Environmental Product Declaration (EPD)
According to ISO 14025 and EN 15804+A2:2019

PVC pitched-roof vents

Registration number:	EPD-Kiwa-EE-218901-EN
Issue date:	27-08-2025
Valid until:	27-08-2030
Declaration owner:	Fleck GmbH
Publisher:	Kiwa-Ecobility Experts
Programme operator:	Kiwa-Ecobility Experts
Status:	verified

1 General information

1.1 PRODUCT

PVC pitched-roof vents

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-218901-EN

1.3 VALIDITY

Issue date: 27-08-2025

Valid until: 27-08-2030

1.4 PROGRAMME OPERATOR

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DE

Raoul Mancke

(Head of programme operations, Kiwa-Ecobility Experts)

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(Verification body, Kiwa-Ecobility Experts)

1.5 OWNER OF THE DECLARATION

Declaration owner: Fleck GmbH

Address: Industriestr. 12, 45711 Datteln, Germany

E-mail: info@fleck-dach.de

Website: www.fleck-dach.de

Production location: Fleck GmbH

Address production location: Industriestraße 12, 45711 Datteln, Germany

1.6 VERIFICATION OF THE DECLARATION

The independent verification is in accordance with the ISO 14025:2011. The LCA is in compliance with ISO 14040:2006 and ISO 14044:2006. The EN 15804+A2:2019 serves as the core PCR.

☐ Internal ☒ External

Lucas Pedro Berman, Senda

1.7 STATEMENTS

The owner of this EPD shall be liable for the underlying information and evidence. The programme operator Kiwa-Ecobility Experts shall not be liable with respect to manufacturer data, life cycle assessment data and evidence.

1.8 PRODUCT CATEGORY RULES

Kiwa-EE GPI R.3.0 (2025)

Kiwa-EE GPI R.3.0 Annex B1 (2025)

Specific PCR: epd-norge - NPCR 030 version 1.1 - Part B for ventilation components (2021-05-18)

1.9 COMPARABILITY

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804+A2:2019.

1 General information

For the evaluation of the comparability, the following aspects have to be considered in particular: PCR used, functional or declared unit, geographical reference, the definition of the system boundary, declared modules, data selection (primary or secondary data, background database, data quality), scenarios used for use and disposal phases, and the life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPD program operators may differ. Comparability needs to be evaluated. For further guidance, see EN 15804+A2:2019 and ISO 14025.

1.10 CALCULATION BASIS

LCA method R<THINK: Ecobility Experts | EN15804+A2

LCA software*: Simapro 9.6

Characterization method: RETHINK characterization method (see references for more details)

LCA database profiles: ecoinvent (for version see references)

Version database: v3.19 (20250306)

** Simapro is used for calculating the characterized results of the Environmental profiles within R<THINK.*

1.11 LCA BACKGROUND REPORT

This EPD is generated on the basis of the LCA background report 'PVC pitched-roof vents ' with the calculation identifier ReTHiNK-118901.

2 Product

2.1 PRODUCT DESCRIPTION

This is a worst-case EPD for PVC pitched-roof vents.
The vents used for the calculation and thus declared in the LCA is the “Aura DN 125 vent".

The other vents covered by the EPD are the following:

- Sani Extra DN 100
- Eurolüfter DN 125
- Sanitary vent Duo DN 125
- Vapor vent DN 150
- Vapor vent DN 200
- Vapor vent DN 250
- Vapor vent DN 300
- Vapor vent DN 400
- Vapor vent DN 500

The pitched-roof vents from FLECK are available in various dimensions and designs. They are comprised of the vent itself and the correpsonding roof tile, with which the vent is mounted to the roof. Over 250 different roof tile models can be repoduced, depending on the wished-for design. The desired pitched roof vent is integrated into the replica roof tile at the factory with the individual roof pitch and then painted in a UV-resistant color close to the original. This results in an unobtrusive overall appearance of the roof surface.

