



SLOVENSKI STANDARD

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Barve in laki - Laboratorijska metoda za preskušanje učinkovitosti konzervansov filma v premazih proti algam

Paints and varnishes - Laboratory method for testing the efficacy of film preservatives in a coating against algae

Beschichtungsstoffe - Laborverfahren für die Prüfung der Wirksamkeit von Filmkonservierungsmitteln in einer Beschichtung gegen Algen

Peintures et vernis - Méthode d'essai en laboratoire permettant de déterminer l'efficacité des préservateurs du feuil d'un revêtement contre les algues

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Barve in laki

Paints and varnishes

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Paints and varnishes - Laboratory method for testing the efficacy of film preservatives in a coating against algae

Peintures et vernis - Méthode d'essai en laboratoire permettant de vérifier l'efficacité des préservateurs du feuil d'un revêtement contre les algues

Beschichtungsstoffe - Laborverfahren für die Prüfung der Wirksamkeit von Filmkonservierungsmitteln in einer Beschichtung gegen Algen

This European Standard was approved by CEN on 3 January 2022.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 15458:2022) has been prepared by 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of an identical text or by endorsement, at the latest by September 2022, and conflicting national standards shall be withdrawn at the latest by September 2022.

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

This document supersedes EN 15458:2014.

The main changes compared to the previous version are as follows:

- a) new terms and definitions have been added;
- b) the use of terms and definitions throughout the document corrected;
- c) the document has been editorially revised and the normative references have been updated.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 15458:2022 (E)

Introduction

This document identifies criteria to assess efficacy of film preservatives in a coating against algae. The results of the method allow evaluation of an active substance with regard to its inclusion in Annex I of the Biocidal Product Regulation 528/2012 (Regulation EU No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the placing of biocidal products on the market – BPR).

The characteristics of the biocide treated coating material should conform to national regulations with regard to health, safety and the environment.

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1 Scope

This document specifies a laboratory test method for determining the biocidal or biostatic efficacy of single active substances or combinations thereof used in film preservatives of coatings against algal growth. The document does not apply to coatings unsusceptible to algal growth. The test method covers only active substances for film preservation, not the substrate itself, e.g. wood, which is dealt with in another standard. The test method is applicable for active substances used for wood protection and masonry coatings. It is not applicable to marine coatings.

Safety, health and environmental aspects are not in the scope of this document.

Determination of the performance of film preservatives in coatings by applying ageing procedures is not within the scope of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 12469, *Biotechnology - Performance criteria for microbiological safety cabinets*

EN 23270, *Paints and varnishes and their raw materials - Temperatures and humidities for conditioning and testing (ISO 3270)*

EN ISO 1513, *Paints and varnishes - Examination and preparation of test samples (ISO 1513)*

EN ISO 15528, *Paints, varnishes and raw materials for paints and varnishes - Sampling (ISO 15528)*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

active substance

substance or micro-organism that has an action on or against harmful organisms

[SOURCE: Biocidal Product Regulation (BPR, Regulation (EU) 528/2012), Article 3.1 (c), modified – the article “a” between “or” and “micro-organism” was deleted]

3.2

sample

portion of coating material to be tested

EN 15458:2022 (E)**3.3****test sample**

strip of filter paper without biocidal effect covered with the coating material to be tested

Note 1 to entry: See also Figure A.1.

3.4**test specimen**

punched-out portion of a test sample

Note 1 to entry: See also Figure A.1.

4 Principle

To determine the algicidal efficacy of film preservatives in a coating, the coating material is applied to a substrate, conditioned according to EN 23270, placed onto an agar surface, inoculated with a standard algal suspension and incubated over a certain period of time under conditions appropriate for algal growth. Conclusions can be drawn with regard to the algicidal efficacy of the film preservatives in a coating from the intensity of the algal growth on the coated surface of the test specimen after incubation. The method described in this document is a semiquantitative, comparative method between coatings with and without film preservatives.

