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:

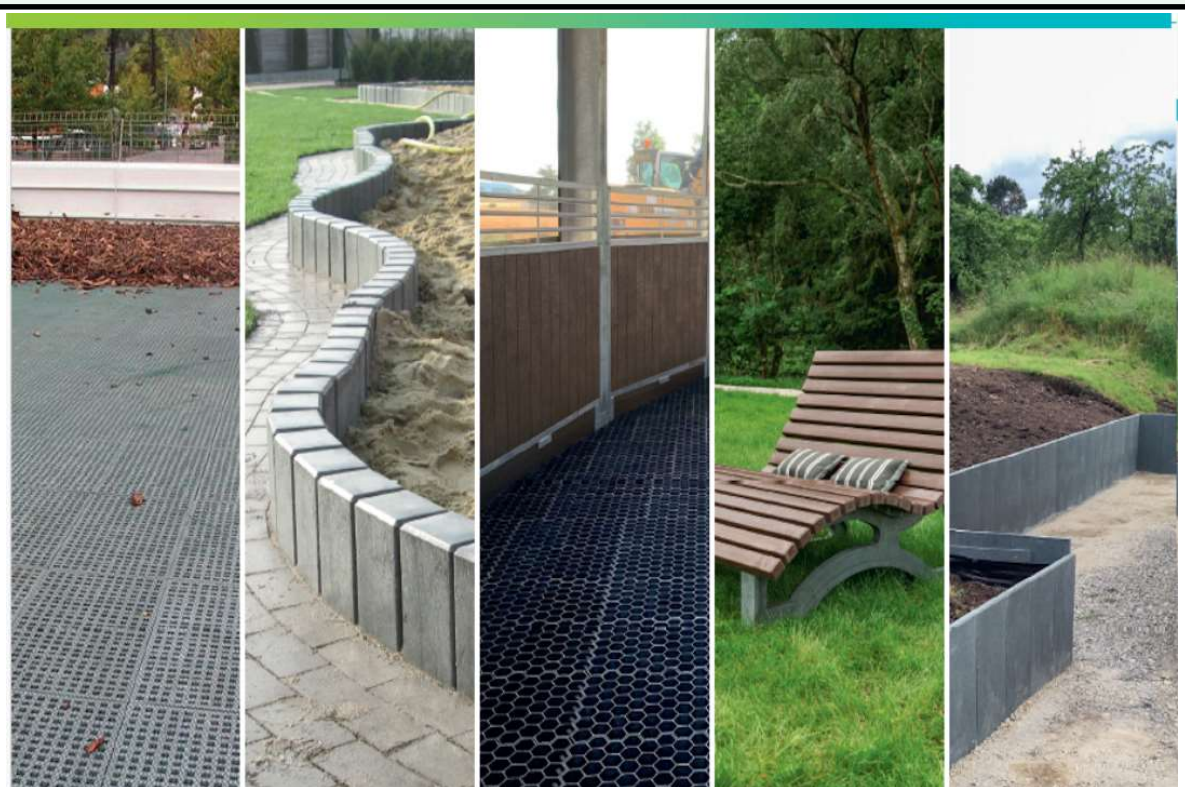
Hanit moulded recycled plastic construction and infrastructure products

from

Hahn Kunststoffe GmbH

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of multiple products, based on the average results of the product group
EPD registration number:	EPD-IES-0025674:001
Version date:	2025-09-05
Validity date:	2030-09-04

An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see 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
E-mail:	support@environdec.com

Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): Product Category Rules for Construction Products (PCR 2019:14) version 2.0.1. UN CPC 3699.
PCR review was conducted by: *The Technical Committee of the International EPD System. A full list of members is available on www.environdec.com. The review panel may be contacted via support@environdec.com. Most recent review chair: Rob Rouwette (chair), Noa Meron (co-chair).*
Verification
External and independent ('third-party') verification of the declaration and data, according to ISO 14025:2006, via EPD verification through: ☒ Individual EPD verification without a pre-verified LCA/EPD tool Third-party individual verifier: *Dr Matthew Fishwick, Fishwick Environmental Ltd* 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 published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit 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 identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Information about EPD owner

Owner of the EPD: Hahn Kunststoffe GmbH, Gebäude 1027, 55483 Bärenbach, Germany.