Material	Composition
PVC	100%

The dimensions of all the declared products are as follows:

Product	Diameter [mm]	Wall thickness [mm]	Length [m]	Specific weight [kg]
Aura DN 125	125	1.5 - 4	up to 0.48	2.15
Sani Extra DN 100	100	1.5 - 4	up to 0.24	0.90
Eurolüfter DN 125	125	1.5 - 4	up to 0.48	1.80
Sanitary vent Duo DN 125	125	1.5 - 4	up to 0.43	1.58
Vapor vent DN 150	150	1.5 - 4	up to 0.70	2.06
Vapor vent DN 200	200	1.5 - 4	up to 0.80	2.90
Vapor vent DN 250	250	1.5 - 4	up to 1.00	6.00
Vapor vent DN 300	300	1.5 - 4	up to 1.00	12.00
Vapor vent DN 400	400	1.5 - 4	up to 1.00	14.00
Vapor vent DN 500	500	1.5 - 4	up to 1.00	16.00

The LCA results can be multiplied by the specific products weight in order to receive the LCA results specific to each product variant. The declared weight is for the average size of the product variant.

The length can vary based on customer specifications.

2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

The pitched-roof vents are designed to allow ventilation on a pitched roof.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT
As the entire life cycle of the pitched-roof vent is not considered in the scope of the study, the specification of the reference service life (RSL) is voluntary. According to BBSR Table 2017 / No. 363.413, the RSL of Fleck's PVC pitched-roof vents is 25 years.

USED RSL (YR) IN THIS LCA CALCULATION:
25

2.4 TECHNICAL DATA

General technical data

2 Product

Characteristic	Value	Standard (if applicable)
Construction material class	B2	DIN 4102
Detachable weathercap		DIN 1986-100

Technical data supporting with product choice

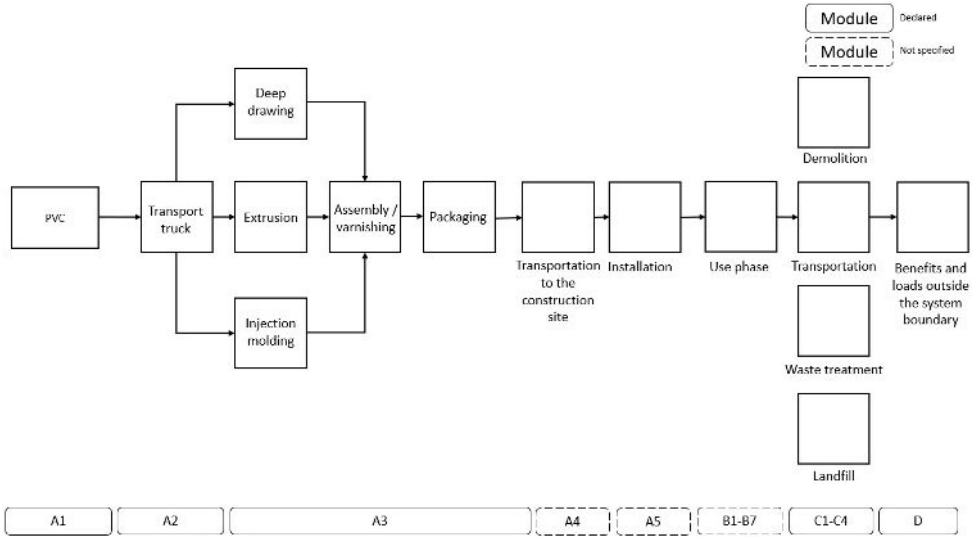
Nominal pipe size	Ventilation diameter [cm²]	Outer ø [mm]	Inner ø [mm]	min. wall thickness [mm]
DN 100	87	110	100	1.5
DN 125	113	125	125	1.5
DN 150	188	160	156	1.5
DN 200	298	200	196	1.5
DN 250	471	250	245	1.5
DN 300	754	315	310	1.5
DN 400	1212	400	393	1.5
DN 500	1885	500	492	1.5

2.5 SUBSTANCES OF VERY HIGH CONCERN

The product does not contain any substances from the “Candidate List of Substances of Very High Concern” (SVHC) in amounts greater than 0.1% (1000 ppm).

