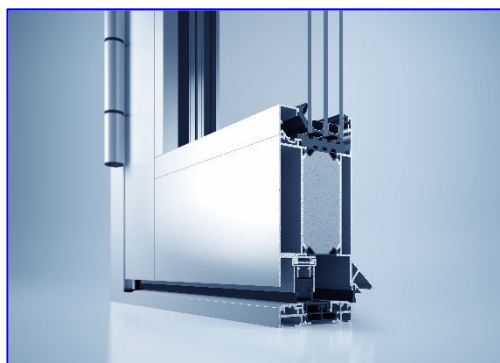


Environmental Product Declaration



Declaration Code: M-EPD-HAT-GB-38.000

Note: This EPD is based on the heroyal aluminium doors model EPD. The EPD becomes valid with transmission to the manufacturer by the ift.



heroyal-Johann Hen-
kenjohann GmbH &
Co. KG

heroyal Doors

D65, D72, D82, D93



Basis:

DIN EN ISO 14025
EN15804

Company EPD
Environmental
Product Declaration

Publication date:
15.04.2021

Next revision:
15.04.2026



[www.ift-rosenheim.de/
published EPDs](http://www.ift-rosenheim.de/published-EPDs)

Environmental Product Declaration



Declaration Code: M-EPD-HAT-GB-38.000

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 D-83026 Rosenheim		
Supported by	heroal-Johann Henkenjohann GmbH & Co. KG Österwieher Straße 80 33415 Verl		Note: Declaration holder are listed on page 3.
Declaration code	M-EPD-HAT-GB-38.000		
Designation of declared product	heroal aluminium doors D65, D72, D82, D93		
Scope	Door systems in aluminium for all building classes.		
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 EN 17213 "PCR for windows and doors", "PCR Part A" PCR-A-0.2:2018 and "Doors" PCR-TT-2.1:2018."		
Validity	Publication date: 15.04.2021	Last revision: 09.06.2021	Next revision: 15.04.2026
	This verified Model Environmental Product Declaration applies solely to the specified products in accordance with the systems from heroal-Johann Henkenjohann GmbH & Co. KG 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 data are based on both the data compiled from the production site of heroal-Johann Henkenjohann GmbH & Co. KG and the generic data derived from the "GaBi 10" database. LCA calculations were carried out for the included "cradle to gate life cycle with options" (cradle to gate with options) including all upstream chains (e.g. raw material extraction, etc.).		
Notes	The "Conditions and Guidance on the Use of ift Test Documents" apply. The declaration holder assumes full liability for the underlying data, certificates and verifications.		

Christian Kehrer
Head of Certification and Surveillance Body

Dr. Torsten Mielecke
Chairman of Expert Committee
ift-EPD and PCR

Patrick Wortner
External verifier



Declaration holder

The currently valid EPDs are published according to the following list on www.ift-service.de/epd:

There are currently no valid EPDs available.

1 General product information

Product definition

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

1 m² of aluminium door

The functional unit is obtained by summing up:

Product group	Assessed product	Weight per unit area	Installation depth
D1	Front doors	28.42 kg/m ²	0.092 m
D2	Commercial doors	36.13 kg/m ²	0.092 m
D3	Fire doors	46.70 kg/m ²	0.093 m

Table 1: Product groups

The average unit is declared as follows:

Directly used material flows are determined using the average sizes (1.23 m x 2.18 m) in accordance with EN 17213 and assigned to the declared unit. 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 2019.

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

D1	D2	D3
D72 RL/CL front door RC3	D72 commercial door	D93
D72 RL/CL front door RC2	D65 commercial door	D82
D72 front door RC3		D65 C SP Eloxal
D72 front door RC2		

*Bold = reference products

Product description

The heroyal D65, D72, D82 SP/FP and D93 SP/FP door system in the form of commercial doors, front doors and fire doors, including associated door thresholds, door leaves and hardware, offer operational versatility with all the usual types of opening including tested escape and emergency exit routes (as per DIN EN 179/1125), automatic door systems, finger protection doors and burglar resistant doors.

The design of the heroyal distortion-resistant profile compound is characterised by the two-part configuration with inserted insulating strip and slide-in spring. The heroyal profile compound features the same mechanical characteristics (structural properties, transverse tensile loads, etc.) as conventional insulating strips both in the machined and unmachined states.

	Doors
Profile system	Face widths 50–250 mm
System dimensions	Frame: 74–254 mm
	Leaf: 56 – 124 mm
	Installation depth: 65/72/82/93 mm
	Glass thickness: 6 - 68 mm
	Infill panel thickness: 92 mm
	Max. leaf weights: 360 kg
	Max. leaf height: 3,000 mm
System supplier	heroal-Johann Henkenjohann GmbH & Co. KG
Opening type/direction	Turn, French, folding, in combination with fixed light; Inward / outward opening.
Frame material	3-chamber aluminium PVC compound
Construction type	Single, double leaf in punched and unitised construction
Thermal break	Insulators: PA66GF25, PA66GF25 LI/Low Lambda
Rebate insulation	Different plastics
Surface	A wide range of designs with a large selection of standard RAL and DB colours as well as Eloxal, Les Couleurs® Le Corbusier and heroal Surface Design (SD).
Infill panel	Components and masses of PU aluminium panel in accordance with the heroal-System. Insulating glass units (double and triple, here: configuration 4/12/4/12/4 mm) in accordance with EPD "Insulating glass units". Fire doors use fire-resistant glass according to EPD "Pilkington Pyrostop and Pilkington Pyrodur monolithic fire-rated glass" (15 mm).
Sealing systems	Extruded EPDM glazing gaskets
Glazing gasket	Extruded EPDM glazing gaskets
Accessories and hardware	Accessories and hardware as well as quantities according to the heroal systems.

Additional information for architects:

Also observe the relevant manufacturer system descriptions.

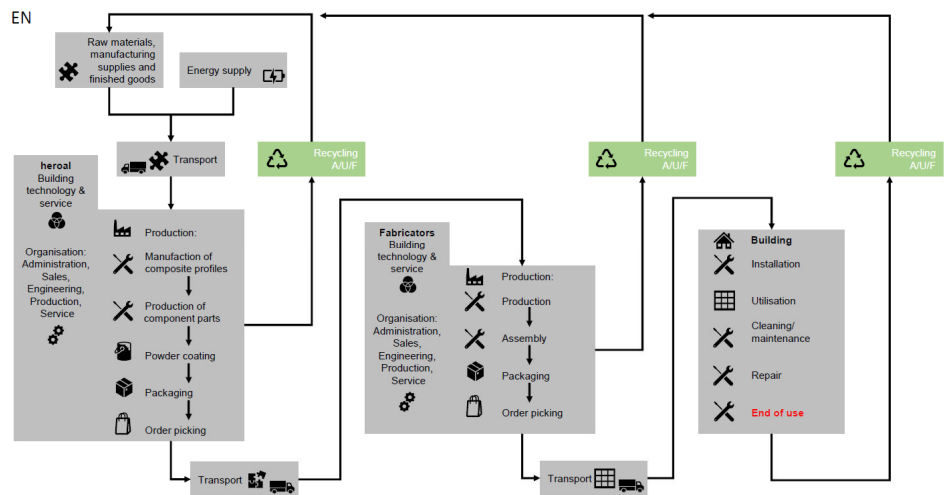
This EPD does not apply to:

- escape and emergency exit doors
- finger protection doors

Additional components such as external/internal shutters, e.g. solar shading devices, etc., and drive mechanisms for automatic door systems must be considered separately.

