Environmental Product Declaration (EPD)

Declaration code EPD-GSN-GB-0.13.0

Hörmann KG
Ichtershausen

Doors and Gates

Sectional garage doors, side-opening doors and side doors

Basis:

DIN EN ISO 14025
EN15804

Company EPD
Environmental
Product **D**eclaration

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ift Rosenheim GmbH
Theodor-Gietl-Str. 7-9
83026 Rosenheim
GERMANY

+49 8031 261-0
info@ift-rosenheim.de
www.ift-rosenheim.de

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Programme operator	ift Rosenheim GmbH Theodor-Gietl-Straße 7-9 83026 Rosenheim, Germany		
Practitioner of the LCA	ift Rosenheim GmbH Theodor-Gietl-Straße 7-9 83026 Rosenheim, Germany		
Declaration holder	Hörmann KG Ichtershausen Thöreyer Str. 6 99334 Amt Wachsenburg OT Ichtershausen, Germany		
Declaration code	EPD-GSN-GB-0.13.0		
Designation of declared product	Sectional garage doors, side-opening doors and side doors		
Scope	Sectional garage door LPU42, side-opening door HST42 and side doors as space-saving closures for building openings in the private sector for exterior (and interior) applications.		
Basis	This EPD was prepared on the basis of EN ISO 14025:2011 and DIN EN 15804:2012+A2:2019. In addition, the "Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen" (General guideline for preparation of Type III Environmental Product Declarations) applies. This declaration is based on PCR documents EN 17213 "PCR for windows and doors", "PCR Part A" PCR-A-0.3:2018 and "Doors and gates" PCR-TT-2.3:2018.		
Validity	Publication date: 14.04.2022	Last revision: 14.04.2022	Next revision: 14.04.2027
	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 data collected from production plant of the company Hörmann KG Ichtershausen were used as a data basis, as well as generic data from the database “GaBi 10". LCA calculations were carried out for the included “cradle to gate – with options” including all upstream chains (e.g. raw material extraction, etc.).		
Notes	The ift-Guidance Sheet “Conditions and Guidance for the Use of ift Test Documents” applies. 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	Susanne Volz External verifier

1 General Product Information

Product definition

The EPD belongs to the product group Doors and gates and applies to

1 m² Sectional garage door, side-opening door or side door of company Hörmann KG Ichtershausen

The functional unit is obtained by summing up:

Assessed product	Surface area of reference product	Weight per unit area
Sectional garage door (incl. pass door)	6.37 m²	28.53 kg/m²
Side-opening door	7.07 m²	20.59 kg/m²
Side door	2.68 m²	20.89 kg/m²

Table 1 Product groups

The average unit is declared as follows:
Directly used material flows for sectional doors and side doors are determined directly for the corresponding reference products and assigned to the declared unit. The average size for sectional garage doors including pass doors was 6.37 m² and 7.07 m² for side-opening doors. The reference size of the side doors was 1.23 x 2.18 m (2.68 m²) according to EN 17213.
All other inputs and outputs in the manufacture were scaled to the declared unit as a whole, since no direct assignment to the average size is possible. The reference period was the year 2020. Drive units and special designs were not included in the analysis.

Product description

Sectional garage door LPU42, side-opening door HST42 and side doors as space-saving closures for building openings in the private sector for exterior (and interior) applications. Sectional garage doors open vertically under the garage ceiling, side-opening doors open horizontally on the garage wall. Side doors serve as a second access to the garage and can be designed in the same way (surfaces, colors, decors) as garage doors.

Specification of sectional doors:

Building components

Door leaf, frame, hardware, closing device, drive unit

Door leaf

42 mm thick, double-walled steel slats made of hot-dip galvanized steel, PU-foamed. Different surface embossings possible.

Door frame

Made of hot-dip galvanized steel with plastic frame base. Painted in RAL 9016. Roller tracks, suspensions and connecting rails made of hot-dip galvanized steel.

Hardware

Sectional garage doors: Tension springs or torsion springs
Side-opening doors: DS and ES hardware

Drive unit

Optionally available with drive unit (manufacturer: Hörmann Antriebstechnik).