Contact of EPD owner: Christan Schorr, info@hanit.de.

Address and contact information of the LCA practitioner commissioned by the EPD owner:
Joel Beuerle; Hedgehog Company; Donauweg 10, 1043 AJ, Amsterdam, The Netherlands;
info@hhc.earth

Description of the organisation:
Hahn Kunststoffe GmbH, established in 1993, is a German company specialising in innovative recycled plastic products under the brand name hanit. Committed to sustainability and circular economy principles, the company transforms post-consumer plastics into durable, maintenance-free materials for construction, landscaping, and infrastructure. With a focus on environmental responsibility, Hahn Kunststoffe combines advanced manufacturing with ecological thinking to create long-lasting solutions that innovatively recycle plastic waste. The production site is located in Bärenbach, Germany.

Product information

Product group name: hanit.

Product group identification: hanit moulded recycled plastic construction and infrastructure products.

UN CPC Code: 3699 Articles of Plastic n.e.c.

Product description:
The declared products are construction and infrastructure elements made from hanit recycled plastic, used for ground reinforcement, structural landscaping, utility applications, and public space design. The range includes items such as paddock slabs, L-stones, palisades, boards, posts, benches, and technical components like biofilter flooring systems and tunnel blocks. These products are designed for long-term outdoor use, offering high durability, resistance to weather, chemicals, and mechanical stress, and are significantly lighter than conventional materials. Typical applications include soil stabilisation, slope retention, path and fence construction, raised beds, drainage systems, cable protection, and segment storage in tunnel construction. All components are made from durable recycled plastic (hanit), enabling low-maintenance, sustainable, and flexible use in agricultural, urban, and industrial environments.

This EPD covers multiple products, based on the average results of the product group. This makes up a diverse range of hanit recycled plastic products: L-stones, rectangular palisades, board profiles, round posts, footpath planks, benches, raised beds, flooring systems, cable duct covers and tunnel blocks. The average product is calculated based on the annual manufacturing data. This was divided by the total kg weight of hanit products produced.

Products within this range vary significantly in size and form, from individual planks and posts (e.g., lengths from approximately 0.5 m to 3 m; cross-sections from 50x50 mm to 200x200 mm for posts and boards) to larger L-stones (e.g., heights from 55 cm to 105 cm) and modular systems like biofilter raised flooring (e.g., standard panels of 1000x1000 mm). The full product portfolio consists of over

2000 different products. The variation in GWP-GHG for modules A1-A3 across this product range was calculated to be 4.6% and is thus not greater than 10%, indicating high representativeness of the declared results.

EPD shall not include rating, judgements, or direct comparisons with other products or companies. “Other products” include previous or alternative versions of the studied product, i.e., the EPD shall not display changes in the environmental performance results of a product over time, or differences with regard to a hypothetical version of the product using, e.g., alternative production processes or input materials.

Content declaration

The mass (weight) of one unit of a product, per declared unit: 1 kg of (average) hanit moulded recycled plastic construction and infrastructure products.

Product components	Mass, kg	Post-consumer material, mass-%	Biogenic material, mass-% and kg C/kg
Recycled mixed plastic	0.95 - 0.99	95 - 99%	0%
Filler Materials	0.00 - 0.02	0%	0%
Masterbatch	0.00 - 0.01	0%	0%
TOTAL	**1.00**	**95 - 99%**	0%
Packaging materials	**Mass, kg**	**Mass-% (versus the product)**	**Biogenic carbon, kg C/kg**
Wooden Pallets	0.024	2.40%	0.012
PET Straps	0.0002	0.02%	0
TOTAL	**0.024**	**2.42%**	**0.012**

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO_2.

A detailed breakdown of materials was not provided in line with GPI section 8.2.3.

