BRITISH STANDARD

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+A1:2013

Durability of wood and wood-based products — Efficacy of preventive wood preservatives as determined by biological tests

Part 1: Specification according to use class

ICS 71.100.50

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

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Durability of wood and wood-based products - Efficacy of preventive wood preservatives as determined by biological tests - Part 1: Specification according to use class

Durabilité du bois et des matériaux dérivés du bois - Efficacité des produits préventifs de préservation du bois établie par des essais biologiques - Partie 1: Spécification par classe d'emploi

Dauerhaftigkeit von Holz und Holzprodukten - Wirksamkeit von Holzschutzmitteln wie sie durch biologische Prüfungen ermittelt wird - Teil 1: Spezifikation entsprechend der Gebrauchsklasse

This European Standard was approved by CEN on 20 June 2009 and includes Amendment 1 approved by CEN on 21 October 2013.

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Foreword

This document (EN 599-1:2009+A1:2013) 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 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of an identical text or by endorsement, at the latest by June 2014, and conflicting national standards shall be withdrawn at the latest by June 2014.

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 includes Amendment 1 approved by CEN on 21 October 2013.

This document supersedes [A1⟩ EN 599-1:2009 ⟨A1].

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1⟩ ⟨A1].

Significant technical differences between this edition and EN 599-1:1996 are as follows:

— The scope now emphasises that this standard is not a performance standard but a standard for characterising the efficacy of wood preservatives, based on data derived from the biological tests that it specifies, supplemented by, in certain cases, data from field tests. This European Standard provides a basis for establishing preservative retentions for timber when specified in conjunction with EN 351-1 taking into account necessary local considerations. It points out that at present not all natural ageing factors which may affect the stability of active ingredients for wood preservatives can be assessed by standardized methods but have nevertheless to be taken into account in the development of preservative products capable of being effective in service. It also allows for preservatives that have been used successfully and legally before the standard was to have their efficacy confirmed in accordance with the general principles of the standard (so called “grandfather-clause”).

— This document now provides for the use of data from CEN/TS 839, in specific cases, as a method for the assessment of preservatives designed for superficial applications.

— In Annex A “Guidance on re-testing after making variations in product formulation”, requirements have been clarified by the provision of diagrams.

— Production control has been withdrawn from Clause 9 and transferred to a new informative annex (now Annex B).

— A new normative annex on the validity of test results from former standards after their revision has been added (now Annex H).

EN 599 consists of two parts. Part 2 (EN 599-2, *Durability of wood and wood-based products — Performance of preventive wood preservatives as determined by biological tests — Part 2: Classification and labelling*) will be revised later once the exact requirements of the Biocidal Products Directive have been finalised.

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, 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.

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Introduction

This part of EN 599 is one of a series and should be used in conjunction with EN 599-2, EN 335-1 and EN 335-2, which describe the service conditions for treated wood in terms of use classes, and EN 351-1, which describes a classification system for preservative treated wood in terms of preservative penetration and gives guidance on classes for retentions. The need for wood preservatives depends in part on the natural durability of the wood and therefore this part of EN 599 should also be used in conjunction with EN 350-1, EN 350-2 and EN 460.

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1 Scope

This part of EN 599 specifies for each of the five use classes defined in EN 335-1, the biological tests required for evaluating the efficacy of wood preservatives for the preventive treatment of solid timber, together with the minimum ageing tests required for the respective use class. It provides the method for calculating the critical value of a preservative. The critical value is the value that shall be used to calculate the recommended retention of the preservative appropriate for specific service conditions. The critical value is not necessarily the recommended retention or the minimum retention level for the preservative. The wide range of hazards, exposure conditions and service life requirements across Europe make it necessary to allow for local considerations in the calculation of the required preservative retention; EN 351-1 provides for the critical value to be adjusted to take account of these factors.

