

# ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

|                          |                                      |
|--------------------------|--------------------------------------|
| Owner of the Declaration | REHAU Industries SE & Co. KG         |
| Publisher                | Institut Bauen und Umwelt e.V. (IBU) |
| Programme holder         | Institut Bauen und Umwelt e.V. (IBU) |
| Declaration number       | EPD-REH-20250352-IBI1-EN             |
| Issue date               | 12.08.2025                           |
| Valid to                 | 11.08.2030                           |

## RAUVOLET PP roller shutter system REHAU Industries SE & Co. KG

[www.ibu-epd.com](http://www.ibu-epd.com) | <https://epd-online.com>



## 1. General Information

### REHAU Industries SE & Co. KG

#### Programme holder

IBU – Institut Bauen und Umwelt e.V.  
Hegelplatz 1  
10117 Berlin  
Germany

#### Declaration number

EPD-REH-20250352-IBI1-EN

#### This declaration is based on the product category rules:

Special product, 01.08.2021  
(PCR checked and approved by the SVR)

#### Issue date

12.08.2025

#### Valid to

11.08.2030



Dipl.-Ing. Hans Peters  
(Chairman of Institut Bauen und Umwelt e.V.)



Florian Pronold  
(Managing Director Institut Bauen und Umwelt e.V.)

### RAUVOLET PP roller shutter system

#### Owner of the declaration

REHAU Industries SE & Co. KG  
Helmut-Wagner-Straße 1  
95111 Rehau  
Germany

#### Declared product / declared unit

1 kg cabinet roller shutter 'RAUVOLET PP roller shutter system'

#### Scope:

The EPD applies to cabinet roller shutters with the designation "RAUVOLET PP roller shutter system", consisting of:

- Guide rail (8 mm, 12 mm or flexible 8 mm); color: black
- Guide screw (8 mm or 12 mm); color: black
- Roller shutter mat (E23, E4, E8, SE26, E9 or SE16); color: uni (various colors)
- Handle strips (standard 47 mm, 36 mm, flush, standard with engagement or overlapping with engagement); color: uni (various colors)
- Handle sliders (8 mm or 12 mm); color: black or plain (various colors)
- Pilaster strip (L-shaped or overlapping); color: uni (various colors)

The "RAUVOLET PP roller shutter system" is produced at the REHAU plants in Velen and Visbek in Germany.

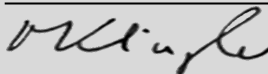
This is a representative EPD. A typical design of a "RAUVOLET PP roller shutter system" was taken into account for the underlying life cycle assessment.

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

#### Verification

|                                                                                  |            |
|----------------------------------------------------------------------------------|------------|
| The standard EN 15804 serves as the core PCR                                     |            |
| Independent verification of the declaration and data according to ISO 14025:2011 |            |
| <input type="checkbox"/>                                                         | internally |
| <input checked="" type="checkbox"/>                                              | externally |



Matthias Klingler,  
(Independent verifier)

## 2. Product

### 2.1 Product description/Product definition

The cabinet roller shutter system covered by the study is a roller shutter for horizontal use in office furniture, consisting of a guide system with guide screw and guide rail, a roller shutter mat, a pilaster strip and a handle strip with handle strip glides. The pilaster strip and guide rail are made of talcum-filled polypropylene (PP-TD). PP-TD and thermoplastic elastomer (TPE) are used to manufacture the roller shutter mat and the handle strip. The guide screw is made of polyamide 6 (PA6). The handle sliders are made of polyoxymethylene (POM).

The use of the product is subject to the respective national regulations at the place of use. In Germany for example these are the building regulations of the federal states, and the technical provisions based on these regulations.

### 2.2 Application

"RAUVOLET PP roller shutter system" is used as a roller shutter for office furniture. It is used as an individual solution for covering cabinet fronts as a space-saving alternative to hinged and folding doors.

### 2.3 Technical Data

The values given in the following table apply to the product "RAUVOLET PP roller shutter system".

#### Surface properties

| Name                                                                                              | Value                                                      | Unit |
|---------------------------------------------------------------------------------------------------|------------------------------------------------------------|------|
| Chemical resistance DIN 68861-1                                                                   | 1B                                                         |      |
| Mechanical resistance DIN 68861-4                                                                 | 4F                                                         |      |
| Light fastness in accordance to EN ISO 4892-2 (evaluation according to blue scale EN ISO 105-B02) | 7                                                          |      |
| Gloss level DIN 67530 - Measuring angle 60°                                                       | "Machine gloss" defined by material (< 10 in normal cases) |      |

Performance values of the product in relation to its characteristics according to the relevant technical regulation (no CE marking).

