EUROPEAN ASSESSMENT DOCUMENT

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BOARDS MADE OF AGGLOMERATED NATURAL CORK FOR THERMAL AND ACOUSTIC INSULATION

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This European Assessment Document (EAD) has been developed taking into account up-to-date technical and scientific knowledge at the time of issue and is published in accordance with the relevant provisions of Regulation (EU) No 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

Contents

1 SCOPE OF THE EAD

1.1 Description of the construction product

Construction products to be covered by this EAD are specific factory made thermal and acoustic insulation products of granulated natural cork agglomerated with an additional binder in the form of boards and without facings.

The additional binder considered in this EAD is an organic binder based either on polyurethane resin (PU) or on urea-formaldehyde resin (UF).

Insulation boards of used or recycled cork (other than waste and by-products generated in the production process) or those including some additive (e.g. flame/fire retardants, biocides, BaP-bituminous based binders) are not considered in this EAD.

The minimum thickness of the agglomerated natural cork board is 20 mm, and the density range is between 130 and 240 kg/m^3. The commonly linear dimensions of the boards are 1 000 mm in length and 500 mm in width.

The boards made of agglomerated natural cork are not covered by EN 13170:2012+A1:2015 because:

- The product does not consist of expanded cork
- The product is made of granulated natural cork agglomerated with an additional binder.

Besides this, the following essential characteristics are covered in addition to EN 13170:2012+A1:2015:

- Propensity to undergo smouldering combustion (no test method is described in EN 13170[1])
- Content, emission or release of dangerous substances (no test and assessment methods are described in EN 13170)
- Biological resistance (no test method is described in EN 13170)

The construction products are hereinafter referred to as insulation boards.

The EAD applies to the insulation boards. All other ancillary components which are necessary to fix the boards are not considered as part of the product covered by the EAD.

1.2 Information on the intended uses of the construction product

1.2.1 Intended uses

The insulation boards are intended to be used in new or in existing buildings as:

- Thermal insulation boards to be used in walls, roofs and ceilings (inside cavities or as lining for internal walls) and in floors (inside cavities or in non-living attic floors).
- Airborne sound insulation or sound absorption boards to be used in walls, roofs and ceilings (inside cavities or as lining for internal walls) and in floors (inside cavities or in non-living areas of attic floors).

Impact sound insulation is not considered in this EAD.

The insulation boards are not intended to be exposed to compression loads.

The insulation boards are not intended to be used in places where they may be exposed to wetting or weathering.

[1] All undated references to standards or to EAD's in this document are to be understood as references to the dated versions listed in clause 4

The thermal and acoustic insulation boards are not self-supporting elements; thus they require an additional supporting element (wall, roof, ceiling or floor). The boards are attached to the substrate either by means of cement-based adhesive or mechanically fixed with additional permanent elements. In ceiling and floor applications the boards may be simply laid over the substrate (without adhesive bond or mechanical fixings).

1.2.2 Product packaging, transport, storage, installation, maintenance, replacement and repair

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

It is assumed that the product will be installed according to the manufacturer's instructions or (in absence of such instructions) according to the usual practice of the building professionals.

Relevant manufacturer's stipulations having influence on the performance of the product covered by this European Assessment Document shall be considered for the determination of the performance and detailed in the ETA.

1.2.3 Working life/Durability

The provisions and the verification and assessment methods included or referred to in this EAD have been written based upon the assumed working life of the agglomerated natural cork for the intended use of 50 years when installed in the works. These provisions are based upon the current state of the art and the available knowledge and experience.

When assessing the products, the intended use as foreseen by the manufacturer shall be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works[2].

The indications given as to the working life of the construction products cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting this EAD nor by the Technical Assessment Body issuing an ETA based on this EAD, but are to be regarded only as a means for expressing the expected economically reasonable working life of the product.

1.3 Specific terms used in this EAD

1.3.1 Cork

Protective layer of the cork oak tree (Quercus suber L.) which may be periodically removed from its trunk and branches to provide the raw material for cork products

1.3.2 Granulated cork

Fragments of cork obtained by grinding and/or milling raw or manufactured cork (waste and by-products generated in the production process).