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

Product manufacture

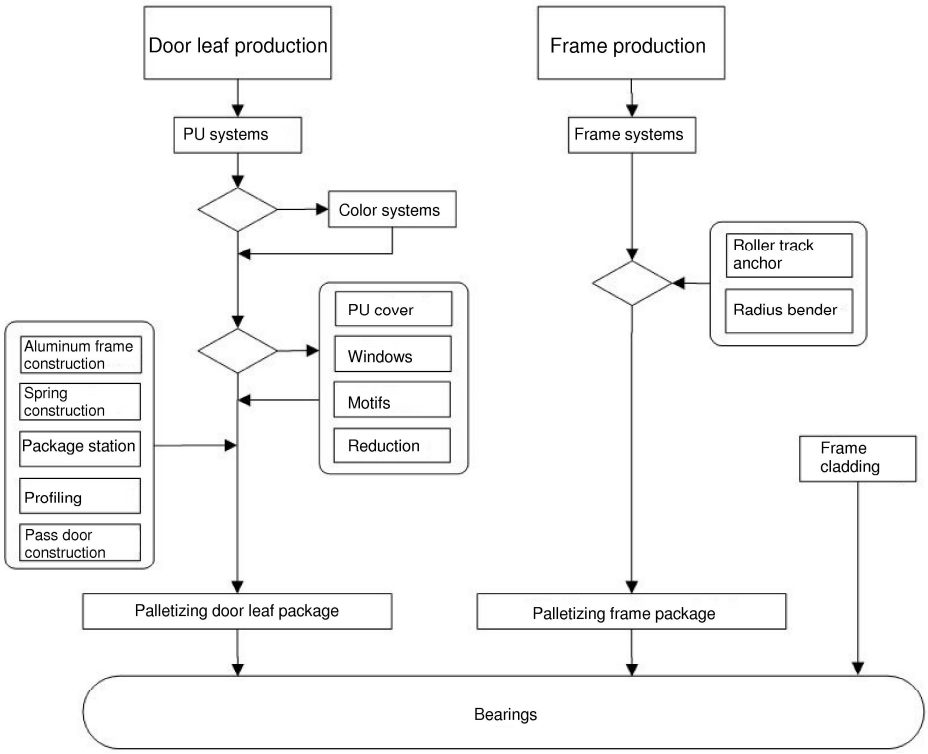


Illustration 1 Production of sectional garage doors

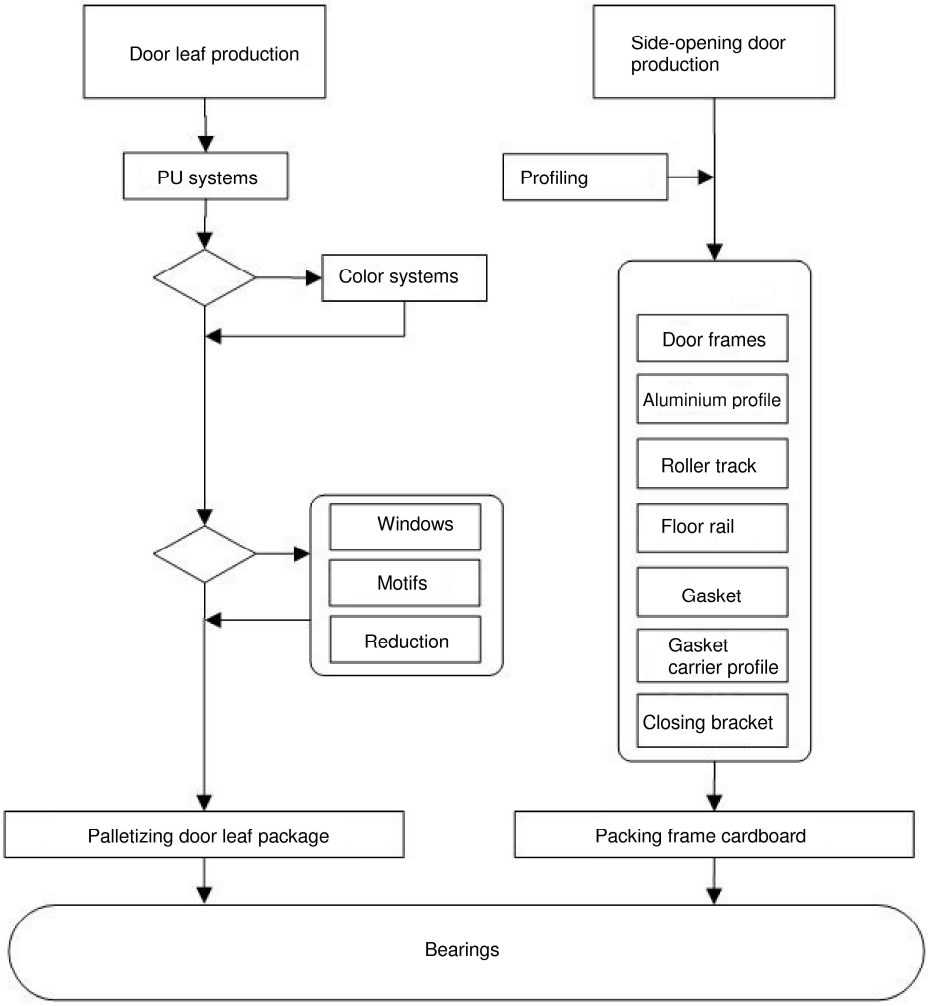


Illustration 2 Production of side-opening doors

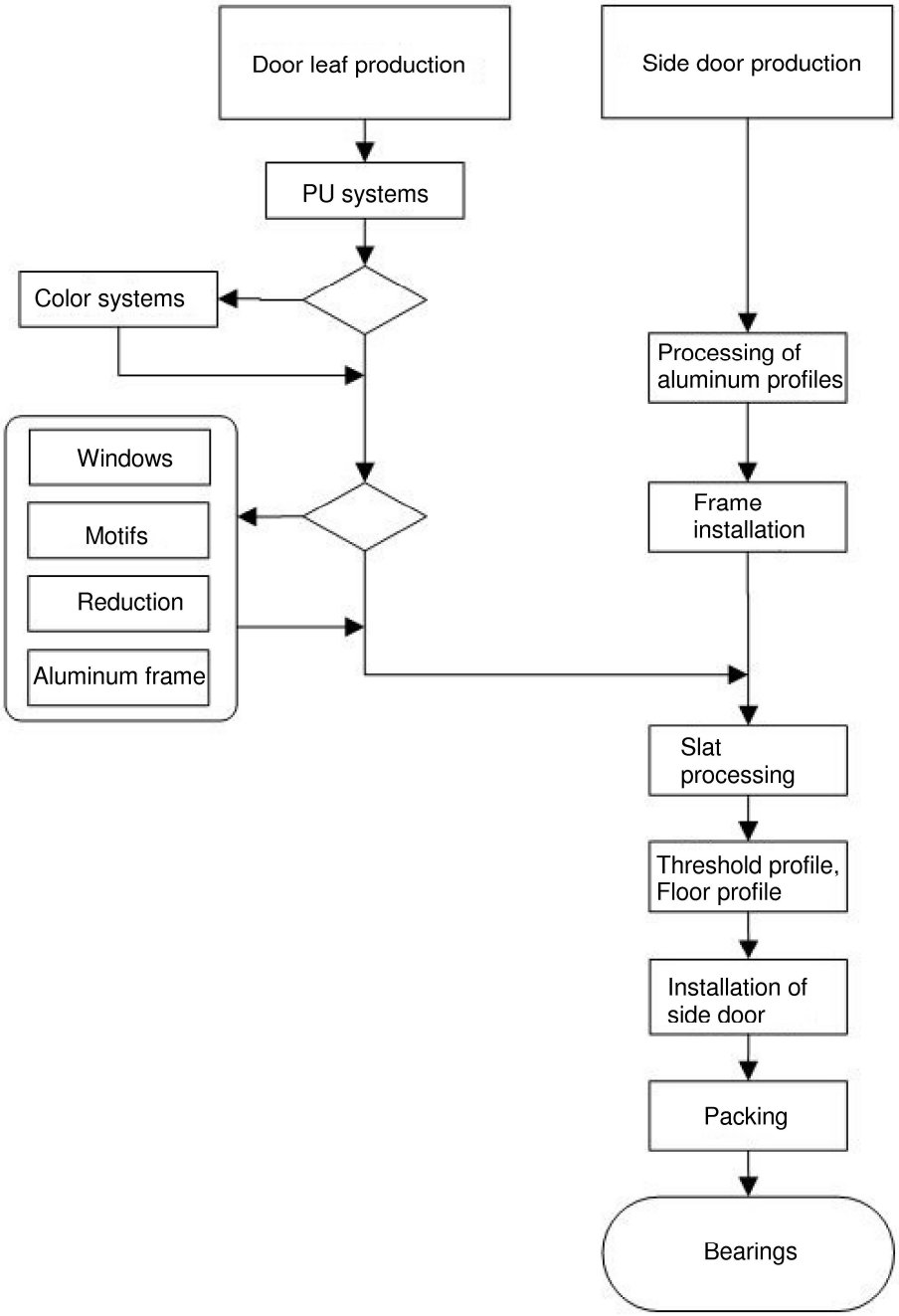


Illustration 3 Production of side doors

Application

Sectional garage door LPU42, side-opening door HST42 and side doors as space-saving closures for building openings in the private sector for exterior (and interior) applications.

Test evidence / reports

The following verifications are held:

- Product quality according to DIN EN 13241-1
- Product quality according to DIN EN 14351-1

For information on further and updated verifications (incl. other national approvals) refer to www.hoermann.de.

Management systems

The following management systems are held:

- Quality management system as per DIN EN ISO 9001
- Energy management system as per DIN EN ISO 50001
- Environmental management system as per DIN EN ISO 14001
- Occupational safety as per DIN ISO 45001

Additional information

For additional verifications of applicability or conformity refer to the CE marking and the documents accompanying the product, if applicable.

Sectional garage doors and side-opening doors fulfill the following building-physical performance characteristics:

- Resistance to wind load according to EN 12424
- Watertightness according to EN 12425
- Air permeability according to EN 12426
- Sound insulation according to EN 717-1
- Thermal insulation according to EN 13241-1/Annex B and EN 12428

Side doors fulfill the following building-physical performance characteristics:

- Wind load according to DIN EN 12210
- Air permeability according to EN 12207
- Thermal insulation according to ISO 12567-1

All performance characteristics have been tested and certified by ift Rosenheim.

2 Materials used

Primary materials

The primary materials used are listed in the LCA (see Section 7).

Declarable substances

No substances according to REACH candidate list are included (declaration of 10.11.2021).

All relevant safety data sheets can be obtained from Hörmann KG Ichtershausen.

3 Construction process stage

Processing recommendations, installation

Observe the instructions for assembly/installation, operation, maintenance and disassembly, provided by the manufacturer. For this, see www.hoermann.de and www.hoermann.com/dop.

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 must be established under specified reference conditions of use and relate to the declared technical and functional performance of the product within the building. It must be determined according to all specific rules given in European product standards or, if none are available, according to a c-PCR. It must also take into account ISO 15686-1, -2, -7 and -8. If there is guidance on deriving RSLs from European Product Standards or a c-PCR, then such guidance must take precedence.
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:
For an EPD "cradle to factory gate with options", with modules C1-C4 and module D (A1-A3 + C + D and one or more additional modules from A4 to B7), the specification of a reference service life (RSL) is only possible if the reference service life conditions are specified.
The service life of the sectional doors from Hörmann KG Ichtershausen is optionally specified as 25 years and that of the side doors as 50 years according to the manufacturer.