Statement regarding REACH:
Regarding Substances of Very High Concern (SVHCs) in the products of this EPD, in accordance with Article 33 of Regulation (EC) No. 1907/2006 (‘REACH’), HAHN Kunststoffe GmbH assures that, according to the current state of knowledge, the preparations, articles and their packaging manufactured by HAHN Kunststoffe do not contain any substances on the currently valid SVHC candidate list of the European Chemicals Agency ECHA above 0.1% by mass. Furthermore, HAHN Kunststoffe GmbH confirms that hanit products placed on the market do not contain any prohibited substances and compounds according to Annex XIV EU REACH Regulation and that the applicable restrictions according to Annex XVII EU REACH Regulation are complied with.

LCA information

Declared unit: 1 kg hanit moulded recycled plastic construction and infrastructure products.

Lifespan: 30 years.

Time representativeness: Production specific data for 2022, based on one-year averaged data.

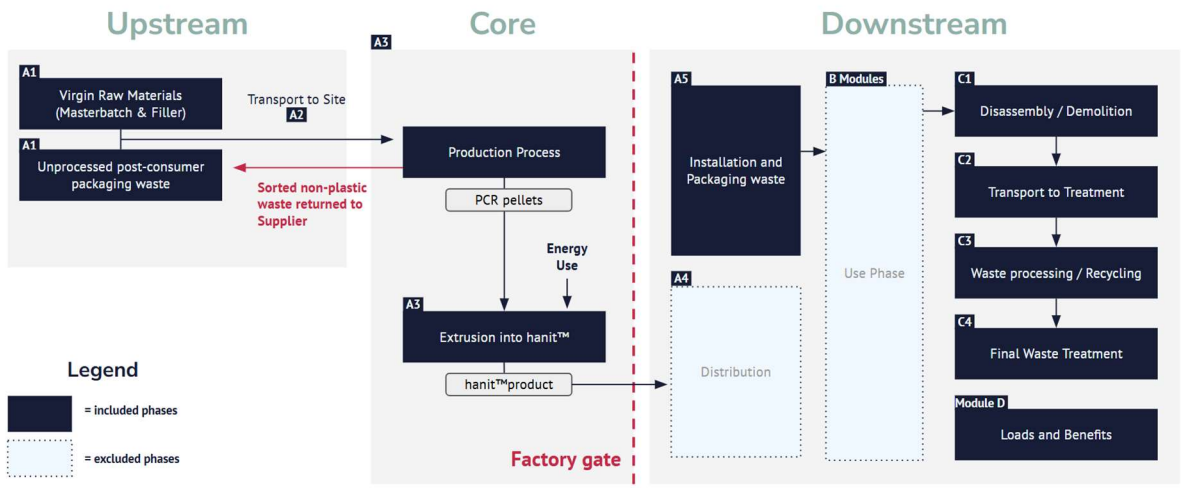
Geographical scope: This EPD covers production (A1-A3) in Germany, A5, C1-C4 and D represent a European scope.

Database(s) and LCA software used: ecoinvent v3.11, cut-off; SimaPro v10.2.0.2.

Life Cycle Impact Assessment Method: EN 15804 reference package based on EF 3.1.

Name and location of production site: Hahn Kunststoffe GmbH, Gebäude 1027, 55483 Bärenbach, Germany.

System Boundaries:
The scope of this LCA is cradle-to-gate with options, modules C1-C4, module D and optional modules A5. These system boundaries are visualised in the system diagram below.



Modules A4, and the B modules have been excluded from this EPD. These phases were excluded since the products covered by this EPD have a very wide range of application. Due to this wide range of application, the installation material required and the distribution distance can vary greatly.

A1 - Raw Materials
The extraction and processing of all raw materials is modelled in A1. The life cycle inventory data were gathered from on-site data over a year. Due to the very fast processing time, it was possible to normalise annual material flows for each kg hanit-output. The raw materials mainly consist of certified post-consumer recycled plastic.

A2 – Transport to Site
All transportation of raw materials to the production site in Bärenbach, Germany, by road.

