Declaration Code: EPD-SFA-GB-49.0





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Schindler Fenster + Fassaden GmbH

Wood/Aluminium Façades

PR-HM 2005 Wood/aluminium stick façade construction HMEF 2020 Wood/aluminium unitised façade construction





Basis: DIN EN ISO 14025 EN15804

Company EPD Environmental Product Declaration

> Publication date: 05.10.2021 Next revision: 05.10.2026



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Notified Body 0757



Environmental Product Declaration

Declaration Code: EPD-SFA-GB-49.0

Programme operator	ift Rosenheim GmbH Theodor-Gietl-Straße 7-9 D-83026 Rosenheim										
Practitioner of the LCA	ift Rosenheim GmbH Theodor-Gietl-Straße 7-9 DE-83026 Rosenheim										
Declaration holder	Schindler Fenster + Fassac Mauthstraße 15 DE-93426 Roding	Schindler Fenster + Fassaden GmbH Mauthstraße 15 DE-93426 Roding									
Declaration code	EPD-SFA-GB-49.0										
Designation of declared product	PR-HM 2005 Wood/aluminium stick façade construction HMEF 2020 Wood/aluminium unitised façade construction										
Scope	Stick façade and unitised façade constructions for use as external building envelopes in commercial construction projects.										
Basis	This EPD was prepared on the basis of EN ISO 14025:2011 and DIN EN 15804:2012+A1:2013. In addition, the "Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen" (Guidance on preparing Type III Environmental Product Declarations) applies. The Declaration is based on the PCR documents "PCR Part A" PCR-A-0.2:2018 and "Façades and roofs made of glass and plastic" PCR-EA-3 1:2018										
	Publication date: 05.10.2021	Last revision: 05.10.2021	Next revision: 05.10.2026								
Validity	This verified Company Environmental Product Declaration (company EPD) applies solely to the specified products and is valid for a period of five years from the date of publication in accordance with DIN EN 15804.										
LCA basis	The LCA was prepared in accordance with DIN EN ISO 14040 and DIN EN ISO 14044. The base data includes both the data collected at the production site of Schindler Fenster + Fassaden GmbH and the generic data derived from the "GaBi 10" database. LCA calculations were carried out for the relevant "cradle to gate" life cycle with options (cradle to gate with options) including all upstream chains										
Notes	The "Conditions and Guida The declaration holder assu verifications.	nce on the Use of ift Test umes full liability for the un	Documents" apply. derlying data, certificates and								
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Prüfung und Kalibrierung – EN ISO/IEC 17025 Inspektion – EN ISO/IEC 17020 Zertifizierung Produkte – EN ISO/IEC 17065 Zertifizierung Managementsysteme – EN ISO/IEC 17021





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1 General product information

Product definition

The EPD relates to the product group "Façades" and applies to:

1 m² of wood/aluminium façade made by Schindler Fenster + Fassaden GmbH.

The declared unit is obtained by summing up:

Assessed product	Surface area	Weight	Weight per unit area	Face width	
PR-HM 2005 + aluminium insert window (PG 1)	34.90 m ²	2,167.64 kg	62.11 kg/m²	60 mm	
HM 2020 + aluminium insert window (PG 2)	34.90 m ²	2,134.14 kg	61.15 kg/m²	90 mm	
HM 2020 + wood/aluminium insert window (PG 3)	34.90 m²	2,168.34 kg	62.13 kg/m²	90 mm	

Table 1: Product groups

The average unit is declared as follows:

Directly used material flows are determined using average sizes (5.00 m \times 6.98 m) and assigned to the declared unit and can be scaled if required. All other inputs and outputs in the production were scaled to the declared unit in their entirety since no direct assignment to the average size is possible. The reference period is the year 2020/2021.

The validity of the EPD is restricted to the following series:

- PR-HM 2005
- HMEF 2020

Product description The Schindler HMEF wood/aluminium façade system is composed of ther-

The Schindler HMEF wood/aluminium façade system is composed of thermal break aluminium composite profiles featuring internal wood profiles with structurally effective joints. The Schindler HMEF façade system offers functional benefits combined along with architectural and design aspects. The advantages offered by the intercompatible components are high thermal insulation, narrow face widths and a natural and attractive internal appearance. The façade allows the integration of any type of infill panel (insert windows, panels, glass units, etc.). The surfaces of the external aluminium profiles can be anodised, wet-coated or powder-coated, as desired.

The Schindler PR-HM 2005 wood/aluminium stick façade system consists of structural GLULAM timber and a screw-fitted basic profile, a pressure

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plate and a cover plate. The thermal insulation can be modified using specially designed thermal insulation pieces. The Schindler PR-HM 2005 façade system offers functional advantages combined with architectural and design aspects. The advantages offered by the intercompatible components are high thermal insulation, narrow face widths and a natural and attractive internal appearance. The façade allows the integration of any type of infill panel (insert windows, panels, glass units, etc.). The profile surfaces of the cover plates can be anodised, wet-coated or powdercoated, as desired.

For a detailed product description refer to the manufacturer specifications or the product specifications of the respective offer/quotation.



Applications

The Schindler wood/aluminium stick façade construction (PR-HM 2005) and the Schindler wood/aluminium unitised façade construction (HMEF 2020) are generally used as external building envelopes in commercial building construction. The products allow the integration of fixed lights as well as transparent opening units, which guarantees air exchange and light penetration into the building. The above products are used mainly in office and administration buildings, both in the public and private sector.

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Verifications

The following verifications are held:

Test evidence PR- HM 2005:

).	
Air permeability	EN 12152:2002-02	A4
Watertightness	EN 12154:1999-12	R7
Resistance to wind load	EN 13116:2001-07	± 2.4 kN /m²/ ± 3.6 kN/m²
Watertightness - dynamic	CWCT sequence B	
(aero engine test)		
Impact resistance	EN 14019:2016-06	I5 / E5
Thermal insulation	EN 12631	> 0.78 W/m²K
Resistance to fire	DIN EN 1364-3	EI30
Burglar resistance	EN 1627:2011	RC 2
Hygrothermal properties	prEN 13420	
Component tests "Safety barrier glazing"	DIN 18008-4	A,B and C

Test evidence HMEF 2020:

Air permeability	EN 12152:2002-02	AE 750
Watertightness	EN 12154:1999-12	RE 1200
Resistance to wind load	EN 13116:2001-07	± 2.0 kN /m²/ ± 3.0 kN/m²
Watertightness - dynamic	EN 13050:2011-07	Pmin = 250 Pa /Pmax = 750 Pa
Impact resistance	EN 14019:2016-06	I5 / E5
Thermal insulation	EN 12631	> 0.70 W/m²K
Hose test	CWCT section 11	220 kPa
Component tests "Safety barrier glazing"	DIN 18008-4	A,B and C

For further and updated verifications (incl. other national approvals) refer to <u>www.schindler-roding.de</u>.

