Statement of Verification

BREG EN EPD No.: 000454 Issue 01

This is to verify that the

Environmental Product Declaration

provided by:

Group MAM

is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

BRE Global Scheme Document SD207

This declaration is for:

Argentum series retrofit window film

Company Address

Group Michiels Advanced Materials NV
Poldergotestraat 24
B-9240 Zele
Belgium

Signed for BRE Global Ltd	Emma Baker Operator	29 September 2022 Date of this Issue
29 September 2022 Date of First Issue		28 September 2027 Expiry Date

Environmental Product Declaration

EPD Number: 000454

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013
Commissioner of LCA study	**LCA consultant/Tool**
Group Michiels Advanced Materials NV Poldergotestraat 24 B-9240 Zele	CO2logic NV/SA Cantersteen 47 B- 1000 Brussels Belgium Virginie@CO2logic.com
Functional Unit	**Applicability/Coverage**
1 square meter of retrofit window film, installed according to Group MAM installation instructions **on an existing window**, maintained according to Group MAM instructions and designed to ensure the solar filtration on a basis of 15 years of typical lifetime.	Product Average.
EPD Type	**Background database**
Cradle to Gate with options	GaBi v.2021

Demonstration of Verification
CEN standard EN 15804 serves as the core PCR [a]
Independent verification of the declaration and data according to EN ISO 14025:2010 ☐Internal ☒ External
(Where appropriate [b])Third party verifier: Roger Connick

a: Product category rules
b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A1:2013. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A1:2013 for further guidance

Information modules covered

Product			Construction		Use stage							End-of-life					Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building							
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal		Reuse, Recovery and/or Recycling potential
☑	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☑	☑	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

All products are manufactured at Group MAM site, located in Zele (Belgium). The films are then sent to an external supplier located in Mortsel (Belgium) to be laminated before coming back to Group MAM for the final packaging.

Windows films production and packaging : **Group MAM site** **Poldergotestraat 24** **9240 Zele, in Belgium**Windows films production and packaging : Group MAM site Poldergotestraat 24 9240 Zele, in Belgium	**Windows films laminating :** **External supplier** **Mortsel, BelgiumWindows films laminating :** **External supplier** **Mortsel, Belgium**

Construction Product:

Product Description

The window films are made primarily of polyethylene terephthalate (PET), on which complex layers of various materials is coated, in order to control how the sun's radiation passes through glass. Proprietary combinations of metals, such as silver and titanium, give each film its unique solar and insulating performance capability. For retrofit purposes, a lamination with a second PET layer is required, performed by an external support facility. There are two different applications for those films, either in automotive or in architectural projects.

The windows films covered by this EPD are **retrofit films from the Argentum Series**, that need to be professionally installed by retrofitting them to the inside or outside surface of an existing glazing. The evaluation has been carried out by considering the Argentum 40/20 retrofit window films as representative of the entire ranges of Group MAM related products families.

The films are produced in four widths, measured in inches. The two larger widths (152 cm (60") and 182 cm (72")) are used to make narrower widths (91 cm (36") and 122 cm (48")) of finished product by slitting.

In addition to these films and sizes, there are two options for adhering the film, pressure sensitive (PS) and clear dry adhesive (CDA).

The films are protected with a scratch-resistant coating, inspected and put through stringent endurance tests to provide a quality product.

The windows film are distributed with a packaging that includes a cardboard box, polystyrene core, polyethylene sleeve, and polyethylene pad plugs.

The products covered by this EPD and their respective technical properties are detailed in the table below.