The service life is dependent on the characteristics of the product and in-use conditions. The conditions and 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

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

Sectional garage doors, side-opening doors and side doors are sent 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.

In this EPD, the modules of after-use are presented according to the market situation.
Metals and plastics are recycled to a certain extent. Residual fractions are sent to landfill or thermally recycled.

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.

As a basis for this, life cycle assessments were created for Sectional garage doors, side-opening doors and side 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

Aim

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 2020 fiscal year. They were collected on-site at the plant located in Ichtershausen 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 originates from the GaBi software, "Professional Datenbank und Baustoff Datenbank" (professional database and building materials database). The last update of both databases was in 2022. 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 sustainability software tool “GaBi” 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 the Sectional garage doors, side-opening doors and side doors.
No additional data from pre-suppliers/subcontractors or 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.

The transport distances of the pre-products used were taken into consideration as a function of 100% of the mass of the 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 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

Aim

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 Sectional garage doors, side-opening doors and side doors 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

No allocations occur during production.

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

Secondary material

The use of secondary material in module A3 by Hörmann KG Ichtershausen was not considered. Secondary material is not used.

Inputs

The LCA includes the following production-relevant inputs per 1 m² sectional garage door, side-opening door, or side door:

Energy

The input material of natural gas is based on “Erdgas Mix Deutschland” (natural gas mix Germany). Electricity mix is based on electricity mix “Hörmann Ichtershausen” (see Table below).

Electricity disclosure of energy supplier	Shares in %
Wind energy	40
Solar energy	15
Hydropower	45

Table 2 Electricity mix Hörmann Ichtershausen

Water

In the individual process steps for production, the water consumption is 0.7 l per m² sectional garage door, 0.6 l per m² side-opening door and 0.5 l per m² side door.
The consumption of fresh water specified in Section 6.3 originates (among others) from the process chain of the pre-products.

Raw material / pre-products

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

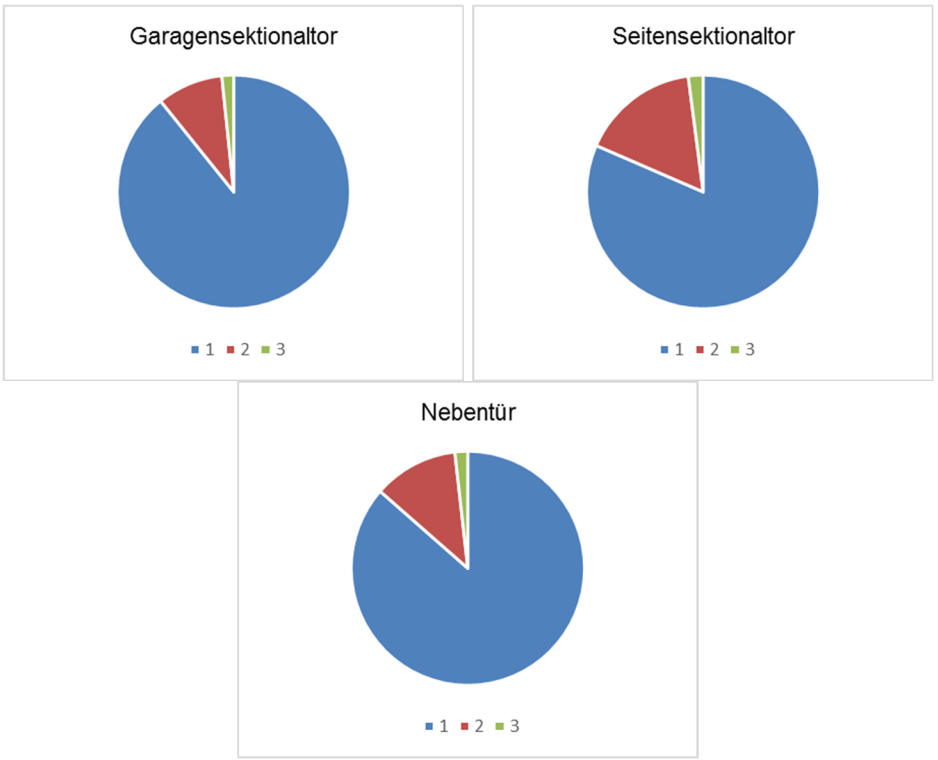


Illustration 4 Percentage of individual materials per declared unit

No.	Material	Mass in %		
		Sectional garage doors	Side-opening doors	Side doors
1	Metals	89.19	81.50	86.45
2	Plastics	9.16	16.44	11.77
3	Paints	1.65	2.06	1.79

Table 3 Percentage of individual materials per declared unit

Ancillary materials and consumables
The following quantities of ancillary materials and consumables are produced:

- Sectional garage doors: 235 g
- Side-opening doors: 211 g
- Side doors: 185 g

Product packaging
The amounts used for product packaging are as follows:

No.	Material	Mass in kg		
		Sectional garage doors	Side-opening doors	Side doors
1	Film/foil	0.13	0.05	0.12
2	Plastics	0.22	0.01	-
3	Cardboard	1.04	1.22	1.62
4	Wood	1.50	0.32	-

Table 4 Weight in kg of packaging per declared unit

Biogenic carbon content
The biogenic carbon content quantifies the amount of biogenic carbon in a construction product leaving the factory gate.

Only the biogenic carbon content of the associated packaging is reported, as the total mass of biogenic carbon-containing materials is less than 5% of the total mass of the product and associated packaging. According to EN 16449, the following amounts of biogenic carbon are generated for packaging:

No.	Component	Content in kg C per m²		
		Sectional garage door	Side-opening door	Side door
1	Packaging	-3.82	-2.12	-2.13

Table 5 Biogenic carbon content of the packaging at the factory gate

Outputs

The LCA includes the following production-relevant outputs per 1 m² sectional garage door, side-opening door or side door:

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

Waste water
During production, 0.7 l of waste water is generated for sectional garage doors, 0.6 l for side-opening doors and 0.5 l for side doors.

6.3 Impact assessment

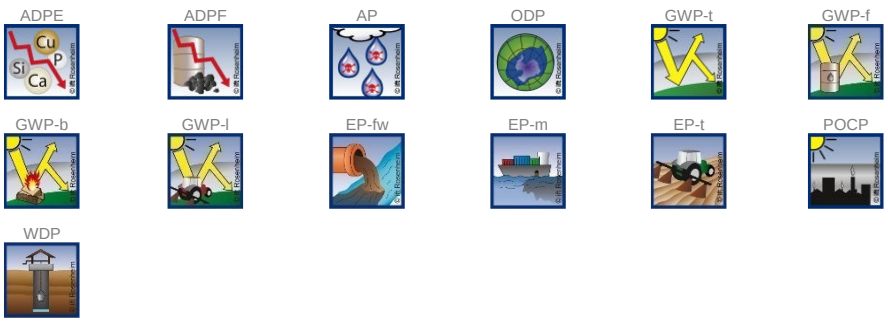
Aim

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-A2.
The impact categories presented in the EPD are as follows:

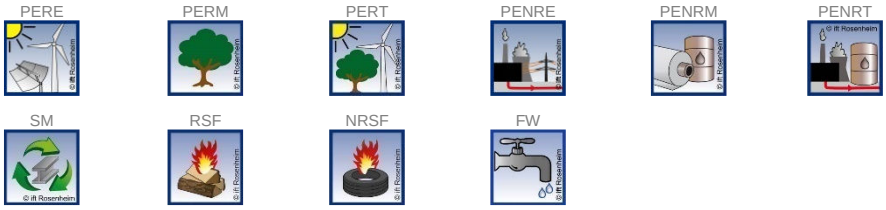
- Depletion of abiotic resources - minerals and metals;
- Depletion of abiotic resources - fossil fuels;
- Acidification;
- Ozone depletion;
- Climate change - total;
- Climate change - fossil;
- Climate change - biogenic;
- Climate change - land use and land use change;
- Eutrophication freshwater;
- Eutrophication salt water;
- Eutrophication land;
- Photochemical ozone creation;
- Water use.



