Environmental Product Declaration (EPD)

Declaration code EPD-HSRL-GB-0.9.2

HÖRMANN KG

Industrial doors and gates

Industrial spiral doors made of steel

Basis:

DIN EN ISO 14025
EN 15804 + A2

Company EPD **E**nvironmental **P**roduct **D**eclaration

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Declaration holder	HÖRMANN KG Upheider Weg 94-98 33803 Steinhagen, Germany www.seuster.de		
Declaration code	EPD-HSRL-GB-0.9.2		
Designation of declared product	Industrial spiral doors made of steel		
Scope	Spiral doors for exterior and interior use		
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. The Declaration is based on the PCR Document “PCR Part A" PCR-A-0.3:2018 and “Doors and Gates" PCR-TT-3.0:2023.		
Validity	Publication date: 23.11.2023	Last revision: 23.11.2023	Valid until: 23.11.2028
	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 are based on both the data compiled from the production site of SEUSTER KG and the generic data derived from the “LCA for Experts 10” database. 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	Katharina Pscherer Independent auditor

1 General Product Information

Product definition

The EPD belongs to the product group Industrial doors and gates and applies to

1 m² spiral door
of company HÖRMANN KG

The declared unit is obtained by summing up:

Assessed product	Declared unit	Weight per unit area
Spiral door HS 7030 PU 42	1 m²	54.66 kg/m²

Table 1 Assessed product

The average unit is declared as follows:
Directly used material flows are determined using average sizes (4.5 m x 4.5 m) and allocated to the declared unit. 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 is the year 2021.

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

- Spiral door HS 7030 PU 42

Product description

HS 7030 PU 42:
SEUSTER spiral door with PU insulating panels for high thermal insulation. Non-contact rewinding technology.

Door leaf: Door sections made of double-walled, PU-foamed steel slats, outside micrograin, made of hot-dip galvanized and coated steel, 250 mm high, installation depth 42 mm. Optionally with DURA-TEC glazing (double or triple). Door leaves are available in over 200 colors, based on RAL.

Surface protection: Coil coating process or optional coated in RAL of your choice

Frame/hardware type: Laterally closed, profiled corner frame, made of hot-dip galvanized steel, with screw-fastened tracks and integrated light grid for monitoring the closing levels.

Weight compensation: Counterweight/tension spring technology with lateral suspension ropes/belts.

Safety equipment:

- Light grid at locking level
- Securing the carrying belts/chain
- Counterweight connection or spring breakage protection
- Fall protection through arresting device in drive unit
- Hand chain with counterweight/spring balancing support

Seals/Gaskets:

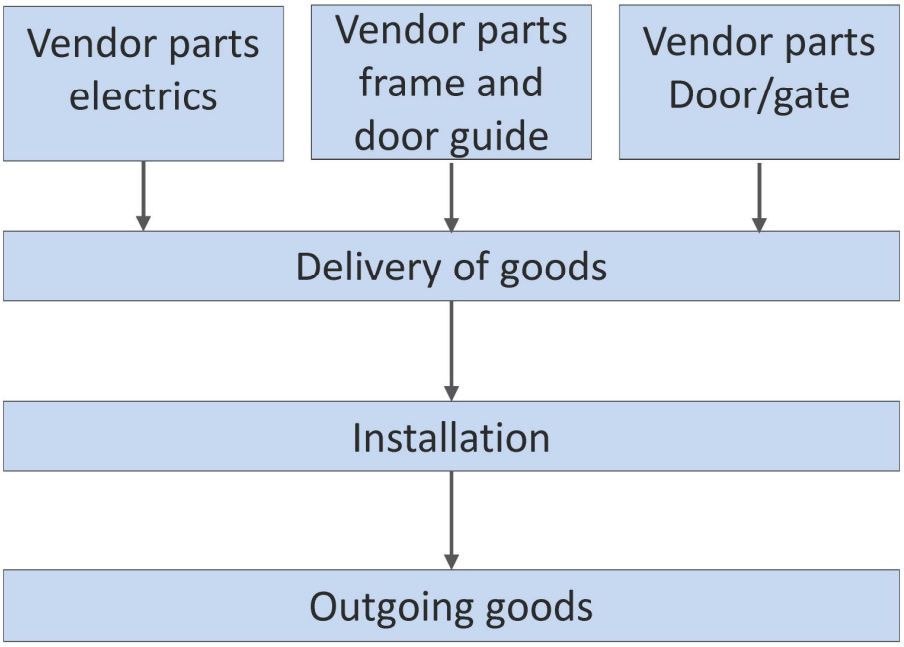
- Continuous in guide and on ground level
- Center seal between door elements

