat composition or sampling of the stream bed.

The Multi-Habitat-Sampling procedure includes several steps which are described in 5.2 and 5.3.

5.2 Estimation of habitat composition

Before initiating sampling, complete the sampling protocol (see Annex A for an example), especially the estimation of the percentage coverage of the different habitats. Whenever possible, the sampling area should not be disturbed by physical contact. If the estimation of the coverage of habitats needs to be corrected, e.g. due to low visibility of parts of the river bed, this can be done during the sampling procedure. After sampling, the estimated coverage of substrates should be reviewed for accuracy and completeness.

With 20 sampling units (for example) and based on the habitats listed in Clause 4 or Table A.1, the coverage of all habitats in the river channel (including margins) with at least 5 % cover is recorded to the nearest 5 %. The presence of other habitats (< 5 % cover) is indicated by a cross.

NOTE It is advisable to divide the sampling reach into 20 m to 25 m segments, thus easing the habitat estimation.

Estimate habitat composition by referring to a suitable pro forma (for example Table A.1) and take into account the following steps:

- a) Estimation of the cover of mineral habitats: the sum of the coverage of the individual mineral habitat should be 100 % (column 1, upper part in Table A.1).
- b) Estimation of the cover of biotic habitats (seen as an additional layer on the mineral substrates, e.g. macrophytes, macro-algae, woody material, roots, or CPOM): the sum of the coverage of the individual biotic habitats is variable (0 % to 100 %).
- c) Depending on the objectives of the sampling, do not sample habitats with a cover of less than 5 % but rather indicate these with a cross.

5.3 Allocation of sampling units

Complete a survey specific pro forma (for example, Sampling Protocol II, Table A.2) in order to define the number and the allocation of sampling units (see Annex A).

To allocate the sampling units, consider the mineral (3.1) and the biotic (3.2) habitats as one layer, thus combining the biotic habitat estimation with the mineral substrate estimation. This ensures that samples taken from biotic habitats include the underlying (subjacent) mineral substrates. The sum of the cover of all habitats (mineral and biotic) should be 100 %. If the conditions allow, estimate the cover of mineral and biotic habitats in one step. This procedure may be helpful if a high proportion of biotic habitats are present in the river and if consequently problems in assessing the percentage of the underlying mineral substrates arise.

The allocation of the 20 sampling units (for example) follows the combined (mineral and biotic) habitat estimation (5 % coverage equals 1 sampling unit) using a suitable pro forma (see Table A.2).