

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	Onduline Avrasya A.Ş.
Programme holder	Institut Bauen und Umwelt (IBU)
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Declaration number	EPD-OND-2013111-E
Issue date	28.04.2013
Valid to	27.04.2018

Onduline Classic
Onduline Avrasya A.Ş.

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Institut Bauen
und Umwelt e.V.



1 General information

Onduline Avrasya A.Ş.

Programme holder

IBU - Institut Bauen und Umwelt e.V.
Rheinufer 108
D-53639 Königswinter

Declaration number

EPD-OND-2013111-E

This Declaration is based on the Product Category Rules:

Requirements on the EPD for corrugated bitumen materials for roofing and external wall cladding, July - 2012 (PCR tested and approved by the independent expert committee (SVA))

Issue date

28.04.2013

Valid to

27.04.2018

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Prof. Dr.-Ing. Hans-Wolf Reinhardt
(Chairman of SVA)

Onduline Classic

Owner of the Declaration

ONDULINE AVRASYA İnşaat Malzemeleri San. ve Tic. A.Ş.
Degirmen Sokak Nida Kule No:12 Kat:8
34742 Kozyatagi, Kadikoy, Istanbul

Declared product / Declared unit

Onduline Classic / 1 m²

Scope:

Within the scope of this study a life cycle study according to ISO 14040/44 is performed for the Onduline Classic product which belongs to the corrugated bitumen roofing sheet product group. Onduline Classic product is manufactured in Onduline Avrasya A.Ş.'s production plant located in Sapanca, Turkey. The Onduline Classic's EPD is a single product EPD which represents the life cycle assessment of this single product. This assessment relies on transparent, plausible and documented basis data. All the model assumptions which influence the results are declared. The life cycle assessment is representative for the Onduline Classic product for the given system boundaries. The life cycle analysis covers the product stage and the construction process stage information modules according to the modular structure defined in EN 15804.

Verification

The CEN standard EN 15804 serves as the core PCR.

Verification of the EPD by an independent third party as per ISO 14025

internally externally

Olivier Müller
(Independent tester appointed by SVA)

2 Product

2.1 Product description

Onduline Classic is a bitumen corrugated sheet for pitched roofs and external walls, consisting of a homogenous base sheet composed of cellulose fiber that is recycled from all sources of waste paper and cardboard, and pre-pigmented with resin and coloring, and impregnated with bitumen, the residue of petroleum refineries, under pressure and heat. This surplus material is used to give the sheet its characteristics of waterproofness. It is produced in a variety of colors. Its large dimensions, lightweight and ease of installation are well-known properties.

2.2 Application

Onduline Classic's main function is to get watertightness on pitched roofs and walls. It can be fixed on wooden or metallic battens and purlins but also on full decks. The type of the substructure has to be chosen according to the shape of the roof. It should be laid onto substructure staggered and overlapped. The corrugated bitumen sheets can be combined with several insulation systems.

2.3 Technical Data

Onduline Classic is produced and delivered according to the requirements of the standard EN 532. The main specifications and the test methods are listed below:

TEST and METHOD	TOLERANCE	TARGET VALUE
Visible defects TS EN 534	-	CONFORM
Length TS EN 534 7.1.1	(+1%,-0,2%)	200 cm
Width TS EN 534 7.1.2	(± 2%)	95 cm
Thickness TS EN 534 7.1.3	(± 10%)	3,1 mm
Height of corrugations TS EN 543 7.1.4	(± 6%)	40 mm
Pitch of corrugations TS EN 534 7.1.5	(± 3%)	95 mm
Squareness TS EN 534 7.1.6	max	4 mm/m
Mass TS EN 534 7.3.3	(± 10%)	3,42 kg/m ²
Proportion of bitumen TS EN 534 7.3.2	min	40 %
Water impermeability TS EN 534 7.3.1	-	CONFORM
TS EN 534 7.4.2 (After ageing)	-	CONFORM

Reaction to fire EN 13501.1	-	E CLASS
Impact strength TS EN 534 7.2.2	-	CONFORM
Tearing strength TS EN 534 7.2.3	min	200 N
TS EN 534 7.4.1 (After ageing)	min	200 N
Bending under downward load(1/200) TS EN 534 7.2.1	FOR 3,1 mm min	1400 N
Thermal coefficient TS EN 534 7.4.3	max	100X10 ⁻⁶ /K K
Bitumen homogeneity TS EN 534 7.3.4	max	1 cm ²
Water absorption 24 h TS EN 534 7.3.5	max	20 %

2.4 Base materials / Ancillary materials

The primary product components are as follows:

Waste paper / cardboard	: % 50-60
Bitumen	: % 40-50
Colour coating	: % 3
Surfactants	: <% 0,3

2.5 Reference service life

Within the scope of this study only the product stage and the construction process stage information modules are declared. Since this EPD does not cover the whole life cycle of this product, the declaration of the reference service life is not mandatory.

3 LCA: Calculation rules

3.1 Declared unit

The declared unit is 1 m² of sheeting. The corresponding surface weight of the roofing sheet is 3,42 kg.

3.2 System boundary

Type of EPD: cradle to gate - with options

The system boundary includes the production of the Onduline Classic product from extraction of raw material to the production of finished packaged product at the factory gate as well as the transportation of the products to the construction site and the installation of the products to the building.