### 2.4 Delivery status

The roller shutter is supplied in its individual parts. The dimensions of the individual parts are selected on a customer-specific basis and according to the installation situation in the cabinet.

Specific information can be found in the technical information: [www.rehau.com/downloads/708894/rauvolett-office-rollladenprogramm.pdf](https://www.rehau.com/downloads/708894/rauvolett-office-rollladenprogramm.pdf)

### 2.5 Base materials/Ancillary materials

#### Composition of the product "RAUVOLET PP roller shutter system"

The exact composition is customer-specific.

| Name                             | Value     | Unit  |
|----------------------------------|-----------|-------|
| Guide rail (PP-TD)               | ca. 1-3   | wt. % |
| Pilaster strip (PP-TD)           | ca. 6-11  | wt. % |
| Handle strip (PP-TD + TPE)       | ca. 10-17 | wt. % |
| Roller shutter mat (PP-TD + TPE) | ca. 59-72 | wt. % |
| Guide screw (PA6)                | ca. 7-10  | wt. % |
| Handle sliders (POM)             | ca. 1     | wt. % |

1) The product **does not contain any** substances on the *ECHA list of Substances of Very High Concern (SVHC)* for

authorization according to the *Chemicals Regulation (EC) No. 1907/2006* (14.06.2023) above 0.1% by mass.

2) The product **does not** contain **any** other CMR substances of category 1A or 1B that are not on the *candidate list* according to the *Chemicals Regulation (EC) No. 1907/2006* above 0.1% by mass in at least one sub-product.

3) **No** biocidal products have been added to this construction product and it has not been treated with biocidal products (it is therefore **not** a treated product within the meaning of the *Biocidal Products Regulation (EU) No. 528/2012*).

### 2.6 Manufacture

The "RAUVOLET PP roller shutter system" is manufactured in several individual steps. These are described below. The guide rail, handle strip, pilaster strip and roller shutter mat are manufactured by REHAU. For this purpose, the compounds and color masterbatches are first produced at the Velen site using an extrusion process. These are transported to the Visbek site where they are extruded into profiles. The profiles for the guide rail, handle strip and pilaster strip are cut to length and packaged. The profiles for the roller shutter mat are cut to length, welded together and then packaged. Production waste is generated, e.g. due to the extrusion process being run in, interruptions or faulty components. The scrap is reprocessed externally and fed back into production as return material. Guide screw and handle sliders are manufactured using injection molding.

### 2.7 Environment and health during manufacturing

The legal regulations on handling exhaust air, waste water, waste and noise emissions are complied with or undercut. The health of employees is not endangered during production.

### 2.8 Product processing/Installation

The corresponding product-specific installation instructions must be observed (see chapter 4.4 "Installation instructions / assembly instructions - document overview" of the technical information <https://www.rehau.com/downloads/708894/rauvolett-office-rollladenprogramm.pdf>). You can obtain the installation instructions from your local sales office.

### 2.9 Packaging

The individual components of the roller shutter are packed on wooden pallets with cardboard, foam fleece, PET strapping and boards. The packaging quantity varies depending on the dimensions of the individual components. The wooden pallet can be reused if necessary. All other packaging materials can be recycled or thermally recovered, depending on local conditions.

### 2.10 Condition of use

The roller shutter is durable and long-lasting. There are no known special features of the material composition for the period of use (material changes during use, environmentally relevant inherent material properties).

### 2.11 Environment and health during use

No negative effects on the environment and health are to be expected during use.

### 2.12 Reference service life

No reference period of use is specified.

### 2.13 Extraordinary effects

**Fire**

## Fire classification

| Name                                                 | Value | Unit                               |
|------------------------------------------------------|-------|------------------------------------|
| Fire classification according to UL94 - 3.2 mm       | HB    | Burns and drips off                |
| Fire classification according to DIN 4102-1          | B2    | Normally flammable                 |
| Fire classification according to DIN EN ISO 15301-1  | E     |                                    |
| Fire classification according to NF P 92-501/504/505 | M4    | Highly flammable                   |
| Fire classification according to NF P 92-501/504/505 | M3    | not standard, possible if required |

## Water

No negative effects on people or the environment are to be expected in the event of unforeseen exposure to water on the roller shutter.