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

Product manufacture



Applications

Aluminium door systems for residential and commercial buildings, office and administrative buildings, industrial buildings, sports and cultural buildings, single-family houses and multiple dwelling units.

Verifications

The following verifications are held:

- product qualities according to MINERGIE® (D72)

Quality assurance

The following quality assurance system are in place:

- performance characteristics as per EN 14351-1
- performance characteristics as per EN 16034
- Qualicoat quality seal (powder coating)
- powder coating quality to GSB AL 631-5 (Sea Proof)

Additional information

For additional verifications 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

REACH conformity is queried when transferred to the manufacturer.

All relevant safety data sheets are available from the manufacturer.



3 Construction process stage

Processing recommendations, installation

Observe the instructions for assembly/installation, operation, maintenance and disassembly, provided by the manufacturer.

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 Lebenszyklusanalyse 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 www.nachhaltigesbauen.de.

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 the aluminium doors manufactured by heroal-Johann Henkenjohann GmbH & Co. KG have a service life of 50 years.

The service life is dependent on the characteristics of the product and in-use 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 known that have a negative effect on the service life

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 building. 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 aluminium doors are shipped to central collection points. There the products are usually shredded and sorted into their 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 shows the end-of-life modules based on EN 17213 (aluminium windows/doors – Figure B.1). Specific components of metals and glass are recycled; most plastics are thermally recycled. Residual fractions are sent to landfill.

Disposal routes

The LCA includes the average disposal routes.

All life cycle scenarios are detailed in the Annex.

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 have been developed as the basis for aluminium doors. These 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 time-related system boundaries

The specific data originate exclusively from the research project "EPDs for transparent building components" as well as from data collected by the manufacturer / system supplier "heroal-Johann Henkenjohann GmbH & Co. KG". The manufacturer-specific data were collected on-site at the plant located in 33415 Verl and originate in parts from company records and partly from values directly obtained by measurement in the 2019 fiscal year. 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 10 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 sustainability software tool "GaBi ts" for the development of life cycle assessments.



Scope / system boundaries	<p>The system boundaries refer to the supply of raw materials and purchased parts, manufacture/production, use and end-of-life stage of aluminium doors.</p> <p>No additional data from pre-suppliers/subcontractors or other sites were taken into consideration.</p>
Cut-off criteria	<p>All company data collected, i.e. all commodities/input and raw materials used, the thermal energy and electricity consumption, were taken into consideration.</p> <p>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.</p> <p>The transport distances of the pre-products used were taken into consideration as a function of 100% of the mass of the products. The transport mix is composed as follows and originates from the research project "EPDs für transparente Bauelemente" (EPDs for transparent building components):</p> <ul style="list-style-type: none"> • truck, 26 – 28 t total weight / 18.4 t payload, Euro 6, freight, 85% capacity used, 100 km; • truck-trailer, 28 – 34 t total weight / 22 t payload, Euro 6, 50% capacity used, 50 km; • freight train, electrical and diesel driven; D 60%, E 51% capacity used, 50 km • seagoing vessel, consumption mix, 50 km. <p>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 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%.</p>
6.2 Inventory analysis	
Goal	<p>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.</p>
Life cycle stages	<p>The Annex shows the entire life cycle of aluminium doors. 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.</p>
Benefits	<p>The below benefits have been defined as per DIN EN 15804:</p> <ul style="list-style-type: none"> • benefits from recycling • benefits (thermal and electrical) from incineration
Allocation of co-products	<p>During manufacture the following allocation takes place:</p>

The allocation is based on the running metre of the products (physical property). Extrusion waste is recycled directly.

Allocations for re-use, recycling and recovery

If the products are reused/recycled and recovered during the product stage (rejects), the elements are shredded, if necessary and then sorted into their 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

The 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).

Secondary material designated as inputs to aluminium doors is calculated as input without loads. For this no benefits are assigned to Module D, but consumption to Modules C3 and C4 (worse case consideration).

The system boundary set for the recycled material refers to collection.

Secondary material

The use of secondary material was considered in Module A3. Secondary material is used.

Inputs

The LCA includes the following production-relevant inputs per 1 m² of aluminium door:

Energy

The input material of natural gas is based on "Thermische Energie für Erdgas Deutschland" (thermal energy for natural gas Germany). Diesel is based on "Diesel Mix Deutschland" (Diesel mix Germany). Distant heating is based on "Fernwärme Deutschland" (distant heating Germany). Manufacture of frame profiles is based on "Strommix heroyal" (heroyal electricity mix) (see Table 2), manufacture of doors is based on "Strommix Europa-28" (Europe-28 electricity mix).

Electricity disclosure of energy supplier	Shares in %
Renewable energies	68
Natural gas	5
Coal	22
Other fossil resources	4
Nuclear energy	1

Table 2: "heroyal" electricity mix

A portion of the process heat is used for space heating. This can, however, not be quantified, hence a "worst case" figure was taken into account for the product.

Water

The water consumed by the individual process steps for the manufacture amounts to a total of 8.13 l per 1 m² of the element.

The consumption of fresh water specified in Section 6.3 originates (among others) from the process chain of the pre-products and the process water for cooling.

Raw material / pre-products

The charts below show the share of raw materials/pre-products in percent.

