# Environmental Product Declaration (EPD)

Declaration Code: EPD-SEK-GB-97.0

**Schiedel s.r.o.**

# Piping systems

# Stainless steel chimney systems

**Basis:**

DIN EN ISO 14025
EN 15804 + A2

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

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| | |
|---|---|
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| **Practitioner of the LCA** | ift Rosenheim GmbH<br>Theodor-Gietl-Straße 7-9<br>D-83026 Rosenheim |
| **Declaration holder** | Schiedel s.r.o.<br>Modlanská 1<br>415 02 Teplice (CZ)<br>www.schiedel.com |
| **Declaration code** | EPD-SEK-GB-97.0 |
| **Designation of declared product** | Stainless steel chimney systems |
| **Scope** | Single-wall stainless steel flue pipes for renovating existing chimneys or for creating connecting pipes.<br>Double-wall chimney systems and connecting pipes for commercial construction, for indoor and outdoor use. |
| **Basis** | This EPD was prepared on the basis of EN ISO 14025:2011 and DIN EN 15804:2012+A2:2019. In addition, the “Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen” (Guidance on preparing Type III Environmental Product Declarations) applies. The Declaration is based on the PCR documents “PCR Part A” PCR-A-2.0:2025 and "Rohrleitungssysteme einschließlich Verbindungs- und Anschlusstechnik“ PCR RS-1.0: 2022. |
| **Validity** | Publication date: 30.10.2025 / Last revision: 18.12.2025 / Valid until 30.10.2030<br>This verified company Environmental Product Declaration 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 includes both the data collected at the production site of Schiedel s.r.o. and the generic data from the ”LCA for Experts 10“ database. LCA calculations were carried out for the included “cradle to grave” life cycle including all upstream chains (e.g. raw material extraction, etc.). |
| **Notes** | The “Conditions and Guidance on the Use of ift Test Documents” apply.<br>The declaration holder assumes full liability for the underlying data, certificates and verifications. |

| | | |
|---|---|---|
| Christoph Seehauser<br>Deputy Head of Sustainability | Dr. Torsten Mielecke<br>Chairman of Expert Committee<br>ift-EPD and PCR | Prof. Dr.-Ing. Eric Brehm<br>External verifier |

# 1 General product information

**Product definition**

The EPD relates to the product group Piping systems and applies to:

**1 m of Stainless steel chimney system**
**made by Schiedel s.r.o.**

The declared unit is obtained as follows:

| Assessed product | Declared unit | Length weight |
|---|---|---|
| **Product group 1:** Prima Plus<br>Single-walled chimney system<br>inner diameter 150 mm<br>unpainted / bare | 1 m | 2.97 kg/m |
| **Product group 2:** ICS 25<br>Double-walled chimney system<br>inner diameter 180 mm<br>unpainted / bare | 1 m | 10.01 kg/m |
| **Product group 3:** Permeter 50<br>Double-walled chimney system<br>inner diameter 180 mm<br>powder-coated | 1 m | 15.31 kg/m |

**Table 1**: Product groups

The average unit is calculated as follows:
Directly used material flows are determined using predefined reference products and allocated to the declared unit. All other inputs and outputs during production are allocated to the declared unit on a pro rata basis based on the quantities produced. The reference period is the year 2024.

The reference products are complete stainless steel chimney systems including all fasteners, standard attachments and features with a total height of approximately 8 m.

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

| Product group 1 | Product group 2 | Product group 3 |
|---|---|---|
| **Prima Plus** | **ICS 25** | **Permeter 50** |
| Prima Smooth | ICS 5000 25 | Permeter 25 |
| ME | HP 5000 25 | ICS 5000 50 |
| HP SW | MF (up to DN400) | ICS 50 |
| | ICID | MF (≥ DN450) |
| | | Permeter smooth 50 |
| | | Permeter smooth 25 |
| | | AD, AM, AT |

**Table 2**: Product groups

## Product description

**Prima Plus**:
Single-walled stainless steel exhaust pipe, available in diameters from 80 to 1200 mm, the elements are made of 1.4404 stainless steel with a wall thickness of 0.6 to 1.0 mm. It can be used in negative pressure up to exhaust gas temperatures of 600 ℃ and is resist ant to soot fires. At temperatures up to 200 ℃, it can be used for overp ressure up to 200 Pa thanks to silicone seals at the connections.

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

**ICS 25**:
Double-walled chimney system and connecting pipe, available in diameters from 80 to 900 mm, the elements consist of:

- Inner pipe made of 1.4404 stainless steel with a wall thickness of 0.5 or 0.6 mm (optionally 1.0 mm),
- A 25 mm thick thermal insulation layer made of mineral fibres,
- Outer pipe made of 1.4301 stainless steel with a wall thickness of 0.5 to 0.7 mm (depending on diameter),

The parts are assembled using a simple plug-in system, secured with clamping bands.

It can be used in negative pressure up to exhaust gas temperatures of 450 ℃ and is resistant to soot fires. At temperatu res up to 200 ℃, it can be used for positive pressure up to 200 Pa thanks to silicone seals at the connections.