Resource management

The models for impact assessment were applied as described in DIN EN 15804-A2.
The following resource use indicators are presented in the EPD:

- Renewable primary energy as energy source;
- Renewable primary energy for material use;
- Total use of renewable primary energy;
- Non-renewable primary energy as energy source;
- Renewable primary energy for material use;
- Total use of non-renewable primary energy;
- Use of secondary materials;
- Use of renewable secondary fuels;
- Use of non-renewable secondary fuels;
- Net use of freshwater resources.

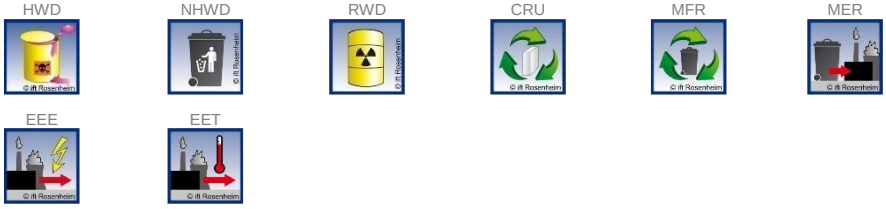


Waste

The waste generated during the production of 1 m² sectional garage door, side-opening door, or side 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.

The models for impact assessment were applied as described in DIN EN 15804-A2.
The following waste categories and indicators for output closures are presented in the EPD:

- Disposed hazardous waste;
- Disposed non-hazardous waste;
- Radioactive waste disposed;
- Components for re-use;
- Materials for recycling;
- Materials for energy recovery;
- Exported electrical energy;
- Exported thermal energy.



Additional environmental impact indicators

The models for impact assessment were applied as described in DIN EN 15804-A2.
The additional impact categories presented in the EPD are as follows:

- Fine dust missions;
- Ionizing radiation, human health;
- Ecotoxicity (freshwater);
- Human toxicity, carcinogenic effects;
- Human toxicity, non-carcinogenic effects;
- Impacts associated with land use/soil quality.

PM 

IRP 

ETP-fw 

HTP-c 

HTP-nc 

SQP 

Results per 1 m² sectional garage door																
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Core indicators																
GWP-t	kg CO_2 equivalent	143.98	6.95	5.11	ND	1.42	29.20	88.40	0	0	0	0	0.15	7.68	2.91E-02	-89.90
GWP-f	kg CO_2 equivalent	147.58	6.92	0.98	ND	1.41	29.20	88.10	0	0	0	0	0.15	7.67	2.99E-02	-89.80
GWP-b	kg CO_2 equivalent	-3.87	-9.54E-03	4.12	ND	1.24E-02	3.39E-02	0.20	0	0	0	0	-2.02E-04	1.30E-02	-8.87E-04	-7.79E-02
GWP-l	kg CO_2 equivalent	3.20E-02	3.85E-02	1.34E-05	ND	2.46E-04	1.13E-02	0.06	0	0	0	0	8.14E-04	3.26E-04	5.53E-05	-1.97E-02
ODP	kg CFC-11-eq.	4.19E-09	4.14E-13	4.36E-13	ND	2.56E-15	5.24E-14	4.15E-09	0	0	0	0	8.75E-15	2.12E-11	7.04E-14	-7.40E-11
AP	mol H^+-eq.	0.58	7.38E-03	1.72E-03	ND	4.38E-03	6.98E-02	0.31	0	0	0	0	1.44E-04	4.89E-03	2.12E-04	-0.35
EP-fw	kg P-eq.	1.25E-04	2.06E-05	1.20E-07	ND	9.47E-06	2.49E-05	1.19E-04	0	0	0	0	4.36E-07	4.29E-06	5.07E-08	-5.13E-05
EP-m	kg N-eq.	0.11	2.46E-03	7.38E-04	ND	6.96E-04	1.59E-02	6.19E-02	0	0	0	0	4.54E-05	1.25E-03	5.43E-05	-6.36E-02
EP-t	mol N-eq.	1.15	2.92E-02	8.91E-03	ND	7.52E-03	0.17	0.67	0	0	0	0	5.48E-04	1.60E-02	5.96E-04	-0.69
POCP	kg NMVOC-eq.	0.34	6.53E-03	1.92E-03	ND	3.31E-03	5.18E-02	0.20	0	0	0	0	1.25E-04	3.33E-03	1.65E-04	-0.20
ADPF*²	MJ	1551.60	92.30	1.30	ND	65.30	291.00	946.00	0	0	0	0	1.95	26.80	0.39	-869.00
ADPE*²	kg Sb equivalent	1.32E-03	5.77E-07	1.11E-08	ND	1.85E-07	9.92E-04	6.15E-04	0	0	0	0	1.22E-08	4.00E-07	3.07E-09	-8.08E-04
WDP*²	m^3 world-eq. deprived	23.71	6.17E-02	0.55	ND	21.50	4.62E-02	12.90	0	0	0	0	1.31E-03	0.96	3.27E-03	-15.60
Resource management																
PERE	MJ	211.74	5.24	5.86	ND	1.02	20.50	173.00	0	0	0	0	0.11	14.40	5.89E-02	-75.50
PERM	MJ	5.59		-5.59	ND				0	0	0	0	0.00	0.00	0.00	0.00
PERT	MJ	217.33	5.24	0.27	ND	1.02	20.50	173.00	0	0	0	0	0.11	14.40	5.89E-02	-75.50
PENRE	MJ	1480.83	92.50	8.46	ND	65.00	285.00	948.00	0	0	0	0	1.96	86.85	3.55	-872.00
PENRM	MJ	70.37		-7.16	ND				0	0	0	0	0.00	-60.05	-3.16	0.00
PENRT	MJ	1551.20	92.50	1.30	ND	65.00	285.00	948.00	0	0	0	0	1.96	26.80	0.39	-872.00
SM	kg	0.00	0.00E+00	0.00E+00	ND	0.00	0.00E+00	0.00E+00	0	0	0	0	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00E+00	0.00E+00	ND	0.00	0.00E+00	0.00E+00	0	0	0	0	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00E+00	0.00E+00	ND	0.00	0.00E+00	0.00E+00	0	0	0	0	0.00	0.00	0.00	0.00
FW	m^3	0.67	5.93E-03	1.30E-02	ND	0.50	1.51E-01	0.39	0	0	0	0	1.25E-04	2.84E-02	9.94E-05	-0.42
Categories of waste																
HWD	kg	3.80E-07	4.43E-10	1.45E-10	ND	9.24E-10	3.69E-08	5.81E-07	0	0	0	0	9.36E-12	2.35E-09	2.02E-11	-3.60E-07
NHWD	kg	15.23	1.33E-02	6.98E-02	ND	0.15	0.64	10.30	0	0	0	0	2.80E-04	0.15	2.01	-7.45
RWD	kg	1.23E-02	1.14E-04	6.63E-05	ND	2.84E-04	2.56E-03	7.22E-03	0	0	0	0	2.41E-06	4.07E-03	4.37E-06	-1.12E-02
Output material flows																
CRU	kg	0.00E+00	0	0	ND	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00
MFR	kg	2.60	0	0	ND	0	11.10	26.40	0	0	0	0	0.00	23.80	0.00	0.00
MER	kg	0.00E+00	0	0	ND	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00
EEE	MJ	0.60	0	8.05	ND	0	1.04	19.20	0	0	0	0	0.00	10.50	0.00	0.00
EET	MJ	1.38	0	14.50	ND	0	2.39	40.00	0	0	0	0	0.00	24.10	0.00	0.00

