ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/ AC:2021 for:

CEM II 42.5 N/B-V

The declaration is an average of 2 package sizes - 25 kg and 50 kg based on worst-case results

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 of multiple products, based on the average results of the product group.

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
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804:2012+A2:2019/AC:2021 serves as the Core Product Category Rules (PCR) and c-PCR-001 Cement and building lime (EN 16908) (2024-04-30)
Product Category Rules (PCR): 2019:14, Construction products, version 1.3.4, UN CPC 375
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 at www.environdec.com/contact.
Life Cycle Assessment (LCA)
LCA accountability: Shai Ben Aharon, KVS
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: Samara Costa PIEP https://www.piep.pt/ 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 15804:2012+A2:2019/AC:2021, 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 characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804:2012+A2:2019/AC:2021 and ISO 14025:2006

COMPANY INFORMATION

Owner of the EPD: Ciment I.S.

Description of the organisation: Ciment, a subsidiary of Israel Shipyards Group, is an importer of cement in the Israeli market. Ciment accounts with Israel's first private port, strong partnerships with leading global cement corporations, extraordinary technology, four fully owned designated cement ship, a modern fleet of trucks, and a superior product. It produces a variety of cement products for the construction industry including the following cement – CEM II 42.5 N/B-V, which is produced in Haifa, Israel.

Name and location of production site(s): Ciment manufacturing site is located in Haifa, Israel.

PRODUCT INFORMATION

Product name: CEM II 42.5 N/B-V.
Product identification: Cement.
Product description:

Portland cement with suspended fly ash is suitable for ready-mix concrete and concrete products. The product is based on Portland cement mixed with cementous products.

CEM II 42.5 N/B-V

Specifications:

Name of Product	CEM II 42.5 N/B-V
Comprehensive Strength 2 days [MPa]	≥ 10
Comprehensive Strength 28 days [MPa]	≥ 42.5 ≤ 62.5
SO3 [%] Sulfate content	≤ 3.5
Soluble chromium Cr+6 [mg/kg]	≤ 2
Chloride content Cl [%]	≤ 0.10
Initial setting time [min]	≥ 60
Soundness [mm]	≤ 10

Product test standard:
The products comply with the Israeli standard IS 1, and the European Standard EN 197-1.

Geographical scope: The study represents the manufacturing of cement in Ciment manufacturing facility in Haifa, Israel. Modules A4, A5, and the end-of-life scenario of the products are application, demolishment, and recycling in Israel, according to market research that was conducted.

LCA INFORMATION

Declared unit: 1 tonne of product.

Reference service life: : RSL is not specified in the c-PCR therefore it is not specified in the LCA/EPD.

Time Representativeness: The time coverage of the LCA's data is from January 2023 to December 2023.

