epd-global
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ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804+A2

Pfleiderer Deutschland GmbH
HDF



PFLEIDERER

Owner of the declaration
Pfleiderer Deutschland GmbH
Ingolstädter Str. 51
92318 Neumarkt i.d.OPf.
Germany

Product
HDF

Declared product / Declared unit
1 m³

This declaration is based on Product Category Rules
EN 15804:2012 + A2:2019,
NPCR Part A:2021 ,
NPCR 010 Part B for Building Boards ,
EN 16485:2014

Program operator:
EPD Global
Majorstuen P.O. Box 5250
N-0303 Oslo
Norway

Declaration number
NEPD-12488-12488-2

Registration number
NEPD-12488-12488-2

Issue date
19.10.2026

Valid to
18.10.2031

EPD Software
Emidat Platform v1.0.0

General Information

Product
HDF

Program Operator
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Declaration Number
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This declaration is based on Product Category Rules
EN 15804:2012 + A2:2019,
NPCR Part A:2021 ,
NPCR 010 Part B for Building Boards ,
EN 16485:2014

Statements
The owner of the declaration shall be liable for the underlying information and evidence. The Norwegian EPD Foundation shall not be liable with respect to manufacturer, life cycle assessment data and evidences.

Declared unit
1 m^3

General information on verification of EPD from EPD tools
Independent verification of data, other environmental information and the declaration according to ISO 14025:2011-10, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD Global's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD Global, and iii) the process is reviewed annually by an independent third-party verifier. See Appendix G of EPD Global's General Programme Instructions for further information on EPD tools.

Verification
Independent third-party verification based on the verification of the EPD tool, background data and test-EPD in accordance with EPD Global's procedures and guidelines for verification and approval of EPD tools.
Third-party verifier: Charlotte Merlin, FORCE Technology

Owner of the declaration
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Manufacturer
Pfleiderer Deutschland GmbH
Ingolstädter Str. 51
92318 Neumarkt i.d.OPf., Germany

Place of production
Mückendorf, Germany

Management system
ISO 14001 , ISO 45001 , ISO 50001 , ISO 9001

Issue date
19.10.2026

Valid to
18.10.2031

Year of study
2025

Comparability
EPDs of construction products may not be comparable if they do not comply with EN 15804 and are not seen in a building context. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database (including primary and secondary data).

Development and verification of EPD
The declaration was created using the Emidat EPD tool v1.0, developed by Emidat GmbH which is third-party verified and approved as a Reference Flow Tool with internal review under administration and surveillance by EPD Global under provisions stated in general information on verification of EPD from EPD tools.

Developer of EPD: Victor Lieber
Reviewer of company-specific input data and EPD: Nikolaus Seemann

Approved

Håkon Hauan, The Norwegian EPD Foundation

Product

Product description

The low-emission high-density fiberboards (HDF) from Pfleiderer Deutschland GmbH are panel-shaped wood-based materials made from fresh forest and sawmill residual wood. They mainly consist of defibrated wood particles and are pressed with thermosetting binders and additives.

The product properties comply with DIN EN13986, as well as DIN EN 622-1/ -2. The finished end product is not coated within the scope of this declaration.

For the placing of products on the market in the EU/EFTA (excluding Switzerland), Regulation (EU) No. 305/2011 of the European Parliament and of the Council of 9 March 2011 applies, which lays down harmonised conditions for the marketing of construction products and repeals Council Directive 89/106/EEC.

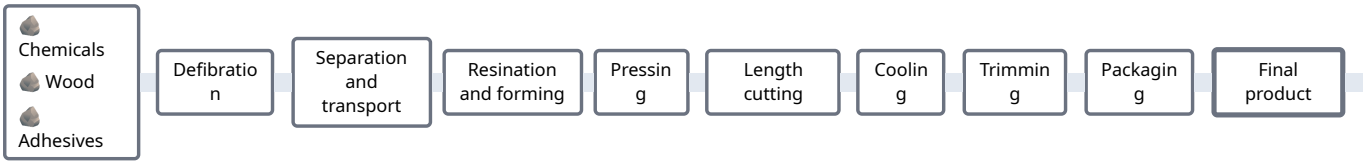
Application description

Wood-based boards like particleboard, MDF, and HDF are widely used in furniture manufacturing, cabinetry, and interior wall paneling due to their stability and ease of machining. They provide a smooth surface ideal for veneers, laminates, or paint. These boards are also commonly used in flooring underlays and door cores.