Key:
GWP-t – global warming potential - total **GWP-f** – global warming potential fossil fuels **GWP-b** – global warming potential - biogenic **GWP-l** – global warming potential - land use and land use change **ODP** – ozone depletion potential **AP** - acidification potential **EP-fw** - eutrophication potential - aquatic freshwater **EP-m** - eutrophication potential - aquatic marine **EP-t** - feutrophication potential - terrestrial **POCP** - photochemical ozone formation potential **ADPF*²** - abiotic depletion potential – fossil resources **ADPE*²** - abiotic depletion potential – minerals&metals **WDP*²** – Water (user) deprivation potential **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 m² sectional garage door																
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Additional environmental impact indicators																
PM	Disease incidence	1.49E-05	4.22E-08	6.48E-09	ND	2.69E-08	9.33E-07	7.18E-06	0	0	0	0	8.52E-10	3.53E-08	2.61E-09	-7.92E-06
IRP*[1]	kBq U235-eq.	1.24	1.67E-02	1.07E-02	ND	4.61E-02	0.25	0.64	0	0	0	0	3.53E-04	0.69	4.86E-04	-1.53
ETP-fw*[2]	CTUe	533.59	64.00	0.545	ND	44.00	71.00	402.00	0	0	0	0	1.35	11.60	0.22	-242.00
HTP-c*[2]	CTUh	2.19E-07	1.29E-09	3.54E-11	ND	8.66E-10	3.64E-08	1.69E-07	0	0	0	0	2.73E-11	3.81E-10	3.35E-11	-7.49E-08
HTP-nc*[2]	CTUh	1.60E-05	6.72E-08	1.35E-09	ND	3.86E-08	4.08E-07	1.51E-05	0	0	0	0	1.41E-09	1.57E-08	3.71E-09	-1.13E-06
SQP*[2]	dimensionless	689.76	31.70	0.34	ND	0.694	16.10	689.00	0	0	0	0	0.671	9.52	8.16E-02	-52.50

Key:
PM – particulate matter emissions potential **IRP*[1]** – ionizing radiation potential – human health **ETP-fw*[2]** - Eco-toxicity potential – freshwater **HTP-c*[2]** - Human toxicity potential – cancer effects **HTP-nc*[2]** - Human toxicity potential – non-cancer effects **SQP*[2]** – soil quality potential

Disclaimers:

*1 This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

*2 The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Results per 1 m² side-opening door																
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Core indicators																
GWP-t	kg CO_2 equivalent	91.50	4.92	2.45	ND	1.42	0.84	86.70	0	0	0	0	0.11	8.53	2.15E-02	-42.90
GWP-f	kg CO_2 equivalent	93.62	4.88	0.20	ND	1.41	0.84	86.70	0	0	0	0	0.11	8.52	2.21E-02	-42.90
GWP-b	kg CO_2 equivalent	-2.23	-6.25E-03	2.25	ND	1.24E-02	2.71E-03	-5.78E-02	0	0	0	0	-1.35E-04	9.90E-03	-6.42E-04	-5.88E-02
GWP-l	kg CO_2 equivalent	4.90E-02	4.01E-02	3.58E-05	ND	2.46E-04	4.15E-04	7.85E-02	0	0	0	0	8.67E-04	1.70E-03	6.49E-05	-7.39E-03
ODP	kg CFC-11-eq.	4.36E-09	6.26E-16	4.20E-16	ND	2.56E-15	3.79E-15	4.36E-09	0	0	0	0	1.35E-17	2.77E-14	8.58E-17	-6.81E-11
AP	mol H^+-eq.	0.25	5.21E-03	6.12E-04	ND	4.38E-03	1.47E-03	0.31	0	0	0	0	1.04E-04	4.44E-03	1.57E-04	-0.12
EP-fw	kg P-eq.	1.46E-04	1.45E-05	7.22E-08	ND	9.47E-06	8.77E-07	1.33E-04	0	0	0	0	3.14E-07	3.19E-06	3.71E-08	-2.98E-05
EP-m	kg N-eq.	5.62E-02	1.72E-03	2.24E-04	ND	6.96E-04	3.65E-04	5.86E-02	0	0	0	0	3.25E-05	1.21E-03	4.08E-05	-2.51E-02
EP-t	mol N-eq.	0.60	2.05E-02	2.84E-03	ND	7.52E-03	3.98E-03	0.64	0	0	0	0	3.92E-04	1.61E-02	4.48E-04	-0.27
POCP	kg NMVOC-eq.	0.18	4.56E-03	5.93E-04	ND	3.31E-03	1.19E-03	0.19	0	0	0	0	8.90E-05	3.22E-03	1.24E-04	-0.08
ADPF*²	MJ	1285.26	65.20	0.70	ND	65.30	12.30	970.00	0	0	0	0	1.41	21.20	0.29	-521.00
ADPE*²	kg Sb equivalent	1.41E-03	3.73E-07	6.44E-09	ND	1.85E-07	1.42E-05	7.48E-04	0	0	0	0	8.06E-09	3.44E-07	2.08E-09	-1.34E-04
WDP*²	m^3 world-eq. deprived	2.66	4.25E-02	0.29	ND	21.50	2.91E-02	7.96	0	0	0	0	9.20E-04	0.93	2.37E-03	-4.93
Resource management																
PERE	MJ	307.21	3.64	1.00	ND	0.90	1.04	158.00	0	0	0	0	7.87E-02	9.30	0.04	-4.84E-08
PERM	MJ	0.87	0.00	-0.87	ND	0.00	0.00	0.00	0	0	0	0	0.00	0.00	0.00E+00	-4.87
PERT	MJ	308.08	3.64	0.13	ND	0.90	1.04	158.00	0	0	0	0	7.87E-02	9.30	3.95E-02	-2.63E-02
PENRE	MJ	1215.68	65.30	1.82	ND	65.40	12.40	972.00	0	0	0	0	1.41	95.36	4.19	-4.84E-08
PENRM	MJ	79.19	0.00	-1.12	ND	0.00	0.00	0.00	0	0	0	0	0.00	-74.16	-3.90	-4.87
PENRT	MJ	1294.87	65.30	0.70	ND	65.40	12.40	972.00	0	0	0	0	1.41	21.20	0.29	-2.63E-02
SM	kg	0.00	0.00	0.00	ND	0.00	0.00	0.00	0	0	0	0	0.00	0.00	0.00	-4.84E-08
RSF	MJ	0.00	0.00	0.00	ND	0.00	0.00	0.00	0	0	0	0	0.00	0.00	0.00	-4.87
NRSF	MJ	0.00	0.00	0.00	ND	0.00	0.00	0.00	0	0	0	0	0.00	0.00	0.00	-2.63E-02
FW	m^3	0.43	4.17E-03	6.73E-03	ND	0.50	1.80E-03	0.28	0	0	0	0	9.01E-05	2.65E-02	7.23E-05	-4.84E-08
Categories of waste																
HWD	kg	4.66E-07	3.29E-09	1.3E-10	ND	1.48E-09	1.37E-09	7.00E-07	0	0	0	0	7.11E-11	5.52E-09	3.11E-11	-2.63E-02
NHWD	kg	10.65	9.70E-03	5.86E-02	ND	0.15	1.36E-02	10.50	0	0	0	0	2.10E-04	0.17	1.46	-4.84E-08
RWD	kg	4.66E-02	7.90E-05	3.59E-05	ND	2.79E-04	1.61E-04	7.06E-03	0	0	0	0	1.71E-06	2.92E-03	3.08E-06	-4.87
Output material flows																
CRU	kg	2.34	0.00	0.00	ND	0.00	0.19	18.20	0	0	0	0	0.00	15.90	0.00	0.00
MFR	kg	0.00	0.00	0.00	ND	0.00	0.00	0.00	0	0	0	0	0.00	0.00	0.00	0.00
MER	kg	0.54	0.00	3.75	ND	0.00	0.26	16.70	0	0	0	0	0.00	12.40	0.00	0.00
EEE	MJ	1.25	0.00	6.77	ND	0.00	0.59	36.60	0	0	0	0	0.00	28.50	0.00	0.00
EET	MJ	2.34	0.00	0.00	ND	0.00	0.19	18.20	0	0	0	0	0.00	15.90	0.00	0.00

