wienerberger

Environmental Product Declaration

EPD of multiple products, based on the average results of the product group. In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Lintel and beam products

from

Wienerberger Téglaipari zRt.

PROGRAMME INFORMATION

Programme: The International EPD® System, www.environdec.com
Programme operator: EPD International AB
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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

EPD®
THE INTERNATIONAL EPD® SYSTEM

ECO PLATFORM EPD VERIFIED

GENERAL INFORMATION

PROGRAMME INFORMATION

Programme: The International EPD® System

Address: EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden

Website: www.environdec.com

E-mail: info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification

PRODUCT CATEGORY RULES (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product Category Rules (PCR): PCR 2019:14 v1.3.2, Construction products

PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.

Life Cycle Assessment (LCA)

LCA accountability: denkstatt Hungary Kft.
LCA practitioners: Csongor Bajnóczki and Csaba Fűzfa

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

☒ EPD verification by individual verifier

Third-party verifier: Anni Oviir, Rangi Maja OÜ

Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third party verifier:

☐ Yes ☒ No

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

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: Wienerberger Téglaipari zRt.

Contact

Postal address: 1119 Budapest, Bártfai utca 34.

Phone: +36 1 464 7030

Email: info@wienerberger.hu

Description of the organisation

Wienerberger Téglaipari zRt. Hungary is a member of the international company Wienerberger AG. The parent company was founded in Vienna in 1819, which has now grown into one of the largest ceramic block manufacturers in the world, is in first place in the production of facing bricks and occupies a leading position in the production of ceramic roof tiles in Europe. Next to the ceramic base products Wienerberger AG and its subsidiary companies produce concrete and plastic building materials for different puposes of use (paving, pipes, etc.) as well. From the company's 9 manufacturing plants 1 produces lintels and beam under the brand Porotherm. The plant is situated in Kőszeg covering all parts of Hungary and other countries across Europe.

Product-related or management system-related certifications

- ISO 9001: 2015

- ISO 14001: 2015

- ISO 45001: 2018

- ISO 50001: 2018

Name and location of production site(s)

Kőszeg, Hungary

Product information

Product name, product identification, and product description

Product Description

The Porotherm lintels are ancillary components for masonry. All types of Porotherm lintels can be used in load-bearing and non-loadbearing masonry, above windows or doors or free openings. Porotherm Beam is a precast concrete product for beam-and-block floor systems to create a half monolithic floor system. After installing the beams and blocks system it must be completed with a reinforced on-site concrete layer in order to create a structurally whole floor system.

Lintel

Prestressed reinforced concrete lintels with ceramic shells, i.e. lintels that have a trough-shaped ceramic shell which is filled with concrete and prestressed wires. By using the lintels, a monolithic ceramic surface can be created in the masonry thus simplifying the plastering. Only exception is Vibraton products where the precast shell is made of concrete as well (the concrete shell is made with a mixture containing brick chips). Lintels suitable for the construction of composite lintel structures are: Porotherm Thermo, Porotherm A-12, Porotherm A-10 neo, Porotherm Sturz 14,2, Porotherm Sturz, Vibraton-Sturz 12/6,5, Vibraton-Sturz9/6,5, Porotherm 20/6,5.
Lintel suitable for construction as a single lintel (as well) structure without any additional reinforcing element above: Porotherm M-25.

Floor System

Porotherm floor system is a half monolithic solution, to create a ceramic surface slab from pre-manufactured beams and blocks and on-site reinforced concrete.
Porotherm Beam is a prestressed reinforced concrete precast beam with ceramic shells.