A3 - Production
All energy required for production is included in A3, for processing steps like shredding, pelletisation, extrusion/injection moulding, as well as light and heating of production halls. Production waste is also included here, although injection wastes are reused internally. As the manufacturing process is heavily reliant on electricity, more than 50% of the GWP-GHG impacts in the production phase are caused by the electricity mix.

The climate intensity of electricity used in A3 is 0.225 kg CO_2 eq / kWh. Consisting of 64.4% supplier mix (0.335 kg CO_2 eq / kWh) and 35.6% of a 100% hydroelectric mix (0.0018 kg CO_2 eq / kWh) procured through the Guarantee of Origin market. The supplier mix is modelled with 28.9% wind, 21% hard coal, 14.1% PV, 11.4% biofuels, 9.7% natural gas, 5.4% nuclear, 4.1% water and 5% imported energy.

A5 – Installation
This phase accounts for installation. As most of the products covered under this EPD are able to be installed by hand, this phase does not include the use of any heavy machinery or ancillary materials. Should the installation require this due to scale, the environmental impacts in a customers own impact assessment.

A5 also includes the end-of-life treatment of packaging products. The following scenario is applied:

- PET: 40.7% recycling; 59.3% incineration
- Wooden pallet: 34.2% recycling; 65.8% incineration

The end-of-life modeling for the packaging waste uses the default scenarios provided in section 4.8.4 of PCR:2019 v2.0.1, as specific data is missing. The recycling pathway for the wooden pallet waste (34.2%) includes energy consumption for mechanical sorting (2.2 kWh/tonne of electricity, modelled with the German residual mix), loading/unloading (1.8 kWh/tonne of diesel), and chipping (6 kWh/tonne of diesel). For the PET components, all of these steps are covered by the relevant ecoinvent process.

C1-C4 modules
Deconstruction (C1) is assumed to be disassembly by hand. If disassembly or demolition requires heavy machinery, it will need to be added in customers own assessments. 100% of the product is collected seperately at end-of-life.

For the delivery to the treatment site (C2), EPD internationals average values are used: 130km for materials to be incinerated, 80km for others.

The waste processing (C3) scenario considers the recycling (10%) and incineration of waste (90%). All landfilling of incineration sludge is modelled in the dataset for incineration in C3. No landfilling was included.

Module D
Module D considers the benefit of recovered energy from incineration of plastic (including packaging) and wooden pallets. Net Energy generated from incineration activities has been considered with 15.1% electrical and 35% thermal efficiency. The following lower heating values have been applied: 42.47 MJ/kg for hanit, 22.9 MJ/kg for PET packaging and 13.99 MJ/kg for the pallet.

The net flows of recovered materials from the life cycle stages A to C, the net flow can be described by the difference between M_{MRin} and M_{MRout}, taking the material yield (here designated with Y) into account.

$$Netflow = \Sigma\ (M_{MRout} - Y\ * M_{MRin})$$

In this LCA study, a Y of 100% is considered, with an M_{MRin} of 100% and a M_{Mrout} of 10%. This results in a net flow of -0.9.

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	DE	DE	DE	-	EU*	-	-	-	-	-	-	-	EU*	EU*	EU*	EU*	EU*
Share of primary data**	80%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	4.6%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	N/A (single site)			-	-	-	-	-	-	-	-	-	-	-	-	-	-

**EU* designation indicates representative data for EU-27, as scenarios are based on EU data for these member states.
**The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.
ND = Not declared; DE = Germany

Data quality assessment

Data quality was assessed for time-related, geographical, and technological coverage. Overall, 80% of the GWP-GHG impact is calculated with primary data. The remaining 20% was calculated with secondary data. The database processes selected were also selected based on representativeness. Below a table shows this average data quality scores per lifecycle stage.

Average data quality per lifecycle phase and data representativeness type. The data quality level and criteria of the UN Environment Global Guidance on LCA database development were used. 1 = Very poor; 2 = Poor; 3 = Fair; 4 = Good; 5 = Very good.