Key:
GWP-t – global warming potential - total **GWP-f** – global warming potential fossil fuels **GWP-b** – global warming potential - biogenic **GWP-l** – global warming potential - land use and land use change **ODP** – ozone depletion potential **AP** - acidification potential **EP-fw** - eutrophication potential - aquatic freshwater **EP-m** - eutrophication potential - aquatic marine **EP-t** - feutrophication potential - terrestrial **POCP** - photochemical ozone formation potential **ADPF*²** - abiotic depletion potential – fossil resources **ADPE*²** - abiotic depletion potential – minerals&metals **WDP*²** – Water (user) deprivation potential **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 m² side-opening door																
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Additional environmental impact indicators																
PM	Disease incidence	2.78E-06	3.00E-08	3.21E-09	ND	2.74E-08	1.60E-08	7.44E-06	0	0	0	0	6.2E-10	3.10E-08	1.95E-09	-1.34E-06
IRP*[1]	kBq U235-eq.	8.88	1.13E-02	5.60E-03	ND	4.39E-02	1.64E-02	0.59	0	0	0	0	2.44E-04	0.48	3.24E-04	-5.26
ETP-fw*[2]	CTUe	468.47	47.10	0.321	ND	45.80	5.09	415.00	0	0	0	0	1.02	8.81	0.17	-155.00
HTP-c*[2]	CTUh	1.66E-07	9.51E-10	1.85E-11	ND	9.03E-10	5.79E-10	1.44E-07	0	0	0	0	2.06E-11	3.07E-10	2.46E-11	-3.23E-08
HTP-nc*[2]	CTUh	1.36E-05	4.94E-08	7.78E-10	ND	4.05E-08	9.43E-09	1.36E-05	0	0	0	0	1.06E-09	1.37E-08	2.72E-09	-4.85E-07
SQP*[2]	dimensionless	450.13	22.40	0.18	ND	0.66	0.91	439.00	0	0	0	0	0.48	6.59	5.91E-02	-38.70

Key:
PM – particulate matter emissions potential **IRP*[1]** – ionizing radiation potential – human health **ETP-fw*[2]** - Eco-toxicity potential – freshwater **HTP-c*[2]** - Human toxicity potential – cancer effects **HTP-nc*[2]** - Human toxicity potential – non-cancer effects **SQP*[2]** – soil quality potential

Disclaimers:

*1 This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

*2 The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Results per 1 m² side door																
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Core indicators																
GWP-t	kg CO_2 equivalent	113.02	5.02	2.67	ND	1.42	2.06	0	0	0	0	0	0.11	7.14	2.35E-02	-55.80
GWP-f	kg CO_2 equivalent	114.69	4.98	0.43	ND	1.41	2.05	0	0	0	0	0	0.11	7.13	2.41E-02	-55.70
GWP-b	kg CO_2 equivalent	-2.47	-6.37E-03	2.24	ND	1.24E-02	6.63E-03	0	0	0	0	0	-1.37E-04	9.89E-03	-7.01E-04	-5.41E-02
GWP-l	kg CO_2 equivalent	5.57E-02	4.09E-02	4.13E-05	ND	2.46E-04	5.03E-04	0	0	0	0	0	8.80E-04	1.69E-03	7.08E-05	-8.45E-03
ODP	kg CFC-11-eq.	4.56E-09	6.38E-16	4.70E-16	ND	2.56E-15	3.78E-15	0	0	0	0	0	1.37E-17	2.77E-14	9.37E-17	-8.64E-11
AP	mol H^+-eq.	0.35	5.32E-03	6.75E-04	ND	4.38E-03	3.15E-03	0	0	0	0	0	1.05E-04	4.06E-03	1.72E-04	-0.18
EP-fw	kg P-eq.	1.62E-04	1.48E-05	8.38E-08	ND	9.47E-06	2.06E-06	0	0	0	0	0	3.19E-07	3.17E-06	4.05E-08	-3.51E-05
EP-m	kg N-eq.	7.08E-02	1.76E-03	2.40E-04	ND	6.96E-04	9.42E-04	0	0	0	0	0	3.29E-05	1.09E-03	4.46E-05	-3.33E-02
EP-t	mol N-eq.	0.76	2.09E-02	3.07E-03	ND	7.52E-03	1.00E-02	0	0	0	0	0	3.97E-04	1.42E-02	4.90E-04	-0.36
POCP	kg NMVOC-eq.	0.22	4.65E-03	6.38E-04	ND	3.31E-03	3.32E-03	0	0	0	0	0	9.02E-05	2.90E-03	1.35E-04	-0.10
ADPF*²	MJ	1566.12	66.50	0.78	ND	65.30	29.90	0	0	0	0	0	1.43	21.10	0.32	-695.00
ADPE*²	kg Sb equivalent	2.00E-03	3.80E-07	7.19E-09	ND	1.85E-07	2.15E-05	0	0	0	0	0	8.18E-09	3.43E-07	2.28E-09	-5.73E-04
WDP*²	m^3 world-eq. deprived	4.60	4.34E-02	0.32	ND	21.50	3.70E-02	0	0	0	0	0	9.33E-04	0.79	2.59E-03	-5.44
Resource management																
PERE	MJ	479.65	3.71	2.14	ND	0.90	1.10	0	0	0	0	0	7.98E-02	9.34	4.31E-02	-189.00
PERM	MJ	1.99	0.00	-1.99	ND	0.00	0.00	0	0	0	0	0	0.00	0.00	0.00	0.00
PERT	MJ	479.65	3.71	0.15	ND	0.90	1.10	0	0	0	0	0	7.98E-02	9.34	4.31E-02	-189.00
PENRE	MJ	1565.83	66.60	3.33	ND	65.40	29.90	0	0	0	0	0	1.43	76.22	3.22	-697.00
PENRM	MJ	60.57	0.00	-2.55	ND	0.00	0.00	0	0	0	0	0	0.00	-55.12	-2.90	0.00
PENRT	MJ	1565.83	66.60	0.78	ND	65.40	29.90	0	0	0	0	0	1.43	21.10	0.32	-697.00
SM	kg	0.00	0.00	0.00	ND	0.00	0.00	0	0	0	0	0	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00	ND	0.00	0.00	0	0	0	0	0	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00	ND	0.00	0.00	0	0	0	0	0	0.00	0.00	0.00	0.00
FW	m^3	0.70	4.25E-03	0.00	ND	0.50	4.05E-03	0	0	0	0	0	9.13E-05	2.32E-02	7.89E-05	-0.41
Categories of waste																
HWD	kg	5.99E-07	3.36E-09	1.44E-10	ND	1.48E-09	3.35E-09	0	0	0	0	0	7.22E-11	5.51E-09	3.4E-11	-5.44E-08
NHWD	kg	17.67	9.90E-03	7.35E-02	ND	0.15	2.81E-02	0	0	0	0	0	2.13E-04	0.14	1.60	-8.75
RWD	kg	7.76E-02	8.06E-05	3.97E-05	ND	2.79E-04	2.06E-04	0	0	0	0	0	1.73E-06	2.95E-03	3.36E-06	-4.29E-02
Output material flows																
CRU	kg	0.00	0.00	0.00	ND	0.00	0.00	0	0	0	0	0	0.00	0.00	0.00	0.00
MFR	kg	2.06	0.00	0.00	ND	0.00	0.30	0	0	0	0	0	0.00	16.70	0.00	0.00
MER	kg	0.00	0.00	0.00	ND	0.00	0.00	0	0	0	0	0	0.00	0.00	0.00	0.00
EEE	MJ	0.44	0.00	4.28	ND	0.00	0.43	0	0	0	0	0	0.00	10.10	0.00	0.00
EET	MJ	1.03	0.00	7.73	ND	0.00	0.979	0	0	0	0	0	0.00	23.20	0.00	0.00