UN CPC code: 375

Geographical scope: Hungary

LCA information

Declared unit: 1 running meter (16,29 kg)

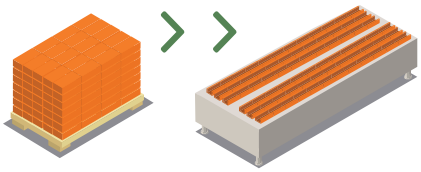
Declared products: Porotherm M-25 lintel, Porotherm Thermo lintel, Porotherm A-12 lintel, Porotherm A-10 neo lintel, PTH Sturz 14,2, PTH-Sturz, Vibraton Sturz 12/6,5, Vibraton Sturz 9/6,5, PTH 20/6,5, Porotherm Beam products manufactured at Kőszeg, Hungary

Reference service life: 150 years
Time representativeness: 2022
Database(s) and LCA software used: ecoinvent 3.9.1 (the EN 15804 reference package based on EF 3.1 has been used) and Microsoft Excel
Description of system boundaries: Cradle to gate with modules A5, C1–C4, and module D (A1–A3 + A5 + C + D)
Energy in the manufacturing phase: Electricity information and CO_2 emission, kg CO_2-eq./kWh (GWP-GHG): electricity, low voltage, residual mix // HU, electricity, low voltage (Ecoinvent 3.9.1): 0,39 kg CO_2-eq./kWh.

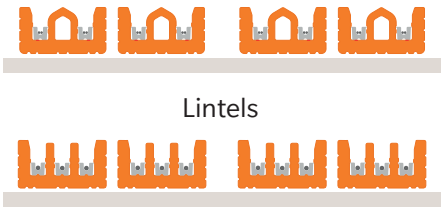
Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Manufacturing of product	Collected data	EPD owner	2022	Primary	10,9%
Generation of electricity used in manufacturing of product	Database	Ecoinvent 3.9.1	2022	Primary	6,2%
Materials	Database	Ecoinvent 3.9.1	2022	Representative generic data	0%
Transportation	Database	Ecoinvent 3.9.1	2022	Primary	2,7%
Direct process emissions	Collected data	EPD owner	2022	Primary	21,6%
Other processes	Database	Ecoinvent 3.9.1	2022	Representative generic data	0%
Total share of primary data, of GWP-GHG results for A1-A3					**41,4%**

MANUFACTURING PROCESS DIAGRAM

1. Racking of U-shaped masonry units to 120 m long work benches



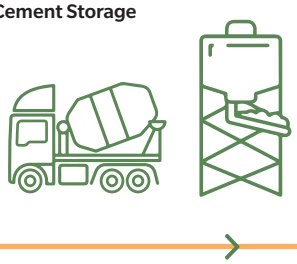
2. Inserting of Spacers and Steel wires



3. Prestressing of the wires

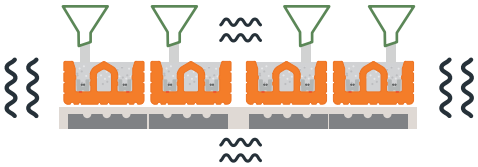
4. Aggregates Storage (sand and stone pulp)

5. Cement Storage

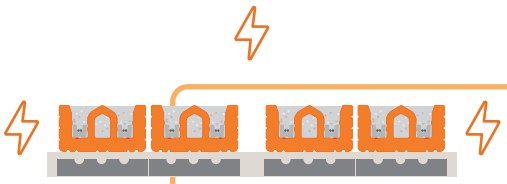


6. Fresh Concrete production at Mixing centre

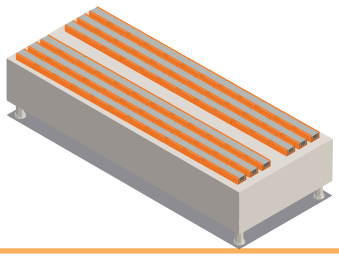
7. Fresh Concrete placement. Concrete pouring and vibration



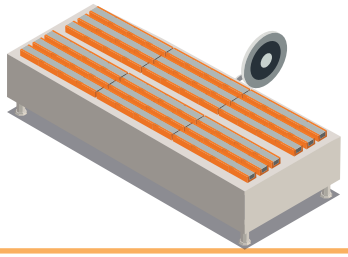
8. Heat curing



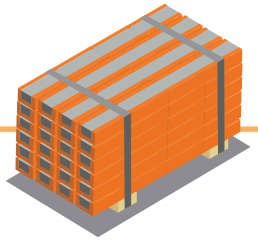
9. Concrete hardening



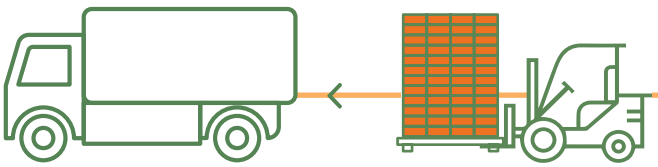
10. Cutting



11. Packaging and storage



12. Transportation



Manufacturing process

0. Lintels are made of ceramic shell elements, prestressed steel wires and concrete. The production of shell elements is the same as the production of bricks.