This part of EN 599 is applicable to all wood preservative products supplied for application in liquid form for the preventive treatment of timbers (structural and non-structural) against wood-attacking fungi, wood-attacking insects and marine borers as described in EN 335-1. However, it is applicable to products for preventive treatments against fungi causing disfigurement (blue stain) of wood in service if this forms part of the overall preventive efficacy of the product.

This part of EN 599 does not necessarily take into account all the factors which may affect the stability of active ingredients in preservative treated wood. These factors include ultra-violet light and microbiological agencies capable of degrading components of the preservative. Such factors are an integral part of exposure in field trials but are subject to natural variation and their impact is not directly assessed in the field trial methods included in this standard. Methods are in development to assess the impact of these factors but are not finalised and cannot be included in this revision of this part of EN 599. Because such factors could, in service, significantly affect the active ingredient's suitability for its intended purpose, the manufacturer/ producer is expected to ensure and be able to provide evidence that its stability, at the recommended retention of the preservative product, has been adequately assessed.

This part of EN 599 is not applicable to wood preservative products supplied for application as pastes, solids or in capsule or gaseous form because these cannot be tested without modification of the biological tests cited in this standard. It does not apply either to wood preservative products for remedial (curative) treatments, to those applied to prevent fungi causing sap stain on green (unseasoned) timber or to those applied solely to prevent fungi causing disfigurement (blue stain) of wood in service.

NOTE 1 The nature of the laboratory and field tests required in this part of EN 599 to demonstrate efficacy of a wood preservative are such that the time required generating the data is many months or years, depending upon the properties of the wood preservative and the use class in which the treated wood is to be exposed.

For preservative products which have already been placed on the market without significant formulation variation (see Annex A) before the end of 1990 and which can demonstrate a record of having been used lawfully and successfully in accordance with local technical traditions during this period, national standards bodies or independent authorities nominated by them, may declare critical values for use within their territories.

NOTE 2 For re-testing after making variations in product formulation, guidance is given in Annex A.

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 20-1, *Wood preservatives - Determination of the protective effectiveness against Lyctus Brunneus (Stephens) - Part 1: Application by surface treatment (laboratory method)*

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EN 20-2, *Wood preservatives - Determination of the protective effectiveness against Lyctus brunneus (Stephens) - Part 2: Application by impregnation (Laboratory method)*

EN 46-1, *Wood preservatives - Determination of the preventive action against Hylotrupes bajulus (Linnaeus) - Part 1: Larvicidial effect (Laboratory method)*

EN 46-2, *Wood preservatives - Determination of the preventive action against Hylotrupes bajulus (Linnaeus) - Part 2: Ovicidal effect (laboratory method)*

EN 47, *Wood preservatives - Determination of the toxic values against larvae of Hylotrupes bajulus (Linnaeus) - (Laboratory method)*

EN 49-1, *Wood preservatives - Determination of the protective effectiveness against Anobium punctatum (De Geer) by egg-laying and larval survival - Part 1: Application by surface treatment (Laboratory method)*

EN 49-2, *Wood preservatives - Determination of the protective effectiveness against Anobium punctatum (De Geer) by egg-laying and larval survival - Part 2: Application by impregnation (Laboratory method)*

EN 73, *Wood preservatives - Accelerated ageing tests of treated wood prior to biological testing - Evaporative ageing procedure*

EN 84, *Wood preservatives - Accelerated ageing of treated wood prior to biological testing - Leaching procedure*

EN 113, *Wood preservatives - Test method for determining the protective effectiveness against wood destroying basidiomycetes - Determination of the toxic values*

EN 117, *Wood preservatives - Determination of toxic values against Reticulitermes species (European termites) (Laboratory method)*

EN 118:2005, *Wood preservatives - Determination of preventive action against Reticulitermes species (European termites) (Laboratory method)*

[A1⟩ EN 152, *Wood preservatives - Determination of the protective effectiveness of a preservative treatment against blue stain in wood in service - Laboratory method* ⟨A1]

EN 252, *Field test method for determining the relative protective effectiveness of a wood preservative in ground contact*

