



SLOVENSKI STANDARD
SIST EN 15458:2007

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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 einem Beschichtungsstoff gegen Algen

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

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Ta slovenski standard je istoveten z: EN 15458:2007

ICS:

87.040

Barve in laki

Paints and varnishes

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English Version

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This European Standard was approved by CEN on 21 June 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.

CEN members are the national standards bodies of 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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 15458:2007) 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of an identical text or by endorsement, at the latest by January 2008, and conflicting national standards shall be withdrawn at the latest by January 2008.

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.

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Introduction

This document identifies criteria to assess the efficacy of film preservatives in a coating against algae. The results of the method allow evaluation of an active ingredient with regard to its inclusion in Annex A of the Biocidal Products Directive 98/8/EC (Directive 98/8/EC of the European Parliament and of the Council of 16 February 1998 concerning the placing of biocidal products on the market – BPD).

NOTE 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 European standard specifies a laboratory test method for determining the biocidal/biostatic efficacy of film preservatives in a coating against algal growth. The standard does not apply to coatings not susceptible to algal growth. The test method comprises only film preservation, not the protection of the substrate itself, e.g. wood, which is dealt with in another standard. The test method is applicable for wood and masonry coatings. It is not applicable to marine coatings.

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

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 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 3270:1984)*

EN ISO 1513, *Paints and varnishes — Examination and preparation of samples for testing (ISO 1513:1992)*

3 Principle

For the determination of 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 specimen after incubation. The method described in this standard is a semi-quantitative, comparative method between coatings with and without film preservatives.

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4 Apparatus and materials

- 4.1 **Cutting device** for preparing the specimens (coated filter paper, with a diameter of 55 mm).
- 4.2 **Autoclave** for sterilization.
- 4.3 **Incubator**, capable of maintaining (23 ± 2) °C.
- 4.4 **Pipette**, in the range between 100 µl to 1 000 µl, with sterile tips or combi-tips of 12,5 ml.
- 4.5 **Filter paper without biocidal effect** (e.g. cellulose with a pore size of 0,45 µm and a thickness of 650 µm).
- 4.6 **Automatic welding apparatus** to seal the bags.
- 4.7 **Sterilized glass bottles** (100 ml, 0,5 l, 1 l).
- 4.8 **Sterilized test tubes or other sterilized glassware** for preparing the slant agar cultures.
- 4.9 **Bold modified Basal medium** as specified in the method (see 7.1).
- 4.10 **Stock solution** (see 7.2).
- 4.11 **Culture flask with cap** (0,5 l or 1 l).
- 4.12 **Laboratory balance**, capable of weighing to an accuracy of 0,1 g.
- 4.13 **Microscope**
- 4.14 **Device to determine cell count** (commercially available counting chamber, e.g. Thoma chamber).
- 4.15 **Device for application of coating**
- 4.16 **Sterile Petri dishes** (with a diameter of 94 mm and a height of 16 mm).
- 4.17 **Sterile tweezers**
- 4.18 **Sterile water**
- 4.19 **Class 1 microbiological safety cabinet** according to EN 12469.

4.20 Luxmeter

4.21 Cold white or daylight lamp

5 Microorganisms

- Blue-green algae *Nostoc commune* SAG¹⁾ B 1453-3;
- Blue-green algae *Gloeocapsa alpicola* (syn. *Anacystis montana*) CCAP²⁾ 1430/1;
- Green algae *Klebsormidium flaccidum* SAG 335-5;
- Green algae *Stichococcus bacillaris* SAG 379-1a = CCAP 179/1a.

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

6 Sampling and preparation of test samples and of specimens

6.1 Sampling

Take a representative sample of the coating material or coating system for testing in accordance with EN ISO 1513.

6.2 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 shall be that recommended by the coating manufacturer for normal use.

6.3 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 may be different according to the coating material and end use corresponding to information given by the manufacturer.

6.4 Preparation and number of specimens

After conditioning, 3 specimens, each of a diameter of 55 mm shall be prepared from the test samples. The specimens shall be sealed in a plastics bag and sterilised using gamma radiation of ≥ 10 kGy. Other methods of sterilisation may be agreed between the parties.

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

1) SAG = Sammlung von Algenkulturen (collection of algae cultures), Göttingen; available by: Pflanzenphysiologisches Institut der Universität Göttingen, Germany

2) CCAP = Collection of Algae and Protozoa, Windermere, UK

7 Procedure

7.1 Preparation of Bold's Basal Medium ³⁾

For the algal nutritive solution the following ingredients are required:

- a) 10 ml each of stock solutions a) to f) in 7.2;
- b) 1 ml each of trace element stock solutions g) to j) in 7.2;
- c) 940 ml demineralised or distilled water;
- d) 15 g agar (only for the solid nutritive medium).

The solution shall be sterilised in the autoclave. For the test both solid (with 1,5 % agar) and also liquid nutritive medium are required.

7.2 Preparation of the 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 |

Trace element stock solutions:

- | | | | | |
|----|--|---------|-----------------------------|----------|
| g) | Ethylenediaminetetraacetic acid | 50 g | | |
| | KOH | 31 g | Distilled water | 1 000 ml |
| h) | FeSO ₄ ·7H ₂ O | 4,98 g | Distilled water (acidified) | 1 000 ml |
| | (acidified distilled water = 1 ml concentrated H ₂ SO ₄ in 999 ml distilled water) | | | |
| i) | H ₃ BO ₃ | 11,42 g | Distilled water | 1 000 ml |

and

- | | | | | |
|----|--|--------|----------|--|
| j) | ZnSO ₄ ·7H ₂ O | 8,82 g | | |
| | MoO ₃ | 0,71 g | | |
| | Co(NO ₃) ₂ ·6H ₂ O | 0,49 g | | |
| | MnCl ₂ ·4H ₂ O | 1,44 g | | |
| | CuSO ₄ ·5H ₂ O | 1,57 g | | |
| | Distilled water | | 1 000 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