Quality assurance

The following quality assurance systems are in place:

PR-HM 2005:

- ift product passport as per EN 13830:2003-09 (12-001937-PR01)
- control of incoming goods of GLULAM timber according to HO-10/1
- abZ (national technical approval) Z-14.4-526 Clamping connection for Schindler façade systems PR-HM 2005/52/60 and PR-HM 2012/52/60
- abZ (national technical approval) Z-9.1-683 Schindler mullion/transom connection as timber connector

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	 HMEF 2020: ift product passport third-party monitoring of SSG production according to ETAG 002 control of incoming goods of GLULAM timber according to HO-10/1 							
Management systems	 The following management systems are in place: quality management system as per DIN EN ISO 9001 occupational health and safety management system as per DIN EN ISO 45001 environmental management system as per DIN EN ISO 14001 							
Additional information	For additional verification of applicability or conformity refer to the CE marking and the documents accompanying the product, if applicable.							
2 Materials used								
Primary materials	The primary materials used are listed in the LCA (see Section 7).							
Declarable substances	The product contains no substances from the REACH candidate list (declaration dated 28.09.2021).							
	All relevant safety data sheets are available from Schindler Fenster + Fassaden GmbH .							
3 Construction proces	ss stage							
Processing recommendations, installation	Observe the instructions for assembly/installation, operation, maintenance and disassembly, provided by the manufacturer. See www.schindler-roding.de							
4 Use stage								
Emissions to the environment	No emissions to indoor air, water and soil are known. There may be VOC emissions.							
Reference service life (RSL)	The RSL information was provided by the manufacturer. The RSL shall refer to the declared technical and functional performance of the product within the building. It shall be established in accordance with specific rules set out in the European product standards and shall also take into account ISO 15686-1, -2, -7 and -8. Where European product standards provide guidance on determining RSL, such guidance shall have priority. If it is not possible to determine the service life as the RSL in accordance with ISO 15686, the BBSR table "Nutzungsdauer von Bauteilen zur Le-							

benszyklusanalyse nach BNB" (service life of building components for life cycle assessment in accordance with the sustainable construction evaluation system) can be used. For further information and explanations refer to <u>www.nachhaltigesbauen.de</u>.

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	 For this EPD the following applies: The reference service life (RSL) can be determined for a "cradle to gate with options" EPD only if all of the Modules A1-A3 and B1-B5 are specified; According to the BBSR table, wood/aluminium façades made by Schindler Fenster + Fassaden GmbH have a service life of 50 years. The service life is dependent on the characteristics of the product and inuse conditions. The characteristics described in the EPD are applicable, in particular the characteristics listed below: Outdoor environment: Climatic influences may have a negative impact on the service life. Indoor environment: No impacts (e.g., humidity, temperature) known that may have a negative effect on the reference service life or the corresponding references. The service life solely applies to the characteristics specified in this EPD or the corresponding references. The reference service life (RSL) does not reflect the actual life span, which is usually determined by the service life and the refurbishment of a build-
	ing. It does not give any information on the useful life, warranty referring to performance characteristics or guarantees.
5 End-of-life stage	
Possible end-of-life stages	The wood/aluminium façades are shipped to central collection points. There the products are usually shredded and sorted into their original constituents. The end-of-life stage depends on the site where the products are used and is therefore subject to the local regulations. Observe the locally applicable regulatory requirements.
	This EPD represents the end-of-life modules based on EN 17213. Specific parts of metal and glass are recycled, most plastics are thermally recycled. Residual fractions are sent to landfill, as necessary.
Disposal routes	The LCA includes the average disposal routes.
	All life cycle scenarios are detailed in the Annex.

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6 Life Cycle Assessment (LCA)

Environmental product declarations are based on life cycle assessments (LCAs) which use material and energy flows for the calculation and subsequent representation of environmental impacts.

Life Cycle Assessments of this kind were developed as the basis for wood/aluminium façades. The LCAs are in conformity with the requirements set out in DIN EN 15804 and the international standards DIN EN ISO 14040, DIN EN ISO 14044, ISO 21930 and EN ISO 14025.

The LCA is representative of the products presented in the Declaration and the specified reference period.

6.1 Definition of goal and scope

Goal

The goal of the LCA is to demonstrate the environmental impacts of the products. In accordance with DIN EN 15804, the environmental impacts covered by this Environmental Product Declaration are presented for the entire product life cycle in the form of basic information. No other additional environmental impacts are specified.

Data quality, data availability and geographical and timerelated system boundaries The specific data originate exclusively from the 2020/2021 fiscal years. They were collected on-site at the plant located in 93426 Roding and originate in parts from company records and partly from values directly obtained by measurement. Validity of the data was checked by the ift Rosenheim.

The generic data originate from the "GaBi 10" professional and building materials databases. The last update of both databases was in 2021. Data from before this date originate also from these databases and are not more than ten years old. No other generic data were used for the calculation.

Data gaps were either filled with comparable data or conservative assumptions, or the data were cut off in compliance with the 1% rule.

The life cycle was modelled using the "GaBi" sustainability software tool for the development of Life Cycle Assessments.

Scope / system boundaries The system boundaries refer to the supply of raw materials and purchased parts, manufacture/production, use and end-of-life stage of wood/aluminium façades. No additional data from other sites were taken into consideration.

Cut-off criteria All company data collected, i.e. all commodities/input and raw materials used, the thermal energy and electricity consumption, were taken into consideration.

The boundaries cover only the product-relevant data. Building sections/parts of facilities that are not relevant to the manufacture of the products, were excluded.

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The transport distances of the pre-products used were taken into consideration as a function of 100% of the mass of products. The criteria for the exclusion of inputs and outputs as set out in DIN EN 15804 are fulfilled. From the data analysis it can be assumed that the total

15804 are fulfilled. From the data analysis it can be assumed that the total of negligible processes per life cycle stage does not exceed 1% of the mass/primary energy. This way the total of negligible processes does not exceed 5% of the energy and mass input. The life cycle calculation also includes material and energy flows that account for less than 1%.

