

CITTERIO S.p.A.



ENVIRONMENTAL PRODUCT DECLARATION

Product Name:
3x3m Vision / double glass
partition with glass 6+6
3x3m Vision / double glass
partition with glass 5+5
3x3m Vision / solid partition

Manufacturing Plant:
Via Don Giuseppe Brambilla 16/18 I
23844, Sirone (LC), Italy

CITTERIO

In compliance with ISO 14025 e EN 15804:2012+A2/AC:2021

Program Operator	EPDIItaly
Publisher	EPDIItaly
Declaration Number	EPDVISION001
Registration Number	EPDITALY0563
UNCPC Code	4212
Issue Date	22.02.2024
Valid until	22.02.2029

www.epditaly.it

GENERAL INFORMATION

EPD REFERENCES	
EPD OWNER	Citterio S.p.A. Via Don Giuseppe Brambilla 16/18 I 23844, Sirone (LC), Italy.
REFERENCE PRODUCTION SITE	Via Don Giuseppe Brambilla 16/18 I 23844, Sirone (LC), Italy.
PROGRAM OPERATOR	EPDIItaly Via Gaetano De Castillia 10, 20124 Milano (MI), Italia www.epditaly.it
INDEPENDENT VERIFICATION	This declaration was developed following the general instructions of the EPDIItaly programme. Independent verification of the declaration and data carried out according to ISO 14025:2010. <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External Third party verification performed by: ICMQ SpA, via De Castillia, 10 - 20124 Milano (www.icmq.it). Accredited by Accredia.
SCOPE OF APPLICATION	The following is an EPD developed by LCA-Tool referring to 4 products of the Wood Wall family of dimensions 3x3m: Vision double glass partition with glass 6+6, Vision double glass partition with glass 5+5, Vision solid partition
UNCPC CODE	4212: "Doors, windows and their frames and thresholds for doors, of iron, steel or aluminium".
REFERENCE DOCUMENTS	This declaration was developed following the EPDIItaly Regulation rev. 5.2 published on 16/02/2022, available at www.epditaly.it . The EN 15804:2012+A2:2019 standard represent the framework reference for the core PCR " ICMQ-001/15 - Rev 3 Construction Products and Services. Issue date: 02/12/2019"
PCR	CORE-PCR ICMQ-001/15 - Rev 3 Construction Products and Services. Issue date: 02/12/2019
COMPARABILITY	Environmental Declarations published within the same product category, but from different programmes, may not be comparable. In particular, EPDs of similar products may not be comparable if they do not comply with the reference technical standard.
RESPONSIBILITY	CITTERIO S.p.A. releases EPDIItaly from any non-compliance with environmental legislation self-declared by the manufacturer. The holder of the declaration shall be responsible for the supporting information and evidence; EPDIItaly declines all responsibility for the manufacturer's information, data and results of the life cycle assessment.
TOOL	-
ORGANIZATION CONTACT	Dott.ssa Laura Camerin – Citterio S.p.A. – Via Don Giuseppe Brambilla 16/18 I 23844, Sirone (LC), Italy. laura.camerin@citteriospa.com
TECHNICAL CONTACT	Federica Gilardelli, Chiara Albini, LCA studio managers, Greenwich S.r.l. Head office: Via Presolana 2/4, 24030, Medolago (BG) – Registered office: Via Vittorio Emanuele II, 179, 24033 Calusco d'Adda - Bergamo. info@greenwichsrl.it



COMPANY INFORMATION

Citterio Spa was founded in 1958 in the province of Lecco and is a leader in the Italian and foreign markets for the production of high-quality office furniture. It is part of the Molteni Group, one of Italy's largest industrial furniture groups, together with Molteni & C, Dada and Unifor.

Citterio supplies the Italian and foreign markets with a wide range of office furniture solutions: wooden partitions, glass partitions, storage units, operative and executive furniture systems, mobile partitions. The Sirone plant in Italy houses Citterio's technical and commercial management offices, showroom and production units. Research, innovation and production flexibility have always been at the heart of the company's approach, so much so that in 2010 it presented the first C_SS acoustic box for meetings, which paved the way for a series of product collections designed to guarantee well-being and optimal acoustic performance in working environments.

Citterio has always animated the dialogue between partition walls and office furniture. The company combines and transforms traditional wood craftsmanship and industrial production processes. Each project stems from the ideas of Italian designers who translate needs and functions into innovative, high-performance products. Each product is the result of the expert hands of skilled workers who treat wood, glass and aluminium with unique expertise. Every single collection is selected by designers from all over the world to furnish workspaces inspired by the logic of high functionality, comfort, technological flexibility and aesthetic quality.

PRODUCT AND PRODUCTION PROCESS DESCRIPTION

Vision partition

Vision is a double-glazed movable internal wall with a separation function characterized by high soundproofing. It is composed of safety glass sheets and extruded aluminum profiles and is complemented by a blind version with wooden panels. The glass wall has a thickness of 66 mm. The products are available with doors in hinged and sliding versions, with single or double leaves, in glass or wood. It is specified that doors are not included in the present study.

Main features:

- Double-glazed wall without vertical mullions;
- Anodized aluminum profiles;
- Glass thickness of 5+5 mm and 6+6 mm;
- Blind version with veneered wood panels and edges;
- Glass joints with "H" profiles in aluminum;
- The wall can be complemented by single-glass and double-glass hinged doors, entirely glazed or framed, or blind single or double-leaf doors. Additionally, there are sliding glass or blind doors, with single or double leaves.

