



## EUROPEAN ASSESSMENT DOCUMENT

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# WALLS, ROOFS AND CEILINGS MADE OF OSB-PANELS WHICH ARE GLUED TOGETHER ON THEIR SURFACES

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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).

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# 1 SCOPE OF THE EAD

## 1.1 Description of the construction product

The products are plane elements (in the following called elements) with a thickness from 75 mm to 250 mm, made of at least 3 and up to 10 layers of OSB plates which are glued together on their surfaces. The OSB plates are oriented parallel to their direction of production. The elements have a width up to 2,8 m perpendicular to the direction of the strands of the OSB plates and a length up to 20 m in the direction of the strands. Wall elements have a maximum height of 6,5 m if oriented up in the direction of the strands.

The OSB plates are glued together parallel to the direction of the strands of the OSB plates.

Each OSB plate forms a continuous layer of the element. In deviation to that it is possible that in the middle of the element (2/5 of the thickness) the OSB plates might not be continuous, so that there are butt joints in these layers. These butt joints overlap with at least 300 mm.

The layers of wall elements, which are loaded in plane of the element perpendicular to direction of the grain, can have horizontal butt joints with a distance of  $a \leq 0,3 H$  from the top and bottom edge, where H is the height of the element. H in this case does not exceed 3,8 m.

The OSB plates are glued together over the whole surface via a one component - polyurethane adhesive according to EN 15425 and EN 14080:2013-09, Annex C.3.

The ETA will state where gaps and joints are possible according to the specification of the manufacturer and their maximum width in service conditions according to the tests undertaken.

This EAD covers only OSB plates for which adhesives for the connection of OSBs are used which have been tested in advance.

The product is not covered by a harmonised European standard (hEN).

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 Information on the intended use(s) of the construction product

### 1.2.1 Intended use

The products are intended to be used as structural elements in buildings to construct walls, floors and roofs.

The products are subject to static and quasi static actions only.

Within a roof construction, the elements will not contribute to the water tightness, but will receive a suitable waterproofing or roof covering. Waterproofing and roof covering are not part of this EAD.

The products are intended to be used in service classes 1 and 2 according to EN 1995-1-1.

### 1.2.2 Working life/Durability

The assessment methods included or referred to in this EAD have been written based on the manufacturer's request to take into account a working life of the OSB plates for the intended use of 50 years when installed

in the works (provided that the OSB plates are subject to appropriate installation (see 1.1)) These provisions are based upon the current state of the art and the available knowledge and experience.

When assessing the product, 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<sup>1</sup>.

The indications given as to the working life of the construction product 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 regarded only as a means for expressing the expected economically reasonable working life of the product.

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<sup>1</sup> 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 referred to above.

## 2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

### 2.1 Essential characteristics of the product

Table 1 shows how the performances of the elements are assessed in relation to the essential characteristics.

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

No	Essential characteristic	Assessment method	Type of expression of product performance
<b>Basic Works Requirement 1: Mechanical resistance and stability</b>			
1	Bending strength *)	2.2.1	Level
2	Shear strength *) **)	2.2.2	Level
3	Compression strength *)**)	2.2.3	Level
4	Tensile strength **)	2.2.4	Level
5	Embedding strength	2.2.5	Level
6	Withdrawal strength	2.2.6	Level
7	Pull through parameter	2.2.7	Level
8	Durability	2.2.8	Description
<b>Basic Works Requirement 2: Safety in case of fire</b>			
9	Reaction to fire	2.2.9	Class
<b>Basic Works Requirement 3: Hygiene, health and the environment</b>			
10	Content, emission and/or release of dangerous substances	2.2.10	Description
<b>Basic Works Requirement 4: Safety and accessibility in use</b>			
11	Same as BWR 1		
<b>Basic Works Requirement 6: Energy economy and heat retention</b>			
12	Thermal resistance	2.2.11	Level
*)	Load bearing capacity and stiffness regarding mechanical actions perpendicular to the elements		
**)	Load bearing capacity and stiffness regarding mechanical actions in plane of the elements		

## 2.2 Methods and criteria for assessing the performance of the product in relation to essential characteristics of the product

### 2.2.1 Bending strength and stiffness

Bending tests shall be performed and evaluated following EN 408.

The characteristic values for bending strength and bending stiffness shall be determined in accordance with EN 1058. A number of 10 samples per element type are advised. Test specimen shall be taken from elements in a way that gaps and joints within the layers are considered.

### 2.2.2 Shear strength and stiffness

Shear tests perpendicular to the plane shall be performed as bending tests with regard to EN 789, chapter 7. The loads shall be applied in a way that shear failure will be decisive.