EN 275, *Wood preservatives - Determination of the protective effectiveness against marine borers*

EN 330, *Wood preservatives - Field test method for determining the relative protective effectiveness of a wood preservative for use under a coating and exposed out of ground contact: L-joint method*

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

EN 351-1, *Durability of wood and wood-based products - Preservative-treated solid wood - Part 1: Classification of preservative penetration and retention*

EN 599-2, *Durability of wood and wood-based products - Performance of preventive wood preservatives as determined by biological tests - Part 2: Classification and labelling*

ENV 807:2001, *Wood preservatives - Determination of the effectiveness against soft rotting micro-fungi and other soil inhabiting micro-organisms*

CEN/TS 839, *Wood preservatives - Determination of the protective effectiveness against wood destroying basidiomycetes - Application by surface treatment*

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

3 Terms, definitions, abbreviations and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1001-2:2005 and the following apply.

3.1.1
active ingredient(s)
a.i
individual chemical compound or compounds included in a wood preservative to give it specific activity against biological agents of deterioration

[EN 1001-2:2005, 4.01]

3.1.2
analytical zone
a.z
part of the treated wood which is analysed for assessing the retention requirement (*r.r.*)

NOTE The analytical zone is taken from the lateral surfaces of the treated wood. The depth to which sampling is required will depend on the species of wood being analysed and the treatment level concerned.

[EN 1001-2:2005, 4.03]

3.1.3
biological reference value
b.r.v
amount in grams per square metre or kilograms per cubic metre of a wood preservative (as product) found to be effective in test in preventing attack by the particular biological agent being tested

[EN 1001-2:2005, 4.06]

3.1.4
critical value
c.v
value equivalent to the highest *b.r.v.* (in grams per square metre or kilograms per cubic metre) obtained from all the biological tests carried out in accordance with this part of EN 599 for any given use class

[EN 1001-2:2005, 4.18]

3.1.5
co-formulant
any ingredient (other than an active ingredient) in a formulated wood preservative product

[EN 1001-2:2005, 4.14]

3.1.6
manufacturer's proposed recommended loading
m.r.l
amount of product in the test specimen corresponding to the mean loading which the manufacturer recommends as necessary and achievable in practice in the analytical zone(s)

[EN 1001-2:2005, 4.50]

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3.1.7
maximum application limit
m.a.l
maximum amount in grams per square metre or kilograms per cubic metre of the product permitted for application to the wood specimens in a particular biological test

[EN 1001-2:2005, 4.51]

3.1.8
mid-toxic value
m.t.v
arithmetic mean of the upper and lower toxic values as defined in the relevant European Standard biological test

[EN 1001-2:2005, 4.52]

3.1.9
nominal effective retention
n.e.r
retention of test product calculated to give the efficacy specified in ENV 807 equivalent to the relevant target retention of the reference preservative

[EN 1001-2:2005, 4.55]

3.1.10
penetrating treatment process
process which includes features or procedures intended to overcome the natural resistance of wood to penetration by a wood preservative in its ready for use form

NOTE Such processes include, for example, currently practised technologies of diffusion treatments, double-vacuum and the vacuum/pressure process.

[EN 1001-2:2005, 4.58]

3.1.11
product
formulated wood preservative in the form as supplied for sale by the manufacturer

[EN 1001-2:2005, 1.32]

3.1.12
retention requirement
r.r
loading of product that is required in the analytical zone

NOTE The retention requirement is expressed in grams of product per square metre for superficial application processes and kilograms of product per cubic metre for penetrating treatment processes. It is derived from the critical value in different ways depending upon the particular test involved.

[EN 1001-2:2005, 4.73]

3.1.13
superficial application process
process which does not include particular features or procedures intended to overcome the natural resistance of wood to penetration of a wood preservative in its ready for use form

NOTE Such processes include for example brush and spray techniques and short-time immersion (dipping) processes in which wood normally has only a few minutes contact with the preservative.

