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BSI Standards Publication

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

National foreword

This Published Document is the UK implementation of CEN/TS 15119-2:2012. It supersedes DD CEN/TS 15119-2:2008 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/515, Wood preservation.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

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

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

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

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Foreword

This document (CEN/TS 15119-2:2012) has been prepared by Technical Committee CEN/TC 38 “Durability of wood and wood-based products”, the secretariat of which is held by AFNOR.

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

This document will supersede CEN/TR 15119:2005 and CEN/TS 15119-2:2008.

CEN/TS 15119 is composed of the following parts:

— *Part 1: Wood held in the storage yard after treatment and wooden commodities exposed in Use Class 3 (not covered, not in contact with the ground) — Laboratory method*;

— *Part 2: Wooden commodities exposed in Use Class 4 or 5 (in contact with the ground, fresh water or sea water) — Laboratory method*.

This document is a revision of Technical Specification published in 2008 in order to consider the OECD 313 which covers the same topic.

Compared to CEN/TS 15119-2:2008 the following modifications have been made:

a) quality criteria for accuracy and reproducibility added in 2.3;

b) provisions for properties of the sea water used for the test added in 2.4.2;

c) procedure for sealing of end grain specified in more detail in 2.7.2;

d) in 2.7.5.2 time intervals for replacement of the water specified and total testing time increased from 19 days to 29 days;

e) reference to extrapolation of results to 1 year or 10 years deleted;

f) recording forms in Annex A modified;

g) Annex B for general recommendations added;

h) Bibliography extended.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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 not covered by a physical protection and 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.

1 Scope

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

2 Description of the test method

2.1 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 in nature and severity to leaching from a wood surface in continuous contact with water.

The mechanism of leaching at the wood surface by fresh water is assumed to be identical in nature and severity to leaching from a wood surface by seawater.

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.

2.2 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 is equivalent to the ratio found in wood exposed in service in some Use Class 4 situations (1 m^3 per 40 m^2 or 25 l per m^2). 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.

2.3 Quality criteria

2.3.1 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.

2.3.2 Reproducibility

Two water samples are collected and 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 and the wood used as test specimens.

2.4 Product and reagent

2.4.1 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.

2.4.2 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.

2.4.3 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 Directive 98/8/EC) or a generic description of co-formulates and the composition expressed in terms of the mass fraction of each of the ingredients.

2.5 Apparatus

2.5.1 Immersion container

The container shall be made of a material that is inert to water and the treated timber and 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, to be 40 (i.e. 40 $m^2 \times m^{-3}$ or 0,4 $cm^2 \times cm^{-3}$). 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 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 evaporations.

2.5.2 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 5 test specimens to be manoeuvred simultaneously and which allows free access of water to all surfaces.

2.6 Test specimens

2.6.1 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.

2.6.2 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.

2.6.3 Size of test specimens

Wood test specimens 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.

2.6.4 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 specimen's size. The total surface of wood test specimens to be immersed in one immersion container is at least 200 cm^2, 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 $\pm$ 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 cm^2 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.

2.6.5 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.

2.7 Procedure

2.7.1 General

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

2.7.2 Preparation of the treated test specimens

All test specimens are end-sealed with a substance which prevents penetration of preservative into the end grain of the specimens or prevents leaching from the specimens via the end grain. 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.

The end-grain has to be open for treatments by penetration processes. Therefore, the specimens have to be end-sealed 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.

2.7.3 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.

2.7.4 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.

2.7.5 Immersion method

2.7.5.1 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.

2.7.5.2 Obtaining of leachates

2.7.5.2.1 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.

NOTE Alternatively, samples taken on successive water replacement days can be bulked. The water may need to be concentrated by an appropriate technique before analysis.

Samples should be stored under conditions that preserve the analyte e.g., in a refrigerator in the dark to reduce microbial growth in the sample before analysis.

These conditions shall be convenient with the nature (organic, inorganic compound) of the active ingredient. A maximum time for the analysis should be defined.

