SLOVENSKI STANDARD
SIST-TS CEN/TS 15083-2:2006

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Trajnost lesa in lesnih proizvodov - Ugotavljanje naravne trajnosti masivnega lesa za zaģļ ito proti lesnim gobam, preskusne metode - 2. del: Glive razkrojevalke lesa

Durability of wood and wood-based products - Determination of the natural durability of solid wood against wood-destroying fungi, test methods - Part 2: Soft rotting micro-fungi

Dauerhaftigkeit von Holz und Holzprodukten - Bestimmung der natürlichen Dauerhaftigkeit von Vollholz gegen holzzerstörende Pilze, Prüfverfahren - Teil 2: Moderfäulepilze

Durabilité du bois et des matériaux dérivés - Détermination de la durabilité naturelle du bois massif vis-a-vis des champignons lignivores, méthodes d'essai - Partie 2: Micro-organismes de pourriture molle

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Foreword

This document (CEN/TS 15083-2:2005) 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 consists of two parts, Part 1 determines the natural durability of solid wood against wood destroying basidiomycetes fungi and Part 2 against soft rotting micro-fungi.

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

Introduction

This CEN Technical Specification describes a laboratory method of test which gives a basis for the assessment of the natural durability of a sample of timber against micro-fungi (ascomycetes and fungi imperfecti) which cause soft rot of wood in service. The infection source is the natural micro-flora of the soil substrate which can also contain other micro-organisms, such as bacteria, and other fungi such as moulds and basidiomycetes. These other organisms can influence the development of soft rot attack in the test specimens. The natural durability of a species of timber can vary depending on the conditions of growth such as climate and soil type. For this reason, the durability established using the method described in this CEN Technical Specification will relate only to the sample of timber tested. Guidance on sampling is given in Annex A.

This laboratory method provides one criterion by which the durability of the timber can be assessed. It is recommended that this information be supplemented by data from other relevant tests, for example CEN/TS 15083-1, and above all by practical experience.

The procedures described in this CEN Technical Specification are intended to be carried out by suitably trained and/or supervised specialists.

1 Scope

This CEN Technical Specification specifies a method of test for determining the natural durability of a timber against soft rotting micro-fungi. The method is applicable to all timber species.

NOTE This method may be used in conjunction with an ageing procedure, for example EN 73 or EN 84.

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

EN ISO 3696, *Water for analytical laboratory use – Specification and test methods (ISO 3696:1987)*

3 Terms and definitions

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

3.1
supplier
sponsor of the test (person or company providing the sample of timber to be tested)

4 Principle

Test specimens prepared from the timber under test and reference timber test specimens are exposed to attack by soft rotting micro-fungi. After a prescribed period of incubation under defined conditions, the percentage loss in dry mass of the test specimens is used to estimate the resistance of hardwood test timbers to attack by the test fungi and as the basis of a provisional durability rating. For softwood test timbers, the percentage loss in dry mass is recorded but the provisional durability rating is based on the loss of modulus of elasticity.

5 Test materials and apparatus

5.1 Biological material

5.1.1 Soil

Natural top soil or a fertile loam-based horticultural soil [1)] of pH 6 to pH 8 and not containing added agrochemical. It shall have a water holding capacity (WHC) of between 25 % and 60 %.

NOTE 1 A suitable method for determining WHC is described in Annex B.

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1) A horticultural soil of the John Innes No. 2 type and with the following composition has been found to be suitable; seven parts by volume loam, three parts by volume sphagnum peat, two parts by volume sharp sand plus 0,6 g chalk and 6,0 g slow release fertilizer per litre of soil mixture. If the WHC is too high, it can be lowered by modifying the soil with the addition of sand.

If a natural soil is used, it shall have the turf or top 50 mm removed and shall not be taken from a depth below 200 mm from the original surface. It shall be passed through a sieve of nominal aperture size 12,5 mm. If it is necessary to store the soil prior to use, it shall be stored in closed moisture proof containers. Before use, thoroughly mix the sample of soil.

NOTE 2 The soil should only be collected in a moist condition.

If a horticultural soil is used which is sterilised during its preparation, then 20 % of a natural soil, prepared as above, shall be added and the soils thoroughly mixed prior to the start of the test.

The soil shall be used only once.

NOTE 3 If assurance of the virulence of the soil is required, the test procedure using cotton cloth described in Annex C, or a similar standardised procedure, may be used.