Velocity:

- With standard frequency converter control AK 500 FU -1, 3-phase in plastic/steel cabinet
- Opening max. 2.5 m/sec.
- Closing max. 0.5 m/sec.

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

Product manufacture



Application

SEUSTER spiral doors for exterior and interior use as an energy-saving closure for building openings in the industrial, commercial and private sectors. In order to optimize traffic flow, improve the indoor climate and working conditions and contribute to energy savings.

Test evidence / reports

The following verifications are held:

- Product quality as per DIN EN 13241-1

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

Management systems

The following management systems are held:

- Quality management system as per DIN EN ISO 9001:2015
- Energy management system as per DIN EN ISO 50001:2018
- Environmental management system as per DIN EN ISO 14001:2015
- Management system for safety and health at work as per DIN ISO 45001:2018

Additional information

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

Spiral doors meet the following building-physical performance characteristics according to EN 13241-1 (Products without fire and smoke control characteristics):

- Resistance to wind load according to EN 12424
- Sound insulation according to EN 717-1
- Thermal insulation according to EN ISO 12567

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

2 Materials used

Primary materials

The raw materials used can be found in Section 6.2 Inventory analysis (Inputs).

Declarable substances

The product contains no substances from the REACH candidate list (declaration dated 22.06.2022).

All relevant safety data sheets can be obtained from company SEUSTER KG.

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.seuster.de

4 Use stage

Emissions to the environment

No emissions to indoor air, water and soil are known. There may be VOC emissions.

Reference service life (RSL)

The RSL information was provided by the manufacturer. The RSL 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 spiral door HS 7030 PU 42 of company SEUSTER KG is optionally specified with 30 years according to the BBSR table.

The service life is dependent on the characteristics of the product and in-use conditions. The in-use conditions described in the EPD are applicable, in particular those listed below:

- Outdoor conditions: Weather conditions can have a negative effect on the service life.
- Indoor environment: No impacts (e.g. humidity, temperature) 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 RSL does not reflect the actual life time, which is usually determined by the service life and the redevelopment 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 Industrial spiral doors made of steel 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.

This EPD shows the end-of-life modules according to the market situation (based on EN 17213).
Specific components of metals and electrical components 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.

As the basis for this, an LCA was prepared for Industrial spiral doors made of steel. 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 2021 fiscal year. They were collected on-site at the plant located in 58513 Lüdenscheid 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 professional database and building materials database software “LCA for Experts 10”. The last update of both databases was in 2023. Data from before this date originate also from these databases and are not more than five years old. No other generic data were used for the calculation.

Generic data are selected as accurately as possible in terms of geographic reference. If no country-specific data sets are available or if the regional reference cannot be determined, European or globally valid data sets are used.

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 “LCA for Experts” for the development of life cycle assessments.

The data quality complies with the requirements of prEN 15941:2022.

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 Industrial spiral doors made of steel..
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 raw materials, ancillary materials and packaging were taken into account.
The transport distances of the pre-products used were taken into consideration as a function of 100% of the mass of the products.

In addition to the transport distances for pre-products, transport distances for waste were also taken into account. The transportation of waste generated in A3 was mapped using the following standard scenario:

- Transport to collection point with 40 t truck (Euro 0-6 Mix), diesel, 27 t payload, 50 % capacity used, 100 km. (1)

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 units.