Guidance for installation

The product is suitable for use as a non-structural interior element under dry service conditions in accordance with EN 13986. For product-specific installation details and current usage recommendations, the user is referred to the manufacturer's installation documentation.

Production process



Product specification

Name of ingredient	Share of total weight
Adhesives	10 - 30 %
Chemicals	0 - 2 %
Wood	70 - 90 %

Packaging

Name	Quantity, kg
Polypropylene strapping bands	0.11
Softwood	9.99
Cardboard	0.20

Technical data

	Unit	Value
Mass	kg	900
Moisture content	%	6
Thermal conductivity	W / (mK)	0.1
Thickness	mm	4

The product is produced according to the product standard EN 622-2.

Scaling of LCA results

The results of this EPD are representative for HDF. The LCA results are assumed to scale linearly with the declared unit. The following conversion factors can be used to allow scaling to a different declared unit:

	Unit	Value
Volume	m^3	1
Mass	kg	900.00
Area	m^2	250.00

The scaling of LCA results assumes that transport and on-site activities (A4, A5, C1, C2) scale linearly with the declared unit. This assumption is considered to have negligible impact on the quality of the scaled results.

Market

Germany

Recipients

B2B

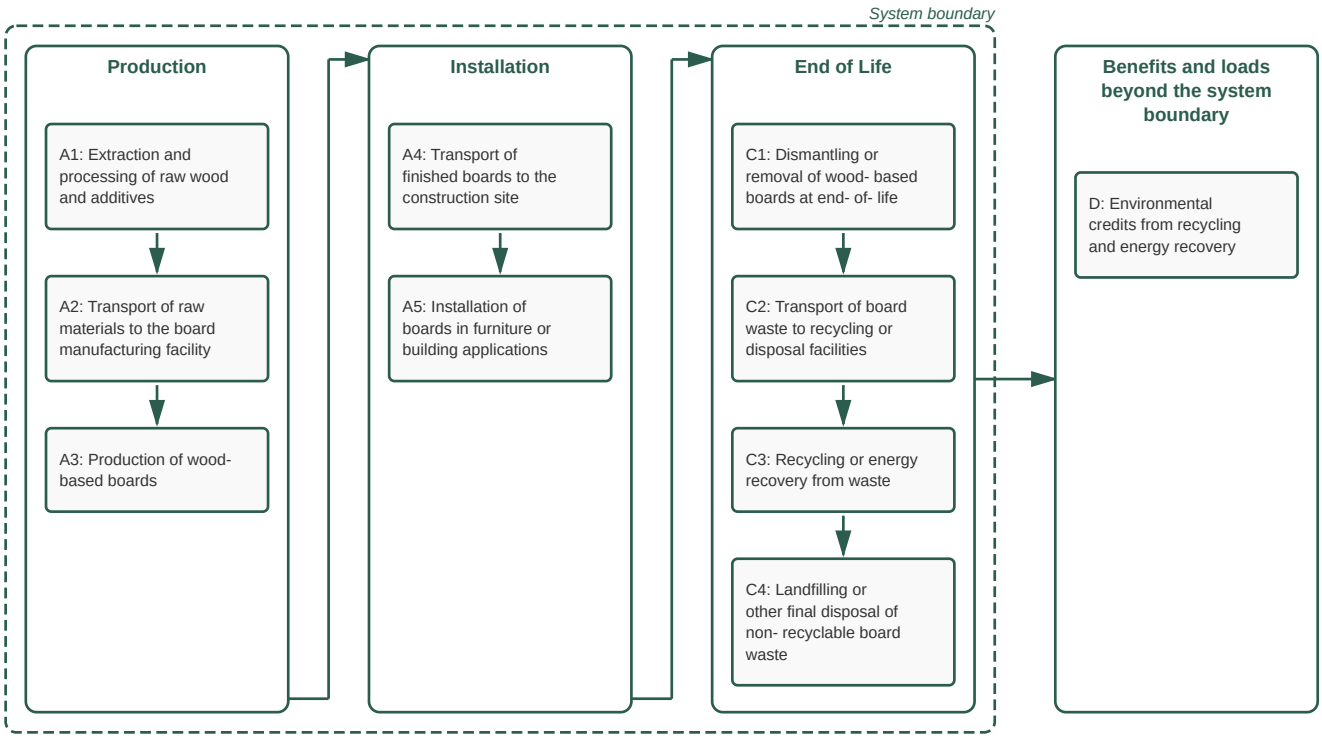
LCA: Calculation rules

Declared unit
1 m^3

Product lifetime
60 years
This value represents a conventional product lifespan, not a guaranteed performance duration, and assumes normal exposure conditions, adequate design, and routine maintenance.