Averages	Geographical Representativeness	Technical Representativeness	Time Representativeness
A1	3	4	5

A2	4	3	5
A3	5	5	5
A5	3	4	5
C2	4	5	5
C3	4	5	5
D	4	4	5

The processes contributing more than 10% of the total GWP-GHG for A1-A3 is declared in the following:

Process	**Source type**	**Source**	**Reference year**	**Data category**	**Share of primary data, of GWP-GHG for A1-A3**	**GWP-GHG contribution for A1-A3**
Electricity for Manufacturing	Database	ecoinvent v3.11 (cut-off)	2022	Primary data, secondary data	55%	55%
Fuels for manufacturing	Database	ecoinvent v3.11 (cut-off)	2022	Primary data, secondary data	10%	10%
Transport of materials (A2)	Collected data	EPD owner (cut-off)	2022	Primary data	16%	16%
Masterbatch production	Database	ecoinvent v3.11 (cut-off)	2022	Primary data, secondary data	0%	7%
Production of packaging	Database	ecoinvent v3.11 (cut-off)	2022	Secondary data	0%	12%
Total share of GWP-GHG for A1-A3					**80%**	**100%**

Cut-off rules
All known inputs and outputs for each unit process were included in the Life Cycle Assessment (LCA) calculation. Data collection was performed in accordance with the requirements of PCR 2019:14, v.2.0.1 and EN 15804:2012+A2:2019.

The procedure for the exclusion of inputs and outputs followed the requirements of EN 15804, Section 6.3.6. No processes were deliberately excluded. In accordance with the PCR, the total of neglected input flows per module is a maximum of 5% of energy usage and mass, and at least 95% of the environmental impact per module is included.

For any unit process where insufficient data was available, the cut-off criteria of 1% of the total mass and 1% of the total energy of that unit process were applied, although ultimately there was no insufficient data. A screening of all inputs was conducted to ensure that all material and energy flows known to have the potential for significant environmental impact were included. This was confirmed through plausibility considerations and expert judgement by Hahn Kunststoffe, ensuring that the final results are representative and robust. The exclusion of any flows is documented and justified as not significantly changing the overall conclusions of the study.

The processes related to infrastructure, construction, and production of equipment, as well as tools that are not directly consumed in the production process, have been excluded. An exception to this is the infrastructure from module A3, which is included as energy consumption has a significant contribution to the environmental impact. Personnel-related activities, such as transportation to and from work, have also been excluded.

Allocation

The allocation procedures in this EPD follow the rules outlined in PCR 2019:14, primarily the polluter-pays principle.

Allocation of post-consumer recycled material: The primary input material is post-consumer plastic packaging waste sourced through several German Dual Systems ('Duales System'). This material is considered to have reached its end-of-waste (EoW) state before entering the product system of Hahn Kunststoffe. According to PCR 2019:14, Section 4.5.2, the EoW state is reached when the recovered material is commonly used for a specific purpose, a market or demand exists, it fulfills technical and legal requirements, and its use does not lead to adverse environmental or human health impacts. As these criteria are met, the environmental burdens associated with the material's previous life cycle, including collection and sorting, are allocated to the previous product system that generated the waste.

Note also that in accordance with PCR 2019:14, Section 4.5.3, the following is declared:

- 100% of the input of post-consumer recycled material is assumed to enter the product system without an upstream environmental burden.
- The Global Warming Potential (GWP-GHG) intensity of this recycled material input is therefore 0 kg CO_2 eq./tonne.

Annual data: Total annual manufacturing data was divided by the total kg weight of hanit products produced. The rapid production turnover at the production site means very few materials will be unaccounted because of this average calculation.

Handling of Impurities: Any incoming material fractions that do not meet the end-of-waste criteria (e.g., contaminated or non-recyclable plastics) are mechanically sorted on-site and returned to the supplier. As these materials have not reached the end-of-waste state, the responsibility for their treatment remains with the previous product system and they are excluded from this study's system boundary.