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[EN 1001-2:2005, 4.82]

3.1.14
target retention
t.r
retention of reference preservative deemed to provide an adequate level of protection against biological attack

[EN 1001-2:2005, 4.87]

3.1.15
wood preservative
active ingredient(s) or preparations containing active ingredient(s) in the form in which they are placed on the market, which are, on the basis of the properties of their active ingredient(s), intended either to prevent wood-destroying or wood-disfiguring organisms (fungi, insects and marine borers) from attacking wood and wood-based products, or to combat an attack by those organisms

[EN 1001-2:2005, 1.56]

3.2 Abbreviations and symbols

3.2.1
A
Anobium

3.2.2
B
Blue stain (see for example Table 2)

3.2.3
F
Field test (see for example Table 3a to Table 5)

3.2.4
H
Hylotrupes (see for example 5.2.3a) and Table 1)

3.2.5
I
All beetles (see for example 5.2.3c) and Table 1 to Table 5)

3.2.6
L
Lyctus (see for example 5.2.3a) and Table 1)

3.2.7
m/m
Mass/Mass (see for example 5.2.16 and 5.2.27)

3.2.8
N
Northern waters (see 5.2.28 and Table 5)

3.2.9
S
Southern waters (see 5.2.28 and Table 5)

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3.2.10
T
Termites (see for example 5.2.7 and Table 1 to Table 5)

3.2.11
V
Coriolus versicolor (see Table 3a and Table 3b)

3.2.12
V^n
nominal mean rating of replicates for non-destructive assessment in EN 330

3.2.13
V^e
nominal mean rating for external surfaces and those visible within the joint of replicates for destructive assessment in EN 330

3.2.14
V^i
nominal mean rating for surfaces created by sawing of replicates for destructive assessment in EN 330

3.2.15
$R2^{TP}$
number of replicates treated with the wood preservative product with a rating of 2 or above in EN 330

3.2.16
$R2^{R}$
number of replicates treated with the reference preservative with a rating of 2 or above in EN 330

3.2.17
spp
species

3.2.18
unrP
upper nominal retention of the wood preservative product

3.2.19
lnrP
lower nominal retention of the wood preservative product

3.2.20
CAS number
Chemical Abstracts Service registry number

3.2.21
EINECS number
European Inventory of Existing Chemical Substances number

3.2.22
ELINCS number
European List of Notified Chemical Substances number

4 Assignment to use class(es)

Each product shall be assigned to one or more use class as described in EN 335-1.

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5 Efficacy

5.1 Principal requirements

5.1.1 Each product shall be tested in accordance with the tests specified in Table 1 to Table 5, taking into consideration the following:

a) relevant use class (see Clause 6);

b) method of application (see Annex C);

c) type of wood to which it is intended to be applied (see Annex D);

d) which insect species (if any) it is to protect against;

e) whether it is only be used under a coating.

Where Table 1 to Table 5 require the wood preservative product to be resistant to evaporative ageing and/or leaching, tests in accordance with EN 73 and/or EN 84 shall be carried out separately (see Annex E).

5.1.2 Using the relevant criteria given in Table 1 to Table 5, the *b.r.v.* shall be established for each test at an application rate at or below the given maximum application limit (see Annex G).

5.1.3 In those European standard biological tests which provide for the derivation of toxic values, the *b.r.v.* shall be the mid toxic value (*m.t.v.)* except in the following cases:

a) in tests with insects using EN 47, if the mortality at the lower toxic value is less than 80 %, then the upper toxic value shall be used as the *b.r.v*;

b) in tests with insects using EN 20-2 or EN 49-2, if the number of live larvae/emerged beetles at the lower toxic value exceeds 20 % of the number from the solvent controls, then the upper toxic value shall be used as the *b.r.v*;

c) in EN 113 tests, if the mean mass loss at the lower toxic value is greater than 10 % (m/m), then the upper toxic value shall be used as the *b.r.v*.

