EPD®
THE INTERNATIONAL EPD® SYSTEM

TERMODAN
Expert's materials

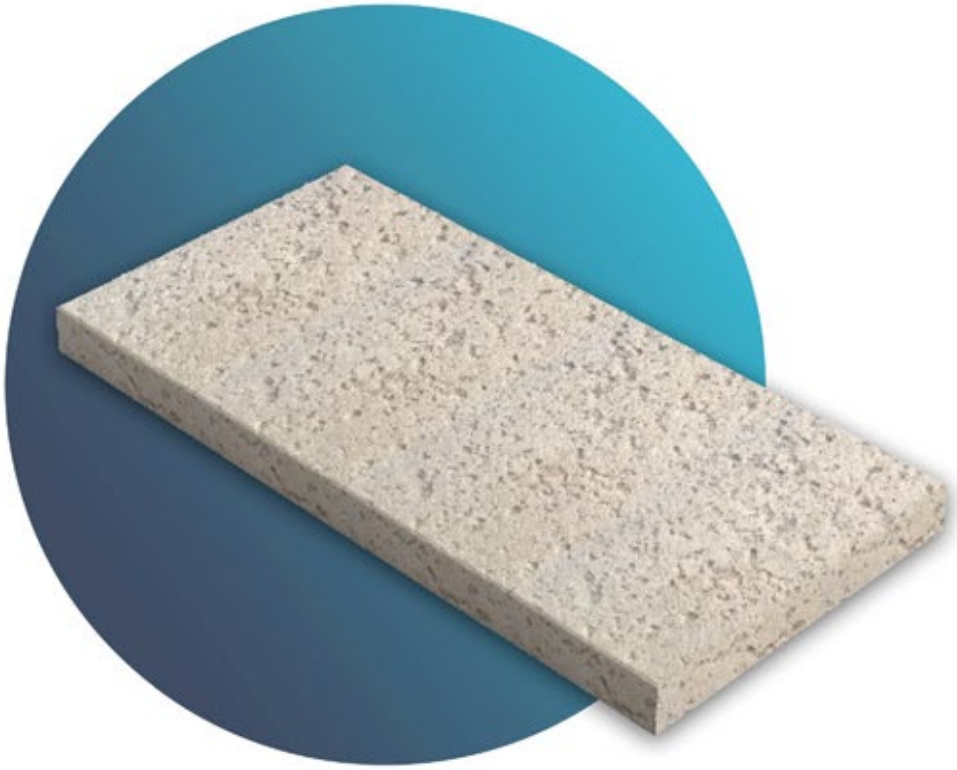
Environmental Product Declaration

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

Architectural wet cast

The EPD is for a specific product with multiple dimensions

from Termodan



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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
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 serves as the Core Product Category Rules (PCR)
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. A full list of members available on www.environdec.com.
The review panel may be contacted via info@environdec.com
Chair of the PCR review: Claudia A. Peña
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:
Rubén Carnerero, IK Ingeniería
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: Termodan
Description of the organisation: Termodan Ltd. is a private company that was established in 1994. Termodan is located in the Kanot Industrial Zone, near Gedera, Israel. Is engaged in the production of building blocks made of aggregates and cement for internal and external uses such as products for landscape and environmental development.

The company works with building contractors, development contractors, construction companies, private clients engaged in self-construction, architects, engineers and entrepreneurs. At Termodan you can find the variety of blocks for the home and for development with the best quality and level of insulation in the market. The Termodan block has been carefully tested by the standards authorities in Israel and found worthy of having 5 standard and quality marks that allow its customers to feel completely secure.

The company has a sales network spread all over the country, which enables delivery and service at the best level and in the shortest possible time. As part of our commitment to be a high-quality and unique company, the people of the company, from the CEO to the last employee, undertake to do everything to continue to provide quality products and impeccable service - one that we stand behind one hundred percent.

Name and location of production site(s): Termodan manufacturing site is located in the Kanot Industrial Zone, near Gedera, Israel.

Product information

Product name: Architectural wet cast.
Product identification: Concrete block.
Product description:
• Architectural wet cast - partitioning block with special cast shapes, for internal and external use in all construction sectors – residential, industrial, office buildings and more.

Specifications:

Name of Product	**Architectural wet cast**
Typical consumption [blocks/m^2]	8.7
Color	Varying colors

Product test standard: The product meets the Israeli standard 4004 and 14020.

UN CPC code: 375 – Articles of plaster or of compositions based on plaster.

Geographical scope: The study represents the manufacturing of concrete blocks in Termodan's manufacturing factory in the Kanot Industrial Zone, near Gedera, Israel. The end-of-life scenario of the products is demolishment and recycling in Israel, according to market research that was conducted.