Vision / solid

The blind version of the wall is composed of extruded profiles at the floor, ceiling, and aluminum alloy partitions (6060 UNI 9006/1). The load-bearing structure is made of galvanized steel. The blind modules are constructed with wood particle (chipboard) panels, veneered and coated.

Vision Blind version has been tested in the laboratory according to the following international standards

UNI EN ISO 10140-1:2016 - UNI EN ISO 10140-2:2010 - UNI EN ISO 171-1:2013.

The test result is $R_w (C;Ctr) = 41 (-4;-10)$ dB.

A specific test is also available in accordance with UNI 10880:2000 for conducting impact tests.

Vision / double glass partition with glass 5+5 and 6+6

The glass version of the wall is made of extruded aluminum alloy profiles (6060 UNI 9006/1) for floor and ceiling guides, uprights, corners, and wall partitions, designed to accommodate safety glass closure panels from the catalog types. The floor and ceiling profiles allow perfect horizontal leveling of the wall, ± 10 mm. The vertical profiles for wall partitions allow compensation for any out-of-plumbness of the surrounding walls or act as expansion joints in anchorages on external glass walls. Sealant between profiles and glass sheets is ensured by gray-colored gaskets.

The double glass 5+5mm partition exhibits remarkable acoustic characteristics, serving as a transparent barrier for the compartmentalization of highly private spaces. The VISION stratified double glass 5+5 has undergone laboratory testing in accordance with the following international standards: UNI EN ISO 10140-1:2016, UNI EN ISO 10140-2:2010, and UNI EN ISO 171-1:2013. The test result is $R_w (C;Ctr) = 40 (-2;-4)$ dB.

For better acoustic performance, it is also possible to use 5+5.2A laminated glass with interposed acoustic film. Additional tests are available at the factory for versions featuring a glass door.

The double glass partition 6+6mm, renowned for its exceptional acoustic characteristics, serves as a transparent barrier enabling the compartmentalization of the most private spaces. The VISION stratified double glass 6+6.2A has undergone laboratory testing in accordance with international standards, specifically UNI EN ISO 10140-1:2016, UNI EN ISO 10140-2:2010, and UNI EN ISO 171-1:2013. The obtained test results indicate an $R_w (C;Ctr)$ value of $45 (-2;-5)$ dB.

Moreover, there are additional tests available at the factory for versions featuring a glass door and a blind door.

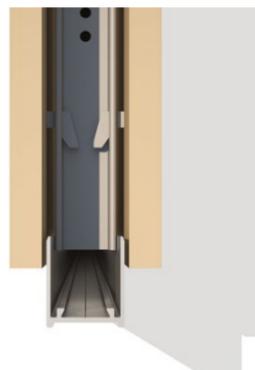
**parete doppio vetro/
double glass partition**



_D66 x H48
Una parete divisoria doppio vetro a spessore ridotto e caratterizzata dall'elevato potere fono abbattente che accoglie 2 spessori di vetro.

A reduced-thickness double-glass partition wall characterised by high acoustic rating that can fit 2 glass thicknesses.

**parete cieca/
solid partition**



_D66 x H26
Una parete divisoria cieca a spessore ridotto con struttura interna in acciaio e pannelli esterni di tamponamento in 8 finiture di nobilitato e 5 di legno.

A reduced-thickness solid partition wall with internal steel frame and external end panels available in 8 melamine and 5 wood finishes.

The bill of materials and the net weight of the components of the Vision partitions analysed are presented below.

Component	Vision / solid (kg)	Vision / double glass 5+5 (kg)	Vision / double glass 6+6 (kg)
Glass, laminated	-	429,39	515,27
Particleboard	171,61		
Mineral wool	26,93		
Steel, profiles	18,75		
Galvanised steel, profiles	9,28	27,37	32,08
Aluminium, profiles	6,76		
Wood, veneer	5,13		
Wood coating	4,94		
Steel, hardware	2,56	1,79	1,79
Polyvinylchloride	0,11	1,74	1,02
Rubber	<0,00	<0,00	<0,00
Total	246,07	460,29	550,15

SCOPE AND TYPE OF EPD

This is a product-specific declaration of type “cradle-to-gate with modules C1-C4 and module D, as set out in EN 15804:2012+A2:2019. Thus, the following phases were considered:

- A1-A3 Product stage: raw material extraction and processing, transport to the manufacturer and manufacturing of the finished product;
- C1-C4 End-of-life Stage (dismantling; collection & transport; end-of-life treatments).

Production			Construction		Use							End of life				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport	Construction installation	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	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

Table 1: X = included in the LCA, MND = the module is not included in the LCA and is not declared

LCA INFORMATION

Type of EPD	The EPD in question is cradle-to-gate with modules C1-C4 and module D.
Geographical scope	Performance was calculated with reference to the Citterio S.p.A. plant in Sirone. The reference market is Global.
Temporal validity	The reference period is the calendar year 2021.
Database used	Ecoinvent 3.9.1
Life Cycle Impact Assessment Method	Environmental Footprint 3.0
Software:	SimaPro 9.5.0.1
Declared Unit	One 3x3m office partition wall is analysed as declared unit.
Allocation rules	Mass-based allocation considering purchases of processed raw materials in 2021.
Cut-off rules	Galvanisation of steel (hardware)
Proxy data	The modelling of the end of life processes of the glue (5% of total particleboard mass), namely: -Waste paint {RoW} treatment of waste paint, municipal incineration Cut-off, U; - Waste polyurethane {RoW} treatment of waste polyurethane, sanitary landfill Cut-off, U

