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European Assessment Document for

Corrugated bitumen tiles and sheets

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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) 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

This European Assessment Document applies to corrugated bitumen tiles or sheets which are elements composed of a bitumen saturated reinforcement made of cellulose and mineral fillers, coloured on the external side by a coating or a paint system with, or without granules or fine flakes; in this document, the term “corrugated bitumen tile” is used throughout, including larger elements, which could be referred to as corrugated bitumen sheets.

These products have an overall rectangular shape with dimensions (as defined in Figure 1.1.1) of 2400 mm maximum in width and 1200 mm maximum in length, having at least three corrugations.

Ancillary products (e.g., fasteners, sealants), which may be part of installation provisions or in the framework of determining performances, are not subject of assessments but are needed for establishing the performance of the corrugated bitumen sheets.

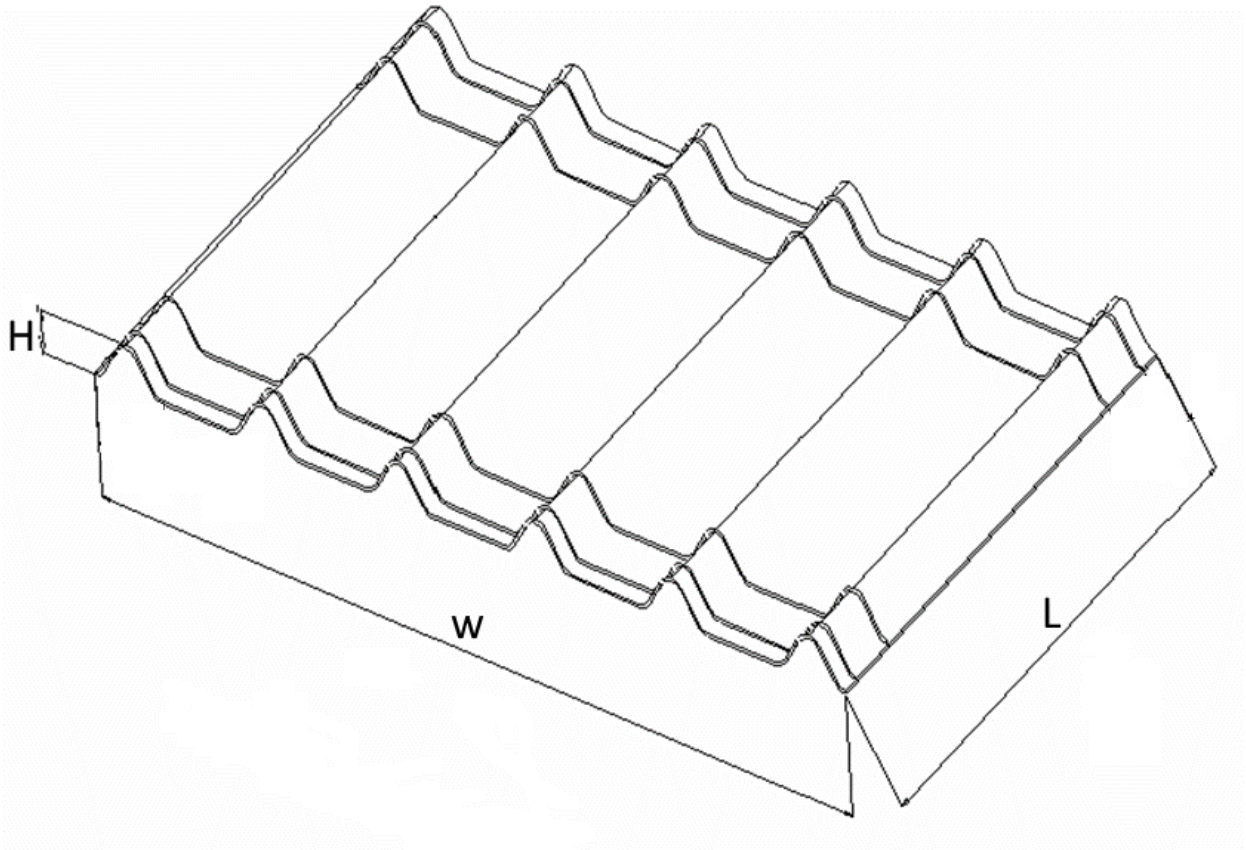

Figure 1.1.1: Corrugated bitumen tile

Key:

W: overall width of the corrugated bitumen tile

L: overall length of the corrugated bitumen tile

H: height of corrugation

The product is not fully covered by the following harmonised technical specification: EN 534[1]; in particular, the performance of the following characteristics can not be determined according to the method foreseen in EN 534:

- bending under downward load: taking into consideration that corrugated bitumen tile are smaller elements with fewer corrugations and the overall length of the corrugated bitumen tile is less than 2000 mm, they can not be assessed according to the method foreseen in EN 534, 5.2.1 and thus do not meet the threshold levels foreseen in EN 534, 5.2.1.
- impact strength: taking into consideration that corrugated bitumen tile are smaller elements with fewer corrugations and the overall length of the corrugated bitumen tile is less than 2000 mm, they can not be assessed according to the method foreseen in EN 534, 5.2.2 and thus do not meet the threshold levels foreseen in EN 534, 5.2.2.

The minimum pitch of the underlying structure shall be stated in the ETA.

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 instruction 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)

Corrugated bitumen tiles are intended to be used for rain proofing of pitched roofs in buildings and for protection from weathering elements such as rain water, snow, UV radiation and alike. The corrugated bitumen tiles are not intended to be used as wall finishings.

The water tightness of the roof covering is ensured by overlapping.

Roof surfaces are not accessible without protection and security assessment.

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 corrugated bitumen tiles for the intended use of 10 years when installed in the works, provided that the corrugated bitumen tiles 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[2].

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[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 the works is subjected to, as well as on the particular conditions of the design, execution, use and maintenance of those works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than those referred to.

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.

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 corrugated bitumen tiles 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	Method of verification and assessment	Type of expression of product performance
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	2.2.1	Class
2	External fire performance of roofs	2.2.2	Class
Basic Works Requirement 3: Hygiene, health and the environment			
3	Water impermeability-	2.2.3	Description
Basic Works Requirement 4: Safety and accessibility in use			
4	Bending under downward load	2.2.5	Level
5	Impact strength	2.2.6	Level
6	Tearing strength	2.2.7	Level
Basic Works Requirement 6: Energy economy and heat retention			
7	Thermal coefficient	2.2.9	Level
Aspects of durability			
Durability of water permeability (related to BWR 3)			
8	Water impermeability after freeze/thaw ageing	2.2.4	Description
Durability of tearing strength (related to BWR 4)			
9	Tearing strength after freeze/thaw ageing	2.2.8	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 state this performance in the Declaration of Performance.

2.2.1 Reaction to fire

The corrugated bitumen tiles shall be tested, using the test method(s) relevant for the corresponding reaction to fire class according to EN 13501-1. The product shall be classified according to the Commission Delegated Regulation (EU) No 2016/364.

Where relevant, EN 12467 shall be used for mounting and fixing purposes. The supporting construction needs to be adapted to correspond with the size of the corrugated bitumen tiles.

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

Note: corrugated bitumen tiles covered by the scope of this EAD are for use on roofs only and not for use in façades, as described in the scope; reaction to fire for façades is thus not relevant.

2.2.2 External fire performance of roofs

The roof (including the complete roof covering) in which the corrugated bitumen tiles is intended to be incorporated, installed or applied shall be tested according to the test method referred to in EN 13501-5 and relevant for the corresponding external fire performance roof class, in order to be classified according to Commission Decision 2001/671/EC amended by Commission Decision 2005/823/EC.

The external fire performance of the roof shall be given in the ETA.

2.2.3 Water impermeability

The purpose of the assessment is to determine the water impermeability of the corrugated bitumen tiles.

Corrugated bitumen tiles shall be assessed in accordance with EN 534, 7.3.1 or the method stated in ANNEX B of this EAD. Both methods give identical results. The first method being the reference method, the second method may be used if the shape or rigidity of the test specimen does not allow the use of the reference method.

The ETA shall state the assessment method used and the result of the assessment in accordance with EN 534, 7.3.1, commented towards the criterion stated in EN 534, 5.3.1, or the result of the assessment in accordance with ANNEX B of this EAD, commented towards the appearance of water on the underside on the test specimen.

