

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804:A1

Owner of the declaration	Moelven Modus AS/ Modus Sverige AB
Program Operator	The Norwegian EPD Foundation
Publisher	The Norwegian EPD Foundation
Declaration number	NEPD-2614-1325-EN
Registration number:	NEPD-2614-1325-EN
ECO Platform reference number:	-
Issue date	23.12.2020
Valid to	23.12.2025

Flush Front partition system - glass panel

Moelven Modus AS/ Modus Sverige AB



www.epd-norge.no





General information

Product

Flush Front partition system - glass panel

Program holder

The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo Phone: +47 23 08 80 00 e-mail: post@epd-norge.no

Declaration number:

NEPD-2614-1325-EN

ECO Platform reference number:

This declaration is based on Product Category Rules:

CEN Standard EN 15804 serve as core PCR PCR for room partition systems by the Institut Bauen und Umwelt, version 1.7 with exception from requirements referring to EN15804+A2 (Date of PCR version 1.7: 01-08-2019).

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.

Declared unit:

1 m² of the fullwall element of the Flush Front - glass panel partition system, including the associated fixing components and sealants at the interfaces with the stationary wall, floor and ceiling.

Functional unit:

Room partitioning and sound insulation for 1 m² surface area, with a sound insulation index of 35 Rw dB, and a reference service life of 60 years

Verification:

externally

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



(Independent verifier approved by EPD Norway)

Owner of the declaration

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Place of production:

Jessheim (Norway), Hulån (Sweden)

Management system:

According to ISO 9001 According to ISO 14001

Org. No:

951 269 778

Issue date

23.12.2020

Valid to 23.12.2025

Year of study: 2019-2020

2010 2020

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.

The EPD has been worked out by:

Martyna Mikusinska

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Approved

SWECO

Håkon Hauan Managing Director of EPD-Norway

Key environmental indicators	Unit	Cradle to gate		Transport
Rey environmental indicators		A1 - A3 * g CO2 - eqv 28.16 0 MJ 935.21 0		
Global warming	kg CO ₂ -eqv	28.16		0
Energy use	MJ	935.21		0
Dangerous substances	%	0		-
Share of energy used from renewable sources	%	32		-
Materials for recycling	%	70		-

Transport from production site to central warehouse in Norway. The warehouses in both Norway and Sweden are situated at the production unit.



Product

Product description:

Flush Front glass panel is built as a modular system with glass panels surrounded by a solid wooden frame, which is available with the thickness of 75 mm or 122 mm. The panels are preconstructed and are simply mounted into buildings for partitioning of building interiors. Wooden parts are painted with optional colours or can also be coated with veneer finish (this EPD only declares the painted alternative).

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

The product is not subject to any EU harmonization.

Product specification

Height, width, weight and acoustic resistance determines choice of glass. The most common glass used is a 8,76 mm laminated glass pane, with a width of 800 mm.

Market:

Nordic

Reference service life: 60 years

Fire protection

According to EN 13501:1:

-The classes of building products regarding their fire performance are predefined as: A1, A2, B, C, D, E, and F; -The classes of flaming droplets/particles are pre-defined as: d0, d1, or d2; -The classes for smoke density are predefined as: s1, s2, or s3

Name	Value
Door: Painted/varnished	D/s2/d0
Door: fire protection painted/varnished	B/s1/d0
Glass	A1/s1/d0

Matariala	122 mm	n frame	75 mm	frame
waterials	kg	Share	kg	Share
Laminated glass pane	1.90E+01	74.5%	1.90E+01	79.9%
Glass	1.86E+01	73.1%	1.86E+01	78.4%
PVB-film	3.60E-01	1.4%	3.60E-01	1.5%
Wood	7.26E+00	21.1%	4.65E+00	15.3%
Paint	4.50E-01	2.4%	3.40E-01	2.6%
Plastic	1.20E-01	1.1%	1.20E-01	1.2%
Steel	3.00E-02	0.8%	3.00E-02	0.8%
Glue	4.00E-03	0.02 %	4.00E-03	0.02 %
Rubber	2.00E-02	0.1%	1.00E-02	0.0%
Glass wool	1.00E-02	0.0%	1.00E-02	0.0%
Sum	2.69E+01	100 %	2.41E+01	100 %

Technical data:

Dimensions and weight of a standard module:Width:2 400 mmHeight:2 700 mmThickness:75 mm, 122 mmArea:6,48 m²Weight:165 kgSound insulation index R in [dB] = 35 dB.