1.3.3 Agglomerated composition cork

Product which will, by virtue of its materials and shape supports all applied loadings (e.g. snow, wind, internal air pressure, foot traffic), and transmits these loadings to the supports.

[2] The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, as well as on the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than the working life referred to above.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 1 shows how the performance of the insulation boards are assessed in relation to the essential characteristics.

Table 1 Essential characteristics of the products and methods and criteria for the performance of the products in relation to those essential characteristics

No	Essential characteristic	Assessment method	Type of expression of product performance *(level, class, description)*
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	2.2.1	Class
2	Continuous smouldering combustion	2.2.2	Description
Basic Works Requirement 3: Hygiene, health and the environment			
3	Content, emission or release of dangerous substances	2.2.3	Description
4	Biological resistance	2.2.4	Level
5	Water vapour diffusion resistance	2.2.5	Level
6	Water absorption (short term, partial immersion)	2.2.6	Level
Basic Works Requirement 5: Protection against noise			
7	Airflow resistivity	2.2.7	Level
8	Sound absorption	2.2.8	Level
Basic Works Requirement 6: Energy economy and heat retention			
9	Thermal conductivity Thermal resistance Moisture conversion coefficients	2.2.9	Level
10	Thickness	2.2.10	Level
11	Density	2.2.11	Level
12	Moisture content	2.2.12	Level
13	Dimensional stability under normal temperature and humidity conditions	2.2.13	Level
14	Dimensional stability under specified temperature and humidity (23°C and 90% humidity)	2.2.14	Level
Other aspects related to the performance			
15	Tensile strength (parallel)	2.2.15	Level
16	Bending strength	2.2.16	Level
17	Length and width	2.2.17	Level
18	Squareness	2.2.18	Level
19	Flatness	2.2.19	Level

2.2 Assessment methods and criteria for the performance of the products in relation to essential characteristics of the products

This chapter is intended to provide instructions for TABs. Therefore, the use of wordings such as “shall be stated in the ETA” or “it has to be given in the ETA” shall be understood only as such instructions for TABs on how results of assessments shall be presented in the ETA. Such wordings do not impose any obligations for the manufacturer and the TAB shall not carry out the assessment of the performance in relation to a given essential characteristic when the manufacturer does not wish to declare this performance in the Declaration of Performance.

2.2.1 Reaction to fire

The insulation boards shall be tested using the test method(s) EN ISO 11925-2 and, eventually, EN 13823 which are relevant for the corresponding reaction to fire class according to EN 13 501-1, in order to be classified according to Commission Delegated Regulation (EU) 2016/364.

For mounting and fixing the boards as well as for the extended application of test results, the provisions given in EN 15715, cl.5 and tables A.37 and A.38, shall apply accordingly for products covered by this EAD.

2.2.2 Continuous smouldering combustion

The performance of the product’s propensity to undergo continuous smouldering combustion shall be tested and assessed in accordance with EN 16733.

The conditions and parameters which shall be taken into account within the test as well as the rules for the application of the test results are specified in Annex A of the EAD.

In accordance with EN 16733, clause 11, the ETA shall specify the following information, depending on the out-come of the assessment:

− “The product does not show propensity to undergo continuous smouldering”;

− “The product shows propensity to undergo continuous smouldering” or

− "Assessment of the propensity to undergo continuous smouldering is not possible".

2.2.3 Content, emission and/or release of dangerous substances

2.2.3.1 Release scenarios

The performance of the product related to the emissions and/or release and, where appropriate, the content of dangerous substances will be assessed on the basis of the information provided by the manufacturer[3] after identifying the release scenarios (in accordance with EOTA TR 034) taking into account the intended

[3] The manufacturer may be asked to provide to the TAB the REACH related information which he must accompany the DoP with (cf. Article 6(5) of Regulation (EU) No 305/2011).

The manufacturer is not obliged:

- to provide the chemical constitution and composition of the product (or of constituents of the product) to the TAB, or

- to provide a written declaration to the TAB stating whether the product (or constituents of the product) contain(s) substances which are classified as dangerous according to Directive 67/548/EEC and Regulation (EC) No 1272/2008 and listed in the "Indicative list on dangerous substances" of the SGDS.

