

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804 +A2



Owner of the declaration:
Moelven Modus AS

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-3560-2152-EN

Registration Number:
NEPD-3560-2152-EN

Issue date: 13.06.2022
Valid to: 13.06.2027

Product name

Loop Wall 300 - Gypsum

Manufacturer
Moelven Modus AS

General information

Product:

Loop Wall

Program Operator:

The Norwegian EPD Foundation
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Declaration Number:

NEPD-3560-2152-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 manufacturer, life cycle assessment data and evidence.

Declared unit:

1 m² of Loop Wall system, including components required for the installation.

Declared unit with option:

N/A

Functional unit:

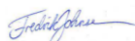
N/A

Verification:

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

internal

external



Fredrik Moltu Johnsen, Stiftinga Vestlandsforskning

Independent verifier approved by EPD Norway

Owner of the declaration:

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Place of production:

Jessheim

Management system:

ISO 9001, ISO 14001

Organisation no:

951 269 778

Issue date:

13.06.2022

Valid to:

13.06.2027

Year of study:

2021

Comparability:

EPDs from other programs than EPD Norge may not be comparable.

The EPD has been worked out by:

Maciej Biedacha, Gaylord K. Booto, Andreas Brekke



Approved (Manager of EPD Norway)

Product

Product description:

Loop Wall room partition systems are designed to meet the future requirements for flexibility and sustainability with a circular design approach where they can be dismantled and reused several times during the building's life cycle. They have prefabricated core with independent surfaces/cladding.

The product supports several types of cladding materials with mouldings in the floor or ceiling and adjacent walls that are easily clicked into place without the need for using fastening materials.

Product specification:

The materials used in the production of Loop Wall 300 – Gypsum are listed in the table below.

Materials	kg	%
Wood	1.00	5.1
Glass wool	0.57	2.9
Plastic	0.56	2.8
Steel	1.19	6.0
Gypsum	16.20	81.9
Glue	0.26	1.3
Paint	0.00	0.0
Total [kg]	19.78	100.0

Technical data:

Dimensions of a Loop Wall module:

Width: 3 600 mm

Height: 2 700 mm

Thickness: 98 mm

Surface area: 9,72 m²

Weight: 192 kg

Sound insulation index R in [dB] = 46.

Market:

Loop Wall is intended for Norwegian market.

Reference service life, product:

60 years

Reference service life, building:

60 years

LCA: Calculation rules

Declared unit:

The declared unit used for the calculations was 1 m² of Loop Wall 300 - Gypsum system with average weight of 19.78 kg, including components required for the installation.

Data quality:

Ecoinvent database (version 3.8) was used as the main source of data for modelling the background system and the entire value chain. All generic data used in this study is < 10 years old. The product is manufactured in one production facility in Jessheim, Norway. Specific system data were collected by the manufacturer and provided to the developer of the EPD using an appropriate data collection file.

Data were discussed between the two involved parts to ensure representativity of the system and produce a reliable model. Employed data were collected for the year 2021.

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 products using mass allocation. Material recycling and transport was also allocated accordingly.



Figure 1. Flow diagram for the production of Loop Wall 300 - Gypsum system.

System boundary:

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 above phases were conducted in accordance with specifications in the new EN15804 + A2:2019.

Cut-off criteria:

All important raw materials and energy use are included in the calculations. For some raw materials, proxy datasets were used in the model to approximate them (not including hazardous materials). The calculations include 100% of materials that make up the product.

LCA: Scenarios and additional technical information

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

For transport to recycling facility, incineration and landfill, distances of 300, 85 and 10 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	50	Euro 5 [> 32t, diesel]	250	0.01	5.08

The distance to the building site is taken as an average distance from 1500 construction sites and was estimated to be approximately 250 km (A4).

Assembly (A5)

	Unit	Value
Material loss	kg	0.00
Output materials from waste treatment	kg	0.45

The installation of the Loop Wall does not require use of any auxiliary materials or energy. The wall elements are being installed manually with the use of basic building tools. Usage of manual tools have not been included in this assessment. After the installation of the components, the resulting packaging waste is sorted and sent either for recycling or for energy recovery, accordingly. No losses were reported at this stage.

End of Life (C1, C3, C4)

	Unit	Value
Hazardous waste disposed	kg	0.00
Collected as mixed construction waste	kg	0.00
Reuse	kg	0.00
Recycling	kg	16.81
Energy recovery	kg	0.00
To landfill	kg	2.97

No hazardous materials are disposed

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance (km)	Fuel/Energy consumption (l/tkm)	value (l/t)
Truck	50%	Euro 5 [> 32t, diesel]	300	0.01	6.10
Truck	50%	Euro 5 [> 32t, diesel]	85	0.01	1.73
Truck	50%	Euro 5 [> 32t, diesel]	10	0.01	0.20

Transport for distances refers to recycling, incineration, and landfill respectively.

Benefits and loads beyond the system boundaries (D)

	Unit	Value
Electricity substitution	MJ	0.12
Thermal heat substitution	MJ	2.83
Avoided materials	kg	16.38

Electricity and thermal heat substitution data are taken from SSB with 2019 as the basis year.