Documentation from performed sound resistance test is presented in appendix 6 of the background report, LCA-report Sweco 2020-05.

Water:

Even when exposed to water over extensive periods of time, it can be assumed that no hazardous substances are released into the environment.

Re-use:

Owing to the product characteristics, reuse is conceivable within the service life insofar as the requirements of the new installation site are complied with.

Disposal phase:

All materials can be classified in accordance with the European Waste Catalogue and directed to energetic or metallurgical utilisation:

EWC 17 02 02, Glass, construction and demolition waste EWC 17 04 05, Iron and steel EWC 17 02 01, Wood EWC 17 02 03, Plastic

EWC 17 09 03, Mixed construction and demolition wastes other than those mentioned in; 17 09 01, 17 09 02, and 17 09 03.



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.

Name	122mm	75mm	Unit
Declared unit	1	1	m2
Grammage	26.7	24.6	kg/m2
Conv. factor to 1 kg	0.0375	0.0407	

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 cutoff 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.

Although the Flush Front 122 mm is produced in Sweden and 75 mm in Norway 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.

Data quality:

Data collection was performed during fall 2020 and collected data mainly represents the years 2019. Specific data for usage of energy and materials have been used for 72 % of the product's mass. Background data have been modelled with generic data from the Ecoinvent 3.6 database.



The data is representative according to temporal, geographical and technological requirements. Background datasets are from 1993 or later, and updated 2019. For assessment of glass panes in Sweden the EPD for laminated glass, conducted by Guardian Flachglas GmbH (declaration no. EPD-GFEV-GB-19.0) was used. For glass panes in Norway an EPD from Saint Gobain (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 describes the scenarios in the different modules of the EPD.

Reference service life:

The RSL of 60 years is defined for a scenario with standard use in an office environment, which could involve moving of the partition wall to conform to changes in the office space. Accidents or other types of unexpected changes of environment are not taken into account for the RSL. The RSL is based on company experts.

Production of Flush Front glass panel at Moelven Modus (A3)

The manufacture of Flush Front at Moelven Modus comprises cutting and painting of metal connectors and wooden frame and fitting of glass panes into the frame, thus constructing pre-made partition modules. Connectors, guide channel and the glass panes in wooden frame are then packed for transportation to the building site (module A4).

Transport from production place to user (A4)

The estimation of an 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.

Туре	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy use
Lorry		Diesel, 16-32 ton, Euro4	290	0.09 /tkm

Installation in the building (A5)

The installation of the Flush 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 Flush Front partition system does generally not entail any specific maintenance. Modules B1 and B5-B7 have been assessed as non-relevant as Flush 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 inability to control how the product is managed by the final user.

End of Life (C1, C3, C4)

After disassembly, the partition wall is dismantled. Glass panes are separated from the wooden frame sent to recycling. To separate glass and wood, metal parts are unbolted leaving even small metal parts divided from the rest of the materials and thus easy to sort for recycling. The painted wooden frame and plastic parts are sent to waste treatment by incineration.

Waste type	Unit	122 mm frame	75 mm frame
Hazardous waste disposed	kg	-	-
Collected as mixed construction waste	kg	-	-
Reuse	kg	-	-
Recycling	kg	18.73	19.73
Energy recovery	kg	-	-
Incineration	kg	7.9	5.3

Transport to waste processing (C2)

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

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



LCA: Results

The software used for modelling the life cycle and assessment 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 characterisation factors according to EN 15804.

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

Pro	duct st	age	Cons installa	struction tion stage	Use stage End of life stage							Beyond the system boundaries				
Raw materials	Transport	Manufacturing	Transport	Construction installation stage	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
х	х	х	х	х	MNR	MND	MND	MND	MNR	MNR	MNR	х	x	х	х	MND

Environmental impact

Flush Front glass panel with 122 mm frame.