Any information provided by the manufacturer regarding the chemical composition of the product may not be distributed to EOTA or to TABs.

use of the product and the Member States where the manufacturer intends his product to be made available on the market.

The identified intended release scenarios for this product and intended use with respect to dangerous substances are:

IA1: Product with direct contact to indoor air

IA2: Product with no direct contact to (e.g. covered products) but possible impact on indoor air

IA3: Product with no contact to and no impact on indoor air

2.2.3.2 VOC and SVOC

For the intended use covered by the release scenario IA1 and/or IA2 semi-volatile organic compounds (SVOC) and volatile organic compounds (VOC) shall be determined in accordance with EN 16516. The loading factor used for emission testing shall be 1,0 m^2/m^3 (for walls).The release of VOC and SVOC (individual VOC/SVOCs and the sum emission of VOC/SVOC) has to be determined according to the relevant parts of EN 16516. Only products for the use as linings for internal walls have to be tested.

The preparation of the test specimen is performed by using a representative sample of the product installed in accordance with the manufacturer's product installation instructions or in absence of such instructions the usual practice of the product installation. The size of the test specimen has to be chosen in consideration of the test chamber size and the intended loading factor (see above).

Once the test specimen has been produced, as described above, it should immediately be placed in the emission test chamber. This time is considered the starting time of the emission test.

The test results have to be reported for the relevant parameters (e.g. chamber size, temperature and relative humidity, air exchange rate, loading factor, size of test specimen, conditioning, production date, arrival date, test period, test result) after 3 and/or 28 days testing.

The product performance shall be expressed in [µg/m^3 or mg/m^3] and stated in the ETA.

2.2.3.3 Formaldehyde

The formaldehyde release of the insulation boards for use in the intended release scenarios IA1 and/or IA2, shall be determined according to EN 16516 and EN ISO 16000-9:2006 in combination with EN ISO 16000-3 and EN ISO 16000-11.

The product performance shall be expressed in [µg/m^3 or mg/m^3] and stated in the ETA.

2.2.4 Biological resistance

The determination of the growth of mould fungus shall be carried out according to Annex B.

The growth of mould fungus shall be expressed according to Table 4 of EN ISO 846.

2.2.5 Water vapour diffusion resistance

The determination of the water vapour diffusion resistance factor (μ) shall be carried out according to EN 12086 clause 7.1, Table 1, set A and/or set C, at least with five test specimens.

The water vapour diffusion resistance factor μ shall be stated in the ETA. The test atmospheres (set A and/or set C) according to EN 12086 used for testing shall be given in the ETA.

2.2.6 Water absorption (short term, partial immersion)

The determination of short-term water absorption shall be determined by partial immersion, according to EN 1609, clause 7.2.2, method A (drainage).

The water absorption level, W_{sp}, in kg/m² shall be calculated using steps of 0.5 kg/m².

2.2.7 Airflow resistivity

The determination of the specific airflow resistivity shall be carried out according to method A in EN 29053.

A minimum value of airflow resistivity shall be stated in the ETA.

2.2.8 Sound absorption

The determination of the sound absorption coefficient shall be tested according to EN ISO 354 using either type A or type B mounting as described in Annex B of EN ISO 354.

The sound characteristics shall be calculated according to EN ISO 11654, using the values for the sound absorption coefficient αp at the frequencies 125 Hz, 250 Hz, 500 Hz, 1000 Hz, 2000 Hz and 4000 Hz and the single number value for the measured sound absorption coefficient α_w.

The obtained values for αp and αw shall be rounded to the nearest 0.05 (α_p larger than 1 shall be expressed as $\alpha_p = 1$).

The values for sound absorption α_p and α_w in levels, with steps of 0.05, shall be stated in the ETA.

2.2.9 Thermal conductivity

The insulation board thermal conductivity, or thermal resistance for insulation boards with uniform thickness, at a temperature of 10 °C, shall be determined according to EN 12667 or EN 12939 for thick products, following the general procedures defined in EN 13170.

At least 4 measurements shall be performed under dry conditions.

The thermal conductivity at a temperature of 10 °C at dry conditions ($\lambda_{10,dry,90/90}$) representing at least 90% of the production with a confidence level of 90% shall be determined according to Annex C, clause C.1.