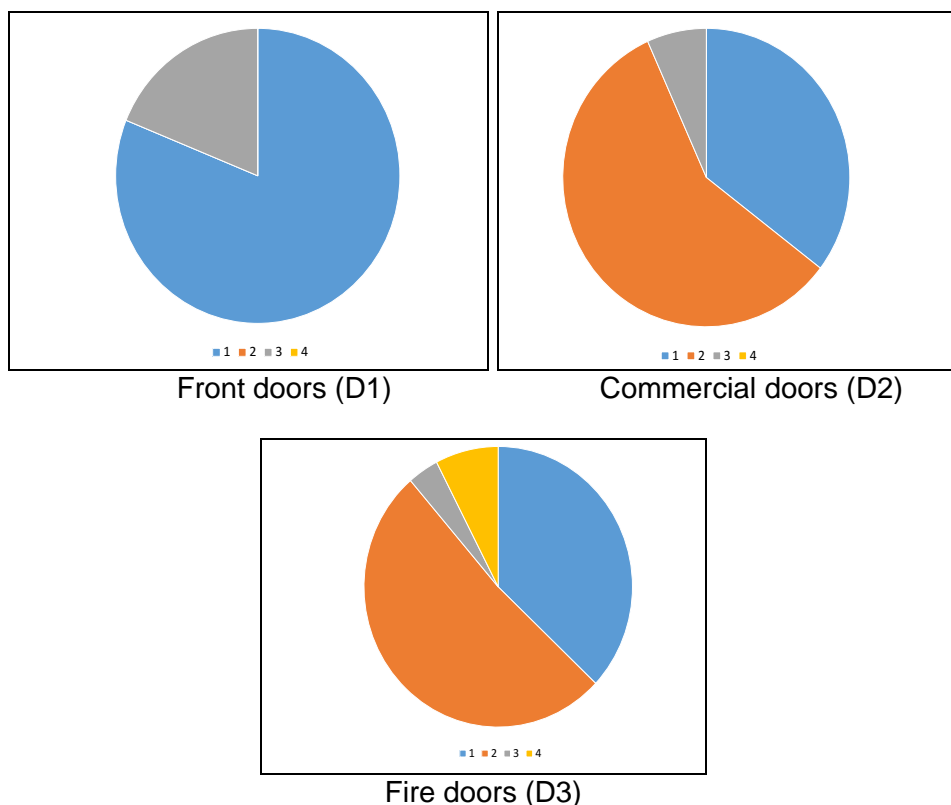


Figure 1: Percentage of individual materials per declared unit

No.	Material	Mass in %		
		D1	D2	D3
1	Metals	81.16	35.39	37.08
2	Glass	0.00	57.91	51.60
3	Plastics	18.84	6.70	3.74
4	Other	0.00	0.00	7.58

Table 3: Percentage of individual materials per declared unit

Ancillary materials and consumables

17.95 g of ancillary materials and consumables are used.

Product packaging

The amounts used for product packaging are as follows:

No.	Material	Mass in g
1	Wood	1.33
2	Cardboard	169.11
3	PE film	184.62

Table 4: Weight in kg of packaging per declared unit

Outputs

The LCA includes the following production-relevant outputs per 1 m² of aluminium door:

Waste

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

Waste water

The manufacture produces 6.79 l waste water.

6.3 Impact assessment**Goal**

The impact assessment covers both inputs and outputs. The impact categories applied are stated 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 aluminium door 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.



Results per 1 m² of aluminium front door (D1)

	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Central environmental impacts																
GWP	kg CO ₂ eq.	278.00	4.81	0.82	-	48.20	15.70	0.00	195.98	0.00	0.00	0.00	1.33	16.00	2.04E-02	-111.00
ODP	kg CFC -11 eq.	3.83E-08	8.41E-16	1.20E-16	-	1.04E-13	1.22E-13	0.00	3.83E-08	0.00	0.00	0.00	2.32E-16	2.25E-15	1.11E-16	-3.60E-13
AP	kg SO ₂ eq.	0.83	1.12E-02	8.36E-05	-	4.74E-02	3.18E-02	0.00	0.41	0.00	0.00	0.00	2.57E-03	1.01E-03	1.23E-04	-0.46
EP	kg PO ₄ ³⁻ eq.	7.70E-02	2.78E-03	1.72E-05	-	7.87E-03	2.57E-03	0.00	5.52E-02	0.00	0.00	0.00	6.36E-04	2.19E-04	1.39E-05	-2.69E-02
POCP	kg ethene eq.	5.19E-02	-3.97E-03	6.97E-06	-	1.29E-02	2.78E-03	0.00	2.28E-02	0.00	0.00	0.00	-8.36E-04	1.06E-04	9.35E-06	-2.59E-02
ADPE	kg Sb eq.	2.80E-04	4.21E-07	7.96E-09	-	1.05E-05	9.28E-05	0.00	1.92E-04	0.00	0.00	0.00	1.16E-07	9.47E-08	7.50E-09	-1.44E-04
ADPF	MJ	3520.00	65.60	0.13	-	1470	195.00	0.00	2426.01	0.00	0.00	0.00	18.10	1.90	0.28	-1260.00
Use of resources																
PERE	MJ	1310.00	3.67	2.76	-	21.10	29.90	0.00	736.03	0.00	0.00	0.00	1.01	0.55	3.84E-02	-602.00
PERM	MJ	2.73	0.00	-2.73	-	0.00	0.00	0.00	2.97E-03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	1310.00	3.67	2.86E-02	-	21.10	29.90	0.00	733.30	0.00	0.00	0.00	1.01	0.55	3.84E-02	-602.00
PENRE	MJ	3950.00	65.80	3.93	-	1480.00	210.00	0.00	2760.31	0.00	0.00	0.00	18.20	106.61	5.77	-1480.00
PENRM	MJ	114.00	0.00	-3.78	-	0.00	0.00	0.00	4.29E-01	0.00	0.00	0.00	0.00	-104.30	-5.49	0.00
PENRT	MJ	4070.00	65.80	0.15	-	1480.00	210.00	0.00	2766.74	0.00	0.00	0.00	18.20	2.31	0.29	-1480.00
SM	kg	1.14	0.00	0.00	-	0.00	0.00	0.00	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ	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
NRSF	MJ	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
FW	m ³	2.62	4.20E-03	1.95E-03	-	0.28	0.08	0.00	1.22	0.00	0.00	0.00	1.16E-03	3.46E-02	7.04E-05	-1.49
Waste categories																
HWD	kg	2.48E-05	3.32E-09	2.69E-11	-	2.02E-07	4.18E-08	0.00	0.00	0.00	0.00	0.00	9.16E-10	4.44E-10	3.03E-11	-1.63E-07
NHWD	kg	51.30	9.77E-03	9.82E-03	-	0.45	1.01	0.00	24.31	0.00	0.00	0.00	2.70E-03	6.34E-02	1.42	-29.10
RWD	kg	0.22	7.96E-05	7.90E-06	-	3.31E-03	5.56E-03	0.00	0.13	0.00	0.00	0.00	2.20E-05	1.65E-04	2.99E-06	-8.78E-02
Output material flows																
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	0.23	0.00	0.00	-	0.00	1.90	0.00	22.13	0.00	0.00	0.00	0.00	21.90	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	1.04	0.00	1.60	-	0.00	9.57	0.00	36.64	0.00	0.00	0.00	0.00	34.00	0.00	0.00
EET	MJ	2.30	0.00	2.86	-	0.00	17.01	0.00	65.56	0.00	0.00	0.00	0.00	60.40	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 **PENRE** - use of non-renewable primary energy **PENRM** - use of non-renewable primary energy resources **PENRT** - total use of non-renewable primary energy resources **SM** - use of secondary 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