## Mechanical destruction

No negative effects on people or the environment are to be expected in the event of unforeseen mechanical destruction of the roller shutter.

## 2.14 Re-use phase

The roller shutter can be thermally utilized at the end of its service life (recovery of thermal and electrical energy). Material recycling does not usually take place.

## 2.15 Disposal

At the end of its life cycle, the cabinet roller shutter can be sent for thermal utilization. Due to the high calorific value, the bound energy can be used for energy recovery.

The waste code of the roller shutter system according to the *European Waste Catalogue* is 20 03 07 (bulky waste).

## 2.16 Further information

Further information can be found on the product page and in the technical information available at:

Product page: <https://interior.rehau.com/de-de/produkte/rauvolet-schrankrollladen/rauvolet-programm>

Technical data sheet: <https://www.rehau.com/downloads/708894/rauvolet-office-rollladenprogramm.pdf>

## 3. LCA: Calculation rules

### 3.1 Declared Unit

The declared unit is 1 kg of roller shutters based on a typical design. The associated packaging has a weight of 0.228 kg.

### Declared unit and mass reference

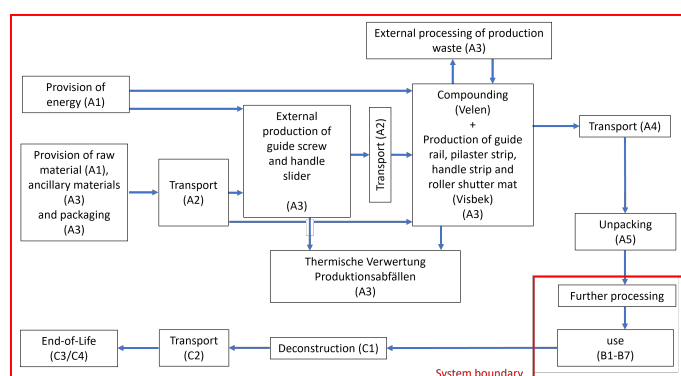
| Name          | Value | Unit              |
|---------------|-------|-------------------|
| Gross density | 1229  | kg/m <sup>3</sup> |
| Declared unit | 1     | kg                |

### 3.2 System boundary

Consideration of the entire product life cycle without taking the use phase into account (see figure).

Type of EPD: Cradle to factory gate with options (modules A1-A3, A4, A5, C1-C4 and D).

The following flow chart shows the system boundaries in the accounting of the "RAUVOLET PP roller shutter system".



The life cycle stages or process modules taken into account are listed below:

#### Module A1-A3 Production:

After the raw materials are delivered to the supplier's plant, the guide screw and handle slider are produced using injection molding. The guide screw and grip slider are then transported to the REHAU plant in Visbek.

Once the raw materials have been delivered to the REHAU plant in Velen, the compounds and masterbatches are produced using an extrusion process. Compounds and masterbatches are then transported to the REHAU plant in Visbek. In Visbek, the compounds and masterbatches are extruded into profiles (guide rail, pilaster strip, handle strip and roller shutter mat). The profiles for the roller shutter mat are cut to length directly in the production line, welded into a mat and packaged. The remaining profiles are also cut to length and packaged. Production waste generated in Visbek is processed externally and used as return material in profile extrusion. All relevant processes are listed below.

- External production of raw materials and supplies, including transportation to the plants
- External production of packaging materials for raw materials, including transportation for recycling with subsequent recycling
- External production of packaging materials for the end product, including transportation to the plants
- Provision of energy for production (electricity) at the sites
- External processing and return to production of production waste (return material)
- Transportation of intermediate products
- Thermal utilization of further waste incl. transport

#### Module A4-A5 Transport for further processing and unpacking:

In module A4, the transport of the product for further processing is taken into account. A distance of 480 km with a truck with a total weight of 32 tons was assumed for the transport. Module A5 covers the transportation of product packaging and offcuts for recycling with subsequent thermal recycling.

#### Modules C1-C4 Disposal:

The modeling of the end-of-life phase (EoL phase) includes

- Dismantling / demolition (Module C1): The installed product is removed manually.
- Transportation to waste treatment (Module C2)
- Waste treatment (modules C3, C4): Thermal utilization

No manufacturer-specific data is known for thermal recycling. Two scenarios are considered. Material recycling does not



usually take place and was not considered in this study.