6.2 Inventory analysis

Goal	All material and energy flows are described below. The processes covered are presented as input and output parameters and refer to the declared/functional units.
Life cycle stages	The entire life cycle of wood/aluminium façades is shown in the Annex. The product stage "A1 – A3", construction process stage" A4 – A5", use stage "B2 – B7", end-of-life stage "C1 – C4" and the benefits and loads beyond the system boundaries "D" are considered.
Benefits	 The below benefits have been defined as per DIN EN 15804: benefits from recycling benefits (thermal and electrical) from incineration
Allocation of co-products	The manufacture of the product does not produce any allocations.
Allocations for re-use, recycling and recovery	If the products are reused/recycled and recovered during the product stage (rejects), the components are shredded, if necessary and then sorted into their single constituents. This is done by various process plants, e.g. magnetic separators. The system boundaries were set following their disposal, reaching the end-of-waste status.
Allocations beyond life cycle boundaries	Use of recycled materials in the manufacturing process was based on the current market-specific situation. In parallel to this, a recycling potential was taken into consideration that reflects the economic value of the product after recycling (recyclate). The system boundary set for the recycled material refers to collection.
Secondary material	The use of secondary material in Module A3 by the company Schindler Fenster + Fassaden GmbH was not considered. Secondary material is not used.

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Inputs

The LCA includes the following production-relevant inputs per 1 m^2 of wood/aluminium façade:

Energy

The heat input material from wood chips is based on "DE: thermal energy from biomass (solid)". The diesel input material is based on "DE: diesel mix from filling station". The electricity mix is based on "Strommix Deutschland" (Germany electricity mix).

Water

The water consumed by the individual process steps for the production amounts to a total of $0.15 \text{ I per } m^2$ of the element.

The consumption of fresh water specified in Section 6.3 results from the process chain of the pre-products.

Raw material / pre-products

The chart below shows the share of raw materials/pre-products in percent.



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Figure 1: Percentage of individual materials per declared unit

No.	Material	Mass in % per m ²									
		PG 1	PG 2	PG 3							
1	Metals	9.92%	14.20%	13.52%							
2	Wood	13.52%	9.58%	10.64%							
3	Plastics	3.27%	2.63%	2.77%							
4	Glass	70.84%	71.20%	70.52%							
5	Other	2.44%	2.39%	2.54%							

Table 2: Percentage of individual materials per declared unit

Ancillary materials and consumables

0.0005 I of ancillary materials and consumables are used.

Product packaging

The amounts used for product packaging are as follows:

No.	Material	Mass in kg per m ²								
		PG 1	PG 2	PG 3						
1	PE film	0.1	0.1	0.1						

Table 3: Weight in kg of packaging per declared unit

Outputs

The LCA includes the following production-relevant outputs per 1 m² of wood/aluminium façade:

Waste

Secondary raw materials were included in the benefits. See Section 6.3 Impact assessment.

Waste water

Manufacture produces 0.15 I waste water.

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6.3 Impact assessment

Goal

The impact assessment covers both inputs and outputs. The impact categories applied are named below:

Impact categories

The models for impact assessment were applied as described in DIN EN 15804-A1.

The impact categories presented in the EPD are as follows:

- depletion of abiotic resources (fossil fuels);
- depletion of abiotic resources (mineral substances);
- acidification of soil and water;
- ozone depletion;
- global warming;
- eutrophication;
- photochemical ozone creation.



Waste

The waste generated during the production of 1 m² of wood/aluminium façade is evaluated and shown separately for the fractions trade wastes, special wastes and radioactive wastes. Since waste handling is modelled within the system boundaries, the amounts shown refer to the deposited wastes. A portion of the waste indicated is generated during the manufacture of the pre-products.

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						Re	sults per 1 m	² of PR-HM	2005 (PG 1)							
	Unit	A1 – A3	A4	A5	B1	B2	B3	B4	B5	B 6	B7	C1	C2	C3	C4	D
Central environmental impacts																
GWP	kg CO ₂ eq.	99.00	1.52	1.12	-	97.70	73.60	0.00	0.00	0.00	0.00	0.00	7.44E-02	90.20	0.45	-74.90
ODP	kg CFC -11 eq.	1.25E-06	4.09E-16	3.66E-14	-	2.09E-13	2.81E-08	0.00	0.00	0.00	0.00	0.00	1.29E-17	7.88E-13	2.48E-15	-1.02E-06
AP	kg SO ₂ eq.	0.83	1.45E-03	1.07E-03	-	9.55E-02	0.67	0.00	0.00	0.00	0.00	0.00	6.39E-05	9.57E-02	2.74E-03	-0.59
EP	kg PO4 ³⁻ eq.	7.00E-02	3.32E-04	1.99E-04	-	1.59E-02	5.59E-02	0.00	0.00	0.00	0.00	0.00	1.47E-05	2.34E-02	3.11E-04	-4.71E-02
POCP	kg ethene eq.	4.60E-02	-1.39E-04	7.57E-05	-	2.61E-02	3.82E-02	0.00	0.00	0.00	0.00	0.00	-6.09E-06	8.98E-03	2.08E-04	-3.25E-02
ADPE	kg Sb eq.	2.15E-03	1.52E-07	3.58E-07	-	2.13E-05	1.93E-03	0.00	0.00	0.00	0.00	0.00	6.47E-09	1.47E-04	1.67E-07	-1.62E-03
ADPF	MJ	1.72E+03	20.70	8.15	-	2980.00	1280.00	0.00	0.00	0.00	0.00	0.00	1.01	467.00	6.19	-1160.00
	Use of resources															
PERE	MJ	658.70	1.19	6.64	-	42.60	231.00	0.00	0.00	0.00	0.00	0.00	5.64E-02	229.15	81.01	-433.00
PERM	MJ	160.30	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-80.15	-80.15	0.00
PERT	MJ	819.00	1.19	6.64	-	42.60	231.00	0.00	0.00	0.00	0.00	0.00	5.64E-02	149.00	0.86	-433.00
PENRE	MJ	2024.40	20.70	12.29	-	2990.00	1350.00	0.00	0.00	0.00	0.00	0.00	1.01	552.32	8.53	-1320.00
PENRM	MJ	45.60	0.00	-2.09	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-41.32	-2.17	0.00
PENRT	MJ	2070.00	20.70	10.20	-	2990.00	1350.00	0.00	0.00	0.00	0.00	0.00	1.01	511.00	6.36	-1320.00
SM	kg	2.93	0.00	0.00	-	0.00	1.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.52
RSF	MJ	3.50E-12	0.00	0.00	-	0.00	3.50E-12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-2.73E-12
NRSF	MJ	7.05E-03	0.00	0.00	-	0.00	4.11E-11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-3.20E-11
FW	m³	0.55	1.36E-03	3.80E-03	-	0.57	0.33	0.00	0.00	0.00	0.00	0.00	6.46E-05	2.14	0.00	-0.24
							Wast	e categorie	es							
HWD	kg	7.00E-03	1.09E-09	3.71E-09	-	4.10E-07	7.00E-03	0.00	0.00	0.00	0.00	0.00	5.10E-11	1.13E-07	6.75E-10	-5.46E-03
NHWD	kg	61.60	3.26E-03	9.19E-03	-	0.90	50.60	0.00	0.00	0.00	0.00	0.00	1.50E-04	103.00	31.70	-39.70
RWD	kg	3.17E-02	3.76E-05	8.15E-04	-	6.69E-03	2.63E-02	0.00	0.00	0.00	0.00	0.00	1.23E-06	1.77E-02	6.68E-05	-2.62E-02
							Output	material flo	ows							
CRU	kg	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	kg	5.04	0.00	0.00	-	0.00	48.60	0.00	0.00	0.00	0.00	0.00	0.00	19.10	0.00	0.00
MER	kg	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	MJ	4.45	0.00	0.57	-	0.00	24.90	0.00	0.00	0.00	0.00	0.00	0.00	25.30	0.00	0.00
EET	MJ	10.00	0.00	1.31	-	0.00	56.20	0.00	0.00	0.00	0.00	0.00	0.00	56.70	0.00	0.00
Key:	1															