2.7.5.2.2 Test system: Treated wood

Collection of the water (leachate) in this system and subsequent analysis allows for an estimation of the emission rate of the analysed components from the preservative treated wood. Collection and analysis of the leachate after increasing time periods of exposure allows for the rate of change of the emission rate with time to be estimated.

2.7.5.2.3 Test system: Untreated wood

Collection of the water (leachate) in this system and subsequent analysis allows for the estimation of the emission rate of the analysed components from untreated wood. Collection and analysis of the leachate after increasing time periods of exposure allows the rate of change of the emission rate with time to be estimated. This system is a control to determine background levels of substances, which are then chemically analysed, or for the presence of substances from untreated wood or soil which are toxic in subsequent eco-toxicity tests. A system with untreated wood provides background data on emission from wood.

2.7.5.3 Control Water

Analysis of the water used allows the background levels of substances present to be estimated, some of which may prove toxic in ecotoxicity tests (the certificate of analysis of water supplied for such tests can be employed for this purpose).

2.8 Expressions of results

2.8.1 Chemical analysis

If the water (leachate) shall be chemically analysed, express the analytical result in appropriate units e.g. micrograms per millilitre. Convert the analytical result to the quantity emitted in milligrams per square metre using the volume of water (l), the concentration in the leachate of a certain immersion event (mg/l) and the surface area of the test specimen (m^2).

Calculate the emission flux for that day by taking the mean of the two replicate measurements taken on that day expressed in milligrams per square metre per day.

In the case of inorganic compounds, if the analysis of the samples from the untreated test specimen shows detectable levels of the analysed components (because of the natural composition of the wood), implying a background level obtained from untreated wood, it shall be subtracted from the analytical results for the treated test specimens.

2.8.2 Bulked samples

If the collected samples are bulked to allow chemical analysis, calculate the quantity emitted in milligrams per square metre per day over the corresponding period.

2.8.3 Emission flux

Calculate the daily emission flux in milligrams per square metre per day by taking the mean of the measurements from the two replicates and dividing by the number of days of immersion.

2.8.4 Recording

Record the results. The mean of the results obtained from the two replicates shall be the daily emission rate for the product in milligrams per square metre per day.

NOTE Table A.1 shows an example of a suggested recording form for one set of treated test specimens, and Table A.2 gives the summary table for calculating the mean daily values of emission.

2.9 Evaluation of the results in the different environmental compartments

2.9.1 Soil

If it is assumed that the water fraction of soil shall be 0,4 the quantity of analysed material entering the soil from the treated wood can be calculated for certain time periods.

2.9.2 Fresh water and sea water

The quantity of analysed material entering the water from the treated wood can be calculated for certain time periods.

3 Test report

The report shall include at least the following information:

a) number of this document (CEN/TS 15119-2:2012);

b) name of the supplier of the preservative under test;

c) specific and unique name or code of the preservative tested. The trade or common name of the active ingredient(s) and substances of concern and the composition in mass fraction of these ingredients;

d) relevant retention or loading (in kilograms per cubic metre or grams per square metre respectively) required for wood used in ground, freshwater or seawater contact;

e) species of wood used, with its density, sapwood percentage in the wood if necessary, growth rate in rings per 10 mm;

f) loading or retention of the preservative tested and the formula used to calculate the retention, expressed as grams per square metre or kilograms per cubic metre;

g) method of application of the preservative, specifying the treatment schedule used for a penetrating process, and the method of application if a superficial treatment was used;

h) date of application of the preservative;

i) conditioning procedures used, specifying the type, conditions and duration;

j) specification of the end sealant used and the number of times applied;

k) specification of any subsequent treatment of the wood, e.g. specification of the supplier, type, characteristics and loading of a paint;

l) total wood surface area of the test specimens exposed to water, the nominal volume of water used and the ratio of the volume of water to the surface area in square metres per cubic metre;

m) time and date of each immersion event the water exchanges, the amount of water used for the immersion of the test specimens, and the amount of water absorbed by the wood during immersion;

n) identification of the samples, which were subsequently chemically analysed or tested for their ecotoxicological properties;

o) any variation from the method described in this Technical Specification and any factors that may have influenced the results;

p) quality of the test water (origin and pH);

q) pH of the leachates.