Thermal utilization (modules C3, C4, D):

In this scenario, the waste is incinerated without prior treatment and used to generate energy. The resulting thermal and electrical energy is calculated as an advantage of subsequent use in Module D.

Module D Advantages and benefits of subsequent use:

The energy recovered from the thermal utilization of the waste (thermal energy and electricity) from Module C3 is taken into account as an advantage. In addition, the energy recovered from the thermal utilization of packaging waste and offcuts from Module A5 is taken into account as an advantage.

### 3.3 Estimates and assumptions

The primary data on the composition of the roller shutters and the data on energy use, transportation routes and the packaging of products and raw materials come from the companies involved in production. In the case of data gaps, these were filled with statistical averages and empirical values. The energy requirement for production at the Visbek plant was calculated using green electricity, while all other electricity requirements were calculated using the German or European residual mix.

### 3.4 Cut-off criteria

In this EPD, all known inputs and outputs were included in the assessment. Due to their very low relevance, individual processes and materials for which no data was available were not included:

- Internal transportation at the plants was not taken into account. Due to the short distances, the environmental impact is not considered relevant.
- The packaging in which the packaging material is delivered was excluded, as it can be assumed that the environmental impact accounts for less than 1% of the analysis due to the small quantities involved.
- The production of reusable packaging was cut off, as a high frequency of use is assumed and the environmental impacts account for less than 1% of the analysis.
- Process stabilizers are used in the compounds. Their proportion is < 0.2 % by weight. Their production, transportation and packaging were cut off, as it can be assumed that the environmental impacts account for less than 1% of the analysis due to the small quantities involved.
- Individual components (adhesive strips, labels and nails) of the product packaging were cut off, as it can be assumed that the environmental impacts account for less than 1% of the analysis due to the small quantities involved.
- Transportation of the raw materials for the production of pigments and TPE was cut off, as it can be assumed that the environmental impacts account for less than 1% of the analysis due to the small quantities involved.

### 3.5 Background data

Only background data from Sphera's *LCA Content database* (version 2024.2, formerly Gabi database) was used for the LCA. The modeling was carried out using the *LCA for Experts software* from Sphera (version 10.9.0.31, formerly GaBi).

### 3.6 Data quality

The specific foreground data for the production of "RAUVOLET PP roller shutter system" originate from the manufacturing companies. The geographical, technical and temporal

representativeness is rated as good to very good. Overall, well over 80% of the specific data is rated as good to very good.

The background data from the *Managed LCA Content database*, which together make up at least 80% of the core indicators of the impact assessment, have good representativeness (geographical, technical, temporal) on average.

### 3.7 Period under review

The specific data for the production of "RAUVOLET PP roller shutter system" was collected for the production year 2023. The electricity demand for the extrusion of the profiles in Visbek was measured in 2021.

### 3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product's lifespan: Europe

### 3.9 Allocation

Co-product allocation:

No co-products are created during the production (module A1-A3) of "RAUVOLET PP roller shutter system". Therefore, no co-product allocation was necessary for foreground processes.

Allocation in the plant:

Material and packaging data were available separately at REHAU. A differentiation from other products manufactured in the plant was therefore already given by the data collection and consequently no allocation was necessary.

Energy data at REHAU was available separately for each plant. An allocation was carried out using the product mass produced. The energy data from the supplier that manufactures the grip strips was available separately.

Benefits and burdens from the recycling and/or thermal utilization of packaging materials and production waste (Module A1-A3):

All process steps are considered until the waste loses its waste status. No benefits are taken into account for energy and material recovered during the energy and material recovery of packaging materials and production waste, but the energy provided and the material processed are deducted.

Benefits and burdens from the thermal recovery of the dismantled product (Module C3) and the recovery of the product packaging (Module A5):

All process steps are considered until the waste loses its waste status. In the case of thermal utilization of the dismantled product in Module C3, recovered energy (thermal and electrical energy) is taken into account as a benefit in Module D. In addition, the energy recovered from the thermal utilization of packaging waste and waste cuttings from Module A5 is taken into account as a benefit in Module D.

### 3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. Background database: *Managed LCA content* from Sphera (version 2024.2, formerly GaBi database) Software: *LCA for Experts* from Sphera (version 10.9.0.31, formerly GaBi)

## 4. LCA: Scenarios and additional technical information

### Characteristic product properties of biogenic carbon

The biogenic carbon content quantifies the amount of biogenic carbon in a construction product that leaves the factory gate. The table below shows the amount of biogenic carbon contained in 1 kg of roller shutters and the associated packaging (packaging weight: 0.228 kg).

