

Environmental Product Declaration



In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

GLASS FIBRE MESH

from

“VALMIERAS STIKLA ŠĶIEDRA” AS



Programme:	The International EPD® System, www.environdec.com
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com



General information

Programme information

Programme:	The International EPD® System
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ISO Standard ISO 21930 and CEN standard EN 15804:2012+A2:2019 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14 Construction products (EN 15804:A2) (1.2.4)
PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción (Chile). The review panel may be contacted via the Secretariat info@environdec.com
Independent third-party verification of the declaration and data, according to ISO 14025:2006: <input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification
Third party verifier: Elisabet Amat, eamat@greenize.es Approved by: The International EPD® System
LCA and EPD has been worked out by Bureau Veritas Latvia. E-mail: riga@bureauveritas.com (www.bureauveritas.lv)
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804:2012+A2:2019. For further information about comparability, see EN 15804:2012+A2:2019 and ISO 14025.

Company information

Owner of the EPD: "VALMIERAS STIKLA ŠĶIEDRA" AS, Cempu iela 13, Valmiera, Valmieras novads, Latvija

Contact: Airisa Vītola, Business process specialist, Mob.: +371 26675058, E-mail: Airisa.Vitola@valmiera-glass.com

Description of the organisation: Company is specialized in the glass fibre research, production, product development and trade. Glass fibre fabric, mesh and yarns is possible to use in variety of industrial and technical industries to create high quality products.

Product-related or management system-related certifications: Globecert Nr. 1702 ; KIWA Certificate Nr. 12304; European Technical Assessment ,ETA16/0526 of 04/09/2021;Certificate of conformity of the factory production control No.1020-CPR-060044003

Name and location of production site(s): "VALMIERAS STIKLA ŠĶIEDRA" AS, Cempu iela 13, Valmiera, Valmieras novads, Latvija

Product information

Product name: Glass fibre mesh

Product identification: The CEN standard EN 15804:2012+A2:2019 serves as the core PCR. In addition, PCR 2019:14 Construction products (EN 15804:A2) (1.2.4), the EN 1090 and the UN CPC code, 26890 Woven fabrics (including narrow fabrics) of glass fibres.

Information on fire protection according to EN 13501 – 1 or any national standard.

Class of construction material - A1 by default.

Product description: Impregnated glass fibre products are used for the outside thermal insulation systems of buildings, indoor plaster strengthening and reinforcement, for the repair of walls, floors, and ceilings. Often included as a key material in drywall repair kits, the provision of high mechanical strength. The glass fibre mesh is prepared throughout multiple processes at VALMIERAS STIKLA ŠĶIEDRA factory which is in Valmiera, Latvia.

The technical parameters of the product are:

- Mesh opening (warp x weft direction) (mm)= (3.8 x 3.6) - (9.0 x 10.5) ± 0.5;
- Average mesh size (warp x weft direction) (mm)= (5.1 x 4.1) - (12.0 x 13.0) ± 0.5;
- Mass per unit area, g/m²=145 - 340 (± 5%)

The products are produced according to following standards: TR-S02

The target group of the product is Business to business (B2B).

LCA information

Functional unit / declared unit: 1 metric ton of Glass fibre, E glass, SSA, GG - type (E-glass netting with aleno weave).

Reference service life: 50 years.

Time representativeness: The production data are from 2021, and the database data are from 2013 – 2021 i.e., no data is older than 10 years.

Database(s) and LCA software used: Database used is mainly Ecoinvent 3.8. The LCA software used is SimaPro 9.4.

Data quality:

The foreground data was collected internally considering the latest available average production amounts and measures during the last year (2021). Data regarding the end-of-life modules are based on the experts' judgment and database data (i.e., Ecoinvent 3.8.).

According to the criteria of the UN Environment Global Guidance on LCA database development, the quality level can be defined as incredibly good. Data is geographically representative as it comes from the area of study, it is technical representative as it comes from processes and products under study using the same state of technology defined in goal and scope, and it is also time representative as data used was collected less than 3 years difference between the reference year according to the documentation.

Description of system boundaries:

LCA is made in "Cradle-to-gate with options, modules C1-C4, module D and with optional module A4" form. All major materials, production energy use and waste are included for product stages A1, A2, A3, A4, C2, C4 and D. All life cycle impacts are included, see flowchart below. The following information describes the scenarios in the different modules of the EPD. All major raw materials and all the essential energy are included. Marginal production process for raw materials and energy flows with a cut-off of 1% are not included. This cut-off rule does not apply to hazardous materials and substances.