Product	Visible Light Transmission	Total Solar Transmission	Total Solar Reflectance	Total Solar Absorbance	Visible Light Reflectance film side	UV Rejected	Solar Heat Gain Coeeficient (G-value)	Total Solar Energy Rejected
Argentum 50 (LE/SP/OS)	48%	36%	29%	35%	26%	99%	0,45	55%
Argentum 40 (LE/SP/OS)	38%	30%	42%	28%	36%	99%	0,38	62%
Argentum 35 (LE/SP/OS)	33%	25%	39%	36%	40%	99%	0,35	65%
Argentum 20 (LE/SP/OS)	18%	14%	62%	24%	59%	99%	0,19	81%

Technical Information

The window films are designed for architectural and automotive solar-protection :

- Architectural solar-control and insulating window films can be applied to any building with windows, including commercial facilities, Government - Healthcare - Schools - Offices - Residential – Classified buildings - High-rise buildings - Greenhouses.... or be integrated as an glazing interlayer.
- Automotive window film coatings : the automotive coatings can be applied in between 2 glass panes (windshields, side window, rear windows..) of new vehicles or on windows of existing cars (for solar, insulating or tinting purposes).

Group MAM window films are conformed to European and other norms, described in the table below :

Property	Value, Unit
Luminous and energetic transmission EN 410:2011, Glass in building. Determination of luminous and solar characteristics of glazing	Meets the requirements
Luminous and energetic reflection EN 410:2011, Glass in building. Determination of luminous and solar characteristics of glazing	Meets the requirements
Emissivity EN 12898:2019, Glass in building - Determination of the emissivity	Meets the requirements
Solar factor (g-factor) EN 410:2011, Glass in building - Determination of luminous and solar characteristics of glazing EN 673:2011, Glass in building - Determination of thermal transmittance (U value) - Calculation method	0,50 to 0,16
Emissivity EN 410:2011, Glass in building - Determination of luminous and solar characteristics of glazing EN 673:2011, Glass in building - Determination of thermal transmittance (U value) - Calculation method	0,04 to 0,08

Main Product Contents

The retrofit products are made of 6 layers. The main layer is the PET film coated with metals. This layer is embodied between a hardcoat, made of waterbased acrylate and a clear dry adhesive layer. A thin PET film joint this adhesive layer with a Pressure Sensitive adhesive, which is protected until the installation by a release liner (PET).

Material/Chemical Input	%
PET	95,3595,35
PS adhesive	0,380,38
Waterbased acrylate	2,572,57
Metals	1,701,70