**Permeter 50**:
Double-walled chimney system and connecting pipe, available in diameters from 80 to 350 mm, the elements consist of:

- Inner pipe made of 1.4404 stainless steel with a wall thickness of 0.5 or 0.6 mm,
- A 50 mm thick thermal insulation layer made of mineral fibres,
- Outer pipe made of 1.4301 stainless steel with a wall thickness of 0.5 to 0.7 mm (depending on diameter)

The parts are assembled using a simple plug-in system, secured with clamping bands.

It can be used in negative pressure up to exhaust gas temperatures of 600 ℃ and is resistant to soot fires. At temperatu res up to 200 ℃, it can be used for positive pressure up to 200 Pa thanks to silicone seals at the connections.

## Product manufacture

**Scope**

**Prima Plus**:
Single-walled stainless steel flue pipe for renovating existing chimneys
- for manufacturing connecting pipes,
- suitable for all fuels and types of heating appliances,
- for use with high and low flue gas temperatures,
- in positive and negative pressure

**ICS 25**:
Double-walled chimney system and connecting pipe,
- for use in residential, commercial and industrial construction;
- suitable for all fuels and types of heating appliances,
- for use with high and low exhaust gas temperatures,
- in positive and negative pressure,
- for indoor and outdoor use

**Permeter 50**:
Double-walled chimney system and connecting pipe
- For use in residential, commercial and industrial construction;
- Suitable for all fuels and types of heating appliances,
- For use with high and low exhaust gas temperatures,
- In positive and negative pressure,

for indoor and outdoor use

**Management systems**

The following management systems are in place:
- Quality management system in accordance with DIN EN ISO 9001:2015
- Environmental management system in accordance with DIN EN ISO 14001:2015

**Additional information**

For additional evidence of fitness for use or certificates of conformity, if applicable, please refer to the CE marking and the documents accompanying the product.

## 2 Materials used

**Primary materials**

The primary materials used are specified in Section 6.2 Inventory analysis (Inputs).

**Declarable substances**

The product contains no substances from the REACH candidate list (declaration dated 2nd October 2025).

All relevant safety data sheets are available from Schiedel s.r.o.

## 3 Construction process stage

**Processing recommendations, installation**

Observe the instructions for mounting/installation, operation, maintenance and disassembly, provided by the manufacturer. See www.schiedel.com

## 4 Use stage

**Emissions to the environment**

There are no known emissions into the air, soil or water, nor are any to be expected based on the material composition of the products. With regard to indoor air, this is not relevant as the products are used almost exclusively outdoors.

**Reference service life (RSL)**

The RSL information was provided by the manufacturer. The RSL shall be specified under defined reference in-use conditions and shall refer to the declared technical and functional performance of the product within the building. It shall be established in accordance with any specific rules given in European product standards, or, if not available, in accordance with a c-PCR. It shall also take into account ISO 15686-1, -2, -7 and -8. Where European product standards or a c-PCR provide guidance on deriving the RSL, such guidance shall have priority.
If it is not possible to determine the service life as the RSL in accordance with ISO 15686, the BBSR table “Nutzungsdauer von Bauteilen zur Lebenszyklusanalyse nach BNB” (service life of building components for life cycle assessment in accordance with the sustainable construction evaluation system) can be used. For further information and explanations refer to www.nachhaltigesbauen.de.

For this EPD the following applies:
For the “Cradle to grave” EPD and module D (A + B + C + D), a reference service life (RSL) shall be stated .
According to the BBSR table, a service life of 25 years is specified for Stainless steel chimney systems made by Schiedel s.r.o.

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

- Outdoor environment: extreme climatic influences may have a negative impact on the service life
- Indoor environment: No factors (e.g. humidity, temperature) known that may have a negative effect on the service life.

The service life applies solely to the characteristics specified in this EPD or the corresponding references.
The RSL does not reflect the actual life span, which is usually determined by the service life and the refurbishment of a building. It does not give any information on the useful life, warranty referring to performance characteristics or guarantees.

## 5 End-of-life stage

**Possible end-of-life stages**

The Stainless steel chimney systems are shipped to central collection points. There the products are generally shredded and sorted into their original constituents. The end-of-life stage depends on the site where the products are used and is therefore subject to the local regulations. Observe the locally applicable regulatory requirements.

This EPD presents the modules for reuse based on the scenarios in EN 17213 (current market situation).
Steel and stainless steel are completely recycled, while plastics are thermally recycled. Residual fractions are sent to landfill.

**Disposal routes**

The LCA includes the average disposal routes.

**All life cycle scenarios are detailed in the Annex.**

# 6 Life Cycle Assessment (LCA)

Environmental product declarations are based on life cycle assessments (LCAs) which use material and energy flows for the calculation and subsequent representation of environmental impacts.

Such life cycle assessments were developed for Stainless steel chimney systems, serving as the basis. The 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

**Goal**

The goal of the LCA is to demonstrate the environmental impacts of the products. In accordance with DIN EN 15804, the environmental impacts covered by this Environmental Product Declaration are presented for the entire product life cycle in the form of basic information. Apart from these, no other environmental impacts are specified.