Key:
GWP-t – global warming potential - total **GWP-f** – global warming potential fossil fuels **GWP-b** – global warming potential - biogenic **GWP-l** – global warming potential - land use and land use change **ODP** – ozone depletion potential **AP** - acidification potential **EP-fw** - eutrophication potential - aquatic freshwater **EP-m** - eutrophication potential - aquatic marine **EP-t** - feutrophication potential - terrestrial **POCP** - photochemical ozone formation potential **ADPF*²** - abiotic depletion potential – fossil resources **ADPE*²** - abiotic depletion potential – minerals&metals **WDP*²** – Water (user) deprivation potential **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 m² side door																
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Additional environmental impact indicators																
PM	Disease incidence	3.64E-06	3.06E-08	3.74E-09	ND	2.74E-08	2.93E-08	0	0	0	0	0	6.29E-10	2.90E-08	2.13E-09	-1.82E-06
IRP*[1]	kBq U235-eq.	15.58	1.15E-02	6.19E-03	ND	4.39E-02	2.45E-02	0	0	0	0	0	2.48E-04	0.48	3.53E-04	-8.85
ETP-fw*[2]	CTUe	555.94	48.10	0.36	ND	45.80	13.20	0	0	0	0	0	1.03	8.79	0.18	-220.00
HTP-c*[2]	CTUh	1.58E-07	9.7E-10	2.09E-11	ND	9.03E-10	1.04E-09	0	0	0	0	0	2.09E-11	2.96E-10	2.69E-11	-3.48E-08
HTP-nc*[2]	CTUh	1.24E-05	5.04E-08	8.96E-10	ND	4.05E-08	2.20E-08	0	0	0	0	0	1.08E-09	1.28E-08	2.97E-09	-6.04E-07
SQP*[2]	dimensionless	489.93	22.80	0.20	ND	0.66	0.98	0	0	0	0	0	0.49	6.58	6.46E-02	-52.10

Key:
PM – particulate matter emissions potential **IRP*[1]** – ionizing radiation potential – human health **ETP-fw*[2]** - Eco-toxicity potential – freshwater **HTP-c*[2]** - Human toxicity potential – cancer effects **HTP-nc*[2]** - Human toxicity potential – non-cancer effects **SQP*[2]** – soil quality potential

Disclaimers:

*1 This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

*2 The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

6.4 Interpretation, LCA presentation and critical review

Evaluation

Calculation of the scenarios was based on a service life of 25 years for sectional doors and 50 years for side doors. Furthermore, the scenarios of the research project "EPDs für transparente Bauelemente“ (EPDs for transparent building components) as well as EN 17213 were used (1) (2). The scenarios selected are presented in bold type.

The environmental impacts of

- Sectional garage doors
- Side-opening doors
- Side doors

differ strongly/significantly from each other. The differences are mainly due to the amounts of pre-products and raw materials used. The different quantities of aluminum and steel used were particularly indicative of this.

In the area of production, the environmental impact of the products is mainly caused by the use of steel and aluminum or their upstream chains. Furthermore, the PU foam used in production and its upstream chains are responsible for a not inconsiderable proportion of the environmental impact, as are the plastic used and its upstream chains in the side-opening doors.

In addition, the side doors generate significant environmental impacts in the A4 transport module.
Furthermore, the one-off replacement of the sectional garage doors and side-opening doors in the 50-year usage phase plays an important role in terms of environmental impact. Further influences in the usage phase of sectional garage doors come from the repair of steel wear parts (hardware) over a period of 50 years.

In scenario C4, only marginal expenditures for the physical pretreatment and the landfill operation are to be expected.
In terms of product recycling, for zinc approx. 3%, for aluminium approx. 11%, and for steel approx. 8% of the environmental impacts arising during the life cycle can be assigned as benefits to scenario D. In the case of side-opening doors, the benefits for aluminum are approx. 7% and for steel approx. 9%. The benefits for zinc in the side-opening doors are only marginal. For side doors, the values for zinc are approx. 5%, for aluminum approx. 21% and for steel approx. 9%. The differences in the benefits are mainly due to the amount of material sent for recycling.

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.

Diagrams

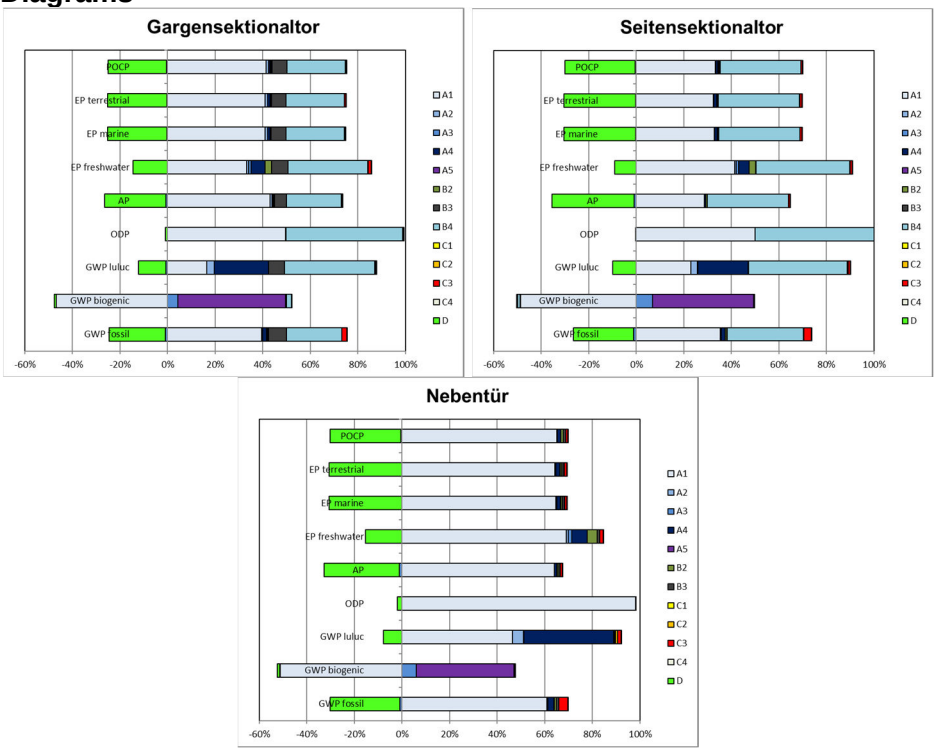


Illustration 5 Percentage of the modules in selected environmental impact indicators

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 deposited with 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 the report took place in the course of verification of the EPD and was carried out by the external verifier Dipl.-Wir.Jur. Susanne Volz MSc.

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.

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.

This Declaration is based on the PCR documents EN 17213 “PCR for windows and doors”, “PCR Part A” PCR-A-0.3:2018 and “Doors and Gates" PCR-TT-2.2:2018.

