Environmental Product Declaration (EPD)

Declaration code EPD-COD-GB-25.1

ConDoor Group B.V.

Doors

Overhead doors

Basis:

DIN EN ISO 14025
EN 15804 + A2

Company EPD
Environmental
Product **D**eclaration

Publication date:
17.04.2024

Valid until:
17.04.2029

www.ift-rosenheim.de/
published EPDs

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

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

Notified Body 0757
PÜZ-Stelle BAY 18

Accredited Certification Body
Products + Services
EN ISO/IEC 17065

DAkkS Deutsche Akkreditierungsstelle D-ZE-11349-01-00

Environmental Product Declaration (EPD)

Declaration code EPD-COD-GB-25.1

Programme operator	ift Rosenheim GmbH Theodor-Gietl-Straße 7-9 83026 Rosenheim, Germany
Practitioner of LCA	ift Rosenheim GmbH Theodor-Gietl-Straße 7-9 83026 Rosenheim, Germany
Declaration holder	ConDoor Group B.V. Handelsweg 31 3899 AA Zeewolde, The Netherlands www.condoor.com
Declaration code	EPD-COD-GB-25.1
Designation of declared product	Overhead doors
Scope	Industrial and garage doors for both residential and industrial 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. The Declaration is based on the PCR Document “PCR Part A" PCR-A-1.0:2023 and “Doors and Gates" PCR TT-3.0: 2023.
Validity	Publication date: 17.04.2024 / Last revision: 17.04.2024 / Valid until: 17.04.2029 This verified Company Environmental Product Declaration (company EPD) applies solely to the specified products and is valid for a period of five years from the date of publication in accordance with DIN EN 15804.
LCA Basis	The LCA was prepared in accordance with DIN EN ISO 14040 and DIN EN ISO 14044. The base data include both the data collected at the ConDoor Group B.V. production site and the generic data derived from the “bank „LCA for Experts 10” database. LCA calculations were carried out for the “cradle to gate” life cycle with options (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	Patrick Wortner External verifier

1 General Product Information

Product definition

The EPD belongs to the product group Doors and applies to

1 m² Overhead-Doors
of the company ConDoor Group B.V.

The declared unit is obtained by summing up:

Product group	Assessed product	Declared unit	Surface weight
PG 1	80mm aluminium frame (1/2 PMMA, 1/2 hard glass filling)	1 m²	32.96 kg/m²
PG 2	40mm aluminium frame (solid filling panels)	1 m²	18.17 kg/m²
PG 3	Steel panels with PMMA windows	1 m²	19.13 kg/m²

Table 1 Product groups

The average unit is declared as follows:
Directly used material flows are determined using average sizes (4 m x 4 m) and allocated to the declared unit. All other inputs and outputs in the production were scaled to the declared unit in their entirety since there is no typical functional unit due to the high number of variants. The reference period is the year 2021.

Product group	Products
Product group 1 (PG 1) Panel doors 80 mm	• Panel doors 80 mm plastic windows • 80 mm ALU frame solid filling panels • **80 mm ALU frame with PMMA filling** • **80 mm ALU frame with hard glass filling** ➔ **80 mm ALU frame (1/2 PMMA, 1/2 hard glass filling)** • Luxe-Line ALU frame panel filling • Luxe-Line ALU frame with PMMA filling • Luxe-Line ALU frame with hard glass filling
Product group 2 (PG 2) Aluminium panels	• Aluminium panels with PMMA windows • **40 mm ALU frame solid filling panels** • 40 mm ALU frame with PMMA filling • 40 mm ALU frame with hard glass filling
Product group 3 (PG 3) Steel panels	**Steel panels with PMMA windows**

Table 2 Overview of products per product group

Product description

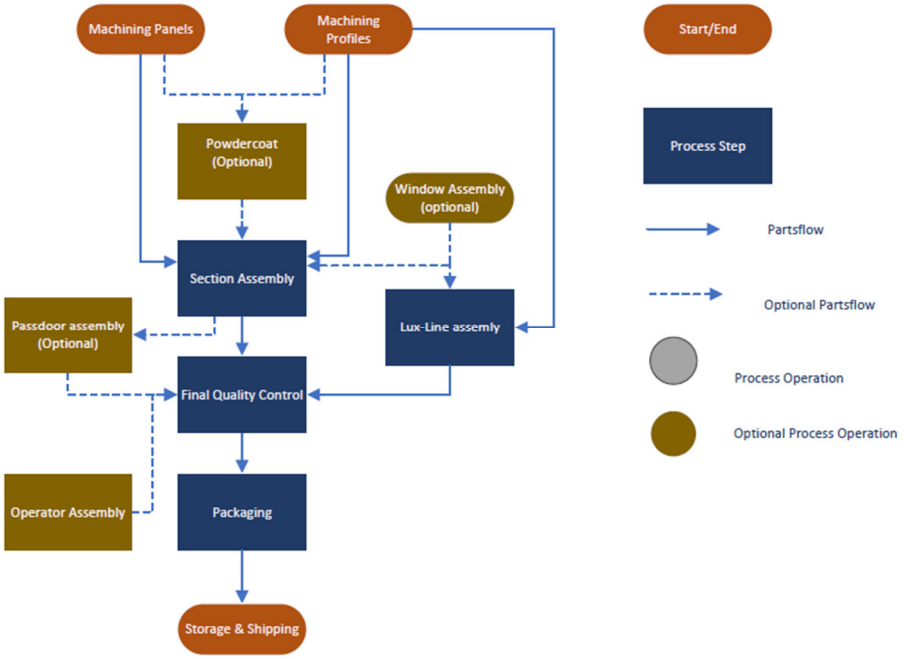
These are sectional doors for industrial and residential applications. A door set consists of a door leaf, a set of tracks and an optional electric drive unit.

The EPD covers industrial and garage doors consisting of door leaf, sealing, hardware, frames, tracks and electric drive unit. All performance characteristics of the product depend on the respective product

configuration and are only specified for the respective product according to DIN EN 13241.

For a detailed product description refer to the manufacturer specifications at www.condoor.com or the product specifications of the respective offer/quotation. The user manuals are also available at https://www.doormanuals.com.

Product manufacture



Application

Industrial and garage doors for both residential and industrial applications.

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.condoor.com.

Quality assurance

CE quality control are performed during and after door leaf production.

Additional information

All product performance characteristics depend on the product configuration and are specified for each individual product according to EN 13241.
For additional verifications of applicability or conformity refer to the CE marking and the documents accompanying the product, if applicable.

2 Materials used

Primary materials

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

Declarable substances

No substances according to REACH candidate list are included (declaration of 22.03.2024).

All relevant safety data sheets can be obtained from ConDoor Group B.V.

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.condoor.com.

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 industrial and garage doors from ConDoor B.V. is optionally specified with 30 years according to the manufacturer based on the BBSR table.