Life cycle stages

The complete life cycle of Industrial spiral doors made of steel is shown in the annex. The product stage "A1 – A3", construction process stage "A4 – A5", use stage "B2, B4, B6, 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

Allocations occur during production.
Allocation was based on the number of products produced.

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 materials that enter the production process as input are calculated in module A1 as input without loads. No benefits are assigned to Module D, but consumption to Modules C3 and C4 (worst case consideration).
The system boundary set for the recycled material refers to collection.

Secondary material

The use of secondary material by SEUSTER KG was not considered in Module A3. Secondary material is not used.

Inputs

The following manufacturing-related inputs were included in the LCA per 1 m² spiral door:

Energy
For the input material gas, "Natural Gas Mix Germany" was assumed. For the electricity mix, the "Electricity Mix Germany" was assumed.

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
There is no water consumption in the individual process steps for production.
The consumption of fresh water specified in Section 6.3 originates (among others) from the process chain of the pre-products and the use as ancillary materials.

Raw material/Pre-products
The chart below shows the use of raw materials/pre-products per cent.

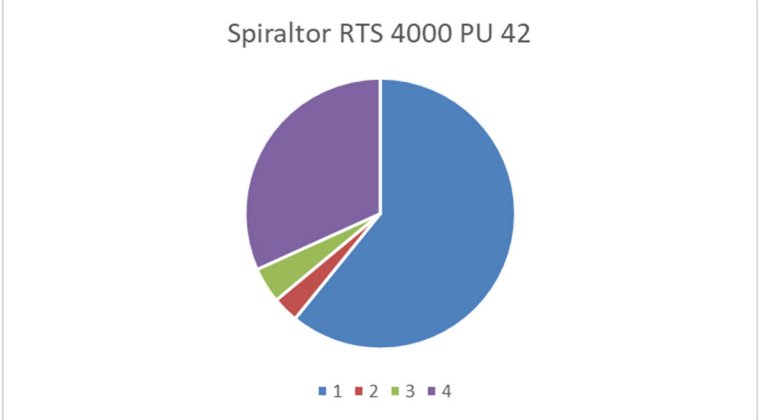


Illustration 1 Percentage of individual materials per declared unit

No.	Material	Mass in %
1	Steel	60.20
2	Aluminum	3.08
3	Electrical components	4.22
4	Seals/Gaskets	1.10
5	Other plastics	31.42

Table 2 Percentage of individual materials per declared unit

Ancillary materials and consumables
57.1 g of ancillary materials and consumables are used.

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

No.	Material	Mass in kg
1	Wood	6.10E-02
2	Cardboard	8.32E-03
3	Film	2.91E-03

Table 3 Weight in kg of packaging per declared unit

Biogenic carbon content
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.	Part	Content in kg C per m²
1	In the corresponding packaging	3.02E-02

Table 4 Biogenic carbon content of the packaging at the factory gate

Outputs

The following manufacturing-related outputs were included in the LCA per 1 m² spiral door:

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

Waste water
No waste water is produced during the manufacturing process.

6.3 Impact assessment

Aim

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

Core indicators

The models for impact assessment were applied as described in DIN EN 15804-A2.

The impact categories presented for the core indicators in the EPD are as follows:

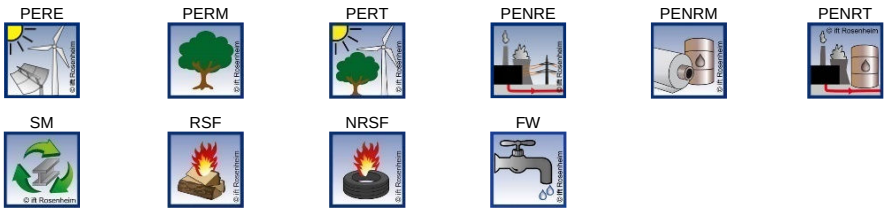
- Climate change - total (GWP-t)
- Climate change - fossil (GWP-f)
- Climate change - biogenic (GWP-b)
- Climate change - land use & land use change (GWP-l)
- Ozone depletion (ODP)
- Acidification (AP)
- Eutrophication freshwater (EP-fw)
- Eutrophication salt water (EP-m)
- Eutrophication land (EP-t)
- Photochemical ozone creation (POCP)
- Depletion of abiotic resources - fossil fuels (ADPF)
- Depletion of abiotic resources - minerals and metals (ADPE)
- Water use (WDP)