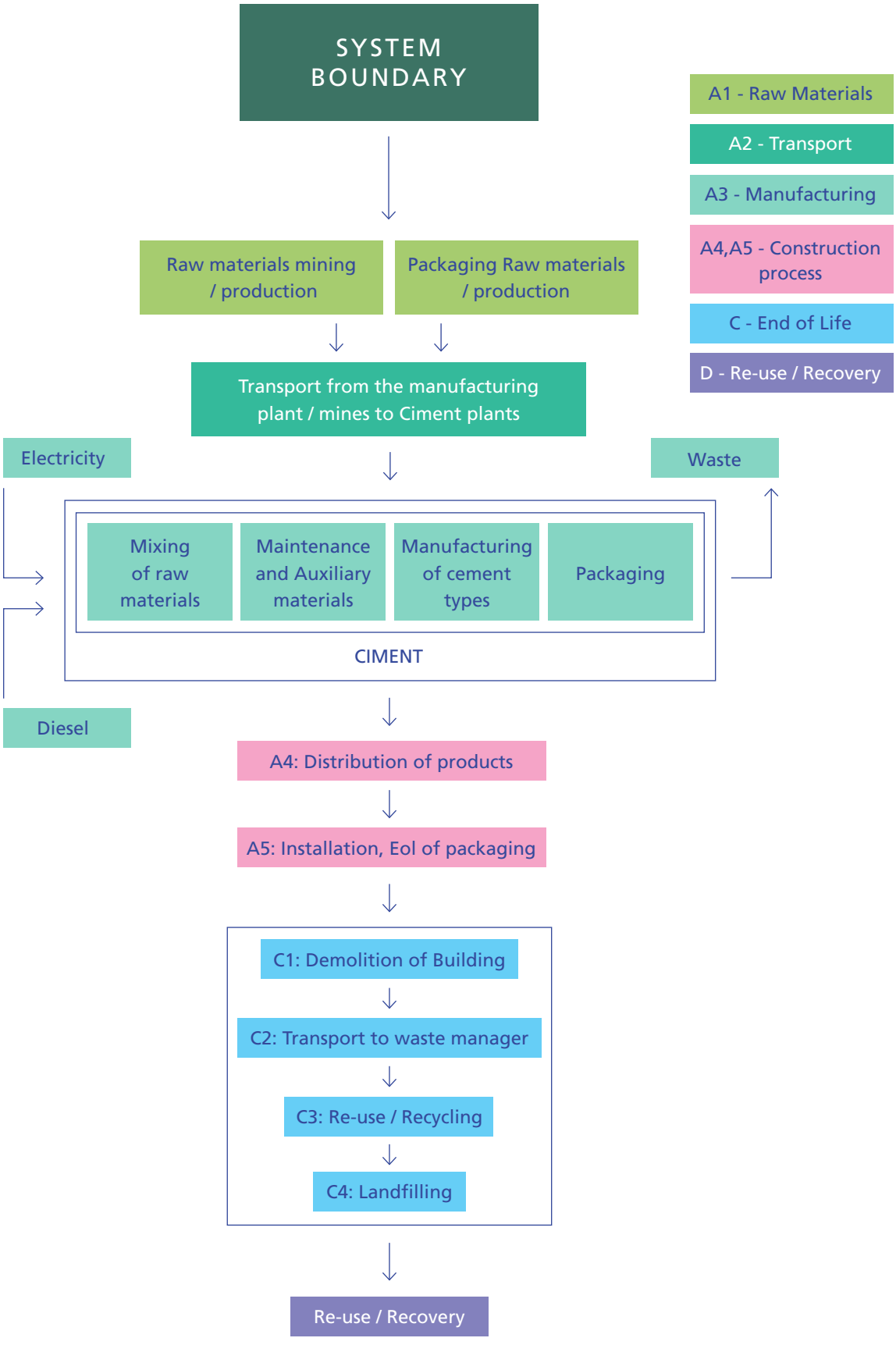
Database(s) and LCA software used: The software used is SimaPro, Analyst 9.6.0.1. The database used is the Ecoinvent database v3.10 (2024) using the cut-off by classification approach.

Description of system boundaries:
Cradle to gate with options A4, A5, C1–C4 and module D (A1–A5 + C + D).

Electricity grid CO_2 coeffientnet: the CO_2 coefficient of the electricity grid is 0.6 kg CO_2-eq/kWh (2022) based on the renewable and non-renewable fuel sources in Israel.

Name and contact information of the LCA practitioner: Shai Ben Aharon shai@kvs.co.il of KVS.

SYSTEM DIAGRAM:



MANUFACTURER'S CONTACT INFORMATION:

Address: Julius Simon St 53, Haifa Shipyards, Israel.
Phone Number: +972- 04-8460570
Email: contact@ciment.co.il
Website: www.ciment.co.il

Assumptions:

a) It was assumed a similar energy per kg product consumed for all products in the same production line.
b) Assumptions were made regarding the transportation for all materials required for manufacturing and packaging the product. The calculation was distance-based.
c) The packaging per declared unit was calculated as the relative weight of packaging per declared unit of product.
d) The primary energy of raw materials was calculated for all renewable and non-renewable raw materials that had LHV value sources. Therefore, materials without available LHV sources found, were not included in the calculations.
e) Assumptions regarding the end-of-life stage were made as mentioned in page 9 for modules C1-C4.
f) Infrastructure and capital goods were not taken into account in the primary data as the were assumed to be neglected and it is a common practice in LCA studies of similar products. In addition, it was included in the background database.