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 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 overhead 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.
Aluminum, steel, glass and plastics are recycled to a certain extent. Residual fractions are sent to landfill or, in part, 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.

A life cycle assessment for overhead doors was created as the basis for this. 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, and EN ISO 14025 as well as based on ISO 21930.

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 Zeewolde 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 6 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 overhead 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 raw materials, ancillary materials and packaging were taken into account. A truck-trailer (34-40 t total weight, 27 t payload) with Euro 0-6 Mix was used. 61% capacity of the truck-trailer was used (according to the standard data set). The Euro standard mix and capacities used are representative of the usual supply chain situations and can therefore be applied.

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 using 34-40 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 overhead doors is shown in the annex. The product stage "A1 – A3", construction process stage "A4", use stage "B2 – B7", end-of-life stage "C1 – C4" and the benefits and loads beyond the system boundaries "D" are considered in the modeling.

Benefits

The below benefits have been defined as per DIN EN 15804:

- Benefits from recycling
- Benefits (thermal and electrical) from incineration

Allocation of co-products

The following allocations of co-products are used:

- Allocations (i.e. the allocation of the environmental impacts of a process to several products) may have been performed for the background data sets used in the „LCA for Experts“ database, which are then included in the associated individual documentation.
- Allocation of material flows that have specific inherent properties, e.g. energy content, elemental composition (e.g. biogenic carbon content) must always be allocated according to the physical flows, regardless of the allocation principle selected for the processes.
- The allocation of inputs and outputs, which are only available as annual values for the ConDoor Group B.V. plant, is based on the mass produced (kg). The allocation within the reference products (industrial and garage doors) is then based on the masses (kg) produced per product.

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.

The following allocations are applied for re-use, recycling and recovery:

- A general value-correction factor (60% according to the standard data set) which reflects the difference in functional equivalence if the output flow does not reach the functional equivalence of the substituting process (value reduction factor)
- The value correction factor for aluminum and steel is 70.2% according to the Sphera data set "Recycling potential" of the corresponding metal.

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 was considered for ConDoor Group B.V.. Secondary material is not used.

Inputs

The LCA includes the following production-relevant inputs per 1 m² Overhead-Doors:

Energy
For the input material gas, the dutch mix "Natural Gas Mix NL" was assumed. The electricity mix Netherlands is used for the electricity mix in the plant.

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

Water

The water consumed by the individual process steps for the manufacture amounts to a total of 0.01 l - 0.015 l per 1 m² of the element.

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

Raw material/Pre-products

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

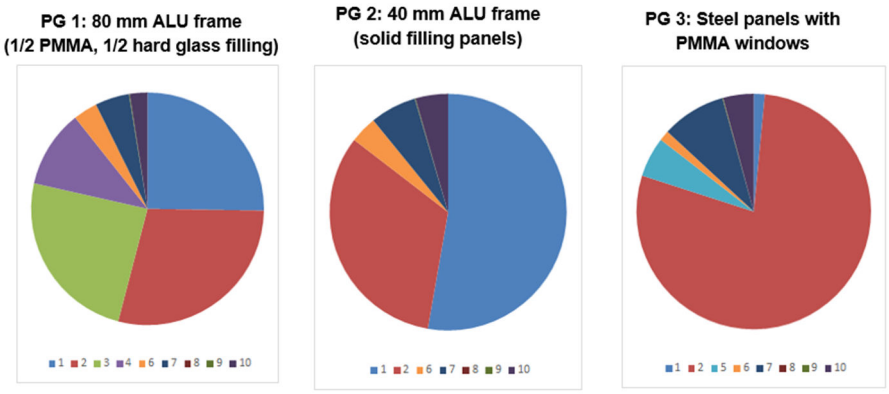


Illustration 1 Percentage of individual materials per declared unit

No.	Material	Mass in % per m²		
		PG 1	PG 2	PG 3
1	Aluminium	25%	53%	2%
2	Steel	29%	33%	78%
3	Glass	24%	0%	0%
4	PMMA	11%	0%	0%
5	Styrene acrylonitrite (SAN)	0%	0%	5%
6	Seals/Gaskets	3%	4%	1%
7	Plastics	5%	6%	9%
8	Cable	< 1%	< 1%	< 1%
9	Electrical component	< 1%	< 1%	< 1%
10	Motor	2%	4%	4%

Table 3 Percentage of individual materials per declared unit

Ancillary materials and consumables

There are the following ancillary materials and consumables:

- PG 1: 0.004 kg/m²
- PG 2: 0.002 kg/m²
- PG 3: 0.002 kg/m²

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

No.	Material	Mass in kg per product group (PG)		
		PG 1	PG 2	PG 3
1	Cardboard	0.96	0.96	0.96
2	PE	0.17	0.14	0.16
3	PET	0.01	0.01	0.01
4	PS	0.03	0.03	0.03
5	Wood	1.32	1.32	0.97

Table 4 Weight in kg of packaging per declared unit

Biogenic carbon content
According to EN 16449, the following amounts of biogenic carbon are generated:

No.	Component	Content in kg C per m²		
		PG 1	PG 2	PG 3
1	In the product	0	0	0
2	In the corresponding packaging	1.15	1.05	0.90

Table 5 Biogenic carbon content in product and packaging at the factory gate

Outputs

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

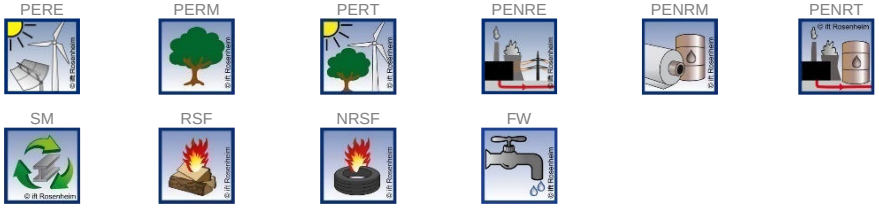
The models for impact assessment were applied as described in DIN EN 15804-A2.
The impact categories presented for the core indicators in the EPD are as follows:

- 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)

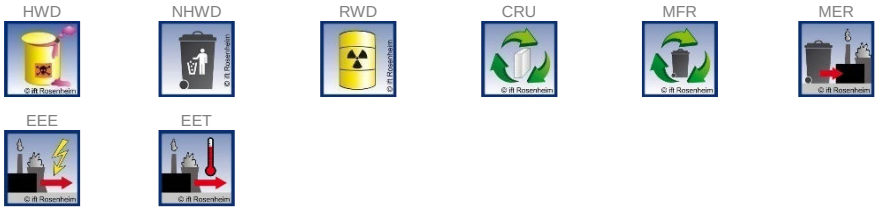


Waste

The waste generated during the production of 1 m² Overhead-Doors 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:

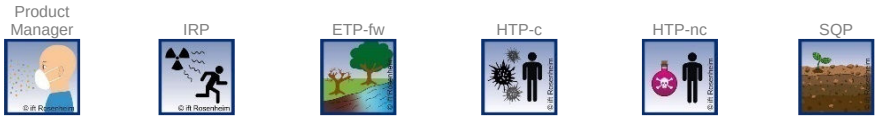
- Disposed hazardous waste (HWD)
- Non-hazardous waste disposed (NHWD)
- Radioactive waste disposed (RWD)
- Components for re-use (CRU)
- Materials for recycling (MFR)
- Materials for energy recovery (MER)
- Exported electrical energy (EEE)
- Exported thermal energy (EET)



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 m² 80 mm ALU frame (1/2 PMMA, 1/2 hard glass filling)																
	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	124.17	0.82	ND	ND	8.37E-02	0.00	1.62	0.00	0.20	0.00	0.00	0.33	5.83	4.57E-02	-83.64
GWP-f	kg CO_2 equivalent	128.38	0.82	ND	ND	8.33E-02	0.00	1.76	0.00	0.20	0.00	0.00	0.33	5.82	4.72E-02	-83.64
GWP-b	kg CO_2 equivalent	-3.78	-1.14E-02	ND	ND	4.07E-04	0.00	-0.13	0.00	2.15E-03	0.00	0.00	-4.59E-03	1.62E-02	-1.57E-03	-4.65E-02
GWP-l	kg CO_2 equivalent	5.70E-02	7.48E-03	ND	ND	1.81E-05	0.00	1.68E-03	0.00	2.13E-05	0.00	0.00	3.01E-03	1.63E-04	1.46E-04	-1.77E-02
ODP	kg CFC-11-eq.	2.18E-07	7.07E-14	ND	ND	5.47E-13	0.00	6.75E-09	0.00	3.63E-12	0.00	0.00	2.84E-14	2.72E-11	1.20E-13	-1.52E-08
AP	mol H^+-eq.	0.54	7.13E-04	ND	ND	1.78E-04	0.00	7.97E-03	0.00	4.20E-04	0.00	0.00	3.78E-04	3.55E-03	3.34E-04	-0.30
EP-fw	kg P-eq.	1.41E-03	2.95E-06	ND	ND	1.68E-07	0.00	4.50E-05	0.00	7.33E-07	0.00	0.00	1.18E-06	5.50E-06	9.49E-08	-7.48E-05
EP-m	kg N-eq.	8.85E-02	1.92E-04	ND	ND	4.47E-05	0.00	1.05E-03	0.00	1.00E-04	0.00	0.00	1.31E-04	8.37E-04	8.64E-05	-5.89E-02
EP-t	mol N-eq.	0.97	2.49E-03	ND	ND	4.80E-04	0.00	1.18E-02	0.00	1.05E-03	0.00	0.00	1.54E-03	9.82E-03	9.50E-04	-0.64
POCP	kg NMVOC-eq.	0.28	5.86E-04	ND	ND	1.64E-04	0.00	3.67E-03	0.00	2.67E-04	0.00	0.00	3.32E-04	2.26E-03	2.61E-04	-0.17
ADPF*²	MJ	2010.43	11.00	ND	ND	1.30	0.00	29.26	0.00	4.13	0.00	0.00	4.42	31.30	0.63	-1187.69
ADPE*²	kg Sb equivalent	1.26E-03	5.21E-08	ND	ND	6.73E-09	0.00	2.05E-05	0.00	3.04E-08	0.00	0.00	2.09E-08	2.29E-07	2.17E-09	-6.41E-04
WDP*²	m^3 world-eq. deprived	91.88	9.31E-03	ND	ND	1.97E-02	0.00	2.89	0.00	4.37E-02	0.00	0.00	3.74E-03	0.73	5.18E-03	-6.06
Resource management																
PERE	MJ	584.74	0.78	ND	ND	0.29	0.00	9.28	0.00	2.47	0.00	0.00	0.31	18.50	0.10	-324.71
PERM	MJ	44.57	0.00	ND	ND	0.00	0.00	1.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	629.31	0.78	ND	ND	0.29	0.00	10.77	0.00	2.47	0.00	0.00	0.31	18.50	0.10	-324.71
PENRE	MJ	1330.19	11.00	ND	ND	1.31	0.00	29.11	0.00	4.13	0.00	0.00	4.43	700.24	7.38	-1187.78
PENRM	MJ	680.21	0.00	ND	ND	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	-668.94	-6.76	0.00
PENRT	MJ	2010.40	11.00	ND	ND	1.31	0.00	29.26	0.00	4.13	0.00	0.00	4.43	31.30	0.63	-1187.78
SM	kg	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW	m^3	2.99	8.57E-04	ND	ND	6.40E-04	0.00	7.88E-02	0.00	1.99E-03	0.00	0.00	3.44E-04	2.42E-02	1.59E-04	-0.65
Categories of waste																
HWD	kg	7.40E-06	4.07E-11	ND	ND	-3.20E-12	0.00	1.61E-07	0.00	-3.23E-10	0.00	0.00	1.64E-11	-2.40E-09	1.37E-11	-2.58E-06
NHWD	kg	22.66	1.59E-03	ND	ND	7.60E-04	0.00	0.35	0.00	3.02E-03	0.00	0.00	6.38E-04	3.97E-02	3.14	-15.09
RWD	kg	8.09E-02	1.42E-05	ND	ND	4.10E-05	0.00	4.16E-04	0.00	6.57E-04	0.00	0.00	5.72E-06	4.92E-03	7.16E-06	-7.33E-02
Output material flows																
CRU	kg	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	kg	0.00	0.00	ND	ND	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	11.40	0.00	0.00
MER	kg	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	MJ	1.00	0.00	ND	ND	0.00	0.00	3.32E-02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EET	MJ	2.81	0.00	ND	ND	0.00	0.00	9.37E-02	0.00	0.00	0.00	0.00	0.00	0.00	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 m² 80 mm ALU frame (1/2 PMMA, 1/2 hard glass filling)															
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Additional environmental impact indicators																
PM	Disease incidence	6.48E-06	4.89E-09	ND	ND	2.26E-09	0.00	1.16E-07	0.00	3.53E-09	0.00	0.00	2.38E-09	2.88E-08	4.11E-09	-3.07E-06
IRP*[1]	kBq U235-eq.	15.68	2.05E-03	ND	ND	5.37E-03	0.00	3.00E-02	0.00	0.11	0.00	0.00	8.26E-04	0.82	8.27E-04	-15.58
ETP-fw*[2]	CTUe	2054.90	7.66	ND	ND	0.46	0.00	52.89	0.00	1.82	0.00	0.00	3.08	13.80	0.34	-494.32
HTP-c*[2]	CTUh	6.11E-08	1.56E-10	ND	ND	6.43E-11	0.00	8.36E-10	0.00	6.07E-11	0.00	0.00	6.27E-11	4.81E-10	5.27E-11	-3.84E-08
HTP-nc*[2]	CTUh	1.61E-06	8.13E-09	ND	ND	1.73E-09	0.00	2.57E-08	0.00	1.49E-09	0.00	0.00	3.34E-09	1.20E-08	5.80E-09	-8.72E-07
SQP*[2]	dimensionless	823.56	4.58	ND	ND	0.21	0.00	25.29	0.00	1.62	0.00	0.00	1.84	12.20	0.15	-82.77

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.