Results per 1 m ² of aluminium commercial door (D2)																
Central environmental impacts																
	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP	kg CO ₂ eq.	184.00	6.10	0.82	-	48.20	44.90	0.00	143.81	0.00	0.00	0.00	1.02	7.25	0.22	-73.60
ODP	kg CFC -11 eq.	5.17E-08	1.07E-15	1.20E-16	-	1.04E-13	1.34E-08	0.00	5.17E-08	0.00	0.00	0.00	1.78E-16	2.48E-15	1.21E-15	-3.09E-13
AP	kg SO ₂ eq.	0.77	1.41E-02	8.36E-05	-	4.74E-02	0.34	0.00	0.56	0.00	0.00	0.00	1.97E-03	5.45E-04	1.33E-03	-0.30
EP	kg PO ₄ ³⁻ eq.	6.98E-02	3.52E-03	1.72E-05	-	7.87E-03	2.71E-02	0.00	5.93E-02	0.00	0.00	0.00	4.88E-04	1.10E-04	1.51E-04	-2.36E-02
POCP	kg ethene eq.	4.62E-02	-5.03E-03	6.97E-06	-	1.29E-02	2.02E-02	0.00	3.07E-02	0.00	0.00	0.00	-6.41E-04	5.42E-05	1.01E-04	-3.56E-03
ADPE	kg Sb eq.	1.05E-03	5.33E-07	7.96E-09	-	1.05E-05	9.49E-04	0.00	1.01E-03	0.00	0.00	0.00	8.92E-08	5.81E-08	8.13E-08	-8.31E-05
ADPF	MJ	2470.00	83.20	0.13	-	1470	703.00	0.00	1942.61	0.00	0.00	0.00	13.90	1.37	3.01	-862.00
Use of resources																
PERE	MJ	795.00	4.65	2.76	-	21.10	63.40	0.00	518.23	0.00	0.00	0.00	0.78	0.63	0.42	-320.00
PERM	MJ	2.73	0.00	-2.73	-	0.00	0.00	0.00	2.97E-03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	798.00	4.65	2.86E-02	-	21.10	63.40	0.00	518.50	0.00	0.00	0.00	0.78	0.63	0.42	-320.00
PENRE	MJ	2720.00	83.40	3.93	-	1480.00	749.00	0.00	2142.80	0.00	0.00	0.00	13.90	49.00	5.57	-991.00
PENRM	MJ	53.40	0.00	-3.78	-	0.00	0.00	0.00	-2.53E-03	0.00	0.00	0.00	0.00	-47.14	-2.48	0.00
PENRT	MJ	2780.00	83.40	0.15	-	1480.00	749.00	0.00	2149.40	0.00	0.00	0.00	13.90	1.86	3.09	-991.00
SM	kg	1.86	0.00	0.00	-	0.00	0.92	0.00	1.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ	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
NRSF	MJ	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
FW	m ³	1.67	5.32E-03	1.95E-03	-	0.28	0.22	0.00	0.98	0.00	0.00	0.00	8.90E-04	1.60E-02	7.63E-04	-0.79
Waste categories																
HWD	kg	3.41E-03	4.20E-09	2.69E-11	-	2.02E-07	3.33E-03	0.00	3.41E-03	0.00	0.00	0.00	7.03E-10	4.17E-10	3.28E-10	-1.55E-07
NHWD	kg	50.90	1.24E-02	9.82E-03	-	0.45	25.40	0.00	52.05	0.00	0.00	0.00	2.07E-03	2.92E-02	15.40	-16.50
RWD	kg	0.12	1.01E-04	7.90E-06	-	3.31E-03	1.76E-02	0.00	7.82E-02	0.00	0.00	0.00	1.69E-05	1.96E-04	3.25E-05	-5.01E-02
Output material flows																
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	2.41	0.00	0.00	-	0.00	25.60	0.00	20.81	0.00	0.00	0.00	0.00	18.40	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	1.04	0.00	1.60	-	0.00	7.48	0.00	18.04	0.00	0.00	0.00	0.00	15.40	0.00	0.00
EET	MJ	2.30	0.00	2.86	-	0.00	13.30	0.00	32.46	0.00	0.00	0.00	0.00	27.30	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 **PENRE** - use of non-renewable primary energy **PENRM** - use of non-renewable primary energy resources **PENRT** - total use of non-renewable primary energy resources **SM** - use of secondary 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

Results per 1 m ² of aluminium fire door (D3)																
Central environmental impacts																
	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP	kg CO ₂ eq.	277.00	7.87	0.82	-	48.20	89.00	0.00	221.87	0.00	0.00	0.00	1.42	5.25	0.31	-90.50
ODP	kg CFC -11 eq.	4.75E-08	1.37E-15	1.20E-16	-	1.04E-13	9.20E-09	0.00	4.75E-08	0.00	0.00	0.00	2.47E-16	2.28E-15	1.67E-15	-3.50E-13
AP	kg SO ₂ eq.	1.04	1.82E-02	8.36E-05	-	4.74E-02	0.45	0.00	0.76	0.00	0.00	0.00	2.73E-03	4.23E-04	1.85E-03	-0.39
EP	kg PO ₄ ³⁻ eq.	0.11	4.54E-03	1.72E-05	-	7.87E-03	5.55E-02	0.00	9.96E-02	0.00	0.00	0.00	6.75E-04	8.26E-05	2.10E-04	-2.89E-02
POCP	kg ethene eq.	6.55E-02	-6.48E-03	6.97E-06	-	1.29E-02	3.03E-02	0.00	4.48E-02	0.00	0.00	0.00	-8.88E-04	4.12E-05	1.41E-04	-6.11E-03
ADPE	kg Sb eq.	5.09E-04	6.88E-07	7.96E-09	-	1.05E-05	3.54E-04	0.00	4.11E-04	0.00	0.00	0.00	1.23E-07	4.70E-08	1.13E-07	-1.91E-04
ADPF	MJ	3570.00	107.00	0.13	-	1470	1260.00	0.00	2906.76	0.00	0.00	0.00	19.30	1.16	4.17	-1050.00
Use of resources																
PERE	MJ	1510.00	6.00	2.76	-	21.10	526.00	0.00	1155.99	0.00	0.00	0.00	1.08	0.58	0.58	-396.00
PERM	MJ	2.73	0.00	-2.73	-	0.00	0.00	0.00	2.97E-03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	1510.00	6.00	2.86E-02	-	21.10	526.00	0.00	1153.26	0.00	0.00	0.00	1.08	0.58	0.58	-396.00
PENRE	MJ	5110.00	108.00	3.93	-	1480.00	2480.00	0.00	4357.92	0.00	0.00	0.00	19.30	35.61	6.08	-1200.00
PENRM	MJ	39.60	0.00	-3.78	-	0.00	0.00	0.00	3.54E-02	0.00	0.00	0.00	0.00	-33.99	-1.79	0.00
PENRT	MJ	5150.00	108.00	0.15	-	1480.00	2480.00	0.00	4358.36	0.00	0.00	0.00	19.30	1.62	4.29	-1200.00
SM	kg	9.41	0.00	0.00	-	0.00	8.13	0.00	9.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ	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
NRSF	MJ	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
FW	m ³	2.02	6.86E-03	1.95E-03	-	0.28	0.10	0.00	1.11	0.00	0.00	0.00	1.23E-03	1.16E-02	1.06E-03	-1.01
Waste categories																
HWD	kg	1.11E-05	5.42E-09	2.69E-11	-	2.02E-07	6.71E-08	0.00	1.05E-05	0.00	0.00	0.00	9.73E-10	3.73E-10	4.55E-10	-1.83E-07
NHWD	kg	35.70	1.60E-02	9.82E-03	-	0.45	1.12	0.00	38.65	0.00	0.00	0.00	2.87E-03	2.13E-02	21.40	-20.80
RWD	kg	0.14	1.30E-04	7.90E-06	-	3.31E-03	4.83E-03	0.00	9.07E-02	0.00	0.00	0.00	2.34E-05	1.82E-04	4.50E-05	-5.91E-02
Output material flows																
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	0.23	0.00	0.00	-	0.00	27.50	0.00	23.93	0.00	0.00	0.00	0.00	23.70	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	1.04	0.00	1.60	-	0.00	5.46	0.00	13.74	0.00	0.00	0.00	0.00	11.10	0.00	0.00
EET	MJ	2.30	0.00	2.86	-	0.00	9.71	0.00	24.86	0.00	0.00	0.00	0.00	19.70	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 **PENRE** - use of non-renewable primary energy **PENRM** - use of non-renewable primary energy resources **PENRT** - total use of non-renewable primary energy resources **SM** - use of secondary 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



6.4 Interpretation, LCA presentation and critical review

Evaluation

The environmental impacts of

- front doors
- commercial doors
- fire doors

differ considerably from each other. The differences result mainly from the amount of pre-products and raw materials used. This was to be expected in particular due to the use of anodised aluminium profiles and glass units. The impact of the different pre-products and raw materials used must also be taken into account. The additional fire-resistant materials used in the fire protection systems are another reason for the generally higher environmental impacts.

