ENVIRONMENTAL PRODUCT DECLARATION

In agreement with ISO 14025:2006 and EN 15804 +A1,
PRODUCT CATEGORY RULES 2013-02-21 Ver. 1.1. CONSTRUCTION PRODUCTS AND CPC Division 54 CONSTRUCTION SERVICES

Programme: The International EPD® System
Website: www.environdec.com
Programme operator: EPD International AB
Date of publication (issue): 20 March 2018
Date of validity: 19 March 2023

EPD®
THE INTERNATIONAL EPD® SYSTEM

ECO PLATFORM
EPD
EN 15804 VERIFIED

ENVIRONMENTAL PRODUCT DECLARATION OF GROUND REINFORCEMENT GRID ECORASTER

Registration number: S-P-03450

REV. 1 Date March 20, 2018

Organization:	Purus Plastics GmbH
	
Address	Am Blätterrangen 4, D-95659 Arzberg Germany
Registration No. / VAT	HRB 2231 / DE168234917
Statutory body	Thomas Manzei
EPD representative	Peter Hendrikson
Contact	p-hendrikson@purus-plastics.de +49 (0) 9233 77 55 19
Webpage	www.purus-plastics.de

Product:	Ecoraster reinforcement grid
Use:	Construction industry
Product lifetime /years/:	Expected lifetime of the products exceeds 50 years.
Hazardous substance contents:	No
UN CPC:	36950 - Builders' ware of plastics n.e.c.

THE STATEMENT

EPD owner organization Purus Plastics GmbH has sole ownership, liability and responsibility for the EPD

1 PROGRAMME RELATED INFORMATION

Program operator for this EPD is The International EPD® system.

The International EPD® system
Postal address: EPD International AB
Box 210 60 SE-100 31 Stockholm
Sweden
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EPD®
THE INTERNATIONAL EPD® SYSTEM

1.1 THE REFERENCE PCR DOCUMENT

The reference documents for this EPD are General Program Instructions and Product Category Rules 2012:01 Version 2.01: Construction Products and CPC Division 54: Construction Services. Product Category Rules (PCR) are specified for certain information modules “cradle-to-gate”, so called core modules. The structure and aggregation level of the core modules is defined by the United Nation Statistics Division - Classification Registry CPC codes (http://unstats.un.org).

1.2 REGISTRATION NUMBER

The registration number of this EPD is: S-P-03450

1.3 DATE OF PUBLICATION AND VALIDITY

The publication date of this EPD is: 20 March 2018
This EPD is valid until: 19 March 2023

1.4 GEOGRAPHICAL SCOPE OF APPLICATION OF EPD

The geographical scope of this EPD is worldwide.

1.5 INFORMATION ABOUT THE YEAR OR REFERENCE PERIOD OF THE UNDERLYING DATA TO THE EPD

The reference period to this EPD is year 2016. Data shown below refers to 2016 and have been collected directly from the Purus Plastics GmbH. Other general data used were taken from the ILCD and Ecoinvent database.

1.6 REFERENCE TO THE WEBSITE

More information related to The International EPD® System program is available at www.environdec.com.

2 PRODUCT RELATED INFORMATION

Trade name of products:

ECORASTER E50
ECORASTER S50
ECORASTER E40

2.1 SPECIFICATION OF THE COMPANY

Ecoraster reinforcement grids are produced at Purus Plastics GmbH, Am Blätterrangen 4, D-95659 Arzberg, Germany, Registration No. / VAT No.: HRB 2231 / DE168234917

Main activity of the company is recycling of plastics. Thanks to one of the most modern washing and production facilities in the world, we are able to produce granulates of very high varietal purity.
From which PURUS PLASTICS produce the original ECORASTER® flexible porous plastic paving grid and various different plastic products.

2.2 TECHNICAL DESCRIPTION OF THE PRODUCT

ECORASTER ® are reinforcement grid made of 100 % recycled polyethylene for permeable reinforced surfaces. Manufactured from 100% recycled plastic bags, effectively keeping millions of non-degradable bags out of public landfills.
Because it can be filled with natural land cover like grass, it helps reduce the “Heat Island Effect”, where higher city temperatures result from non-permeable surfaces like asphalt and concrete absorbing instead of reflecting the sun’s energy. This is important because the higher city temperatures increase air pollution levels, and heat-related illness and fatalities, and put extra pressure on our energy generation network.
ECORASTER’s ® environmentally-sustainable permeability allows surface water to soak through the soil and plants, which do an excellent job of filtering out pollutants, and therefore helps maintain ground water quality and avoid environmental problems caused by storm water runoff. By providing a solid structure for soil, Ecoraster prevents soil compaction, further decreasing storm water runoff and preventing soil erosion.
ECORASTER® have multiple certificates:

- Environmentally neutral in acc. with OECD 202:2004
- Up to 20 t axle load in acc. with DIN 1072
- High load ability, DIN EN 124:2011
- Monitored production, “Made in Germany” TÜV Nord
- UV-resistance (DIN EN 60068-2-5) and durability
- Permeability (infiltration test on concrete pavers) DIN 18130
- RAL approved
- CE approved
- DIN 4102 - Approval emergency access routes, fire resistance
- DIN IN ISO 124 and B125 - Approval for car parks, access roads & storage areas
- NATO certified E50 - MOD / 9330-99-858-1406
- TÜV “Made in Germany” Certification

The ECORASTER ® products have a plenty of application like, ground reinforcement of car parking, roads, paths, emergency vehicle access routes, erosion control, riding arenas or green goofs.

Table 1 Product characteristics of Ecoraster reinforcement grids

Product name	E 50	S 50	E 40
Dimensions (mm)	330 x 330 x 50	330 x 330 x 50	330 x 330 x 40
Wall thickness (mm)	5	2.5	4
Carrying load (t) per sqm (empty)	Up to 350	Up to 120	Up to 120
Weight (kg) per sqm	9.55	6.84	5.22
Weight (kg) per unit	0.76	1.06	0.58
Wall height (mm)	50	50	40
Pressure resistance	Up to 20 t load in according with DIN 1072		
Dimensional stability	Temperature range -50°C to +90°C		
Deformation absorption	0.5 % °C to 80°C		
Moisture absorption	0.01 %		
Solubility	Resistant to acids, alkalis, alcohols, oil and petrol (deicing salt, ammonia, acid rains, etc.)		

2.3 DECLARED UNIT

Functional, respectively declared unit used in this study is 1 m^2 of evaluated ground reinforcement grid.

2.4 DESCRIPTION OF UNDERLYING LCA-BASED INFORMATION

2.4.1 SYSTEM BOUNDARIES

System boundaries of this EPD are cradle to gate. Based on EN 15804+A1 The International EPD® System has adopted an LCA calculations procedure which is separated into different life cycle stages, so called modules A1, A2 and A3:

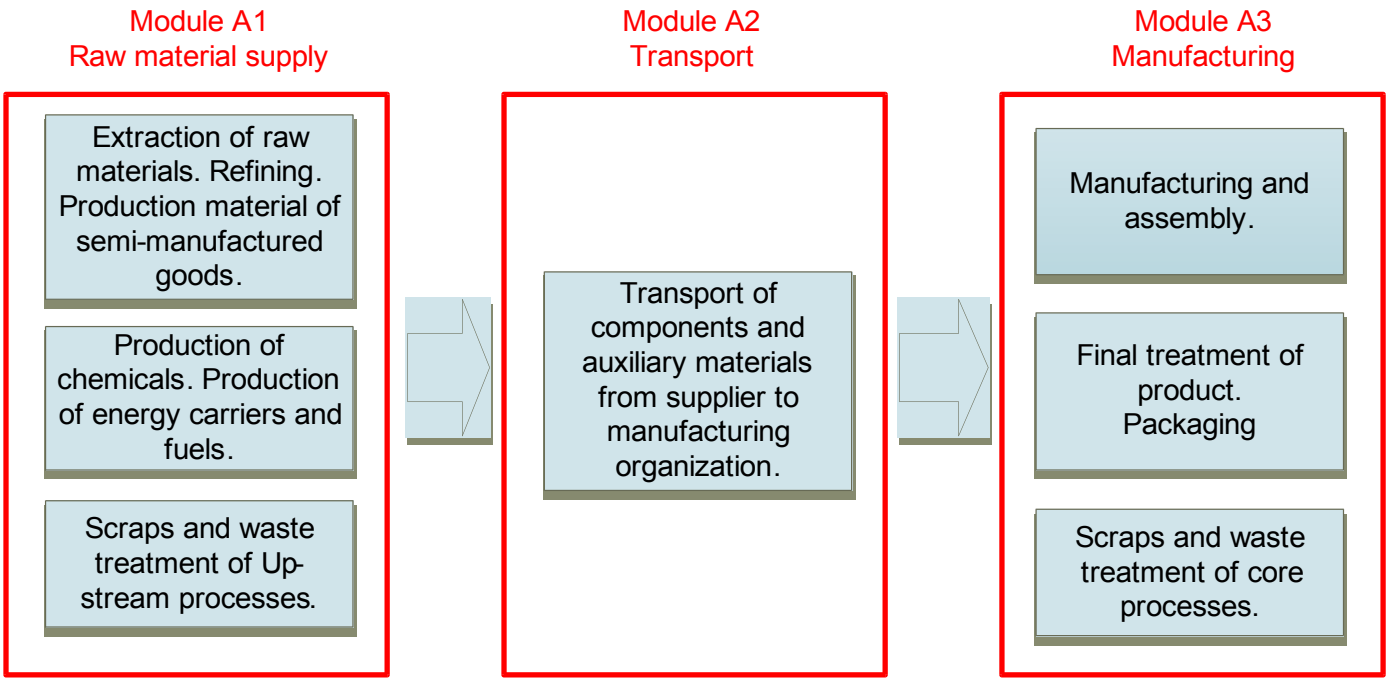
Module A1 covers production of for Purus Plastics GmbH Ecoraster ground reinforcement grid used materials, fuels and energy carriers. This includes production of recycled polyethylene, antifoaming agent and packaging foil made of PE.