5.2 Additional requirements in Table 1 to Table 5

5.2.1 Where local conditions require the wood preservative product to have additional biological efficacy, or to support the claims of manufacturers or the demands of specifiers, the product shall also be tested in accordance with the relevant additional/local tests given in Table 1 to Table 5.

NOTE 1 Field tests which vary in form or geographical location from the procedures prescribed in EN 252, EN 275 and EN 330 may provide relevant supplementary data for confirming retention requirements in EN 351 which are derived from critical values according to EN 599.

NOTE 2 See Annex F.

5.2.2 The most relevant application process specified in the respective EN methods of biological test shall be used even though this may not correspond precisely with the process intended for the test product in practice.

5.2.3 Wood preservative products in use class 1 shall be effective against specific or all wood boring beetles specified in this part of EN 599. There is no risk of fungal attack in this use class.

Tests of the product shall be carried out against one of the following:

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a) unless b) or c) is applicable and is selected, all or each relevant individual beetle(s) *"Hylotrupes bajulus (H) "; "Anobium punctatum (A)";* and *"Lyctus brunneus (L)";* or;

b) the most tolerant beetle species, if the product is based on insecticide(s) for which data already exist (aged or unaged) which show different activities against the different beetle species, that is the mid toxic value of the least tolerant beetle species is less than 80 % of the mid toxic value of the most tolerant beetle species; or;

c) as defined in the column "for all beetle spp (I)", if the product is based on insecticide(s) for which data already exist (aged or unaged) which show more or less equal activity against all beetle species, that is the mid toxic value of the least tolerant beetle species is equal to or greater than 80 % of the mid toxic value of the most tolerant beetle species.

5.2.4 Additional tests need only be conducted when necessary to meet or confirm local or regional requirements, the stated requirements of specifiers or the specific claims of manufacturers (see 5.2.1).

5.2.5 The product shall be tested according to EN 46-2 if a repellent or ovicidal activity is claimed.

5.2.6 Leaching in accordance with EN 84 is not required for products intended for use classes 1 and 2 which shall be protected from prolonged exposure to rain or other accidental and temporary forms of wetting during transport and installation. If such protection cannot be ensured, products intended for use in use classes 1 and 2 to be applied by methods which will not achieve lateral penetrations greater than 3 mm, shall be tested after leaching to EN 84.

Leaching according to EN 84 cannot be used in conjunction with EN 20-1 and EN 20-2; therefore the *b.r.v.* against Lyctus *brunneus (L)* where there is a leaching hazard shall be deemed to be equal to that for:

Hylotrupes bajulus (H) or

Anobium punctatum (A) after leaching; whichever is the greater.

5.2.7 For the anti-termite qualification "T", a superficial application product shall have been tested in ready for use form:

a) according to EN 46 or the relevant beetle test and have achieved the criteria to provide the biological reference value for this test and;

b) according to EN 118:2005 when applied at 200 g/m^2 of treating product and have achieved the efficacy criteria defined for termites in this part of EN 599.

NOTE European Standard EN 118:2005 does not provide an adequate test of all the modes of action of currently available preservative products. By the time a new version of EN 118 or an alternative European test standard providing more realistic test results for efficacy against termites is produced, other applicable evaluation methods may be used to provide the *b.r.v.*

5.2.8 EN 20-2 shall not be used for water-dispersed or water-soluble types of wood preservative products because the scope of the method does not permit its use with such products.

5.2.9 When deriving the mid toxic value, if the mortality at the lower toxic value in EN 47 is less than 80 %, the upper toxic value shall be used as the *b.r.v*. In EN 20-2 and EN 49-2, if the number of live larvae/emerged beetles at the lower toxic value exceeds 20 % of the number from the solvent controls, the upper toxic value shall be used as the *b.r.v.*

5.2.10 The required retention in the respective laboratory tests shall not exceed the manufacturers recommended loading and shall be achieved for the laboratory tests by full impregnation with a diluted solution of the product.

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