LCA information

Reference service life: RSL is not specified since there is no valid c-PCR for the product that specifies it.

Time Representativeness: The time coverage of the LCA's data is from January 2022 to December 2022.

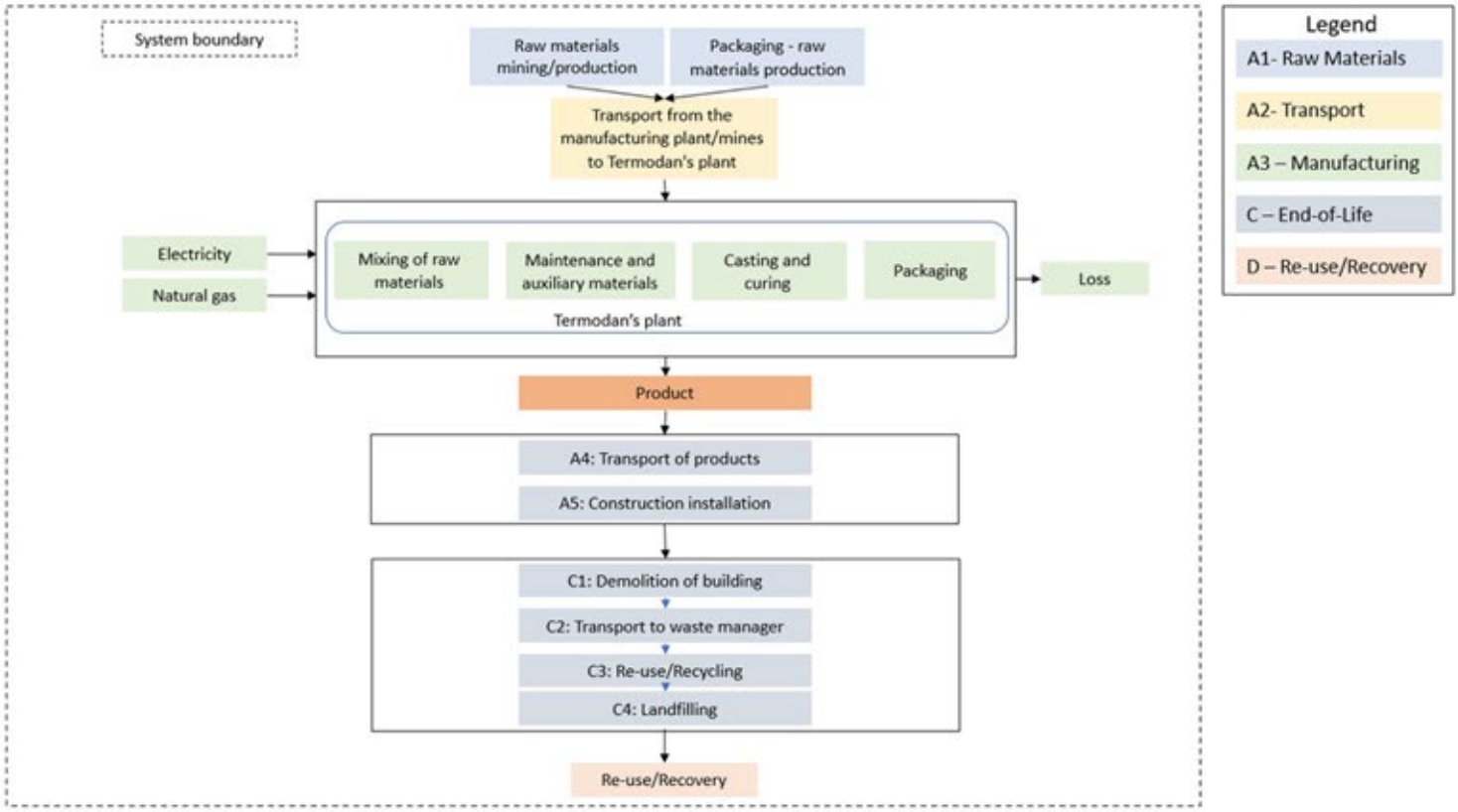
Declared and functional unit: The declared unit is 1 kg of manufactured concrete block product. To convert from the results given in this EPD to an individual block use the table in page 10.

Database(s) and LCA software used: The software used is SimaPro, Analyst 9.4.0.3. The database used is the Ecoinvent database v3.8 (2021) using the cut-off by classification approach (SCLCI, 2017).

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

Electricity grid CO2 coeffientnet: the CO2 coefficient of the electricity grid is 0.579 kg CO2-eq/kWh (2022) based on the renewable and non-renewable fuel sources in Israel.