Manufacturing Process

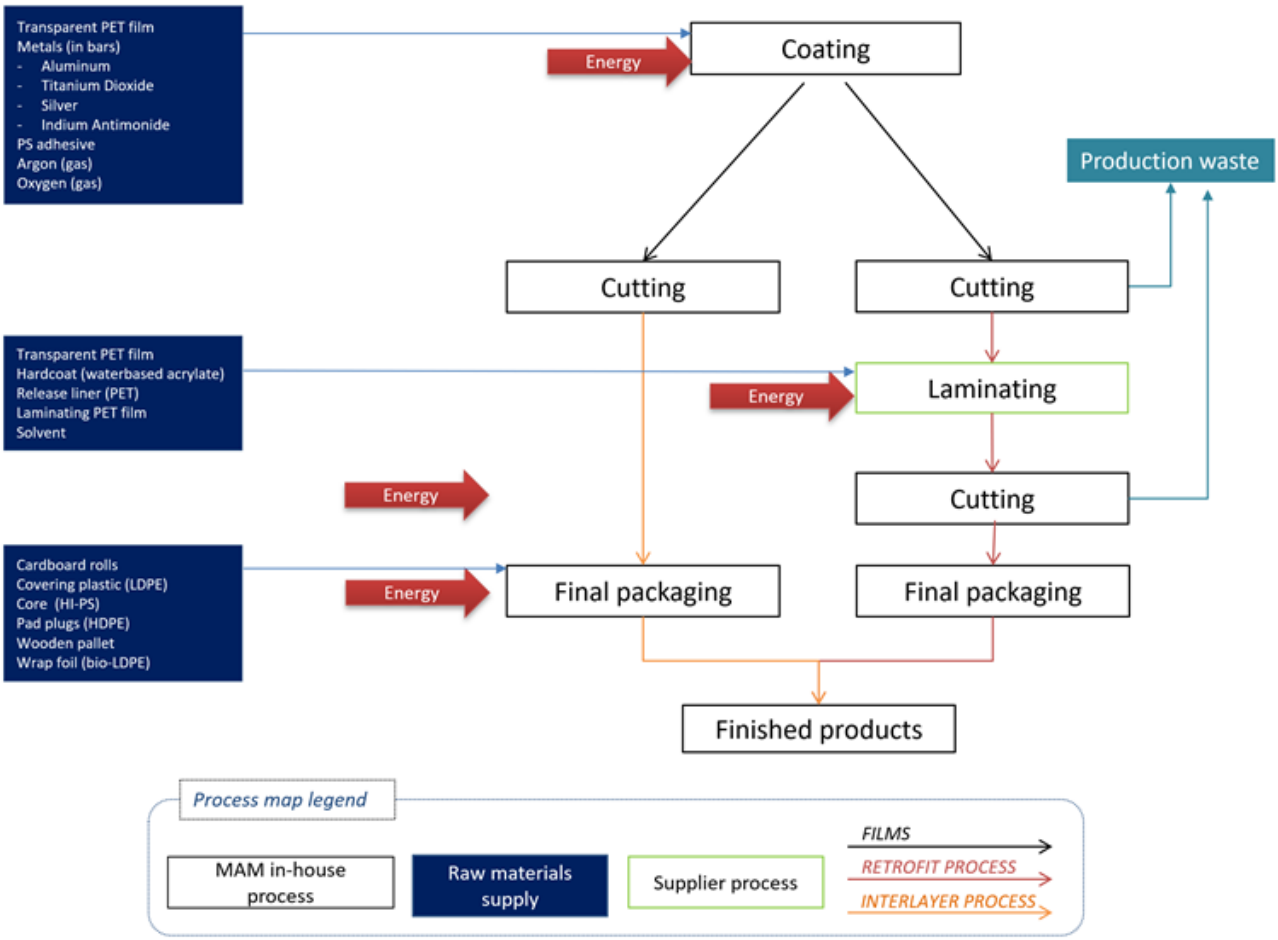
The window films support is a film made of virgin PET, extruded and rolled by a supplier.

The main process is roller coater sputtering. This is a process in which a roll of plastic film is uncoiled in a vacuum chamber, stretched onto a cylindrical roll and coated with one or more layers using a number of plasma (sputter) sources. Afterwards, the roll is wound up again.
The sputtering sources have as consumables metal plates or tubes, made of the material to be deposited. The plasma is created by adding argon gas. Where necessary, the metals are converted to a metal oxide by adding a small amount of oxygen gas.

After the large roll of coated film leaves this installation, it still has to be rewound and cut with the slitter/rewinder machine.

In the case of retrofit products, the rolls will leave Group MAM facilities for the supplier, where the products will be laminated.

Process flow diagram



Packaging content

The primary packaging is made up of four components: core, sleeve, box, and pad plugs.

Core	Sleeve	Box	Pad plugs
The core is a tube made of high impact polystyrene (HIPS) and is what the finished film is wrapped around.	The sleeve covers and protects the roll of film and is made from low density polyethylene (LDPE).	A box of 80% recycled cardboard and 20% virgin is used to protect the film and indicates the film type.	The pad plugs are made from high density polyethylene (HDPE) and are used to close the box at each end.

The rolls are transported on wooden pallets, wrapped together with a LDPE film made of 50% bio-LDPE.

Transport

Finished materials are transported directly to the customer, by van and by plane depending on the client's location.

Construction Installation

The products are installed manually. The installation involves the cleaning of the window, removal and disposal of the protective liner, and adhesion of the film to the glass with any bubbles smoothed out. As the release liner is removed from the window film no substantial amounts of volatile organic compounds are

released into the atmosphere. The amount of material emissions from installation is considered to be zero, and were not included in this EPD.