Moisture related conversion coefficients, mass by mass, $f_{u,1}$ and $f_{u,2}$ and equilibrium moisture contents (expressed in kg/kg) $u_{23,50}$ and $u_{23,80}$ shall be given in the ETA.

The moisture conversion coefficient ($f_{u,1}$) and the equilibrium moisture content $u_{23,50}$ shall be determined in accordance with Annex C, clause C.2.

The moisture conversion coefficient ($f_{u,2}$) to high humidity and the equilibrium moisture content $u_{23,80}$ shall be determined in accordance with Annex C, clause C.3.

Mass related moisture conversion factors F_{m1} and F_{m2} shall be given in the ETA.

The moisture conversion factor F_{m1} for conversion of $\lambda_{10,dry}$ to $\lambda_{10,(23,50)}$ and the moisture conversion factor F_{m2} for conversion of $\lambda_{10,(23,50)}$ to $\lambda_{10,(23,80)}$ shall be calculated according to EN ISO 10456:2007 clause 7.3, equation 4.

2.2.10 Thickness

The determination of the thickness(es), d_N, of the insulation boards shall be carried out according to EN 823. A minimum of three full size boards shall be used in the determination.The load shall be 50 Pa.

Mean thickness value(s) shall be given in the ETA.

2.2.11 Density

The determination of density shall be carried out according to EN 1602. Test specimens shall, preferably, be full size boards. A minimum of three boards shall be used in the determination. Otherwise, at least five test specimens with minimum dimensions 200 mm x 200 mm shall be used.

Individual results and a value for the mean density of boards, rounded to the nearest kg/m^3, shall be stated in the ETA.

2.2.12 Moisture content

The moisture content shall be determined according to EN 12105.

The calculated mean value, expressed as mass fraction (%), shall be given in the ETA.

2.2.13 Dimensional stability under normal temperature and humidity conditions

The determination of the dimensional stability under normal temperature and humidity conditions (23 ºC and 50% relative humidity) shall be carried out according to EN 1603, method A (full size boards). The test shall be carried out after storage of 48 h at (23 ± 2) °C and (50 ± 5)% relative humidity.

The measured mean values from individual tests of relative change of dimensions in length, $\Delta\varepsilon_l$, width, $\Delta\varepsilon_b$, and thickness, $\Delta\varepsilon_d$, shall be given in the ETA expressed in %.

2.2.14 Dimensional stability under specified temperature and humidity (23°C and 90% humidity)

The determination of the dimensional stability under specified temperature and humidity conditions shall be carried out according to EN 1604. The test specimens shall be previously conditioned to equilibrium (EN 1604, clause 6.4) at (23 ± 2) °C and (50 ± 5)% relative humidity. The test shall be carried out after storage of 48 h at (23 ± 2) °C and (90 ± 5)% relative humidity.

The relative change of dimensions in length, $\Delta\varepsilon_l$, width, $\Delta\varepsilon_b$, and thickness, $\Delta\varepsilon_d$, shall be given in the ETA expressed
in %.

2.2.15 Tensile strength (parallel)

The determination of tensile strength parallel to faces σt shall be carried out according to EN 1608. A minimum of three test specimens shall be used.

Individual results and corresponding mean value shall be given in the ETA.

2.2.16 Bending strength

The bending strength σ_b shall be determined according to EN 12089, method B.

For handling purposes, the measured value shall be given in the ETA.

2.2.17 Length and width

The determination of length and width of the boards shall be carried out according to EN 822. A minimum of three full size boards shall be used in the determination.

Mean values for the length and width of the boards shall be given in the ETA.

2.2.18 Squareness

The determination of squareness of the boards shall be carried out according to EN 824. The determination shall be performed at least on three full size boards.

The deviation from squareness (in relation to length, witdth and thickness), expressed as indicated in clause 10d) of EN 824, shall be given in the ETA.

2.2.19 Flatness

The determination of flatness of the boards shall be carried out according to EN 825. The determination shall be performed at least on three full size boards

The deviation from squareness, expressed as indicated in clause 10d) of EN 825, shall be given in the ETA.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 Systems of assessment and verification of constancy of performance to be applied

For the products covered by this EAD the applicable European legal act is: decision 1999/91/EC as amended by decision 2001/596/EC.