**Data quality, data availability and geographical and time-related system boundaries**

The specific data comes exclusively from the 2024 financial year. It was recorded at the plant in 415 02 Teplice (CZ) and originates partly from business records and partly from directly read measurements. Primary data for energy, water and packaging costs, as well as for auxiliary materials and waste/offcuts, was collected from the company's own data management system and through specific measurements. At the time of the on-site plausibility check on 24 September 2025, data for energy, water and packaging costs, as well as for auxiliary materials and waste/offcuts, was available in full and was checked for validity.

Generic data comes from the Professional Database and Building Materials Database of the ‘LCA for Experts 10’ software. Both databases were last updated in 2025. Older data also comes from this database and is no more than three years old. No other generic data was used for the calculation.

Generic data is selected as accurately as possible in terms of geographical 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 replaced by comparable data or conservative assumptions, or truncated in accordance with the 1% rule.

The software system for holistic life cycle assessment 'LCA for Experts' version 10.9.3.0 with database version 2025.2 was used to model the life cycle. The LCA was evaluated using the EF3.1 impact assessment method.

The data quality complies with the requirements of EN15941:2024-10.

**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 Stainless steel chimney systems.

EPD data for insulation material was included. No additional data from upstream suppliers or other locations was taken into account.

**Cut-off criteria**

All the data that the company records, i.e. all commodities/input and raw materials used, the thermal energy used 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 to the plant in 415 02 Teplice (CZ) are determined within the company. The distance to the furthest supplier is always used. In addition to the transport distances for preliminary products, transport distances for waste are also taken into account.

Distances are available for 100 % of preliminary products, which is why transport distances can be calculated. Transport in A2 is mapped using the following standard scenario:

| Means of transport, capacity utilisation, transport kilometres |
|---|
| Transport to the factory with 34-40 t lorry (Euro 0-6 mix, GLO), diesel, 27 t payload, 61 % utilisation (according to data set), distance according to manufacturer's specifications |

In addition to transport routes for preliminary products, transport routes for waste are also taken into account.

The transport of waste generated in A3 is represented by the following standard scenario:

| Means of transport, capacity utilisation, transport kilometres |
|---|
| Transport to collection point with 34-40 t lorry (Euro 0-6 mix, GLO), diesel, 27 t payload, 50 % capacity utilisation, 100 km or manufacturer's specifications for the respective distance |

Distances are based on manufacturer specifications. Where distance specifications are missing, a distance of 100 km has been assumed.

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. All in all, 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

**Goal**

All material and energy flows are described below. The processes covered are presented as input and output parameters and refer to the declared unit.

**Life cycle stages**

The Annex shows the entire life cycle of Stainless steel chimney systems. The “Product stage” (A1 - A3), “Construction process stage” (A4 - A5), “Use stage” (B1 - B7), “End-of-life stage” (C1 - C4) and the “Benefits and loads beyond the system boundaries” (D) are considered.

**Benefits**

The below benefits have been defined in accordance with DIN EN 15804:

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

**Allocation of co-products**

No allocations of co-products are applied. Allocations (i.e. the assignment of environmental impacts of a process to several products) may have been made in the background data sets used in the ‘LCA for Experts’ database, which are stored in the associated individual documentation.

**Allocations for reuse, recycling and recovery**

If the products are reused/recycled and recovered during the product stage (rejects) the components are shredded/broken if necessary and then sorted into their single 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 state.

**Allocations beyond life cycle boundaries**

The use of recycled materials in the manufacturing process was based on the current market-specific situation. A recycling potential that reflects the economic value of the product after recycling (recyclate) was also taken into account.
The system boundary set for the recycled material refers to collection.

**Secondary material**

The use of secondary material by Schiedel s.r.o. was considered in module A3. Secondary material was not used.

## Inputs

The LCA includes the following production-relevant inputs per 1 m of Stainless steel chimney system:

### Energy

The data set '*RER: Thermal energy from natural gas Sphera*' is used for the input thermal energy from natural gas. The electricity mix for the plant is based on the Czech Republic electricity mix '*CZ: Electricity grid mix Sphera*'.

| Electricity mix / gas mix | Total | Unit |
|---|---|---|
| CZ: Electricity grid mix Sphera | 0.554 | $kgCO_2$-Äqv./kWh |
| RER: Thermal energy from natural gas Sphera | 0.070 | $kgCO_2$-Äqv./MJ |

**Table 3:** Greenhouse gas emissions from the use of electricity/gas in A3

### Water

There is no water consumption for PG1 and PG2 in the individual production process steps. For PG3, water consumption is 0.1 litres per metre of chimney system.
The consumption of freshwater specified in Section 6.3 originates (among others) from the process chain of the pre-products as well as process water in the paint shop (PG3 only).

### Raw material/pre-products

The chart below shows the share of raw materials/pre-products in %.