Results per m² 40 mm ALU frame (solid filling panels)																
	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	92.84	0.47	ND	ND	8.37E-02	0.00	0.44	0.00	0.20	0.00	0.00	0.18	2.09	2.17E-02	-83.44
GWP-f	kg CO_2 equivalent	96.70	0.48	ND	ND	8.33E-02	0.00	0.57	0.00	0.20	0.00	0.00	0.18	2.08	2.24E-02	-83.44
GWP-b	kg CO_2 equivalent	-3.85	-6.64E-03	ND	ND	4.07E-04	0.00	-0.13	0.00	2.15E-03	0.00	0.00	-2.53E-03	8.88E-03	-7.44E-04	-1.45E-02
GWP-l	kg CO_2 equivalent	4.20E-02	4.35E-03	ND	ND	1.81E-05	0.00	1.10E-03	0.00	2.13E-05	0.00	0.00	1.66E-03	8.89E-05	6.96E-05	-1.57E-02
ODP	kg CFC-11-eq.	1.80E-07	4.11E-14	ND	ND	5.47E-13	0.00	5.51E-09	0.00	3.63E-12	0.00	0.00	1.57E-14	1.49E-11	5.70E-14	-1.52E-08
AP	mol H^+-eq.	0.45	4.15E-04	ND	ND	1.78E-04	0.00	5.15E-03	0.00	4.20E-04	0.00	0.00	2.08E-04	1.85E-03	1.59E-04	-0.30
EP-fw	kg P-eq.	1.17E-04	1.71E-06	ND	ND	1.68E-07	0.00	2.19E-06	0.00	7.33E-07	0.00	0.00	6.53E-07	3.02E-06	4.51E-08	-5.66E-05
EP-m	kg N-eq.	6.75E-02	1.11E-04	ND	ND	4.47E-05	0.00	4.75E-04	0.00	1.00E-04	0.00	0.00	7.24E-05	4.38E-04	4.11E-05	-5.45E-02
EP-t	mol N-eq.	0.73	1.45E-03	ND	ND	4.80E-04	0.00	5.10E-03	0.00	1.05E-03	0.00	0.00	8.51E-04	4.89E-03	4.52E-04	-0.59
POCP	kg NMVOC-eq.	0.21	3.41E-04	ND	ND	1.64E-04	0.00	1.66E-03	0.00	2.67E-04	0.00	0.00	1.83E-04	1.18E-03	1.24E-04	-0.16
ADPF*²	MJ	1349.65	6.38	ND	ND	1.30	0.00	8.53	0.00	4.13	0.00	0.00	2.43	17.10	0.30	-1127.69
ADPE*²	kg Sb equivalent	9.78E-04	3.03E-08	ND	ND	6.73E-09	0.00	1.57E-05	0.00	3.04E-08	0.00	0.00	1.15E-08	1.26E-07	1.03E-09	-5.07E-04
WDP*²	m^3 world-eq. deprived	14.69	5.41E-03	ND	ND	1.97E-02	0.00	0.32	0.00	4.37E-02	0.00	0.00	2.06E-03	0.30	2.46E-03	-5.46
Resource management																
PERE	MJ	543.47	0.45	ND	ND	0.29	0.00	6.71	0.00	2.47	0.00	0.00	0.17	10.20	4.86E-02	-351.71
PERM	MJ	40.90	0.00	ND	ND	0.00	0.00	1.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	584.37	0.45	ND	ND	0.29	0.00	8.07	0.00	2.47	0.00	0.00	0.17	10.20	4.86E-02	-351.71
PENRE	MJ	973.31	6.40	ND	ND	1.31	0.00	8.40	0.00	4.13	0.00	0.00	2.44	385.85	4.02	-1127.78
PENRM	MJ	376.33	0.00	ND	ND	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	-368.75	-3.72	0.00
PENRT	MJ	1349.64	6.40	ND	ND	1.31	0.00	8.53	0.00	4.13	0.00	0.00	2.44	17.10	0.30	-1127.78
SM	kg	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW	m^3	1.27	4.98E-04	ND	ND	6.40E-04	0.00	1.90E-02	0.00	1.99E-03	0.00	0.00	1.90E-04	1.09E-02	7.54E-05	-0.71
Categories of waste																
HWD	kg	2.86E-06	2.37E-11	ND	ND	-3.20E-12	0.00	5.14E-08	0.00	-3.23E-10	0.00	0.00	9.03E-12	-1.32E-09	6.50E-12	-1.32E-06
NHWD	kg	24.66	9.23E-04	ND	ND	7.60E-04	0.00	0.31	0.00	3.02E-03	0.00	0.00	3.52E-04	1.74E-02	1.49	-16.79
RWD	kg	6.86E-02	8.28E-06	ND	ND	4.10E-05	0.00	-2.73E-04	0.00	6.57E-04	0.00	0.00	3.16E-06	2.71E-03	3.40E-06	-7.94E-02
Output material flows																
CRU	kg	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	kg	0.00	0.00	ND	ND	0.00	0.00	5.00E-02	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00
MER	kg	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	MJ	0.55	0.00	ND	ND	0.00	0.00	1.83E-02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EET	MJ	1.55	0.00	ND	ND	0.00	0.00	5.17E-02	0.00	0.00	0.00	0.00	0.00	0.00	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 m² 40 mm ALU frame (solid filling panels)															
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Additional environmental impact indicators																
PM	Disease incidence	5.22E-06	2.84E-09	ND	ND	2.26E-09	0.00	7.17E-08	0.00	3.53E-09	0.00	0.00	1.31E-09	1.52E-08	1.95E-09	-3.12E-06
IRP*[1]	kBq U235-eq.	13.83	1.19E-03	ND	ND	5.37E-03	0.00	-9.72E-02	0.00	0.11	0.00	0.00	4.55E-04	0.45	3.93E-04	-17.18
ETP-fw*[2]	CTUe	508.42	4.46	ND	ND	0.46	0.00	3.71	0.00	1.82	0.00	0.00	1.70	7.55	0.16	-412.32
HTP-c*[2]	CTUh	5.27E-08	9.07E-11	ND	ND	6.43E-11	0.00	5.52E-10	0.00	6.07E-11	0.00	0.00	3.46E-11	2.58E-10	2.51E-11	-3.81E-08
HTP-nc*[2]	CTUh	1.22E-06	4.72E-09	ND	ND	1.73E-09	0.00	1.35E-08	0.00	1.49E-09	0.00	0.00	1.84E-09	6.38E-09	2.76E-09	-8.38E-07
SQP*[2]	dimensionless	713.25	2.66	ND	ND	0.21	0.00	21.47	0.00	1.62	0.00	0.00	1.02	6.70	7.25E-02	-78.77

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.

