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European Technical Assessment ETA 22/0174 of 18/07/2024

General Part

Technical Assessment Body issuing the ETA:	**TECNALIA RESEARCH & INNOVATION**
Trade name of the construction product	SIATE DE CUBIERTA ONDULINE
Product family to which the construction product belongs	Self – supporting multi-layer waterproofing and insulating system for pitched roof
Manufacturer	ONDULINE MATERIALES DE CONSTRUCCION S.A.U. Pol. Ind. El Campillo II, parcela 12 E-48500 Gallarta, Bizkaia (Spain)
Manufacturing plant	Pol. Ind. El Campillo II, parcela 12 E-48500 Gallarta, Bizkaia (Spain)
This European Technical Assessment contains	14 pages including 2 Annexes which form an integral part of this assessment.
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	EAD 220119-00-0402 Self-supporting multi-layer waterproofing and insulating system for pitched roofs

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SPECIFIC PARTS

1. Technical description of the product

The product is a self-supporting multi-layer waterproofing and insulating system for pitched roofs which is factory-produced by the manufacturer. Some components are produced by suppliers. The manufacturer is ultimately responsible for all components of the products specified in this ETA (European Technical Assessment).

The *SIATE DE CUBIERTA ONDULINE* product is composed by extruded polystyrene foam boards (XPS), hydrophobic wood boards (H) and bitumen corrugated sheets. Hydrophobic wood boards and extruded polystyrene foam board are glued together at manufacturing plant.

The respective components are identified in table 1 and have the main characteristics and the geometrical characteristics defined in Annex A.

	Components	Standard references	Characteristics
Thermal insulation material	Extruded polystyrene foam board, XPS	According to EN 13164	See Annex A
Wood board	Hydrophobic wood boards, H	According to EN 13986	See Annex A
Adhesive	Adhesive of polyurethane		See Annex A
Corrugated sheet	Bitumen corrugated sheets	According to EN 14964	See Annex A
Fixing devices	EJOT® RA-P		See Annex B
	Onduline´s Screw for wood		
	Onduline´s Universal Screw		

Table 1: Identification and characteristics of the components.

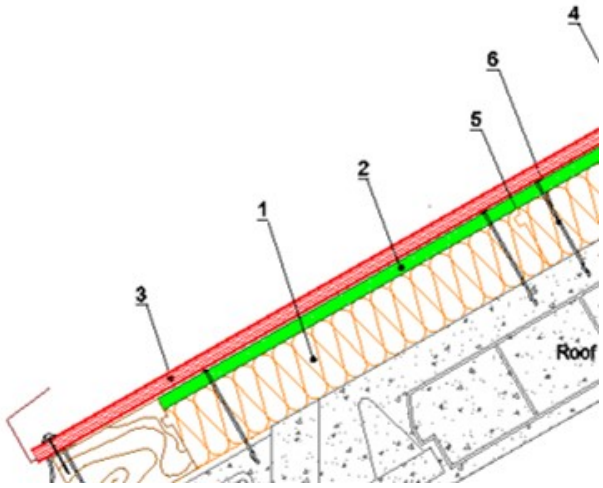


Figure 1: Example of SIATE applied on concrete roof.

The hydrophobic wood board and extruded polystyrene foam board are glued – both formed “Ondutherm Basic” panel, are directly placed on the continuous roof. This panel is mechanically fixed to the roof with fitting fixing. The suitable fixing is “EJOT® RA-P” for concrete and brick roof decks and the “Onduline´s Screw for wood” is for wood roof. Then the bitumen corrugated sheets are fixed to this panel. The "Onduline´s Universal Screw” are used to fix corrugated sheet to panel.

It´s recommend using the putty or adhesive tape for sealing joints between panels. The system must be covered by a covering of ceramic tile or slate. The covering components as ceramic tiles or slates are no part of this ETA.

2. Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

The *SIATE DE CUBIERTA ONDULINE* product is intended to be used for waterproofing and insulating system for continuous pitched roofs. The extruded polystyrene boards provide thermal protection and the bitumen corrugated sheets provide water vapour control and prevent water penetration. The insulation system is fully supported by a continuous roof with only mechanicals fixing. The slopes range covered by ETA are between 45º (the maximum) and 6º (the minimum) from the horizontal.

The *SIATE DE CUBIERTA ONDULINE* is a self-supporting multi-layer system. It does not contribute to the stability of the roof on which it is installed.

The product will be installed according to the manufacturer’s instructions.

The provisions made in this European Technical Assessment are based on an assumed working life of 25 years as minimum, provided that the components are subject to appropriate use and maintenance.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3. Performance of the product and references to the methods used for its assessment

The identification tests and the assessment for the intended use of the *SIATE DE CUBIERTA ONDULINE* according to the Basic Requirements (BWR) were carried out in compliance with EAD 220119-00-0402 “Self-supporting multi-layer waterproofing and insulating system for pitched roofs”. The characteristics of the components shall correspond to the respective values laid down in the technical documentation of this ETA, checked by Tecnalia Research & Innovation.

Safety in case of fire (BWR 2)

3.1. Reaction to fire

Reaction to fire of the SIATE according to Commission Delegated Regulation (EU) 2016/364 and EN 13501-1 is Class E.

3.2. Propensity to undergo continuous smouldering

Performance not assessed.

Hygiene, heath and the environment (BWR 3)

3.3. Water permeability

The test was carried out according to EAD 220119-00-0402, Annex C. The wind speed for water permeability is 5 m/s.

3.4. Water absorption

The test of water absorption of the XPS boards was carried out according to EN 1609, clause 7.2.2., method A.

For 30 mm thickness, W_{sp} is 0,05 kg/m^2 and for 200 mm thick W_{sp} is 0,07 kg/m^2.

3.5. Water vapour permeability

The test of water vapour permeability of XPS was carried out according to EN 12086. The test of water vapour permeability of wood boards and bitumen corrugated sheets were tested according to EN ISO 12572 by “C test condition”. The results are given in table 2.

	Water vapour permeability, μ
Extruded polystyrene, XPS	121
Hydrophobic wood board, H	49
Bitumen corrugated sheets, BT-50	544

Table 2: Water vapour permeability

3.6. Biological resistance

The determination of the grow of mould fungus was carried out according to method A and method B specified by EN ISO 846. The results are given in table 3.

	Growth intensity	
	Method A	Method B
Extruded polystyrene, XPS	1b	2
Hydrophobic wood board, H	2	4
Bitumen corrugated sheets, BT-50	2	5

Table 3: Evaluation of fungal growth

Safety and accessibility in use (BWR 4)

3.7. Mechanical resistance (Winds loads)

Mechanical resistance test, resistance to wind loads test, was carried out according to EAD 220119-00-0402, Annex D. The maximum wind load resistance (suction and pressure) is 2,2 kPa.

3.8. Point load resistance

The point load resistance test was carried out according to EAD 220119-00-0402, Annex E. The force applied was 0,953 kN (before failure occurs) for BT-235. For the rest of the bitumen corrugated sheets: performance not assessed.

3.9. Impact resistance (hard and soft body)

The impact resistance tests were carried out according to EAD 210005-00-0505, Annex E. The results of the impacts are given in table 4.

	Hard body (0,5 kg)	Hard body (1 kg)	Soft body (50 kg)
Impact energies (E)	6 Nm	10 Nm	1200 Nm
Description of the damage	No damage	No damage	No damage

Table 4: Hard and soft body impact resistances

3.10. Corrosion resistance

The corrosion resistance of metallic screws was determined and classified according to EN 1670. The results of the grade of corrosion resistance are indicated in table 5.