### Information on the biogenic carbon content at the plant gate

| Name                                        | Value  | Unit       |
|---------------------------------------------|--------|------------|
| Biogenic carbon in the product              | < 0.05 | kg C/d. u. |
| Biogenic carbon in the associated packaging | 0.10   | kg C/d. u. |

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO<sub>2</sub>.

The following technical information is the basis for the declared modules or can be used for the development of specific scenarios in the context of a building assessment if modules are not declared (MND).

### Transportation to construction site (A4)

| Name               | Value | Unit |
|--------------------|-------|------|
| Transport distance | 480   | km   |

### Recycling of product packaging and offcuts (A5)

As the "RAUVOLET PP roller shutter system" is a product that is installed in a cabinet, only the unpacking and thermal utilization of the packaging and offcuts during installation were taken into account in Module A5.

| Name                                     | Value | Unit |
|------------------------------------------|-------|------|
| Thermal utilization of product packaging | 0.228 | kg   |
| Thermal utilization of offcuts           | 0.008 | kg   |

### End of life (C1-C4)

| Name                | Value | Unit |
|---------------------|-------|------|
| Thermal utilization | 1.00  | kg   |

### Reuse, recovery and recycling potential (D), relevant scenario information

The advantages and burdens of subsequent use are shown in the following table.

| Name                                                                                                    | Value | Unit |
|---------------------------------------------------------------------------------------------------------|-------|------|
| Advantages                                                                                              |       |      |
| Electrical energy (1.00 kg of roller shutters and 0.228 kg of product packaging are thermally utilized) | 4.12  | MJ   |
| Thermal energy (1.00 kg of roller shutters and 0.228 kg of product packaging are thermally utilized)    | 7.41  | MJ   |

## 5. LCA: Results

The results of the life cycle assessment and the impact assessment for the "RAUVOLET PP roller shutter system" product examined are listed in detail below.

The characterization factors of the Environmental Footprint (EF3.1) were used for the calculation.

**DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)**

| Product stage       |           |               | Construction process stage          |          | Use stage |             |        |             |               |                        |                       | End of life stage          |           |                  |          | Benefits and loads beyond the system boundaries |
|---------------------|-----------|---------------|-------------------------------------|----------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|-------------------------------------------------|
| Raw material supply | Transport | Manufacturing | Transport from the gate to the site | Assembly | Use       | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential              |
| A1                  | A2        | A3            | A4                                  | A5       | B1        | B2          | B3     | B4          | B5            | B6                     | B7                    | C1                         | C2        | C3               | C4       | D                                               |
| X                   | X         | X             | X                                   | X        | MND       | MND         | MNR    | MNR         | MNR           | MND                    | MND                   | X                          | X         | X                | X        | X                                               |

### RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 kg roller shutter system

| Parameter      | Unit                             | A1-A3     | A4       | A5       | C1 | C2       | C3       | C4 | D         |
|----------------|----------------------------------|-----------|----------|----------|----|----------|----------|----|-----------|
| GWP-total      | kg CO <sub>2</sub> eq            | 2.82E+00  | 5.3E-02  | 1.51E-01 | 0  | 6.91E-03 | 1.93E+00 | 0  | -8.49E-01 |
| GWP-fossil     | kg CO <sub>2</sub> eq            | 2.92E+00  | 5.2E-02  | 3.44E-02 | 0  | 6.78E-03 | 1.93E+00 | 0  | -8.45E-01 |
| GWP-biogenic   | kg CO <sub>2</sub> eq            | -1.02E-01 | 1.32E-04 | 1.16E-01 | 0  | 1.72E-05 | 4.69E-05 | 0  | -3.63E-03 |
| GWP-luluc      | kg CO <sub>2</sub> eq            | 3.48E-03  | 8.86E-04 | 1.15E-04 | 0  | 1.15E-04 | 8.57E-05 | 0  | -7.65E-05 |
| ODP            | kg CFC11 eq                      | 3.98E-11  | 5.31E-15 | 1.69E-14 | 0  | 6.92E-16 | 2.08E-13 | 0  | -7.46E-12 |
| AP             | mol H <sup>+</sup> eq            | 5.46E-03  | 8.36E-05 | 3.93E-05 | 0  | 1.09E-05 | 5.53E-04 | 0  | -8.81E-04 |
| EP-freshwater  | kg P eq                          | 1.12E-05  | 2.25E-07 | 3.33E-08 | 0  | 2.93E-08 | 1.42E-07 | 0  | -1.4E-06  |
| EP-marine      | kg N eq                          | 1.38E-03  | 3.23E-05 | 1.35E-05 | 0  | 4.21E-06 | 2.26E-04 | 0  | -2.7E-04  |
| EP-terrestrial | mol N eq                         | 1.39E-02  | 3.78E-04 | 1.76E-04 | 0  | 4.93E-05 | 2.9E-03  | 0  | -2.9E-03  |
| POCP           | kg NMVOC eq                      | 4.57E-03  | 7.81E-05 | 3.54E-05 | 0  | 1.02E-05 | 5.96E-04 | 0  | -7.64E-04 |
| ADPE           | kg Sb eq                         | 7.15E-07  | 4.49E-09 | 7.46E-10 | 0  | 5.85E-10 | 2.76E-09 | 0  | -7.27E-08 |
| ADPF           | MJ                               | 6.68E+01  | 6.88E-01 | 1.24E-01 | 0  | 8.97E-02 | 5.18E-01 | 0  | -1.51E+01 |
| WDP            | m <sup>3</sup> world eq deprived | 4.83E-01  | 7.85E-04 | 1.64E-02 | 0  | 1.02E-04 | 2.21E-01 | 0  | -9E-02    |

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

### RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 kg roller shutter system

| Parameter | Unit           | A1-A3    | A4       | A5        | C1 | C2       | C3        | C4 | D         |
|-----------|----------------|----------|----------|-----------|----|----------|-----------|----|-----------|
| PERE      | MJ             | 1.85E+01 | 5.82E-02 | 7.29E-01  | 0  | 7.58E-03 | 1.32E-01  | 0  | -4.98E+00 |
| PERM      | MJ             | 7.12E-01 | 0        | -7.12E-01 | 0  | 0        | 0         | 0  | 0         |
| PERT      | MJ             | 1.92E+01 | 5.82E-02 | 1.75E-02  | 0  | 7.58E-03 | 1.32E-01  | 0  | -4.98E+00 |
| PENRE     | MJ             | 6.72E+01 | 6.88E-01 | 4.61E-01  | 0  | 8.97E-02 | 2.61E+01  | 0  | -1.51E+01 |
| PENRM     | MJ             | 2.6E+01  | 0        | -3.37E-01 | 0  | 0        | -2.56E+01 | 0  | 0         |
| PENRT     | MJ             | 9.32E+01 | 6.88E-01 | 1.24E-01  | 0  | 8.97E-02 | 5.18E-01  | 0  | -1.51E+01 |
| SM        | kg             | 4.08E-02 | 0        | 0         | 0  | 0        | 0         | 0  | 0         |
| RSF       | MJ             | 0        | 0        | 0         | 0  | 0        | 0         | 0  | 0         |
| NRSF      | MJ             | 0        | 0        | 0         | 0  | 0        | 0         | 0  | 0         |
| FW        | m <sup>3</sup> | 1.68E-02 | 6.53E-05 | 3.91E-04  | 0  | 8.52E-06 | 5.19E-03  | 0  | -3.81E-03 |

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; 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 = Use of net fresh water

### RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 kg roller shutter system

| Parameter | Unit | A1-A3    | A4       | A5       | C1 | C2       | C3       | C4 | D         |
|-----------|------|----------|----------|----------|----|----------|----------|----|-----------|
| HWD       | kg   | 4.56E-08 | 2.23E-11 | 2.39E-11 | 0  | 2.9E-12  | 2.66E-10 | 0  | -1.01E-08 |
| NHWD      | kg   | 3.29E-02 | 1.07E-04 | 3.58E-03 | 0  | 1.4E-05  | 1.74E-01 | 0  | -7.81E-03 |
| RWD       | kg   | 8.46E-04 | 8.89E-07 | 2.01E-06 | 0  | 1.16E-07 | 2.27E-05 | 0  | -1.1E-03  |
| CRU       | kg   | 2.4E-01  | 0        | 1.43E-01 | 0  | 0        | 0        | 0  | 0         |
| MFR       | kg   | 7.65E-02 | 0        | 0        | 0  | 0        | 0        | 0  | 0         |
| MER       | kg   | 0        | 0        | 0        | 0  | 0        | 0        | 0  | 0         |
| EEE       | MJ   | 5.32E-02 | 0        | 2.23E-01 | 0  | 0        | 3.9E+00  | 0  | 0         |