Allocations: In this study, as per EN 15804:2012+A2:2019/AC:2021, allocation is conducted in the following order:

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

Overall and in general, allocations were avoided whenever possible. Nevertheless, allocations were made in the general energy usage.

Allocation used in Ecoinvent 3.10 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of the EN 15804:2012+A2:2019/AC:2021 standard.

Cut-off rules: The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019/AC:2021 and the applied PCR 2019:14 Construction products (version 1.3.4) of the International EPD® System. The study does not exclude any hazardous materials or substances. The study includes all major raw materials and energy consumption. All inputs and outputs of the unit processes with available data are included in the calculation. There is no neglected unit process of more than 1% of total mass or energy flows, and in fact components with a share of even less than 1% are included.

Background Database: The EPD is based on the primary production data of Ciment. The background database is Ecoinvent database v3.10 (2024). Since there are several missing datasets for Israel, background data for larger areas in which Israel is included in was used for a small part of the life cycle inventory. The electricity mix of the high voltage electricity grid according to 2022 data is given by a formal report from the ministry of energy in Israel and the water grid is modeled according to the water sources in Israel.

The electricity mix of high voltage electricity grid according to 2022 data is given by a formal report from the Israel Electricity Authority, and is as follows: 22% of hard coal, 68% of natural gas, 0.27% of oil and 9.75% of renewable and other.

The water grid is modeled according to the water sources in Israel, Meron et al (2020).

ELECTRICITY MIX (2022)	kg CO_2eq./kWh (GWP-GHG)
Israel's electricity grid – 100%	0.6

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	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	IL EUR Global	IL EUR Global	IL	IL	IL	ND	ND	ND	ND	ND	ND	ND	IL	IL	IL	IL	IL
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-products	<5%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

PROCESS	Data quality	Source	Year	Share of primary data %, of GWP-GHG. Results for A1–A3
Production of cement	Collected data	EPD from supplier	2023	96
Production of ash	Collected data	EPD from supplier	2023	0
Production of ferrous sulfate	Collected data	EPD owner	2023	0
Production of packaging	Collected data	EPD owner	2023	1
Transport of raw materials to the manufacturing site	Collected data	EPD owner	2023	3
Manufacturing of the product	Collected data	EPD owner	2023	0
Generation of electricity used in manufacturing product	Database	Israel Electricity Authority	2022	0

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that do not capture all relevant aspects of data quality. The indicator is not comparable across product categories.

All the modules described below were modeled and calculated specifically for each manufacturing site:

PRODUCT STAGE (A1-A3):

MODULE A1 – Raw materials supply: The declared cement product consists of the mining and processing of raw materials, the extraction and processing of materials. The cements are produced in several plants in nearby countries. Other raw materials and the packaging are also included in this module.

MODULE A2 – Transport: The cements and other raw materials are produced locally and abroad in nearby countries. Accordingly, transport distances are short and done by ships and trucks. Further raw materials are supplied from manufacturers within Israel or other European countries.

MODULE A3 – Manufacturing: The manufacturing includes mixing of cement with additional raw materials and additives according to the relevant recipes of each product. The end products are packaged into paper sack packaging and compiled on wooden pallets or loaded directly to silo trucks. Electricity is consumed during the manufacturing process, in addition to maintenance procedures.

Construction process stage (A4-A5):

MODULE A4 – Transport: Transportation distance of distribution is estimated as 80 km by a 16-32 tonnes lorry, and with empty return which are the most common.