The environmental impacts of the manufacture result mainly from the use of aluminium / its upstream chains and the anodisation of the profiles. For all doors the use of insulating strips and their upstream chains presents an additional factor that must be taken into account. The environmental impacts of commercial and fire doors result furthermore mainly from the use of the (fire-resistant) glass and its upstream chains.

The cleaning operations using glass cleaners containing ethanol and isopropanol over the 50-year use stage also play a notable role in environmental impacts. Additional central values during the use stage originate from repair of wearing parts (in particular glass) as well as the one-off replacement in the context of building renovation during a 50-year time 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, for aluminium between 9% (commercial and fire doors) and 23% (front doors) of the environmental impacts arising during the life cycle can be assigned as benefits to scenario D, depending on the product group. An additional 2% benefit can be assigned to the glass for front doors.

The charts below show the allocation of the main environmental impacts.

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

Charts

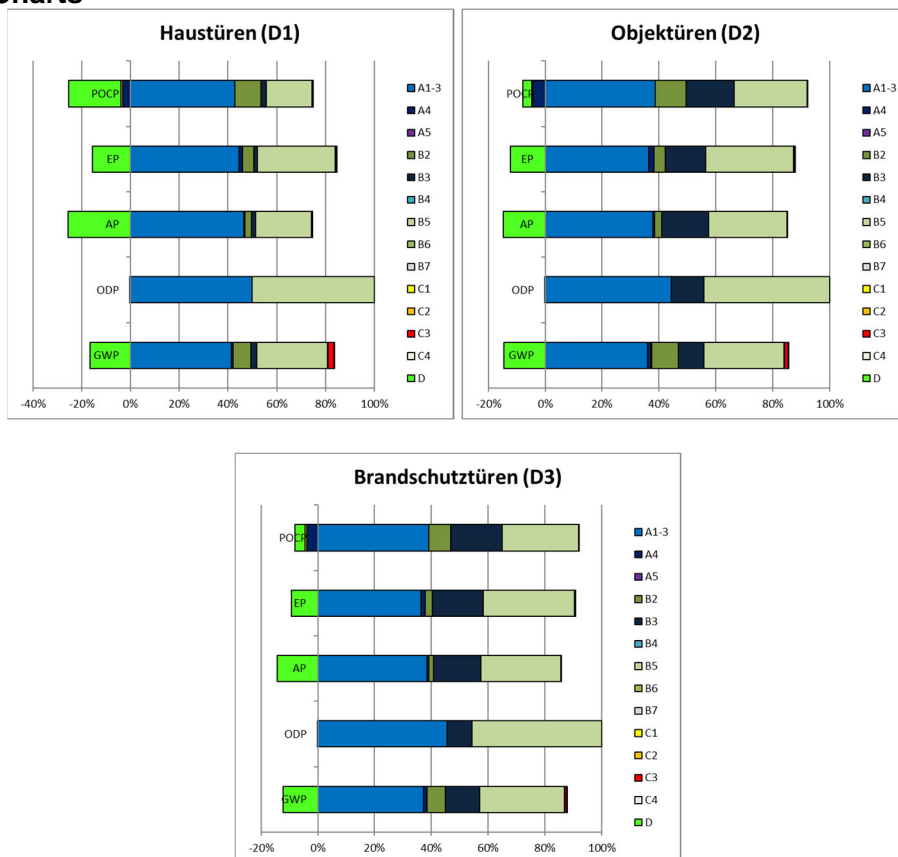


Figure 2: Percentage of the modules in selected environmental impact categories

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.

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. 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 EN 17213 "PCR for windows and doors", "PCR Part A" PCR-A-0.2:2018 and "Doors" PCR-TT-2.1:2018."

The European standard EN 15804 serves as the core PCR ^{a)}
Independent verification of the Declaration and statement according to EN ISO 14025:2010 <input type="checkbox"/> internal <input checked="" type="checkbox"/> 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	14.04.2021	External Verification	Zwick	Wortner
2				
3				

1 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. **DIN EN 12457 - Parts 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.
3. **Klöpffer, W und Grahl, B. Ökobilanzen (LCA).** Weinheim: Wiley-VCH-Verlag, 2009.
4. **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.
5. **Gefahrstoffverordnung – GefStoffV (Hazardous substances regulation) Verordnung zum Schutz vor Gefahrstoffen (Regulation on protection against hazardous substances),** Berlin : BGBl. (Federal Gazette) I S. 3758, 2017.
6. **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 : BGBl. (Federal Gazette) I S. 1328, 2017.
7. **DIN EN ISO 14040:2018-05. Environmental management - Life cycle assessment - Principles and framework.** Berlin : Beuth Verlag GmbH, 2018.
8. **DIN EN ISO 14044:2006-10. Environmental management - Life cycle assessment - Requirements and guidelines..** Berlin : Beuth Verlag GmbH, 2006.
9. **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.
10. **LUMITOS AG. Nitrogen. chemie.de. [Online] 2021. [Quotation from: 27 January 2021.]** <https://www.chemie.de/lexikon/Stickstoff.html>.
11. —. **Oxygen. chemie.de. [Online] 2021. [Quotation from: 27 January 2021.]** <https://www.chemie.de/lexikon/Sauerstoff.html>.
12. **OENORM S 5200:2009-04-01 Radioactivity in construction materials.** Berlin : Beuth Verlag GmbH, 2009.
13. **PCR Part B - Windows, flat roof windows, skylights and continuous roof lights. Product category rules for environmental product declarations as per EN ISO 14025 and EN 15804** Rosenheim: ift Rosenheim, 2018
14. **EN 15942:2012-01. Sustainability of construction works - Environmental product declarations - Communication format business-to-business.** Berlin : Beuth Verlag GmbH, 2012.
15. **EN 15804:2012+A1:2013. Sustainability of construction works - Environmental product declarations - Rules for the product categories.** Berlin : Beuth Verlag GmbH, 2013.
16. **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
17. **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.
18. **DIN EN 13501-1:2010-01. Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests.** Berlin : Beuth Verlag GmbH, 2010.
19. **DIN EN ISO 16000 Part 6, 9 11 Indoor air: Determination of the emission of volatile organic compounds from building products and furnishing** Berlin : Beuth Verlag GmbH, 2012, 2008, 2006.
20. **ISO 21930:2017-07. Sustainability in building construction - Environmental declaration of building products** Berlin : Beuth Verlag, 2017.
21. **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 : BGBl. (Federal Gazette) I S. 3830, 2017.
22. **Chemikaliengesetz – ChemG (Chemicals Act 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 : BGBl. (Federal Gazette) I S. 1146, 2017.
23. **IKP Universität Stuttgart and PE Europe GmbH GaBi 10: Software and database for LCA.** Leinfelden-Echterdingen: s.n, 2020
24. **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.
25. **EN 17213:2020. Windows and doors - Environmental product declarations - Product category rules for windows and doors.** Berlin : Beuth Verlag GmbH, 2020.
26. **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.
27. **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.
28. **DIN EN ISO 12457 Part 1-4 Characterization of waste - Leaching; Compliance test for leaching of granular waste materials and sludges - Part 1-4:** Berlin : Beuth Verlag GmbH, 2003.
29. **LUMITOS AG. Argon. chemie.de. [Online] 2021. [Quotation from: 27 January 2021.]** <https://www.chemie.de/lexikon/Argon.html>.