Production waste: All production waste, such as offcuts from the moulding process, is reused internally. This constitutes a closed-loop recycling process. Therefore, no co-product allocation is necessary for these internal material flows.

Environmental performance

LCA results of the products - main environmental performance results

This chapter presents the results of the environmental performance indicators. The environmental performance of 1 kg of hanit moulded recycled plastic construction and infrastructure products is declared and reported using the parameters and units as specified in PCR 2019:14 v2.0.1. These life cycle impact assessment results and other environmental results are presented in the tables below per declared unit, broken down by module. 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. The calculation for resource use indicators is carried out in accordance with Option A of Annex 3 of PCR 2019:14 v2.0.1. The results are declared using EN 15804 reference package based on EF 3.1.

Mandatory impact category indicators according to EN 15804

Results per kg hanit moulded recycled plastic construction and infrastructure products								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	2.35E-01	4.97E-04	0.00E+00	9.58E-03	2.83E+00	0.00E+00	1.50E-01
GWP-biogenic	kg CO_2 eq.	-3.86E-02	3.86E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO_2 eq.	2.52E-04	2.12E-07	0.00E+00	1.51E-07	4.66E-05	0.00E+00	7.43E-04
GWP-total	kg CO_2 eq.	1.97E-01	3.91E-02	0.00E+00	9.58E-03	2.83E+00	0.00E+00	1.50E-01
ODP	kg CFC 11 eq.	7.26E-09	9.59E-11	0.00E+00	2.18E-10	6.73E-10	0.00E+00	2.61E-08
AP	mol H+ eq.	1.07E-03	2.59E-06	0.00E+00	2.47E-05	4.28E-04	0.00E+00	2.86E-03
EP-freshwater	kg P eq.	1.12E-05	3.38E-09	0.00E+00	5.92E-09	1.62E-06	0.00E+00	2.85E-05
EP-marine	kg N eq.	1.83E-04	1.28E-06	0.00E+00	9.43E-06	1.78E-04	0.00E+00	4.61E-04
EP-terrestrial	mol N eq.	2.16E-03	1.35E-05	0.00E+00	1.03E-04	1.95E-03	0.00E+00	4.64E-03
POCP	kg NMVOC eq.	2.03E-03	3.39E-06	0.00E+00	4.10E-05	4.90E-04	0.00E+00	9.40E-03
ADP-minerals&metals*	kg Sb eq.	5.55E-06	6.21E-11	0.00E+00	2.50E-10	3.16E-08	0.00E+00	-7.98E-08
ADP-fossil*	MJ	3.34E+00	2.20E-03	0.00E+00	1.27E-01	5.98E-01	0.00E+00	3.97E+01
WDP*	m^3	3.10E-02	8.04E-05	0.00E+00	4.17E-05	1.94E-02	0.00E+00	1.67E+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 there is limited experience with the indicator.*

Additional mandatory and voluntary impact category indicators

Results per kg hanit moulded recycled plastic construction and infrastructure products								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	2.35E-01	4.96E-04	0.00E+00	9.58E-03	2.83E+00	0.00E+00	1.30E-01

Resource use indicators

Results per kg hanit moulded recycled plastic construction and infrastructure products								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.02E+00	3.30E-01	0.00E+00	3.13E-04	9.07E-02	0.00E+00	8.62E-01
PERM	MJ	3.30E-01	-3.30E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.35E+00	6.76E-05	0.00E+00	3.13E-04	9.07E-02	0.00E+00	8.62E-01
PENRE	MJ	3.34E+00	6.24E-03	0.00E+00	1.27E-01	4.31E+01	0.00E+00	3.97E+01
PENRM	MJ	4.25E+01	-4.03E-03	0.00E+00	0.00E+00	-4.25E+01	0.00E+00	0.00E+00
PENRT	MJ	4.58E+01	2.20E-03	0.00E+00	1.27E-01	5.98E-01	0.00E+00	3.97E+01
SM	kg	9.70E-01	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
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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+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 indicators

Results per kg hanit moulded recycled plastic construction and infrastructure products								
Indicator	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	2.69E-05	1.35E-08	0.00E+00	8.47E-07	5.15E-06	0.00E+00	1.18E-03
Non-hazardous waste disposed	kg	2.02E-02	1.76E-04	0.00E+00	4.28E-06	3.82E-02	0.00E+00	-6.82E-02
Radioactive waste disposed	kg	4.73E-06	1.58E-09	0.00E+00	7.69E-09	2.43E-06	0.00E+00	3.69E-05

[1] 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.