Use Information

Maintenance, repair, replacement and refurbishment are not expected during the lifetime and thus not considered as part of the EPD. After installation, the film does not require any special maintenance, besides occasional cleaning with water or diluted mild soap (not exceeding general routine glazing cleaning), and no repairs are performed. Window cleaning practices utilized prior to the installation of window film can be carried out as usual. The scratch resilient hardcoat on the exposed surface of the film protects it from premature wear.

The architectural film products are conform to CRI Green Label Plus indoor air quality testing program.

End of Life

Retrofit window films end-of-life scenario will differ, depending on whether it is manually removed from the glazing or if it reaches its end of life simultaneously with the glazing. Because the retrofit window film has a service life estimated at 15 years, one can consider that 2 window films will be used on a glazing average service life (about 30 years), 1 of them (50%) ending up as municipal waste et the last one (50%) with the glazing.
The following average end-of-life scenario for retrofit window films has been calculated :

- 71% to landfill
- 29 % to incineration

Life Cycle Assessment Calculation Rules

Functional unit description

1 square meter of retrofit window film from the Argentum series, installed according to Group MAM installation instructions **on an existing window**, maintained according to Group MAM instructions and designed to ensure the solar filtration on a basis of 15 years of typical lifetime.

System boundary

The system boundaries of the product LCA follow the modular design defined by EN 15804-A1. The scope for this EPD's is a "**Cradle to gate with options, modules C1-C4 and module D"**. The modules A1-A3, A4, C1-C4 and D are declared.

Data sources, quality and allocation

Inventory data quality is judged by its precision (measured, calculated or estimated), completeness (e.g. unreported emissions), consistency (degree of uniformity of the methodology applied) and representativeness (geographical, temporal, and technological).
To cover these requirements and to ensure reliable results, primary data was combined with background LCA data from the GaBi database v.2021.

The primary data collected from the group is the activity data for the year 2020. This data is considered to be representative of the activity over the next 5 years, as the technology is not expected to change in this time frame.

The LCI data sets from GaBi database are widely distributed and used with GaBi Software. The datasets have been used in LCA models worldwide in industrial and scientific applications, as well as in many critically reviewed and published studies. In the process of providing these datasets they are cross-checked with other databases and values from industry and science.

The applied data sets are representative for the year 2020 and have a European coverage. For A3 module covering Group MAM, activities datasets are representative of Group MAM in-house manufacture located in Belgium (electricity mix).

For this EPD, some allocations have been required :

- Allocation of energy for coating and lamination processes: onsite energy were allocated according to total site production (per square meter produced) both at Group MAM and its external supplier.
- For similar reason, the water consumption at Group MAM has also been allocated according to the total site production (per square meter of solar film produced).

The evaluation is carried out by considering the Argentum 40/20 retrofit window films as representative of the entire ranges of Group MAM related products families. Indeed, all products within this product group have similar composition and the differences represent around 1% of product total weight and lead to impact results that are not significantly different, the below 10% difference, which has been verified with a sensitivity analysis.

Cut-off criteria

Processes or activities that contribute no more than 1% of the total mass and 1% of the total energy, as well as less than 5% of total mass and energy usage per module, may be omitted under EN 15804+A1 cut-off criteria. For this study, all inputs and outputs have been taken into account excepting the following items: Construction of the manufacturing machines and employee commuting are not part of the scope. These capital equipment's were cut-off under the assumption that the impacts associated with these aspects are sufficiently small enough to fall below cut-off criteria when scaled down to the functional unit.