Product group: "Doors"

30. **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
31. **PCR Part A.** *Product category rules for environmental product declarations as per EN ISO 14025 and EN 15804.* Rosenheim: ift Rosenheim, 2018

2 Annex

Description of life cycle scenarios for aluminium doors

Product stage			Construction stage		Use stage							End-of-life stage				Benefits and loads from beyond the system boundaries
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material supply	Transport	Manufacture	Transport	Construction/Installation	Use	Inspection, maintenance, cleaning	Repair	Exchange / Replacement	Improvement / Modernisation	Operational energy use	Operational water use	Deconstruction	Transport	Waste management	Disposal	Re-use Recovery Recycling potential
✓	✓	✓	✓	✓	—	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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).

Note: 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

A4 Transport to the construction site						
No.	Scenario	Description				
A4.1	Small series - direct marketing	7.5 t truck (Euro 0-6 mix), 2.7 t payload, 20% capacity used, approx. 50 km to site and empty return trip.				
A4.2	Small series via local manufacturers	7.5 t truck (Euro 0-6 mix), 2.7 t payload, full capacity, approx. 50 km to site and empty return trip as well as 7.5 t truck (Euro 0-6 mix), 2.7 t payload, 20% load, approx. 50 km to site and empty return trip				
A4.3	Small series via distributors	34 - 40 t truck (Euro 0-6 mix), 27 t payload, full capacity, approx. 150 km to site and empty return trip as well as 7.5 t truck (Euro 0-6 mix), 2.7 t payload, 20% capacity used, approx. 50 km to site and empty return trip				
A4.4	Large-scale project	34- 40 t truck (Euro 0-6 mix), 27 t payload, full capacity, approx. 150 km to site and empty return trip.				
Weight: D1: 28.78 kg/m ² , D2: 36.48 kg/m ² , D3: 47.05 kg/m ²						
The scenarios were calculated per kg and can be scaled to the product group using the above masses. The values in the summary table are already based on m ² .						
A4 Transport to the construction site per 1 kg		Unit	A4.1	A4.2	A4.3	A4.4
Central environmental impacts						
GWP		kg CO ₂ eq.	0.14	0.17	0.16	2.04E-02
ODP		kg CFC -11 eq.	2.42E-17	2.92E-17	2.77E-17	3.54E-18
AP		kg SO ₂ eq.	3.21E-04	3.88E-04	3.50E-04	2.84E-05
EP		kg PO ₄ ³⁻ eq.	8.00E-05	9.66E-05	8.69E-05	6.95E-06
POCP		kg ethene eq.	-1.14E-04	-1.38E-04	-1.21E-04	-7.29E-06
ADPE		kg Sb eq.	1.21E-08	1.46E-08	1.39E-08	1.77E-09
ADPF		MJ	1.88	2.28	2.16	0.28
Use of resources						
PERE		MJ	0.11	0.13	0.12	1.54E-02
PERM		MJ	0.00	0.00	0.00	0.00
PERT		MJ	0.11	0.13	0.12	1.54E-02
PENRE		MJ	1.89	2.29	2.17	0.28
PENRM		MJ	0.00	0.00	0.00	0.00
PENRT		MJ	1.89	2.29	2.17	0.28
SM		kg	0.00	0.00	0.00	0.00
RSF		MJ	0.00	0.00	0.00	0.00
NRSF		MJ	0.00	0.00	0.00	0.00
FW		m ³	1.21E-04	1.46E-04	1.38E-04	1.77E-05
Waste categories						
HWD		kg	9.53E-11	1.15E-07	1.01E-07	1.40E-08
NHWD		kg	2.81E-04	3.40E-04	3.32E-04	4.11E-05
RWD		kg	2.29E-06	2.77E-06	2.62E-06	3.35E-07
Output material flows						
CRU		kg	0.00	0.00	0.00	0.00
MFR		kg	0.00	0.00	0.00	0.00
MER		kg	0.00	0.00	0.00	0.00
EEE		MJ	0.00	0.00	0.00	0.00
EET		MJ	0.00	0.00	0.00	0.00

A5 Construction/Installation				
No.	Scenario	Description		
A5.1	Manual	The elements are installed without mechanical handling. 0.0 kWh/m ² electricity consumed		
A5.2	Small lifting trolley / lifting platform	A small lifting device or fork-lift truck is required for the installation of the elements. 1.0 kWh/m ² electricity consumed by lifting platform (1)		
A5.3	Crane	A (construction) crane is required for the installation of the elements. 1.5 kWh/m ² electricity consumed by crane (1)		
In case of deviating consumption during installation/assembly of the products which forms part of the site management, they are covered at the building level.				
Ancillary materials, consumables, use of water, material losses and waste as well as transport distances during installation are negligible.				
It is assumed that the packaging material in the Module construction / installation is sent to waste handling. Waste is only thermally recycled in line with the conservative approach. Transport to the recycling plants is not taken into account.				
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).				
A5 Construction / Installation per 1 m ²	Unit	A5.1	A5.2	A5.3
Central environmental impacts				
GWP	kg CO ₂ eq.	0.00	0.39	0.59
ODP	kg R11 eq.	0.00	1.27E-14	1.90E-14
AP	kg SO ₂ eq.	0.00	7.72E-04	1.16E-03
EP	kg PO ₄ ³⁻ eq.	0.00	9.09E-05	1.36E-04
POCP	kg C ₂ H ₄ eq.	0.00	5.60E-05	8.40E-05
ADPE	kg Sb eq.	0.00	1.32E-07	1.99E-07
ADPF	MJ	0.00	4.42	6.63
Use of resources				
PERE	MJ	0.00	3.26	4.89
PERM	MJ	0.00	0.00	0.00
PERT	MJ	0.00	3.26	4.89
PENRE	MJ	0.00	7.07	10.60
PENRM	MJ	0.00	0.00	0.00
PENRT	MJ	0.00	7.07	10.60
SM	kg	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00
FW	m ³	0.00	3.17E-03	4.76E-03
Waste categories				
HWD	kg	0.00	1.87E-09	2.80E-09
NHWD	kg	0.00	5.02E-03	7.52E-03
RWD	kg	0.00	1.05E-03	1.58E-03
Output material flows				
CRU	kg	0.00	0.00	0.00
MFR	kg	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00