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 (PERE)
- Renewable primary energy for material use (PERM)
- Total use of renewable primary energy (PERT)
- Non-renewable primary energy as energy source (PENRE)
- Renewable primary energy for material use (PENRM)
- Total use of non-renewable primary energy (PENRT)
- Use of secondary materials (SM)
- Use of renewable secondary fuels (RSF)
- Use of non-renewable secondary fuels (NRSF)
- Net use of freshwater resources (FW)

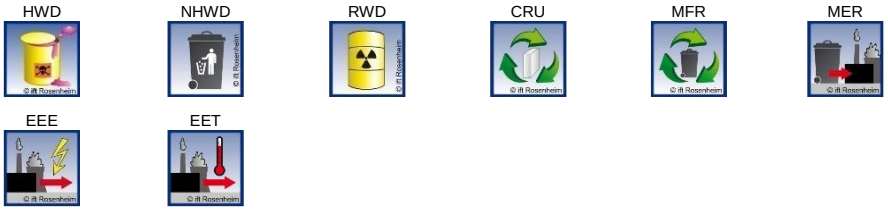


Waste

The waste generated during the production of 1 m² spiral 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 waste categories and indicators for output material flows presented in the EPD are as follows:

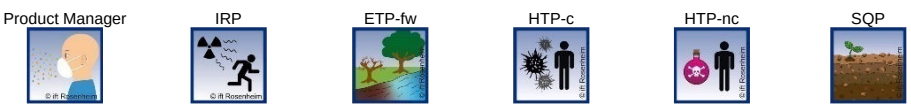
- Disposed hazardous waste (HWD)
- Non-hazardous waste disposed (NHWD)
- Radioactive waste disposed (RWD)
- Components for re-use (CRU)
- Materials for recycling (MFR)
- Materials for energy recovery (MER)
- Exported electrical energy (EEE)
- Exported thermal energy (EET)



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:

- Particulate matter emissions (PM)
- Ionizing radiation, human health (IRP)
- Ecotoxicity – freshwater (ETP-fw)
- Human toxicity, carcinogenic effects (HTP-c)
- Human toxicity, non-carcinogenic effects (HTP-nc)
- Impacts associated with land use/soil quality (SQP)