The application of the loads shall be similar to Figure 2, chapter 7.3. The distance between the loads points and the supports,  $l_2$ , shall be two times the normal thickness and the distance between the loads,  $l_3$  shall be six times the normal thickness.

The maximum shear value is derived from:  $\tau_{\max} = 1,5 \cdot \frac{V_{\max}}{b \cdot t}$

The characteristic values for shear strength shall be determined in accordance with EN 1058. A number of 10 samples per element type are advised.

Each specimen's failure surface shall be examined. The bonding quality shall be such that the failure does not rip the wood fibers off the glue area between the OSB plates. If the bonding slit is free from wood fibers in the area of the failure surface, the product cannot be surveyed according to this EAD.

Figures for shear strength and shear modulus in plane of the elements as well as shear stiffness perpendicular to the plane of the elements can be taken from the declaration of performance of OSB plates used in the element. If these figures of OSB plates used within one element vary, the lowest figure is decisive.

### 2.2.3 Compression strength and stiffness

Compression tests perpendicular to the plane of the elements can be performed according to EN 789. Compression tests in plane of the elements can be performed according to EN 408.

Alternative figures for these characteristics, taken from the declaration of performance of OSB plates used in the element can be regarded as significant for the elements. If these figures of OSB plates used within one element vary, the lowest figure is decisive.

### 2.2.4 Tensile strength and stiffness

Tensile tests to evaluate the tensile strength and tensile modulus of elasticity in plane of the elements shall be performed in accordance to EN 408.

Alternative figures for these characteristics, taken from the declaration of performance of the OSB plates used in the element, can be regarded as significant for the elements. If these figures of OSB plates used within one element vary, the lowest figure is decisive.

### 2.2.5 Embedding strength

Embedding tests shall be performed according to EN 383.

### 2.2.6 Withdrawal strength

Withdrawal tests shall be performed according to EN 1382.

### 2.2.7 Pull through parameter

Pull through tests shall be performed according to EN 1383.

### 2.2.8 Durability

For the durability of the OSB plates EN 13986 applies.

The polyurethane adhesive has to be tested as described in EN 15425 and EN 14080:2013-09, Annex C.3. The type of adhesive is given in the ETA.

The documented and stated characteristics of the adhesives for the connection of OSBs are deposited at the Technical Assessment Body.

### 2.2.9 Reaction to fire

The OSB panels are considered to satisfy the requirements for performance class of the characteristic reaction to fire as shown in Table 8 of EN 13986:2004+A1:2015 for OSB plates in accordance with the EC Decision 2000/43/EC without the need for testing on the basis of it fulfilling the conditions set out in that Decision and its intended use being covered by that Decision.

Therefore the performance of the product is classified according to EN 13501-1+A1. It can be assumed that the product complies with the decision 2008/43/EC of the European Commission if the OSB plates used in the product fulfil the requirements given in the decision.

Note: A European reference fire scenario has not been laid down for façades. In some Member States, the classification of the product as above might not be sufficient for the use in façades. An additional assessment according to national provisions (e.g. on the basis of a large scale test) might be necessary to demonstrate the compliance with Member State regulations or administrative provisions.

### 2.2.10 Content, emission and/or release of dangerous substances

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<sup>2</sup> after identifying the release scenarios (in accordance with EOTA TR 034) taking into account the intended use of the product and the Member States where the manufacturer intends his product to be made available on the market.

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<sup>2</sup> 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 products may not be distributed to EOTA or to TABs.



The identified intended release scenario for this product and intended use with respect to dangerous substances is:

- IA 2: Product with indirect contact to indoor air (e.g. covered products) but possible impact on indoor air.

#### SVOC and VOC, incl. formaldehyde

Semi-volatile organic compounds (SVOC) and volatile organic compounds (VOC) have to be determined in accordance with EN 16516. The respective loading factor [ $\text{m}^2/\text{m}^3$ ] used for emission testing can be taken from the following table:

**Table X Loading factor L, depending on the product type (in accordance with EN 16516)**

Intended use	Loading factor [ $\text{m}^2/\text{m}^3$ ]
Walls	1,0
Floor, ceiling	0,4

The test specimen presents the maximum thickness and the maximum number of layers and is appropriate to the size of the test chamber. The edges of the product should be sealed with self-adhesive, VOC-free aluminum foil or using a suitable frame. It has to be ensured that no emission derives from the back side.

Once the test specimen has been produced, it should immediately be placed in the emission test chamber. This time is considered the starting time of the emission test. Formaldehyde emission shall be undertaken according to ISO 16000-3.

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, edge sealing, conditioning, glue system, production date, arrival date, test period, test result) after 3 and 28 days testing. The relevant test results shall be expressed in [ $\text{mg}/\text{m}^3$ ] and stated in the ETA.