 GWP
 - global warming potential
 ODP
 - ozone depletion potential
 AP - acidification potential
 EP - eutrophication potential
 POCP - photochemical ozone formation potential
 ADPE - abiotic depletion potential

 non-fossil resources
 ADPF - abiotic depletion potential – fossil resources
 PERE - Use of renewable primary energy
 PERM - use of renewable primary energy resources
 PERT - total use of renewable primary energy resources
 PERT - total use of renewable primary energy resources

 material
 RSF - use of renewable secondary fuels
 NRSF - use of non-renewable secondary fuels
 FW - net use of fresh water
 HWD - hazardous waste disposed
 NHWD - non-hazardous waste disposed

 radioactive waste disposed
 CRU - components for re-use
 MFR - materials for recycling
 MER - materials for energy recovery
 EEE - exported electrical energy
 EET - exported thermal energy

Declara	tion code: EPD)-SFA-GB-	49.0 Pub	lication da	te: 05.10).2021								Page 14		
	Results per 1 m ² of HMEF 2020 with aluminium insert window (PG 2)															
	Unit	A1 – A3	A4	A5	B1	B2	B3	B4	B5	B 6	B7	C1	C2	C3	C4	D
Central environmental impacts																
GWP	kg CO₂ eq.	119.00	1.50	1.11	-	97.70	70.80	0.00	0.00	0.00	0.00	0.00	7.28E-02	84.90	0.45	-76.40
ODP	kg CFC -11 eq.	2.53E-06	4.02E-16	3.66E-14	-	2.09E-13	2.78E-08	0.00	0.00	0.00	0.00	0.00	1.27E-17	7.85E-13	2.46E-15	-1.67E-06
AP	kg SO₂ eq.	0.88	1.43E-03	1.07E-03	-	9.55E-02	0.66	0.00	0.00	0.00	0.00	0.00	6.25E-05	9.38E-02	2.71E-03	-0.60
EP	kg PO₄³- eq.	7.60E-02	3.27E-04	1.99E-04	-	1.59E-02	5.43E-02	0.00	0.00	0.00	0.00	0.00	1.44E-05	2.29E-02	3.08E-04	-4.82E-02
POCP	kg ethene eq.	4.88E-02	-1.37E-04	7.57E-05	-	2.61E-02	3.73E-02	0.00	0.00	0.00	0.00	0.00	-5.96E-06	8.85E-03	2.06E-04	-3.35E-02
ADPE	kg Sb eq.	2.05E-03	1.50E-07	3.58E-07	-	2.13E-05	1.91E-03	0.00	0.00	0.00	0.00	0.00	6.34E-09	1.46E-04	1.66E-07	-1.55E-03
ADPF	MJ	1,850.00	20.30	8.15	-	2,980.00	1,240.00	0.00	0.00	0.00	0.00	0.00	0.99	464.00	6.13	-1140.00
	Use of resources															
PERE	MJ	1,086.03	1.17	6.64	-	42.60	181.00	0.00	0.00	0.00	0.00	0.00	5.52E-02	214.99	67.84	-619.00
PERM	MJ	133.97	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-66.99	-66.99	0.00
PERT	MJ	1,220.00	1.17	6.64	-	42.60	181.00	0.00	0.00	0.00	0.00	0.00	5.52E-02	148.00	0.85	-619.00
PENRE	MJ	2,283.00	20.40	12.29	-	2,990.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.99	542.12	8.04	-1,360.00
PENRM	MJ	37.00	0.00	-2.09	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-33.12	-1.74	0.00
PENRT	MJ	2,320.00	20.40	10.20	-	2,990.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.99	509.00	6.30	-1,360.00
SM	kg	2.90	0.00	0.00	-	0.00	1.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.50
RSF	MJ	3.46E-12	0.00	0.00	-	0.00	3.46E-12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-2.70E-12
NRSF	MJ	7.01E-03	0.00	0.00	-	0.00	4.06E-11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-3.17E-11
FW	m³	0.54	1.34E-03	3.79E-03	-	0.57	0.31	0.00	0.00	0.00	0.00	0.00	6.32E-05	2.12	1.55E-03	-0.22
							Wast	e categorie	es							
HWD	kg	6.92E-03	1.08E-09	3.71E-09	-	4.10E-07	6.93E-03	0.00	0.00	0.00	0.00	0.00	4.99E-11	1.12E-07	6.69E-10	-5.40E-03
NHWD	kg	60.60	3.21E-03	9.19E-03	-	0.90	50.00	0.00	0.00	0.00	0.00	0.00	1.47E-04	103.00	31.40	-39.10
RWD	kg	3.25E-02	3.71E-05	8.15E-04	-	6.69E-03	2.53E-02	0.00	0.00	0.00	0.00	0.00	1.20E-06	1.76E-02	6.61E-05	-2.36E-02
							Output	material flo	ows							
CRU	kg	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	kg	5.31	0.00	0.00	-	0.00	48.10	0.00	0.00	0.00	0.00	0.00	0.00	21.30	0.00	0.00
MER	kg	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	MJ	6.32	0.00	0.57	-	0.00	18.20	0.00	0.00	0.00	0.00	0.00	0.00	18.70	0.00	0.00
EET	MJ	14.20	0.00	1.31	-	0.00	40.90	0.00	0.00	0.00	0.00	0.00	0.00	41.90	0.00	0.00
Kev:																

