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The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Moelven Modus AS/ Modus Sverige AB
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-2270-1035-EN
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ECO Platform reference number:	-
Issue date:	25.06.2020
Valid to:	25.06.2025

Glass front partition system

Moelven Modus AS/ Modus Sverige AB

www.epd-norge.no

General information

Product:
Glass front partition system

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Declaration number:
NEPD-2270-1035-EN

Place of production:
Jessheim (Norway), Kumla (Sweden)

ECO Platform reference number:

Management system:
According to ISO 9001
According to ISO 14001
According to ISO 9001
According to ISO 14001

This declaration is based on Product Category Rules:
CEN Standard EN 15804 serves as core PCR
PCR for room partition systems, v. 1.7, by the Institut Bauen und Umwelt. Date of PCR version 1.7: 8.1.2019

Organisation no:
951 269 778

Issue date:
25.06.2020

Statement of liability:
The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturerinformation, life cycle assessment data and evidences.

Valid to:
25.06.2025

Year of study:
<xxxx>

Declared unit:
1 m² of the fullwall element of the Glass front partition system, including the associated fixing components and sealants at the interfaces with the stationary wall, floor and ceiling.

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

The EPD has been worked out by:
Isak Eklöv, Martyna Mikusinska & Andreas Asker

Verification:
The CEN Norm EN 15804 serves as the core PCR.
Independent verification of the declaration and data, according to ISO14025:2010

☐ internal ☑ external

☑ Third party verifier: ☑

PhD, Andreas Brekke, NORSUS
(Independent verifier approved by EPD Norway)

Approved

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

This EPD refers to the Glass Front partition system. Glass front provides maximal glass surfaces which gives a feeling of openness in the office space without compromising the acoustic environment. It is built as a modular system with glass panes mounted to floor and roof with aluminium profiles. The glass panes are merged with a transparent glass tape, giving Glass Front a clean appearance, good stability and sound resistance.

The design of the partition wall makes it easy to disassemble, move and put together again without breaking any parts. Thus, during its lifetime Glass Front can be moved several times to conform with changes in the indoor layout of the building.

Product specification:

Height, width, weight and acoustic resistance determines choice of glass. The most common glass used is a 10,38 mm laminated glass pane, with a width of 800 mm.

Materials	kg	Share
Laminated glass pane	24.19	98 %
Glass	*23.8*	97 %
PVB-film	*0.35*	1 %
Aluminium profiles	0.24	1 %
Sealing strip	0.16	1 %
Glass tape	0.02	0.1%
Screw	0.06	0.2%
Sum	24.67	100 %

Technical data:

Dimensions and weight of a standard module:

Width:	2 400 mm
Height:	2 700 mm
Thickness:	10,38 mm
Area:	6,48 m^2
Weight:	173 kg

Sound insulation index R in [dB] = 35 dB. Documentation from performed sound resistance tests, self-declared by Moelven Modus, is presented in appendix 6 of the background report, LCA-report Sweco 2020-4.

Market:

Nordic

Reference service life, product:

60 years

LCA: Calculation rules

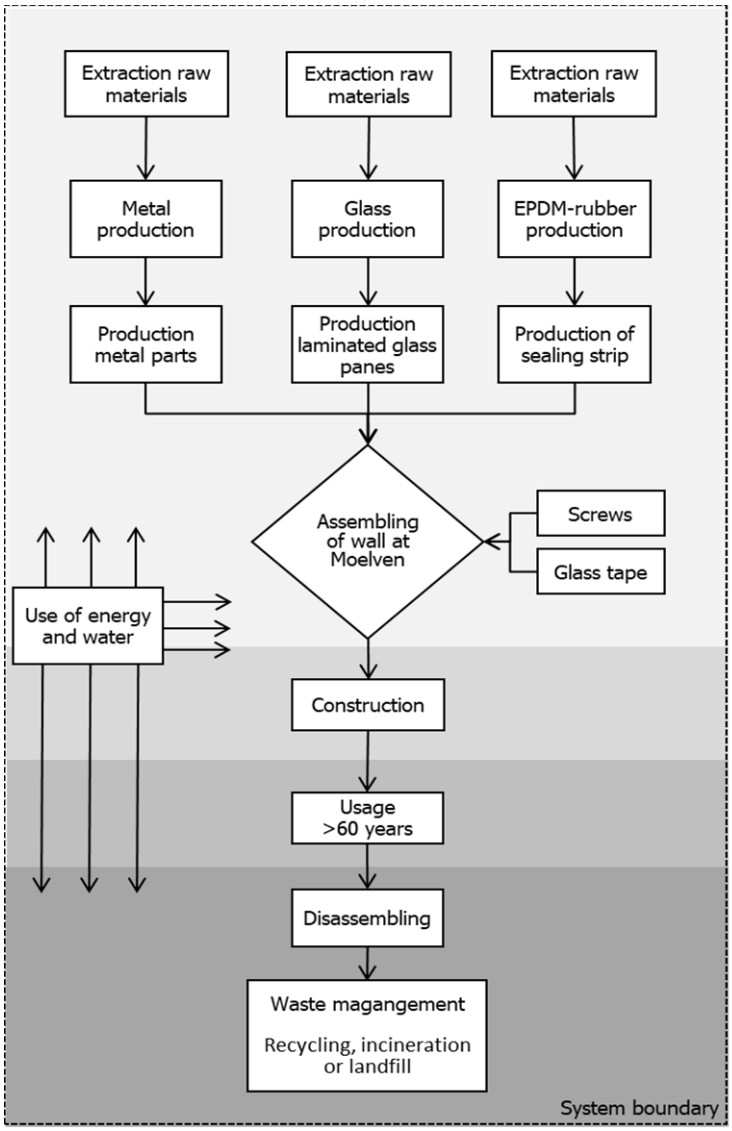
Functional unit:
Providing room partition and acoustic insulation on 1 m² with an acoustic resistance of 35 Rw dB and with a reference service life of 60 years.