	Grade of corrosion resistance
EJOT® RA-P	Grade 2
Onduline´s Screw for wood	Grade 2
Onduline´s Universal Screw	Grade 1 (uncoated part) and Grade 4 (coated part)

Table 5: Grade of corrosion resistances of the screws

Energy economy and heat retention (BWR 4)

3.11. Thermal resistance

The thermal resistance results of “Ondutherm Basic” panel with a well-ventilated air layer between corrugated sheet and “Ondutherm Basic” panel are given in table 6.

Table 7 summarized the thermal resistance results for “Ondutherm Basic” panel with unventilated air space between corrugated sheet and “Ondutherm Basic” panel, according to EN ISO 6946.

XPS thickness (mm)	Thermal Resistance (m^2K/W)			
	(H16- BT50)	(H16-BT235)	(H19-BT50)	(H19-BT235)
30	1,02	1,02	1,04	1,04
40	1,31	1,31	1,34	1,34
50	1,6	1,6	1,63	1,63
60	1,9	1,9	1,92	1,92
80	2,48	2,48	2,51	2,51
100	3,08	3,08	3,11	3,11
120	3,66	3,66	3,69	3,69
140	4,25	4,25	4,27	4,27
160	4,83	4,83	4,88	4,88
180	5,42	5,42	5,45	5,45
200	6	6	6,04	6,04

Table 6: Thermal resistance of product with a well-ventilated layer

XPS thickness (mm)	Thermal Resistance (m^2K/W)			
	(H16-BT50)	(H16-BT235)	(H19-BT50)	(H19-BT235)
30	1,13	1,15	1,15	1,17
40	1,42	1,44	1,45	1,47
50	1,71	1,74	1,74	1,76
60	2,01	2,03	2,03	2,06
80	2,6	2,62	2,62	2,65
100	3,19	3,21	3,22	3,24
120	3,77	3,8	3,81	3,85
140	4,35	4,4	4,4	4,42
160	4,96	4,98	4,98	5,01
180	5,54	5,54	5,58	5,61
200	6,12	6,16	6,16	6,2

Table 7: Thermal resistance of product with an unventilated layer

3.12. Air permeability

The test of air permeability was carried out according to EN 12114. The maximum positive pressure tested was +500 Pa and the air permeability was 1,02 $m^3/(m^2h)$. The maximum negative pressure tested was -500 Pa and the air permeability was 1,34 $m^3/(m^2h)$.

4. Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

According to the decision 1998/436/EC as amended by 2001/596/EC, the applicable AVCP system (see EC delegated regulation (EU) No 568/2014 amending Annex V to Regulation (EU) 305/2011) is 4, except for uses on reaction to fire regulation, where AVCP system 3 applies.

5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the Assessment and Verification of Constancy of Performance (AVCP) system are laid down in the control plan deposited with Tecnalia Research & Innovation.

The Control Plan is a confidential part of the ETA and is only handed over to the notified body involved in the assessment and verification of constancy of performance.

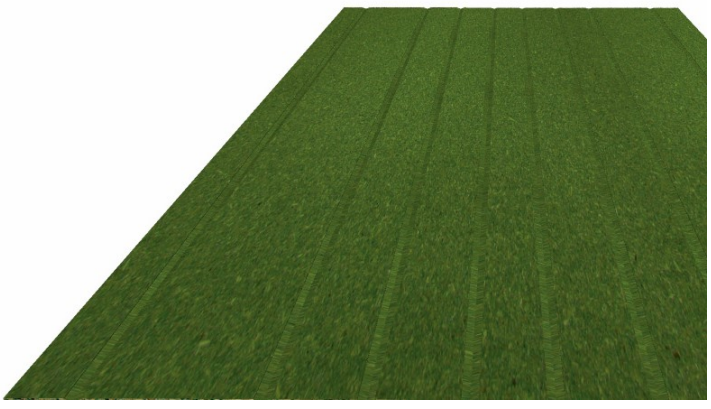
Issued in Azpeitia, on 18/07/2024

Miguel Mateos
Innovation and Conformity Assessment Point
Tecnalia Research & Innovation