Production Process

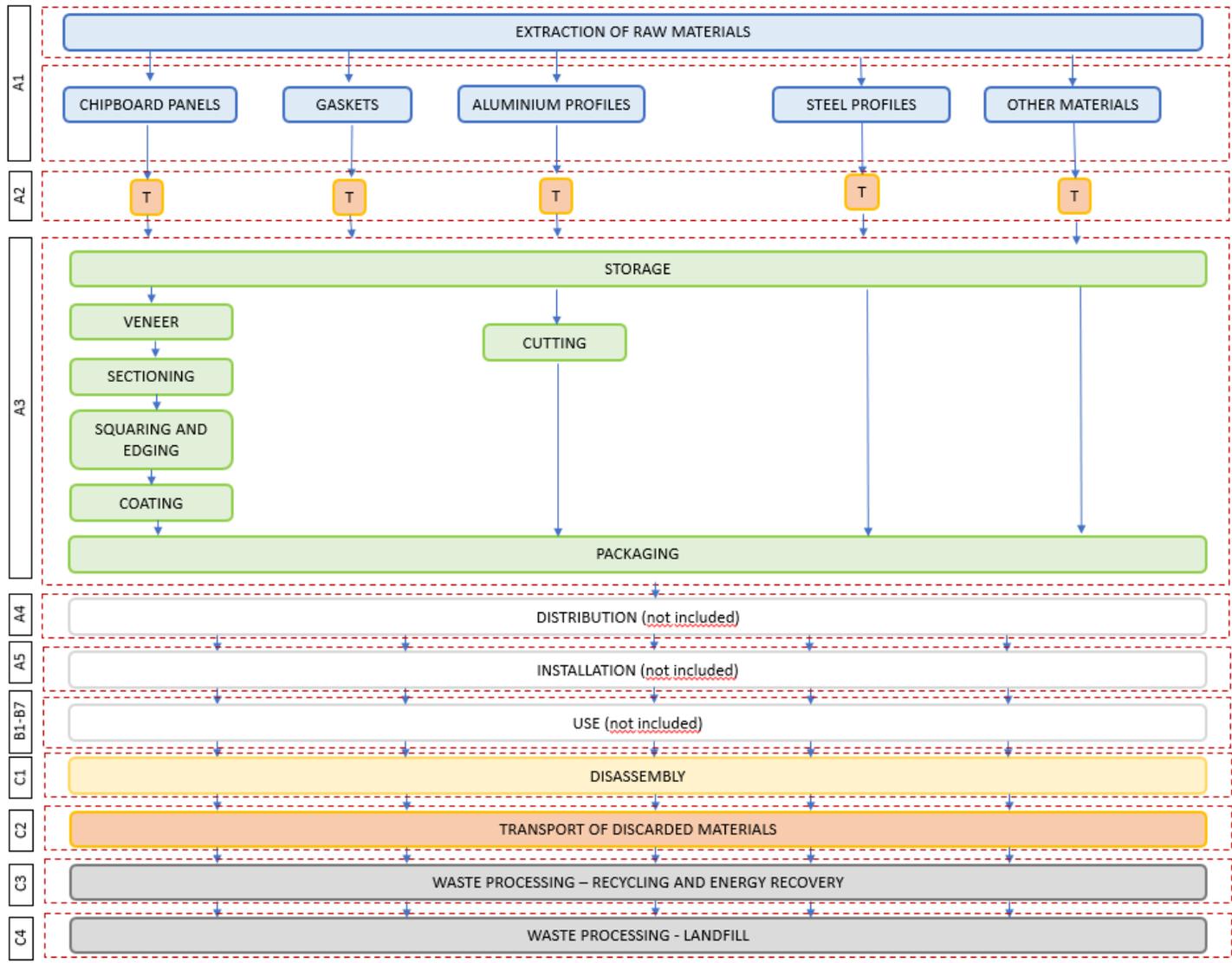
The design and production processes take place at Citterio's Sirone plant.

The process begins with the receipt of raw materials and semi-finished products, which are stored in the warehouse. The materials are then recovered along the path of production and assembly of the wall components.

The production processes include, for:

- Particleboard panels an initial visual quality control is carried out, followed by a cutting process to obtain the desired dimensions. This is followed by the veneering process with melamine resin edging with oak veneer. The waste generated by the cutting process is partly destined to be burnt in a kiln with energy recovery and partly disposed of externally with EWC code 030105;
- Aluminium steel profiles: cut to the desired dimensions;
- Wooden panels: coating;
- Packaging of product components to be assembled on site.

The system diagram of the solid wall, which is the product with the most machining, is presented below. For the other walls analysed, there is no machining of particleboard.



RESULTS

The following tables summarise the total impacts for each indicator of the 3 products under study.

