
Trajnost lesa in lesnih izdelkov - Določanje emisij iz zaščenega lesa v okolje - 2. del: Lesni izdelki, izpostavljeni 4. ali 5. razredu uporabe (v stiku z zemljo, sladko ali morskovo vodo) - Laboratorijska metoda

Durability of wood and wood-based products - Determination of emissions from preservative treated wood to the environment - Part 2: Wooden commodities exposed in Use Class 4 or 5 (in contact with the ground, fresh water or sea water) - Laboratory method

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Dauerhaftigkeit von Holz und Holzprodukten - Abschätzung von Emissionen von mit Holzschutzmitteln behandeltem Holz an die Umwelt - Teil 2: Holzprodukte in Gebrauchsklasse 4 und 5 (im Kontakt mit Erde, Süßwasser oder Meerwasser) - Laborverfahren

Durabilité du bois et des matériaux à base de bois - Estimation des émissions dans l'environnement du bois traité avec des produits de préservation - Partie 2 : Articles en bois exposés en classe d'emploi 4 ou 5 (en contact avec le sol, l'eau douce ou l'eau de mer) - Méthode de laboratoire

Ta slovenski standard je istoveten z: prEN 15119-2

ICS:

13.020.30	Ocenjevanje vpliva na okolje	Environmental impact assessment
71.100.50	Kemikalije za zaščito lesa	Wood-protecting chemicals

oSIST prEN 15119-2:2023

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 15119-2

December 2022

ICS 71.100.50; 13.020.30

Will supersede CEN/TS 15119-2:2012

English Version

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European foreword

This document (prEN 15119-2:2022) has been prepared by Technical Committee CEN/TC 38 “Durability of wood and wood-based products”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede CEN/TS 15119-2:2012.

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Introduction

The emissions from preservative treated wood to the environment need to be quantified to enable an environmental risk assessment of the treated wood. This document describes a laboratory method for the estimation of emissions from preservative treated wood in the case where the preservative treated wood is in contact with the ground, fresh water or seawater. There are three situations in this case where emissions could enter the environment:

- a) emissions from treated wood in contact with the ground. Use Class 4A. Emissions from the surface of the treated wood could enter the soil via the soil water;
- b) emissions from treated wood in contact with fresh water. Use Class 4B. Emissions from the surface of the treated wood could enter the water;
- c) emissions from treated wood in contact with sea water. Use Class 5. Emissions from the surface of the treated wood could enter the sea.

The method is a laboratory procedure for obtaining water samples (leachate) from treated wood in contact with water, at increasing time intervals (complete duration of 29 days). The quantities of emissions in the leachate are related to the surface area of the wood and the length of exposure, to estimate a flux in milligrams per square metre per day.

The quantity of emissions can be used in an environmental risk assessment of the treated wood.

The results of this short-term test can be extrapolated to longer exposure periods using suitable projection estimation methods.

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1 Scope

This document specifies a laboratory method for obtaining water samples from treated wood which has been in conditions designed to simulate continuous contact with the ground or with water (use Class 4 or 5), at time intervals after exposure.

2 Normative references

There are no normative references in this document.

3 Description of the test method

3.1 General considerations

The principal agent for causing emissions from wood exposed to soil is the soil water. The mechanism of leaching at the wood surface by the soil water is assumed to be identical comparable in nature and of equal or lesser severity to leaching from a wood surface in continuous contact with water.

The mechanism of leaching at the wood surface by the sea water is assumed to be identical comparable in nature and of equal or lesser severity to leaching from a wood surface in continuous contact with fresh water.

The wood, in the case of wood treated with a wood preservative, shall be representative of commercially used wood. It shall be treated in accordance with the preservative manufacturer's instructions and in compliance with appropriate standards and specifications. The parameters for the post-treatment conditioning of the wood prior to the commencement of the test shall be stated.

The composition, amount and pH value of the water used in the test are important in determining the quantity, content and nature of emissions from wood.