The system to be applied is 3 (any use, dangerous substances).

In addition, with regard to reaction to fire for products covered by this EAD the applicable systems are 1, 3 and/or 4.

3.2 Tasks of the manufacturer

The corner stones of the actions to be undertaken by the manufacturer of the products in the procedure of assessment and verification of constancy of performance are laid down in **Error! Reference source not found.**.

Table 2 Control plan for the manufacturer; corner stones

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control*
Factory production control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]					
1	Raw and base materials	According to manufacturer´s specifications	Control Plan	Control Plan	Each batch
2	Reaction to fire	2.2.1	Control Plan	3 (EN 13823) 6 (EN ISO 11925-2)	1 per year
3	Continuous smouldering combustion	2.2.2	Control Plan	1	1 per 2 years
4	Content, emission or release of dangerous substances	2.2.3	Control Plan	Control Plan	Control Plan
5	Biological resistance	2.2.4	Control Plan	4	1 per 5 years
6	Water vapour diffusion resistance	2.2.5	Control Plan	3	1 per year
7	Water absorption (short term, partial immersion)	2.2.6	Control Plan	4	1 per month
8	Airflow resistivity	2.2.7	Control Plan	4	1 per year
9	Sound absorption	2.2.8	Control Plan	1	1 per 5 years

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control*
10	Thermal conductivity Thermal resistance Moisture conversion coefficients and factors	2.2.9	Control Plan	1	Every three months
11	Thickness	2.2.10	Control Plan	3	1 per day
12	Density	2.2.11	Control Plan	3	1 per day
13	Moisture content	2.2.12	Control Plan	3	1 per week
14	Dimensional stability under normal temperature and humidity conditions	2.2.13	Control Plan	3	1 per 5 years
15	Dimensional stability under specified temperature and humidity (23°C and 90% humidity)	2.2.14	ControlPlan	3	1 per 5 years
16	Tensile strength (parallel)	2.2.15	Control Plan	3	1 per month
17	Bending strength	2.2.16	Control Plan	3	1 per month
18	Length and width	2.2.17	Control Plan	3	1 per day
19	Squareness	2.2.18	Control Plan	1	1 per day
20	Flatness	2.2.19	Control Plan	1	1 per day

* In case of discontinuous production these minimum frequencies should be adapted to an equivalent frequency.

3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body in the procedure of assessment and verification of constancy of performance for the boards made of agglomerated natural cork for thermal and acoustic insulation are laid down in Table 3.

The involvement of a notified product certification body is required only under the conditions defined in Decision 1999/94/EC as amended by Decision 2012/202/EC, in case of reaction to fire classes A1, A2, B and C of the product for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. a limiting of organic material and/or the addition of fire retardant).

For the products falling under systems 3 and 4 (see clause 3.1), there is no involvement of a notified body after the ETA has been issued.

Table 3 Control plan for the notified body; corner stones

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control *(for system 1 only)*					
1	Control of the manufacturing plant and of the factory production carried out by the manufacturer regarding the constancy of performance related to reaction to fire and taking into account a limiting of organic material and/or the addition of fire retardant	As defined in clause 2.2.1 of the EAD	Control Plan		When starting the production, after its modification and when starting a new production line
Continuous surveillance, assessment and evaluation of factory production control *(for system 1 only)*					
2	Continuous surveillance, assessment and evaluation of the factory production control carried out by the manufacturer regarding the constancy of performance related to reaction to fire and taking into account a limiting of organic material and/or the addition of fire retardant	As defined in clause 2.2.1 of the EAD	Control Plan		Annually