Vision / solid

Environmental impact indicators

Environmental impact parameters - Results per declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	5,76E+02	1,13E+01	7,81E+01	6,65E+02	1,51E+01	4,80E+01	1,90E+01	2,16E+00	- 1,42E+02
GWP-biogenic	kg CO ₂ eq.	- 4,36E+02	1,09E-02	1,54E+02	- 2,82E+02	2,40E-03	1,96E-02	1,38E+02	1,83E+02	2,90E-01
GWP-luluc	kg CO ₂ eq.	2,07E+00	5,43E-03	1,05E-01	2,18E+00	4,87E-04	2,47E-02	5,01E-04	1,06E-03	-4,97E-02
GWP-total	kg CO ₂ eq.	1,42E+02	1,13E+01	2,32E+02	3,86E+02	1,51E+01	4,81E+01	1,57E+02	1,85E+02	- 1,42E+02
ODP	kg CFC 11 eq.	1,57E-05	2,41E-07	2,44E-07	1,62E-05	2,63E-08	7,43E-07	4,29E-08	3,17E-08	-1,14E-06
AP	mol H ⁺ eq.	3,47E+00	4,56E-02	3,39E-01	3,86E+00	7,26E-03	2,06E-01	2,41E-02	9,78E-03	- 1,16E+00
EP-freshwater	kg P eq.	1,76E-01	7,76E-04	8,97E-03	1,86E-01	1,30E-04	3,81E-03	6,42E-04	2,55E-04	-6,65E-02
EP-marine	kg N eq.	5,95E-01	1,74E-02	1,70E-01	7,83E-01	8,64E-03	7,56E-02	1,52E-02	1,23E-01	-1,57E-01
EP-terrestrial	mol N eq.	9,16E+00	1,86E-01	1,78E+00	1,11E+01	3,27E-02	8,09E-01	1,26E-01	3,84E-02	- 1,65E+00
POCP	kg NMVOC eq.	2,55E+00	6,68E-02	1,33E+00	3,95E+00	9,53E-03	2,78E-01	3,15E-02	1,51E-02	-4,87E-01
ADP-minerals&metals*	kg Sb eq.	3,83E-03	3,56E-05	3,10E-05	3,89E-03	1,71E-06	1,51E-04	3,40E-06	2,78E-06	2,15E-04
ADP-fossil*	MJ	9,76E+03	1,57E+02	1,41E+02	1,01E+04	1,35E+01	6,64E+02	1,77E+01	2,93E+01	- 1,49E+03
WDP*	m ³	2,34E+02	6,50E-01	3,04E+00	2,37E+02	7,04E-01	2,98E+00	-2,09E-01	1,22E+00	- 3,64E+01
Acronyms	<p>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; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption</p> <p>* The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator</p>									

Use of resources - Results per declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PERE	MJ	6,21E+02	2,44E+00	6,04E+00	6,29E+02	4,08E-01	8,45E+00	4,26E-01	5,69E-01	-7,15E+01
PERM	MJ	2,68E+03	0,00E+00	5,10E+01	2,73E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	3,30E+03	2,44E+00	5,70E+01	3,36E+03	4,08E-01	8,45E+00	4,26E-01	5,69E-01	-7,15E+01
PENRE	MJ	8,94E+03	1,57E+02	1,18E+02	9,21E+03	1,35E+01	6,64E+02	1,77E+01	2,93E+01	-1,49E+03
PENRM	MJ	8,24E+02	0,00E+00	2,30E+01	8,47E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	9,76E+03	1,57E+02	1,41E+02	1,01E+04	1,35E+01	6,64E+02	1,77E+01	2,93E+01	-1,49E+03
SM	kg	1,64E+02	0,00E+00	0,00E+00	1,64E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

RSF	MJ	0,00E+00								
NRSF	MJ	0,00E+00								
FW	m ³	8,35E+00	2,24E-02	9,51E-02	8,47E+00	2,23E-02	9,47E-02	5,17E-03	2,99E-02	-8,55E-01
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water									

Waste production - Results per declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
HWD	kg	5,78E-02	1,00E-03	4,32E-04	5,92E-02	7,93E-05	4,29E-03	9,42E-05	1,44E-04	4,61E-02
NHWD	kg	7,93E+01	7,69E+00	4,71E+00	9,17E+01	2,76E+00	3,23E+01	1,32E+00	1,24E+02	-2,66E+01
RWD	kg	1,38E-02	5,11E-05	2,15E-04	1,41E-02	7,16E-06	1,34E-04	5,00E-06	1,02E-05	-2,12E-03
Acronyms	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed									

Output flows - Results per declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
CRU	kg	0,00E+00								
MFR	kg	0,00E+00	0,00E+00	6,03E+01	6,03E+01	0,00E+00	0,00E+00	3,11E+01	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	1,94E-01	1,94E-01	0,00E+00	0,00E+00	8,84E+01	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,54E+02	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,09E+02	0,00E+00	0,00E+00
Acronyms	CRU = Components for re-use; MR = Material for recycling; MER = Materials for energy recovery; EEE = Exported energy, electricity; EET = Exported energy, thermal									

Additional indicators - Results per declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PM	Disease Inc.	3,72E-05	9,03E-07	1,93E-06	4,01E-05	8,42E-08	3,84E-06	1,86E-07	2,06E-07	-5,75E-06
IRP**	kBq U235 eq.	5,39E+01	2,10E-01	8,48E-01	5,50E+01	2,93E-02	5,65E-01	2,01E-02	4,25E-02	-8,84E+00
ETP-fw*	CTUe	2,79E+03	8,31E+01	2,33E+03	5,20E+03	3,23E+01	3,92E+02	4,04E+01	2,89E+01	9,69E+02
HTP-nc*	CTUh	1,06E-05	1,46E-07	1,44E-05	2,52E-05	5,49E-08	6,41E-07	2,42E-07	2,88E-08	8,32E-07
HTP-c*	CTUh	2,04E-06	5,04E-09	8,63E-08	2,13E-06	1,98E-09	2,13E-08	1,20E-08	7,97E-10	2,16E-07
SQP*	Pt	3,46E+03	9,36E+01	2,66E+02	3,82E+03	3,08E+00	3,96E+02	4,28E+00	6,34E+01	-2,08E+02
Acronyms	<p>CRU = Components for re-use; MR = Material for recycling; MER = Materials for energy recovery; EEE = Exported energy, electricity; EET = Exported energy, thermal</p> <p>* The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator Disclaimer</p> <p>** This impact category deals primarily with the possible impact on human health of low-dose ionizing radiation from the nuclear fuel cycle. Do not consider effects due to possible nuclear accidents, occupational exposure or due to the disposal of radioactive waste in underground landfills. Potential ionizing radiation from the ground, radon and some building materials are also not evaluated from this indicator.</p>									