1. After firing the ceramic shells, the ceramic shells are placed on 120 m long production benches in the lintel factory.

2. High-strength tension wires are then placed inside the shells using plastic spacers to ensure the correct positions of the wires.

3. The steel wires are prestressed along the entire 120 m length.

4-6. After the grooves of the ceramic shells are poured with concrete of a certain quality.

7. In order to cure the concrete faster, the post-treatment is done by heat aging: the prestressed wires are heated by electricity.

8. After the concrete solidifies, the tension of the wires is released, and the tension force is released on the lintel/ beam.

9. Finally, on the production bench, the product is cut to the desired length with a special cutting machine.

10-11. The lintels are packed on wooden planks with strapping.

More information

Detailed information on the products can be found at https://www.wienerberger.hu/. The underlying LCA study was carried out by denkstatt Hungary Kft.
(contact: denkstatt@denkstatt.hu).

Data quality

ISO 14044 was applied in terms of data collection and quality requirements. The data concerning the modules A1 (raw material supply), A2 (transportation) and A3 (product manufacturing) were provided by Wienerberger Téglaipari zRt. and involved all input and output materials to the plants, the consumed utilities (energy, water) and the distances and means of transport for each input stream. Data reliability is considered very good for energy consumption, material inputs, material outputs, transportation, and waste management. Proxy had to be applied for an additive, because the ecoinvent 3.9.1 database does not contain such data; after researching the material and the available information in ecoinvent 3.9.1, it was deemed that propylene glycol production, liquid was the most similar activity to substitute the ingredient and its environmental impacts.

Allocation

ISO 14040 defines the allocation as "partitioning the input or output flow of a unit process to the product system under study". Allocation was done to identify the associated quantity of flows that are common for the factory: electricity and petrol used for logistic purposes, product specific data (e.g., material inputs), transportation and use of packaging materials (EUR-pallets), water usage, and the delivery kilometres of the common ingredients. Allocation is based on product volume, mass (kg), because there is a linear correlation between energy demand and weight mass of materials (product volume) and the inputs and outputs were provided in mass (kg).

Justification behind the grouping of products

the products included in this EPD are all lintel elements with the same ingredients used in similar ratios used for similar purposes. The manufacturing steps and equipment used to make these products are also the same.

Cut-off rules

According to the PCR and EN 15804, not more than 5% of the incoming flows (by mass and energy) per module can be excluded. Data is provided for all inputs and outputs to the factory processes, and they are accounted in the model in full. Materials and processes with negligible contributions (less than 1%) are also included. For processes after the production stage, relevant scenarios are assumed regarding geographical scope and existent practices, e.g., for waste treatment options. Where site-specific data was missing, it was modelled with generic datasets from the Ecoinvent 3.9.1 database. Construction of buildings, machines and other equipment or infrastructure and consumption related to offices are not included as they do not have a direct relation to the production process.

Technical characteristics based on MSZ EN 845-2:2013+A1:2016:

Unit	Width mm	Weight kg/m	Surface mass (per unit surface) kg/m²	Min./max. open span m	Fire resistance class Class
Porotherm M-25	65	34,3	144	0,5-3,25	A1
Porotherm Thermo	120	14	215	0,5-3	A1
Porotherm A-12	120	14	215	0,5-2,75	A1
Porotherm A-10 neo	100	12,7	195,4	0,5-3	A1
Porotherm Sturz 14,2	120	26,5	187	0,5-3,25	A1
Porotherm Sturz	90	10,5	162	0,5-2,75	A1
Vibraton Sturz 12/6,5	120	16,5	254	0,5-3,75	A1
Vibraton Sturz 9/6,5	90	12,5	192	0,5-3,75	A1
Porotherm 20/6,5	200	28,4	438	0,5-2,75	A1