2.2.4 Water impermeability after freeze/thaw ageing

The purpose of the assessment is to determine the water impermeability of the corrugated bitumen tiles after freeze/thaw ageing.

The test specimen shall be conditioned in accordance with EN 534, 7.4.4 and subsequently stored for 24 h at laboratory conditions (23 ± 2) °C.

After the conditioning and subsequent storing, the corrugated bitumen tiles shall be assessed in accordance with paragraph 2.2.3 of this EAD 030016-00-0402.

The ETA shall state the assessment method used and the result of the assessment in accordance with EN 534, 7.4.2, commented towards the criterion stated in EN 534, 5.4.2, or the result of the assessment in accordance with ANNEX B of this EAD, commented towards the appearance of water on the underside on the test specimen.

2.2.5 Bending under downward load

The purpose of the assessment is to determine the minimum load on a corrugated bitumen tile resulting in a deflection of 1/200 for the determined span.

The corrugated bitumen tiles shall be tested in accordance with EN 534, 7.2.1, taking into account the dimensions of the product. Dimensions of the test rig, including the distance and the number of supports, need to be adjusted to take into account the size and the intended end use application of the tile. All other parameters are maintained as in EN 534. Information regarding preparation of test specimens and their conditioning is specified in Annex A.

The ETA shall state the arithmetic mean results of the tests performed on five corrugated bitumen tiles in accordance with EN 534, 7.2.1.3 and the span used, commented against the criteria stated in EN 534, 5.2.1.

2.2.6 Impact strength

The purpose of the assessment is to determine the success rate of a sphero-conical bag falling through a corrugated bitumen tile for the determined span when released from a distance of 400 mm or 250 mm.

The corrugated bitumen tiles shall be tested in accordance with EN 534, 7.2.2, taking into account the dimensions of the product. Dimensions of the test rig, including the distance and the number of supports, need to be adjusted to take into account the size and the intended end use application of the tile. All other parameters are maintained as in EN 534, 7.2.2. Information regarding preparation of test specimens and their conditioning is specified in Annex A.

The ETA shall state if for every sample the bag has not fallen through the corrugated bitumen tiles in accordance with EN 534, 7.2.2.3; the ETA shall also state the height of fall and the span used, commented against the criteria stated in EN 534, 5.2.2.

2.2.7 Tearing strength

The purpose of the assessment is to determine the tearing strength of the corrugated bitumen tile.

The corrugated bitumen tiles shall be tested in accordance with EN 534, 7.2.3. Information regarding preparation of test specimens and their conditioning is specified in Annex A.

The corrugated bitumen tiles shall be assessed in accordance with EN 534, 5.2.3.

2.2.8 Tearing strength after freeze/thaw ageing

The purpose of the assessment is to determine the tearing strength after ageing of the corrugated bitumen tile.

The corrugated bitumen tiles shall be tested in accordance with EN 534, 7.4.1. Information regarding preparation of test specimens and their conditioning is specified in Annex A.

The corrugated bitumen tiles shall be assessed in accordance with EN 534, 5.4.1.

2.2.9 Thermal coefficient

The purpose of the assessment is to determine the thermal coefficient of the corrugated bitumen tile.

The corrugated bitumen tiles shall be tested in accordance with EN 534, 7.4.3. Information regarding preparation of test specimens and their conditioning is specified in Annex A.

The corrugated bitumen tiles shall be assessed in accordance with EN 534, 5.4.3.

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 acts are: Commission Decisions[3] 98/436/EC and 98/437/EC, as amended by Commission Decision 2001/596/EC.

The systems have been specified in Table 3.1.1.

Table 3.1.1 System of assessment and verification of constancy of performance applicable to corrugated bitumen tiles

Product(s)	Intended use(s)	Level(s) or class(es)	AVCP system(s)
Corrugated bitumen tiles	For uses subject to reaction to fire regulations	A1*, A2*, B*, C*	1
		A1**, A2**,B**, C**, D, E,	3
		(A1 to E)***, F	4
	For uses subject to external fire performance regulations	Product requiring testing	3
		Products in class F_{ROOF} according to EN 13501-5	4
	For uses other than specified above	-	4
*	Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g., an addition of fire retardants or a limiting of organic material).		
**	Products/materials not covered by footnote (*).		
***	Products/materials that do not require to be tested for reaction to fire (e.g., Products/materials of Classes A1 according to Commission Decision 96/603/EC).		