Reference service life
Not declared

System boundary



Data quality
The foreground data are based on extensive and detailed data collection at the production site of the manufacturer, covering key processes such as raw material sourcing, formulation, and manufacturing. These foreground data are fully linked with corresponding datasets from the background database (ecoinvent 3.10) or with EN15804+A2-compliant EPDs, ensuring consistency, reliability, and maintaining alignment with the latest industry standards.

The overall data representativeness is rated as good with an overall score of 4.00/5, in accordance with EN 15804+A2 Annex E guidance on data quality assessment for the calculation of the environmental footprint of products (Table E.2), considering geographical, technical, and temporal representativeness.

The following table discloses all processes or activities assessed with very poor or poor data representativeness according to EN 15804+A2, as well as those assessed as fair that contribute more than 30 % to any core impact indicator in A1–A3:

Element	Source	Year
Adhesives	ecoinvent 3.10	2023
Chemical	ecoinvent 3.10	2023
For grinding	ecoinvent 3.10	2023
For wood	ecoinvent 3.10	2023
Gas	ecoinvent 3.10	2023
Incineration	ecoinvent 3.10	2023
Landfill	ecoinvent 3.10	2023
Manufacturing fuels	ecoinvent 3.10	2023
Packaging	ecoinvent 3.10	2023
Polypropylene strapping bands	ecoinvent 3.10	2023

System boundaries (X=included, MND=module not declared)

	Production			Installation		Use stage							End-of-Life				Next product system
	Raw material supply	Transport	Manufacturing	Transport	Installation Process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Demolition	Transport	Waste Processing	Disposal	Benefits and loads beyond the system boundary
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	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x
Geography			DE	DE	DE	MND	MND	MND	MND	MND	MND	MND	DE	DE	DE	DE	DE

For the geographies modeled in A1 and A2, refer to *Product specification*.

Type of EPD: Cradle to gate with options, modules A4, A5, C1-C4 + D

Stage of Material Production and Construction

Module A1: Extraction and processing of raw wood and additives
Module A2: Transport of raw materials to the board manufacturing facility
Module A3: Production of wood-based boards
Module A4: Transport of finished boards to the construction site
Module A5: Installation of boards in furniture or building applications

Disposal Stage

Module C1: Dismantling or removal of wood-based boards at end-of-life
Module C2: Transport of board waste to recycling or disposal facilities
Module C3: Recycling or energy recovery from waste
Module C4: Landfilling or other final disposal of non-recyclable board waste

Credits and burdens outside the system boundaries

Module D: Environmental credits from recycling and energy recovery

Cut-off criteria

All inputs and outputs related to the declared modules of High-density fibreboard, including raw materials, packaging, transportation, energy usage and ancillary materials, were comprehensively considered in line with EN 15804+A2 and if

applicable the product-specific PCR. Furthermore, all known hazardous substances (within the REACH list and the Norwegian Priority List), regulated materials, and significant emissions were declared and are not excluded under the cut-off rules.

The following processes are considered below the EN 15804+A2 cut-off threshold and were excluded:

- Impacts related to the manufacturer's infrastructure and assets
- Manufacturing of means of production, buildings or other capital goods
- Transportation of personnel to the plant
- Transportation of personnel within the plant
- Research and development activities
- Long-term emissions

Allocation

Foreground inventory data (energy and fuels, ancillary materials, emissions and waste) was collected at the production process level. Allocation based on mass was applied to allocate the total output of the production process in 2025 to the reference product.

Key assumptions and estimates

Production process flows are allocated to the reference product, as described under allocation. The mass-based allocation assumes a uniform distribution of production impacts across co-products. Foreground inventory data is checked for consistency of production process, to ensure the validity of the allocated results.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD. Mass and energy flows are reported per 1 m³ of product.