EEE	MJ	0.00	0.00	0.00	0.00	
EET	MJ	0.00	0.00	0.00	0.00	
B1 Use (not included)						
Refer to Section 5 Use stage - Emissions to the environment. Emissions cannot be quantified.						
B2 Inspection, maintenance, cleaning						
B2.1 Cleaning						
No.	Scenario	Description				
B2.1.1	Rarely, manual	Less than 2.5 m height or industrial climber, manually using suitable cleaning agents, annually 2.5 l consumed per 1 m ² and cleaning (125 l / 50 yr) (1)				
B2.1.2	Rarely, using machines	More than 2.5 m with elevating platform, crane systems, maintenance platform, etc., annually 10 l water consumed per 1 m ² and cleaning (500 l / 50 yr) and 2.5 kWh / 50 yr (1)				
B2.1.3	Frequently, manual	Less than 2.5 m height or industrial climber, manually using suitable cleaning agents, quarterly 2.5 l consumed per 1 m ² and cleaning (500 l / 50 yr) (1)				
B2.1.4	Frequently, using machines	More than 2.5 m with elevating platform, crane systems, maintenance platform, etc., quarterly 10 l water consumed per 1 m ² and cleaning (2,000 l / 50 yr) and 2.5 kWh / 50 yr (1)				
Ancillary materials, consumables, use of energy and water, material losses and waste as well as transport distances during cleaning are negligible.						
B2.1 Cleaning per 1 m ²		Unit	B2.1.1	B2.1.2	B2.1.3	B2.1.4
Central environmental impacts						
GWP		kg CO ₂ eq.	48.10	1.74	193.00	4.02
ODP		kg CFC -11 eq.	1.07E-13	5.18E-14	4.30E-13	1.12E-13
AP		kg SO ₂ eq.	4.72E-02	3.36E-03	0.19	7.67E-03
EP		kg PO ₄ ³⁻ eq.	7.96E-03	7.57E-04	3.18E-02	2.35E-03
POCP		kg ethene eq.	1.28E-02	2.60E-04	5.14E-02	6.20E-04
ADPE		kg Sb eq.	1.21E-05	6.67E-06	4.82E-05	2.57E-05
ADPF		MJ	1,460.00	20.50	5850.00	48.90
Use of resources						
PERE		MJ	22.00	12.80	88.20	26.60
PERM		MJ	0.00	0.00	0.00	0.00
PERT		MJ	22.00	12.80	88.20	26.60
PENRE		MJ	1,470.00	30.20	5890.00	67.70
PENRM		MJ	0.00	0.00	0.00	0.00
PENRT		MJ	1,470.00	30.20	5890.00	67.70
SM		kg	0.00	0.00	0.00	0.00
RSF		MJ	0.00	0.00	0.00	0.00
NRSF		MJ	0.00	0.00	0.00	0.00
FW		m ³	0.40	0.51	1.61	2.02
Waste categories						
HWD		kg	2.02E-07	7.75E-09	8.09E-76	1.70E-08
NHWD		kg	0.46	6.39E-02	1.83	0.22
RWD		kg	3.58E-03	3.84E-03	1.43E-02	7.75E-03

Output material flows					
CRU	kg	0.00	0.00	0.00	0.00
MFR	kg	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00
EEE	MJ	0.00	0.00	0.00	0.00
EET	MJ	0.00	0.00	0.00	0.00
B2.2 Maintenance					
No.	Scenario	Description			
B2.2.1	Low use (e.g. residential construction)	Every two years functional check, visual inspection, greasing/lubrication of hardware and, if necessary, repair - 0.125 kg lubricants per 50 yr (1)			
B2.2.2	Normal use (e.g. office or public buildings)	Annual functional check, visual inspection, greasing / lubrication of hardware and, if necessary, repair - 0.250 kg lubricants per 50 yr (1)			
B2.2.3	Heavy use (e.g. schools and hotels)	Biannual functional check, visual inspection, greasing /lubrication of hardware and, if necessary, repair - 0.500 kg lubricants per 50 yr (1)			
Ancillary materials, consumables, use of energy and water, waste, material losses and transport distances during maintenance are negligible.					
B2.2 Maintenance per 1 m ²		Unit	B2.2.1	B2.2.2	B2.2.3
Central environmental impacts					
GWP	kg CO ₂ eq.		0.13	0.27	0.53
ODP	kg R11 eq.		5.94E-16	1.19E-15	2.38E-15
AP	kg SO ₂ eq.		2.83E-04	5.67E-04	1.13E-03
EP	kg PO ₄ ³⁻ eq.		2.41E-05	4.83E-05	9.66E-05
POCP	kg C ₂ H ₄ eq.		4.46E-05	8.92E-05	1.78E-04
ADPE	kg Sb eq.		2.29E-08	4.59E-08	9.17E-08
ADPF	MJ		6.37	12.70	25.50
Use of resources					
PERE	MJ		0.11	0.22	0.45
PERM	MJ		0.00	0.00	0.00
PERT	MJ		0.11	0.22	0.45
PENRE	MJ		6.41	12.80	25.60
PENRM	MJ		0.00	0.00	0.00
PENRT	MJ		6.41	12.80	25.60
SM	kg		0.00	0.00	0.00
RSF	MJ		0.00	0.00	0.00
NRSF	MJ		0.00	0.00	0.00
FW	m ³		7.80E-05	1.56E-04	3.212E-04
Waste categories					
HWD	kg		1.69E-10	3.38E-10	6.76E-10
NHWD	kg		8.99E-04	1.80E-03	3.60E-03
RWD	kg		1.51E-05	3.01E-05	6.03E-05
Output material flows					
CRU	kg		0.00	0.00	0.00
MFR	kg		0.00	0.00	0.00
MER	kg		0.00	0.00	0.00
EEE	MJ		0.00	0.00	0.00
EET	MJ		0.00	0.00	0.00

B3 Repair		
No.	Scenario	Description
B3	Normal use and heavy use	One replacement*: all hardware, glass incl. glazing gaskets and seals (1)
<p>* Assumptions for evaluation of possible environmental impacts; statements made do not constitute any guaranty or warranty of performance.</p> <p>For updated information refer to the relevant manufacturer instructions for assembly/installation, operation and maintenance</p> <p>Ancillary materials, consumables, use of energy and water, waste, material losses and transport distances during repair are negligible.</p> <p>Since only one scenario is used, the results are shown in the relevant summary table.</p>		
B4 Interchange / replacement (not relevant)		
No.	Scenario	Description
B4	Normal use and heavy use	No replacement over a 50 year period*
<p>* Assumptions for evaluation of possible environmental impacts; statements made do not constitute any guaranty or warranty of performance.</p> <p>The statements made in this EPD are only informative to allow evaluation at the building level.</p> <p>It is assumed that no replacement will be necessary during the 50-year reference service life and the 50-year building service life.</p> <p>For updated information refer to the relevant manufacturer instructions for assembly/installation, operation and maintenance</p> <p>Ancillary materials, consumables, use of energy and water, material losses, waste as well as transport distances during installation are negligible.</p> <p>Since only one scenario is used, the results are shown in the relevant summary table.</p>		
B5 Improvement / modernisation		
No.	Scenario	Description
B5	Normal use and heavy use	One replacement in the context of upgrade / renovation / refurbishment of the building*
<p>* Assumptions for evaluation of possible environmental impacts; statements made do not constitute any guaranty or warranty of performance.</p> <p>The environmental impacts of the selected scenario originate from the product, construction and disposal phases.</p> <p>Ancillary materials, consumables, use of energy and water, waste, material losses and transport distances are taken into account.</p> <p>For updated information refer to the relevant manufacturer instructions for assembly/installation, operation and maintenance</p>		