Note: The determination of the mass of bitumen used is very often considered a clearly identifiable stage in the production process which may result in a modification of the reaction to fire performance.

[3] Official Journal of the European Communities L 194 of 10 July 1998

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	Reaction to fire	2.2.1	According to control plan	Table A1.1	Once per composition, although additional testing may be necessary, e.g., when starting a new production line.
2	External fire performance (of roofs)	2.2.2	According to control plan	Table A1.1	Once per composition, although additional testing may be necessary, e.g., when starting a new production line.
3	Length	EN 534, 7.1.1	According to control plan	Table A1.1	EN 534, Table A.1
4	Width	EN 534, 7.1.2	According to control plan	Table A1.1	EN 534, Table A.1
5	Thickness	EN 534, 7.1.3	According to control plan	Table A1.1	EN 534, Table A.1
6	Height of corrugations	EN 534, 7.1.4	According to control plan	Table A1.1	EN 534, Table A.1
7	Pitch of corrugations	EN 534, 7.1.5	According to control plan	Table A1.1	EN 534, Table A.1
8	Squareness	EN 534, 7.1.6	According to control plan	Table A1.1	EN 534, Table A.1
9	Water impermeability	2.2.3 or ANNEX B	According to control plan	Table A1.1	EN 534, Table A.1 or according to control plan
10	Water impermeability after freeze/thaw ageing	2.2.4	According to control plan	Table A1.1	EN 534, Table A.1 or according to control plan
11	Bending under downward load	2.2.5	According to control plan	Table A1.1	EN 534, Table A.1
12	Impact strength	2.2.6	According to control plan	Table A1.1	EN 534, Table A.1
13	Tearing strength	2.2.7	According to control plan	Table A1.1	EN 534, Table A.1

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
14	Tearing strength after freeze/thaw ageing	2.2.8	According to control plan	Table A1.1	EN 534, Table A.1 or according to control plan
15	Thermal coefficient	2.2.9	According to control plan	Table A1.1	EN 534, Table A.1 or according to control plan
16	Proportion of bitumen	EN 534, 7.3.2	According to control plan	Table A1.1	according to control plan
17	Tolerances on the mass	EN 534, 7.3.3	According to control plan	Table A1.1	according to control plan
18	Homogeneity of the product	EN 534, 7.3.4	According to control plan	Table A1.1	according to control plan
19	Water absorption	EN 534, 7.3.5	According to control plan	Table A1.1	according to control plan
The product characteristics and minimum frequencies of testing in the framework of factory production control shall be in accordance with EN 534, Table A.1. Indirect test methods may be used in accordance with the requirements of EN 534, 8.3.6.					

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 corrugated bitumen tiles are laid down in Table 3.3.1.

Table 3.3.1 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
Initial inspection of factory and factory production control (FPC) *(for system 1 only)*					
1	Identification and documentation of the kind and manner of the manufacturing process and factory production control of the products, enabling the notified body/inspection body to assess the compliance with the provisions of the technical specification on the one hand and to provide a baseline to identify possible changes that may occur during surveillance.	Verification of the complete FPC as described in the control plan agreed between the TAB and the manufacturer	As defined in the control plan agreed between the TAB and the manufacturer	As defined in the control plan agreed between the TAB and the manufacturer	When starting the production or a new line
Continuous surveillance, judgment and assessment of factory production control (FPC) *(for system 1 only)*					
2	Where the intervention of the Notified Body is necessary only because the conditions for the applicability of system 1 in the Decisions regarding reaction to fire are fulfilled, the notified body will consider especially the clearly identifiable stage in the production process which results in an improvement of the reaction to fire classification (e.g., an addition of fire retardants or a limiting of organic material)	Verification of the controls carried out by the manufacturer as described in the control plan agreed between the TAB and the manufacturer with reference to the raw materials, to the process and to the product as indicated in Table 3.2.1	As defined in the control plan agreed between the TAB and the manufacturer	As defined in the control plan agreed between the TAB and the manufacturer	As defined in the control plan agreed between the TAB and the manufacturer. Indirect control, e.g., of raw materials and the production process, with a frequency sufficient to ensure that the results from initial type testing remains representative for current production.

