Environmental Product Declaration

In accordance with ISO 14025 and EN 15804 +A2

Smartpanel MDF panels



The Norwegian
EPD Foundation

Owner of the declaration:
Smartpanel AS
Habroveien 50
1630 Gamle Fredrikstad

Product name:
Smartpanel MDF panels

Declered unit:
1m2 of installed Smartpanel MDF panel, including waste treatment at end-of-life.

This declaration is based on Product Category Rules:
NPCR 03.2021 Part A. Construction products and services vers.2; ; NPCR 010:03.2022 Part B for building boards (references to EN 15804 +A2).

Program operator:
The Norwegian EPD Foundation

Declaration number:
NEPD-6711-6036-EN

Registration number:
NEPD-6711-6036-EN

Issue date: 31.05.2024
Valid to: 31.05.2029

General information

Product:
Smartpanel MDF panels

Program Operator:
The Norwegian EPD Foundation
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Declaration Number:
NEPD-6711-6036-EN

This declaration is based on Product Category Rules:
NPCR Part A. Construction products and services vers.2; NPCR 010:03.2022 Part B for building boards (references to EN 15804 +A2).

Statements:
The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturers life cycle assessment data and evidence.

Declared unit:
1m2 of installed Smartpanel MDF panel, including waste treatment at end-of-life.

Declared unit with option:
N/A

Functional unit:
N/A

Verification:
Independent verification of the declaration and data. according to ISO14025:2010

internal ☐ external ☒

Gaylord K. Booto

Independent verifier approved by EPD Norway

Owner of the declaration:
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Manufacturer:
Smartpanel AS
Habroveien 50, 1630 Gamle Fredrikstad
Phone: +47 6992 1920
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Place of production:
Gamle Fredrikstad, Norway

Management system:
Factory Production Control System

Organisation no:
921 075 197

Issue date:
31.05.2024

Valid to:
31.05.2029

Year of study:
2022

Comparability:
EPD of construction products may not be comparable if they do not comply with EN 15804:2012+A2:2019 and seen in a building context.

The EPD has been worked out by:
Maciej Biedacha and Lars G. Tellnes

Approved (Manager of EPD Norway)

Product

Product description:

Smartpanel are medium density fibreboards (MDF) for general use in dry conditions, designed to allow easy application on walls and ceilings with reduced need of auxiliary materials, available in painted or unpainted variants.



Product specification:

The main materials used in the manufacturing of Smartpanel are listed in the table under. Values are given for 1m² of the product.

Materials	kg	%
Particle board (MDF)	7,76	93,3 %
Water	0,47	5,6 %
Primer	0,02	0,2 %
Paint	0,06	0,7 %
UV lacquer	0,01	0,1 %
TOTAL	8,32	100,0 %
Wood packaging	0,10	
Plastic packaging	0,01	
Paper packaging	0,01	
Total incl. packaging	8,43	

Technical data:

The standard dimensions of the plates are 2390 mm x 620 mm with thickness of 11 mm. The density of the product is approximately 705 kg/m3. Physical properties of the Smartpanel are presented in the table below. Additional technical information can be found in Declaration of Performance Nr. 001/SP-DoP-2020/rev.2.

Property	Standard EN	Value	Unit	Tolerance
Thickness	324-1	11	mm	± 0.4 mm
Density	323	> 710	kg/m³	-
Width	324-1	620	mm	± 0.5 mm
Length	324-1	2390	mm	± 1 mm

Market:

Nordic and European market.

Reference service life for product:

Reference service life is assumed to be equal with a reference study period of 60 years for a building.

Reference service life for building:

60 years.

LCA: Calculation rules

Declared unit:

The declared unit used for the calculations was 1 m^2 of installed Smartpanel MDF boards, including waste treatment at end-of-life.

Data quality:

The Ecoinvent database (version 3.8) was used as the main source of data for modelling the background system. Specific system data were collected by the manufacturer for the year 2022 and provided to the developer of the EPD using an appropriate data collection file. Part of data for MDF boards was taken from an EPD (EPD-KRO-20230159-CBA1-EN).