System boundary:
Cradle to gate with options - the following stages have been declared: A1-3, A4-5, B1, B5-B7, C1-4. See flowsheet on the right.

Cut-off criteria:
All major raw materials and all the essential energy is included. Production processes for raw materials and energy flows which represent very small amounts (<1 %) have been excluded. This cut-off rule does not apply for hazardous substances.

Allocation:
The allocation is made in accordance with the provisions of EN 15804. Principally allocation is avoided by subdivision of included processes. When subdivision is no option, incoming energy and material flows are allocated among all products made in the given process through mass allocation.
Moelven's production in Sweden and Norway include the same activities and require basically corresponding energy and water consumption. Data for the Swedish production has been used to represent these parameters in both countries with allocation factors representing production volumes corresponding to 52% in Norway and 48% in Sweden. For parameters in the production that are different for the two countries (transport distances and electricity mix), averaging of data based on each country's proportion of the total production of Glass Front was used.

Data quality:
Specific data for usage of energy and materials have been used for 99 % of the product's mass. Background data have been modelled with generic data from the Ecoinvent 3 database.
The data is representative according to temporal, geographical and technological requirements. Background datasets are from 2000 or later, and updated within the last 3 years. For assessment of glass panes in both Sweden and Norway the EPD's for laminated glass, conducted by Guardian Flachglas GmbH and Saint Gobain (declaration no. EPD-GFEV-GB-19.0 and S-P 00930) was used. Specific processes were assessed with average data for one year of production (principally year 2019).



LCA: Scenarios and additional technical information

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

Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel consumption
Lorry		Diesel, 16-32 ton, Euro5	290	0.09 l/tkm

The estimation of average distance between the production unit and construction site is based on actual distances between the production units and main cities within Sweden and Norway.

Installation in the building (A5)

The installation of the Glass Front partition system does not require any use of materials or energy. The walls are fitted and installed manually with the use of basic building tools. Usage of manual tools have not been included in this assessment. During the installation of the components, packagings are sorted and disposed. The waste management of packagings is the only flow reported in module A5.

Use phase (B1-B7)

The usage of the Glass Front partition system does generally not entail any specific maintenance. Modules B1 and B5-B7 have been assessed as non-relevant as Glass Front does not require any materials or energy for usage or refurbishment. Cleaning and maintanance (modules B2-B) have been excluded from the study due to uncertainties and inablility to control how the product is managed by the final user.

End of Life (C1, C3, C4)

Waste type	Unit	Value
Hazardous waste disposed	kg	2.7E-05
Collected as mixed construction waste	kg	0.3
Reuse	kg	-
Recycling	kg	24.2
Energy recovery	kg	0.2
To landfill	kg	0.1

After disassembly, the partition wall is dismantled. Glass panes are separated from aluminium profiles and sent to recycling. It is assumed that sealing strips and the acrylic adhesive are still attached to the glass and aluminium when sent to recycling, but then separated in the recycling process and incinerated.

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel consumption
Waste collection lorry		Diesel, 21 ton	50	0.4 l/tkm

The distance to disposal site is assumed to be 50 km.

LCA: Results

Key environmental indicators	Unit	Cradle to gate, A1-A3
Global warming	kg CO_2	39.0
Energy use	MJ	572
Dangerous substances	%	0
Share of energy used from renewable sources	%	98
Materials for recycling	%	99

The software used for modelling the life cycle and assesment of the environmental impacts is SimaPro 9.0. For calculation of environmental impacts the LCIA method CML-IA baseline was applied, with certain modification of charachterisation factors according to EN 15804.