Annex A - Characteristics of insulation components

THERMAL INSULATION BOARD CHARACTERISTICS	
DESIGNATION	
Type	Extruded polystyrene foam board, XPS
Standard	EN 13164:2012+A1:2015
PHYSICAL CHARACTERISTICS	
Length	2500 mm
Width	600 mm
Thickness	30, 40, 50, 60, 80, 100, 120, 140, 160, 180 and 200 mm
Density	35 kg/m^3
ESSENTIAL CHARACTERISTICS	
Reaction to fire	Class E
Long term water absorption (total immersion)	WL(T) 0,7
Long term water absorption (diffusion)	WD(V) 3
Thermal resistance and thermal conductivity	λ_D= 0,033 W/mK / d_N=30 – 60 mm / R_D=0,90 –1,80 m^{2}K/W λ_D= 0,035 W/mK / d_N=70 – 115 mm / R_D=2,0 –3,25 m^{2}K/W λ_D= 0,036 W/mK / d_N=120 – 160 mm / R_D=3,35 –4,45 m^{2}K/W
Compressive stress	CS (10/y)300
Dimensional stability under specified conditions	DS (70,90)
Deformation under specified compressive load and temperature conditions	DLT (2)5

Table 8: Characteristics of insulation



"Ondutherm Basic" panel: XPS and hydrophobic board glued

HYDROPHOBIC WOOD BOARD CHARACTERISTICS	
DESIGNATION	
Type	Hydrophobic wood boards, H
Standard	EN 13986:2004+A1:2015
PHYSICAL CHARACTERISTICS	
Length	2500 mm
Width	600 mm
Thickness	16 mm and 19 mm
ESSENTIAL CHARACTERISTICS	
Formaldehyde emission	Class E1
Reaction to fire	D-s2, d0
Tensile strength (perpendicular)	0,45 N/mm^2
Bending strength	14 N/mm^2
Modulus of elasticity	2050 N/mm^2

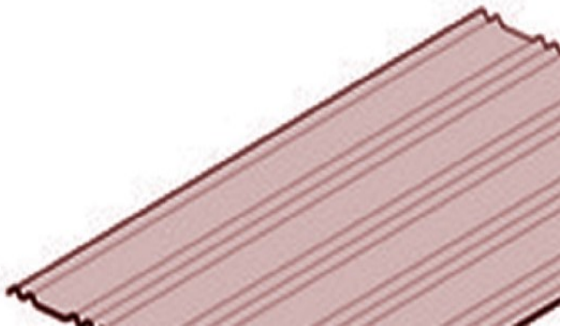
Table 9: Characteristics of the wood board

ADHESIVE CHARACTERISTICS	
DESIGNATION	
Type	Polyurethane adhesive
Trademark	PUR-15 ON
PHYSICAL CHARACTERISTICS	
Density	1,12 g/cm^3
Brookfield viscosity	5500 / 7000 cps
Applied adhesive weight	40 g/m^2
Colour	Honey colour

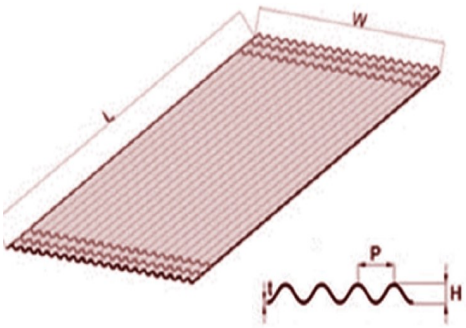
Table 10: Characteristics of the adhesive

CORRUGATED SHEETS CHARACTERISTICS	
DESIGNATION	
Type	Bitumen corrugated rigid sheet, BT
Standard	EN 14964:2006
PHYSICAL CHARACTERISTICS	
Length	2000 mm
Width	950mm, 1030 mm and 1050 mm
Thickness of sheet	2,4 mm and 2,6 mm
ESSENTIAL CHARACTERISTICS	
Reaction to fire	Class E
Water tightness	Pass
Water vapour permeability	< 4000 μ
Permeability to water after freeze/thaw ageing	Pass
Bending under downward load	> 500N