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)] Susanne Volz
[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	Person in charge	Testing personnel
1	14.04.2022	External verification	Hilz	Volz
2				
3				

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9 Annex

Description of life cycle scenarios for Sectional garage doors, side-opening doors and side doors

Product stage			Con-struction process stage		Use stage							End-of-life stage				Benefits and loads beyond system boundaries
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material supply	Transport	production	Transport	Construction/installation process	Use	maintenance	Repair	replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/demolition	Transport	Waste processing	Disposal	Reuse Recovery Recycling potential
✓	✓	✓	✓	✓	—	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

The scenarios were calculated taking into account the defined building service life of 50 years (according to RSL at 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" as well as EN 17213 (1; 2).

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 construction site

No.	Scenario	Description
A4	Transport Hörmann Ichtershausen	14-20 t truck (Euro 6), diesel, 11.4 t payload, 90 % capacity used, approx. 870 km to site and empty return trip.

A4 Transport to construction site	Transport weight [kg/m²]
Sectional garage door	31.41
Side-opening door	22.18
Side door	22.63

Since this is a single scenario, the results are shown in the relevant summary table.

A5 Construction/Installation

No.	Scenario	Description
A5	Manual	According to the manufacturer, the products are installed without additional lifting and auxiliary devices

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.

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

Ancillary materials, consumables, use of energy and water, other resource use, material losses, direct emissions as well as waste during construction / 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 or deposited in line with the conservative approach: Foils / protective covers, wood and cardboard in incineration plants. Benefits from A5 are specified in module D. Benefits from waste incineration: Benefits from waste incineration: electricity replaces electricity mix (EU 28); thermal energy replaces thermal energy from natural gas (EU 28).
Transport to the recycling plants is not taken into account.

Since this is a single scenario, the results are shown in the relevant summary table.

B1 Use

Refer to Section 4 Use stage - Emissions to the environment. Emissions cannot be quantified.

B2 Inspection, maintenance, cleaning

Since this is a single scenario, the results are shown in the relevant summary table.

B2.1 Cleaning

No.	Scenario	Description
B2.1	Frequently, manual	Manually with suitable cleaning agents according to the manufacturer, every three months (2.5 l / cleaning; 500 l / 50 yr)

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

Since this is a single scenario, the results are shown in the relevant summary table.

B2.2 Maintenance

No.	Scenario	Description
B2.2	**Normal use**	**Annual functional check, visual inspection, lubrication/greasing and, if necessary, repair according to manufacturer** **0.25 kg lubricants per 50 yr** (1)

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

Since this is a single scenario, the results are shown in the relevant summary table.

B3 Repair

No.	Scenario	Description
B3	**Normal use and heavy use**	**According to the manufacturer:** **One-time replacement*: Hardware and Sealants** **Repeated replacement*: Torsion springs (4 times)**

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

For updated information refer to the respective instructions for assembly/installation, operation and maintenance from Hörmann KG Ichtershausen.

The service life of the sectional garage doors and side-opening doors from Hörmann KG Ichtershausen is specified as 25 years, that of the side doors as 50 years. For scenario B3, the respective components of the building elements whose useful life is less than the observation period of 50 years are accounted for.

It is assumed that the replaced components in the repair module will be sent for recycling. Metals come into the melt (material recycling) and plastics to incineration plants. Benefits from B3 are specified in module D. Benefits from waste incineration: Benefits from waste incineration: electricity replaces electricity mix (EU 28); thermal energy replaces thermal energy from natural gas (EU 28).

Transport to the recycling plants is not taken into account.

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

Since this is a single scenario, the results are shown in the relevant summary table.

B4 Exchange / Replacement

No.	Scenario	Description
B4	**Normal use and heavy use**	**No replacement: Side doors** **One replacement over a 50 year period*: Sectional garage doors and side-opening doors**

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

With a service life of 25 years for sectional garage doors and side-opening doors and 50 years for side doors according to the manufacturer and the assumed building service life of 50 years, a one-off replacement of sectional garage doors and side-opening doors is planned. No replacement is planned for side doors.

For updated information refer to the relevant manufacturer “instructions for assembly/installation, operation and maintenance”.

The environmental impacts of the selected scenario originate from the product, construction and disposal phases.

Since this is a single scenario, the results are shown in the relevant summary table.

B5 Modification/refurbishment

According to the manufacturer, the elements are not included in the improvement / modernisation activities for buildings.

For updated information refer to the respective instructions for assembly/installation, operation and maintenance from Hörmann KG Ichtershausen.

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

B6 Operational energy use

There is no energy used during normal use. The products are opened by manual control.

B7 Operational water use

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

C1 Deconstruction

No.	Scenario	Description
C1	**Deconstruction**	**acc. to EN 17213:** **Deconstruction of glass-free materials: 95%** **Further deconstruction rates are possible, give adequate reasons.**

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

Since this is a single scenario, 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	Transport to collection point using 40 t truck (Euro 6), diesel, 27 t payload, 80% capacity used, 50 km

Since this is a single scenario, the results are shown in the summary table.

C3 Waste management

No.	Scenario	Description
C3.1	Current market situation	**Share for recirculation of materials:** • **98% steel in melt** (UBA, 2017) • **95% aluminium in melt** (GDA, 2018) • **97% remaining metals in melt** (UBA, 2017) • **Plastics 66 % thermal recycling in incineration plants** (Zukunft Bauen, 2017) • **Plastics 34 % recycled** (Zukunft Bauen, 2017) • **Remainder to landfill/disposal,**

Electricity consumption of recycling plant: 0.5 MJ/m^2.

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

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	Sectional garage door	Side-opening door	Side door
Collection process, collected separately	kg	27.09	19.57	19.85
Collection process, collected as mixed construction waste	kg	1.43	1.03	1.04
Recovery system, for re-use	kg	0.00	0.00	0.00
Recovery system, for recycling	kg	23.76	15.88	16.68
Recovery system, for energy recovery	kg	2.73	3.23	2.62
Disposal	kg	2.01	1.46	1.59

The 100% scenarios differ from the average current recovery (D3.1). The evaluation of each scenario is described in the background report.

Since this is a single scenario, the results are shown in the summary table.

C4 Disposal

No.	Scenario	Description
C4.1	Standard scenario	The non-recordable amounts and losses within the re-use/recycling chain (C1 and C3) are modelled as “disposed” (EU-28).

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.

The 100 % scenarios differ from the standard scenario (C 4.1). The evaluation of each scenario is described in the background report.

Since this is a single scenario, the results are shown in the summary table.

D Benefits and loads from beyond the system boundaries

No.	Scenario	Description
D.1	**Recycling potential (current market situation)**	**Aluminium recyclate from C3 excluding the recyclate used in A3 replaces 60% of aluminium compound; Steel scrap from C3 excluding the scrap used in A3 replaces 60% of steel; Plastic recyclate from C3 excluding the plastics used in A3 replaces 60% of plastic; Benefits from incineration plant: 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.

The 100% scenarios differ from the average current recovery (D.1). The evaluation of each scenario is described in the background report.

Since this is a single scenario, the results are shown in the summary table.

Imprint

Practitioner of the LCA
ift Rosenheim GmbH
Theodor-Gietl-Straße 7-9
83026 Rosenheim, Germany

Programme operator
ift Rosenheim GmbH
Theodor-Gietl-Straße 7-9
83026 Rosenheim, Germany
Phone +49 (0)8031/261-0
Fax: +49 (0)8031/261-290
E-Mail: info@ift-rosenheim.de
www.ift-rosenheim.de

Declaration holder
Hörmann KG Ichtershausen
Thöreyer Str. 6
99334 Amt Wachsenburg OT Ichtershausen,
Germany

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

Layout
ift Rosenheim GmbH – 2021

Photographs (front page)
Hörmann KG Ichtershausen

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