	Results per 1 m² spiral door HS 7030 PU 42															
	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	184.16	9.03	0.12	ND	1.66E-02	ND	3.94	ND	0.52	0.00	0.50	0.52	5.56	0.25	-82.00
GWP-f	kg CO_2 equivalent	183.20	9.07	9.27E-03	ND	1.65E-02	ND	3.91	ND	0.51	0.00	0.50	0.52	5.53	0.26	-82.00
GWP-b	kg CO_2 equivalent	0.96	-0.13	0.11	ND	1.97E-05	ND	3.57E-02	ND	5.57E-03	0.00	5.37E-03	-7.20E-03	2.58E-02	-8.53E-03	0.12
GWP-l	kg CO_2 equivalent	6.20E-02	8.29E-02	5.71E-07	ND	1.16E-05	ND	3.92E-03	ND	5.50E-05	0.00	5.32E-05	4.75E-03	3.23E-04	7.98E-04	-3.34E-02
ODP	kg CFC-11-eq.	7.28E-08	1.17E-12	1.27E-14	ND	8.43E-11	ND	1.24E-09	ND	9.33E-12	0.00	9.04E-12	6.67E-14	4.37E-11	6.53E-13	-3.68E-08
AP	mol H^+-eq.	0.41	4.78E-02	2.04E-05	ND	8.80E-05	ND	8.15E-03	ND	1.08E-03	0.00	1.05E-03	2.98E-03	6.00E-03	1.82E-03	-0.23
EP-fw	kg P-eq.	3.09E-04	3.27E-05	3.61E-09	ND	2.13E-08	ND	1.12E-05	ND	1.89E-06	0.00	1.83E-06	1.87E-06	8.90E-06	5.17E-07	-1.92E-05
EP-m	kg N-eq.	9.69E-02	2.29E-02	6.10E-06	ND	9.23E-06	ND	2.57E-03	ND	2.59E-04	0.00	2.50E-04	1.45E-03	1.63E-03	4.71E-04	-4.65E-02
EP-t	mol N-eq.	1.04	0.26	8.62E-05	ND	9.77E-05	ND	2.80E-02	ND	2.70E-03	0.00	2.62E-03	1.61E-02	1.78E-02	5.18E-03	-0.50
POCP	kg NMVOC-eq.	0.35	4.51E-02	1.66E-05	ND	3.37E-05	ND	8.43E-03	ND	6.90E-04	0.00	6.68E-04	2.82E-03	4.33E-03	1.42E-03	-0.15
ADPF*²	MJ	2786.70	122.00	3.18E-02	ND	0.27	ND	75.21	ND	10.67	0.00	10.30	6.99	50.80	3.42	-726.00
ADPE*²	kg Sb equivalent	2.14E-03	5.90E-07	1.18E-10	ND	2.06E-06	ND	3.60E-05	ND	7.87E-08	0.00	7.59E-08	3.38E-08	3.67E-07	1.18E-08	-1.09E-03
WDP*²	m^3 world-eq. deprived	6.95	0.11	1.30E-02	ND	3.70E-03	ND	0.16	ND	0.11	0.00	0.11	6.20E-03	0.83	2.82E-02	-3.18
Resource management																
PERE	MJ	406.61	8.88	1.12	ND	3.60E-02	ND	14.95	ND	6.37	0.00	6.16	0.51	29.70	0.56	-5.69
PERM	MJ	1.11	0.00	-1.11	ND	0.00	ND	0.00	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	407.72	8.88	7.88E-03	ND	3.60E-02	ND	14.95	ND	6.37	0.00	6.16	0.51	29.70	0.56	-5.69
PENRE	MJ	2432.12	122.00	9.14E-02	ND	0.27	ND	75.38	ND	10.67	0.00	10.30	7.01	397.01	21.64	-731.00
PENRM	MJ	364.49	0.00	-5.96E-02	ND	0.00	ND	1.89E-15	ND	0.00	0.00	0.00	0.00	-346.21	-18.22	0.00
PENRT	MJ	2796.61	122.00	3.18E-02	ND	0.27	ND	75.38	ND	10.67	0.00	10.30	7.01	50.80	3.42	-731.00
SM	kg	0.00	0.00	0.00	ND	0.00	ND	0.00	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00	ND	0.00	ND	0.00	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00	ND	0.00	ND	0.00	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW	m^3	0.69	9.72E-03	3.07E-04	ND	2.84E-04	ND	1.75E-02	ND	5.13E-03	0.00	4.97E-03	5.57E-04	3.10E-02	8.64E-04	-0.21
Categories of waste																
HWD	kg	4.52E-06	3.79E-10	7.06E-13	ND	4.63E-10	ND	1.47E-07	ND	-8.33E-10	0.00	-8.07E-10	2.17E-11	-3.80E-09	7.45E-11	-9.05E-08
NHWD	kg	10.84	1.87E-02	2.98E-03	ND	2.58E-03	ND	0.79	ND	7.80E-03	0.00	7.55E-03	1.07E-03	0.42	17.10	-4.83
RWD	kg	5.07E-02	2.29E-04	1.72E-06	ND	5.07E-06	ND	1.70E-03	ND	1.69E-03	0.00	1.64E-03	1.31E-05	7.84E-03	3.90E-05	-9.41E-03
Output material flows																
CRU	kg	0.00	0.00	0.00	ND	0.00	ND	0.00	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	kg	0.69	0.00	0.00	ND	2.00E-03	ND	1.23	ND	0.00	0.00	0.00	0.00	36.20	0.00	0.00
MER	kg	0.00	0.00	0.00	ND	0.00	ND	0.00	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	MJ	3.02	0.00	0.17	ND	2.21E-03	ND	0.30	ND	0.00	0.00	0.00	0.00	5.79	0.00	0.00
EET	MJ	6.94	0.00	0.31	ND	4.00E-03	ND	0.59	ND	0.00	0.00	0.00	0.00	10.40	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 spiral door HS 7030 PU 42																
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Additional environmental impact indicators																
PM	Disease incidence	4.61E-06	2.32E-07	1.38E-10	ND	8.10E-10	ND	6.70E-08	ND	9.10E-09	0.00	8.81E-09	1.18E-08	4.91E-08	2.24E-08	-2.93E-06
IRP*[1]	kBq U235-eq.	7.31	3.42E-02	2.72E-04	ND	8.17E-04	ND	0.21	ND	0.28	0.00	0.27	1.96E-03	1.30	4.51E-03	-2.73
ETP-fw*[2]	CTUe	1119.67	86.70	1.54E-02	ND	0.14	ND	35.22	ND	4.70	0.00	4.55	4.96	22.70	1.87	-185.00
HTP-c*[2]	CTUh	1.46E-07	1.78E-09	1.26E-12	ND	9.30E-12	ND	1.47E-09	ND	1.57E-10	0.00	1.52E-10	1.02E-10	7.72E-10	2.87E-10	-1.05E-07
HTP-nc*[2]	CTUh	3.50E-06	9.97E-08	8.50E-11	ND	3.50E-10	ND	1.01E-07	ND	3.87E-09	0.00	3.73E-09	5.66E-09	2.19E-08	3.16E-08	-6.45E-07
SQP*[2]	dimensionless	333.88	51.00	9.43E-03	ND	4.03E-02	ND	14.02	ND	4.17	0.00	4.05	2.92	19.60	0.83	7.64