Transport to the building site (A4)	Value	Unit
Location of the production site	Germany	
Location of the installation site	Germany	
Transported mass: Product and packaging	910.30	kg
Transport modality: Truck	transport, freight, lorry >32 metric ton, EURO6	-
Distance	300.00	km
Litres of fuel	36.48	l / 100km
Energy demand	1.58	MJ / t*km
Energy demand (km)	1.44	MJ / km
Capacity utilization	53.30	%

Transport of the product and its packaging from the production site to the installation site. Transport distances are based on external sources such as reported market averages, standards or PCRs. Vehicle type, fuel consumption and capacity utilization assumptions stem from the underlying background transport datasets and are stated below.

Installation into the building (A5)	Value	Unit
Ancillary materials for installation		
Acrylic-based primer	0	kg
Paint	0	kg
Jointing compound	0	kg
Jointing tape	0	kg
Water use during installation	0	m³
Use of other resources during installation	0	kg
Energy consumption during installation		
Diesel for installation equipment	0	l
Electricity for installation equipment	0	kWh
Material waste on the construction site before waste processing		
Polypropylene strapping bands	0.11	kg
Softwood	9.99	kg
Cardboard	0.20	kg
Product installation loss	5.00	%
Product installation loss	45.00	kg
Direct emissions to ambient air, soil and water	0	kg
Treatment of packaging waste	Polypropylene strapping bands	
Landfill	23.00	%
Recycling	42.00	%
Incineration	35.00	%

Installation into the building (A5)	Value	Unit
Treatment of packaging waste	Softwood	
Landfill	32.00	%
Recycling	38.00	%
Incineration	30.00	%
Treatment of packaging waste	Cardboard	
Landfill	5.00	%
Recycling	87.00	%
Incineration	8.00	%
Treatment of installation loss waste		
Incineration	100.00	%

Installation losses are accounted for by scaling up the quantity of product required at the construction site by the loss percentage. The production, transportation and treatment of the lost material is assigned to A5. Fasteners (screws) and other additional materials are not included, these are expected to be included at building level assessments. As installation is carried out manually, no installation energy use is included in module A5.

End-of-life scenario (C1-C4)	Value	Unit
Collection process specified by type		
Collected individually	0	kg
Collected with mixed construction and demolition waste	900.00	kg
Recovery system specified by type		
Destined for reuse	0	kg
Destined for recycling	0	kg
Destined for energy recovery	898.55	kg
Destined for energy recovery (Plastics)	118.94	kg
Destined for energy recovery (Wood)	779.61	kg
Disposal specified by type		
Product or material destined for final disposal (Others)	1.45	kg
Transport		
Distance to incineration	50.00	km
Distance to landfill	50.00	km
Transport modality: Truck	transport, freight, lorry >32 metric ton, EURO6	-
Energy demand	1.58	MJ / t*km
Energy demand (km)	1.42	MJ / km
Capacity utilization	53.30	%

For the manual deconstruction of the product, no environmental impact is modeled. Module C2 includes the impact of transportation of material after deconstruction, during the End-of-Life stage.

Reuse, recovery and/or recycling potentials (D)	Value	Unit
Amount of secondary material that the system takes in	0	kg
Installation (packaging): Material for recycling/reuse	4.02	kg
Installation (packaging): Net flow of secondary material	4.02	kg
End-of-life (product): Net flow of secondary material	0	kg
Substitution of plastics	0.05	kg
Substitution of wood chips	3.80	kg
Substitution of paper	0.17	kg
Installation (packaging): Material eligible for incineration credits	3.05	kg
Installation (packaging): Exported energy eligible for credits	21.92	MJ
Installation (production loss): Material eligible for incineration credits	45.00	kg
Installation (production loss): Exported energy eligible for credits	320.15	MJ
End-of-life (product): Material eligible for incineration credits	898.55	kg
End-of-life (product): Exported energy eligible for credits	6402.98	MJ
Substitution of electricity production, grid mix	1913.02	MJ
Substitution of heat production from natural gas	4832.02	MJ

Calculation of loads and benefits per EN 15804+A2. Exported energy is credited only where it originates from the incineration of primary material; landfilled fractions receive no exported-energy credit and therefore no avoided primary energy consumption. Recycling or reuse benefits are credited for the net flow of secondary material.

LCA: Results

The following results are based on the market-based electricity approach applied to the foreground system (A3). Further details on electricity data are provided in the Additional Requirements section.