- **Raw material supply (A1)**

The materials that are needed to produce glass fibre mesh are sand, minerals, 45 different additives, glass fibre thread, and 17 different paints/pigments. Other materials that are used in the process have not been considered because of a quantity less than 1% in mass.

- **Transport (A2)**

Raw materials are transported from multiple different countries (that are not presented in data from the manufacturer) by truck and by ferry.

- **Manufacturing (A3)**

The processes that are included in the manufacturing phase are melting (furnace), oiling, drying, conditioning, spooling, twisting, shearing, loom, and coating, of which energy consumption, auxiliary material consumption, waste, and gaseous emissions have been modelled. Glass fibre waste, air and wastewater emissions, and packaging waste are generated during the manufacturing process: polyethylene waste (20.3% of PE waste is recycled and 79.7% is disposed of in landfills) and cardboard waste (74.6% of cardboard is recycled and 25.4% is disposed of in landfills).

- **Transport from production place to user (A4)**

From the production site at VALMIERAS STIKLA ŠĶIEDRA in Latvia, the product is transported to customers in Great Britain, Bahrain, Belgium, Bosnia and Herzegovina, Czech Republic, Chile, Estonia, Italy, Russian Federation, Latvia, Lithuania, Mexico, Netherland, Norway, Colombia, Poland, Romania, Serbia, Slovakia, Slovenia, Spain, Switzerland, Turkey, Ukraine, Hungary, Sweden, Greece, France, Bulgaria. Transportation by road includes transport type lorry of > 32 metric ton EURO5, and water transportation includes transport type ferry and container ship. The transportation impacts cover fuel direct exhaust emissions, environmental impacts of fuel production and related to infrastructure emissions. The information of these transports is shown in the table below.

Type	Vehicle	Distance km	Fuel/energy consumption	Value (l/t)
Great Britain				
Truck	Lorry, >32t, EURO5	53,80	0,0226 l/tkm	1,22
Boat	Ferry	2345,20	0,0399 l/tkm	93,57
Bahrain				
Truck	Lorry, >32t, EURO5	40,71	0,0226 l/tkm	0,92
Boat	Ferry	13490,11	0,0399 l/tkm	2538,26
Belgium				
Truck	Lorry, >32t, EURO5	2107,20	0,0226 l/tkm	47,62
Bosnia and Herzegovina				
Truck	Lorry, >32t, EURO5	2250,80	0,0226 l/tkm	50,87
Czech Republic				
Truck	Lorry, >32t, EURO5	1590,90	0,0226 l/tkm	35,95
Chile				
Truck	Lorry, >32t, EURO5	215,85	0,0226 l/tkm	4,88
Boat	Container ship	16191,66	0,0005 l/tkm	8,09
Estonia				
Truck	Lorry, >32t, EURO5	262,80	0,0226 l/tkm	5,94
Italy				
Truck	Lorry, >32t, EURO5	2793,60	0,0226 l/tkm	63,14
Russian Federation				
Truck	Lorry, >32t, EURO5	864,40	0,0226 l/tkm	19,54
Latvia				
Truck	Lorry, >32t, EURO5	135,19	0,0226 l/tkm	3,06
Lithuania				
Truck	Lorry, >32t, EURO5	403,80	0,0226 l/tkm	9,13
Mexico				
Truck	Lorry, >32t, EURO5	318,54	0,0226 l/tkm	7,19
Boat	Container ship	14803,96	0,0005 l/tkm	7,40
Netherland				
Truck	Lorry, >32t, EURO5	1415,52	0,0226 l/tkm	31,99
Norway				
Truck	Lorry, >32t, EURO5	121,67	0,0226 l/tkm	2,75
Boat	Ferry	1836,78	0,0399 l/tkm	73,29
Colombia				
Truck	Lorry, >32t, EURO5	509,54	0,0226 l/tkm	11,52
Boat	Ferry	10617,37	0,0399 l/tkm	423,63
Poland				
Truck	Lorry, >32t, EURO5	815,00	0,0226 l/tkm	18,42
Romania				
Truck	Lorry, >32t, EURO5	2445,50	0,0226 l/tkm	55,27
Serbia				
Truck	Lorry, >32t, EURO5	2052,40	0,0226 l/tkm	46,38
Slovakia				
Truck	Lorry, >32t, EURO5	1483,20	0,0226 l/tkm	33,52
Slovenia				