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 ionising radiation from the soil, from radon and from some building 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

In the area of production, the environmental impact of the spiral door mainly results from the use of galvanized steel and of PU panels or its upstream chains. Furthermore, the use of aluminum and the drive unit as well as the transport in A4 play a minor role in terms of environmental impact.
Furthermore, the energy consumption with electricity in B6 during the 30-year utilization phase has a significant impact on the environmental impact.

In scenario C4, only marginal expenditures for the physical pretreatment and the landfill operation are to be expected. Allocation to individual products is almost impossible for site disposal.
When recycling Industrial spiral doors made of steel, around 4.6 % of the environmental impacts of the core indicators (excluding WDP, as not supported by the software) occurring during the life cycle can be credited in scenario D for aluminum, around 16.5 % for galvanized steel and around 11.7 % for the drive unit.

Some LCA results differ considerably from the results presented in the EPD prepared six years ago. This is partly due to methodological changes in modelling and partly reflects production changes. The sources of the differences are listed below:

- Extensive further development/optimization of products, including replacement of materials used and reduction of material usage
- Updating of the data basis and optimization of the data collection by the manufacturer In particular, the differentiated consideration of the PU panel as a composite material made of steel and PU foam leads to significant differences in the environmental impacts
- Selection of other, more suitable life cycle scenarios
- Selection of other, more suitable "LCA for Experts" datasets
- Amendment of background data in "LCA for Experts" (version update)
- Update of modeling basis due to revision of EN 15804+A1 to EN 15804+A2
- Extension of considered life cycle modules

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.

Diagram

The diagram below shows the B modules with reference to the specified RSL within the building service life of 50 years.