4 REFERENCE DOCUMENTS

EN 534:2006+A1:2010	Corrugated bitumen sheets - Product specification and test methods
EN 12467:2012+A2:2018	Fibre-cement flat sheets - Product specification and test methods
EN 13501-1:2018	Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests
EN 13501-5:2016	Fire classification of construction products and building elements - Part 5: Classification using data from external fire exposure to roofs tests

ANNEX A TEST SPECIMENS AND CONDITIONING

A1 Test specimens and conditioning

Details of specimens and specimen preparation for testing are given in Table A1.1.

Table A1.1 Test specimens and conditioning

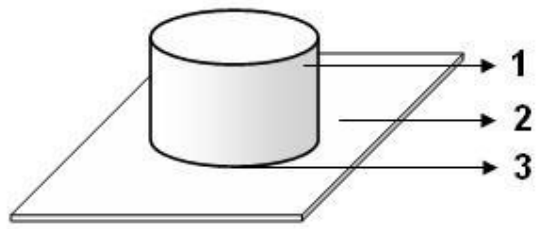
Paragraph in this document	Characteristic	Number, width and length of test specimens, conditioning and cutting of the tile
2.2.1	Reaction to fire	See EN 13501-1
2.2.2	External fire performance (of roofs)	See EN 13501-5
EN 534, 7.1.1	Length	See EN 534 table 1
EN 534, 7.1.2	Width	See EN 534 table 1
EN 534, 7.1.3	Thickness	See EN 534 table 1
EN 534, 7.1.4	Height of corrugations	See EN 534 table 1
EN 534, 7.1.5	Pitch of corrugations	See EN 534 table 1
EN 534, 7.1.6	Squareness	See EN 534 table 1
2.2.3 or ANNEX B	Water impermeability	See EN 534 table 1 or ANNEX B
2.2.4	Water impermeability after freeze/thaw ageing	See EN 534 table 1 or ANNEX B
2.2.5	Bending under downward load	See EN 534 table 1
2.2.6	Impact strength	See EN 534 table 1
2.2.7	Tearing strength	See EN 534 table 1
2.2.8	Tearing strength after freeze/thaw ageing	See EN 534 table 1
2.2.9	Thermal coefficient	See EN 534 table 1
EN 534, 7.3.2	Proportion of bitumen	See EN 534 table 1
EN 534, 7.3.3	Tolerances on the mass	See EN 534 table 1
EN 534, 7.3.4	Homogeneity of the product	See EN 534 table 1
EN 534, 7.3.5	Water absorption	See EN 534 table 1

ANNEX B WATER IMPERMEABILITY

The method specified in EN 534 7.3.1 being the reference method, the following method may be used if the shape of the test specimen does not allow the use of the reference method (e.g., if the required number of corrugations the test specimen should consist of as per the method of EN 534 does not fit in the dimensions of the test specimen as per this method). Both methods give identical results.

Five test specimens of (150 ± 5) mm x (150 ± 5) mm shall be cut from five different tiles. A stainless-steel cylinder with a diameter of (100 ± 1) mm shall be placed on each of the test specimen. The cylinder shall be adapted to the shape of the corrugated tile. The joint between cylinder and tile shall be sealed with watertight silicon sealant on the inside of the cylinder (see figure 3.4.11.1).

Demineralised water shall be poured into this cylinder to a height of (100 ± 5) mm above the surface of the test specimen.



Key	
1	Stainless steel cylinder without bottom
2	Tile
3	Silicon sealant

Figure 3.4.11.1 — Top side of corrugated bitumen tile

The test specimen shall be left for (48 ± 2) h in laboratory conditions, temperature (23 ± 3) °C after which the underside of the test specimen shall be examined visually to see if there is any water penetration.

The test report shall contain at least the following information:

- number, title and publication date of this EAD
- name and address of the laboratory that did the tests and the name and address of the laboratory that prepared the samples (if these are different)
- identification number of the test report
- name and address of the manufacturer or supplier of the product
- name and the identifier or batch number of the product
- date the product was produced
- sampling method and the body that performed it
- location, date and time of the sampling
- identification of the corrugated bituminous tile samples
- test date
- test results
- comments, if any
- date of the test report and signature.