	Results per m² of steel panels with PMMA windows															
	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	32.19	0.49	ND	ND	8.37E-02	0.00	0.73	0.00	0.20	0.00	0.00	0.19	2.98	2.37E-02	-14.94
GWP-f	kg CO_2 equivalent	35.43	0.50	ND	ND	8.33E-02	0.00	0.84	0.00	0.20	0.00	0.00	0.19	2.97	2.45E-02	-14.94
GWP-b	kg CO_2 equivalent	-3.24	-6.90E-03	ND	ND	4.07E-04	0.00	-0.11	0.00	2.15E-03	0.00	0.00	-2.66E-03	9.38E-03	-8.12E-04	-5.88E-03
GWP-l	kg CO_2 equivalent	3.86E-02	4.52E-03	ND	ND	1.81E-05	0.00	1.27E-03	0.00	2.13E-05	0.00	0.00	1.75E-03	9.43E-05	7.60E-05	-7.28E-03
ODP	kg CFC-11-eq.	1.97E-07	4.27E-14	ND	ND	5.47E-13	0.00	6.08E-09	0.00	3.63E-12	0.00	0.00	1.65E-14	1.58E-11	6.22E-14	-1.51E-08
AP	mol H^+-eq.	0.11	4.31E-04	ND	ND	1.78E-04	0.00	2.18E-03	0.00	4.20E-04	0.00	0.00	2.20E-04	2.02E-03	1.73E-04	-4.91E-02
EP-fw	kg P-eq.	1.26E-04	1.78E-06	ND	ND	1.68E-07	0.00	3.62E-06	0.00	7.33E-07	0.00	0.00	6.87E-07	3.19E-06	4.93E-08	-2.28E-05
EP-m	kg N-eq.	2.32E-02	1.16E-04	ND	ND	4.47E-05	0.00	5.22E-04	0.00	1.00E-04	0.00	0.00	7.62E-05	4.77E-04	4.48E-05	-8.76E-03
EP-t	mol N-eq.	0.24	1.51E-03	ND	ND	4.80E-04	0.00	5.51E-03	0.00	1.05E-03	0.00	0.00	8.97E-04	5.51E-03	4.93E-04	-9.40E-02
POCP	kg NMVOC-eq.	8.12E-02	3.54E-04	ND	ND	1.64E-04	0.00	1.86E-03	0.00	2.67E-04	0.00	0.00	1.92E-04	1.29E-03	1.35E-04	-2.92E-02
ADPF*²	MJ	581.93	6.64	ND	ND	1.30	0.00	14.12	0.00	4.13	0.00	0.00	2.56	18.10	0.33	-193.69
ADPE*²	kg Sb equivalent	9.73E-04	3.15E-08	ND	ND	6.73E-09	0.00	1.57E-05	0.00	3.04E-08	0.00	0.00	1.22E-08	1.33E-07	1.13E-09	-5.04E-04
WDP*²	m^3 world-eq. deprived	3.34	5.63E-03	ND	ND	1.97E-02	0.00	7.53E-02	0.00	4.37E-02	0.00	0.00	2.17E-03	0.38	2.69E-03	-1.49
Resource management																
PERE	MJ	144.48	0.47	ND	ND	0.29	0.00	4.55	0.00	2.47	0.00	0.00	0.18	10.70	5.31E-02	-18.11
PERM	MJ	35.59	0.00	ND	ND	0.00	0.00	1.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	180.07	0.47	ND	ND	0.29	0.00	5.74	0.00	2.47	0.00	0.00	0.18	10.70	5.31E-02	-18.11
PENRE	MJ	182.82	6.66	ND	ND	1.31	0.00	13.86	0.00	4.13	0.00	0.00	2.57	406.41	4.25	-194.78
PENRM	MJ	400.09	0.00	ND	ND	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	-388.31	-3.92	0.00
PENRT	MJ	582.91	6.66	ND	ND	1.31	0.00	14.12	0.00	4.13	0.00	0.00	2.57	18.10	0.33	-194.78
SM	kg	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW	m^3	0.20	5.18E-04	ND	ND	6.40E-04	0.00	4.90E-03	0.00	1.99E-03	0.00	0.00	2.00E-04	1.32E-02	8.23E-05	-6.35E-02
Categories of waste																
HWD	kg	2.58E-05	2.46E-11	ND	ND	-3.20E-12	0.00	8.16E-07	0.00	-3.23E-10	0.00	0.00	9.51E-12	-1.39E-09	7.09E-12	-1.28E-06
NHWD	kg	1.90	9.59E-04	ND	ND	7.60E-04	0.00	0.11	0.00	3.02E-03	0.00	0.00	3.70E-04	2.15E-02	1.63	-0.19
RWD	kg	1.60E-02	8.61E-06	ND	ND	4.10E-05	0.00	4.80E-04	0.00	6.57E-04	0.00	0.00	3.32E-06	2.85E-03	3.72E-06	-4.28E-03
Output material flows																
CRU	kg	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	kg	0.00	0.00	ND	ND	0.00	0.00	6.73E-02	0.00	0.00	0.00	0.00	0.00	2.02	0.00	0.00
MER	kg	0.00	0.00	ND	ND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	MJ	0.58	0.00	ND	ND	0.00	0.00	1.93E-02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EET	MJ	1.63	0.00	ND	ND	0.00	0.00	5.43E-02	0.00	0.00	0.00	0.00	0.00	0.00	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 m² of steel panels with PMMA windows															
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Additional environmental impact indicators																
PM	Disease incidence	1.41E-06	2.96E-09	ND	ND	2.26E-09	0.00	3.02E-08	0.00	3.53E-09	0.00	0.00	1.38E-09	1.65E-08	2.13E-09	-5.55E-07
IRP*[1]	kBq U235-eq.	2.23	1.24E-03	ND	ND	5.37E-03	0.00	6.13E-02	0.00	0.11	0.00	0.00	4.80E-04	0.48	4.29E-04	-0.85
ETP-fw*[2]	CTUe	253.38	4.63	ND	ND	0.46	0.00	6.48	0.00	1.82	0.00	0.00	1.79	7.99	0.18	-74.92
HTP-c*[2]	CTUh	2.33E-08	9.43E-11	ND	ND	6.43E-11	0.00	3.62E-10	0.00	6.07E-11	0.00	0.00	3.64E-11	2.77E-10	2.74E-11	-1.45E-08
HTP-nc*[2]	CTUh	7.74E-07	4.91E-09	ND	ND	1.73E-09	0.00	2.07E-08	0.00	1.49E-09	0.00	0.00	1.94E-09	6.87E-09	3.01E-09	-1.77E-07
SQP*[2]	dimensionless	610.60	2.77	ND	ND	0.21	0.00	20.31	0.00	1.62	0.00	0.00	1.07	7.09	7.91E-02	-11.47

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

The environmental impacts of

- PG 1: 80mm aluminium frame (1/2 PMMA, 1/2 hard glass filling)
- PG 2: 40mm aluminium frame (solid filling panels)
- PG 3: Steel panels with PMMA windows

differ strongly/significantly from each other. The differences lie in the different pre-products and raw materials used. This was mainly due to the different types of panels in the product categories and the differences in the mass of the panels used.