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

Product stage			Assemby stage		Use stage							End of life stage				Beyond the system boundaries
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	MNR	MND	MND	MND	MNR	MNR	MNR	x	x	x	x	MND

Environmental impact

Parameter	Unit	A1	A2	A3	A4	A5	C2	C3	C4
GWP	kg CO_2 -eqv	3.84E+01	5.11E-01	1.34E-01	1.52E+00	5.79E-02	2.01E-01	6.01E-01	6.31E-04
ODP	kg CFC11-eqv	4.29E-07	9.47E-08	1.55E-08	2.81E-07	1.07E-08	3.73E-08	1.34E-09	2.50E-10
POCP	kg C_2H_4 -eqv	1.10E-02	8.31E-05	4.96E-05	2.47E-04	9.43E-06	3.27E-05	3.41E-06	1.77E-07
AP	kg SO_2 -eqv	1.60E-01	1.63E-03	4.94E-03	4.83E-03	1.84E-04	6.40E-04	8.83E-05	4.65E-06
EP	kg PO_4^{3-}-eqv	3.67E-02	3.66E-04	1.08E-03	1.09E-03	4.15E-05	1.44E-04	1.42E-04	1.02E-06
ADPM	kg Sb-eqv	2.51E-04	1.55E-06	9.16E-08	4.61E-06	1.76E-07	6.11E-07	2.77E-08	6.78E-10
ADPE	MJ	5.11E+02	7.68E+00	8.06E-01	2.28E+01	8.71E-01	3.02E+00	1.22E-01	2.05E-02

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources

Moelven's production units in Sweden and Norway use different suppliers for glass panes. In both cases glass panes, laminated with polyvinyl butyral (PVB) film are used. Specific data for the production of glass panes, from the supplier used in Sweden has been used to assess both the Swedish and Norwegian production of Glass Front. Environmental impacts from the specific glass panes used in the Norwegian production of Glass Front might differ from the data used in this EPD due to variety in electricity mix, type of fuels, proportion of secondary materials used etc.

Resource use

Parameter	Unit	A1	A2	A3	A4	A5	C2	C3	C4
RPEE	MJ	4.78E+01	1.14E-01	1.18E+00	3.39E-01	1.30E-02	3.39E-01	7.89E-03	2.75E-04
RPEM	MJ	1.63E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TPE	MJ	4.95E+01	1.14E-01	1.18E+00	3.39E-01	1.30E-02	3.39E-01	7.89E-03	2.75E-04
NRPE	MJ	5.10E+02	8.34E+00	2.18E+00	2.48E+01	9.46E-01	2.48E+01	1.67E-01	2.23E-02
NRPM	MJ	1.54E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRPE	MJ	5.26E+02	8.34E+00	2.18E+00	2.48E+01	9.46E-01	2.48E+01	1.67E-01	2.23E-02
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
RSF	MJ	0.00E+00	0.00E+00	1.91E+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	0.00E+00
W	m^3	0.00E+00	0.00E+00	5.48E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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 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	C2	C3	C4
HW	kg	5.85E-05	4.59E-06	7.81E-07	1.36E-05	5.21E-07	1.81E-06	2.74E-06	7.17E-09
NHW	kg	1.11E+00	3.73E-01	6.29E-03	1.11E+00	4.23E-02	1.47E-01	4.02E-02	1.47E-01
RW	kg	2.13E-04	5.40E-05	1.77E-05	1.60E-04	6.12E-06	2.12E-05	6.10E-07	1.43E-07

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	C2	C3	C4
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
MR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.42E+01	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-01	0.00E+00
EEE	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
ETE	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

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

Additional Norwegian requirements

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

Data source	Amount	Unit
Electricity Mix based on specific distributor's data in Sweden (2018)	0.117	kg CO_2-eqv/kWh
Electricity Mix, AC, consumption mix, at consumer, 230V, NO S, ELCD (2017)	0.009	kg CO_2-eqv/kWh

Dangerous substances

- ☑ 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 contain dangerous substances, more then 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
The product meets the requirements for low emissions (M1) according to EN15251: 2007 Appendix E.
Report from performed emission test is presented in appendix 7 of the background report, LCA-report Sweco 2020-4.
Glass and aluminium do not emit any notable substances into air. The acrylic adhesive or rubber seal do not contain any toxic substances or substances with irritating properties.

Carbon footprint
Carbon footprint has not been worked out for the product.

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
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EPD for laminated glass, 2016	*EPD for laminated safety glass, conducted by Guardian Flachglas GmbH (Declaration Code EPD-GFEV-GB-19.0)*
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