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European Assessment Document for

Humidity-dependent vapour control layers



CE

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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 humidity-dependent vapour control layers (in the following referred to as vapour control layers) consist of several layers of plastic, paper or rubber sheets with or without reinforcement.

The total thickness of the vapour control layers ranges from 0,1 mm to 1,0 mm and the total weight of the vapour control layers ranges from 50 g/m² to 300 g/m².

Vapour control layers are designed to have variable diffusion resistance dependent on the surrounding relative humidity. The function of vapour control is expressed with the help of the humidity-dependent water-vapour diffusion-equivalent air-layer-thickness (s_d -value) of vapour control layers.

The vapour control layers are not fully covered by a harmonised European standard (hEN). The product differs from traditional vapour barriers as described in EN 13984¹, as they have moisture regulating properties which do not exist in traditional vapour barriers. Furthermore, the products have different intended uses which lead to the fact that the assessment methods given in EN 13984 are to a great extent not appropriate.

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(s)

The product is intended to be used as membrane for thermally insulated constructions with low air permeability. At the same time the vapour control layers are intended to provide for the water vapour control property. The water vapour transmission properties of the products are humidity-dependent so that it becomes more permeable to vapour when summer time conditions dominate and less permeable to vapour when winter time conditions dominate.

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 taking into account a working life of the vapour control layers 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 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 works².

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.

¹ All undated references to standards or to EADs in this EAD are to be understood as references to the dated versions listed in chapter 4

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 referred to above.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 2.1.1 shows how the performance of vapour control layers is assessed in relation to the essential characteristics.

Table 2.1.1 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
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	2.2.1	Class
Basic Works Requirement 4: Safety and accessibility in use			
2	Resistance to tearing (nail shank)	EN 13984, clause 5.8	Level
3	Water vapour transmission properties	2.2.2	Level
4	Durability of water vapour transmission properties - artificial ageing by long-term exposure to elevated temperature	2.2.3	Level
5	Tensile properties	2.2.4	Level
6	Durability of tensile properties - artificial ageing by long-term exposure to elevated temperature and exposure to UV and heat	2.2.5	Level
7	Air permeability	2.2.6	Level
8	Water tightness	EN 13984, clause 5.5	Level
9	Resistance to impact	EN 13984, clause 5.6	Level
10	Durability - chemical resistance	EN 13984, clause 5.7.2	Level
11	Joint strength	EN 13984, clause 5.9	Level
12	Dangerous substances	EN 13984, clause 5.14	Level

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

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 vapour control layers shall be tested, using the test method(s) for the corresponding reaction to fire class(es) according to EN 13501-1. The provisions of EN 13984, clause 5.12, shall be considered for choosing samples, execution of tests and the application of test result.

The vapour control layers shall be classified according to Commission Delegated Regulation (EU) 2016/364 in connection with EN 13501-1.

The reaction to fire class shall be stated in the ETA.

2.2.2 Water vapour transmission properties

The water vapour transmission properties shall be assessed in connection with the corresponding humidity for each conditioning shown in Table 2.2.2.1.

Table 2.2.2.1 Test conditions according to EN ISO 12572

Set	Conditioning °C – % RH	Tolerances				
		Temperature °C	Relative humidity %			
			Dry state		Wet state	
			Set point	Tolerance	Set point	Tolerance
A	23 – 0/50	23 °C ± 0.5	0	+3	50	±3
B	23 – 50/93	23 °C ± 0.5	50	±3	93	±3
C	23 – 85/95 or 83/97	23 °C ± 0.5	85 or 83	±3	95 or 97	±3

Test for each conditioning

Test conditions according to EN ISO 12572, clause 7.1, Table 1 do not apply. Instead, the conditions specified in the Table 2.2.2.1 shall be used. The test procedures according to EN ISO 12572, clause 7.2 and clause 7.3 apply with the following deviations:

Tests shall be done using 5 test specimens taken from different locations over the entire width of the membrane. The selection over the entire width of the membrane is essential to increase the variance of the specimens.

Assessment for each conditioning

The mean s_d -values of the 5 test specimens shall be calculated.

Water vapour diffusion-equivalent air layer thickness s_d [m] for each conditioning shall be stated in ETA.