Vision / double glass 5+5

Environmental impact indicators

Environmental impact parameters - Results per declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	1,07E+03	6,71E+00	1,28E+01	1,09E+03	1,51E+01	8,86E+01	7,03E-01	5,03E+00	- 3,43E+02
GWP-biogenic	kg CO ₂ eq.	7,85E+00	6,44E-03	1,31E+00	9,17E+00	2,40E-03	3,61E-02	1,40E-03	4,22E-02	1,21E+00
GWP-luluc	kg CO ₂ eq.	5,48E+00	3,22E-03	6,35E-03	5,49E+00	4,87E-04	4,55E-02	8,88E-05	3,01E-03	-4,57E-02
GWP-total	kg CO ₂ eq.	1,08E+03	6,72E+00	1,41E+01	1,11E+03	1,51E+01	8,87E+01	7,05E-01	5,08E+00	- 3,42E+02
ODP	kg CFC 11 eq.	5,89E-05	1,43E-07	1,54E-07	5,92E-05	2,63E-08	1,37E-06	1,36E-08	1,18E-07	-2,71E-06
AP	mol H ⁺ eq.	8,05E+00	2,71E-02	5,92E-02	8,13E+00	7,26E-03	3,80E-01	5,12E-04	3,50E-02	- 3,24E+00
EP-freshwater	kg P eq.	3,38E-01	4,60E-04	2,59E-03	3,41E-01	1,30E-04	7,04E-03	3,01E-05	4,79E-04	-1,75E-01
EP-marine	kg N eq.	1,35E+00	1,03E-02	2,08E-02	1,38E+00	8,64E-03	1,40E-01	1,54E-04	1,60E-02	-4,31E-01
EP-terrestrial	mol N eq.	1,48E+01	1,10E-01	2,23E-01	1,51E+01	3,27E-02	1,49E+00	1,40E-03	1,43E-01	- 4,33E+00
POCP	kg NMVOC eq.	4,57E+00	3,96E-02	6,80E-02	4,68E+00	9,53E-03	5,12E-01	4,45E-04	4,81E-02	- 1,31E+00
ADP-minerals&metals*	kg Sb eq.	5,70E-03	2,11E-05	2,87E-05	5,75E-03	1,71E-06	2,79E-04	5,01E-07	9,43E-06	1,48E-03
ADP-fossil*	MJ	1,39E+04	9,32E+01	1,84E+02	1,41E+04	1,35E+01	1,23E+03	1,10E+00	1,05E+02	- 3,36E+03
WDP*	m ³	3,36E+02	3,85E-01	2,55E+00	3,39E+02	7,04E-01	5,49E+00	9,79E-01	4,61E+00	- 1,64E+01
Acronyms	<p>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; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption</p> <p>* The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator</p>									

Use of resources - Results per declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PERE	MJ	2,08E+03	1,45E+00	8,85E+00	2,09E+03	4,08E-01	1,56E+01	1,03E-01	1,36E+00	-4,09E+01
PERM	MJ	1,60E+01	0,00E+00	0,00E+00	1,60E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,10E+03	1,45E+00	8,85E+00	2,11E+03	4,08E-01	1,56E+01	1,03E-01	1,36E+00	-4,09E+01
PENRE	MJ	1,38E+04	9,32E+01	1,01E+02	1,40E+04	1,35E+01	1,23E+03	1,10E+00	1,05E+02	-3,36E+03
PENRM	MJ	8,36E+01	0,00E+00	8,28E+01	1,66E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,39E+04	9,32E+01	1,84E+02	1,41E+04	1,35E+01	1,23E+03	1,10E+00	1,05E+02	-3,36E+03
SM	kg	0,00E+00								
RSF	MJ	0,00E+00								
NRSF	MJ	0,00E+00								
FW	m ³	1,52E+01	1,33E-02	6,44E-02	1,53E+01	2,23E-02	1,75E-01	2,99E-02	1,11E-01	-4,88E-01
Acronyms	<p>PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources</p>									

used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

Waste production - Results per declared unit

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
HWD	kg	8,85E-02	5,94E-04	2,30E-04	8,94E-02	7,93E-05	7,92E-03	4,98E-06	5,41E-04	1,46E-01
NHWD	kg	1,96E+02	4,56E+00	4,60E+00	2,05E+02	2,76E+00	5,95E+01	1,90E-01	4,37E+02	-5,85E+01
RWD	kg	3,06E-02	3,03E-05	1,93E-04	3,08E-02	7,16E-06	2,48E-04	1,24E-06	2,15E-05	-4,28E-03
Acronyms	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed									