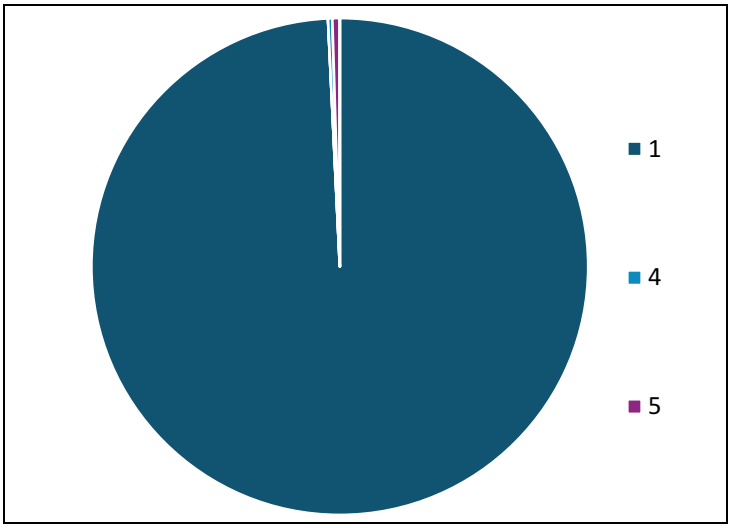



**Figure 1**: Percentage of individual materials per declared unit, PG 1

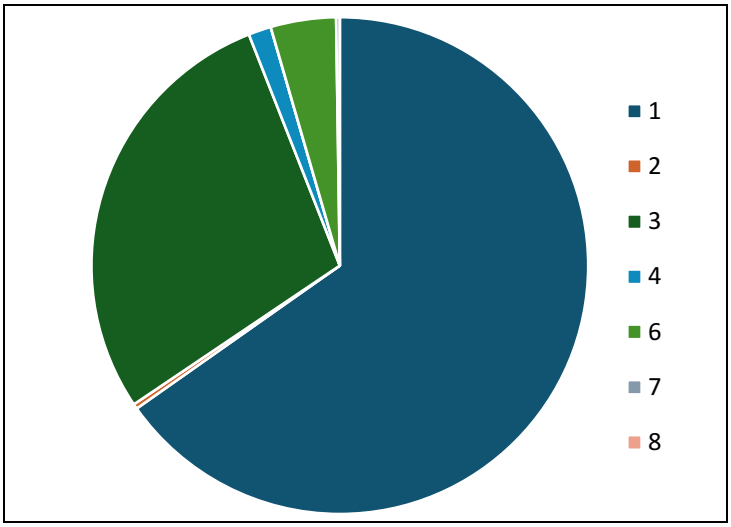



**Figure 2**: Percentage of individual materials per declared unit, PG 2

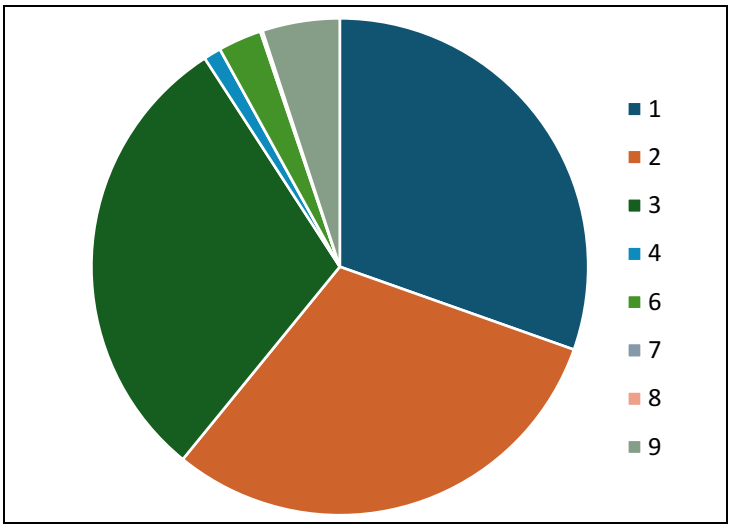



**Figure 3**: Percentage of individual materials per declared unit, PG3

| No. | Material | Mass in % | | |
|---|---|---|---|---|
| | | PG 1 | PG 2 | PG 3 |
| 1 | Stainless steel | 99.2 % | 65.2 % | 30.4 % |
| 2 | Galvanized steel | - | < 1.0 % | 30.5 % |
| 3 | Insulation | - | 28.5 % | 30.0 % |
| 4 | Silicone components | < 1.0 % | 1.5 % | 1.1 % |
| 5 | Graphite | < 1.0 % | - | - |
| 6 | Butyl components | - | 4.2 % | 2.8 % |
| 7 | PE components | - | < 1.0 % | < 1.0 % |
| 8 | Plastic (unspecified) | - | < 0.01 % | < 0.01 % |
| 9 | Powder paint | - | - | 5.0 % |

**Tabelle 4**: Darstellung der Einzelmaterialien in %

**Ancillary materials and consumables**
PG1 consumes 85 g of auxiliary and operating materials.
PG2 and PG3 consume 171 g of auxiliary and operating materials.