Allocation:

Allocation was done based on specifications stated in the newly published standard EN 15804 + A2:2019. Energy and water use as well as generated waste were allocated evenly to the product using mass allocation. Material recycling and transport was also allocated accordingly.

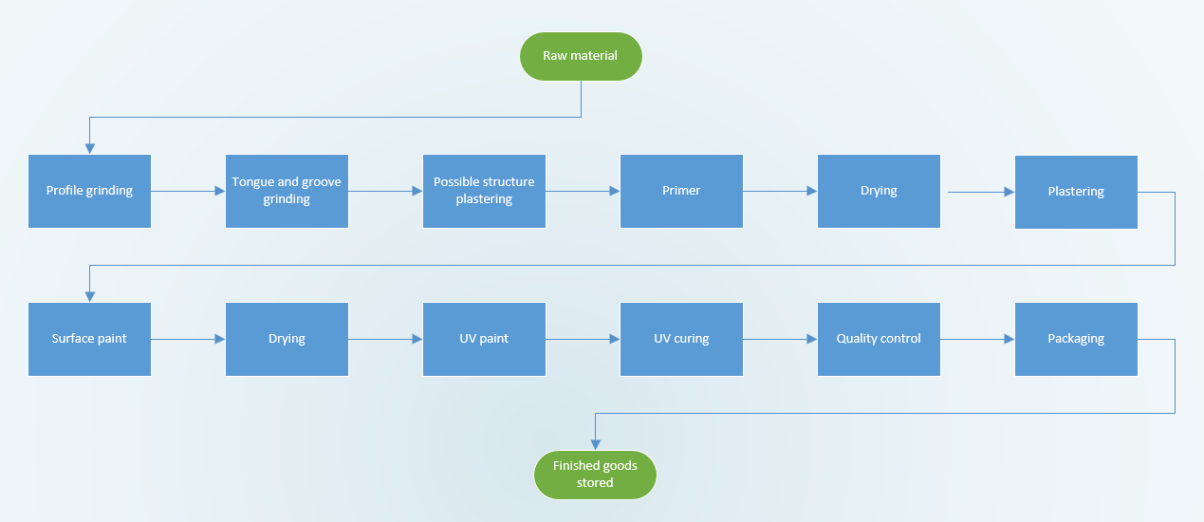


Figure 1. Flow diagram of the production of Smartpanel.

System boundary

For readability of the figure processes from module A3 are detailed presented in figure 1 on page 5.