GWP – global warming potential ODP – ozone depletion potential AP - acidification potential EP - eutrophication potential POCP - photochemical ozone formation potential ADPE - abiotic depletion potential – non-fossil resources ADPF - abiotic depletion potential – fossil resources PERE - Use of renewable primary energy PERM - use of renewable primary energy resources PERT - total use of renewable primary energy resources PERT - total use of renewable primary energy resources PERT - total use of renewable primary energy resources PERT - total use of renewable primary energy resources SM - use of secondary fuels RSF - use of renewable secondary fuels FW - net use of fresh water HWD - hazardous waste disposed CRU - components for re-use MFR - materials for recycling MER - materials for energy recovery EEE - exported electrical energy EET - exported thermal energy

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					Results	per 1 m ² of H	MEF 2020 wi	th wood/al	uminium inse	ert window (PG 3)					
	Unit	A1 – A3	A4	A5	B1	B2	B3	B4	B5	B 6	B7	C1	C2	C3	C4	D
							Central envi	ironmental	impacts							
GWP	kg CO₂ eq.	114.00	1.53	1.12	-	97.70	71.40	0.00	0.00	0.00	0.00	0.00	7.47E-02	86.70	0.45	-77.00
ODP	kg CFC -11 eq.	2.28E-06	4.09E-16	3.66E-14	-	2.09E-13	2.80E-08	0.00	0.00	0.00	0.00	0.00	1.30E-17	7.86E-13	2.47E-15	-1.55E-06
AP	kg SO₂ eq.	0.88	1.45E-03	1.07E-03	-	9.55E-02	0.66	0.00	0.00	0.00	0.00	0.00	6.42E-05	9.45E-02	2.73E-03	-0.61
EP	kg PO₄³- eq.	7.54E-02	3.32E-04	1.99E-04	-	1.59E-02	5.48E-02	0.00	0.00	0.00	0.00	0.00	1.48E-05	2.30E-02	3.10E-04	-4.83E-02
POCP	kg ethene eq.	4.88E-02	-1.40E-04	7.57E-05	-	2.61E-02	3.76E-02	0.00	0.00	0.00	0.00	0.00	-6.12E-06	8.89E-03	2.08E-04	-3.35E-02
ADPE	kg Sb eq.	2.84E-03	1.52E-07	3.58E-07	-	2.13E-05	1.92E-03	0.00	0.00	0.00	0.00	0.00	6.50E-09	1.47E-04	1.67E-07	-2.00E-03
ADPF	MJ	1,820.00	20.70	8.15	-	2,980.00	1,250.00	0.00	0.00	0.00	0.00	0.00	1.01	465.00	6.17	-1160.00
Use of resources																
PERE	MJ	1,011.72	1.19	6.64	-	42.60	196.00	0.00	0.00	0.00	0.00	0.00	5.67E-02	227.14	79.99	-587.00
PERM	MJ	158.28	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-79.14	-79.14	0.00
PERT	MJ	1,170.00	1.19	6.64	-	42.60	196.00	0.00	0.00	0.00	0.00	0.00	5.67E-02	148.00	0.85	-587.00
PENRE	MJ	2,230.90	20.80	12.29	-	2,990.00	1,310.00	0.00	0.00	0.00	0.00	0.00	1.02	545.16	8.19	-1370.00
PENRM	MJ	39.10	0.00	-2.09	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-35.16	-1.85	0.00
PENRT	MJ	2,270.00	20.80	10.20	-	2,990.00	1,310.00	0.00	0.00	0.00	0.00	0.00	1.02	510.00	6.34	-1,370.00
SM	kg	2.91	0.00	0.00	-	0.00	1.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.51
RSF	MJ	3.48E-12	0.00	0.00	-	0.00	3.48E-12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-2.72E-12
NRSF	MJ	6.97E-03	0.00	0.00	-	0.00	4.09E-11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-3.19E-11
FW	m³	0.55	1.36E-03	3.80E-03	-	0.57	0.31	0.00	0.00	0.00	0.00	0.00	6.49E-05	2.13	1.56E-03	-0.23
							Wast	e categorie	es							
HWD	kg	6.97E-03	1.09E-09	3.71E-09	-	4.10E-07	6.97E-03	0.00	0.00	0.00	0.00	0.00	5.13E-11	1.12E-07	6.73E-10	-5.44E-03
NHWD	kg	61.00	3.26E-03	9.19E-03	-	0.90	50.30	0.00	0.00	0.00	0.00	0.00	1.51E-04	103.00	31.60	-39.40
RWD	kg	3.34E-02	3.77E-05	8.15E-04	-	6.69E-03	2.57E-02	0.00	0.00	0.00	0.00	0.00	1.23E-06	1.76E-02	6.65E-05	-2.50E-02
							Output	material flo	ows							
CRU	kg	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	kg	5.30	0.00	0.00	-	0.00	48.40	0.00	0.00	0.00	0.00	0.00	0.00	21.10	0.00	0.00
MER	kg	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	MJ	7.79	0.00	0.57	-	0.00	20.10	0.00	0.00	0.00	0.00	0.00	0.00	20.80	0.00	0.00
EET	MJ	17.50	0.00	1.32	-	0.00	45.20	0.00	0.00	0.00	0.00	0.00	0.00	46.70	0.00	0.00

Key:

 GWP – global warming potential
 ODP – ozone depletion potential
 AP - acidification potential
 EP - eutrophication potential
 POCP - photochemical ozone formation potential
 ADPE - abiotic depletion potential

 non-fossil resources
 ADPF - abiotic depletion potential – fossil resources
 PERE - Use of renewable primary energy
 PERM - use of renewable primary energy resources
 PERT - total use of renewable primary energy resources

 material
 RSF - use of renewable secondary fuels
 NRSF - use of non-renewable secondary fuels
 FW - net use of fresh water
 HWD - hazardous waste disposed
 NHWD - non-hazardous waste disposed

 RWD - radioactive waste disposed
 CRU - components for re-use
 MFR - materials for recycling
 MER - materials for energy recovery
 EEE - exported electrical energy
 EET - exported thermal energy

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Product group: "Façades"

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6.4 Interpretation, LCA presentation and critical review

Evaluation

The environmental impacts of

- PR-HM 2005
- HMEF 2020 with aluminium insert window
- HMEF 2020 with wood/aluminium insert window

differ in parts considerably from each other. The differences are due to the amount of pre-products and raw materials used. This was to be expected in particular for the aluminium used.