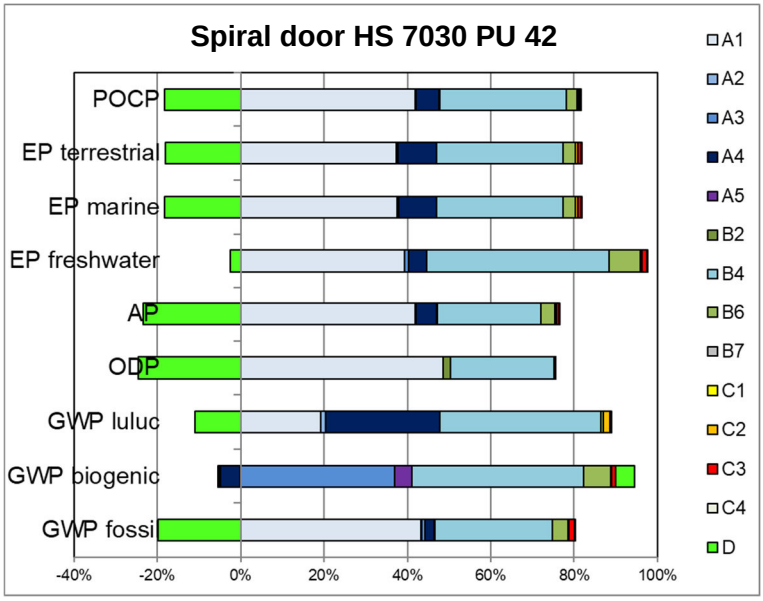


Illustration 2 Percentage of the modules in selected environmental impact indicators

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 by the independent auditor Katharina Pscherer, M.Sc.

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 Document “PCR Part A" PCR-A-0.3:2018 and "Doors and Gates" PCR-TT-3.0:2023.

The European standard EN 15804 serves as the core PCR [a)]
Independent verification of the Declaration and statement according to EN ISO 14025:2010
Independent third party verifier: [b)] Katharina Pscherer
[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 LCA	Verifier
1	23.11.2023	Revision	Dellawalle	Pscherer
2	15.01.2024	Editorial revision	Dellawalle	Pscherer

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9 Annex

Description of life cycle scenarios for Industrial spiral doors made of steel

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
✓	✓	✓	✓	✓	—	✓	—	✓	—	✓	✓	✓	✓	✓	✓	✓

* For declared B-modules, the calculation of the results is performed taking into account the specified RSL related to one year

Table 5 Overview of applied life cycle stages

The scenarios were calculated taking into account the defined RSL (see 4 Use stage).

The scenarios were based on information provided by the manufacturer. The scenarios were furthermore based on EN 17213 (1) and the research project "EPDs for transparent building components" (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	Small series - direct marketing	7.5 t truck (Euro 5 mix), diesel, 5 t payload, 85% capacity used[1], approx. 600 km and empty return trip

[1] Capacity used: utilized loading capacity of the truck

A4 Transport to construction site	Transport weight [kg/m²]	Density [kg/m³]	Capacity load factor[2]
Spiral door HS 7030 PU 42	54.73	111.20	< 1

[2] Capacity load factor:
= 1 Product completely fills the packaging (without air inclusion)
< 1 Packaging contains unused volume (e.g.: air, filling material)
> 1 Product is packed in compressed form

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.

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 (RER); thermal energy replaces thermal energy from European natural gas (RER).
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.

B2 Cleaning, maintenance and repair

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

B2.1 Cleaning

No.	Scenario	Description
B2.1	Rarely, manual	Manual using suitable cleaning agents: as specified by the manufacturer, every six months (2.5 l/cleaning; 150 l/RSL)
Ancillary materials, consumables, use of energy and water, material losses and waste as well as transport distances during cleaning are negligible.		

B2.2 Maintenance and repair

No.	Scenario	Description
B2.2	Normal use	According to the manufacturer: Annual functional check, visual inspection, lubrication/greasing and, if necessary, repair. 0.15 kg lubricants per 30 yr (1) One-time replacement*: Sealants 0.57 kg, Drive unit 1.99 kg

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

For updated information refer to the relevant instructions for assembly/installation, operation and maintenance from company SEUSTER KG.