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

| Nr. | Material | Mass in kg/m | | |
|---|---|---|---|---|
| | | PG 1 | PG 2 | PG 3 |
| 1 | cardboard | 1.25 | 2.52 | 2.52 |
| 2 | wood | 5.90E-02 | 0.12 | 0.12 |
| 3 | PE-Film | 3.18E-02 | 6.42E-02 | 6.42E-02 |

**Table 4:** Presentation of the packaging in kg per declared unit

**Biogenic carbon content**
Only the biogenic carbon content of the associated packaging is specified, as the total mass of substances containing biogenic carbon is less than 5% of the total mass of the product and associated packaging. In accordance with EN 16449, packaging produces the following amounts of biogenic carbon :

| PG | Component | Content in kg C per m |
|---|---|---|
| 1 | Associated packaging | 0.46 |
| 2 | Associated packaging | 0.92 |
| 3 | Associated packaging | 0.92 |

Note: 1 kg C corresponds to 44/12 kg $CO_2$ eq. of biogenic carbon

**Table 5**: Biogenic carbon content of packaging at gate

GWP-b values resulting from the sequestration and release of biogenic carbon were calculated specifically for each life cycle module and are listed in Note: 1 kg C corresponds to 44/12 kg $CO_2$-eqv. of biogenic carbon Table 6. The overall results table presented in this document, issued by "LCA for Experts", has not been changed.

| Binding and release of $CO_2$ emissions in kg $CO_2$-eqv. / m | | | | | | |
|---|---|---|---|---|---|---|
| Component | | A1-A3 | A5 | C3 | C4 | D |
| PG 1 | Product | 0 | 0 | 0 | 0 | 0 |
| | Packaging | - 1.68 | + 1.68 | 0 | 0 | 0 |
| PG 2 | Product | 0 | 0 | 0 | 0 | 0 |
| | Packaging | - 3.38 | + 3.38 | 0 | 0 | 0 |
| PG 3 | Product | 0 | 0 | 0 | 0 | 0 |
| | Packaging | - 3.38 | + 3.38 | 0 | 0 | 0 |

**Note: 1 kg C corresponds to 44/12 kg $CO_2$-eqv. of biogenic carbon**

**Table 6:**Binding and release of biogenic $CO_2$ emissions in kg $CO_2$-eqv. from product and packaging per life cycle module

**Outputs**

The LCA includes the following production-relevant outputs per 1 m of Stainless steel chimney system:

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

**Waste water**
No wastewater is produced during the manufacture of product groups 1 and 2.
During the manufacture of product group 3, 0.1 litres of wastewater per metre are produced.

## 6.3 Impact assessment

**Goal**

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

**Core indicators**

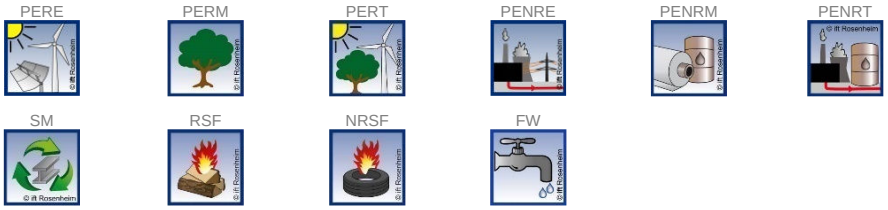
The models for impact assessment were applied as described in DIN EN 15804+A2.
The impact categories presented in the EPD as core indicators are as follows:

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

**Use of resources**

The models for impact assessment were applied as described in DIN EN 15804-A2.
The following parameters for the use of resources are shown 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 resource (PENRE)
- Non-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)

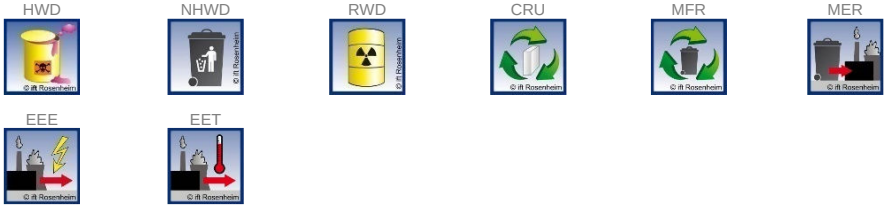



**Waste**

The waste generate during the production of 1 m of Stainless steel chimney system 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:

- Hazardous waste disposed (HWD)
- Non-hazardous waste disposed (NHWD)
- Radioactive waste disposed (RWD)
- Components for reuse (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)
- Ionising radiation, human health (IRP)
- Ecotoxicity – freshwater (ETP-fw)
- Human toxicity - cancer effect (HTP-c)
- Human toxicity - non-cancer effect (HTP-nc)
- Land use related impacts / soil quality (SQP)