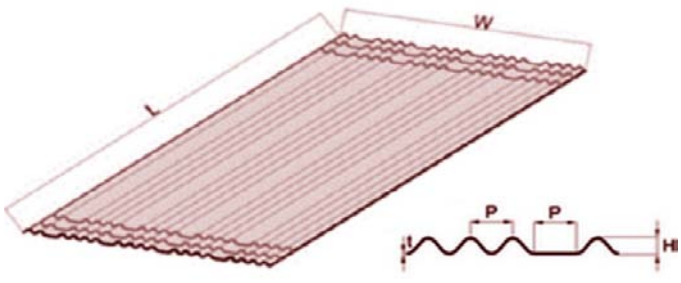
Table 11: Characteristics of the bitumen corrugated sheets



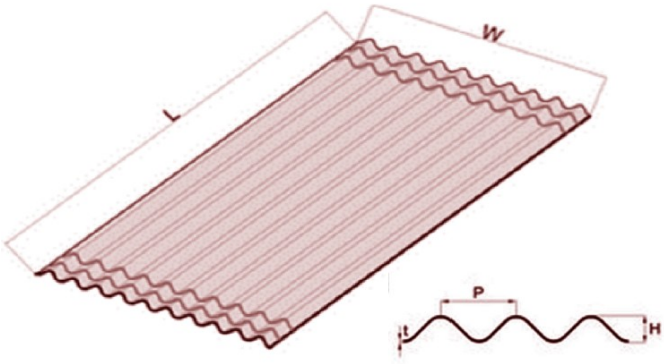
BT-10
L = 2000 mm; W = 1050 mm; P= 48mm;
H =24 mm



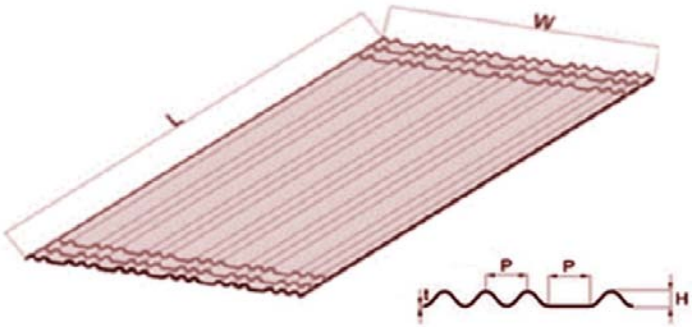
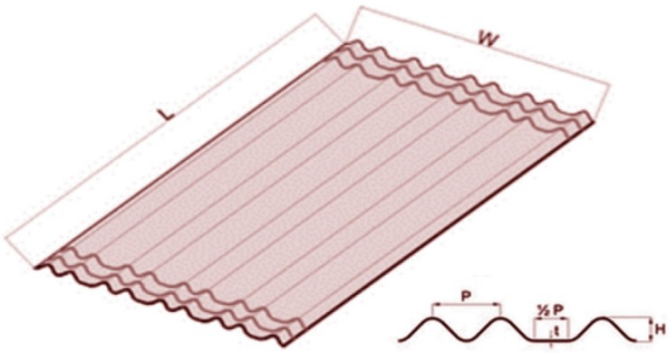
BT-50
L = 2000 mm; W = 1030 mm; P= 48 mm;
H =24 mm



BT-150
L = 2000 mm; W = 1050 mm; P= 48 mm;
H =24 mm



BT-190
L = 2000 mm; W = 950 mm; P= 95 mm;
H =36 mm

	
BT-200	**BT-235**
L = 2000 mm; W = 1030 mm; P= 48 mm; H =24 mm	L = 2000 mm; W = 1050 mm; P= 95 mm; H =38 mm; t = 2,6 mm