Module A2 covers transport of material into site of production Purus Plastics GmbH Arzberg and internal transport. Generic database (DB) processes with site specific parameters for distance were used.

Module A3 covers on site operated processes dealing with reinforcement grid production. These processes are under operational control of Purus Plastics GmbH and all of them are specific processes modelled based data collection. Treatment of waste generated from the manufacturing processes is also included in this module.

Schematic description of system boundaries consisting of up-steam module processes, core processes and down-stream processes is shown on following figure.

Figure 1 System boundaries



Based on PCR the downstream module was not included into system boundaries. Transport of final product to a costumer is also excluded.The general description of the system boundary is in following table shown.

Table 2 General description of the system boundary. D = Declared (Included in LCA); ND = Not Declared.

A1 - A3 Product stage	Raw material supply	A1	x
	Transport	A2	x
	Manufacturing	A3	x
A4 - A5 Construction process	Transport from the gate to the site	A4	ND
	Assembly	A5	ND
B1 - B7 Use stage	Use	B1	ND
	Maintenance	B2	ND
	Repair	B3	ND
	Replacement	B4	ND
	Refurbishment	B5	ND
	Operational water use	B6	ND
	Operational energy use	B7	ND
C1 - C4 End of life stage	De-construction	C1	ND
	Transport	C2	ND
	Waste processing	C3	ND
	Disposal	C4	ND
D Benefits and loads beyond the system boundaries	Reuse- Recycling - Recovery Potential	D	ND

