

SLOVENSKI STANDARD

SIST EN ISO 15181-2:2007

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Paints and varnishes - Determination of release rate of biocides from antifouling paints -
Part 2: Determination of copper-ion concentration in the extract and calculation of the
release rate (ISO 15181-2:2007)

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Beschichtungsstoffe - Bestimmung der Auswaschrates von Bioziden aus Antifouling-
Beschichtungen - Teil 2: Bestimmung der Kupferionen-Konzentration im Extrakt und
Berechnung der Auswaschrates (ISO 15181-2:2007)

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Peintures et vernis - Détermination du taux de lixiviation des biocides contenus dans les
peintures antisalissures - Partie 2: Détermination de la concentration ionique du cuivre
dans l'extrait et calcul du taux de lixiviation (ISO 15181-2:2007)

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Barve in laki

Paints and varnishes

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en,fr,de

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English Version

Paints and varnishes - Determination of release rate of biocides
from antifouling paints - Part 2: Determination of copper-ion
concentration in the extract and calculation of the release rate
(ISO 15181-2:2007)

Peintures et vernis - Détermination du taux de lixiviation
des biocides contenus dans les peintures antisalissures -
Partie 2: Détermination de la concentration ionique du
cuivre dans l'extrait et calcul du taux de lixiviation (ISO
15181-2:2007)

Beschichtungsstoffe - Bestimmung der Auswaschrates von
Bioziden aus Antifouling-Beschichtungen - Teil 2:
Bestimmung der Kupferionen-Konzentration im Extrakt und
Berechnung der Auswaschrates (ISO 15181-2:2007)

This European Standard was approved by CEN on 16 May 2007.

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.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

Foreword

This document (EN ISO 15181-2:2007) has been prepared by Technical Committee ISO/TC 35 "Paints and varnishes" in collaboration with Technical Committee CEN/TC 139 "Paints and varnishes", 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 December 2007, and conflicting national standards shall be withdrawn at the latest by December 2007.

This document supersedes EN ISO 15181-2:2004.

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 United Kingdom.

Endorsement notice

The text of ISO 15181-2:2007 has been approved by CEN as EN ISO 15181-2:2007 without any modifications.

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**Paints and varnishes — Determination of
release rate of biocides from antifouling
paints —**

Part 2:

**Determination of copper-ion
concentration in the extract and
calculation of the release rate**

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*Peintures et vernis — Détermination du taux de lixiviation des biocides
contenus dans les peintures antisalissures —*

<https://standards.iteh.ai/catalog/standards/sist/76ac3675-4b36-4e23-824a-69d7749b8c/sist-15181-2-2007>

*Partie 2: Détermination de la concentration ionique du cuivre dans
l'extrait et calcul du taux de lixiviation*



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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 15181-2 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

This second edition cancels and replaces the first edition (ISO 15181-2:2000), which has been technically revised.

ISO 15181 consists of the following parts, under the general title *Paints and varnishes — Determination of release rate of biocides from antifouling paints*:

- Part 1: General method for extraction of biocides
- Part 2: Determination of copper-ion concentration in the extract and calculation of the release rate
- Part 3: Calculation of the zinc ethylene-bis(dithiocarbamate) (zineb) release rate by determination of the concentration of ethylenethiourea in the extract
- Part 4: Determination of pyridine-triphenylborane (PTPB) concentration in the extract and calculation of the release rate
- Part 5: Calculation of the tolylfluanid and dichlofluanid release rate by determination of the concentration of dimethyltolylsulfamide (DMST) and dimethylphenylsulfamide (DMSA) in the extract

Introduction

By using standard conditions of temperature, salinity and pH at low biocide concentrations in the surrounding artificial seawater, a repeatable value of the release rate under the specified laboratory conditions can be determined using the method given in this part of ISO 15181, which can be used for quality assurance and material selection purposes. The actual release rate of biocides from antifouling paints on ships' hulls into the environment will, however, depend on many factors, such as ship operating schedules, length of service, berthing conditions, paint condition, as well as the temperature, salinity, pH, pollutants and biological community in a particular area.

The results of this test do not reflect environmental biocide release rates for antifouling products and are not suitable for direct use in the process of generating environmental-risk assessments, producing environmental-loading estimates or for establishing release rate limits for regulatory purposes. In comparison with copper and organotin release rates obtained either by direct or indirect measurements of the copper release rate from ships' hulls and from measurements made on panels exposed in harbours, all available data indicate that the results obtained using this generic test method significantly overestimate the release rates of biocides under in-service conditions. Published results demonstrate that the results of this test method are generally higher than direct *in situ* measurements of copper and organotin release rates from in-service ship hulls by a factor of about 10 or more for several commercial antifouling coatings [1, 2]. A similar relationship is expected to be found for other biocides. Realistic estimates of the biocide release rate from a ship's hull under in-service conditions can only be obtained from this test method if this difference is taken into account.

Where the results of this test method are used in the process of generating environmental-risk assessments, producing environmental-loading estimates or for regulatory purposes, it is most strongly recommended that the relationship between laboratory release rates and actual environmental inputs be taken into account to allow a more accurate estimate of the biocide release rate from antifouling coatings under real-life conditions to be obtained. This can be accomplished through the application of appropriate correction factors [2].

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Paints and varnishes — Determination of release rate of biocides from antifouling paints —

Part 2: Determination of copper-ion concentration in the extract and calculation of the release rate

1 Scope

This part of ISO 15181 specifies the apparatus and analytical method for determining the amount of copper (based) biocide that has been released from an antifouling paint into artificial seawater in accordance with the procedure given in ISO 15181-1.

It determines the copper-ion concentration and gives the final calculation for the release rate of copper under the specified laboratory conditions. This part of ISO 15181 is designed to generally allow the concurrent determination of copper ions and other biocides that might be released by a given antifouling paint through the analysis of separate sub-samples of an artificial seawater extract generated in accordance with the procedure given in ISO 15181-1, and analysed in accordance with the procedures given in other parts of this International Standard.

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When used in conjunction with ISO 15181-1, the practical limits on the quantitative measurement of release rates by this method are from $1,8 \mu\text{g}\cdot\text{cm}^{-2}\cdot\text{d}^{-1}$ to $500 \mu\text{g}\cdot\text{cm}^{-2}\cdot\text{d}^{-1}$. The quantitative measurement of release rates below this range will require the use of an analytical method with a lower limit of quantitation for copper in artificial seawater than the limit specified in 5.1.

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 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 15181-1:2007, *Paints and varnishes — Determination of release rate of biocides from antifouling paints — Part 1: General method for extraction of biocides*

ASTM D 6442-06, *Standard Test Method for Determination of Copper Release Rate from Antifouling Coatings in Substitute Ocean Water*

3 Principle

The concentration of the copper ions released into artificial seawater in accordance with the procedure given in ISO 15181-1 is determined by the use of an atomic absorption spectrometer or by an alternative analytical method, provided that it demonstrates a limit of quantitation for copper in artificial seawater of $10 \mu\text{g/l}$ or less. The release rate of the biocide is then calculated as copper metal.