LCA: Results

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	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	1.05E+01	3.40E-01	1.83E+00	1.26E+01	4.59E-01	9.87E-02	0.00E+00	4.70E-01	1.66E+00	2.32E-02	-1.31E+00
GWP-fossil	kg CO2 eq.	1.26E+01	3.39E-01	1.78E+00	1.47E+01	4.59E-01	3.08E-03	0.00E+00	4.70E-01	4.62E-02	2.30E-02	-2.94E+00
GWP-biogenic	kg CO2 eq.	-2.12E+00	3.23E-04	3.85E-02	-2.08E+00	2.31E-04	9.56E-02	0.00E+00	2.36E-04	1.61E+00	1.74E-04	-1.63E+00
GWP-LULUC	kg CO2 eq.	1.59E-02	1.26E-04	6.23E-03	2.22E-02	1.11E-04	1.52E-07	0.00E+00	1.14E-04	4.79E-06	1.42E-05	-1.55E-03
ODP	kg CFC11 eq.	3.45E-06	8.04E-08	1.17E-07	3.65E-06	1.11E-07	3.66E-10	0.00E+00	1.14E-07	9.61E-09	7.98E-09	-1.07E-07
AP	mol H ⁺ eq.	7.09E-02	1.84E-03	1.98E-02	9.26E-02	1.91E-03	1.61E-05	0.00E+00	1.95E-03	4.73E-04	2.24E-04	-1.16E-02
EP-freshwater	kg P eq.	5.01E-04	2.27E-06	9.75E-05	6.01E-04	5.79E-06	6.19E-08	0.00E+00	5.93E-06	1.76E-07	3.07E-07	-1.26E-04
EP-marine	kg N eq.	1.45E-02	5.31E-04	2.30E-03	1.74E-02	5.58E-04	6.70E-06	0.00E+00	5.72E-04	2.07E-04	8.48E-05	-2.51E-03
EP-terrestrial	mol N eq.	1.53E-01	5.87E-03	2.93E-02	1.88E-01	6.27E-03	7.77E-05	0.00E+00	6.42E-03	2.27E-03	9.33E-04	-2.95E-02
POCP	kg NMVOC eq.	4.88E-02	1.80E-03	8.42E-03	5.90E-02	2.01E-03	2.02E-05	0.00E+00	2.06E-03	6.24E-04	2.65E-04	-1.50E-02
ADP-M&M	kg Sb eq.	1.64E-04	7.62E-07	2.76E-04	4.41E-04	1.06E-06	-4.77E-09	0.00E+00	1.09E-06	1.64E-07	3.89E-08	-7.73E-06
ADP-fossil	MJ	1.74E+02	5.25E+00	1.96E+01	1.99E+02	7.34E+00	3.47E-02	0.00E+00	7.51E+00	6.18E-01	5.41E-01	-5.18E+01
WDP	m ³	4.70E+00	1.77E-02	5.77E-01	5.29E+00	4.12E-02	9.68E-04	0.00E+00	4.22E-02	1.07E-03	3.56E-02	-1.14E+00

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	C1	C2	C3	C4	D
PM	Disease incidence	9.80E-07	3.85E-08	1.75E-07	1.19E-06	5.17E-08	1.63E-10	0.00E+00	5.29E-08	1.18E-07	5.06E-09	-1.98E-07
IRP	kBq U235 eq.	3.52E-01	2.27E-02	6.18E-02	4.36E-01	3.37E-02	1.11E-04	0.00E+00	3.45E-02	2.63E-03	2.24E-03	-5.87E-02
ETP-fw	CTUe	3.42E+02	4.06E+00	1.25E+02	4.71E+02	4.58E+00	-1.63E-01	0.00E+00	4.69E+00	4.09E-01	3.60E-01	-9.71E+01
HTP-c	CTUh	9.20E-08	1.18E-10	1.06E-08	1.03E-07	1.41E-10	3.32E-12	0.00E+00	1.44E-10	1.67E-11	9.33E-12	-1.12E-08
HTP-nc	CTUh	2.13E-07	4.39E-09	1.84E-07	4.02E-07	6.12E-09	1.91E-10	0.00E+00	6.27E-09	3.41E-10	2.24E-10	-4.88E-08
SQP	Pt	2.93E+02	5.81E+00	7.46E+01	3.74E+02	8.40E+00	2.39E-02	0.00E+00	8.60E+00	8.17E-02	1.06E+00	-3.53E+01

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
ILCD type / level 3	Potential Human exposure efficiency relative to U235 (IRP)	1
	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	
<p>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.</p> <p>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.</p>		