|     |    |          |   |          |   |   |          |   |   |
|-----|----|----------|---|----------|---|---|----------|---|---|
| EET | MJ | 1.21E-01 | 0 | 4.02E-01 | 0 | 0 | 7.01E+00 | 0 | 0 |
|-----|----|----------|---|----------|---|---|----------|---|---|

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 OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 kg roller shutter system

| Parameter | Unit              | A1-A3    | A4       | A5       | C1 | C2       | C3       | C4 | D         |
|-----------|-------------------|----------|----------|----------|----|----------|----------|----|-----------|
| PM        | Disease incidence | 5.86E-08 | 6.78E-10 | 2.61E-10 | 0  | 8.84E-11 | 3.38E-09 | 0  | -7.22E-09 |
| IR        | kBq U235 eq       | 1.35E-01 | 1.24E-04 | 3.15E-04 | 0  | 1.62E-05 | 3.54E-03 | 0  | -1.81E-01 |
| ETP-fw    | CTUe              | 3.29E+01 | 5.06E-01 | 8.04E-02 | 0  | 6.6E-02  | 2.5E-01  | 0  | -2.11E+00 |
| HTP-c     | CTUh              | 1.12E-09 | 1.02E-11 | 2.58E-12 | 0  | 1.32E-12 | 1.65E-11 | 0  | -1.72E-10 |
| HTP-nc    | CTUh              | 3.09E-08 | 4.52E-10 | 1.03E-10 | 0  | 5.9E-11  | 2.54E-10 | 0  | -4.05E-09 |
| SQP       | SQP               | 0        | 0        | 0        | 0  | 0        | 0        | 0  | 0         |

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (carcinogenic); HTP-nc = Potential comparative Toxic Unit for humans (not carcinogenic); SQP = Potential soil quality index

Restriction notice 1 - applies to the indicator 'Potential effect of human exposure to U235'.

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

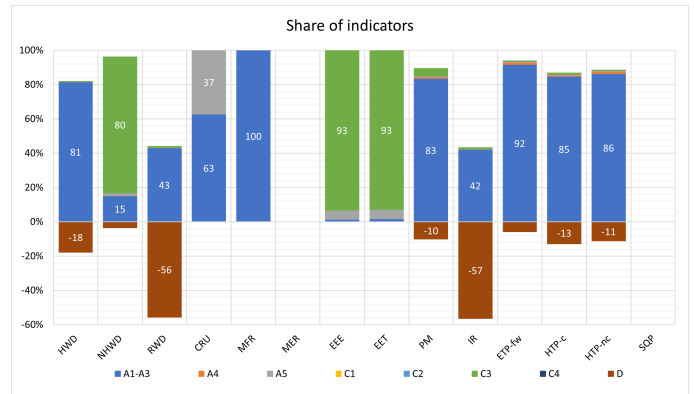
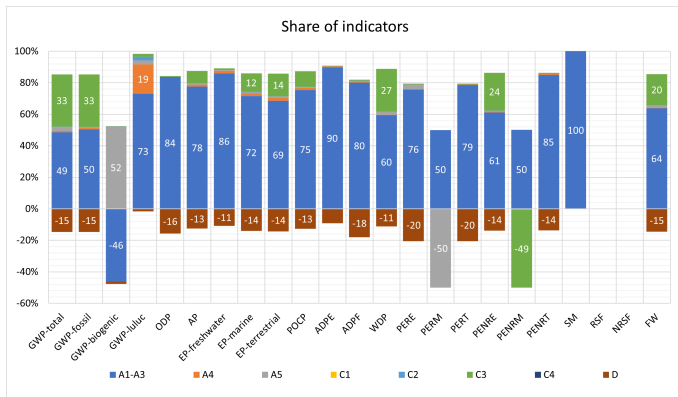
Restriction notice 2 - applies to the indicators: 'Potential for depletion of abiotic resources - non-fossil resources', 'Potential for depletion of abiotic resources - fossil fuels', 'Water depletion potential (user)', 'Potential toxicity comparison unit forecosystems', 'Potential toxicity comparison unit for humans - carcinogenic effect', 'Potential toxicity comparison unit for humans - non-carcinogenic effect', 'Potential soil quality index'.