4 REFERENCE DOCUMENTS

EN 822:2013	*Thermal insulating products for building applications. Determination of length and width*
EN 823:2013	*Thermal insulating products for building applications. Determination of thickness*
EN 824:2013	*Thermal insulating products for building applications. Determination of squareness*
EN 825:2013	*Thermal insulating products for building applications. Determination of flatness.*
EN 933-1:2012	*Tests for geometrical properties of aggregates – Part 1: Determination of particle size distribution – Sieving method*
EN 1602:2013	*Thermal insulating products for building applications. Determination of the apparent density*
EN 1603:2013	*Thermal insulating products for building applications. Determination of dimensional stability under constant normal laboratory conditions (23°C/50% relative humidity)*
EN 1604:2013	*Thermal insulating products for building applications. Determination of dimensional stability under specified temperature and humidity conditions*
EN 1608:2013	*Thermal insulating products for building applications. Determination of tensile strength parallel to faces*
EN 1609:2013	*Thermal insulating products for building applications. Determination of short term water absorption by partial immersion*
EN 12086:2013	*Thermal insulating products for building applications. Determination of water vapour transmission properties*
EN 12087:2013	*Thermal insulating products for building applications. Determination of long term water absorption by immersion*
EN 12089:2013	*Thermal insulating products for building applications. Determination of bending behavior*
EN 12105:1998	*Resilient floor coverings - Determination of moisture content of agglomerated composition cork*
EN 12667:2001	*Thermal performance of building materials and products. Determination of thermal resistance by means of guarded hot plate and heat flow meter methods. Products of high and medium thermal resistance*
EN 12939:2000	*Thermal performance of building materials and products. Determination of thermal resistance by means of guarded hot plate and heat flow meter methods. Thick products of high and medium thermal resistance*
EN 13170: 2012 +A1:2015/prA2	*Thermal insulation products for buildings. Factory made products of expanded cork (ICB). Specification*
EN 13823: 2010+ +A1:2014	*Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item.*
EN 13501-1:2010	*Fire classification of construction products and building elements. Classification using test data from reaction to fire tests*
EN 15715:2009	*Thermal insulation products. Instructions for mounting and fixing for reaction to fire testing. Factory made products*
EN 16516:2017	*Construction products: Assessment of release of dangerous substances - Determination of emissions into indoor air*
EN 16733:2016	*Reaction to fire tests for building products - Determination of a building product's propensity to undergo continuous smouldering*
EN 29053:1993	*Acoustics. Materials for acoustical applications. Determination of airflow resistance*
EN ISO 354:2003	*Acoustics. Measurement of sound absorption in a reverberation room*
EN ISO 846:1997	*Plastics – Evaluation of the action of microorganisms*
EN ISO 11654:1997	*Acoustics. Sound absorbers for use in buildings. Rating of sound absorption*

EN ISO 11925-2:2010+ +AC:2011	*Reaction to fire tests – Ignitability of products subjected to direct impingement of flame – Part 2: Single-flame source test*
EN ISO 16000-3:2011	*Indoor Air. Part 3: Determination of formaldehyde and other carbonyl compounds. Active sampling method*
EN ISO 16000-9:2006+ +AC:2007	*Indoor air. Part 9: Determination of the emission of volatile organic compounds from building products and furnishing. Emission test chamber method*
EN ISO 16000-11:2006	*Indoor air. Part 11: Determination of the emission of volatile organic compounds from building products and furnishing. Sampling, storage of samples and preparation of test specimens*
CDR (EU) 2016/364	*Commission Delegated Regulation (EU) 2016/364 of 1 July 2015 on the classification of the reaction to fire performance of construction products pursuant to Regulation (EU) No 305/2011 of the European Parliament and of the Council*
EOTA TR 034:2015	*General BWR3 Checklist for EADs/ETAs. Dangerous substances*

ANNEX A Determination of propensity to undergo continuous smouldering

A.1 Product and installation parameters

In addition to EN 16733, the following conditions and relevant parameters shall be considered:

- product-type (type of binder and additives etc.);
- the product or product variant with the highest and lowest density;
- the product or product variant with the highest thickness;
- each different produced orientation, if relevant (i. e. lengthwise and crosswise to the length direction of the product);
- each face of the product, if relevant (e.g. different texture or granule size);
- without any facings, coatings or suchlike.

A.2 Preparation of tests specimens

The tests shall be done without consideration of the intended end-use conditions, because propensity to undergo continuous smouldering is hardly affected by end-use conditions. If the paragraph 6.2.5 of EN 16733 applies, a permanent contact between the pieces shall be assured.