The environmental impacts during the manufacture of the façades result mainly from the use of aluminium and glass and their upstream chains. For unitised façades the anodisation of the aluminium elements is also of importance.

For all the three façades, the cleaning processes using glass cleaners over the 50-year use stage also play a major role in terms of environmental impacts. Further important parameters in the use stage result from the repair of plastic wearing parts, seals/gaskets and glass components over the 50-year period.

For scenario C4 only marginal consumptions arising from the physical pre-treatment and management of the disposal site are expected. Allocation to individual products is almost impossible for site disposal. In terms of product recycling, about 12-13% of the environmental impacts during recycling can be assigned to aluminium and 4-5% to glass, as benefits to scenario D.

The chart below shows the allocation of the main environmental impacts.

The values obtained from the LCA calculation are suitable for the certification of buildings.

Product group: "Façades"

Diagrams



Figure 2: Percentage of the modules in selected environmental impact categories

Report The LCA report underlying this EPD was developed according to the requirements of DIN EN ISO 14040 and DIN EN ISO 14044 as well as DIN EN 15804 and DIN EN ISO 14025. It is not addressed to third parties for reasons of confidentiality. It is deposited with the ift Rosenheim. The results and conclusions reported to the target group are complete, correct, without bias and transparent. The results of the study are not designed to be used for comparative statements intended for publication.

PR-HM 2005 (PG 1)

Critical review The critical review of the LCA and of the report took place in the course of verification of the EPD and was carried out by Patrick Wortner, MBA and Eng., Dipl.-Ing. (FH), an external verifier.

7 General information regarding the EPD

Comparability

This EPD was prepared in accordance with DIN EN 15804 and is therefore only comparable to those EPDs that also comply with the requirements set out in DIN EN 15804. Any comparison must refer to the building context and the same boundary conditions of the various life cycle stages. For comparing EPDs of construction products, the rules set out in DIN EN 15804 (Clause 5.3) apply.

The detailed individual results of the products were summarised on the basis of conservative assumptions and differ from the average results.

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HMEF 2020 + Alufenster (PG 2)



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Product group: "Façades"

Identification of the product groups and the resulting variations are documented in the background report.

Communication The communications format of this EPD meets the requirements of EN 15942:2012 and is therefore the basis for B2B communication. Only the nomenclature has been changed according to DIN EN 15804.

Verification Verification of the Environmental Product Declaration is documented in accordance with the ift "Richtlinie zur Erstellung von Typ III Umweltproduktdeklarationen" (Guidance on preparing Type III Environmental Product Declarations) in accordance with the requirements set out in DIN EN ISO 14025.

The Declaration is based on the PCR documents "PCR Part A" PCR-A-0.2-0.2:2018 and "Façades and roofs made of glass and plastic" PCR-FA-3.1:2018.

The European standard EN 15804 serves as the core PCR ^{a)}
Independent verification of the Declaration and statement
according to EN ISO 14025:2010
□ internal ⊠ external
Independent third-party verifier: b)
Patrick Wortner
^{a)} Product category rules
^{b)} Optional for business-to-business communication
Mandatory for business-to-consumer communication
(see EN ISO 14025:2010, 9.4)

Revisions of this document

No.	Date	Note:	Practitioner of the LCA	Verifier
1	05.10.2021	External verification	Hilz	Wortner
2				
3				

Publication date: 05.10.2021

Product group: "Façades"

8 Bibliography

1. **Research project.** "EPDs für transparente Bauelemente" (EPDs for transparent building components) - Final report. Rosenheim : ift Rosenheim GmbH, 2011 SF-10.08.18.7-09.21/II 3-F20-09-1-067.

2. **PCR Part A.** *Product category rules for environmental product declarations as per EN ISO 14025 and EN 15804.* Rosenheim: ift Rosenheim, 2018

3. **ift-Guideline NA-01/3.** Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen (Guidance on preparing Type III Environmental Product Declarations) Rosenheim : ift Rosenheim GmbH, 2015

4. **Klöpffer, W und Grahl, B.** *Ökobilanzen (LCA).* Weinheim: Wiley-VCH-Verlag, 2009.

5. Eyerer, P. und Reinhardt, H.-W. Ökologische Bilanzierung von Baustoffen und Gebäuden - Wege zu einer ganzheitlichen Bilanzierung. (LCA of building materials and buildings -Routes to integrated LCA). Basel: Birkhäuser Verlag, 2000.

6. Gefahrstoffverordnung – GefStoffV (Hazardous substances regulation) Verordnung zum Schutz vor Gefahrstoffen (Regulation on protection against hazardous substances), Berlin: BGBI. (Federal Gazette) I S. 3758, 2017.

7. Chemikalien-Verbotsverordnung – ChemVerbotsV (Chemicals Prohibition Regulation) Verordnung über Verbote und Beschränkungen des Inverkehrbringens gefährlicher Stoffe, Zubereitungen und Erzeugnisse Chemikaliengesetz (Regulation on bans and restrictions of the placing on the market of hazardous substances, formulations and products covered by the Chemicals Law), Berlin: BGBI. (Federal Gazette) I S. 1328, 2017.

8. **DIN EN ISO 14040:2018-05.** *Environmental management - Life cycle assessment - Principles and framework.* Berlin: Beuth Verlag GmbH, 2018.

9. **DIN EN ISO 14044:2006-10.** *Environmental management - Life cycle assessment - Requirements and guidelines..* Berlin: Beuth Verlag GmbH, 2006.

10. EN ISO 14025:2011-10. Umweltkennzeichnungen und deklarationen Typ III Umweltdeklarationen - Grundsätze und Verfahren.(Environmental labels and declarations - Type III environmental declarations - Principles and procedures) Berlin: Beuth Verlag GmbH, 2011.

11. **OENORM Š 5200:2009-04-01** Radioactivity in construction materials. Berlin: Beuth Verlag GmbH, 2009.

12. **PCR Part B - Façades and roofs made of glass and plastic.** *Product category rules for environmental product declarations as per EN ISO 14025 and EN 15804* Rosenheim: ift Rosenheim, 2018

13. **EN 15942:2012-01.** Sustainability of construction works - Environmental product declarations - Communication format business-to-business. Berlin: Beuth Verlag GmbH, 2012.