The results of this environmental impact indicators must be used with caution, as the uncertainties in these results are high or because there is only limited experience with the indicators.

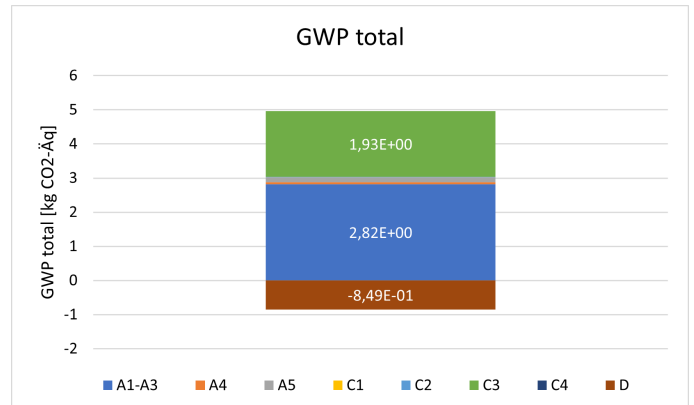
## 6. LCA: Interpretation

In the following section, the LCA results are presented and interpreted graphically. The figures show the percentage shares of the modules in the indicators.

Many of the indicators on environmental impacts and resource consumption are dominated by the production phase (modules A1-A3). Waste treatment (Module C3) also has a significant share of the indicators. Furthermore the effects within the system boundaries can be partially compensated for by utilization potentials outside the system boundaries (Module D). Transport for further processing (Module A4) and assembly (Module A5) play a greater role for only a few indicators.



The following figure shows the LCA results for the indicator "GWP total" (global warming potential). The illustration shows the absolute values (kg CO<sub>2</sub>-eq.).



"GWP total" is dominated by the production phase (modules



A1-A3) and waste treatment (module C3). The effects within the system boundaries can be partially compensated by recovery

potentials outside the system boundaries (Module D).

## 7. Requisite evidence

### VOC measurement

VOC measurement in accordance with VDA 278

Conditioning: 7 days at 23 °C

Gaseous emissions (VOC) are quantified against an external toluene standard, while condensable emissions (FOG) are quantified against hexadecane (C16-n-alkane). The respective

concentrations are given in ppm (mg/kg) as total emissions in toluene or hexadecane equivalents.

| Name | Value | Unit |
|------|-------|------|
| VOC  | 358   | µg/g |
| FOG  | 174   | µg/g |

## 8. References

### Standards

#### EN 15804

EN 15804:2012+A2:2019+AC:2021, Nachhaltigkeit von Bauwerken – Umweltproduktdeklarationen – Grundregeln für die Produktkategorie Bauprodukte.

#### ISO 14025

EN ISO 14025:2011, Umweltkennzeichnungen und -deklarationen – Typ III Umweltdeklarationen – Grundsätze und Verfahren.

### Further literature

#### IBU 2021

Institut Bauen und Umwelt e.V.: Allgemeine Anleitung für das EPD-Programm des Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021  
<http://www.ibu-epd.com>

#### PCR Teil A

Produktkategorieregeln für gebäudebezogene Produkte und Dienstleistungen: Rechenregeln für die Ökobilanz und Anforderungen an den Projektbericht nach EN 15804+A2:2019,

Version 1.4, Institut Bauen und Umwelt e. V. (IBU), Berlin, Apr. 2024.

#### PCR Teil B

Anforderungen an die EPD für Spezialprodukte, Version 7: PCR Anleitungstext für gebäudebezogene Produkte und Dienstleistungen, Institut Bauen und Umwelt e. V. (IBU), Berlin, Jul. 2023.

#### European Waste Catalogue

Bundesministerium der Justiz (2001): Verordnung über das Europäische Abfallverzeichnis. - URL: <https://www.gesetze-iminternet.de/avv/AVV.pdf> (last access 01.04.2025)

### Title of the software/database

#### Database

Managed LCA Content (ehemals GaBi-Datenbank), Version 2024.2. Chicago (USA): Sphera Solutions, Inc. (last access 01.04.2025).

#### Software

LCA for Experts (formerly GaBi), Version 10.9.0.31. Chicago (USA): Sphera Solutions, Inc. (last access 01.04.2025).

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