#### **2.2.11 Thermal resistance**

If the manufacturer wants to make a declaration regarding the thermal resistance, the thermal conductivity  $\lambda$  [ $\text{W}/\text{m}^2\text{K}$ ] shall be stated in the ETA.

The thermal conductivity can be taken from the declaration of performance of the OSB plates used in the element. If these figures of OSB plates used within one element vary, the lowest figure is decisive. If the manufacturer wants to make a declaration regarding the thermal resistance, the specific heat capacity  $c_p$  [ $\text{J}/\text{kgK}$ ] as stated in EN ISO 10456 for OSB plates can be regarded as applicable for this product and can be stated in the ETA.

### 3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

#### 3.1 System(s) 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 1997/176/EC.

The system is: 1.

#### 3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 3.

**Table 3 Control plan for the manufacturer; cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Factory production control (FPC)</b> [including testing of samples taken at the factory in accordance with a prescribed test plan]					
1	tensile strength perpendicular to the plane of the OSB plates	3.4	Acc. to EN 13986 for OSB		
2	Swelling in thickness of the OSB plates	3.4	Acc. to EN 13986 for OSB		
3	Moisture content of the OSB plates in the production process (gluing)	3.4	Acc. to EN 322 for OSB		
4	Bending strength and bending stiffness perpendicular to the grain of the OSB plates	3.4	Acc. to EN 13986 for OSB		
5	Density of the OSB plates	3.4	As tested	10	daily
6	Shear tests for the bonding quality	3.4	$f_{v,k} = 3,0$ N/mm <sup>2</sup>	10	daily

#### 3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 4.

**Table 4 Control plan for the notified body; cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Initial inspection of the manufacturing plant and of factory production control</b>					
1	To ascertain in accordance with the test plan that personnel, equipment and factory production control of the manufacturing plant are suitable to ensure a continuous and orderly manufacturing of elements made of OSB plates according to the ETA. The provisions of EN 14080 shall be taken into account.	Inspection	-	-	-
<b>Continuous surveillance, assessment and evaluation of factory production control</b>					
2	Same characteristics as in Table 3	See Table 3			2/year

### 3.4 Special methods of control and testing used for the assessment and verification of constancy of performance

#### 3.4.1 Shear tests for the bonding quality

Shear tests are done on the basis of EN 14080.

## 4 REFERENCE DOCUMENTS

As far as no edition date is given in the list of standards thereafter, the standard in its current version at the time of issuing the European Technical Assessment is of relevance.

EN 310	Wood-based panels; determination of modulus of elasticity in bending and of bending strength
EN 317	Particleboards and fibreboards; determination of swelling in thickness after immersion in water
EN 319	Particleboards and fibreboards; determination of tensile strength perpendicular to the plane of the board
EN 322	Wood-based panels; determination of moisture content
EN 323	Wood-based panels; determination of density
EN 383	Timber structures – test methods – determination of embedding strength and foundation values for dowel type fasteners
EN 408	Timber structures – Structural timber and glued mechanically laminated timber – Determination of some physical and mechanical properties
EN 789	Timber structures - Test methods - Determination of mechanical properties of wood based panels
EN 1382	Timber structures. Test methods. Withdrawal capacity of timber fasten
EN 1383	Timber structures - Test methods - Pull through resistance of timber fasteners
EN 1995-1-1	Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings
EN 12114	Thermal performance of buildings – Air permeability of building components and building elements – Laboratory test method
EN 12354-1	Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 1: Airborne sound insulation between rooms
EN 12354-2	Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 2: Impact sound insulation between rooms
EN 12354-3	Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound
EN 12354-3	Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound
EN13501-1:2007+A1:2009	Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests
EN 13986:2004+A1:2015	Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking
EN 14080:2013	Timber structures - Glued laminated timber - Requirements
EN 15425	Adhesives - One component polyurethane for load bearing timber structures - Classification and performance requirements
EN ISO 354	Acoustics – Measurement of sound absorption in a reverberation room
EN ISO 717-1	Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation

EN ISO 717-2	Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation
EN ISO 6946	Building components and building elements – Thermal resistance and thermal transmittance – Calculation method
EN ISO 10140-2	Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation
EN ISO 10140-3	Acoustics - Laboratory measurement of sound insulation of building elements - Part 3: Measurement of impact sound insulation
EN ISO 11654	Acoustics – Sound absorbers for use in buildings – Rating of sound absorption
EN ISO 12572	Hygrothermal performance of building materials and products - Determination of water vapour transmission properties
EN ISO 13788	Hygrothermal performance of building components and building elements – Internal surface temperature to avoid critical surface humidity and interstitial condensation – Calculation method