Annex B - Characteristics of Fixing Devices

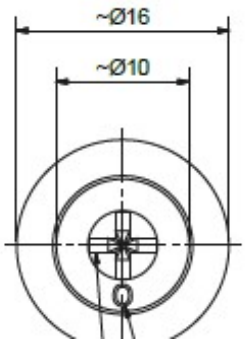
The panel (hydrophobic board glued into insulation, called “Ondutherm Basic”) is drilling going into the continuous roof at least 3 cm. The “Onduline´s Screw for wood” is used in wood substrate and the “EJOT® RA-P” screw for the concrete and brick substrates.

The “Ondutherm Basic” panels will be fixed with a minimum of 6 fixings per panel, divided into 3 lines of 2 fixings each. One line at each end of the panel and another in the center. In case of slopes greater than 45% - and windy and highly exposure areas of the roofs, the number of fixings must be increased to 9 per panel (3 per line).

Bitumen corrugated sheets are fixed mechanically to the “Ondutherm Basic” panels with “Onduline´s Universal Screw”. The bitumen corrugated sheets fixation is done from the top part of the waves and penetrating in the “Ondutherm Basic” panels a minimum of 3 cm.

The corrugated sheets will be fixed with a minimum of 9 fixings per sheet, divided into 3 lines of 3 fixings each. One line at each end of the sheet and another in the center. In case of slopes greater than 20%, the number of fixings must be increased to 12 per sheet (4 per line).

CHARACTERISTICS OF SCREW	
DESIGNATION	
Type	ONDULINE´s Universal screw
PHYSICAL PROPERTIES	
Nominal diameter	Ø 3,9 mm
Head	LP™ (low profile) head with Phillips drive
Material	Carbon steel (C1016 – C1022)
Washer	Ø 16 mm M-washer in aluminium vulcanized EPDM rubber
Surface treatment	Electroplated, 7 µm zinc with blue chrome passivation
Service class	2 (acc. EN 1995-1-1)



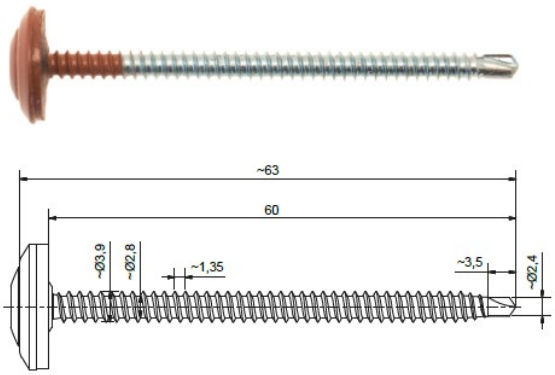


Table 12: Characteristics of the ONDULINE´s Universal screw

CHARACTERISTICS OF ONDULINE´s SCREW FOR WOOD	
DESIGNATION	
Type	ONDULINE´S Screw for wood
PHYSICAL PROPERTIES	
Nominal diameter (body)	Ø 6 mm
Nominal diameter (rod)	Ø 12 mm
Length	120 – 150 – 200 – 240 mm
Head	Flat countersunk
Drive	TORX
Pitch	2,6 mm
Material	Steel (class 4,8%_C:0,55 – P: 0,055 – P:0,055)
Bending angle	15º
	

Table 13: Characteristics of the ONDULINE´s screw for wood

CHARACTERISTICS OF EJOT® concrete screw	
DESIGNATION	
Type	EJOT® RA-P
PHYSICAL PROPERTIES	
Nominal diameter	Ø 7,5 mm
Embedment depth	≥ 30 mm
Material	Case-hardened steel
Drill capacity	Nominal 6,0 mm diameter drill
Corrosion category	Grade 2 (acc. EN 1670)
	

Table 14: Characteristics of the EJOT® concrete screw