14. **EN 15804:2012+A1:2013.** Sustainability of construction works - Environmental product declarations - Rules for the product categories. Berlin: Beuth Verlag GmbH, 2013.

15. RAL-Gütegemeinschaft Fenster und Haustüren e.V.; ift Institut für Fenstertechnik (Quality Assurance Association Windows and Doors). Leitfaden zur Planung und Ausführung der Montage von Fenstern und Haustüren (Guide on planning and implementing the installation of windows and external pedestrian doorsets). Frankfurt: RAL-Gütegemeinschaft Fenster und Haustüren e.V. (Quality Assurance Association Windows and Doors), 2014 16. Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety) Berlin, Leitfaden Nachhaltiges Bauen (Guidance on Sustainable Building) Berlin: s.n., 2016.

17. **DIN EN 13501-1:2010-01.** Fire classification of construction products and building elements - Part 1: Classification using test data from reaction to fire tests Berlin: Beuth Verlag GmbH, 2010.

18. **DIN ISO 16000-6:2012-11.** Indoor air- Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on TENAX TA®, thermal desorption and gas chromatography using MS/FID. Berlin: Beuth Verlag GmbH, 2012.

19. **ISO 21930:2017-07.** Sustainability in building construction - Environmental declaration of building products Berlin: Beuth Verlag, 2017.

20. Bundesimmissionsschutzgesetz – BImSchG (Federal Immission Law) Gesetz zum Schutz vor schädlichen Umwelteinwirkungen durch Luftverunreinigungen, Geräusche, Erschütterungen und ähnlichen Vorgängen (Law on harmful environmental impacts by air contamination, noise, vibrations and similar processes. Berlin : BGBI. (Federal Gazette) I S. 3830, 2017.

21. Chemikaliengesetz – ChemG (Chemicals Act Gesetz zum Schutz vor gefährlichen Stoffen - Unterteilt sich in Chemikaliengesetz und eine Reihe von Verordnungen; hier relevant (Law on protection against hazardous substances - Subdivided into Chemicals Law and a series of regulations; of relevance here): Gesetz zum Schutz vor gefährlichen Stoffen (Law on protection against hazardous substances) Berlin : BGBI. (Federal Gazette) I S. 1146, 2017.

22. **IKP Universität Stuttgart and PE Europe GmbH** *GaBi 8: Software and database for LCA*. Leinfelden-Echterdingen: s.n, 2017

23. **DIN EN 16034:2014-12** Pedestrian doorsets, industrial, commercial, garage doors and openable windows - Product standard, performance characteristics - Fire resistance and/or smoke control characteristics. Berlin : Beuth Verlag GmbH, 2014.

24. **prEN 17213:2018-01.** *Windows and doors - Environmental product declarations - Product category rules for windows and doors.* Berlin : Beuth Verlag GmbH, 2018.

25. **DIN EN 14351-2:2019-01.** Windows and doors - Product standard, performance characteristics - Part 2: Internal pedestrian doorsets without resistance to fire/or smoke leakage characteristics. Berlin : Beuth Verlag GmbH, 2019.

26. **DIN EN 14351-1:2016-12.** Windows and doors – Product standard, performance characteristics – Part 1: Windows and external pedestrian doors without resistance to fire and/or smoke leakage characteristics. Berlin : Beuth Verlag GmbH, 2016.

27. **DIN EN ISO 12547 - Part-1-4:2003-01.** Characterization of waste - Leaching; Compliance test for leaching of granular waste materials and sludges - Part 1-4: Berlin : Beuth Verlag GmbH, 2003.

28. **DIN EN ISO 16000-9:2008-04.** Indoor air- Part 9: Determination of the emission of volatile organic compounds from building products and furnishing - Emission test chamber method Berlin : Beuth Verlag GmbH, 2008.

29. **DIN EN ISO 16000-11:2006-06.** Indoor air - Part 11: Determination of the emission of volatile organic compounds from building products and furnishing- Sampling, storage of

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samples and preparation of test specimens. Berlin : Beuth Verlag GmbH, 2006.

30. **DIN EN 12457 - Part-1-4:2003-01.** Characterization of waste - Leaching; Compliance test for leaching of granular waste materials and sludges - Part 1-4: Berlin : Beuth Verlag GmbH, 2003.

31. EN ISO 16000-11:2006-06. Indoor air - Part 11: Determination of the emission of volatile organic compounds from building products and furnishing- Sampling, storage of samples and preparation of test specimens. Berlin : Beuth Verlag GmbH, 2006.

32. EN ISO 16000-9:2006-08. Indoor air - Part 9: Determination of the emission of volatile organic compounds from building products and furnishing - Emission test chamber method Berlin : Beuth Verlag GmbH, 2006. Page 20



Con-

struction

stage

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9 Annex

Product stage

Description of life cycle scenarios for wood/aluminium façades

B2 C1 C2 C3 A1 A2 A3 A4 A5 B1 **B**3 **B4** B5 **B6 B**7 C4 D clean-Improvement / Modernisation Inspection, maintenance, ing Exchange / Replacement Construction/Installation use use Re-use Recovery Recycling potential Waste management Raw material supply Operational energy Operational water Deconstruction Manufacture Transport Transport Transport Disposal Repair Use ~ √ \checkmark \checkmark \checkmark \checkmark v

Use stage

Calculation of the scenarios was based on a building service life of 50 years (in accordance with RSL of Section 4 Use stage).

The scenarios were based on information provided by the manufacturer. The scenarios were furthermore based on the research project "EPDs for transparent building components (1).

<u>Note:</u> The standard scenarios selected are presented in bold type. They were also used for calculating the indicators in the summary table.

- ✓ Included in the LCA
- Not included in the LCA



Benefits and loads from

beyond the

system

boundaries

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End-of-life stage

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A4 Transport to the construction site				
No.	Scenario	Description		
A4	Direct shipment to construction site	40 t truck (Euro 0-5 mix), diesel, 27 t payload, 85 capacity used, 400 km to construction site, 80 km return trip, 50% capacity used		
Since or	ly one scenario is used, the results a	re shown in the relevant summary table.		
A5 Cons	struction/Installation			
No.	Scenario	Description		
А5	Installation using crane	According to the manufacturer, the elements are installed using a rotating tower crane, a mobile crane, a manipulator or similar machine Electricity consumption: 1.5 kWh/m ²		
In case manage	of deviating consumption the installa ment and is covered at the building le	ation / assembly of the products forms part of the site vel.		
Ancillary	materials, consumables, use of wate	er and material losses during installation are negligible.		
It is assumed that the packaging material in the Module construction / installation is sent to waste handling. Waste is only recycled thermally or disposed of in line with the conservative approach: films/foils / protective covers, wood and cardboard in waste incineration plants. Benefits from A5 are specified in Module D. Benefits from waste incineration: electricity replaces electricity mix (EU 28); thermal energy replaces thermal energy from natural gas (EU 28).				
ranspo	It to the recycling plants is not taken i	nio account.		