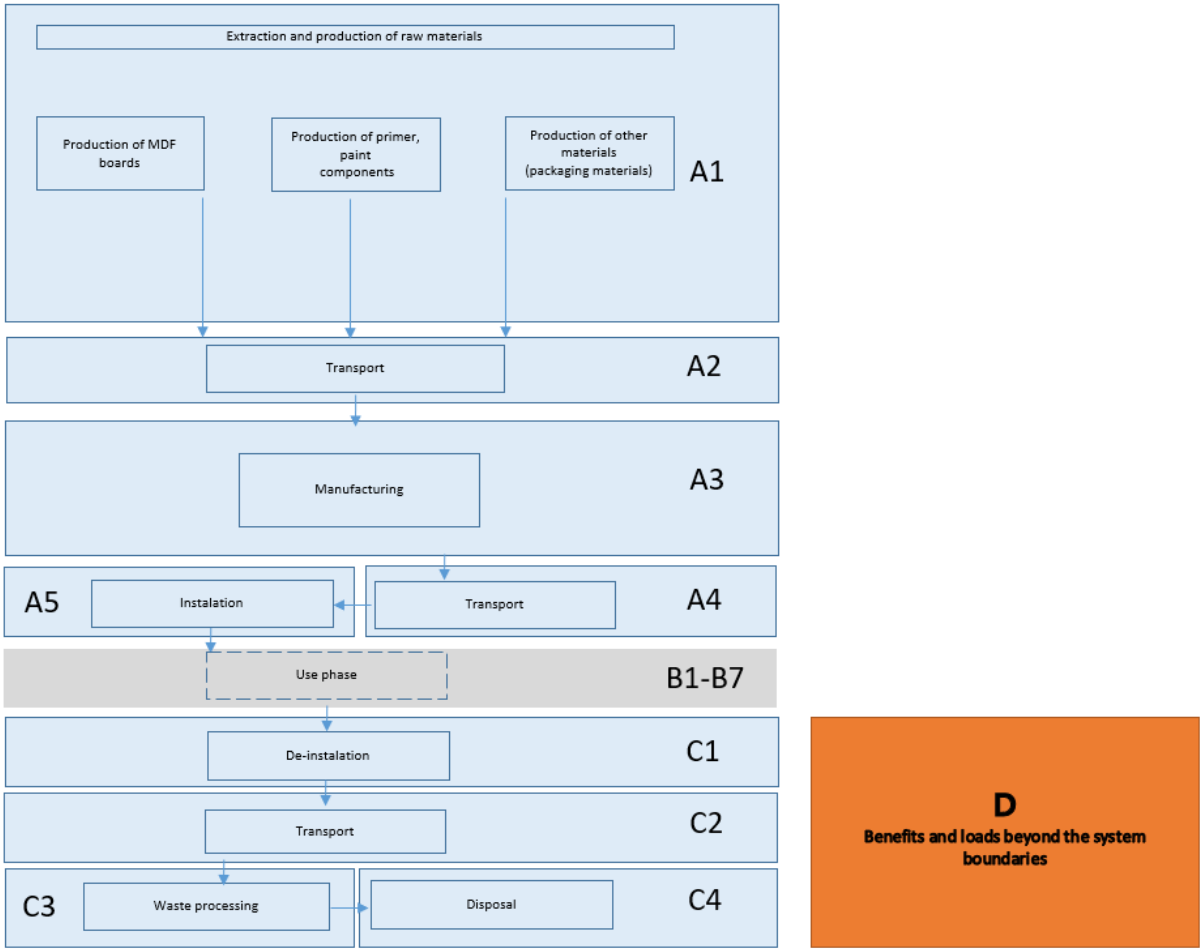


Figure 2. System boundaries.

The phases described below were conducted in accordance with specifications in the new EN15804 + A2:2019 and provisions defined in the same standard for EPD cradle to gate with options, modules C1-C4 and module D. The studied system includes the following modules: A1(raw materials), A2 (transport of raw materials), A3 (manufacturing), A4 (transport to the construction site), A5 (Assembly), C1 (disassembly), C2 (transport to waste processing), C3 (waste processing), C4 (waste disposal), and D (benefits beyond the system boundaries). The use of Smartpanel does not require any material or energy use. Maintenance is expected to be negligible. Therefore, modules B1-B7 are not modelled here.

Cut-off criteria:

All the raw materials used are included in the calculations. For some raw materials, proxy datasets were used in the model as approximations. This does not include hazardous materials. The calculations include 100% of materials that make up the product and the packaging.

LCA: Scenarios and additional technical information

The following information describes the scenarios in the different modules of the EPD.

For transport to a recycling facility, incineration and landfill, distances of 300 and 85 km have been used in this assessment.

Transport from production place to assembly/user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance (km)	Fuel/Energy consumption (l/tkm)	Value (l/t)
Truck	68.3	Euro 6 [> 32t. diesel]	300	0.01	4.59

Assessed transport scenario considers the distance of 300 km to the building site in Norway is taken as an average distance based on default values given in NPCR 010:2022 Part B for building boards version 4. Capacity utilisation was calculated based on average load factor declared by Smartpanel AS and generic capacity utilisation from ecoinvent.

Assembly (A5)

	Unit	Value
Material loss	kg	0.42
Output materials for waste treatment (packaging)	kg	0.12

The installation of the Smartpanel boards requires marginal amount of auxiliary materials or energy. Losses of 5% are assumed to occur in this stage. After the installation of the components, the resulting packaging waste is sorted and sent either for recycling or for energy recovery, accordingly.

End of Life (C1, C3 and C4)

	Unit	Value
Hazardous waste disposed	kg	-
Collected as mixed construction waste	kg	8.32
Reuse	kg	-
Recycling	kg	-
Incineration	kg	8.32
To landfill	kg	0

No hazardous materials are disposed.

In considered scenario 100% of waste Smartpanel is assumed to be collected and sent to incineration.