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

B6 Operational energy use

No.	Scenario	Description
B6.1	Hand-operated	No energy consumed when used
B6.2	Doors: power-operated normal use	Per drive mechanism: 1,566.35 kWh / 50 yr electricity (incl. standby operation), for 0.120 kW drive capacity, 100 cycles per day, 48 weeks of building use per year; electricity mix (EU 28)
B6.2	Fire doors: power-operated normal use	Per drive mechanism: 3,403.07 kWh / 50 yr electricity (incl. standby operation), for 0.240 kW drive capacity, 10 cycles per day, 48 weeks of building use per year; electricity mix (EU 28)

* Frequencies, times of use, number of users, cycles, etc.

There is no transport consumption for energy use in buildings. Ancillary materials, consumables and water, waste materials and other scenarios are negligible.

B6 Operational energy use per 1 kg	Unit	B6.1	B6.2	B6.2
			Doors	Fire safety
Central environmental impacts				
GWP	kg CO ₂ eq.	0.00	614.00	1340.00
ODP	kg CFC -11 eq.	0.00	1.99E-11	4.32E-11
AP	kg SO ₂ eq.	0.00	1.21	2.63
EP	kg PO ₄ ³⁻ eq.	0.00	0.14	0.31
POCP	kg ethene eq.	0.00	8.87E-02	0.19
ADPE	kg Sb eq.	0.00	2.07E-04	4.51E-04
ADPF	MJ	0.00	6930.00	15100.00
Use of resources				
PERE	MJ	0.00	5110.00	11100.00
PERM	MJ	0.00	0.00	0.00
PERT	MJ	0.00	5110.00	11100.00
PENRE	MJ	0.00	11100.00	24100.00
PENRM	MJ	0.00	0.00	0.00
PENRT	MJ	0.00	11100.00	24100.00
SM	kg	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00
FW	m ³	0.00	4.97	10.80
Waste categories				
HWD	kg	0.00	2.93E-06	6.36E-06
NHWD	kg	0.00	7.86	17.09
RWD	kg	0.00	1.68	3.65
Output material flows				
CRU	kg	0.00	0.00	0.00
MFR	kg	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00
EEE	MJ	0.00	0.00	0.00
EET	MJ	0.00	0.00	0.00



B7 Operational water use (not relevant)

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

There is no transport consumption for water use in buildings. Ancillary materials, consumables, waste materials and other scenarios are negligible.

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

C1 Deconstruction

No.	Scenario	Description
C1	Deconstruction	<p>Based on EN 17213 (metal windows/doors – Figure B.1): Deconstruction 30% for glass; Deconstruction remaining materials 95% Remainder to landfill.</p> <p>Further deconstruction rates are possible, give adequate reasons.</p>

No relevant inputs or outputs apply to the scenario selected. The energy consumed for deconstruction is negligible. Any arising consumption is marginal.

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

In case of deviating consumption the removal of the products forms part of site management and is covered at the building level.

C2 Transport

No.	Scenario	Description
C2	Transport	<p>Transport to collection point using 7.5 t truck (Euro 0-6 mix), full capacity, approx. 50 km to collection point and empty return trip. From collection point to recycling plant using 34 - 40 t truck (Euro 0-6 mix), 27 t payload, full capacity, approx. 150 km and empty return trip.</p>

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

C3 Waste management

No.	Scenario	Description
C3	Disposal	<p>Share for recirculation of materials:</p> <ul style="list-style-type: none"> • 100% metals in melt • 100% glass in melt • plastics 100% thermal recycling in waste incineration plant (R1>0,6) • remainder (e.g. fire-resistant material) sent to landfill

As the products are placed on the European market, the disposal scenario is based on average European data sets.

Product group: "Doors"

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 Disposal	Unit	D1	D2	D3
Collection process, collected separately	kg	27.00	20.72	28.70
Collection process, collected as mixed construction waste	kg	1.42	15.41	18.00
Recovery system, for re-use	kg	0.00	0.00	0.00
Recovery system, for recycling	kg	21.91	18.42	23.68
Recovery system, for energy recovery	kg	5.09	2.30	1.66
Disposal	kg	1.42	15.41	21.36

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

C4 Disposal

No.	Scenario	Description
C4	Disposal	The non-recordable amounts and losses within the re-use/recycling chain (C1 and C3) are modelled as "disposed".

The consumption in scenario C4 results from physical pre-treatment, waste recycling and management of the disposal site. The benefits obtained here from the substitution of primary material production are allocated to Module D, e.g. electricity and heat from waste incineration.

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

D Benefits and loads from beyond the system boundaries

No.	Scenario	Description
D	Recycling potential	Aluminium recyclate from C3 excluding the recyclate used in A3 replaces 60% of aluminium compound; Stainless steel scrap from C3 excluding the scrap used in A3 replaces 60% of stainless steel; Steel scrap from C3 excluding the scrap used in A3 replaces 60% of steel; Glass recyclate from C3 excluding the glass shards used in A3 replace 60% of glass; Benefits from waste incineration: electricity replaces electricity mix (EU-28); thermal energy replaces thermal energy from natural gas (EU-28).

The values in Module D result from recycling of the packaging material in Module A5 and from deconstruction at the end of service life.

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

Imprint

Practitioner of the LCA

ift Rosenheim GmbH
Theodor-Gietl-Straße 7-9
D-83026 Rosenheim

Programme operator

ift Rosenheim GmbH
Theodor-Gietl-Str. 7-9
D-83026 Rosenheim
Phone: 0 80 31/261-0
Fax: 0 80 31/261 290
Email: info@ift-rosenheim.de
www.ift-rosenheim.de

With the support of

heroal-Johann Henkenjohann GmbH & Co. KG
Österwieher Straße 80
33415 Verl

Notes

This EPD is mainly based on the work and findings of the Institut für Fenstertechnik e.V., Rosenheim (ift Rosenheim) and specifically on the ift-Richtlinie NA-01/3 Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen. (Guideline NA.01/3 - Guidance on preparing Type III Environmental Product Declarations)

The publication and all its parts are protected by copyright. Any utilisation outside the confined limits of the copyright provisions is not permitted without the consent of the publishers and is punishable. In particular, this applies to any form of reproduction, translations, storage on microfilm and the storage and processing in electronic systems.

Layout

ift Rosenheim GmbH - 2018

Photographs (front page)

heroal-Johann Henkenjohann GmbH & Co. KG

© ift Rosenheim, 2020



ift Rosenheim GmbH
Theodor-Gietl-Str. 7-9
D-83026 Rosenheim
Phone: +49 (0) 80 31/261-0
Fax: +49 (0) 80 31/261-290
Email: info@ift-rosenheim.de
www.ift-rosenheim.de