Figure 2 Manufacturing process - crushing and processing

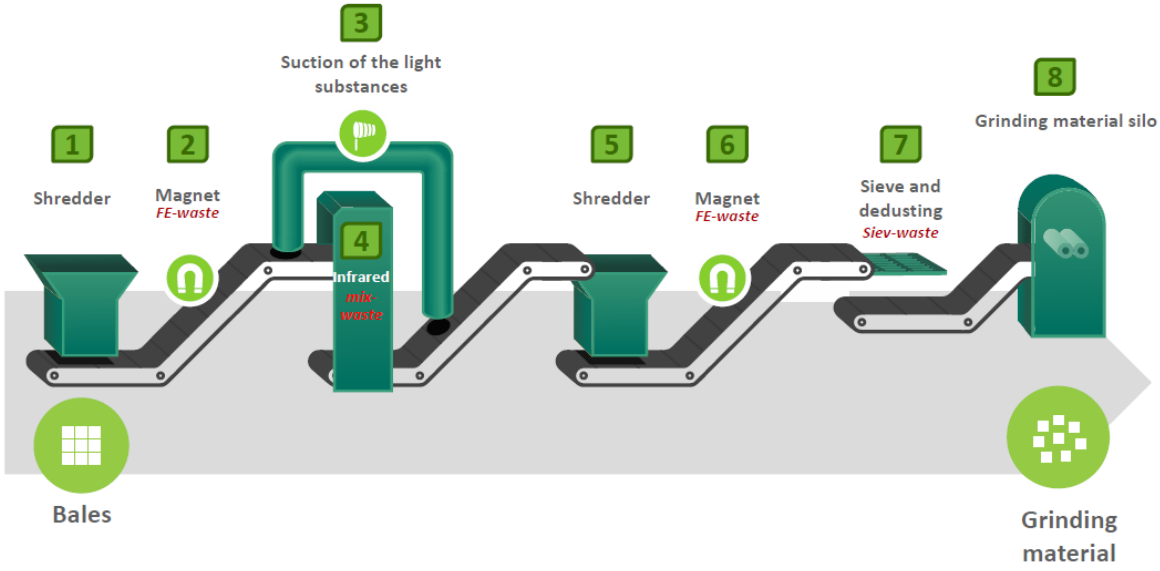
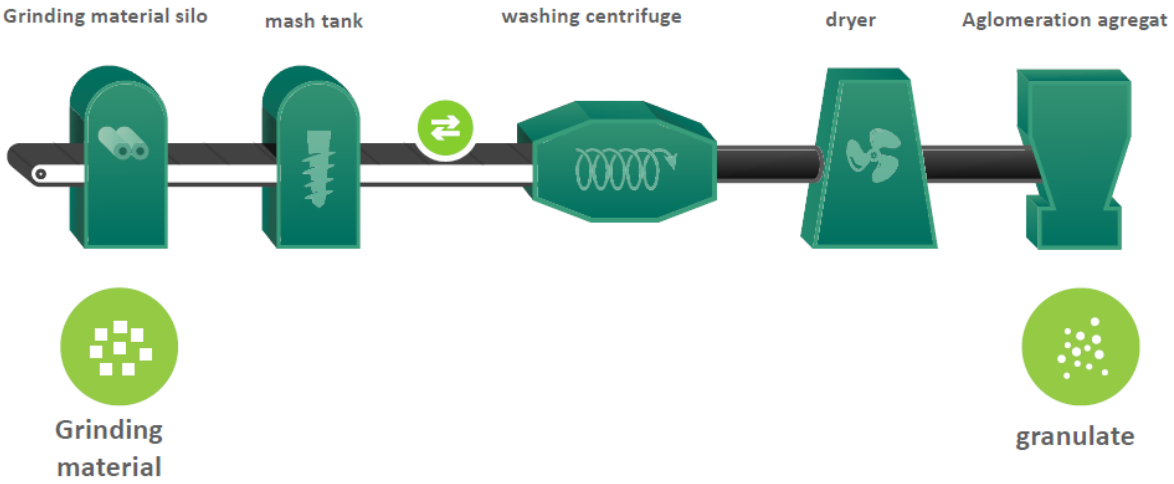


Figure 3 Manufacturing process - recycling and processing



2.4.2 DATA QUALITY

All relevant data are of specific quality. Data used for calculation were relevant for year 2016. Data set needed for calculation is complete.

2.4.3 LCA STUDY

The LCA calculations rules used for this declaration follow the overall requirements for The International EPD® System. These rules follow the international standards ISO 14040 and ISO 14044 with respect to EN 15804+A1. The product system for this LCA has been described by using specific data when available; generic data have been used in accordance with PCR and GPI requirements. Underlying LCA study used for this EPD was complete and covering all relevant inputs. For LCA study site specific data from producer were used. The LCA was conducted in year 2017. Underlying LCA study was elaborated by LCA studio, www.lcastudio.cz.

2.5 CONTENT OF MATERIALS AND CHEMICAL SUBSTANCES

For production of Ecoraster products 100 % of recycled polyethylene is used as the only material input.

Table 3 Composition of 1m^2 Ecoraster products

Material composition	Ecoraster (1 m^2)		
	E50	S50	E40
Recycled Polyethylene (kg)	9.55	6.84	5.22

3 ENVIRONMENTAL PERFORMANCE-RELATED INFORMATION

All environmental performance is reported per declared unit: 1 m^2 of reinforcement grid.

3.1 USE OF NATURAL RESOURCES

Following tables report the main consumption of resources for Ecoraster reinforcement grids life cycle. Use of resources in MJ/D.U. is expressed. All energy data are expressed as net caloric value.

Table 4 Ecoraster reinforcement grid: Use of renewable and nonrenewable material resources, renewable and non- renewable primary energy and water

Aggregated results for modules A1+A2+A3	Unit	E40	E50	S50
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	7.8	14.3	10.2
Use of renewable primary energy resources used as raw materials	MJ	0.0	0.0	0.0
Total use of renewable primary energy resources	MJ	7.8	14.3	10.2
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	18.1	35.0	23.5
Use of non-renewable primary energy resources used as raw materials	MJ	0.0	0.0	0.0
Total use of non-renewable primary energy resources	MJ	18.1	35.0	23.5
Use of secondary material	kg	5.3	9.6	6.9
Use of renewable secondary fuels	MJ	0.0	0.0	0.0
Use of non renewable secondary fuels	MJ	0.0	0.0	0.0
Net use of fresh water	m3	3.8	6.8	4.9

3.2 POTENTIAL ENVIRONMENTAL IMPACTS

For calculation of impact category results characterization factors prescribed in the CML 2001 methodology for calculating environmental impact as required by EPD® program in GPI. The characterization of CML-IA version 4.1, dated as of October 2012 was used based on EN 15804+A1 and applied PCR. The environmental impacts per declared unit are presented in following table:

Table 5 Impact category results of environmental results of Ecoraster reinforcement grid life cycle. Data are aggregated (A1-A3) and referred to D.U.