Output flow indicators

Results per kg hanit moulded recycled plastic construction and infrastructure products								
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	1.08E-01	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	3.31E-02	0.00E+00	0.00E+00	5.77E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	7.67E-02	0.00E+00	0.00E+00	1.34E+01	0.00E+00	0.00E+00

LCA results of the products – Alternative scenarios

In line with PCR:2019 the LCA results for two 100% scenario are presented in the following tables. The scenarios are based on 100% incineration with energy recovery and 100% recycling.

Mandatory impact category indicators according to EN 15804 – 100% incineration scenario

Results per kg hanit moulded recycled plastic construction and infrastructure products (alternative 100% incineration scenario)						
Indicator	**Unit**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	0.00E+00	9.97E-03	3.09E+00	0.00E+00	1.67E-01
GWP-biogenic	kg CO_2 eq.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO_2 eq.	0.00E+00	1.57E-07	4.45E-06	0.00E+00	8.26E-04
GWP-total	kg CO_2 eq.	0.00E+00	9.97E-03	3.09E+00	0.00E+00	1.68E-01
ODP	kg CFC 11 eq.	0.00E+00	2.26E-10	2.35E-01	0.00E+00	2.35E-01
AP	mol H^+ eq.	0.00E+00	2.57E-05	3.71E-04	0.00E+00	3.18E-03
EP-freshwater	kg P eq.	0.00E+00	6.15E-09	1.95E-07	0.00E+00	3.16E-05
EP-marine	kg N eq.	0.00E+00	9.81E-06 1.07E-04	1.80E-04 1.97E-03	0.00E+00 0.00E+00	5.13E-04 5.16E-03
EP-terrestrial	mol N eq.	0.00E+00	4.26E-05	4.79E-04	0.00E+00	1.04E-02
POCP	kg NMVOC eq.	0.00E+00	2.60E-10	1.17E-08	0.00E+00	-8.70E-08
ADP-minerals&metals*	kg Sb eq.	0.00E+00	1.32E-01	2.36E-01	0.00E+00	4.41E+01
ADP-fossil*	MJ	0.00E+00	4.33E-05	1.51E-02	0.00E+00	1.85E+00
WDP*	m^3	0.00E+00	6.63E-10	1.24E-09	0.00E+00	1.87E-08
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					

Additional mandatory and voluntary impact category indicators – 100% incineration scenario

Results per kg hanit moulded recycled plastic construction and infrastructure products (alternative 100% incineration scenario)						
Indicator	**Unit**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[2]	kg CO_2 eq.	0.00E+00	9.58E-03	2.83E+00	0.00E+00	1.30E-01

[2] 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.

Mandatory impact category indicators according to EN 15804 – 100% recycling scenario