Core environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2-eq.	-7.95e+02	2.83e+01	4.63e+01	0.00e+00	4.66e+00	1.63e+03	8.52e-03	-6.21e+02
GWP-fossil	kg CO_2-eq.	5.01e+02	2.83e+01	2.77e+01	0.00e+00	4.66e+00	2.95e+02	8.52e-03	-5.96e+02
GWP-biogenic	kg CO_2-eq.	-1.30e+03	1.42e-02	1.85e+01	0.00e+00	2.34e-03	1.33e+03	0.00e+00	-2.48e+01
GWP-luluc	kg CO_2-eq.	1.80e+00	1.00e-02	9.09e-02	0.00e+00	1.65e-03	4.80e-03	1.37e-06	-4.90e-01
ODP	kg CFC-11-Eq	8.57e-06	5.89e-07	4.75e-07	0.00e+00	9.71e-08	2.40e-07	3.18e-10	-1.84e-05
AP	mol H+-Eq	3.10e+00	6.68e-02	1.67e-01	0.00e+00	1.10e-02	1.90e-01	5.30e-05	-7.15e-01
EP-freshwater	kg P-Eq	1.51e-01	1.99e-03	8.04e-03	0.00e+00	3.28e-04	6.14e-03	3.87e-07	-3.11e-01
EP-marine	kg N-Eq	8.91e-01	1.75e-02	5.10e-02	0.00e+00	2.89e-03	1.03e-01	2.27e-05	-2.48e-01
EP-terrestrial	mol N-Eq	1.00e+01	1.89e-01	5.53e-01	0.00e+00	3.12e-02	9.54e-01	2.48e-04	-2.04e+00
POCP	kg NMVOC-Eq	3.62e+00	1.16e-01	1.99e-01	0.00e+00	1.91e-02	2.40e-01	1.00e-04	-1.00e+00
ADPE	kg Sb-Eq	3.57e-03	8.08e-05	1.85e-04	0.00e+00	1.33e-05	4.51e-05	1.09e-08	-5.58e-04
ADPF	MJ, net calorific value	7.53e+03	4.25e+02	4.11e+02	0.00e+00	7.00e+01	1.63e+02	2.12e-01	-9.45e+03
WDP	m^3 world Eq deprived	5.60e+02	2.13e+00	2.97e+01	0.00e+00	3.51e-01	4.40e+01	7.19e-04	-5.34e+01

GWP-total: Global Warming Potential - total , **GWP-fossil**: Global warming potential - fossil , **GWP-biogenic**: Global Warming Potential - biogenic , **GWP-luluc**: Global Warming Potential - luluc , **ODP**: Depletion potential of the stratospheric ozone layer , **AP**: Acidification potential, Accumulated Exceedance , **EP-freshwater**: Eutrophication potential - freshwater , **EP-marine**: Eutrophication potential - marine , **EP-terrestrial**: Eutrophication potential - terrestrial , **POCP**: Photochemical Ozone Creation Potential , **ADPE**: Abiotic depletion potential - non-fossil resources , **ADPF**: Abiotic depletion potential - fossil resources , **WDP**: Water (user) deprivation potential

Additional indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	disease incidence	2.17e-04	2.75e-06	1.11e-05	0.00e+00	4.54e-07	1.74e-06	1.34e-09	-3.88e-06
IRP	kBq U235-Eq	2.20e+01	5.16e-01	1.16e+00	0.00e+00	8.50e-02	2.25e-01	1.81e-04	-5.67e+01
ETP-fw	CTUe	5.93e+03	1.01e+02	3.12e+02	0.00e+00	1.66e+01	7.10e+02	2.17e-02	-1.08e+03
HTP-c	CTUh	1.08e-05	1.81e-07	5.66e-07	0.00e+00	2.98e-08	2.85e-07	3.58e-11	-9.62e-07
HTP-nc	CTUh	6.40e-06	2.80e-07	4.33e-07	0.00e+00	4.61e-08	2.37e-06	3.28e-11	-2.06e-06
SQP	dimensionless	8.75e+04	4.27e+02	4.40e+03	0.00e+00	7.04e+01	4.56e+01	4.29e-01	-7.30e+02

PM: Potential incidence of disease due to PM emissions , **IRP**: Potential Human exposure efficiency relative to U235 , **ETP-fw**: Potential Comparative Toxic Unit for ecosystems , **HTP-c**: Potential Comparative Toxic Unit for humans - cancer effects , **HTP-nc**: Potential Comparative Toxic Unit for humans - non-cancer effects , **SQP**: Potential Soil quality index . **IRP**: 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. **ETP-fw, HTP-c, HTP-nc, SQP**: The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with these indicators.