Truck	Lorry, >32t, EURO5	1862,10	0,0226 l/tkm	42,08
Spain				
Truck	Lorry, >32t, EURO5	3656,60	0,0226 l/tkm	82,64
Switzerland				
Truck	Lorry, >32t, EURO5	2272,80	0,0226 l/tkm	51,37
Turkey				
Truck	Lorry, >32t, EURO5	3400,10	0,0226 l/tkm	76,84
Ukraine				
Truck	Lorry, >32t, EURO5	1184,00	0,0226 l/tkm	26,76
Hungary				
Truck	Lorry, >32t, EURO5	1220,69	0,0226 l/tkm	27,59
Sweden				
Truck	Lorry, >32t, EURO5	40,33	0,0226 l/tkm	0,91
Boat	Ferry	486,86	0,0399 l/tkm	19,43
Greece				
Truck	Lorry, >32t, EURO5	2069,53	0,0226 l/tkm	46,77
France				
Truck	Lorry, >32t, EURO5	2012,54	0,0226 l/tkm	45,48
Bulgaria				
Truck	Lorry, >32t, EURO5	1646,12	0,0226 l/tkm	37,20

- Demolition (C1)

No process and impacts are attributed to glass fibre in the demolition stage. It is considered that all demolition processes and the impacts are attributed to constructions in which glass fibre products are used and not the glass fibre products themselves.

- Transport (C2)

Average waste transportation for 50 km by municipal waste collection truck is assumed.

- Waste processing (C3)

It is assumed that in this waste processing phase no special procedures are performed for glass fibre waste.

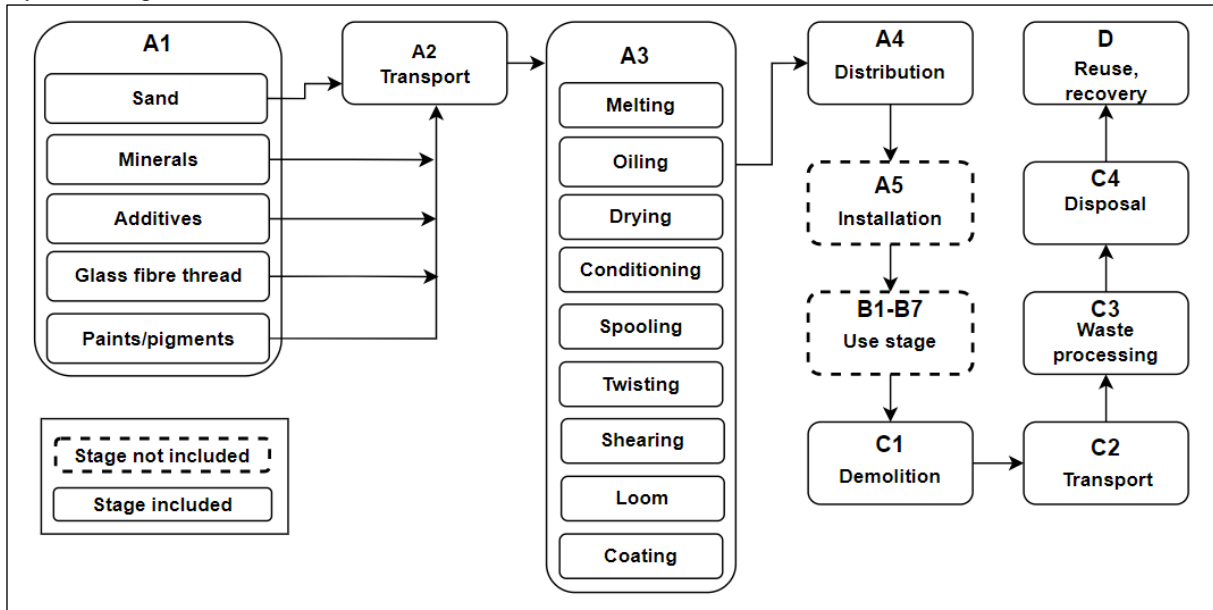
- Disposal (C4)

It is assumed that all of glass fibre waste are disposed in landfill.

- Reuse, recovery, recycling, potential (D)

Based on the information presented in module C4, all glass fibre waste is disposed of. This assumption was made based on a research article (Gonçalves et al., 2022) and two review articles (Karuppanan Gopalraj & Kärki, 2020; May et al., 2021). The authors of these articles describe possible ways of glass fibre recycling but don't provide information about countries or volumes that are recycled globally.

System diagram:



More information: Electricity, waste and ancillary materials in production are calculated as an average weight per produced tonne of all products using yearly production data and the rate for 2021. For manufacturing processes, the specific country mix of electricity is considered. For secondary data on materials' flow information has been gathered from the Ecoinvent 3.8. database. In addition, the allocation is made following the provisions of PCR 2019:14 Construction products (EN 15804:A2) (1.2.4). The recycling process and transportation of the material is considered in this analysis. The polluter pays and modularity principles are followed. The processes excluded from analysis are environmental impacts from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process and personnel-related impacts.