SCENARIO INFORMATION	Unit per functional unit
Vehicle type	Lorry, 16-32 metric tonnes, euro 6 fuel type
Capacity utilization	50% (empty returns)
Distance	80 km

MODULE A5 – Construction installation:

The scenario takes into account manual installation and use of the cement for masonry uses therefore the resources are neglected and the scenario takes into account only the end of life of the paper bags packaging that assumed to be 100% incinerated with energy recovery (RDF).

SCENARIO INFORMATION	Unit per functional unit
Ancillary materials for installation	Neglected
Energy consumption	Neglected
Waste treatment of packaging – municipal incineration	Biogenic packaging – 5.99 E-03 - 6.69E-03 tonne Non biogenic packaging – 0 tonne

End-of-Life stage (C1-C4):

MODULE C1 – De-construction: Demolition of the cement products will take place with the whole demolition of the building/construction. Thus it is assumed that energy used for the demolition of cement has minor significance and the environmental impact of this module is set to be zero.

At the end-of-life, in the demolition phase 100% of the waste is assumed to be collected as mixed construction waste.

MODULE C2 – Transportation: Transportation distance to the closest disposal area is estimated as 50 km by a 16-32 tonnes lorry, which is the most common.

MODULE C3 – Waste processing: According to a report of the Knesset (the Israeli Parliament) from 2022, named "Treatment of Construction Waste in Israel - Data and Points of Discussion" in Hebrew (Page 9, Table 3), and according to interviews with industry executives that manage the construction waste in Israel (GREENMIX), approx. 85% of the mineral construction waste which cement cements are included in are recycled, and about 15% are landfilled. The mineral construction waste is commonly recycled to bedding aggregated products used for infrastructure and thus the dataset was modeled to fit this assumption. For the waste processing, an energy consumption of 0.01 kWh of electricity/kg of waste input was calculated

MODULE C4 – Disposal: 15% of the products will be landfilled

Resource Recovery stage (D):

MODULE D – Reuse-Recovery-Recycling potential: Module D calculates the potential environmental benefits of the recycling or reuse of materials. 85% of the product is assumed to be recycled to bedding aggregated products used for infrastructures of roads, sidewalks, etc. The calculations of this module were according to Annex D in EN 15804:2012+A2:2019/AC:2021.

CONTENT INFORMATION

PRODUCT COMPONENTS	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Cement	70-74	0	0
Ash	20-25	0	0
Additives	0.5-1	0	0
TOTAL	**100**	**0**	**0**
PACKAGING MATERIALS	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon-%**
Paper bag	<0.1	<0.1	<0.1
PE cover	<0.1	0	0
Wooden pallet	<0.1	<0.1	<0.1
TOTAL	<0.1	<0.5	<0.5

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% declared unit
Not present in the product	ND	ND	ND

ENVIRONMENTAL INFORMATION

The EPD represents an average of the worst-case environmental impacts for 1 tonne of the CEM II 42.5 N/B-V product (modules A1-A3, and A4) across two types of packaging: 25 kg, 50 kg.

Potential environmental impact[1],[2] – mandatory indicators according to EN 15804:2012+A2:2019/AC:2021