Impact categories	E40	E50	S50
Abiotic Depletion (ADP elements) [kg Sb-Equiv.]	7.46E-07	1.37E-06	9.73E-07
Abiotic Depletion (ADP fossil) [MJ]	13.9	27.5	18.1
Acidification Potential (AP) [kg SO2-Equiv.]	0.001	0.003	0.002
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	0.0004	0.0009	0.0005
Global Warming Potential (GWP 100 years) [kg CO2-Equiv.]	4.58	8.46	5.98
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC-11 Eq.]	1.59E-09	2.88E-09	2.07E-09
Photochem. Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	-0.0003	-0.0008	-0.0004

3.3 OTHER ENVIRONMENTAL INDICATORS

The following indicators are also reported in the EPD per declared unit:

Table 6 Ecoraster reinforcement grid: Parameters for describing the waste categories. Data are aggregated (A1-A3) and referred to D.U.

	Unit	E40	E50	S50
Non-hazardous waste	Kg/D.U.	0.12	0.22	0.16
Hazardous waste	Kg/D.U.	5.42E-07	1.14E-06	7.08E-07
Radioactive waste	Kg/D.U.	0.002	0.003	0.002

Table 7 Other environmental information describing Ecoraster reinforcement grid output flows. Data are aggregated (A1-A3) and referred to D.U.

Parameter	Unit	E40	E50	S50
Components for re-use	Kg/D.U.	0	0	0
Materials for recycling	Kg/D.U.	1.10	1.99	1.43
Materials for energy recovery	Kg/D.U.	4.95	8.99	6.46
Exported energy	MJ per energy carrier /D.U.	0	0	0

4 ADDITIONAL ENVIRONMENTAL INFORMATION

PURUS PLASTICS GMBH IS:
DIN EN ISO 9001 :2008 CERTIFIED (QUALITY MANAGEMENT SYSTEM)
ISO 50001 CERTIFIED (ENERGY MANAGEMENT SYSTEM)

5 MANDATORY STATEMENT

5.1 COMPARISIONS OF EPDS WITHIN THIS PRODUCT CATEGORY

This EPD® refers to the International EPD® System and is available, on the website, www.environdec.com.
This EPD has been developed according to the PCR Construction products and CPC division 54 construction services; and international standard EN 15804+A1:2011.
EPDS OF CONSTRUCTION PRODUCTS MAY NOT BE COMPARABLE IF THEY DO NOT COMPLY WITH EN 15804.

5.2 VERIFICATION AND REGISTRATION

Independent verification of the declaration and data accordance to ISO 14025:2006

Programme	The International EPD ® system (www.environdec.com)
Verification procedure	ISO 14025: 2006 Environmental labels and declarations – Type III environmental declarations – principle and procedures General Program Instructions for Environmental Product Declarations.
Product category rules (PCR)	PCR CONSTRUCTION PRODUCTS AND CPC 54 CONSTRUCTION SERVICES, version 1.1, 2013-02-21
PCR was prepared by	IVL Swedish Environmental Research Institute, SwedishEnvironmental Protection Agency, SP Trätek, SwedishWood Preservation Institute, Swedisol, SCDA, SvensktLimträ AB, SSAB
PCR moderator	Martin Erlandsson, IVL Swedish Environmental Research Institute, Sweden, martin.erlandsson@ivl.se
PCR review was conducted by	The International EPD® System Technical Committee
Independent verification of the declaration data, according to ISO 14025	☐ Internal ☐ X External ☐ EPD process certification
Third party verifier	Dr Hüdai Kara Metsims Sustainability Consulting 4 Clear Water Place Oxford OX2 7NL, United Kingdom Office: +44 7557 351476

6 VALIDITY OF THE EPD

This EPD is valid for 5 years, i.e. until 19 March 2023. If any change in production causing increase of any environmental impact larger than +/- 5% the EPD shall be adjusted.

7 REFERENCES

\ General Programme Instructions for environmental product declarations, The international EPD® System
\ Product Category Rules: Construction Products and CPC Division 54: Construction Services. Product Category Rules, The international EPD® System, Stockholm

Author of this declaration

LCA studio

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NARA SK
NÁRODNÁ RECYKLAČNÁ AGENTÚRA SLOVENSKO