2.6 DESCRIPTION PRODUCTION PROCESS

As this EPD covers multiple products through a worst-case approach, slight variations exist in the production processes.
The production process detailled here will cover the production process for the worst-case product modelled in the LCA.
There are three main production processes, injection moulding, deep drawing and extrusion, which happen parallel to each other and each supply specific components to the finished product. All three processes include the heating, forming and cooling of the respective part. The three main production processes are supplemented by cutting and deburring, after which the parts are then varnished and packaged for storage or delivery.



3 Calculation rules

3.1 DECLARED UNIT

1 kg

1 kg of PVC pitched-roof vents

Reference unit: kilogram (kg)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	kg
Conversion factor to 1 kg	1.000000	kg

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with modules C1-C4 and module D EPD. The life cycle stages included are as shown below:

(X = module included, ND = module not declared)

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

The modules of the EN 15804 contain the following:

Module A1 = Raw material supply	Module B5 = Refurbishment
Module A2 = Transport	Module B6 = Operational energy use
Module A3 = Manufacturing	Module B7 = Operational water use
Module A4 = Transport	Module C1 = De-construction / Demolition
Module A5 = Construction - Installation process	Module C2 = Transport
Module B1 = Use	Module C3 = Waste Processing
Module B2 = Maintenance	Module C4 = Disposal
Module B3 = Repair	Module D = Benefits and loads beyond the product system boundaries
Module B4 = Replacement	

3.4 REPRESENTATIVENESS

This EPD is representative for PVC pitched-roof vents , a product of Fleck GmbH. The results of this EPD are representative for Germany.

3.5 CUT-OFF CRITERIA

Product stage (A1-A3)
All input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. production waste) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

3 Calculation rules

Excluded processes are:

- Long-term emissions
- The manufacture of equipment used in production, buildings or any other capital goods;
- The transport of personnel to the plant;
- The transportation of personnel within the plant;
- Research and development activities

End of life stage (C1-C4)
All input flows (e.g. energy use for demolition or disassembly, transport to waste processing, etc.) and output flows (e.g. end-of-life waste processing of the product, etc.) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

Benefits and loads beyond the system boundary (Module D)
All benefits and loads beyond the system boundary resulting from reusable products, recyclable materials and/or useful energy carriers leaving the product system are considered in this LCA.

3.6 ALLOCATION

Allocations were avoided as far as possible. There are no coproducts or by-product in the manufacturing of the examined product. Based on energy consumption measurements, the energy requirements of the production were allocated to the individual products. Specific information about allocations within the background data is included in the documentation of the Ecoinvent datasets.

3.7 DATA COLLECTION & REFERENCE PERIOD

All process-specific data was collected for the 2023 operating year from the 1st of January to the 31st of December. The quantities of raw materials, consumables and supplies used and the energy consumption were recorded and averaged over the entire 2023 operating year. The reference area is Germany.

3.8 ESTIMATES AND ASSUMPTIONS

C1: Since the product is dismantled manually by a roofing contractor, an environmental impact of 0 is assumed for C1.

As the raw material composition doesn't change between product variants and they have a high variance in product weight, it was decided that the declared unit kg would be most sensible to reflect a high range of products in one EPD. Through multiplying the LCA results with the specific products weight, product specific results can be calculated.

Based on EN 15804+A4, the end-of-life system boundary of the product system is set, where outputs of the system under study, have reached the end-of-waste state. Thus, waste processing of the materials flows during any module of the product system (e.g. the production stage, end-of-life stage) are included up to the system boundary of the respective module. A product reaches its end-of-waste state when there is a market for the recovered product and when the recovered product fulfils the technical requirements for the specific purposes and meets the legislation and standards applicable to the product. Therefore producers of waste bear the burden of the waste treatment, based on the “polluter pays” principle. Consumers of recycled products receive them burden-free.

3.9 DATA QUALITY

The quality level of geographical representativeness can be considered “good”.
The quality level of technical representativeness can be considered “good”.
The time representativeness can also be regarded as “good”.