INDICATOR	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP - total	kg CO_2 eq.	6.44E+02	3.04E+01	1.14E+01	0.00E+00	9.59E+00	5.97E+00	3.35E+00	-1.52E+01
GWP-fossil	kg CO_2 eq.	6.50E+02	3.04E+01	1.70E+00	0.00E+00	9.58E+00	5.98E+00	3.34E+00	-1.52E+01
GWP-biogenic	kg CO_2 eq.	-5.58E+00	2.11E-02	9.64E+00	0.00E+00	2.80E-04	-1.05E-02	2.43E-03	-2.01E-02
GWP - luluc	kg CO_2 eq.	2.51E-01	1.01E-02	4.02E-05	0.00E+00	3.89E-03	3.38E-04	6.90E-03	-5.96E-03
ODP	kg CFC 11 eq.	7.53E-06	6.05E-07	2.17E-09	0.00E+00	1.42E-07	5.76E-08	6.60E-08	-7.24E-07
AP	mol H+ eq.	4.51E-01	6.33E-02	1.56E-03	0.00E+00	2.20E-02	2.96E-02	2.06E-02	-3.81E-02
EP - freshwater	kg P eq.	1.47E-01	2.37E-04	1.98E-06	0.00E+00	8.88E-05	1.40E-04	2.88E-05	-6.93E-05
EP - marine	kg N eq.	1.96E-01	1.48E-02	7.08E-04	0.00E+00	4.96E-03	4.26E-03	8.28E-03	-1.33E-02
EP - terrestrial	mol N eq.	1.18E+00	1.64E-01	7.47E-03	0.00E+00	5.51E-02	4.74E-02	9.04E-02	-1.64E-01
POCP	kg NMVOC eq.	8.57E-01	1.05E-01	1.88E-03	0.00E+00	3.07E-02	1.32E-02	3.02E-02	-7.70E-02
ADP-minerals & metals [3]	kg Sb eq.	2.14E-04	9.89E-05	3.01E-07	0.00E+00	3.13E-05	1.08E-05	7.20E-06	-5.91E-05
ADP-fossil [4]	MJ	2.25E+03	4.28E+02	1.29E+00	0.00E+00	1.35E+02	7.99E+01	5.65E+01	-2.11E+02
WDP [5]	m_3	1.01E+02	1.78E+00	1.26E-01	0.00E+00	6.13E-01	4.42E-01	1.15E+00	-5.57E+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								

* Disclaimers:

[1] When considering the results, one should account all declared modules and not only modules A1-A3.
The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

[2] It is discouraged to use the results of modules A1-A3 (A1-A5 for services) without considering the results of module C.

[3,4,5] 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.

Potential environmental impact – additional mandatory and voluntary indicators

INDICATOR	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG[6]	kg CO_2 eq.	6.50E+02	3.04E+01	1.70E+00	0.00E+00	9.59E+00	5.98E+00	3.35E+00	-1.52E+01

USE OF RESOURCES[7]

INDICATOR	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2.15E+02	7.34E+00	4.41E-02	0.00E+00	1.47E+00	4.27E+00	3.84E-01	-1.33E+00
PERM	MJ	6.03E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.75E+02	7.34E+00	4.41E-02	0.00E+00	1.47E+00	4.27E+00	3.84E-01	-1.33E+00
PENRE	MJ	1.84E+03	3.56E+01	3.02E-01	0.00E+00	1.26E+02	7.81E+01	3.72E+01	-2.00E+02
PENRM	MJ	1.43E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.85E+03	3.56E+01	3.02E-01	0.00E+00	1.26E+02	7.81E+01	3.72E+01	-2.00E+02
SM	kg	2.50E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	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	0.00E+00
FW	m3	2.37E+00	5.92E-02	4.47E-03	0.00E+00	1.45E-02	1.17E-02	2.52E-02	-6.93E-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								

[6] 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 CO2 is set to zero.
[7] The primary energy use indicators were calculated according to the PCR 2019:14 v1.3.4 Annex C option B.

WASTE PRODUCTION AND OUTPUT FLOWS

Waste production

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	3.54E-03	2.88E-03	1.27E-05	0.00E+00	3.32E-04	1.18E-04	7.41E-05	-6.03E-04
Non-hazardous waste disposed	kg	8.54E+00	2.07E+01	1.51E-01	0.00E+00	6.50E+00	3.96E-01	1.50E+02	-9.83E+00
Radioactive waste disposed	kg	7.07E-04	1.38E-04	5.45E-07	0.00E+00	8.20E-04	1.22E-05	2.46E-04	-1.66E-03

Output flows

Indicator	Unit	A1-A3	A4	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	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.50E+02
Materials for energy recovery	kg	0.00E+00	0.00E+00	6.34E+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	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	0.00E+00

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