PM 

IRP 

ETP-fw 

HTP-c 

HTP-nc 

SQP 

**Results per 1 m of Stainless steel chimney system, single-walled, PPL DN150 (PG1)**

| | Unit | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Core indicators** | | | | | | | | | | | | | | | | |
| **GWP-t** | kg $CO_2$ eq. | 11.62 | 1.09 | 1.95 | 0.00 | 0.00 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.00 | 2.72E-02 | 0.17 | 2.27E-03 | -7.83 |
| **GWP-f** | kg $CO_2$ eq. | 13.74 | 1.04 | 0.12 | 0.00 | 0.00 | 0.00 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 2.58E-02 | 0.17 | 2.27E-03 | -7.84 |
| **GWP-b** | kg $CO_2$ eq. | -2.18 | 4.24E-02 | 1.82 | 0.00 | 0.00 | 0.00 | -5.87E-03 | 0.00 | 0.00 | 0.00 | 0.00 | 1.06E-03 | 1.28E-03 | -7.35E-06 | 2.49E-02 |
| **GWP-l** | kg $CO_2$ eq. | 3.28E-02 | 1.06E-02 | 6.67E-05 | 0.00 | 0.00 | 0.00 | 5.77E-04 | 0.00 | 0.00 | 0.00 | 0.00 | 2.63E-04 | 4.10E-04 | 9.31E-06 | -1.53E-02 |
| **ODP** | kg CFC-11 eq. | 6.36E-12 | 1.99E-13 | 2.74E-13 | 0.00 | 0.00 | 0.00 | -8.75E-13 | 0.00 | 0.00 | 0.00 | 0.00 | 4.97E-15 | 2.83E-12 | 6.32E-15 | -5.34E-11 |
| **AP** | mol $H^+$ eq. | 8.47E-02 | 1.54E-03 | 5.24E-04 | 0.00 | 0.00 | 0.00 | 9.90E-04 | 0.00 | 0.00 | 0.00 | 0.00 | 3.80E-05 | 2.86E-04 | 1.61E-05 | -3.76E-02 |
| **EP-fw** | kg P eq. | 4.72E-05 | 2.78E-06 | 5.11E-08 | 0.00 | 0.00 | 0.00 | 9.26E-07 | 0.00 | 0.00 | 0.00 | 0.00 | 6.93E-08 | 2.66E-07 | 3.38E-09 | -4.05E-06 |
| **EP-m** | kg N eq. | 1.60E-02 | 6.31E-04 | 1.90E-04 | 0.00 | 0.00 | 0.00 | 2.36E-04 | 0.00 | 0.00 | 0.00 | 0.00 | 1.55E-05 | 6.95E-05 | 4.20E-06 | -5.15E-03 |
| **EP-t** | mol N eq. | 0.17 | 6.59E-03 | 2.39E-03 | 0.00 | 0.00 | 0.00 | 2.47E-03 | 0.00 | 0.00 | 0.00 | 0.00 | 1.62E-04 | 7.98E-04 | 4.58E-05 | -5.74E-02 |
| **POCP** | kg NMVOC eq. | 4.74E-02 | 1.37E-03 | 5.04E-04 | 0.00 | 0.00 | 0.00 | 6.72E-04 | 0.00 | 0.00 | 0.00 | 0.00 | 3.39E-05 | 1.73E-04 | 1.26E-05 | -1.59E-02 |
| **ADPF*²** | MJ | 196.96 | 13.30 | 0.62 | 0.00 | 0.00 | 0.00 | 2.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 2.54 | 2.98E-02 | -97.10 |
| **ADPE*²** | kg Sb eq. | 5.90E-04 | 6.87E-08 | 3.18E-09 | 0.00 | 0.00 | 0.00 | 7.86E-06 | 0.00 | 0.00 | 0.00 | 0.00 | 1.71E-09 | 2.58E-08 | 1.41E-10 | -1.97E-04 |
| **WDP*²** | $m^3$ world eq. deprived | 8.15 | 5.15E-03 | 0.24 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 1.28E-04 | 3.60E-02 | 2.46E-04 | -2.64 |
| **Use of resources** | | | | | | | | | | | | | | | | |
| **PERE** | MJ | 64.42 | 1.01 | 20.10 | 0.00 | 0.00 | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 0.00 | 2.51E-02 | 1.73 | 5.75E-03 | -19.70 |
| **PERM** | MJ | 19.95 | 0.00 | -19.95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **PERT** | MJ | 84.37 | 1.01 | 0.16 | 0.00 | 0.00 | 0.00 | 1.35 | 0.00 | 0.00 | 0.00 | 0.00 | 2.51E-02 | 1.73 | 5.75E-03 | -19.70 |
| **PENRE** | MJ | 194.87 | 13.30 | 2.01 | 0.00 | 0.00 | 0.00 | 2.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 3.20 | 2.98E-02 | -97.10 |
| **PENRM** | MJ | 2.09 | 0.00 | -1.40 | 0.00 | 0.00 | 0.00 | 6.91E-04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -0.66 | 0.00 | 0.00 |
| **PENRT** | MJ | 196.96 | 13.30 | 0.62 | 0.00 | 0.00 | 0.00 | 2.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 2.54 | 2.98E-02 | -97.10 |
| **SM** | kg | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **RSF** | MJ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **NRSF** | MJ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **FW** | $m^3$ | 0.26 | 5.16E-04 | 5.60E-03 | 0.00 | 0.00 | 0.00 | 3.73E-03 | 0.00 | 0.00 | 0.00 | 0.00 | 1.29E-05 | 1.46E-03 | 7.19E-06 | -8.26E-02 |
| **Waste categories** | | | | | | | | | | | | | | | | |
| **HWD** | kg | 6.44E-04 | 5.62E-10 | 3.14E-10 | 0.00 | 0.00 | 0.00 | 1.29E-05 | 0.00 | 0.00 | 0.00 | 0.00 | 1.40E-11 | 3.31E-09 | 6.52E-12 | -1.51E-08 |
| **NHWD** | kg | 0.42 | 1.89E-03 | 6.48E-02 | 0.00 | 0.00 | 0.00 | 1.42E-03 | 0.00 | 0.00 | 0.00 | 0.00 | 4.70E-05 | 3.00E-03 | 0.15 | -0.57 |
| **RWD** | kg | 1.26E-02 | 2.61E-05 | 3.04E-05 | 0.00 | 0.00 | 0.00 | 2.36E-04 | 0.00 | 0.00 | 0.00 | 0.00 | 6.50E-07 | 3.99E-04 | 3.16E-07 | -1.25E-03 |
| **Output material flows** | | | | | | | | | | | | | | | | |
| **CRU** | kg | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **MFR** | kg | 0.46 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.51E-02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.80 | 0.00 | 0.00 |
| **MER** | kg | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **EEE** | MJ | 0.44 | 0.00 | 2.96 | 0.00 | 0.00 | 0.00 | 6.97E-02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.21E-02 | 0.00 | 0.00 |
| **EET** | MJ | 0.80 | 0.00 | 5.37 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.19 | 0.00 | 0.00 |