Unit	Width mm	Weight kg/m	Min./max. open span m	Fire resistance class Class
Porotherm beam	120	16	2,25-7,75	A1

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

	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	ND	x	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x
Geography	EU	EU	HU	N/A	EU	N/A	N/A	N/A	N/A	N/A	N/A	N/A	EU	EU	EU	EU	EU
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products[1]	-26/+95%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products[2]	0,01-67,5%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	>0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

[1] In an EPD of multiple products, the difference (in %) between the declared GWP-GHG result, and the product with GWP-GHG results furthest away from the declared results shall be reported in the EPD. If the difference is below 10%, the actual difference or "<10%" shall be reported. Optionally, this variation can instead be declared as the difference between the declared result and lowest and highest result, respectively.

[2] If the EPD does not claim compliance with ISO 21930, variations above 10% are allowed, if justified in the LCA report and the EPD declares the variation of each impact indicator results for which the variation is above 10%.

Variation - products[3]

Unit	AP	GWP-t	GWP-b	GWP-f	GWP-l	ADP-f	EP-f	EP-m	EP-t	ADP-m&m	ODP	POCP	WDP
PTH M-25	0,0%	0,7%	0,0%	0,5%	1,0%	0,0%	0,0%	0,1%	0,1%	0,6%	1,6%	0,0%	0,0%
PTH Thermo	0,1%	0,3%	28,1%	0,1%	3,8%	0,1%	1,2%	0,0%	0,0%	0,9%	1,0%	0,1%	1,9%
PTH A-12	0,0%	0,2%	28,4%	0,1%	3,9%	0,0%	1,2%	0,0%	0,0%	0,9%	1,0%	0,1%	1,9%
PTH A-10 neo	0,0%	0,1%	34,4%	0,0%	4,4%	0,0%	1,3%	0,0%	0,0%	0,7%	0,0%	0,1%	1,8%
PTH 14,2	0,1%	0,0%	51,1%	0,1%	0,0%	0,1%	1,5%	0,1%	0,1%	0,0%	0,2%	0,2%	0,5%
PTH Sturz	0,2%	0,1%	45,0%	0,1%	5,9%	0,2%	2,3%	0,1%	0,1%	1,2%	0,6%	0,2%	3,4%
Vibraton 12	2,2%	3,7%	67,0%	3,8%	6,7%	2,2%	4,2%	1,8%	2,1%	2,1%	3,3%	1,8%	5,3%
Vibraton 9	2,3%	3,9%	67,5%	4,0%	8,4%	2,2%	5,5%	1,9%	2,2%	2,5%	2,3%	2,0%	6,7%
PTH 20/6,5	0,6%	47,4%	16,3%	47,1%	5,8%	0,5%	3,2%	0,5%	0,5%	1,6%	1,8%	0,5%	4,6%
Porotherm Beam	1,1%	2,0%	57,8%	2,2%	5,6%	0,7%	3,8%	0,9%	0,9%	2,2%	1,0%	0,8%	4,3%

Content information per functional unit

Product components	Weight kg	Post-consumer material weight-%	Biogenic material weight-% and kg C/kg
Sand	7-10	0	0
Additive	<0,05	0	0
Steel wire	<0,25	0	0
Brick rubble	<0,10	0	0
Cement	<2	0	0
Yellow clay	6-9	0	0
Water	<1	0	0
TOTAL	16,29	0	0

Packaging materials	Weight kg	Weight % (versus the product)	Weight biogenic carbon kg C/kg
Wooden planks	0,0069	0,0426%	0,45
Plastic foil	0,0001	0,0004%	0
Plastic band	0,0016	0,0096%	0
TOTAL	0,01	0,0526%	0,44

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2

[3] If the EPD does not claim compliance with ISO 21930, variations above 10% are allowed, if justified in the LCA report and the EPD declares