The overall data quality for this EPD can, therefore, be described as “good”. All relevant process-specific data were collected during data collection.

In all possible cases, primary data from customers was used, which has very good data quality because it comes directly from the source. In addition, secondary data from the ecoinvent database (2019, version 3.9.1) was used when no primary data could be supplied. The database is checked regularly and, therefore, meets the requirements of DIN EN ISO 14040/44 (background data not older than 10 years). The background data meets the requirements of EN 15804+A2. The quantities of raw materials, consumables and supplies used and the energy consumption were recorded and averaged over the entire operating year.

The general rule that specific data from certain production processes or average data derived from certain processes must take precedence when calculating an EPD or LCA was adhered to. Data for processes over which the manufacturer has no influence were assigned to generic data/scenarios. When selecting these, care was taken to always choose the data set/scenario that most realistically represents the processes.

3.10 POWER MIX

A residual mix was used for this Environmental Product Declaration. It does not contain electricity for which GOs have to be provided.

3 Calculation rules

The GWP-total of the applied electricity mix is 0.725 kg CO2 eqv. per kWh.

4 Scenarios and additional technical information

4.1 DE-CONSTRUCTION, DEMOLITION (C1)

No inputs are needed for the product at the de-construction / demolition phase

4.2 TRANSPORT END-OF-LIFE (C2)

The following distances and transport conveyance are assumed for transportation during end of life for the different types of waste processing.

Waste Scenario	Transport conveyance	Not removed (stays in work) [km]	Landfill [km]	Incineration [km]	Recycling [km]	Re-use [km]
(ei3.9.1) PVC, pipes (NMD ID 64)	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0

The transport conveyance(s) used in the scenario(s) for transport during end of life has the following characteristics.

	Value and unit
Vehicle type used for transport	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)
Fuel type and consumption of vehicle	not available
Capacity utilisation (including empty returns)	50 % (loaded up and return empty)
Bulk density of transported products	inapplicable
Volume capacity utilisation factor	1

4.3 END OF LIFE (C3, C4)

The scenario(s) assumed for end of life of the product are given in the following tables.
First the assumed percentages per type of waste processing are displayed, followed by the assumed amounts.

Waste Scenario	Region	Not removed (stays in work) [%]	Landfill [%]	Incineration [%]	Recycling [%]	Re-use [%]
(ei3.9.1) PVC, pipes (NMD ID 64)	NL	0	10	20	70	0

4 Scenarios and additional technical information

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
(ei3.9.1) PVC, pipes (NMD ID 64)	0.000	0.100	0.200	0.700	0.000
Total	**0.000**	**0.100**	**0.200**	**0.700**	**0.000**

4.4 BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

The presented Benefits and loads beyond the system boundary in this EPD are based on the following calculated Net output flows in kilograms and Energy recovery displayed in MJ Lower Heating Value.

Waste Scenario	Net output flow [kg]	Energy recovery [MJ]
(ei3.9.1) PVC, pipes (NMD ID 64)	0.700	4.302
Total	**0.700**	**4.302**

5 Results

For the impact assessment long-term emissions (>100 years) are not considered. The results of the impact assessment are only relative statements that do not make any statements about end-points of the impact categories, exceedance of threshold values, safety margins or risks. The following tables show the results of the indicators of the impact assessment, of the use of resources as well as of waste and other output flows.