Specifications:



Manufacturer's contact information:

Address: Kanot Industrial Zone, near Gedera, Israel.

Phone Number: +972- 8-8578100

Email: mosh@termodan.co.il

Website: https://termodan.co.il/

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

Assumptions:

a. t 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. In cases of multiple suppliers for one raw material a proportional share was taken into account.
d. The primary energy of raw materials was calculated for all renewable raw materials that had LHV value sources.
e. The wooden pallets were assumed to be reused three times.
f. Assumptions were made regarding the transportation of the product to the construction installation. The calculation was distance-based.
g. Assumptions regarding the installation were made as mentioned in the product stage, page 8 for module A5.
h. Assumptions regarding the end-of-life stage were made as mentioned in the product stage, page 8 for modules C1-C4.

Allocations: In this study, as per EN 15804, 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 3.8 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of the EN 15804 standard.

Cut-off rules: The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012 and the applied PCR 2019:14 Construction products (version 1.3.4) of the EPD International Institution. 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 Termodan. The background database is Ecoinvent database v3.8 (2021). 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 CO2 eq./kWh (GWP-GHG)
Israel's electricity grid – 100%	0.579

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	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

Product stage (A1-A3):

Module A1 – Supply of raw materials: The declared blocks consist of cement, aggregates mix, and additives. The raw materials supply includes raw material extraction/production that are taken into account in this study. The raw materials of packaging i.e., wooden pallets, paper bags and polyethylene are also included in this module.

Module A2 – Transport of raw materials: The cement is produced abroad in a nearby country. Accordingly, transport distances are short and done by ships and trucks. The aggregates are mainly extracted in Israel and transported locally. Further raw materials are supplied from manufacturers within Israel or other European countries.

Module A3 – Manufacturing: The manufacturing includes mixing of cement with aggregates and additives according to the relevant recipes of each product. The end products are packaged into film packaging and compiled on wooden pallets. Electric energy, and natural are consumed during the manufacturing process.data provided.

Construction stage (A4-A5):
Module A4 – Transport: Transport to the building site. This module includes transport from the production gate to the building site. Transport is calculated on the basis of a scenario in Israel of average distance of 80 km between the production gate to the building site. The scenario also accounts the empty return of the truck to the production gate.

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

Module A5 – Construction assembly: The installation in the building is not consider in this EPD. However, this stage will model the end-of-life of the packaging, which are assumed to be incinerated in municipal waste treatment plant.

Scenario information	kg per functional unit (kg/kg product)
Waste treatment of packaging – municipal incineration	Biogenic packaging – 2.23 E-03 kg Non biogenic packaging – 2.29E-04 kg

End-of-Life stage (C1-C4):
Module C1 – De-construction: Demolition of the products takes place with the whole demolition of the building/construction. Thus it is assumed that energy used for the demolition of blocks has a 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 tonne 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 plasters 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.

Processes	Type	Amount per kg declared unit
Collection process	Kg collected separately	0
	Kg collected with mixed construction waste	1
Recovery specified by type	Kg for re use	0
	Kg for recycling	0.85
	Kg for energy recovery	0
Disposal	landfilled	0.15
Assumption doe transport scenario	Transport to disposal waste treatment plant with Euro 6, 16-32 tonne lorry for 50 km	0.05 tkm

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

Content information

Product components	Weight-%	Post-consumer material, weight-%	Biogenic material, weight-%
Limestone	59-75	0	0
Cement	4-20	0	0
Aggregate	12-28	0	0
Water	3-5	0	0
Additives	0.3-0.7	0	0
TOTAL	100	0	0
Packaging materials	**Weight-%**	**Post-consumer material, weight-%**	**Weight biogenic carbon-%**
Wooden pallet	<1	0	<1
Polyethylene cover	<1	0	0
Polyester Strapping	<1	0	0
TOTAL	<1	0	<1

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
Not present in the product	ND	ND	0

Environmental Information

The EPD is for a specific product with multiple dimensions - **Environmental impacts of 1 kg of Architectural wet cast.**
Conversion factors for each product from the declared unit (kg of product) to kg/m2 are detailed below:

Name of Product	Length (cm)	Height (cm)	Width (cm)	Mass of 1 unit (Kg)	kg/m2	Units/m2
Architectural wet cast	60	30	3	12.5	69.37	5.55
	60	40	3	16.20	67.39	4.16
	70	15	2	7.08	67.40	9.52
	70	40	3	18.90	67.47	3.57
	50	23	3	8.8	76.56	8.7