The service life of the Industrial spiral doors made of steel of company SEUSTER KG is optionally specified with 30 years. For scenario B2.2, the respective components of the building elements whose useful life is less than the specified RSL are accounted for. The results were based on one year, taking into account the RSL.

It is assumed that the replaced components will be recycled in the module maintenance and repair. 87% of electrical components are recycled, rest to landfill, plastics to incineration plants. Benefits from B2.2 are specified in Module D. Benefits from waste incineration: Benefits from waste incineration: electricity replaces electricity mix (RER); thermal energy replaces thermal energy from European natural gas (RER). 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 maintenance and repair are negligible.

B4 Exchange/replacement

No.	Scenario	Description
B4.1	Normal use and heavy use	One replacement over a 30-year period (RSL)*

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

The statements made in this EPD are only informative to allow evaluation at the building level.

It is assumed that a one-time replacement will be necessary during the 30-year reference service life and the 50-year building service life. The results were based on one year, taking into account the RSL.

For updated information refer to the relevant instructions for assembly/installation, operation and maintenance from company SEUSTER KG.

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.

B6 Operational energy use

No.	Scenario	Description
B6	power-operated normal use	According to the manufacturer: per year*: 1.57 kWh/cycle, 30,000 cycles per year (1,413 kWh/RSL) Electricity (including standby mode) * Electricity mix (RER)

* Frequencies, usage times, 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.

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

B7 Operational water use

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

C1 Deconstruction

No.	Scenario	Description
C1	Deconstruction	**Based on EN 17213 (metal doors):** **Industrial doors and gates 95 % deconstruction** **5 % residues** **Further deconstruction rates are possible, give adequate reasons.**

Power consumption deconstruction: 0.1 MJ/kg (according to manufacturer)

In the selected scenario, expenses arise from power consumption when dismantling the products.

Since this is a single scenario, the results are shown in the relevant 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 34-40 t truck (Euro 0-6 mix), diesel, 27 t payload, 85% capacity used, 100 km** (2)

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

C3 Waste management

No.	Scenario	Description
C3	Current market situation	**Share for recirculation of materials:** **Based on EN 17213** (metal doors)**:** • **Metals 100% recycled** • **Plastics 100% thermal recycling** **On basis of market scenarios:** • **Electrical components 87%** (based on waste electrical equipment 87%; UBA, 2018) • **GFRP-reinforced plastics 100% thermal recycling** (UBA TEXTE 151/2021, 2021) • **Remainder to landfill/disposal.**

Electricity consumption of recycling plant: 0.5 MJ/kg.

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	C3
Collection process, collected separately	kg	51.93
Collection process, collected as mixed construction waste	kg	2.73
Recovery system, for re-use	kg	0.00
Recovery system, for recycling	kg	36.25
Recovery system, for energy recovery	kg	1.33
Disposal	kg	17.10

Since this is a single scenario, 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" (RER).**

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 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	**Recycling potential**	**Aluminum recyclate from C3 excluding the aluminum sheet used in A3 replaces 60% of aluminum sheet; Steel recyclate from C3 excluding the steel coil used in A3 replaces 60% of bare steel; Galvanized steel recyclate from C3 excluding the steel sheet used in A3 replaces 60% of galvanized steel; 3-wire cable recyclate from C3 excluding the 3-wire cable used in A3 replaces 60 % of electrical components; 3-wire cable recyclate from C3 excluding the 3-wire cable used in A3 replaces 60 % of copper cables; Drive unit recyclate from C3 excluding the drive unit used in A3 replaces 60 % of drive unit; Benefits from incineration plant: Benefits from waste incineration: electricity replaces electricity mix (RER); thermal energy replaces thermal energy from European natural gas (RER).**

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

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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-Guideline NA-01/4 “Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen” (Guidance on preparing Type III Environmental Product Declarations.)

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