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			GWP	ODP	AP	EP	POCP	ADPE	ADPF
			kg CO_2 equiv.	kg CFC 11 equiv.	kg SO_2 equiv.	kg $(PO_4)^{3-}$ equiv.	kg C_2H_4 equiv.	kg Sb equiv.	MJ, net calorific value.
Product stage	Raw material supply	A1	3,92E-01	1,13E-09	4,60E-04	8,69E-05	1,06E-04	7,36E-08	9,13E+00
	Transport	A2	1,70E-01	2,26E-17	4,95E-04	1,06E-04	4,87E-05	2,08E-08	2,23E+00
	Manufacturing	A3	7,17E-01	2,57E-12	6,96E-04	3,25E-04	7,61E-05	3,73E-07	8,75E+00
	Total (of product stage)	A1-3	1,28E+00	1,13E-09	1,65E-03	5,18E-04	2,31E-04	4,68E-07	2,01E+01
Construction process stage	Transport	A4	8,61E-02	1,85E-17	1,88E-04	4,21E-05	2,07E-05	6,15E-09	1,17E+00
	Construction	A5	MND	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	4,50E-05	4,07E-19	6,00E-08	4,87E-08	5,88E-09	5,12E-12	5,54E-04
	Transport	C2	5,80E-04	1,56E-19	1,06E-06	2,45E-07	1,16E-07	5,26E-11	7,81E-03
	Waste processing	C3	0	0	0	0	0	0	0
	Disposal	C4	4,94E-02	3,04E-12	1,26E-05	1,03E-05	1,09E-06	2,53E-10	5,96E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1,59E-02	-1,90E-16	-1,43E-05	-2,23E-06	-1,58E-06	-2,35E-09	-2,38E-01

GWP = Global Warming Potential;
ODP = Ozone Depletion Potential;
AP = Acidification Potential for Soil and Water;
EP = Eutrophication Potential;
POCP = Formation potential of tropospheric Ozone;
ADPE = Abiotic Depletion Potential – Elements;
ADPF = Abiotic Depletion Potential – Fossil Fuels;

LCA Results (continued)

Parameters describing resource use, primary energy								
			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	5,84E-01	0,00E+00	5,84E-01	6,85E+00	2,66E+00	9,51E+00
	Transport	A2	9,89E-03	0,00E+00	9,89E-03	2,36E+00	0,00E+00	2,36E+00
	Manufacturing	A3	7,35E+00	0,00E+00	7,35E+00	2,16E+01	0,00E+00	2,16E+01
	Total (of product stage)	A1-3	7,94E+00	0,00E+00	7,94E+00	3,08E+01	2,66E+00	3,34E+01
Construction process stage	Transport	A4	4,56E-02	0,00E+00	4,56E-02	1,18E+00	0,00E+00	1,18E+00
	Construction	A5	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	8,92E-05	0,00E+00	8,92E-05	6,05E-04	0,00E+00	6,05E-04
	Transport	C2	4,54E-04	0,00E+00	4,54E-04	7,91E-03	0,00E+00	7,91E-03
	Waste processing	C3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Disposal	C4	6,08E-03	0,00E+00	6,08E-03	6,21E-02	0,00E+00	6,21E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-4,89E-02	0,00E+00	-4,89E-02	-2,79E-01	0,00E+00	-2,79E-01

PERE = Use of renewable primary energy excluding renewable primary energy 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 resource

LCA Results (continued)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	1,58E-02	0,00E+00	0,00E+00	1,81E-03
	Transport	A2	0,00E+00	0,00E+00	0,00E+00	2,25E-05
	Manufacturing	A3	3,70E-04	0,00E+00	0,00E+00	5,86E-03
	Total (of product stage)	A1-3	1,62E-02	0,00E+00	0,00E+00	7,69E-03
Construction process stage	Transport	A4	0,00E+00	0,00E+00	0,00E+00	5,29E-05
	Construction	A5	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	5,01E-04
	Transport	C2	0,00E+00	0,00E+00	0,00E+00	5,20E-07
	Waste processing	C3	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Disposal	C4	0,00E+00	0,00E+00	0,00E+00	9,71E-05
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0,00E+00	0,00E+00	0,00E+00	-4,77E-05