2.2.3 Durability of water vapour transmission properties – artificial ageing by long-term exposure to elevated temperature

The durability of water vapour transmission properties shall be assessed by artificial ageing by long-term exposure to elevated temperature in accordance with the test method given in EN 1296. The test period of the artificial ageing described in EN 1296, Table 1 is extended for the procedure to guarantee the functionality even under adverse conditions. Therefore, it is possible to declare greater durability according to this EAD, which is additional to the standard procedure and preserves the humidity-dependent water vapour transmission properties during working life. One of the two temperature levels a) or b) mentioned below shall be used. Both methods are equivalent:

- a) Storage at 80(±2) °C for 24 weeks or
- b) Storage at 70(±2) °C for 48 weeks.

Tests shall be done after storage.

Test for each conditioning

Tests shall be done using 5 test specimens taken from different locations over the entire width of the membrane.

The mean s_d -values of the 5 test specimens for each conditioning after artificial ageing shall be stated in the ETA.

2.2.4 Tensile properties

Tensile properties shall be determined in accordance with EN 13984, clause 5.11.

The maximum tensile force in N/50 mm and their related elongation in % shall be stated in the ETA.

2.2.5 Durability of tensile properties – artificial ageing by long-term exposure to elevated temperature and exposure to UV and heat

The durability of tensile properties shall be assessed by artificial ageing by long-term exposure to elevated temperature and exposure to UV and heat. For each procedure separate specimens shall be used at the following conditions:

2.2.5.1 Artificial ageing by long-term exposure to elevated temperature

The durability of tensile properties shall be assessed in accordance with EN 13984, clause 5.11, after storage described in chapter 2.2.3 a) or b).

2.2.5.2 Artificial ageing by exposure to UV and heat

The durability of tensile properties shall be assessed in accordance with Annex C of EN 13859-1 after artificial ageing by exposure to UV and heat. The tensile test shall be performed in accordance with EN 13984, clause 5.11.

5 specimens shall be tested each for the longitudinal and transverse direction.

The mean values of tensile force in N/50 mm and elongation at maximum force in % before and after exposure shall be stated in the ETA.

2.2.6 Air permeability

The air permeability shall be tested in accordance with EN 13859-2, clause 4.3.4, and EN 12114. The test result shall be given in $m^3/(m^2 \cdot h \cdot 50 Pa)$ and shall 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 Commission Decision 1999/90/EC, as amended by Commission Decision 2001/596/EC.

The system is 3 for any use except for uses subject to regulations on reaction to fire performance.

For uses subject to regulations on reaction to fire the applicable AVCP systems regarding reaction to fire are 1, 3 or 4 depending on the conditions defined in the said Decision.

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 3.2.1.

Table 3.2.1 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
Factory production control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]					
1	Dimensions and tolerances	EN 13984, clause 5.3	according to EN 13984, clause 5.3	3	Once a week during production
2	Resistance to tearing (nail shank)	EN 13984, clause 5.8	according to EN 13984, clause 5.8	5 each direction	Once a week during production
3	Tensile properties	2.2.4	according to control plan	5 each direction	Once a week during production
4	Thickness and mass per unit area	EN 13984, clause 5.4	according to EN 13984, clause 5.4	3	Once per shift
5	Water vapour transmission properties	2.2.2	according to control plan	5 each batch	Once a year
6	Durability of water vapour transmission properties – artificial ageing by long-term exposure to elevated temperature	2.2.3	according to control plan	5 each batch	Once per 5 years
7	Durability of tensile properties – artificial ageing by long-term exposure to elevated temperature and exposure to UV and heat	2.2.5	according to control plan	5 each direction	Once per 5 years
8	Reaction to fire	2.2.1	according to control plan	1	Once a week during production

4 REFERENCE DOCUMENTS

EN 1296:2000	Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Method for artificial ageing by long term exposure to elevated temperature
EN 12114:2000	Thermal performances of buildings - Air permeability of building components and building elements - Laboratory test method
EN 13501-1:2018	Fire classification of construction products and building elements – Part 1: Classification using data from reaction
EN 13859-1:2010	Flexible sheets for waterproofing - Definitions and characteristics of underlays - Part 1: Underlays for discontinuous roofing
EN 13859-2:2010	Flexible sheets for waterproofing – Definitions and characteristics of underlays - Part 2: Underlays for walls
EN 13984:2013	Flexible sheets for waterproofing – Plastic and rubber vapour control layers – Definitions and characteristics
EN ISO 11925-2:2020	Reaction to fire tests – Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test (ISO 11925-2:2020)
EN ISO 12572:2016	Hygrothermal performance of building materials and products - Determination of water vapour transmission properties - Cup method (ISO 12572:2016)