Output flows - Results per declared unit

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
CRU	kg	0,00E+00								
MFR	kg	0,00E+00	0,00E+00	5,84E+00	5,84E+00	0,00E+00	0,00E+00	6,06E+01	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	1,87E-02	1,87E-02	0,00E+00	0,00E+00	3,31E-01	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,52E-01	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,83E+00	0,00E+00	0,00E+00
Acronyms	CRU = Components for re-use; MR = Material for recycling; MER = Materials for energy recovery; EEE = Exported energy, electricity; EET = Exported energy, thermal									

Additional indicators - Results per declared unit

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PM	Disease Inc.	8,64E-05	5,36E-07	4,47E-07	8,74E-05	8,42E-08	7,09E-06	4,37E-09	7,81E-07	-1,79E-05
IRP**	kBq U235 eq.	1,20E+02	1,25E-01	7,59E-01	1,21E+02	2,93E-02	1,04E+00	4,87E-03	9,04E-02	-1,79E+01
ETP-fw*	CTUe	7,23E+03	4,93E+01	2,48E+02	7,53E+03	3,23E+01	7,23E+02	3,71E+01	5,73E+01	-4,64E+02
HTP-nc*	CTUh	2,18E-05	8,63E-08	1,47E-06	2,34E-05	5,49E-08	1,18E-06	1,10E-08	5,35E-08	-5,93E-06
HTP-c*	CTUh	1,21E-06	2,99E-09	1,29E-08	1,22E-06	1,98E-09	3,94E-08	1,35E-10	2,74E-09	-3,18E-07
SQP*	Pt	3,31E+03	5,55E+01	2,81E+01	3,40E+03	3,08E+00	7,30E+02	5,57E-01	2,52E+02	-4,58E+02
Acronyms	<p>CRU = Components for re-use; MR = Material for recycling; MER = Materials for energy recovery; EEE = Exported energy, electricity; EET = Exported energy, thermal</p> <p>* The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator Disclaimer</p> <p>** This impact category deals primarily with the possible impact on human health of low-dose ionizing radiation from the nuclear fuel cycle. Do not consider effects due to possible nuclear accidents, occupational exposure or due to the disposal of radioactive waste in underground landfills. Potential ionizing radiation from the ground, radon and some building materials are also not evaluated from this indicator.</p>									

Vision / double glass 6+6

Environmental impact indicators

Environmental impact parameters - Results per declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	1,27E+03	7,90E+00	1,61E+01	1,29E+03	1,51E+01	1,06E+02	4,12E-01	5,94E+00	-4,02E+02
GWP-biogenic	kg CO ₂ eq.	9,29E+00	7,58E-03	1,51E+00	1,08E+01	2,40E-03	4,32E-02	8,21E-04	5,05E-02	1,41E+00
GWP-luluc	kg CO ₂ eq.	6,43E+00	3,79E-03	8,49E-03	6,44E+00	4,87E-04	5,44E-02	5,21E-05	3,60E-03	-5,35E-02
GWP-total	kg CO ₂ eq.	1,28E+03	7,91E+00	1,76E+01	1,31E+03	1,51E+01	1,06E+02	4,13E-01	6,00E+00	-4,00E+02
ODP	kg CFC 11 eq.	6,92E-05	1,69E-07	1,71E-07	6,96E-05	2,63E-08	1,64E-06	7,98E-09	1,41E-07	-3,08E-06
AP	mol H ⁺ eq.	9,56E+00	3,19E-02	7,41E-02	9,66E+00	7,26E-03	4,55E-01	3,00E-04	4,19E-02	-3,80E+00
EP-freshwater	kg P eq.	3,97E-01	5,42E-04	3,30E-03	4,01E-01	1,30E-04	8,41E-03	1,76E-05	5,72E-04	-2,05E-01
EP-marine	kg N eq.	1,60E+00	1,22E-02	2,54E-02	1,64E+00	8,64E-03	1,67E-01	9,02E-05	1,75E-02	-5,05E-01
EP-terrestrial	mol N eq.	1,76E+01	1,30E-01	2,72E-01	1,80E+01	3,27E-02	1,78E+00	8,24E-04	1,71E-01	-5,08E+00
POCP	kg NMVOC eq.	5,42E+00	4,67E-02	8,46E-02	5,56E+00	9,53E-03	6,13E-01	2,61E-04	5,76E-02	-1,53E+00
ADP-minerals&metals *	kg Sb eq.	6,78E-03	2,49E-05	3,71E-05	6,84E-03	1,71E-06	3,33E-04	2,94E-07	1,13E-05	1,73E-03
ADP-fossil*	MJ	1,64E+04	1,10E+02	2,51E+02	1,67E+04	1,35E+01	1,47E+03	6,43E-01	1,26E+02	-3,93E+03
WDP*	m ³	3,93E+02	4,54E-01	3,49E+00	3,97E+02	7,04E-01	6,56E+00	5,74E-01	5,52E+00	-1,90E+01
Acronyms	<p>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; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption</p> <p>* The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator</p>									

Use of resources - Results per declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PERE	MJ	2,45E+03	1,70E+00	1,18E+01	2,46E+03	4,08E-01	1,86E+01	6,06E-02	1,63E+00	-4,76E+01
PERM	MJ	1,87E+01	0,00E+00	0,00E+00	1,87E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,47E+03	1,70E+00	1,18E+01	2,48E+03	4,08E-01	1,86E+01	6,06E-02	1,63E+00	-4,76E+01
PENRE	MJ	1,63E+04	1,10E+02	1,32E+02	1,65E+04	1,35E+01	1,47E+03	6,43E-01	1,26E+02	-3,93E+03
PENRM	MJ	9,57E+01	0,00E+00	1,20E+02	2,15E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,64E+04	1,10E+02	2,51E+02	1,67E+04	1,35E+01	1,47E+03	6,43E-01	1,26E+02	-3,93E+03
SM	kg	0,00E+00								
RSF	MJ	0,00E+00								
NRSF	MJ	0,00E+00								
FW	m ³	1,77E+01	1,57E-02	8,58E-02	1,78E+01	2,23E-02	2,09E-01	1,75E-02	1,33E-01	-5,68E-01
Acronyms	<p>PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material;</p>									

RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water
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Waste production - Results per declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
HWD	kg	1,04E-01	6,99E-04	2,70E-04	1,05E-01	7,93E-05	9,47E-03	2,92E-06	6,48E-04	1,71E-01
NHWD	kg	2,32E+02	5,37E+00	5,56E+00	2,43E+02	2,76E+00	7,11E+01	1,11E-01	5,23E+02	-6,84E+01
RWD	kg	3,60E-02	3,57E-05	2,48E-04	3,62E-02	7,16E-06	2,96E-04	7,28E-07	2,56E-05	-5,02E-03
Acronyms		HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed								

Output flows - Results per declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	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	0,00E+00
MFR	kg	0,00E+00	0,00E+00	6,84E+00	6,84E+00	0,00E+00	0,00E+00	7,19E+01	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	2,20E-02	2,20E-02	0,00E+00	0,00E+00	1,94E-01	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,29E-01	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,04E+00	0,00E+00	0,00E+00
Acronyms		CRU = Components for re-use; MR = Material for recycling; MER = Materials for energy recovery; EEE = Exported energy, electricity; EET = Exported energy, thermal								

Additional indicators - Results per declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PM	Disease Inc.	1,03E-04	6,31E-07	5,69E-07	1,04E-04	8,42E-08	8,47E-06	2,56E-09	9,35E-07	-2,09E-05
IRP**	kBq U235 eq.	1,41E+02	1,47E-01	9,78E-01	1,42E+02	2,93E-02	1,25E+00	2,85E-03	1,08E-01	-2,10E+01
ETP-fw*	CTUe	8,61E+03	5,80E+01	2,93E+02	8,96E+03	3,23E+01	8,64E+02	2,17E+01	6,82E+01	-5,54E+02
HTP-nc*	CTUh	2,58E-05	1,02E-07	1,73E-06	2,76E-05	5,49E-08	1,41E-06	6,45E-09	6,39E-08	-6,97E-06
HTP-c*	CTUh	1,42E-06	3,52E-09	1,49E-08	1,44E-06	1,98E-09	4,71E-08	7,91E-11	3,28E-09	-3,76E-07
SQP*	Pt	3,93E+03	6,53E+01	3,71E+01	4,03E+03	3,08E+00	8,73E+02	3,26E-01	3,01E+02	-5,37E+02
Acronyms		<p>CRU = Components for re-use; MR = Material for recycling; MER = Materials for energy recovery; EEE = Exported energy, electricity; EET = Exported energy, thermal</p> <p>* The results of this indicator should be used with caution given their high uncertainty or limited experience with the indicator Disclaimer</p> <p>** This impact category deals primarily with the possible impact on human health of low-dose ionizing radiation from the nuclear fuel cycle. Do not consider effects due to possible nuclear accidents, occupational exposure or due to the disposal of radioactive waste in underground landfills. Potential ionizing radiation from the ground, radon and some building materials are also not evaluated from this indicator.</p>								

Biogenic carbon

The content of biogenic carbon in the product and packaging of the finished product was quantified according to EN 16449:2014.

Biogenic carbon content	Biogenic carbon content in product [kg C]	Biogenic carbon content in accompanying packaging [kg C]
Vision / solid	78,90	2,68
Vision / double glass 5+5	0	0
Vision / double glass 6+6	0	0

CALCULATION METHODOLOGY

The methodology followed as a reference standard is that of the Life Cycle Assessment (LCA); “LCA addresses environmental aspects and potential environmental impacts (e.g. resource use and environmental consequences of releases) throughout the product life cycle, from raw material acquisition through manufacturing and use, right through to end-of-life treatment, recycling and final disposal (i.e. from cradle to grave)” [ISO 14040:2021].

Declared Unit/ Functional Unit

The study was carried out using 1 product as a reference unit. The allocation was made on a mass basis.

Rules of Exclusion and Cut off

The galvanization of the steel hardware was considered in cut-off.

Inputs excluded:

- employee travel;
- the natural gas used for heating offices and the company canteen.

Data quality

With reference to the EN 15804:2012+A2:2019 standard, the analysis describes specific products using specific data for the processes on which the manufacturer has an influence:

- for A1-A2 phases, the data regarding BOM components (material, weight, quantity, source) are derived from company databases and they are site-specific. The type of material and processes were taken from the Ecoinvent 3.9.1 database.
- all data related to A3 phase are site specific.

The company procures itself through the national energy system, and therefore the Italian residual mix is adopted, using as a source of data the dataset Ecoinvent *Electricity, medium voltage {IT} electricity, medium voltage, residual mix | Cut-off, U*.

With regards to the modelling of the particleboard and glass double glazing, the relative Ecoinvent datasets have been adapted to better suit their material composition.

The particleboard used for the solid wall is made of 93,6% recycled content, therefore the dataset *Particleboard, uncoated {RER} market for particleboard, uncoated | Cut-off, U* was adjusted to that content by reportioning the internal inputs of *Particleboard, uncoated {RER} particleboard production, uncoated, average glue mix | Cut-off, U*, namely those referring to Pulpwood and Wood chips.