5.1.2 Reference timbers

5.1.2.1 Species

The following species of wood shall be used for the tests:

— Scots pine sapwood (*Pinus sylvestris* Linnaeus) for tests with softwoods.

— beech (*Fagus sylvatica* Linnaeus) for tests with hardwoods and softwoods.

5.1.2.2 Wood quality

The wood shall be free from cracks, stain, decay, insect damage or other defects. The wood shall not have been water-stored, floated, chemically treated or steamed.

NOTE Wood that has been kiln dried at temperatures below 60 °C may be used.

The Scots pine shall be exclusively sapwood containing little resin and having between 2,5 and 8 annual growth rings per 10 mm. The proportion of latewood in the annual rings shall not exceed 30 % of the whole.

The beech shall be even-grained, free from tyloses and discoloration. It shall have between 2 and 6 annual growth rings per 10 mm.

5.1.2.3 Provision of reference timber test specimens

Condition the wood to a mass fraction of (12 ± 2) % moisture content. Prepare planed strips having a cross-section of (10 ± 0,1) mm × (5 ± 0,1) mm. The longitudinal faces shall be parallel to the direction of the grain. The annual rings shall have a contact angle of (90 ± 15)° to the broad faces. Make transverse cuts, neatly to give sharp edges and a fine-sawn finish to the end-grain surfaces, to give reference timber test specimens (100 ± 1) mm long.

The test specimens shall originate from a minimum of three trees or shall be taken from a stock originally of more than 500 test specimens.

NOTE 1 A moisture meter of the two-pronged electrical conductivity type is suitable for assessing moisture content.

NOTE 2 A moisture content of mass fraction (12 ± 2) % can be achieved in the conditions provided by the conditioning chamber (5.2.1).

5.1.2.4 Dimensions and density of reference timber test specimens

The dimensions of each reference timber test specimen at a mass fraction of (12 ± 2) % moisture content shall be (100 ± 1) mm × (10 ± 0,1) mm × (5 ± 0,1) mm.

In a batch of test specimens, the density of an individual is permitted to differ from the mean value of the batch by ± 10 %.

5.1.2.5 Number and distribution of reference timber test specimens

For softwoods use at least 30 reference timber test specimens but a minimum of three per test container.

NOTE Both Scots pine sapwood and beech reference timber test specimens should be used in tests with softwoods.

For hardwoods, the test specimens represent three sets of 10 replicates which can be assessed after different exposure periods (see 7.5.1).

Mark each test specimen so that it can be identified throughout the test.

5.2 Material

Water, complying with grade 3 of EN ISO 3696.

5.3 Apparatus

5.3.1 Conditioning chamber, well ventilated and controlled at (20 ± 2) °C and (65 ± 5) % relative humidity.

5.3.2 Drying oven, capable of being controlled at (103 ± 2) °C.

5.3.3 Desiccators, with efficient desiccant (silica gel for example).

5.3.4 Test containers, made of material which does not have a toxic effect on the soil inhabiting micro-organisms and provided with a ventilated lid. The depth shall be at least 150 mm, so as to provide at least 30 mm below the test specimens when inserted in the soil to a depth of 80 mm and adequate clearance above the top of the protruding parts of the test specimens.

5.3.5 Culture chamber, (incubator or room) dark and controlled at (27 ± 2) °C and (70 ± 5) % relative humidity.

5.3.6 Ordinary laboratory equipment, including a balance accurate to 0,001 g.

6 Test specimens

6.1 Species and source of wood

Ensure that the species of each plank or log to be tested has been identified correctly and record both the botanical and the trade name. Obtain as much information as possible on the origin and history of the sample (see Clause 9). The sample of timber shall be free from penetrating wood preservative treatments, for example boron-based anti-stain products.

NOTE 1 Commercial samples of timber may contain more than one botanical species.

NOTE 2 Guidance on sampling is given in Annex A.

6.2 Wood quality

Record the physical characteristics of the timber sample, for example the sizes of logs/planks, the presence of resin pockets, cross-grain, knots, sapwood and where possible record the widths of annual rings and the proportion of latewood. For logs, record the position in the trunk if known.

6.3 Provision of the test specimens

Reject at least the outer 10 mm from lateral faces of planks and 50 mm from the end grain; reject at least 50 mm from the end grain of logs.