5.1 ENVIRONMENTAL IMPACT INDICATORS PER KILOGRAM

CORE ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq.	3.01E+0	8.19E-2	6.68E-1	3.76E+0	0.00E+0	1.12E-2	7.29E-1	7.37E-3	-1.07E+0
GWP-f	kg CO_2 eq.	3.00E+0	8.16E-2	1.47E+0	4.55E+0	0.00E+0	1.11E-2	7.28E-1	7.36E-3	-1.07E+0
GWP-b	kg CO_2 eq.	6.89E-3	2.66E-5	-8.08E-1	-8.01E-1	0.00E+0	3.63E-6	5.51E-4	7.04E-6	-2.63E-3
GWP-luluc	kg CO_2 eq.	2.78E-3	2.91E-4	8.84E-3	1.19E-2	0.00E+0	3.97E-5	4.05E-4	8.91E-7	-7.23E-4
ODP	kg CFC 11 eq.	1.06E-6	1.45E-9	3.35E-8	1.10E-6	0.00E+0	1.98E-10	7.13E-8	2.76E-11	-5.07E-7
AP	mol H+ eq.	1.41E-2	3.90E-4	5.22E-3	1.98E-2	0.00E+0	5.33E-5	1.46E-3	8.65E-6	-3.79E-3
EP-fw	kg P eq.	1.03E-4	8.11E-7	8.26E-5	1.86E-4	0.00E+0	1.11E-7	1.13E-5	1.77E-8	-3.68E-5
EP-m	kg N eq.	2.43E-3	1.48E-4	1.99E-3	4.57E-3	0.00E+0	2.03E-5	3.69E-4	5.17E-6	-6.81E-4
EP-T	mol N eq.	3.12E-2	1.58E-3	1.45E-2	4.72E-2	0.00E+0	2.16E-4	4.04E-3	3.37E-5	-7.18E-3
POCP	kg NMVOC eq.	9.82E-3	5.40E-4	4.24E-3	1.46E-2	0.00E+0	7.38E-5	1.38E-3	1.31E-5	-3.03E-3
ADP-mm	kg Sb-eq.	2.47E-5	2.55E-7	7.03E-6	3.19E-5	0.00E+0	3.49E-8	2.04E-6	2.46E-9	-1.07E-5
ADP-f	MJ	6.05E+1	1.17E+0	2.17E+1	8.33E+1	0.00E+0	1.59E-1	4.25E+0	2.56E-2	-2.64E+1
WDP	m3 world eq.	-3.45E-1	6.38E-3	2.63E-1	-7.48E-2	0.00E+0	8.71E-4	1.45E-1	1.08E-3	-1.55E+0

GWP-total=Global Warming Potential total (GWP-total) | **GWP-f**=Global Warming Potential fossil fuels (GWP-fossil) | **GWP-b**=Global Warming Potential biogenic (GWP-biogenic) | **GWP-luluc**=Global Warming Potential land use and land use change (GWP-luluc) | **ODP**=Depletion potential of the stratosperic ozon layer (ODP) | **AP**=Acidification potential, Accumulated Exceedance (AP) | **EP-fw**=Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) | **EP-m**=Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine) | **EP-T**=Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | **POCP**=Formation potential of tropospheric ozone (POCP) | **ADP-mm**=Abiotic depletion potential for non fossil resources (ADP mm) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprication potential, deprivation-weighted water consumption (WDP)

5 Results

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PM	disease incidence	1.33E-7	8.05E-9	4.57E-8	1.87E-7	0.00E+0	1.10E-9	2.16E-8	1.81E-10	-3.00E-8
IR	kBq U235 eq.	6.83E-2	4.56E-4	5.83E-2	1.27E-1	0.00E+0	6.22E-5	9.25E-3	1.37E-5	-4.61E-2
ETP-fw	CTUe	1.45E+1	8.62E-1	7.33E+0	2.26E+1	0.00E+0	1.18E-1	2.99E+1	3.78E-1	-4.71E+0
HTP-c	CTUh	2.11E-9	4.32E-11	5.09E-10	2.66E-9	0.00E+0	5.90E-12	4.20E-10	7.47E-13	-5.62E-10
HTP-nc	CTUh	3.51E-8	9.38E-10	1.67E-8	5.27E-8	0.00E+0	1.28E-10	5.13E-9	2.03E-11	-1.57E-8
SQP	Pt	6.63E+0	9.22E-1	2.31E+1	3.07E+1	0.00E+0	1.26E-1	2.38E+0	5.80E-2	-2.18E+0

PM=Potential incidence of disease due to PM emissions (PM) | **IR**=Potential Human exposure efficiency relative to U235 (IRP) | **ETP-fw**=Potential Comparative Toxic Unit for ecosystems (ETP-fw) | **HTP-c**=Potential Comparative Toxic Unit for humans (HTP-c) | **HTP-nc**=Potential Comparative Toxic Unit for humans (HTP-nc) | **SQP**=Potential soil quality idex (SQP)