Adjustments were also made to the dataset used for the specific laminated glass used which does not contain any gas (argon) and aluminium finishes. For this reason, the latter inputs contained within the dataset *Glazing, double, U<1.1 W/m2K, laminated safety glass {RER} production | Cut-off, U* have been zeroed out.

Generic data

In the use of generic data, the following criteria were applied:

- geographic equivalence;
- technological equivalence;
- equivalence with respect to system boundaries.

For generic data, information between 2019 and 2022 was considered.

For the disposal scenarios, see the below table.

Assumptions / Scenarios

As for the steel trestles for transporting the glass, it was considered that the trestle is used at least twice a week for 2-3 years, so that the total weight (74 kg) is divided by the frequency of use multiplied by the kg transported (a transport of 3 mq of glass weighing 27 kg/mq).

Modules	Scenarios
C1 Disassembling	The partition walls are completely disassemblable. Therefore, their dismantling was modelled through the use of an 1100W hammer drill, while the use of a 16 kW mini electric crane with a maximum working height of 23.5m, suitable for glass installation and the installation of façades and steel structures, was considered for handling the glass. The installation and assembly time was estimated at 10 minutes. The respective Ecoinvent modules used are <i>Electricity, low voltage {GLO} market group for Cut-off, U</i> and <i>Machine operation, diesel, < 18.64 kW, low load factor {GLO} market for Cut-off, U</i> .
C2 Transport of the disassembled materials	A distance of 1000 km was considered for the transport of waste modelled with <i>Transport, freight, lorry 16-32 metric ton, EURO4 {RoW} transport, freight, lorry 16-32 metric ton, EURO4 Cut-off, U</i> .
C3 Waste management, recycling and energy recovery	The recycling and incineration with energy recovery refer to a global context. Different literature and Organisation reports sources were consulted for obtaining the percentage rates of waste processing at the end of life. The % rates and sources of the materials are: <ul style="list-style-type: none"> - Wood (95% of particleboard): 50% incineration with energy recovery; - Glue (5% of particleboard): 50% incineration - Veneer: 50% incineration with energy recovery - Paint: 50% incineration - Aluminium: 76% recycling (International Aluminium Institute, 2020). - Steel: 85% recycling (Arcelor Mittal, 2023). - PVC: 9% recycling; 19% incineration with energy recovery (OECD, 2023) - Rubber: 100% incineration with energy recovery
C4 Waste management,	The disposal scenarios refer to a global context. The % rates for the materials are: <ul style="list-style-type: none"> - Wood (95% of particleboard): 50% landfill

landfill disposal	<ul style="list-style-type: none"> - Glue (5% of particleboard): 50% landfill - Veneer: 50% landfill - Paint: 50% landfill - Glass: 100% landfill - Aluminium: 24% landfill - Steel: 15% landfill - PVC: 72% landfill - Mineral wool: 100% landfill
D Benefits beyond the system boundaries	<p>This module includes benefits related to material recycling and electrical and thermal energy production from material incineration. For the fractions of wood, aluminium, steel, plastics and PVC sent to recycling, substitution of virgin material has been considered according to the respective % rates. For materials undergoing incineration, namely wood, plastics and rubber, the relative heating value was used to calculate the electricity production.</p>

Additional Environmental Information

The blind Vision wall has undergone Indoor Air Comfort Gold tests by Eurofins, a certification that assesses compliance with low VOC (Volatile Organic Compounds) emission requirements demanded by the market. Below is the first page of the Eurofins report dated December 13, 2021.

VOC EMISSION TEST REPORT Indoor Air Comfort GOLD®

13 December 2021

1 Sample Information

Sample name	FURNITURE: BRIDGE/POINT/CORNER/SHARD/PROGRAMMA3 WALL: SEALED/BASIC/VISION/PROGRAMMA3
Batch no.	001
Stated production date	20/10/2021
Product type	Wood based panel
Sample reception	26/10/2021

2 Brief Evaluation of the Results

Regulation or protocol	Conclusion	Version of regulation or protocol
French VOC Regulation		Decree of March 2011 (DEVL1101903D) and Arrêté of April 2011 (DEVL1104875A) modified in February 2012 (DEVL1133129A)
French CMR components	Pass	Regulation of April and May 2009 (DEVP0908633A and DEVP0910046A)
Italian CAM Edilizia	Pass	Decree 11 October 2017 (GU n.259 del 6-11-2017)
ABG/AgBB	Pass	Ausschuss zur gesundheitlichen Bewertung von Bauprodukten (June 2021)
Belgian Regulation	Pass	Royal decree of May 2014 (C-2014/24239)
EMICODE	EC 1 PLUS	April 2020
Indoor Air Comfort®	Pass	Indoor Air Comfort 7.0 of May 2020
Indoor Air Comfort GOLD®	Pass	Indoor Air Comfort GOLD 7.0 of May 2020
BREEAM International	Exemplary Level	BREEAM International New Construction v2.0 (2016)
LEED v4.1 BETA (outside U.S.)	Pass	LEED v4.1 BETA for Building Design and Construction (February 2021)
BREEAM® NOR	Pass	BREEAM-NOR New Construction v1.2 (2019)

Full details based on the testing and direct comparison with limit values are available in the following pages
Regarding pass/fail decision rule please see appendix


Rasmus Verdier
Analytical Service Manager


Rasmus Stengaard Christensen
Analytical Service Manager, MSc in Chemistry

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