Parameter	Unit	A1	A2	A3	A4	A5	C2	C3	C4
GWP	kg CO ₂ -eqv	2.56E+01	2.21E+00	3.49E-01	1.32E+00	7.88E-03	4.16E-01	0.00E+00	8.48E-02
ODP	kg CFC11-eqv	4.29E-07	3.97E-07	2.55E-07	2.42E-07	1.37E-09	7.24E-08	0.00E+00	2.79E-09
POCP	kg C ₂ H ₄ -eqv	5.85E-03	2.99E-04	1.80E-04	1.78E-04	1.22E-06	6.44E-05	0.00E+00	1.86E-05
AP	kg SO ₂ -eqv	1.95E-01	7.80E-03	2.24E-03	4.24E-03	3.68E-05	1.94E-03	0.00E+00	1.73E-04
EP	kg PO₄ ³⁻ -eqv	1.36E-02	1.84E-03	1.11E-03	9.76E-04	7.94E-06	4.19E-04	0.00E+00	2.43E-04
ADPM	kg Sb-eqv	3.25E-04	5.70E-05	1.24E-05	3.61E-05	4.70E-08	2.48E-06	0.00E+00	3.91E-07
ADPE	MJ	3.72E+02	3.24E+01	2.97E+00	1.97E+01	1.08E-01	5.69E+00	0.00E+00	3.04E-01

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

Flush Front glass panel with 75 mm frame.

Parameter	Unit	A1	A2	A3	A4	A5	C2	C3	C4			
GWP	kg CO ₂ -eqv	3.15E+01	1.19E+00	1.43E-01	1.18E+00	5.35E-03	3.05E-01	0.00E+00	1.24E-01			
ODP	kg CFC11-eqv	3.56E-07	2.14E-07	1.56E-08	2.16E-07	9.32E-10	5.32E-08	0.00E+00	4.43E-09			
POCP	kg C ₂ H ₄ -eqv	9.76E-03	1.62E-04	1.21E-04	1.59E-04	8.29E-07	4.73E-05	0.00E+00	2.89E-05			
AP	kg SO ₂ -eqv	2.03E-01	4.29E-03	1.02E-03	3.78E-03	2.50E-05	1.43E-03	0.00E+00	2.32E-04			
EP	kg PO₄ ³⁻ -eqv	3.87E-02	1.01E-03	4.29E-04	8.70E-04	5.39E-06	3.08E-04	0.00E+00	1.03E-03			
ADPM	kg Sb-eqv	2.60E-04	3.05E-05	1.76E-06	3.22E-05	3.19E-08	1.82E-06	0.00E+00	6.09E-07			
ADPE	MJ	4.10E+02	1.75E+01	1.38E+00	1.76E+01	7.32E-02	4.18E+00	0.00E+00	4.56E-01			

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 Flush Front. Environmental impacts from the specific glass panes used in the Norwegian production of Flush 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

Flush Front glass panel with 122 mm frame

riush riont glass panel with 122 min name.									
Parameter	Unit	A1	A2	A3	A4	A5	C2	C3	C4
RPEE	MJ	2.05E+02	0.00E+00	2.76E+02	4.87E-01	1.87E+01	2.84E-01	0.00E+00	4.07E-04
RPEM	MJ	9.05E+01	0.00E+00	1.70E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TPE	MJ	2.96E+02	0.00E+00	2.76E+02	4.87E-01	1.87E+01	2.84E-01	0.00E+00	4.07E-04
NRPE	MJ	3.85E+02	3.52E+01	3.21E+01	2.14E+01	1.15E-01	6.06E+00	0.00E+00	3.32E-01
NRPM	MJ	1.06E+01	0.00E+00	2.55E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRPE	MJ	3.95E+02	3.52E+01	3.46E+01	2.14E+01	1.15E-01	6.06E+00	0.00E+00	3.32E-01
SM	kg	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							
W	m³	1.19E-04	0.00E+00	3.12E-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 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; W Use of net fresh water

Flush Front glass panel with 75 mm frame.

Parameter	Unit	A1	A2	A3	A4	A5	C2	C3	C4
RPEE	MJ	6.26E+01	0.00E+00	1.79E+02	2.64E-01	2.45E+01	2.53E-01	0.00E+00	2.77E-04
RPEM	MJ	1.41E+02	0.00E+00	1.70E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TPE	MJ	2.04E+02	0.00E+00	1.79E+02	2.64E-01	2.45E+01	2.53E-01	0.00E+00	2.77E-04
NRPE	MJ	4.24E+02	1.90E+01	2.14E+00	1.91E+01	7.81E-02	4.45E+00	0.00E+00	4.96E-01
NRPM	MJ	1.07E+01	0.00E+00	4.68E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRPE	MJ	4.35E+02	1.90E+01	2.54E+00	1.91E+01	7.81E-02	4.45E+00	0.00E+00	4.96E-01
SM	kg	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							
W	m ³	1.19E-04	0.00E+00	3.12E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

End of life - Waste

Flush Front glass panel with 122 mm frame.

