SLOVENSKI STANDARD
SIST EN ISO 20079:2007

01-februar-2007

Kakovost vode - Doloļ evanje toksiļ nih uļ inkov sestavin vode in odpadnih voda na vodno leļ o (Lemna minor) - Preskus zaviranja rasti vodne leļ e (ISO 20079:2005)

Water quality - Determination of the toxic effect of water constituents and waste water on duckweed (Lemna minor) - Duckweed growth inhibition test (ISO 20079:2005)

Wasserbeschaffenheit - Bestimmung der toxischen Wirkung von Wasserinhaltsstoffen und Abwasser gegenüber Wasserlinsen (Lemna minor) - Wasserlinsen-Wachstumshemmtest (ISO 20079:2005)

Qualité de l'eau - Détermination de l'effet toxique des constituants de l'eau et des eaux résiduaires vis-a-vis des lentilles d'eau (Lemna minor) - Essai d'inhibition de la croissance des lentilles d'eau (ISO 20079:2005)

Ta slovenski standard je istoveten z: EN ISO 20079:2006

ICS:

13.060.70	Preiskava bioloških lastnosti vode	Examination of biological properties of water

SIST EN ISO 20079:2007 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 20079

September 2006

ICS 13.060.70

English Version

Water quality - Determination of the toxic effect of water constituents and waste water on duckweed (Lemna minor) - Duckweed growth inhibition test (ISO 20079:2005)

Qualité de l'eau - Détermination de l'effet toxique des constituants de l'eau et des eaux résiduaires vis-à-vis des lentilles d'eau (Lemna minor) - Essai d'inhibition de la croissance des lentilles d'eau (ISO 20079:2005)

Wasserbeschaffenheit - Bestimmung der toxischen Wirkung von Wasserinhaltsstoffen und Abwasser gegenüber Wasserlinsen (kursiv(Lemna minor)) - Wasserlinsen-Wachstumshemmtest (ISO 20079:2005)

This European Standard was approved by CEN on 17 August 2006.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Foreword

The text of ISO 20079:2005 has been prepared by Technical Committee ISO/TC 147 "Water quality" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 20079:2006 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 March 2007, and conflicting national standards shall be withdrawn at the latest by March 2007.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, 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.

Endorsement notice

The text of ISO 20079:2005 has been approved by CEN as EN ISO 20079:2006 without any modifications.

INTERNATIONAL STANDARD

ISO 20079

First edition
2005-11-01

Water quality — Determination of the toxic effect of water constituents and waste water on duckweed (*Lemna minor*) — Duckweed growth inhibition test

*Qualité de l'eau — Détermination de l'effet toxique des constituants de l'eau et des eaux résiduaires vis-à-vis des lentilles d'eau (*Lemna minor*) — Essai d'inhibition de la croissance des lentilles d'eau*

Reference number
ISO 20079:2005(E)

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 20079 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 5, *Biological methods*.

Introduction

The duckweed species *Lemna minor* is used as model organism for higher water plants. Duckweeds are monocotyledonous, free-floating angiosperms and belong to the *Arales* within the subclass of *Aridae*. Duckweeds are fast growing higher plants, spreading from the tropic to the arctic zone. As primary producers they are a food source for waterfowl, fish and small animals and serve as physical support for a variety of small invertebrates.

Duckweed can be damaged by water constituents and effluents (see Annex B). The subsequent inhibition of growth is calculated from the observation parameters (frond number, frond area, chlorophyll, dry weight) by a number of defined calculation methods.

EC values are determined to allow for an assessment of toxic effects of water constituents (e.g. chemicals, plant protection products). The evaluation for at least two observation parameters is based on the average specific growth-rates.

The test is designed for measurement of response of substances dissolved in water. This includes the definition of a fixed dilution step, or a concentration of the test sample at which a parameter of observation (endpoint) is inhibited relative to a control for a defined percentage.

Water quality — Determination of the toxic effect of water constituents and waste water on duckweed (*Lemna minor*) — Duckweed growth inhibition test

WARNING — Persons using this International 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 safety and health practices and to ensure compliance with any national regulatory conditions.

IMPORTANT — It is absolutely essential that tests conducted according to this International Standard be carried out by suitably trained staff.

1 Scope

This International Standard specifies a method for the determination of the growth-inhibiting response of duckweed (*Lemna minor*) to substances and mixtures contained in water, treated municipal wastewater and industrial effluents.

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.

ISO 5667-16, *Water quality — Sampling — Part 16: Guidance on biotesting of samples*

ISO 10260, *Water quality — Measurement of biochemical parameters — Spectrometric determination of the chlorophyll-a concentration*

3 Terms and definitions

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

3.1
axenic cultures
monocultures of organisms from a single species, free from fungi, algae and other macrophyte species

3.2
calculation parameters
parameters for the estimation of toxicity derived from any parameters of observation by different methods of calculation

EXAMPLE Growth-rates derived from frond number, frond area, chlorophyll and dry weight are calculation parameters in this International Standard.

3.3
chlorosis
loss of pigment (yellowing of frond tissue)

3.4
colony
aggregate of mother and daughter fronds, attached to each other, sometimes referred to as a plant

3.5
control batch
control medium, including organisms used for testing

3.6
control medium
combination of dilution water and/or nutrient medium used in the test

3.7
dilution water
water added to the test sample to prepare a series of defined dilutions

3.8
doubling time
quotient of natural logarithm of 2 (ln 2) divided by average specific growth-rate

3.9
effective concentration

concentration of the test sample (EC_x) at which an effect of x % is measured, if compared to the control

NOTE To unambiguously denote an EC value deriving from growth-rate, it is proposed to use the symbol "EC(r)", followed by the observation parameter used, e.g. EC(r) (frond number).

3.10
frond
individual leaf-like structure on a duckweed colony; the smallest unit (i.e. individual), capable of reproducing

3.11
frond area
total area of all fronds visible from vertically above

3.12
frond number
all fronds protruding from a mother frond which are directly visible from above without magnification

3.13
growth
increase in biomass over time as the result of proliferation of new tissues

NOTE In this test it refers to any parameter of observation.

3.14
growth-rate
calculation parameter defined as quotient of the difference of the natural logarithms of a parameter of observation and the respective time period

NOTE If the time period comprises the total duration of the test, the term is referred to as average specific growth-rate. If the period between two measurements within the test period is used, the term is named segmented growth-rate (see 12.1.2).