RESULTS OF THE ENVIRONMENTAL PERFORMANCE INDICATORS

Mandatory impact category indicators according to EN 15804

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	3,04E+00	1,38E-01	9,89E-02	1,35E+00	5,69E-02	6,87E-02	-1,79E-01
GWP-biogenic	kg CO_2 eq.	-2,07E-01	2,26E-01	2,13E-05	1,12E-03	8,82E-04	3,60E-05	-2,51E-04
GWP-luluc	kg CO_2 eq.	2,53E-03	1,14E-04	1,11E-05	7,95E-04	9,32E-05	4,15E-05	-7,15E-05
GWP-total	kg CO_2 eq.	2,85E+00	1,40E-01	9,89E-02	1,35E+00	5,78E-02	6,88E-02	-1,80E-01
ODP	kg CFC 11 eq.	7,00E-08	6,61E-09	1,57E-09	2,96E-08	1,36E-09	1,99E-09	-3,45E-09
AP	mol H^+ eq.	7,79E-03	1,60E-03	9,16E-04	5,24E-03	2,96E-04	5,18E-04	-7,97E-04
EP-freshwater	kg P eq.	4,68E-04	4,79E-05	3,03E-06	1,15E-04	3,33E-05	5,72E-06	-8,02E-05
EP-marine	kg N eq.	2,04E-03	1,33E-04	4,25E-04	1,91E-03	6,03E-05	1,99E-04	-1,96E-04
EP-terrestrial	mol N eq.	2,41E-02	1,31E-03	4,62E-03	2,04E-02	6,00E-04	2,13E-03	-2,22E-03
POCP	kg NMVOC eq.	7,74E-03	5,64E-04	1,37E-03	7,48E-03	2,43E-04	7,41E-04	-9,74E-04
ADP-minerals & metals*	kg Sb eq.	1,25E-05	1,31E-06	3,46E-08	6,08E-06	6,41E-07	9,68E-08	-1,83E-06
ADP-fossil*	MJ	2,38E+01	2,39E+00	1,30E+00	1,92E+01	1,28E+00	1,72E+00	-1,87E+00
WDP*	m^3	5,97E-01	1,27E-01	3,22E-03	1,09E-01	1,82E-02	5,36E-03	-1,13E-01

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.*

*** Disclaimer: The information provided by modules A1-A3 is intended for informational purposes only. While these modules may yield valuable insights, it is crucial to consider the results from module C in conjunction with them.*

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[4]	kg CO_2 eq.	2,46E+00	1,38E-01	9,89E-02	1,35E+00	5,70E-02	6,87E-02	-1,80E-01

Resource use indicators

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	7,94E+00	1,98E-01	7,34E-03	4,15E-01	1,34E-01	1,45E-02	-1,44E-01
PERM	MJ	2,23E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-4,73E-02	0,00E+00
PERT	MJ	1,02E+01	1,98E-01	0,00E+00	4,15E-01	1,34E-01	-3,28E-02	-1,44E-01
PENRE	MJ	2,21E+01	1,50E+00	1,30E+00	1,92E+01	1,28E+00	1,72E+00	-1,87E+00
PENRM	MJ	8,63E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-6,50E-01	0,00E+00
PENRT	MJ	2,29E+01	1,50E+00	0,00E+00	1,92E+01	1,28E+00	1,08E+00	0,00E+00
SM	kg	2,80E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,84E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	5,97E-01	1,27E-01	3,22E-03	1,09E-01	1,82E-02	5,36E-03	-1,13E-01

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

[4] *This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.*

Waste indicators

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	9,83E-02	7,77E-03	6,00E-04	1,44E-02	1,85E-03	8,28E-04	-3,30E-02
Non-hazardous waste disposed	kg	1,91E+00	3,47E-01	1,20E-02	5,10E-01	1,33E-01	2,48E-02	-2,95E-01
Radioactive waste disposed	kg	6,16E-05	4,12E-06	1,42E-07	9,39E-06	4,02E-06	2,53E-07	-1,40E-06

Output flow indicators

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,84E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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