Since only one scenario is used, the results are shown in the summary table..

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B1 Use (not included)

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Refer to Section 5 Use stage - Emissions to the environment. Emissions cannot be quantified. B2 Inspection, maintenance, cleaning

B2.1 Cleaning

No.	Scenario	Description
B2.1	Manual	Manually, using suitable detergents, half-yearly according to the manufacturer 2.5 I/m ² or 2.5 I / cleaning (250 I / 50 yr)

Use of energy and water, material losses and waste as well as transport distances during cleaning are negligible.

Since only one scenario is used, the results are shown in the relevant summary table.

B2.2 Maintenance			
No.	Scenario	Description	
B2.2	Normal use	Annual functional check, visual inspection, greas- ing/lubrication and, if necessary, repair. 0.125 kg of grease per 50 yr	

Ancillary materials, consumables, use of energy and water, waste, material losses and transport distances during maintenance are negligible.

Since only one scenario is used, the results are shown in the relevant summary table.

B3 Repa	air	
No.	Scenario	Description
B3	Normal use	One replacement*: seals/gaskets, glass, wood and other wearing parts (1)

* Assumptions for evaluation of possible environmental impacts; statements made do not constitute any guaranty or warranty of performance.

For updated information refer to the relevant instructions for assembly/installation, operation and maintenance from Schindler Fenster + Fassaden GmbH .

A 50-year service life has been specified for both the PR-HM 2005 Wood/aluminium stick façade construction

HMEF 2020 Wood/aluminium unitised façade construction made by Schindler Fenster + Fassaden GmbH. Scenario B3 presents the LCA of the components of building elements with a service life of less than the relevant period of 50 years.

Ancillary materials, consumables, use of energy and water, waste, material losses and transport distances during repair are negligible.

Since only one scenario is used, the results are shown in the summary table.

Product group: "Façades"

B4 Interchange / replacement (not relevant)

It is assumed that no replacement will be necessary during the 50-year service life and the 50-year building service life.

For updated information refer to the relevant manufacturer instructions "Anleitung für Montage, Betrieb und Wartung" (Manufacturer instructions for assembly/installation, operation and maintenance).

B5 Improvement / modernisation (not relevant)

According to the manufacturer, there is no obligation for reconditioning/upgrade/refurbishment of the elements.

For information regarding reconditioning/upgrade/refurbishment refer also to "Anleitung für Montage, Betrieb und Wartung" (Manufacturer instructions for assembly/installation, operation and maintenance).

B6 Operational energy use use (not relevant)

There is no energy used during normal use

B7 Operational water use (not relevant)

No water consumption when used as intended. Water consumption for cleaning is specified in Module B2.1.



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C1 Deconstruction					
No.	Scenario	Description	1		
		As per EN 2	17213:		
C1	Deconstruction	95% decon 30% decon	struction of gla struction of gla	ass-free materi ass	als
		Further dec quate reaso	construction ra	tes are possib	le, give ade-
No relev is neglig	ant inputs or outputs apply to the s ible. Any arising consumption is m	cenario selec arginal.	ted. The energy	consumed for a	deconstruction
Since or	nly one scenario is used, the result	s are shown i	n the summary	table.	
In case o is covere	of deviating consumption the remo ed at the building level.	val of the pro	ducts forms par	rt of the site ma	nagement and
C2 Tran	sport				
No.	Scenario	Description	1		
C2	Transport	Transport t 0-5 mix), di km	o collection po esel, 27 t paylo	oint using 40 t f oad, 80% capac	truck (Euro city used, 50
Since or	nly one scenario is used, the result	s are shown i	n the summary	table.	
C3 Was	te management				
No.	Scenario	Description	1		
C3	Disposal	Based on EN 17213 : • 100% metals in melt • 100% glass in melt • 100% wood - thermal recycling • 100% insulating material - thermal recycling • 100% plastics - thermal recycling			
The below table presents the disposal processes and their percentage by mass/weight. The calculation is based on the above mentioned shares in percent related to the declared unit of the product system.					
C3 Dispos	al	Unit	PG 1	PG 2	PG 3
Collection p	process, collected separately	kg	30.43	29.78	30.57
Collection p waste	process, collected as mixed construction	kg	31.68	31.37	31.56
Recovery s	ystem, for re-use	kg	0.00	0.00	0.00
Recovery s	ystem, for recycling	kg	19.10	21.30	21.10
Recovery s	ystem, for energy recovery	kg	11.33	8.48	9.47

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Disposal kg 0.00 0.00 0.00					0.00
Since only one scenario is used, the results are shown in the summary table.					
C4 Disp	osal				
No.	Scenario	Description	n		
C4 Disposal The non-recordable amounts and losses within the re-use/recycling chain (C1 and C3) are modelled "disposed".				s within the nodelled as	
The con manage production	nsumption in scenario C4 resument of the disposal site. The ben on are allocated to Module D, e.g.	ults from ph efits obtained electricity and	ysical pre-trea here from the s d heat from was	tment, waste substitution of pr ste incineration.	recycling and imary material
Since only one scenario is used, the results are shown in the summary table.					
D Benefits and loads from beyond the system boundaries					
D Benef	its and loads from beyond the s	ystem boun	daries		
D Benef No.	its and loads from beyond the s Scenario	ystem bound Description	daries 1		
D Benef No. D	its and loads from beyond the s	Description Aluminium used in A3 Stainless s used in A3 Glass recyc used in A3 Zinc recycl used in A3 Benefits fro EU-28 elect mal energy	daries recyclate from replaces 60% of teel scrap from replaces 60% of clate from C3 ex replaces 60% of ate from C3 ex replaces 60% of om waste incin tricity mix; the from natural g	a C3 excluding of aluminium c of c3 excluding of stainless ste excluding the g of glass cluding the zin of glass eration: electri rmal energy rej jas (EU-28).	the recyclate omponents. the scrap eel; lass shards ac recyclate city replaces places ther-

Since only one scenario is used, the results are shown in the summary table.

Imprint

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Notes

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