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation:

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	x	x	x	x	ND	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x
Geography	GLO	GLO	LV	GLO	ND	ND	ND	ND	ND	ND	ND	ND	GLO	GLO	GLO	GLO	GLO
Specific data used	> 90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	E-glass netting with aleno weave					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	No data declared					-	-	-	-	-	-	-	-	-	-	-	-

More information: Note that ND stands for “Not Declared” as reported by EN 15804:2012+A2:2019.

Content information

Data refer to the declared unit of product.

Product components	Weight, %	Post-consumer material, weight-%	Renewable material, weight-%
Glass fibre	66%	0%	0%
Coating and colour	34%	0%	0%
TOTAL	100%	0%	0%

The product does not contain any REACH SVHC substances in amounts greater than 1%.

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804:2012+A2:2019

Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	1,09 E+03	5,68 E+02	1,59 E+01	1,47 E+02	0,00 E+00	6,39 E+01	0,00 E+00	8,45 E+00	0,00 E+00
GWP-fossil	kg CO ₂ eq.	1,08 E+03	5,67 E+02	7,10 E+01	1,47 E+02	0,00 E+00	6,39 E+01	0,00 E+00	8,41 E+00	0,00 E+00
GWP-biogenic	kg CO ₂ eq.	7,07 E+00	5,02 E-01	-5,56 E+01	1,39 E-01	0,00 E+00	1,96 E-02	0,00 E+00	1,42 E-02	0,00 E+00
GWP-luluc	kg CO ₂ eq.	7,35 E+00	2,25 E-01	4,55 E-01	5,60 E-02	0,00 E+00	7,02 E-03	0,00 E+00	2,56 E-02	0,00 E+00
ODP	kg CFC 11 eq.	3,40 E-04	1,31 E-04	6,33 E-06	3,48 E-05	0,00 E+00	1,39 E-05	0,00 E+00	2,74 E-06	0,00 E+00
AP	mol H ⁺ eq.	7,48 E+00	2,57 E+00	8,10 E-01	8,90 E-01	0,00 E+00	4,04 E-01	0,00 E+00	6,91 E-02	0,00 E+00
EP-freshwater	kg PO ₄ ³⁻ eq.	3,83 E-01	1,10 E-01	9,29 E-02	2,69 E-02	0,00 E+00	3,47 E-03	0,00 E+00	2,45 E-03	0,00 E+00
EP-freshwater	kg P eq.	1,27 E-01	3,63 E-02	3,07 E-02	8,89 E-03	0,00 E+00	1,14 E-03	0,00 E+00	8,09 E-04	0,00 E+00
EP-marine	kg N eq.	1,67 E+00	7,58 E-01	4,36 E-01	2,54 E-01	0,00 E+00	1,62 E-01	0,00 E+00	2,43 E-02	0,00 E+00
EP-terrestrial	mol N eq.	1,73 E+01	8,30 E+00	2,22 E+00	2,79 E+00	0,00 E+00	1,78 E+00	0,00 E+00	2,65 E-01	0,00 E+00
POCP	kg NMVOC eq.	5,36 E+00	2,50 E+00	1,19 E+00	8,42 E-01	0,00 E+00	6,28 E-01	0,00 E+00	7,66 E-02	0,00 E+00
ADP-minerals&metals*	kg Sb eq.	4,63 E-03	1,95 E-03	3,46 E-04	3,28 E-04	0,00 E+00	5,57 E-05	0,00 E+00	2,32 E-05	0,00 E+00
ADP-fossil*	MJ	2,88 E+04	8,56 E+03	1,32 E+03	2,27 E+03	0,00 E+00	8,70 E+02	0,00 E+00	1,93 E+02	0,00 E+00
WDP	m ³	9,36 E+02	2,55 E+01	3,76 E+01	7,59 E+00	0,00 E+00	7,84 E-01	0,00 E+00	6,83 E+00	0,00 E+00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption									

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Global warming potential - GHG

Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
GWP-GHG	kg CO ₂ eq.	1,09 E+03	5,68 E+02	1,59 E+01	1,47 E+02	0,00 E+00	6,39 E+01	0,00 E+00	8,45 E+00	0,00 E+00
Acronyms	GWP-GHG = Global Warming Potential, Green House Gases emissions.									