Product group 1:
In the area of production, the environmental impacts of product group 1 arise primarily from the use of aluminum in its upstream chains. Steel, glass, PA 6, PMMA and the motor have a minor influence. In the utilisation phase, power consumption has a moderate influence.

When recycling the products, around 29% of the environmental impacts of the core indicators (without WDP, as not supported by the software) occurring during the life cycle can be credited for aluminum in scenario D. The value for the motor is around 4%, glass and electrical components are at 3%, PE at 2% and steel at 1%. All other ingredients are less than one percent.

Product group 2:
In PG 2, the environmental impact of production is primarily caused by the use of aluminum and its upstream chain. The use of steel has a moderate influence. In the utilisation phase, power consumption has a moderate influence.

When recycling the products, around 45% of the environmental impacts of the core indicators (without WDP, as not supported by the software) occurring in the life cycle can be credited for aluminum in scenario D. The value for the motor is around 7%, for steel and the electrical component 1%. All other ingredients are less than one percent.

Product group 3:
For PG 3, the use of steel and PU in production has a major influence on the environmental impact. The input materials aluminum, PU, SAN and the packaging material cardboard have a smaller influence. In the utilisation phase, power consumption has a moderate influence.

When recycling the products, the motor can be credited with around 9% of the environmental impacts of the core indicators (without WDP, as not supported by the software) occurring in the life cycle in scenario D. The value for steel is 7%, for the electrical component 5%, for aluminum 3% and for PE 2%. All other ingredients are less than one percent.

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.

Some LCA results differ considerably from the results presented in the EPD prepared five years ago. The reasons for this are that other, more suitable „LCA for Experts“ data sets were used, the background data in „LCA for Experts“ has changed and a new data collection of the production was carried out by the declaration holder. In addition, the normative specification has changed from DIN EN 15804:2012+A1:2013 to DIN EN 15804-2012+A2:2018.

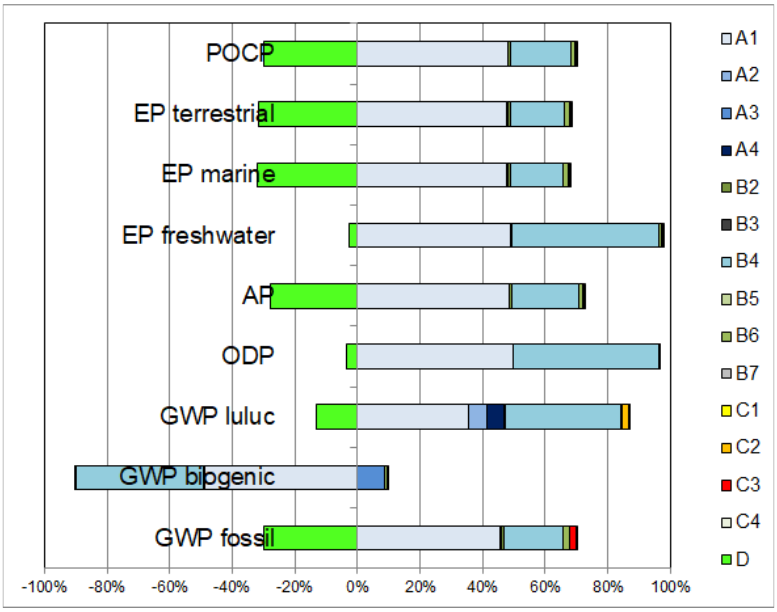
The charts below show the allocation of the main environmental impacts.

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

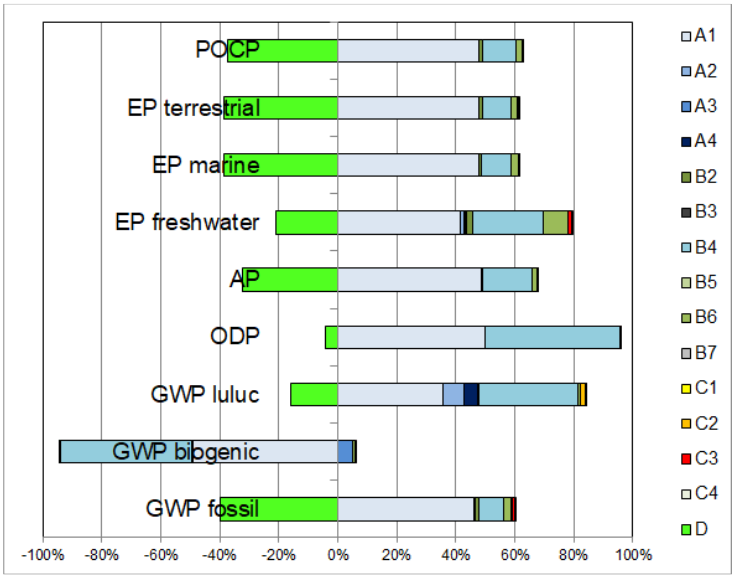
Diagrams

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

PG 1: 80mm ALU frame (1/2 PMMA, 1/2 hard glass filling)



PG 2: 40mm ALU frame (solid filling panels)



PG 3: Steel panels with PMMA windows

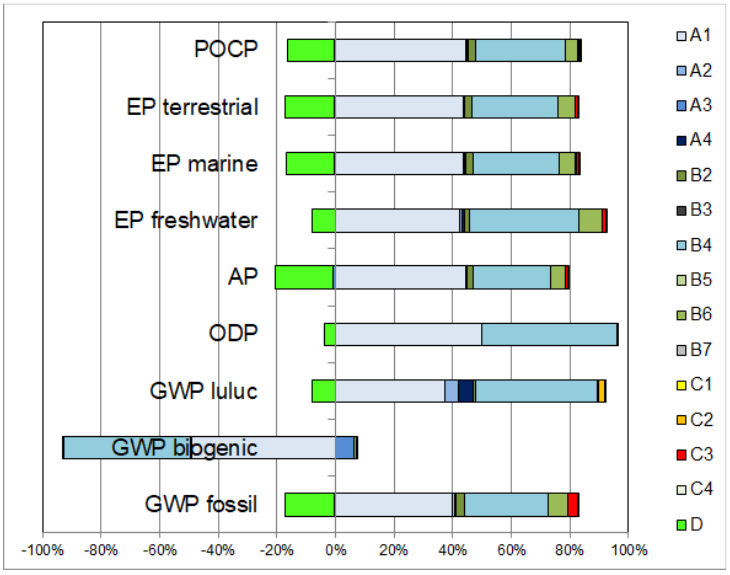


Illustration 2 Percentage of the modules in selected environmental impact indicators

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 of the report took place in the course of verification of the EPD and was carried out by the external auditor Patrick Wortner.