**Key:**
**GWP-t** – climate change - total **GWP-f** – climate change - fossil **GWP-b** – climate change - biogenic **GWP-l** – climate change - land use and land use change **ODP** – ozone depletion **AP** - acidification **EP-fw** - eutrophication - aquatic freshwater **EP-m** - eutrophication - aquatic marine **EP-t** - eutrophication - terrestrial **POCP** - photochemical ozone formation **ADPF*²** - depletion of abiotic resources – fossil fuels **ADPE*²** - depletion of abiotic resources – minerals and metals **WDP*²** – water use **PERE** - use of renewable primary energy **PERM** - use of renewable primary energy resources used as raw materials **PERT** - total use of renewable primary energy **PENRE** - use of non-renewable primary energy **PENRM** - use of non-renewable primary energy resources used as raw materials **PENRT** - total use of non-renewable primary energy **SM** - use of secondary materials **RSF** - use of renewable secondary fuels **NRSF** - use of non-renewable secondary fuels **FW** - net use of freshwater **HWD** - hazardous waste disposed **NHWD** - non-hazardous waste disposed **RWD** - radioactive waste disposed **CRU** - components for reuse **MFR** - materials for recycling **MER** - materials for energy recovery **EEE** - exported electrical energy **EET** - exported thermal energy

| | Results per 1 m of Stainless steel chimney system, single-walled, PPL DN150 (PG1) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Unit** | **A1-A3** | **A4** | **A5** | **B1** | **B2** | **B3** | **B4** | **B5** | **B6** | **B7** | **C1** | **C2** | **C3** | **C4** | **D** |
| | **Additional environmental impact indicators** | | | | | | | | | | | | | | | |
| **PM** | Disease incidence | 1.34E-06 | 1.39E-08 | 2.98E-09 | 0.00 | 0.00 | 0.00 | 1.39E-08 | 0.00 | 0.00 | 0.00 | 0.00 | 3.44E-10 | 2.32E-09 | 2.00E-10 | -6.64E-07 |
| **IRP*[1]** | kBq U235 eq. | 1.20 | 3.70E-03 | 4.74E-03 | 0.00 | 0.00 | 0.00 | 2.15E-02 | 0.00 | 0.00 | 0.00 | 0.00 | 9.23E-05 | 6.59E-02 | 3.50E-05 | -0.21 |
| **ETP-fw*[2]** | CTUe | 77.50 | 17.20 | 0.26 | 0.00 | 0.00 | 0.00 | 1.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.43 | 0.43 | 2.30E-02 | -35.90 |
| **HTP-c*[2]** | CTUh | 1.97E-07 | 2.32E-10 | 1.55E-11 | 0.00 | 0.00 | 0.00 | 3.69E-09 | 0.00 | 0.00 | 0.00 | 0.00 | 5.77E-12 | 4.07E-11 | 3.96E-13 | -1.30E-08 |
| **HTP-nc*[2]** | CTUh | 2.42E-07 | 1.30E-08 | 3.52E-10 | 0.00 | 0.00 | 0.00 | 4.61E-09 | 0.00 | 0.00 | 0.00 | 0.00 | 3.23E-10 | 8.68E-10 | 1.48E-11 | -2.58E-08 |
| **SQP*[2]** | Dimensionless. | 58.22 | 5.83 | 0.18 | 0.00 | 0.00 | 0.00 | 1.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 1.02 | 7.35E-03 | -13.00 |