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance (km)	Fuel/Energy consumption (l/tkm)	Value (l/t)
Truck	53%	Euro 6 [> 16-32t. diesel]	85	0.015	2.65

Transport for distances refers to incineration facilities.

Benefits and loads beyond the system boundaries (D)

	Unit	Value
Electricity substitution	MJ	10.61
Thermal heat substitution	MJ	121.26
Avoided materials	kg	0.007

Electricity and thermal heat substitution data are taken from Statistic Norway (SSB) with 2021 as the basis year.

LCA: Results

All result were obtained with use of LCA software SimaPro version 9.3.03 (2021), Ecoinvent v 3.8 and methods according to EN15804+A2:2019.

System boundaries (X=included. MND= module not declared. MNR=module not relevant)

Product stage			Assembly stage		Use stage							End of life stage				Benefits & loads beyond system boundary
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

Core environmental impact indicators

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5
GWP-total	kg CO2 eq.	-9.76E+00	4.22E-01	1.66E+00	-7.68E+00	1.73E-01	5.47E-01
GWP-fossil	kg CO2 eq.	4.19E+00	4.21E-01	1.13E+00	5.74E+00	1.73E-01	3.84E-01
GWP-biogenic	kg CO2 eq.	-1.41E+01	2.79E-04	5.26E-01	-1.35E+01	1.38E-04	1.57E-01
GWP-LULUC	kg CO2 eq.	1.27E-01	2.18E-04	1.37E-03	1.28E-01	8.45E-05	6.45E-03
ODP	kg CFC11 eq.	2.89E-07	9.12E-09	1.74E-08	3.15E-07	3.93E-09	1.70E-08
AP	mol H^+ eq.	1.99E-02	2.66E-03	8.40E-03	3.10E-02	4.29E-04	1.81E-03
EP-freshwater	kg P eq.	1.48E-04	3.25E-06	4.67E-05	1.98E-04	1.45E-06	1.05E-05
EP-marine	kg N eq.	3.38E-03	6.86E-04	1.39E-03	5.46E-03	1.14E-04	3.75E-04
EP-terrestrial	mol N eq.	4.18E-02	7.45E-03	2.70E-02	7.62E-02	1.20E-03	4.94E-03
POCP	kg NMVOC eq.	1.35E-02	2.79E-03	5.47E-03	2.18E-02	7.00E-04	1.42E-03
ADP-M&M	kg Sb eq.	3.75E-05	1.07E-06	1.93E-05	5.78E-05	4.85E-07	3.33E-06
ADP-fossil	MJ	7.03E+01	6.22E+00	1.21E+01	8.86E+01	2.63E+00	4.79E+00
WDP	m^3	4.10E+00	2.78E-02	1.12E+00	5.25E+00	1.26E-02	2.71E-01

Indicator	Unit	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	3.48E-03	6.60E-02	1.40E+01	6.20E-04	-1.88E+00
GWP-fossil	kg CO2 eq.	3.35E-03	6.59E-02	1.03E+00	6.18E-04	-1.01E+00
GWP-biogenic	kg CO2 eq.	1.04E-04	5.26E-05	1.29E+01	1.49E-06	-8.25E-01
GWP-LULUC	kg CO2 eq.	2.26E-05	3.21E-05	7.42E-05	5.46E-07	-4.60E-02
ODP	kg CFC11 eq.	9.89E-11	1.50E-09	1.65E-08	1.87E-11	-1.24E-07
AP	mol H^+ eq.	3.60E-05	1.63E-04	3.44E-03	3.69E-06	-1.02E-02
EP-freshwater	kg P eq.	2.29E-07	5.52E-07	5.56E-06	5.79E-09	-9.11E-05
EP-marine	kg N eq.	3.37E-06	4.35E-05	1.61E-03	1.45E-06	-3.58E-03
EP-terrestrial	mol N eq.	4.36E-05	4.56E-04	1.80E-02	1.56E-05	-3.85E-02
POCP	kg NMVOC eq.	1.29E-05	2.66E-04	4.77E-03	6.16E-06	-1.08E-02
ADP-M&M	kg Sb eq.	3.77E-07	1.84E-07	4.62E-07	1.11E-09	-1.44E-05
ADP-fossil	MJ	6.54E-02	1.00E+00	1.91E+00	1.54E-02	-1.62E+01
WDP	m^3	2.90E-03	4.78E-03	7.52E-02	2.29E-04	-4.43E-01