A.3 Extended application of test results

The results of tests considering the aforementioned parameters in full are also valid for products:

- of the same product-type,
- with all densities between those evaluated,
- with lower thickness and also with higher thickness when 100 mm thick specimens were tested,
- with all orientations and both faces, if all relevant orientations (lengthwise and crosswise) and different faces had been tested,
- for any end-use conditions.

ANNEX B Determination of resistance to mould fungus

B.1 Principle

Three test specimens are exposed for a defined period of time at a constant temperature to a saturated atmosphere.

After this period of time the test specimens are visually inspected for the presence of mould fungus.

B.2 Apparatus

Desiccator(s), of sufficient size, that can contain test specimens of 50 mm x 20 mm x 30 mm.

B.3 Testing conditions

The exposure shall be performed at a constant temperature of (23 ± 2) °C.

Note*: This constant temperature is necessary to avoid any condensation during the exposure period.*

B.4 Procedure

- The desiccator is filled at the bottom with water;
- The sample is then put in the desiccator, taking care that no part of the sample can come into contact with the water;
- The desiccator is then closed tightly and put in the temperature-conditioned room for a period of four weeks;
- After four weeks the desiccator is opened and the sample visually inspected on the presence of mould fungus according to EN ISO 846:1997, clause 9.1.

B.5 Expression of results

The presence of mould fungus is expressed according to Table 4 of EN ISO 846.

ANNEX C Determination of fractile value of thermal conductivity and the mass-related moisture conversion coefficient to high moisture content

C.1 Determination of the λ fractile value at 10 °C, at dry conditions ($\lambda_{10,dry,90/90}$)

C.1.1 Measurement of the λ_{dry} at 10 °C

C.1.1.1 Test specimens for the determination of the thermal conductivity λ at 10 °C shall be conditioned to dryness after storage for at least 72 hours at (70 ± 2) °C in an oven ventilated with air taken at (23 ± 2) °C and (50 ± 5)% relative humidity.

C.1.1.2 The thermal conductivity of the test specimens conditioned according to C.1.1.1 shall be measured according to EN 12667 or EN 12939 for thick products at a mean temperature of (10 ± 0.3) °C.

During the measurement, precaution shall be taken to avoid moisture absorption by the specimen. It is acceptable, for instance, to put the test specimen into a thin plastic bag.

C.1.2 Calculation of the λ fractile value at 10 °C, at dry conditions ($\lambda_{10,dry,90/90}$)

C.1.2.1 The λ fractile value at 10 °C, at dry conditions ($\lambda_{10,dry,90/90}$) representing at least 90% of the production with a confidence limit of 90% shall be calculated using the principles as detailed in EN 13170:2012, Annex A.

C.2 Determination of the mass-related moisture conversion coefficient ($f_{u,1}$)

For the determination of the mass-related moisture conversion coefficient $f_{u,1}$, two sets of measurements are needed.

Set 1

At least three measurements on dry test specimens, to determine $\lambda_{10,dry}$ and u_{dry} (moisture content mass by mass).

Set 2

At least three measurements on test specimens conditioned at (23 ± 2) °C and (50 ± 5)% relative humidity, to determine $\lambda_{10,(23,50)}$ and $u_{23,50}$ (moisture content mass by mass).

C.2.1 Procedure

C.2.1.1 Set 1

C.2.1.1.1 Dry the test specimens following the procedure in C.1.1.1.

C.2.1.1.2 Determine for each test specimen the mass in dry condition. Average the values to determine the m_{dry}. The u_{dry}, being the moisture content in dry condition, is by definition set to 0.

C.2.1.1.3 Determine for each test specimen the λ value at 10 °C following the procedure in C.1.1.2. Average the values to determine the $\lambda_{10,dry}$.

C.2.1.2 Set 2

C.2.1.2.1 Condition the test specimens at (23 ± 2) °C and (50 ± 5)% relative humidity following the procedures detailed in EN 13170:2012, clause 5.2, step 2.

C.2.1.2.2 Determine for each test specimen the mass at (23 ± 2) °C and (50 ± 5)% relative humidity.

Average the values to determine the mass at 23 °C and 50% relative humidity as $m_{23,50}$.