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results (continued)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	1,34E-09	9,50E-03	1,13E-04
	Transport	A2	5,12E-11	1,47E-04	2,37E-06
	Manufacturing	A3	1,37E-08	5,88E-02	5,04E-03
	Total (of product stage)	A1-3	1,51E-08	6,85E-02	5,15E-03
Construction process stage	Transport	A4	4,33E-11	1,62E-04	1,74E-06
	Construction	A5	MND	MND	MND
Use stage	Use	B1	MND	MND	MND
	Maintenance	B2	MND	MND	MND
	Repair	B3	MND	MND	MND
	Replacement	B4	MND	MND	MND
	Refurbishment	B5	MND	MND	MND
	Operational energy use	B6	MND	MND	MND
	Operational water use	B7	MND	MND	MND
End of life	Deconstruction, demolition	C1	1,01E-13	1,42E-04	1,89E-08
	Transport	C2	4,17E-13	1,24E-06	1,44E-08
	Waste processing	C3	0	0	0
	Disposal	C4	1,14E-11	5,04E-02	9,22E-07
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-6,04E-11	-1,14E-04	-1,56E-05

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

LCA Results (continued)

Other environmental information describing output flows – at end of life						
			CRU	MFR	MER	EE
			kg	kg	kg	MJ per energy carrier
Product stage	Raw material supply	A1	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	A2	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Manufacturing	A3	0,00E+00	1,48E-02	0,00E+00	1,49E-01
	Total (of product stage)	A1-3	0,00E+00	1,48E-02	0,00E+00	1,49E-01
Construction process stage	Transport	A4	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Construction	A5	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Waste processing	C3	0,00E+00	0	0,00E+00	0
	Disposal	C4	0,00E+00	0,00E+00	0,00E+00	3,71E-01
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0,00E+00	0,00E+00	0,00E+00	0,00E+00

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
A4 – Transport to the building site	The transport distance for this stage was calculated based on the distances travelled from Group Umisol to its clients in 2020, weighted by the volume transported. The scope of the study is Europe, and as such only the distribution to European clients has been considered in the calculation. About 14% of the production volume is transported by air.		
	Truck Euro 5, 7.5 t - 12t gross weight / 5t payload capacity	Diesel	
	Capacity utilisation van (incl. empty returns)	%	6
	Distance by van	Km	445
	Distance by plane	Km	62
Reference service life	The service life of the retrofit window films strongly depends on the service reference life of the window and on the correct installation, taking into account the declared instructions provided by Group MAM. **The Reference Service Life (RSL) of 15 years** can be assumed. This lifespan has been estimated based on ageing tests results, where the windows films showed a lifespan of 1000 hours, representing 15 years in real life.		
	RSL	years	15
C1 to C4 End of life,	The C1-C4 modules only cover the window films end-of-life. The window end-of-life is beyond the boundaries. Retrofit window films end-of-life scenario will differ, depending on whether it is manually removed from the glazing or if it reaches its end of life simultaneously with the glazing. Because the retrofit window film has a service life estimated at 15 years, one can consider that 2 window films will be used on a glazing average service life (about 30 years), 1 of them (50%) ending up as municipal waste et the last one (50%) with the glazing.		
	The module C1 includes the removal of the window film and is included in the study. The stage includes the impacts of the water used for the removal. This water use is only applied on 50% of the window film, as the remaining 50% is supposed to be treated together with the glazing.	Water	1 kg/m2
	Transport in C2 module is assumed to be made by a Truck, Euro 5, more than 32t gross weight / 24.7t payload capacity.		
	From construction/demolition site to sorting plant/crusher/collection point	km	30
	From sorting plant to landfill	km	50
	Stage (C3) is declared but will not have an impact because the film cannot be split into recoverable/reusable/recyclable components during the waste processing.		