Potential environmental impact – additional mandatory and voluntary indicators

Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
PM	Disease inc.	1,05 E-04	4,84 E-05	1,33 E-05	1,65 E-05	0,00 E+00	9,01 E-06	0,00 E+00	1,36 E-06	0,00 E+00
IRP	kBq U-235 eq	3,70 E+01	4,39 E+01	1,82 E+01	1,14 E+01	0,00 E+00	3,89 E+00	0,00 E+00	8,78 E-01	0,00 E+00
ETP-fw	CTUe	1,62 E+04	6,66 E+03	1,77 E+03	1,75 E+03	0,00 E+00	4,88 E+02	0,00 E+00	1,36 E+02	0,00 E+00
HTP-c	CTUh	4,91 E-07	2,19 E-07	4,57 E-08	5,18 E-08	0,00 E+00	8,74 E-09	0,00 E+00	4,13 E-09	0,00 E+00
HTP-nc	CTUh	3,31 E-05	6,97 E-06	1,17 E-06	1,89 E-06	0,00 E+00	3,32 E-07	0,00 E+00	1,05 E-07	0,00 E+00
SQP	Pt	2,40 E+03	5,81 E+03	6,66 E+03	2,47 E+03	0,00 E+00	1,52 E+02	0,00 E+00	3,49 E+02	0,00 E+00
Acronyms	PM = Potential incidence of disease due to PM emissions; IRP = Potential Human exposure efficiency relative to U235; ETP-fw= Potential Comparative Toxic Unit for ecosystems; HTP-c = Potential Comparative Toxic Unit for humans; HTP-nc = Potential Comparative Toxic Unit for humans; SQP = Potential Soil quality index									

Use of resources

Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
PERE	MJ	2,20 E+02	8,98 E+01	1,06 E+02	2,16 E+01	0,00 E+00	2,40 E+00	0,00 E+00	1,43 E+00	0,00 E+00
PERM	MJ	2,14 E+02	3,00 E+01	1,21 E+03	6,39 E+00	0,00 E+00	9,90 E-01	0,00 E+00	8,25 E-01	0,00 E+00
PERT	MJ	4,34 E+02	1,20 E+02	1,31 E+03	2,80 E+01	0,00 E+00	3,39 E+00	0,00 E+00	2,25 E+00	0,00 E+00
PENRE	MJ	2,88 E+04	8,56 E+03	1,32 E+03	2,27 E+03	0,00 E+00	8,70 E+02	0,00 E+00	1,93 E+02	0,00 E+00
PENRM	MJ	8,75 E+00	3,58 E-01	4,34 E-01	1,10 E-01	0,00 E+00	1,24 E-02	0,00 E+00	1,62 E-01	0,00 E+00
PENRT	MJ	2,88 E+04	8,56 E+03	1,32 E+03	2,27 E+03	0,00 E+00	8,70 E+02	0,00 E+00	1,93 E+02	0,00 E+00
SM	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
RSF	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
NRSF	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
FW	m ³	2,31 E+01	9,47 E-01	1,26 E+00	2,62 E-01	0,00 E+00	3,23 E-02	0,00 E+00	1,65 E-01	0,00 E+00
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water									

Waste production and output flows

Waste production

Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	3,47 E-01	2,21 E-02	2,01 E-03	5,30 E-03	0,00 E+00	2,34 E-03	0,00 E+00	3,43 E-04	0,00 E+00
Non-hazardous waste disposed	kg	4,55 E+01	4,34 E+02	2,30 E+02	2,01 E+02	0,00 E+00	4,42 E+00	0,00 E+00	1,00 E+03	0,00 E+00
Radioactive waste disposed	kg	1,27 E-02	5,79 E-02	5,71 E-03	1,54 E-02	0,00 E+00	6,14 E-03	0,00 E+00	1,26 E-03	0,00 E+00

Output flows

Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
Material for recycling	kg	0,00 E+00	0,00 E+00	8,06 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
Material for energy recovery	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
Exported energy	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00

Information on biogenic carbon content

Results per functional or declared unit		
BIOGENIC CARBON CONTENT	Unit	QUANTITY
Biogenic carbon content in product	kg C	0,00 E+00
Biogenic carbon content in packaging	kg C	7,47 E-01

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂.

To obtain the results in accordance with the provisions of EN 15804:2012+A2:2019, the “EF method”, “EDIP”, “CED” and “IPCC” methodologies have been used for environmental impacts, waste generation, energy consumption and biogenic carbon content respectively.

Information related to the EPD sector

This EPD® is individual.

References

- EN 15804:2012+A2:2019. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- General Programme Instructions of the International EPD® System. Version 3.01
- ISO 14025:2006. Environmental labels and declarations — Type III environmental declarations — Principles and procedures
- ISO 14040:2006. Environmental management – Life cycle assessment – Principles and framework
- ISO 14044:2006. Environmental management – Life cycle assessment – Requirements and guidelines
- LCA software SimaPro 9.3
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