Results per kg hanit moulded recycled plastic construction and infrastructure products (alternative 100% recycling scenario)						
Indicator	**Unit**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	0.00E+00	6.13E-03	4.18E-01	0.00E+00	-9.57E-03
GWP-biogenic	kg CO_2 eq.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO_2 eq.	0.00E+00	9.69E-08	4.26E-04	0.00E+00	-9.93E-06
GWP-total	kg CO_2 eq.	0.00E+00	6.13E-03	4.18E-01	0.00E+00	-9.58E-03
ODP	kg CFC 11 eq.	0.00E+00	1.39E-10	3.45E-09	0.00E+00	-1.01E-09
AP	mol H^+ eq.	0.00E+00	1.58E-05	9.45E-04	0.00E+00	-1.52E-05
EP-freshwater	kg P eq.	0.00E+00	3.79E-09	1.44E-05	0.00E+00	-6.19E-08
EP-marine	kg N eq.	0.00E+00	6.03E-06	1.61^{E}-04	0.00E+00	-5.25E-06
EP-terrestrial	mol N eq.	0.00E+00	6.60E-05	1.77E-03	0.00E+00	-5.75E-05
POCP	kg NMVOC eq.	0.00E+00	2.62E-05	5.89E-04	0.00E+00	-2.68E-05
ADP-minerals&metals*	kg Sb eq.	0.00E+00	1.60E-10	2.11E-07	0.00E+00	-1.51E-08
ADP-fossil*	MJ	0.00E+00	8.15E-02	3.86E+00	0.00E+00	-1.65E-01
WDP*	m^3	0.00E+00	2.67E-05	5.87E-02	0.00E+00	-1.03E-03
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					

Additional mandatory and voluntary impact category indicators – 100% recycling scenario

Results per kg hanit moulded recycled plastic construction and infrastructure products (alternative 100% recycling scenario)						
Indicator	**Unit**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[3]	kg CO_2 eq.	0.00E+00	6.13E-03	4.42E-01	0.00E+00	-9.58E-03

[3] 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.

Abbreviations

Abbreviation	Definition
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
CEN	European Committee for Standardization
CPC	Central product classification
CF	Characterisation Factor
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO_2 eq.)
GWP-fossil	Global Warming Potential from fossil sources (kg CO_2 eq.)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO_2 eq.)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO_2 eq.)
GWP-total	Total Global Warming Potential (kg CO_2 eq.)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO_2 eq.)
ODP	Ozone Depletion Potential (kg CFC-11 eq.)
AP	Acidification Potential (mol H^+ eq.)
EP	Eutrophication Potential
EP-freshwater	Freshwater eutrophication potential (kg P eq.)
EP-marine	Marine eutrophication potential (kg N eq.)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq.)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq.)
ADP	Abiotic Depletion Potential
ADP-minerals&metals	Abiotic depletion potential for non-fossil resources (kg Sb eq.)
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m^3)
PM	Particulate matter emissions (Disease incidence)
IRP	Ionising radiation. human health (kBq U235 eq.)
ETP-fw	Ecotoxicity. freshwater (CTUe)
HTP-c	Human toxicity. cancer effects (CTUh)

Abbreviation	Definition
HTP-nc	Human toxicity. non-cancer effects (CTUh)
SQP	Land use related impacts / soil quality (Dimensionless)
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)
PERM	Use of renewable primary energy resources used as raw materials (MJ)
PERT	Total use of renewable primary energy resources (MJ)
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ)
PENRM	Use of non-renewable primary energy resources used as raw materials (MJ)
PENRT	Total use of non-renewable primary energy resources (MJ)
SM	Use of secondary material (kg)
RSF	Use of renewable secondary fuels (MJ)
NRSF	Use of non-renewable secondary fuels (MJ)
FW	Use of net fresh water (m^3)
HW	Hazardous Waste (disposed) (kg)
NHW	Non-Hazardous Waste (disposed) (kg)
RW	Radioactive Waste (disposed) (kg)
CFR	Components for Reuse (kg)
MR	Material for Recycling (kg)
MER	Materials for Energy Recovery (kg)
EEE	Exported Energy. Electricity (MJ)
EET	Exported Energy. Thermal (MJ)
SVHC	Substances of Very High Concern
MJ	Megajoule
kg	Kilogram
m^3	Cubic Meter
NMVOC	Non-Methane Volatile Organic Compounds
Sb eq.	Antimony Equivalents
P eq.	Phosphorus Equivalents
N eq.	Nitrogen Equivalents
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO_2 eq.	Carbon Dioxide Equivalents
kg C	Kilograms of Carbon
kg CO_2 eq.	Kilograms of Carbon Dioxide Equivalent

Abbreviation	Definition
ND	Not Declared

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