C.2.1.2.3 Calculate $u_{23,50}$ by the following formula:

$$u_{23,50} = \frac{m_{23,50} - m_{dry}}{m_{dry}}$$

where,

$m_{23,50}$ is the mass at 23 °C and 50% relative humidity according to C.2.1.2.2

m_{dry} is the mass according to C.2.1.1.2

C.2.1.2.4 Determine for each test specimen conditioned according to C.2.1.2.1 the λ value in accordance with EN 12667 or EN 12939 for thick products at a mean temperature of (10 ± 0.3) °C.

Average the values to determine $\lambda_{10,(23,50)}$.

C.2.1.3 Calculation of the mass-related moisture conversion coefficient ($f_{u,1}$)

The mass-related moisture conversion coefficient $f_{u,1}$ shall be calculated by the following formula (derived from ISO 10456, formula 4):

$$f_{u,1} = \frac{\ln \frac{\lambda_{10,(23,50)}}{\lambda_{10,dry}}}{u_{23,50} - u_{dry}}$$

where,

$\lambda_{10,(23,50)}$ is determined according to C.2.1.2.4;

$\lambda_{10,dry}$ is determined according to C.2.1.1.3;

$u_{23,50}$ is determined according to C.2.1.2.3;

u_{dry} is determined according to C.2.1.1.2 and is defined to be 0.

C.3 Determination of the mass-related moisture conversion coefficient ($f_{u,2}$) to high moisture content

For the determination of the mass-related moisture conversion coefficient to high moisture content $f_{u,2}$, two sets of measurements are needed.

Set 1

At least three measurements on test specimens conditioned at (23 ± 2) °C and (50 ± 5)% relative humidity, to determine $\lambda_{10,(23,50)}$ and $u_{23,50}$ (moisture content mass by mass).

Set 2

At least three measurements on test specimens conditioned at (23 ± 2) °C and (80 ± 5)% relative humidity, to determine $\lambda_{10,(23,80)}$ and $u_{23,80}$ (moisture content mass by mass).

C.3.1 Procedure

C.3.1.1 Set 1

Determine the $\lambda_{10\,(23,50)}$ and $u_{23,50}$ in accordance with C.2.1.2

C.3.1.2 Set 2

C.3.1.2.1 Condition the test specimens at (23 ± 2) °C and (80 ± 5)% relative humidity until stabilization at constant weight is achieved, Stabilisation is obtained when the relative change in weight does not exceed 0.5% between two consecutive daily measurements.

C.3.1.2.2 Determine for each test specimen the mass at (23 ± 2) °C and (80 ± 5)% relative humidity.

Average the values to determine the mass at 23 °C and 80% relative humidity as $m_{23,80}$.

C.3.1.2.3 Calculate $u_{23,80}$ by the following formula:

$$u_{23,80} = \frac{m_{23,80} - m_{dry}}{m_{dry}}$$

where,

$m_{23,80}$ is the mass at 23 °C and 80% relative humidity according to C.3.1.2.2

m_{dry} is the mass according to C.2.1.1.2

C.3.1.2.4 Determine for each test specimen conditioned according C.3.1.2.1 the λ value in accordance with EN 12667 or EN 12939 for thick products at a mean temperature of (10 ± 0.3) °C.

Average the values to determine $\lambda_{10,(23,80)}$.

C.3.1.3 Calculation of the mass-related moisture conversion coefficient to high moisture content ($f_{u,2}$)

The mass-related moisture conversion coefficient to high moisture content $f_{u,2}$ shall be calculated by the following formula (derived from ISO 10456, formula 4):

$$f_{u,2} = \frac{\ln \frac{\lambda_{10,(23,80)}}{\lambda_{10,(23,50)}}}{u_{23,80} - u_{23,50}}$$

where,

$\lambda_{10,(23,80)}$ is determined according to C.3.1.2.4;

$\lambda_{10,(23,50)}$ is determined according to C.2.1.2;

$u_{23,80}$ is determined according to C.3.1.2.3.

$u_{23,50}$ is determined according to C.2.1.2.

Note 1*: Thermal conductivity may also be measured at mean temperatures other than 10 °C, providing that the accuracy of the relationship between the temperature and thermal properties is well documented.*