Annex A
(informative)

Recording forms

The following form is an example of the general presentation of the test results.

Table A.1 — Recording form for the treatment process of the test specimens (Use Class 4 or 5)

Test house	
Wood preservative	
Supplier of the preservative	
Specific and unique name or code of the preservative	
Trade or common name of the preservative	
Coformulants	
Relevant retention for wood used in UC4 or UC5	
Application	
Application method	
Date of application	
Formula used to calculate the retention	
Conditioning procedure	
Duration of conditioning	
End sealant / number of times applied	
Subsequent treatment	if relevant
Test specimens	
Wood species	
Density of the wood (with moisture content)	(minimum ... mean value ... maximum)
Growth rate (rings per 10 mm)	(minimum ... mean value ... maximum)
Moisture content	

Table A.1 — Recording form for the treatment process of the test specimens (Use Class 4 or 5)
(continued)

Test assemblies	**Retention (e.g. kg/m³)**
Treated , replicate 1	Mean value and standard deviation or range for 5 specimens
Treated , replicate 2	Mean value and standard deviation or range for 5 specimens
Untreated	
Variation of influencing parameters	e.g. water quality, dimension of test specimens

Table A.2 — Recording form for one set of treated test specimens (Use Class 4 or 5)

Time	Water exchange	Specimen mass		Water sample			
		Treated (mean)	Untreated		Test water	Replicate 1	Replicate 2
	Date	g	g	N°	pH	pH	pH
Start							
6h				1			
24h				2			
2d				3			
4d				4			
8d				5			
15d				6			
22d				7			
29d				8			

Please prepare separate tables for each active ingredient.

Table A.2 — Recording form for one set of treated test specimens (Use Class 4 or 5) *(continued)*

Time	Water exchange	Analytical results								
		Untreated specimen			Treated specimen					
		Concentration a.i. in water	Quantity emitted	Emission rate	Concentration a.i. in water		Quantity emitted		Emission rate	
					Replicate 1	Replicate 2	Replicate 1	Replicate 2	Replicate 1	Replicate 2
	Date	mg/l	mg/m²	mg/m²/d	mg/l	mg/l	mg/m²	mg/m²	mg/m²/d	mg/m²/d
6h										
24h										
2d										
4d										
8d										
15d										
22d										
29d										

Test House: ABC

CEN/TS 15119-2

Preservative under test Product A

It is recommended to add graphs that represent the emission rates (mg/m²/immersion day) versus time (or amount of water) as well as the cumulative emission (mg/m²) versus time (or amount of water) for each active ingredient and the loss ratio per the quantity of actives initially brought by the treatment.

Annex B
(informative)

General recommendations

The wood samples used should be representative of the commodities used.

Dimensions described in the paragraph 2.6.3 are the minimum to use. Others may be used under the conditions to respect the ratio with the volume of the water.

The test can be applied to wood using a penetrating process or superficial application or to treated wood which has an additional mandatory surface treatment (e.g., paint that is applied as a requirement for commercial use).

The leachate can also be tested for eco-toxicological effects.

Bibliography

[1] EN 335-1:2006*, Durability of wood and wood-based products — Definition of use classes — Part 1: General*

[2] EN 1001-2:2005, *Durability of wood and wood-based products — Terminology — Part 2: Vocabulary*

[3] EN ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3696)*

[4] EN ISO/IEC 17025:2005, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025)*

[5] 98/8/EC, Directive of the European Parliament and of the Council of 16 February 1998 concerning the placing of biocidal products on the market

[6] American Society for Testing and Materials Standards, ASTM D 1141 – 1998. Standard Practice for the Preparation of Substitute Ocean Water, Without Heavy Metals. *Annual Book of ASTM Standards*, Volume 11.02

[7] OECD Guideline for testing chemicals 313 (adopted : 16 October 2007): estimation of emissions from preservative - Treated Wood to the Environment: Laboratory Method for Wooden Commodities that are not Covered and are in Contact with Fresh Water or Seawater

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