Use of resources

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	6.26e+03	6.74e+00	1.06e+03	0.00e+00	1.11e+00	1.40e+04	4.34e-03	-8.40e+02
PERM	MJ	1.41e+04	0.00e+00	-1.11e+02	0.00e+00	0.00e+00	-1.40e+04	0.00e+00	-6.80e+01
PERT	MJ	2.04e+04	6.74e+00	9.54e+02	0.00e+00	1.11e+00	4.86e+00	4.34e-03	-9.08e+02
PENRE	MJ	5.86e+03	4.25e+02	4.13e+02	0.00e+00	7.00e+01	1.84e+03	2.12e-01	-9.45e+03
PENRM	MJ	1.69e+03	0.00e+00	-3.48e+00	0.00e+00	0.00e+00	-1.68e+03	0.00e+00	-1.94e+00
PENRT	MJ	7.54e+03	4.25e+02	4.09e+02	0.00e+00	7.00e+01	1.63e+02	2.12e-01	-9.45e+03
SM	kg	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	4.02e+00
RSF	MJ	3.87e+03	0.00e+00	1.93e+02	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	m^3	1.37e+01	6.17e-02	6.86e-01	0.00e+00	1.02e-02	4.75e-01	2.41e-04	-1.77e+00

PERE: Primary energy resources - renewable: use as energy carrier , **PERM**: Primary energy resources - renewable: used as raw materials , **PERT**: Primary energy resources - renewable: total , **PENRE**: Primary energy resources - non-renewable: use as energy carrier , **PENRM**: Primary energy resources - non-renewable: used as raw materials , **PENRT**: Primary energy resources - non-renewable: total , **SM**: Use of secondary material , **RSF**: Renewable secondary fuels , **NRSF**: Non-renewable secondary fuels , **FW**: Net use of fresh water

Waste flows

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	3.60e-01	0.00e+00	1.80e-02	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
NHWD	kg	5.96e+01	0.00e+00	5.43e+01	0.00e+00	0.00e+00	8.99e+02	1.45e+00	0.00e+00
RWD	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

HWD: Hazardous waste disposed , **NHWD**: Non hazardous waste disposed , **RWD**: Radioactive waste disposed

Output flows

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
CRU	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
MFR	kg	6.04e-04	0.00e+00	4.02e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
MER	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
EEE	MJ	3.96e+01	0.00e+00	9.90e+01	0.00e+00	0.00e+00	1.82e+03	0.00e+00	0.00e+00
EET	MJ	8.44e+01	0.00e+00	2.49e+02	0.00e+00	0.00e+00	4.59e+03	0.00e+00	0.00e+00

CRU: Components for re-use , **MFR**: Materials for recycling , **MER**: Materials for energy recovery , **EEE**: Exported electrical energy , **EET**: Exported thermal energy

Name	Value	Unit
Biogenic carbon content in product	3.63e+02	kg C
Biogenic carbon content in accompanying packaging	4.57e+00	kg C

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

Electricity consumption in the manufacturing phase is composed from the sources below. This EPD follows the market-based approach.

Approach	Electricity	Quantity [kWh]	Emission Factor [kg CO_2e/kWh]
market-based	ecoinvent: electricity, medium voltage, residual mix (DE)	42.50	0.80
(location-based)	(ecoinvent: market for electricity, medium voltage (DE))	(42.50)	(0.46)

Rows marked with () are provided for reference and not used in the assessment.

Dangerous substances

The product contains no hazardous substances given by the REACH Candidate List or the Norwegian Priority List.

Additional environmental information

Secondary content

The product contains 0 % secondary material. Secondary material includes recycled, recovered and by-product content.

Additional environmental impact indicators required in NPCR Part A for construction products

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-IOBC	kg CO_2-eq.	5.18e+02	2.83e+01	2.87e+01	0.00e+00	4.66e+00	2.95e+02	8.52e-03	-5.98e+02

GWP-IOBC: Global Warming Potential - Instantaneous oxidation of biogenic carbon

Bibliography

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EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
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