7 General information regarding the EPD

Comparability

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

The detailed individual results of the products were summarised on the basis of conservative assumptions and differ from the average results. Identification of the product groups and the resulting variations are documented in the background report.

Communication

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

Verification

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

This Declaration is based on the PCR Document “PCR Part A" PCR-A-1.0:2023 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)] Patrick Wortner
[a)] Product category rules [b)] Optional for business-to-business communication Mandatory for business-to-consumer communication (see EN ISO 14025:2010. 9.4).

Revisions of this document

No.	Date	Note	Person in charge	Testing personnel
1	17.04.2024	External verification	M. Thiele	P. Wortner

8 Bibliography

1. **Forschungsvorhaben.** *EPDs für transparente Bauelemente - Abschlussbericht.* Rosenheim : ift Rosenheim GmbH, 2011. SF-10.08.18.7-09.21/II 3-F20-09-1-067.
2. **PCR Teil A.** *Allgemeine Produktkategorieregeln für Umweltprodukdeklarationen nach EN ISO 14025 und EN 15804.* Rosenheim : ift Rosenheim, 2018.
3. **Klöpffer, and Grahl, .** *Ökobilanzen (LCA).* Weinheim : Wiley-VCH-Verlag, 2009.
4. **Eyerer, and Reinhardt, .** *Ökologische Bilanzierung von Baustoffen und Gebäuden - Wege zu einer ganzheitlichen Bilanzierung.* Basel : Birkhäuser Verlag, 2000.
5. **Gefahrstoffverordnung - GefStoffV.** *Verordnung zum Schutz vor Gefahrstoffen.* Berlin : BGBI. I S. 3758, 2017.
6. **Chemikalien-Verbotsverordnung - ChemVerbotsV.** *Verordnung über Verbote und Beschränkungen des Inverkehrbringens gefährlicher Stoffe, Zubereitungen und Erzeugnisse nach Chemikaliengesetz.* Berlin : BGBI. I S. 1328, 2017.
7. **DIN EN ISO 14040:2018-05.** *Umweltmanagement - Ökobilanz - Grundsätze und Rahmenbedingungen.* Berlin : Beuth Verlag GmbH, 2018.
8. **DIN EN ISO 14044:2006-10.** *Umweltmanagement - Ökobilanz - Anforderungen und Anleitungen.* Berlin : Beuth Verlag GmbH, 2006.
9. **EN ISO 14025:2011-10.** *Umweltkennzeichnungen und -deklarationen Typ III Umweltdecklarationen - Grundsätze und Verfahren.* Berlin : Beuth Verlag GmbH, 2011.
10. **PCR Teil B - Türen und Tore.** *Produktkategorieregeln für Umweltprodukdeklarationen nach EN ISO 14025 und EN 15804.* Rosenheim : ift Rosenheim, 2018.
11. **EN 15942:2012-01.** *Nachhaltigkeit von Bauwerken - Umweltproduktdeklarationen - Kommunikationsformate zwischen Unternehmen.* Berlin : Beuth Verlag GmbH, 2012.
12. **Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit.** *Leitfaden Nachhaltiges Bauen.* Berlin : s.n., 2016.
13. **Bundesimmissionsschutzgesetz - BImSchG.** *Gesetz zum Schutz vor schädlichen Umwelteinwirkungen durch Luftverunreinigungen, Geräusche, Erschütterungen und ähnlichen Vorgängen.* Berlin : BGBI. I S. 3830, 2017.
14. **Chemikaliengesetz - ChemG.** *Gesetz zum Schutz vor gefährlichen Stoffen - Unterteilt sich in Chemikaliensetz und eine Reihe von Verordnungen; hier relevant: Gesetz zum Schutz vor gefährlichen Stoffen.* Berlin : BGBI. I S. 1146, 2017.
15. **IKP Universität Stuttgart und PE Europe GmbH.** *GaBi 8: Software und Datenbank zur Ganzheitlichen Bilanzierung.* Leinfelden-Echterdingen : s.n., 2017.
16. **ift Rosenheim GmbH.** *Bedingungen und Hinweise zur Verwendung von ift-Prüfdokumentationen.* Rosenheim : s.n., 2016.
17. **ift-Richtlinie NA-01/4.** *Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen.* Rosenheim : ift Rosenheim GmbH, 2023.
18. **DIN EN 15804:2012+A2:2019+AC:2021.** *Nachhaltigkeit von Bauwerken - Umweltproduktdeklarationen - Grundregeln für die Produktkategorie Bauprodukte.* Berlin : Beuth Verlag GmbH, 2022.

9 Annex

Description of life cycle scenarios for overhead 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
✓	✓	✓	✓	—	—	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 6 Overview of applied life cycle stages

✓ Included in the LCA
— Not included in the LCA
* For declared B-modules, the calculation of the results is performed taking into account the specified RSL related to one year

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

The scenarios were furthermore based on the research project “EPDs for transparent building components”. (1)

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

A4 Transport

No.	Scenario	Description
A4	**Direct delivery to construction site/branch**	**40 t truck (Euro 6), diesel, 22 t payload, 85% capacity used[1], 100 km to construction site 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]
PG1	35.97	272	< 1
PG2	20.91	316	< 1
PG3	21.74	329	< 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 process (not included, informative module)

The scenario is not considered as the power requirement for the lifting platform is not known.

Informative: The amounts used for product packaging are as follows, which were accounted for in A1-A3:

Material	Mass in kg
Plastic	0.22
Timber	1.66
Cardboard	1.13

B1 Use (not included)

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

B2 Cleaning, maintenance and repair

B2.1 Cleaning

No.	Scenario	Description
B2.1	**Manual**	**Manually with suitable cleaning agents according to the manufacturer, twice a year** per m²: Water: 0.2 l/cleaning; Cleaner: 0.01l/cleaning ➔ **per m² and year:** **Water: 0.4 l/cleaning;** **Cleaner: 0.02l/cleaning**

The quantity of cleaning agent was assumed based on DIN EN 17074, as no specific figures were provided by the manufacturer.

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

The results are based on one year, taking into account the RSL.

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

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.** 0.25 kg lubricants per 50 yr (1) ➔ **per m² and year: 0.005 kg** **The following must be exchanged within the RSL*:** **Spring: one-time** **Corresponds to: R07 – Steel – 2.52 kg/m²**

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

The quantity of lubricant was assumed on the basis of DIN EN 17074, as no specific figures were provided by the manufacturer.