GWP-total: *Global Warming Potential;* ***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; See "additional Norwegian requirements" for indicator given as PO4 eq.* ***EP-marine:*** *Eutrophication potential. fraction of nutrients reaching freshwater end compartment;* ***EP-terrestrial:*** *Eutrophication potential. Accumulated Exceedance;* ***POCP****: Formation potential of tropospheric ozone;* ***ADP-M&M****: Abiotic depletion potential for non-fossil resources (minerals and metals);* ***ADP-fossil:*** *Abiotic depletion potential for fossil resources;* ***WDP:*** *Water deprivation potential. deprivation weighted water consumption*

Additional environmental impact indicators

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5
PM	Disease incidence	3.85E-07	3.75E-08	1.27E-07	5.50E-07	1.71E-08	3.04E-08
IRP	kBq U235 eq.	1.07E-01	2.79E-03	3.54E-02	1.45E-01	1.26E-03	8.76E-03
ETP-fw	CTUe	4.65E+01	3.26E+00	1.12E+01	6.10E+01	1.38E+00	3.45E+00
HTP-c	CTUh	4.30E-09	1.85E-10	4.57E-09	9.06E-09	7.71E-11	6.11E-10
HTP-nc	CTUh	4.25E-08	5.30E-09	3.81E-08	8.59E-08	2.37E-09	5.61E-09
SQP	Dimensionless	2.00E+02	5.64E+00	7.89E+01	2.84E+02	2.67E+00	1.45E+01

Indicator	Unit	C1	C2	C3	C4	D
PM	Disease incidence	2.28E-10	6.51E-09	2.63E-08	8.26E-11	-6.98E-07
IRP	kBq U235 eq.	1.32E-03	4.81E-04	2.16E-03	6.49E-06	-1.16E-01
ETP-fw	CTUe	4.01E-02	5.23E-01	5.19E+00	5.47E-02	-9.49E+01
HTP-c	CTUh	8.71E-12	2.93E-11	2.79E-09	3.47E-10	-1.72E-09
HTP-nc	CTUh	4.10E-10	9.01E-10	1.12E-08	2.82E-10	-1.05E-07
SQP	Dimensionless	3.10E-02	1.02E+00	4.14E-01	3.87E-02	-1.34E+02

PM: *Particulate matter emissions;* ***IRP:*** *Ionising radiation. human health;* ***ETP-fw:*** *Ecotoxicity (freshwater);* ***HTP-c:*** *Human toxicity. cancer effects;* ***HTP-nc:*** *Human toxicity. non-cancer effects;* ***SQP:*** *Land use related impacts / soil quality*

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
	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 are 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.

Resource use

Parameter	Unit	A1	A2	A3	A4	A5
RPEE	MJ	2.55E+01	8.53E-02	8.56E+00	3.42E+01	3.85E-02
RPEM	MJ	1.66E+02	0.00E+00	0.00E+00	1.66E+02	0.00E+00
TPE	MJ	1.92E+02	8.53E-02	8.56E+00	2.00E+02	3.85E-02
NRPE	MJ	7.22E+01	6.22E+00	1.21E+01	9.05E+01	2.63E+00
NRPM	MJ	7.56E-02	0.00E+00	0.00E+00	7.56E-02	0.00E+00
TRPE	MJ	7.22E+01	6.22E+00	1.21E+01	9.05E+01	2.63E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	2.73E+01	0.00E+00	0.00E+00	2.73E+01	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
W	m^3	2.30E-01	9.19E-04	7.26E-02	3.04E-01	4.13E-04