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
	If the film is manually removed from the glazing, the window film will likely end up with the municipal waste, in which case the European statistics can be applied : • 47 % landfill • 53 % incineration If the window film reaches its end of life simultaneously with the glazing, it is likely that it won't be released from the glazing first. Although the glass is 100% recyclable, only 25% of flat glass is recycled at its end-of-life to this day and only 5% in glazing furnace. It has then been considered that 95% of the glazing will be landfilled and 5% will be recycled in glass furnace. Based on that, the following average end-of-life scenario for retrofit window films has been calculated : • 71% to landfill • 29 % to incineration		
Module D	The benefits of Module D include the energy credits from waste incineration of product at end-of-life (from C 4.2 module) The process generating energy from waste is assumed to substitute electricity mix of Europe (medium voltage) and average European process steam production based on natural gas. The net electric production values of corresponding components are included in GaBi datasets. The following materials have been considered for this module: PET film and PS adhesive.		

Summary, comments and additional information

Conclusions

The goal of this study was to conduct a cradle-to-gate LCA of Group MAM speciality products to develop EPDs. The creation of those EPDs will allow consumers or architects in the building and construction industry to make better-informed decisions about the environmental impacts associated with the products they choose. Overall, the study found that environmental performance is driven primarily by raw material production, in particular the metals, and the manufacturing stage.

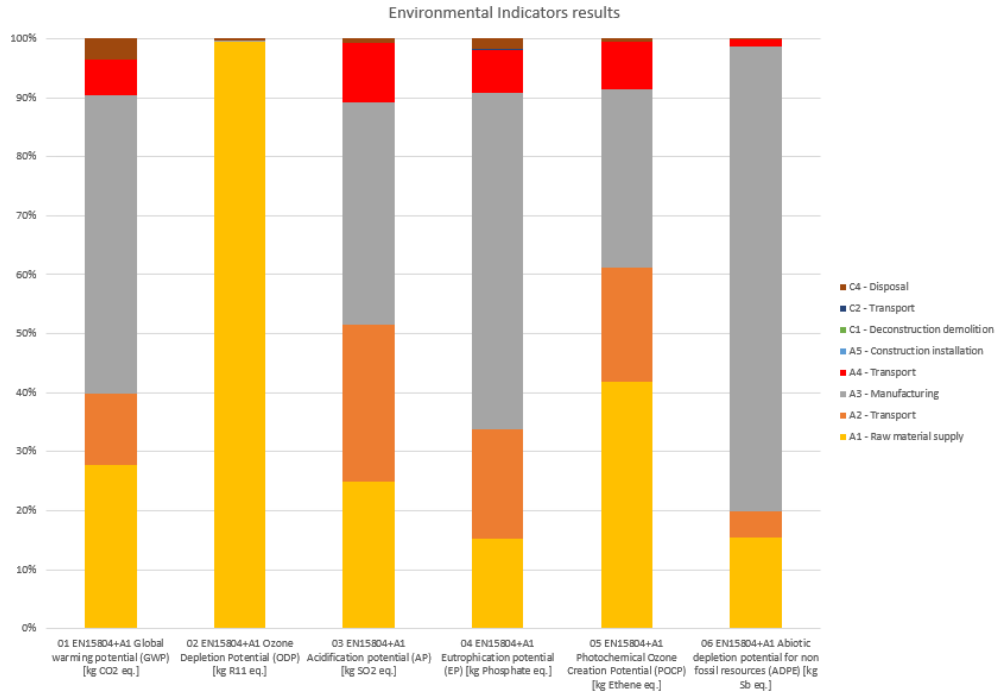


Figure 1

GroupMAM' sustainability program

Group MAM is a leading European manufacturer of energy saving window films, commercialized by its sister company Umiscreen. Those window films provide privacy and protection from the sun, keeping occupants comfortable and reducing cooling loads.

Michiels Group embraces a culture of sustainability from top to bottom by continuing to improve the energy efficiency of its facility, but also by purchasing packaging materials contain a significant percentage of recycled content and 100% recyclable.

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