5 Apparatus and materials

- 5.1 Cutting device** for preparing the test specimens (coated filter paper, with a diameter of 55 mm).
- 5.2 Autoclave** for sterilization.
- 5.3 Incubator**, capable of maintaining (23 ± 2) °C.
- 5.4 Pipette**, in the range between 100 µl to 1 000 µl, with sterile tips or combi-tips of 12,5 ml.
- 5.5 Filter paper without biocidal effect** (e.g. cellulose with a pore size of 0,45 µm and a thickness of 650 µm).
- 5.6 If applicable, automatic welding apparatus** to seal the bags.
- 5.7 Sterilized glass bottles** (100 ml, 0,5 l, 1 l).
- 5.8 Sterilized test tubes or other sterilized glassware** for preparing the slant agar cultures.
- 5.9 Bold's modified Basal medium** as specified in the method (see 8.1).
- 5.10 Bold's Basal modified medium stock solution** (see 8.2).
- 5.11 Culture flask with cap** (0,5 l or 1 l).
- 5.12 Laboratory balance**, capable of weighing to an accuracy of 0,1 g.
- 5.13 Microscope**.
- 5.14 Device to determine cell count** (commercially available counting chamber, e.g. Thoma chamber).
- 5.15 Device for applying the coating**.

5.16 Sterile Petri dishes (with a diameter of 94 mm and a height of 16 mm).

5.17 Sterile tweezers.

5.18 Sterile water.

5.19 Class 1 microbiological safety cabinet according to EN 12469.

5.20 Luxmeter or quantummeter.

5.21 Cold white or daylight lamp.

6 Microorganisms

- Blue-green algae *Nostoc commune* SAG¹ 1453-3;
- Blue-green algae *Gloeocapsa atrata* Kützing (syn. *Anacystis montana*) CCAP² 1430/1;
- Green algae *Klebsormidium flaccidum* SAG 335-5;
- Green algae *Stichococcus bacillaris* SAG 379-1a = CCAP 379/1A.

From these four microorganisms one blue-green and one green algae are selected.

7 Sampling and preparation of test samples and of test specimens

7.1 Sampling

Take a representative sample of the coating material or of the coating system for testing in accordance with EN ISO 15528 and examine and prepare it in accordance with EN ISO 1513.

7.2 Preparation of test samples (see Annex A)

Coat a strip of filter paper without biocidal effect with the coating material/system to be tested. The application rate recommended by the coating manufacturer for normal use should be employed.

7.3 Conditioning of the test samples

Condition the test samples in a horizontal position for at least 5 days at (23 ± 2) °C and (50 ± 5) % relative humidity, in accordance with EN 23270.

NOTE The conditioning time might vary according to the coating material and end use corresponding to information given by the manufacturer.

¹ SAG = Sammlung von Algenkulturen (Culture Collection of Algae), Göttingen; available at: Georg August Universität Göttingen, Germany.

² CCAP = Culture Collection of Algae and Protozoa; SAMS Research Services Ltd, Scottish Marine institute Oban, Scotland, UK.

EN 15458:2022 (E)**7.4 Preparation and number of test specimens**

After conditioning, three test specimens, each of a diameter of 55 mm shall be prepared from the test samples. The test specimens shall be sealed in a plastic or paper bag and sterilized using gamma radiation of ≥ 10 kGy. Other methods of sterilization may be agreed upon between the parties.

For each test series, three test specimens coated with material containing the film preservative, three test specimens coated with the same coating material without film preservative and three test specimens of the uncoated substrate shall be tested.

8 Procedure**8.1 Preparation of Bold's Basal Medium³**

For the algal nutritive solution the following substances are required:

- a) 10 ml each of a) to f) in 8.2;
- b) 1 ml each of trace element g) to j) in 8.2;
- c) 940 ml demineralized or distilled water;
- d) 15 g agar (only for the solid nutritive medium).

The solution shall be sterilized in the autoclave ($121\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, at least 20 min, at least 1 000 hPa). For the test both solid (with 1,5 % agar) and also liquid nutritive medium are required.

8.2 Preparation of the Bold's Basal Medium stock solutions

Weigh the chemical to the nearest 0,1 g (for trace element stock solutions to the nearest 0,01 g) in a suitable flask and add the specified amount of distilled water. Homogenize the Bold's Basal medium stock solutions.

Stock solutions:

a)	NaNO ₃	10,0 g	Distilled water	400 ml
b)	CaCl ₂ ·2H ₂ O	1,0 g	Distilled water	400 ml
c)	MgSO ₄ ·7H ₂ O	3,0 g	Distilled water	400 ml
d)	K ₂ HPO ₄	3,0 g	Distilled water	400 ml
e)	KH ₂ PO ₄	7,0 g	Distilled water	400 ml
f)	NaCl	1,0 g	Distilled water	400 ml

³ Bischoff, H. W. & Bold, H. C. (1963): Phycological Studies. IV. Some soil algae from Enchanted Rock and related algal species. – Univ. Texas Publ. 6318: p. 1-95.