3.2 Principle

Water samples are collected after continuous contact with treated wood at increasing time intervals. To simulate the emission of wood preservatives from wood that is exposed to continuous contact with water test specimens are immersed in water and samples of the water are collected at different intervals. The volume of water relative to the surface area exposed to the water was found to be a suitable ratio to allow active substances to be adequately analysed (1 m³ per 40 m² or 25 l per m²). The water (leachate) is collected and is chemically analysed at seven or more sample times over the 29 days; it is suitable for ecotoxicity testing. Emission rates in milligrams per square metre per day are calculated from analytical results. The sampling periods are recorded. Tests with untreated samples can be discontinued if there is no background detected in the first three data points.

3.3 Quality criteria

3.3.1 Accuracy

The performance of the analytical method should be determined before conducting the test:

- 1) Accuracy;
- 2) Specificity;
- 3) Limit of detection;
- 4) Limit of quantification.

The testing is carried out with untreated references and with controlled water.

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3.3.2 Number of replicates and reproducibility

Two replicate sets of treated test specimens are used. Water samples collected from each are analysed and the mean value is taken as the emission value. The reproducibility of the results within one laboratory and between different laboratories depends upon the immersion regime, the wood used as test specimens and the water used as the agent of leaching.

3.4 Products and reagent

3.4.1 Water

Fresh water and soil leaching scenarios: Water complying with grade 3 of EN ISO 3696 or water especially designed for environmental investigations is ideal. Deionised water can also be used. The pH value shall normally be in the range 5 to 7. The pH value shall not be adjusted unless special conditions might justify setting the pH to a specified value between 5 and 7.

Water temperature shall be (20 ± 2) °C. The pH value and water temperature shall be stated in the test report.

3.4.2 Seawater

Seawater leaching scenarios: Synthetic seawater (e.g., ASTM D 1141 Substitute Ocean Water, without Heavy Metals) is recommended for use in the leaching test when wood exposed to seawater is to be evaluated. The water temperature shall be (20 ± 2) °C and the measured pH and water temperature included in the test report.

3.4.3 Preservative

The identity of the preservative product used to treat the wood samples shall be stated in the test report. It shall state the name and other designation of the preservative, and the trade or common name of the active ingredient(s), substances of concern (as defined in the EU regulation n°528/2012) or a generic description of co-formulates and the composition expressed in terms of the mass fraction of each of the ingredients.

3.5 Apparatus

3.5.1 Immersion container

The container shall be made of a material that is inert to water and the treated timber. It shall be large enough to allow the test specimens to have all their faces exposed to water and to contain sufficient water for the ratio of the exposed surface area of the test specimen to the volume of water to which it is exposed (i.e. $40 \text{ m}^2 \times \text{m}^{-3}$ or $0,4 \text{ cm}^2 \times \text{cm}^{-3}$). The volume of water required is therefore 25 l per m^2 of exposed surface area of the test specimen (this is equivalent to $2,5 \text{ cm}^3$ per cm^2).

EXAMPLE For example, for five wood test specimens 25 mm wide by 50 mm long, 15 mm thick, end sealed, where the surface area exposed to water is 200 cm^2 the volume of water required is 500 ml.

The container is covered in order to avoid water evaporation.

3.5.2 Assembly for test specimens

No equipment used to hold the test specimens below the level of the water shall be made of a material that will react with the water or the treated timber. The test samples should be restrained in a test frame which allows all test specimens to be manoeuvred simultaneously and which allows free access of water to all surfaces.

3.6 Test specimens

3.6.1 Species of wood

The wood species shall be typical of the wood species used for the efficacy testing of wood preservatives e.g. *Pinus sylvestris* (Linnaeus) (Scots pine).

Additional tests may be made using other species but, if so, this should be stated in the test report.

3.6.2 Quality of wood and wood moisture content

Use straight grained wood without knots. Material of a resinous appearance shall be avoided.

The wood should be typical of wood that is available commercially.

The source, density with a defined humidity and number of annual growth rings per 10 mm shall be stated in the test report.

Regarding the moisture content before the treatment, the recommendations of the wood preservative manufacturer should be followed.