Parameter	Unit	C1	C2	C3	C4	D
RPEE	MJ	4.03E-01	1.47E-02	8.29E-02	3.22E-04	-1.03E+02
RPEM	MJ	0.00E+00	0.00E+00	-1.44E+02	0.00E+00	0.00E+00
TPE	MJ	4.03E-01	1.47E-02	-1.44E+02	3.22E-04	-1.03E+02
NRPE	MJ	6.55E-02	1.00E+00	1.02E+01	1.54E-02	-1.62E+01
NRPM	MJ	0.00E+00	0.00E+00	-8.27E+00	0.00E+00	0.00E+00
TRPE	MJ	6.55E-02	1.00E+00	1.91E+00	1.54E-02	-1.62E+01
SM	kg	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	-4.78E-03
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
W	m3	2.85E-03	1.57E-04	5.89E-03	1.73E-05	-2.90E-01

RPEE *Renewable primary energy resources used as energy carrier;* ***RPEM*** *Renewable primary energy resources used as raw materials;* ***TPE*** *Total use of renewable primary energy resources;* ***NRPE*** *Nonrenewable primary energy resources used as energy carrier;* ***NRPM*** *Nonrenewable primary energy resources used as materials;* ***TRPE*** *Total use of nonrenewable primary energy resources;* ***SM*** *Use of secondary materials;* ***RSF*** *Use of renewable secondary fuels;* ***NRSF*** *Use of nonrenewable secondary fuels;* ***W*** *Use of net fresh water*

End of life - Waste

Parameter	Unit	A1	A2	A3	A4	A5
CR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	kg	4.88E-03	0.00E+00	1.10E-02	0.00E+00	8.14E-03
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.65E-03
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.68E-01
ETE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.32E+00

Parameter	Unit	C1	C2	C3	C4	D
CR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	9.30E-02	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	8.88E+00	0.00E+00	0.00E+00
ETE	MJ	0.00E+00	0.00E+00	1.01E+02	0.00E+00	0.00E+00

CR *Components for reuse;* ***MR*** *Materials for recycling;* ***MER*** *Materials for energy recovery;* ***EEE*** *Exported electric energy;* ***ETE*** *Exported thermal energy*

Reading example: 9.0 E-03 = 9.0*10-3 = 0.009

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in the product	kg C	3.59
Biogenic carbon content in the accompanying packaging	kg C	0.05

Biogenic carbon contents are calculated for the wooden materials only.

Additional Norwegian requirements

Greenhous gas emission from the use of electricity in the manufacturing phase

For the calculation electricity low voltage has been applied (A3).

National electricity grid	Unit	Value
El-mix low-voltage Norway (ecoinvent 3.8)	g CO_2 -eq/kWh	34.8
El-mix medium-voltage Norway (ecoinvent 3.8)	g CO_2 -eq/kWh	28.2

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

In order to increase the transparency of biogenic carbon contribution to climate impact. The results for indicator GWP-IOBC have been presented below:

GWP-IOBC Climate impacts calculated according to the principle of instantaneous oxidation.

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5
GWP-IOBC	kg CO2 eq.	3.00E+00	4.22E-01	1.15E+00	4.57E+00	1.73E-01	3.26E-01

Indicator	Unit	C1	C2	C3	C4	D
GWP-IOBC	kg CO_2 eq.	3.41E-03	6.59E-02	1.03E+00	6.19E-04	-1.07E+00

GWP-IOBC *Global warming potential calculated according to the principle of instantaneous oxidation.*

Hazardous substances

The declaration is based upon reference to threshold values and/or test results and/or material safety data sheets provided to EPD verifiers. Documentation available upon request to EPD owner.

- ☐ The product contains no substances given by the REACH Candidate list or the Norwegian priority list.
- ☒ Product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0.1 % by weight.
- ☐ The product contains dangerous substances more than 0.1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- ☐ The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskiften. Annex III). see table.

Indoor environment

Detailed description of performed tests and product characteristics is given in DoP for the product group.

Carbon footprint

Calculations related to climate change and global warming potential (GWP) include greenhouse gas emissions from fossil sources and land use change connected to extraction of raw materials. Biogenic emissions of CO2 are also calculated and included.

Bibliography

ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
Ecoinvent v.3	Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories
ISO 21930:2007	Sustainability in building construction - Environmental declaration of building products
NPCR 03.2021	PART A: Construction products and services Version: 2.0
NPCR 010:2022	Part B for building boards (references to EN 15804 +A2).
Biedacha M. et al (2023)	Background report for the Environmental Product Declarations for Huntonit Sutak, Smartpanel and Wetwall
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