Resource use

Parameter	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
RPEE	MJ	7.24E+01	6.58E-02	7.53E+00	1.32E-01	9.41E-01	0.00E+00	1.35E-01	3.93E-03	7.58E-03	-7.21E+00
RPEM	MJ	1.86E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TPE	MJ	9.10E+01	6.58E-02	7.53E+00	1.32E-01	9.41E-01	0.00E+00	1.35E-01	3.93E-03	7.58E-03	-7.21E+00
NRPE	MJ	1.74E+02	5.25E+00	1.96E+01	7.34E+00	3.47E-02	0.00E+00	7.51E+00	6.18E-01	5.41E-01	-5.18E+01
NRPM	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	0.00E+00	0.00E+00
TRPE	MJ	1.74E+02	5.25E+00	1.96E+01	7.34E+00	3.47E-02	0.00E+00	7.51E+00	6.18E-01	5.41E-01	-5.18E+01
SM	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	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	0.00E+00	0.00E+00	-1.91E-05
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	0.00E+00	0.00E+00
W	m3	1.98E-01	6.12E-04	3.60E-02	1.58E-03	2.43E-05	0.00E+00	1.62E-03	3.78E-05	8.99E-04	-2.06E-02

PEE 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** Non-renewable primary energy resources used as energy carrier; **NRPM** Non-renewable primary energy resources used as materials; **TRPE** Total use of non-renewable primary energy resources; **SM** Use of secondary materials; **RSF** Use of renewable secondary fuels; **NRSF** Use of non-renewable secondary fuels; **W** Use of net fresh water

End of life - waste

Parameter	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
HW	kg	1.19E-03	1.24E-05	8.49E-05	3.95E-06	3.45E-08	0.00E+00	4.05E-06	1.70E-06	9.36E-07	-2.23E-04
NHW	kg	1.30E+01	5.03E-01	6.01E+00	6.65E-01	3.01E-03	0.00E+00	6.81E-01	5.10E-03	5.95E+00	-1.80E+00
RW	kg	3.50E-04	3.56E-05	5.98E-05	5.12E-05	1.68E-07	0.00E+00	5.25E-05	4.26E-06	3.57E-06	-5.67E-05

HW Hazardous waste disposed; **NHW** Non-hazardous waste disposed; **RW** Radioactive waste disposed

End of life – output flow

Parameter	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
CR	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	0.00E+00	0.00E+00
MR	kg	0.00E+00	0.00E+00	5.84E-01	0.00E+00	1.69E-02	0.00E+00	0.00E+00	1.78E+01	0.00E+00	-1.67E+01
MER	kg	0.00E+00	0.00E+00	6.56E-02	0.00E+00	6.43E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	2.87E-02	0.00E+00	5.23E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.50E-02
ETE	MJ	0.00E+00	0.00E+00	3.16E-01	0.00E+00	5.67E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-5.86E-01

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

Reading example: $9,0 \text{ E-}03 = 9,0 \cdot 10^{-3} = 0,009$

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C	0.44
Biogenic carbon content in the accompanying packaging	kg C	0.03

Biogenic carbon contents are calculated for the wooden materials only.

Additional Norwegian requirements

Greenhouse gas emission from the use of electricity in the manufacturing phase National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process(A3).

National electricity grid	Unit	Value
El-mix low-voltage Norway (ecoinvent 3.8)	kg CO2 -eq/kWh	0.026

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

In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator for GWP has been sub-divided into the following:

GWP-IOBC Climate impacts calculated according to the principle of instantaneous oxidation
 GWP-BC Climate impacts from the net uptake and emission of biogenic carbon from each module.

In addition, EP-freshwater shall also declare as PO4 eq, site-generic characterisation factors have been used.

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
EP-freshwater*	kg PO4 eq.	7.53E-03	2.15E-04	1.29E-03	2.48E-04	3.54E-06	0.00E+00	2.54E-04	7.32E-05	3.21E-05	-1.33E-03
GWP-IOBC	kg CO2 eq.	1.26E+01	3.39E-01	1.79E+00	4.59E-01	3.08E-03	0.00E+00	4.70E-01	4.62E-02	2.30E-02	-2.94E+00
GWP-BC	kg CO2 eq.	-2.12E+00	3.23E-04	3.85E-02	2.31E-04	9.56E-02	0.00E+00	2.36E-04	1.61E+00	1.74E-04	-1.63E+00
GWP	kg CO2 eq.	1.05E+01	3.40E-01	1.83E+00	4.59E-01	9.87E-02	0.00E+00	4.70E-01	1.66E+00	2.32E-02	-1.31E+00

*EP-freshwater** Eutrophication potential, fraction of nutrients reaching freshwater end compartment. Declared as PO4 eq. *GWP-IOBC* Global warming potential calculated according to the principle of instantaneous oxidation. *GWP-BC* Global warming potential from net uptake and emissions of biogenic carbon from the materials in each module. *GWP* Global warming potential

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.
- The 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 (Avfallsforskriften, Annex III), see table.

Indoor environment





The product meets the requirements for low-emitting materials (M1), tests were performed in accordance with EN 16516. Documentation from performed emissions tests is presented in appendix of the LCA background report.

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
ISO 21930:2007	Sustainability in building construction - Environmental declaration of building products
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
NPCR	PART A: Construction products and services Version: 2.0
NPCR 010:2022	Part B for building boards (references to EN 15804 +A2)
Raadal, H. L., et al (2009)	Klimaregnskap for avfallshåndtering, Fase I og II. Oppdragsrapport nr. 18.09 fra Østfoldforskning, Norge.

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EPD for the best environmental decision



Global
Program
Operator