3.6.3 Size of test specimens

Wood test specimens should have minimum dimensions of 25 mm wide by 50 mm in length, 15 mm thick, with the longitudinal faces parallel to the grain of the wood. Test specimens shall consist of 100 % sapwood. Each test specimen is marked so that it can be identified throughout the test.

The wood test specimens shall be plain sawn and the surfaces shall not be sanded.

3.6.4 Number of test specimens

Two sets of treated test specimens in two immersion containers (2.5.1) are used and the mean value taken as the emission value. One set of untreated test specimens in one immersion container is also used. The number of wood test specimens depends on the specimens' size. The total surface of wood test specimens to be immersed in one immersion container is at least 200 cm², and the minimum number of test specimens per immersion container is three. For one test there is at least nine (three sets of three) test specimens: six test specimens are treated with preservative, three test specimens are untreated. Sufficient test specimens are prepared to allow a selection of six which are within ± 5 % of the mean value of the retentions of the group of test specimens, and one for the estimation of the oven dry moisture content of the test specimens before treatment.

NOTE For the minimum size of specimens given in 2.6.3., the number of specimens to obtain 200 cm² is 5; the total number of specimens needed is therefore 16: 10 treated, 5 untreated and 1 for the estimation of the oven dry moisture content.

3.6.5 End seal

The end seal shall be a substance which, when applied to the end-grain of test specimens, prevents penetration of the preservative under test.

NOTE Two coats of a silicone sealant have been found to be suitable.

3.7 Procedure

3.7.1 General

The test shall be carried out in a room that has a temperature of (20 ± 2) °C.

prEN 15119-2:2022 (E)**3.7.2 Preparation of the treated test specimens**

It is necessary to distinguish between specimens used for superficial application and penetration processes for the application of the end-sealant.

The application of the end-sealant has to be applied prior to treatment only in case of superficial application. In this case all test specimens are end-sealed with a substance which prevents penetration of preservative into the end grain of the specimens or and prevents leaching from the specimens via the end grain

The end-grain has to be open for treatments by penetration processes. The specimens have to be end-sealed after treatment at the end of the conditioning period. The emission has to be estimated for the longitudinal surface area only. Sealants should be inspected and reapplied if necessary prior to initiating leaching and should not be reapplied after leaching has been initiated.

The wood test specimen to be treated with the preservative under test shall be weighed and then treated by the method specified by the supplier of the preservative. At the end of the treatment process, the test specimens shall be reweighed so that uptakes can be determined.

3.7.3 Conditioning of the test specimens after treatment

After treatment, the treated test specimen shall be conditioned in accordance with the recommendations made by the supplier of the test preservative. A description of the procedures used shall be stated in the test report.

3.7.4 Preparation and selection of test specimens

The mean retention of the group of test specimens shall be calculated and at least six representative test specimens with retention within $\pm 5\%$ of the mean for the group shall be selected.

3.7.5 Immersion method**3.7.5.1 Preparation of apparatus**

Prior to each test the immersion container (2.5.1) should be washed and dried and the required volume of water (2.4.1) or seawater (2.5.2) should be placed in it.

Several immersion containers shall be prepared in advance to make easier the change of the baths.

3.7.5.2 Obtaining of leachates**3.7.5.2.1 General**

Immerse totally the test specimens in the water. Record the water uptake, the date and the time of the change of water and the mass of water. Measure and record the pH of the leachate. Cover the immersion container to reduce water evaporation.

The water is replaced at the following intervals: 6 hours, 1 day, 2 days, 4 days, 8 days, 15 days, 22 days, 29 days (note: these are total times not interval times). The time and date of the water change and the mass of water recovered from the container should be recorded. Remove the test specimens from the water and allow to drain for 60 s, allowing run-off to return to the water.

Any signs of microbiological growth in the water or on the wood shall be recorded in the report.

Record the time and date of the change of water and the mass of water recovered from the immersion container. Measure and record the pH of the leachate.

The method allows the water samples taken on one day to be analysed to give a profile of the quantity of emissions against time.