Parameter	Unit	A1	A2	A3	A4	A5	C2	C3	C4
HW	kg	1.13E-04	8.71E-05	7.26E-06	5.28E-05	2.91E-07	1.54E-05	0.00E+00	1.15E-06
NHW	kg	6.35E-01	1.49E+00	1.29E-01	9.63E-01	5.14E-04	2.71E-02	0.00E+00	9.49E-02
RW	kg	1.51E-04	2.25E-04	5.09E-04	1.37E-04	7.68E-07	4.05E-05	0.00E+00	1.32E-06

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

Flush Front glass panel with 75 mm frame.

Parameter	Unit	A1	A2	A3	A4	A5	C2	C3	C4
HW	kg	8.17E-05	4.70E-05	2.46E-06	4.70E-05	1.98E-07	1.13E-05	0.00E+00	1.68E-06
NHW	kg	6.12E-01	7.91E-01	1.41E-01	8.59E-01	3.49E-04	1.99E-02	0.00E+00	1.11E-01
RW	kg	1.21E-04	1.22E-04	1.92E-05	1.22E-04	5.22E-07	2.98E-05	0.00E+00	2.22E-06

End of life - Output flow

Flush Front glass panel with 122 mm frame.

Parameter	Unit	A1	A2	A3	A4	A5	C2	C3	C4
CR	kg	0.00E+00							
MR	kg	0.00E+00	0.00E+00	9.00E-02	0.00E+00	8.19E+00	0.00E+00	1.06E+01	0.00E+00
MER	kg	0.00E+00	0.00E+00	5.79E+00	0.00E+00	0.00E+00	0.00E+00	7.60E+00	0.00E+00
EEE	MJ	0.00E+00							
ETE	MJ	0.00E+00							

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

Flush Front glass panel with 75 mm frame.

Parameter	Unit	A1	A2	A3	A4	A5	C2	C3	C4
CR	kg	0.00E+00							
MR	kg	0.00E+00	0.00E+00	9.00E-02	0.00E+00	5.24E+00	0.00E+00	1.35E+01	0.00E+00
MER	kg	0.00E+00	0.00E+00	3.76E+00	0.00E+00	0.00E+00	0.00E+00	4.98E+00	0.00E+00
EEE	MJ	0.00E+00							
ETE	MJ	0.00E+00							

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



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 prosess(A3).

Data source	Amount	Unit
Electricity, low voltage {SE} market for Cut-off, U	0.047	kg CO ₂ -eqv/kWh
Electricity, high voltage {NO} market for Cut-off, U	0.017	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

The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian

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.

Transports

Transport from production unit to central storage in Norway/Sweden:0 kmCentral storage is close beside the production unit in both countries, therefore no other transport needed.Transport from production unit to construction site in Norway/Sweden:290 km

Indoor environment

The product meets the requirements for low emissions (M1) according to EN15251: 2007 Appendix E. Glass and steel do not emit any notable substances into air. The hot-melt glue does not contain any toxic substances or substances with irritating properties. Emission tests have been performed on the solid wood and results can be found in Appendix 7 of the LCA-report *(LCA-report Sweco 2020-5)*.

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography	
ISO 14025:2006	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:A1	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
ISO 21930:2007	Sustainability in building construction - Environmental declaration of building products
PCR, Institut Bauen und Umwelt, v1.7 2019	Product Category Rules for Building-Related Products and Services; Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the project report Part B: Requirements on the EPD for Room partition systems
LCI/LCA Report	Background report for Flush Front. Report number: LCA-report Sweco 2020-5
ECHA, 2014	ECHA: "Candidate List of Substances of Very High Concern for authorisation". Available at http://www.echa.europa.eu/web/guest/candidate-list-table Last update: 25 june 2020
Norwegian Environment Agency	List of Priority Substances Available at http://www.environment.no/en/Tema/Kjemikalier/Kjemikalielister/Prioritetslisten/

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