For updated information refer to the respective instructions for assembly/installation, operation and maintenance from ConDoor Group B.V..

The service life of the overhead doors of company ConDoor Group B.V. is optionally specified with 30 years. For scenario B2, 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 in the module maintenance and repair will be sent for recycling - metals in melt (material recycling). Benefits from B2 are specified in module D. 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.

B3 Repair

According to the manufacturer, no repairs are planned.

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

B4 Replacement

No.	Scenario	Description
B4.1	Exchange according to RSL	**The RSL is 30 years, so the door must be replaced once during the 50-year service life of the building***

*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.

Given the assumed building service life of 50 years, a one-time replacement of the door is planned. The results were based on one year, taking into account the RSL.

For updated information refer to the respective instructions for assembly/installation, operation and maintenance from ConDoor Group B.V..

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 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 ConDoor Group B.V.

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

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

B6 Operational energy use

No.	Scenario	Description
B6.1	**Average industrial use**	2,100 cycles per year Power consumption: 9.73 kWh/year (16m² door) --> Power consumption (declared unit 1m²): 0.608 kWh/year **--> Power consumption RSL:** **18.24 kWh/(30 years & m²)**
B6.2	Manual	No energy consumed when used

There is no transport consumption for energy use in buildings. Ancillary materials, consumables and water, waste materials and other scenarios are negligible.
In the following table, the results were based on one year, taking into account the RSL.

B6 Operational energy use					
Environmental impact factor	**Unit**	**B6.1**			B6.2
		PG 1	**PG 2**	**PG 3**	
Core indicators					
GWP-t	kg CO_2 equivalent	0.2	0.2	0.2	0
GWP-f	kg CO_2 equivalent	0.2	0.2	0.2	0
GWP-b	kg CO_2 equivalent	2.15E-03	2.15E-03	2.15E-03	0
GWP-l	kg CO_2 equivalent	2.13E-05	2.13E-05	2.13E-05	0
ODP	kg CFC-11-eq.	3.63E-12	3.63E-12	3.63E-12	0
AP	mol H^+-eq.	4.20E-04	4.20E-04	4.20E-04	0
EP-fw	kg P-eq.	7.33E-07	7.33E-07	7.33E-07	0
EP-m	kg N-eq.	1.00E-04	1.00E-04	1.00E-04	0

EP-t	mol N-eq.	1.05E-03	1.05E-03	1.05E-03	0
POCP	kg NMVOC-eq.	2.67E-04	2.67E-04	2.67E-04	0
ADPF	MJ	4.13	4.13	4.13	0
ADPE	kg Sb equivalent	3.04E-08	3.04E-08	3.04E-08	0
WDP	m³ world-eq. deprived	0.0437	0.0437	0.0437	0
Resource management					
PERE	MJ	2.47	2.47	2.47	0
PERM	MJ	0	0	0	0
PERT	MJ	2.47	2.47	2.47	0
PENRE	MJ	4.13	4.13	4.13	0
PENRM	MJ	0	0	0	0
PENRT	MJ	4.13	4.13	4.13	0
SM	kg	0	0	0	0
RSF	MJ	0	0	0	0
NRSF	MJ	0	0	0	0
FW	m³	1.99E-03	1.99E-03	1.99E-03	0
Categories of waste					
HWD	kg	-3.23E-10	-3.23E-10	-3.23E-10	0
NHWD	kg	3.02E-03	3.02E-03	3.02E-03	0
RWD	kg	6.57E-04	6.57E-04	6.57E-04	0
Output material flows					
CRU	kg	0.00	0.00	0.00	0
MFR	kg	0.00	0.00	0.00	0
MER	kg	0.00	0.00	0.00	0
EEE	MJ	0.00	0.00	0.00	0
EET	MJ	0.00	0.00	0.00	0
Additional environmental impact indicators					
PM	Disease incidence	3.53E-09	3.53E-09	3.53E-09	0
IRP	kBq U235-eq.	0.11	0.11	0.11	0
ETPfw	CTUe	1.82	1.82	1.82	0
HTPc	CTUh	6.07E-11	6.07E-11	6.07E-11	0
HTPnc	CTUh	1.49E-09	1.49E-09	1.49E-09	0
SQP	dimensionless	1.62	1.62	1.62	0

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 summary table.

C1 Deconstruction, demolition

No.	Scenario	Description
C1	**Dismantling, demolition**	**Gates 99 % dismantling** (1); **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 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 40 t truck (Euro 0-6 mix), diesel, 27 t payload, 80% capacity used (outward journey) and empty return trip, 100 km (round trip)**

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:** • **98% steel in melt** (UBA, 2017) • **95% aluminium in melt** (GDA, 2018) • **Remaining metals 97 % in melt** (UBA, 2017) • **Plastics 66 % thermal recycling in incineration plants** (Zukunft Bauen, 2017) • **Plastics 34 % recycled** (Zukunft Bauen, 2017) • **100% glass in melt** (EN 17074) • **Electrical components 87%** (based on waste electrical equipment 87%; UBA, 2018) • **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. Where no European data sets were available, German data sets were used.

Since this is the only scenario, the results are shown in the overall table.

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	PG1	PG2	PG3
Collection process, collected separately	kg	32.6	18.0	18.9
Collection process, collected as mixed construction waste	kg	0.3	0.2	0.2
Recovery system, for re-use	kg	0	0	0
Recovery system, for recycling	kg	28.3	16.3	16.8
Recovery system, for energy recovery	kg	1.4	0.4	0.7
Disposal	kg	3.1	1.5	1.6

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[1]
D	Recycling potential	• Steel scrap from C3 excluding the scrap used in A3 replaces 70.2% of steel; • Aluminium scrap from C3 excluding the scrap used in A3 replaces 70.2% of aluminium; • Glass recyclate from C3 excluding the cullet used in A3 replace 60% of glass; • Plastic recyclate from C3 excluding the plastics used in A3 replaces 60% of polyethylene granules; Benefits from incineration plant: Benefits from waste incineration: electricity replaces electricity mix (RER); thermal energy replaces thermal energy from European natural gas (RER).

[1] Applied value correction factor over 70.2% according to metal-specific data set, 60% according to standard data set for other materials.

The values in module D result from de-construction at the end of service life.

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
ConDoor Group B.V.
Handelsweg 31
3899 AA Zeewolde, The Netherlands

Notes
This EPD is mainly based on the work and findings of the Institut für Fenstertechnik e.V., Rosenheim (ift Rosenheim) and specifically on the ift-Richtlinie NA-01/4 Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen. (ift-Guideline NA-01/4 - Guidance on preparing Type III Environmental Product Declarations)

Layout
ift Rosenheim GmbH – 2021

Photographs (front page)
ConDoor Group B.V.

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