Condition the wood to a mass fraction of (12 ± 2) % moisture content. Prepare planed strips having a cross-section of (10 ± 0,1) mm × (5 ± 0,1) mm which avoid all obvious defects and which are entirely heartwood or entirely sapwood. The longitudinal faces shall be parallel to the direction of the grain. The annual rings shall have a contact angle of (90 ± 15)° to the broad faces. Make transverse cuts, neatly to give sharp edges and a fine-sawn finish to the end-grain surfaces, to give timber test specimens (100 ± 1) mm long.

NOTE 1 A moisture meter of the two-pronged electrical conductivity type is suitable for assessing moisture content.

NOTE 2 A moisture content of a mass fraction of (12 ± 2) % can be achieved in the conditions provided by the conditioning chamber (5.3.1).

6.4 Dimensions of test specimens

The dimensions of each test timber specimen at a mass fraction of (12 ± 2) % moisture content shall be (100 ± 1) mm × (10 ± 0,1) mm × (5 ± 0,1) mm.

NOTE The nominal volume of each test specimen is 5,0 cm^3.

6.5 Number and distribution of test specimens

The timber test specimens are divided into:

e_1 Test specimens:

these are the test specimens of the test timber subjected to attack by the soft rotting micro-fungi. Use at least 30 test specimens obtained from a minimum of five logs or planks (see Annex A).

e_2 Moisture content test specimens:

these are test specimens of the test timber which are used to establish the moisture content of the timber following conditioning to constant mass, to allow calculation of the initial dry mass of the test specimens. Use at least 10 moisture content test specimens and a minimum of one from each log or plank.

Mark each test specimen so that it can be identified throughout the test.

7 Procedure

7.1 Preparation of the timber test specimens

7.1.1 Reference timber

Place the numbered reference timber test specimens in the oven (5.3.2) and leave them there for 18 h to 24 h. Cool to room temperature in a desiccator (5.3.3) and weigh to the nearest 0,001 g to determine the initial dry mass (m_0).

7.1.2 Test timber

NOTE If the test specimens are to be subjected to an ageing procedure, the procedure should be carried out prior to conditioning to constant mass to avoid the need to establish changes in mass due to the ageing procedure.

Place the numbered timber test specimens (e_1) and the moisture content test specimens (e_2) in the conditioning chamber (5.3.1) until weighing of sample test specimens at 24 h intervals are within ± 0,005 g. Weigh the timber test specimens and the moisture content test specimens and record the initial conditioned mass (m_1).

Calculate the mean density of the timber test specimens using the mean conditioned mass and the nominal volume (see 6.4).

Place the moisture content test specimens in the oven (5.3.2) and leave them there for 18 h to 24 h. Cool to room temperature in a desiccator (5.3.3) and weigh to the nearest 0,001 g to determine the oven dry mass (m_0). Calculate the moisture content of each moisture content test specimen by expressing the mass of water ($m_1 - m_0$) as a percentage of the oven dry mass (m_0). Calculate the mean moisture content (MC) of the moisture content test specimens. Use the mean moisture content to calculate the initial dry mass (m_i) of each test timber specimen using the equation:

$$mi = m_1 \times \frac{100}{100 + MC} \quad (1)$$

where

m_i is the initial dry mass ,in grams, of the timber test specimen;

m_1 is the initial conditioned mass, in grams, of the timber test specimen;

MC is the mean moisture content, in percentage, of the timber test specimen.

7.2 Establishment of initial modulus of elasticity (MOE) for soft woods

Impregnate the reference timber test specimens and the timber test specimens (e_1) with water using the method described in EN 84. Leave the test specimens in the vessels for 2 h.

Carry out a static bending test using either a central loading method or a four-point loading method using an appropriate standard test. Calculate the MOE according to the standard test. The full title and reference to the method shall be included in the test report.

After testing, condition the test specimens to constant mass in the conditioning chamber (5.3.1).

7.3 Exposure of the test specimens

7.3.1 Preparation of test containers

Determine the mass of soil required to provide at least 120 mm depth of soil in a selected test container (5.3.4). Calculate the amount of water required the soil in the fully charged container to 95 % of its WHC.

NOTE A suitable procedure for determining WHC and the quantity of water required to wet up the soil is described in Annex B.

Add the required volume of soil to each test container and add the calculated amount of water slowly whilst mixing to ensure an even distribution of moisture.