In this study, the product stage (A1 – A3) and the construction process stage information modules are considered. These modules include production of raw material extraction and processing (A1), processing of secondary material input (A1),

transport of the raw materials to the manufacturer (A2), manufacturing of the product (A3), the packaging materials (A3), transportation of the manufactured products to the construction site (A4), the installation of products to the building (A5), and the benefits and loads beyond the system boundary (D) for the packaging materials (wooden pallets and shrink (polyethylene film), for which the EoL data were available, the product itself is not included.

3.3 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to EN 15804 and the building context, respectively the product-specific characteristics of performance, are taken into account.

4 LCA: Scenarios and additional technical information

The modules B1, B2, B3, B4, B5, reference service life, B6, B7 and C1 – C4 are not considered and declared in this study.

Transport to the construction site (A4)

Transport to the construction site is considered within the scope of the life cycle assessment. For the integration of this module following diesel and truck processes from GaBi 5 are integrated to the life cycle model. According to the data delivered by the manufacturer, it is assumed that the yearly average transport distance for 1 m² of the Onduline Classic product is 3660 km.

Truck process: Diesel driven, Euro 5, 26 – 28 t gross weight, 18,4 payload capacity

Diesel: Diesel mix at refinery (nation: EU – 27)

Installation in the building (A5)

Materials used for installation of the Onduline Classic product to the building including the packaging material under delivery conditions are as following:

Cast iron part (nails): 0,0474 kg/m²

Corrugated board boxes (nail boxes): 0,00421 kg/m²

Polyethylene low density granulate (nail head): 0,0158 kg/m²

Polyethylene-film (shrink used on pallets): 0,00218 kg/m²

5 LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

Raw material supply	Transport	Manufacturing	Transport	Construction- installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse- Recovery- Recycling- potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m² Onduline Classic

Parameter	Unit	Manufacturing			Installation		Credits
		A1 - A3	A4	A5	D		
GWP	[kg CO ₂ -Äq.]	1,10	7,18E-01	2,76E-01	-5,00E-02		
ODP	[kg CFC11-Äq.]	2,15E-08	2,66E-10	1,07E-09	-3,57E-13		
AP	[kg SO ₂ -Äq.]	9,61E-03	1,92E-03	3,69E-04	-4,19E-04		
EP	[kg PO ₄ ³⁻ -Äq.]	1,41E-03	4,02E-04	4,07E-05	-2,03E-05		
POCP	[kg Ethen Äq.]	1,15E-03	-5,08E-04	6,52E-05	-2,37E-05		
ADPE	[kg Sb Äq.]	1,99E-06	2,83E-08	1,94E08	-3,30E-09		
ADPF	[MJ]	109,30	9,92	2,86E01	-7,39E-01		
Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources						

RESULTS OF THE LCA - RESOURCE USE: 1 m² Onduline Classic

Parameter	Unit	Manufacturing			Installation		Credits
		A1 - A3	A4	A5	D		
PERE	[MJ]	0,76	0,622	0,31	-0,032		
PERM	[MJ]	2,86	0,00	0,00	0,00		
PERT	[MJ]	3,61	0,622	0,31	-0,032		
PENRE	[MJ]	30,33	9,95	3,34	-0,75		
PENRM	[MJ]	90,05	0	0,00	0,00		
PENRT	[MJ]	120,39	9,95	3,34	-0,75		
SM	[kg]	2,03	0,00	0,00	0,00		
RSF	[MJ]	0,00	0,00	0,00	0,00		
NRSF	[MJ]	0,00	0,00	0,00	0,00		
FW*	[m ³]	-	-	-	-		
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Use of net fresh water						

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² Onduline Classic

Parameter	Unit	Manufacturing			Installation		Credits
		A1 - A3	A4	A5	D		
HWD*	[kg]	-	-	-	-		
NHWD*	[kg]	-	-	-	-		
RWD	[kg]	3,99E-04	1,39E-05	1,87E04	-2,78E-07		
CRU	[kg]						
MFR	[kg]						
MER	[kg]						
EE [Typ]	[MJ]			0,37			
EE [Typ]	[MJ]			0,12			
Caption	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy per energy carrier						

* Not declared according to the interim solution authorised by the advisory board of 4.12.12

6 References

Institut Bauen und Umwelt 2011

Institut Bauen und Umwelt e.V., Königswinter (pub.): Generation of Environmental Product Declarations (EPDs); General principles for the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2011-06

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PCR 2011, Part A

Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. 2011-07

www.bau-umwelt.de

PCR 2012, Part B

PCR Guidance – Texts for Building Related Products and Services From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU) Part B: Requirements on the EPD for corrugated bitumen materials for roofing and external wall cladding. 2011-07

ISO 14025

DIN EN ISO 14025:2011-10: Environmental labels and declarations – Type III environmental declarations – Principles and procedures

EN 15804

DIN EN 15804:2011-04: Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction products

EN 534

DIN EN 534: 2006-06: Corrugated bitumen sheets - Product specification and test methods

GaBi 5

GaBi 5: Software and databasis for Life Cycle Engineering. LBP, University of Stuttgart and PE International. 2011.

GaBi Documentation: Documentation of the GaBi 5 datasets. LBP, University of Stuttgart and PE International. 2011. <http://documentation.gabi-software.com/>



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