CLASSIFICATION OF DISCLAIMERS TO THE DECLARATION OF CORE AND ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD type / level 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2

5 Results

ILCD classification	Indicator	Disclaimer
	Potential Soil quality index (SQP)	2

Disclaimer 1 – This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

5.2 INDICATORS DESCRIBING RESOURCE USE AND ENVIRONMENTAL INFORMATION BASED ON LIFE CYCLE INVENTORY (LCI)

PARAMETERS DESCRIBING RESOURCE USE

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PERE	MJ	2.45E+0	1.65E-2	-1.92E+0	5.41E-1	0.00E+0	2.25E-3	3.31E-1	4.61E-4	-1.22E+0
PERM	MJ	0.00E+0	0.00E+0	6.58E+0	6.58E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	2.45E+0	1.65E-2	4.66E+0	7.13E+0	0.00E+0	2.25E-3	3.31E-1	4.61E-4	-1.22E+0
PENRE	MJ	3.89E+1	1.17E+0	2.16E+1	6.17E+1	0.00E+0	1.60E-1	4.25E+0	2.56E-2	-1.63E+1
PENRM	MJ	2.15E+1	0.00E+0	1.29E-1	2.16E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.01E+1
PENRT	MJ	6.05E+1	1.17E+0	2.17E+1	8.33E+1	0.00E+0	1.60E-1	4.25E+0	2.56E-2	-2.64E+1
SM	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	m^3	-1.64E-2	2.82E-4	1.63E-2	1.69E-4	0.00E+0	3.85E-5	4.02E-3	2.63E-5	-1.17E-2

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**=Net use of fresh water

5 Results

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
HWD	Kg	1.05E-4	7.45E-6	1.84E-4	2.96E-4	0.00E+0	1.02E-6	1.45E-5	1.27E-7	-4.77E-5
NHWD	Kg	3.06E-1	7.72E-2	2.03E-1	5.87E-1	0.00E+0	1.05E-2	3.57E-1	1.00E-1	-8.88E-2
RWD	Kg	4.71E-5	2.67E-7	6.78E-5	1.15E-4	0.00E+0	3.65E-8	6.63E-6	8.38E-9	-3.68E-5

HWD=Hazardous waste disposed | **NHWD**=Non-hazardous waste disposed | **RWD**=Radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
CRU	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	Kg	0.00E+0	0.00E+0	7.60E-3	7.60E-3	0.00E+0	0.00E+0	7.00E-1	0.00E+0	0.00E+0
MER	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	MJ	0.00E+0	0.00E+0	1.59E-2	1.59E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.33E+0
EEE	MJ	0.00E+0	0.00E+0	9.26E-3	9.26E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.74E-1

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy, Thermic | **EEE**=Exported Energy, Electric

5 Results

5.3 INFORMATION ON BIOGENIC CARBON CONTENT PER KILOGRAM

BIOGENIC CARBON CONTENT

The following Information describes the biogenic carbon content in (the main parts of) the product at the factory gate per kilogram:

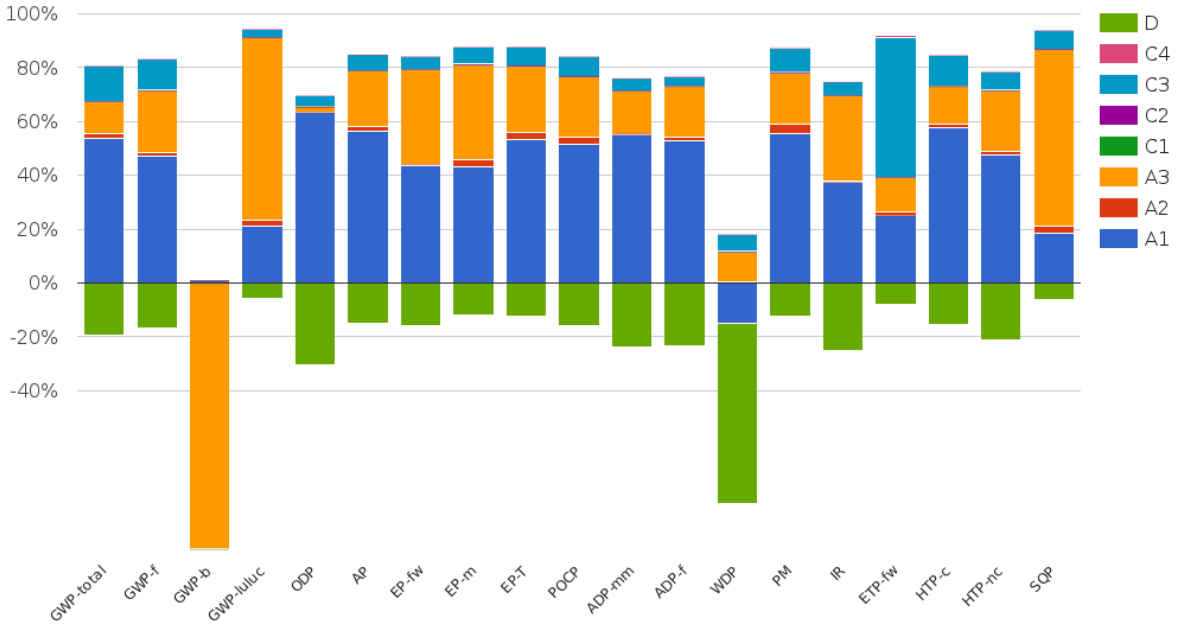
Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	0.2327	kg C

UPTAKE OF BIOGENIC CARBON DIOXIDE

The following amount of carbon dioxide uptake is taken into account. Related uptake and release of carbon dioxide in downstream processes are not taken into account in this number although they do appear in the presented results. One kilogram of biogenic Carbon content is equivalent to 44/12 kg of biogenic carbon dioxide uptake.

Uptake Biogenic Carbon dioxide	Amount	Unit
Packaging	0.8533	kg CO2 (biogenic)

6 Interpretation of results



A1 is responsible for a major of environmental impact in most categories. Especially with ADP-mm (Resource use minerals and metal), ADP-f (Resource use fossils) with between ~55% and ~65% each and ODP (Ozone depletion potential) with ~65% are impacted by A1. Another significant impactor is A3 in GWP-luluc (Global warming potential - land use and land use change) and SQP (potential soil quality index) with between ~65% and ~75%.

The majority of the CO2 emissions within the impact category GWP-biogenic originate from the packaging in A3. Since the module A5, which includes the waste processing of packaging, is not declared, there seems to be a disbalance of biogenic CO2 emissions. If A5 would be declared, this imbalance would disappear.

Lastly, C3 is responsible for ~50% of the impact in ETP-fw (Ecotoxicity freshwater).

7 References

ISO 14040
ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006

ISO 14044
ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14044:2006

ISO 14025
ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

EN 15804+A2
EN 15804+A2: 2019: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

Kiwa-EE GPI R.2.0 (2025)
Kiwa-Ecobility Experts, General Programme Instructions “Product Level”, SOP EE 1201_R.3.0 (03.06.2025)

Kiwa-EE GPI R.2.0 Annex B1 (2025)
Kiwa-Ecobility Experts, General Programme Instructions “Product Level” – Annex B1 Environmental Information Programme according to EN 15804 / ISO 21930 , SOP EE 1203_R.3.0 (03.06.2025)

Specific PCR
epd-norge - NPCR 030 version 1.1 - Part B for ventilation components (2021-05-18)

NMD
NATIONAL ENVIRONMENTAL DATABASE

ecoinvent database version 3.9.1

DIN 1986-100:2016-12
Drainage systems on private ground - Part 100: Specifications in relation to DIN EN 752 and DIN EN 12056

DIN 4102-1
Fire behavior of building materials and elements Section 1: Classification of building materials Requirements and tests

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