Potential environmental impact – mandatory indicators according to EN 15804

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-fossil	kg CO_2 eq.	2.28E-01	2.61E-02	6.84E-04	0	8.50E-03	5.80E-03	1.86E-03	-1.33E-02
GWP-biogenic	kg CO_2 eq.	-3.34E-03	2.25E-05	3.35E-03	0	4.60E-06	-8.30E-06	2.23E-06	-2.53E-05
GWP - luluc	kg CO_2 eq.	2.79E-05	1.04E-05	1.27E-08	0	3.56E-06	3.13E-07	3.91E-06	-7.97E-06
GWP - total	kg CO_2 eq.	2.25E-01	2.61E-02	3.94E-03	0	8.51E-03	5.79E-03	1.87E-03	-1.33E-02
ODP	kg CFC 11 eq.	1.91E-08	6.04E-09	2.87E-12	0	1.83E-09	8.18E-11	5.40E-10	-3.72E-09
AP	mol H^+ eq.	6.98E-04	7.40E-05	4.44E-07	0	2.50E-05	2.75E-05	1.66E-05	-4.95E-05
EP - freshwater	kg PO_4 eq.	2.29E-04	5.69E-07	1.61E-09	0	2.21E-07	4.70E-07	5.12E-08	-1.59E-07
EP - freshwater	kg P eq.	7.47E-05	1.86E-07	5.26E-10	0	7.21E-08	1.54E-07	1.67E-08	-5.21E-08
EP - marine	kg N eq.	2.09E-04	1.47E-05	2.10E-07	0	4.98E-06	4.04E-06	6.40E-06	-1.40E-05
EP - terrestrial	mol N eq.	2.30E-03	1.64E-04	2.25E-06	0	5.56E-05	4.48E-05	7.02E-05	-1.72E-04
POCP	kg NMVOC eq.	6.01E-04	6.30E-05	5.61E-07	0	2.08E-05	1.21E-05	1.99E-05	-5.36E-05
ADP- fossil *	MJ	1.59E+00	3.95E-01	3.30E-04	0	1.26E-01	7.81E-02	3.72E-02	-2.00E-01
ADP-minerals&metals *	kg Sb eq.	2.84E-07	9.24E-08	9.91E-11	0	2.95E-08	1.76E-08	3.80E-09	-7.60E-08
WDP*	m^3	1.67E-02	1.20E-03	-2.39E-05	0	4.40E-04	4.39E-04	1.04E-03	-5.55E-02
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:

I: 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.

II: when considering the results, one should account all declared modules and not only modules A1-A3.

III: 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

IV: It is discouraged to use the results of modules A1-A3 (A1-A5 for services) without considering the results of module C

Potential environmental impact – additional mandatory and voluntary indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG[1]	kg CO_2 eq.	2.29E-01	2.61E-02	6.84E-04	0	8.51E-03	5.80E-03	1.87E-03	-1.33E-02

Use of resources[2]

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1.20E-01	5.65E-03	8.80E-06	0	1.26E-01	7.81E-02	3.72E-02	-2.00E-01
PERM	MJ	3.43E-02	0.00E+00	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.54E-01	5.65E-03	8.80E-06	0	1.26E-01	7.81E-02	3.72E-02	-2.00E-01
PENRE	MJ	1.59E+00	3.95E-01	3.30E-04	0	1.47E-03	4.27E-03	3.84E-04	-1.33E-03
PENRM	MJ	9.10E-03	0.00E+00	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.59E+00	3.95E-01	3.30E-04	0	1.47E-03	4.27E-03	3.84E-04	-1.33E-03
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	3.31E-04	4.47E-05	-3.57E-07	0	1.45E-05	1.32E-05	2.52E-05	-6.91E-04
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 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								

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.
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	1.17E-06	1.03E-06	9.02E-10	0	3.32E-07	1.18E-07	7.41E-08	-6.03E-07
Non-hazardous waste disposed	kg	1.33E-02	2.07E-02	4.78E-05	0	6.50E-03	3.96E-04	1.50E-01	-9.83E-03
Radioactive waste disposed	kg	4.15E-06	2.67E-06	6.20E-10	0	8.20E-07	1.22E-08	2.46E-07	-1.66E-06

Output flows

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	0	0	0	0	0	0	0	0
Material for recycling	kg	0	0	0	0	0	8.50E-01	0	0
Materials for energy recovery	kg	0	0	2.45E-03	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0

References

https://termodan.co.il/

Termodan technical data sheets

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ISO 14040:2006 Environmental management. Life cycle assessment principles and frameworks.

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PCR 2019:14, Construction products, version 1.3.4

Report of Israel's electricity market, by the Israeli authority of electricity, 2023

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