**Key:**
**PM** – particulate matter emissions **IRP*[1]** – ionising radiation – human health **ETP-fw*[2]** - ecotoxicity – aquatic freshwater **HTP-c*[2]** - human toxicity potential – cancer effect **HTP-nc*[2]** - human toxicity potential – non-cancer effect **SQP*[2]** – land use related impacts / soil quality

**Disclaimers**

*1 This impact category deals mainly with the eventual impact of low-dose ionising 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 1 m of Stainless steel chimney system, double-walled, 25 mm Isolierung, ICS25 DN180 (PG2)**

| | Unit | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Core indicators** | | | | | | | | | | | | | | | | |
| **GWP-t** | kg $CO_2$ eq. | 32.79 | 2.32 | 3.93 | 0.00 | 0.00 | 0.00 | 0.46 | 0.00 | 0.00 | 0.00 | 0.00 | 9.16E-02 | 1.73 | 4.90E-02 | -18.10 |
| **GWP-f** | kg $CO_2$ eq. | 37.21 | 2.20 | 0.25 | 0.00 | 0.00 | 0.00 | 0.47 | 0.00 | 0.00 | 0.00 | 0.00 | 8.71E-02 | 1.72 | 4.90E-02 | -18.10 |
| **GWP-b** | kg $CO_2$ eq. | -4.47 | 9.02E-02 | 3.68 | 0.00 | 0.00 | 0.00 | -1.27E-02 | 0.00 | 0.00 | 0.00 | 0.00 | 3.57E-03 | 4.37E-03 | -1.59E-04 | 5.36E-02 |
| **GWP-l** | kg $CO_2$ eq. | 8.65E-02 | 2.25E-02 | 1.34E-04 | 0.00 | 0.00 | 0.00 | 1.54E-03 | 0.00 | 0.00 | 0.00 | 0.00 | 8.88E-04 | 1.41E-03 | 2.01E-04 | -3.46E-02 |
| **ODP** | kg CFC-11 eq. | 8.75E-07 | 4.23E-13 | 5.52E-13 | 0.00 | 0.00 | 0.00 | 1.75E-08 | 0.00 | 0.00 | 0.00 | 0.00 | 1.67E-14 | 9.72E-12 | 1.36E-13 | -1.21E-10 |
| **AP** | mol $H^+$ eq. | 0.21 | 3.28E-03 | 1.06E-03 | 0.00 | 0.00 | 0.00 | 2.71E-03 | 0.00 | 0.00 | 0.00 | 0.00 | 1.28E-04 | 1.30E-03 | 3.46E-04 | -8.48E-02 |
| **EP-fw** | kg P eq. | 1.17E-04 | 5.90E-06 | 1.03E-07 | 0.00 | 0.00 | 0.00 | 2.30E-06 | 0.00 | 0.00 | 0.00 | 0.00 | 2.34E-07 | 9.27E-07 | 7.29E-08 | -9.39E-06 |
| **EP-m** | kg N eq. | 4.19E-02 | 1.34E-03 | 3.83E-04 | 0.00 | 0.00 | 0.00 | 6.46E-04 | 0.00 | 0.00 | 0.00 | 0.00 | 5.23E-05 | 3.38E-04 | 9.06E-05 | -1.18E-02 |
| **EP-t** | mol N eq. | 0.45 | 1.40E-02 | 4.82E-03 | 0.00 | 0.00 | 0.00 | 6.97E-03 | 0.00 | 0.00 | 0.00 | 0.00 | 5.46E-04 | 4.30E-03 | 9.88E-04 | -0.13 |
| **POCP** | kg NMVOC eq. | 0.13 | 2.92E-03 | 1.02E-03 | 0.00 | 0.00 | 0.00 | 1.92E-03 | 0.00 | 0.00 | 0.00 | 0.00 | 1.14E-04 | 8.55E-04 | 2.71E-04 | -3.63E-02 |
| **ADPF*²** | MJ | 542.73 | 28.20 | 1.24 | 0.00 | 0.00 | 0.00 | 7.16 | 0.00 | 0.00 | 0.00 | 0.00 | 1.12 | 8.86 | 0.64 | -225.00 |
| **ADPE*²** | kg Sb eq. | 7.99E-04 | 1.46E-07 | 6.42E-09 | 0.00 | 0.00 | 0.00 | 7.25E-06 | 0.00 | 0.00 | 0.00 | 0.00 | 5.77E-09 | 8.89E-08 | 3.03E-09 | -4.37E-04 |
| **WDP*²** | $m^3$ world eq. deprived | 21.12 | 1.09E-02 | 0.48 | 0.00 | 0.00 | 0.00 | 0.32 | 0.00 | 0.00 | 0.00 | 0.00 | 4.33E-04 | 0.24 | 5.30E-03 | -5.89 |
| **Use of resources** | | | | | | | | | | | | | | | | |
| **PERE** | MJ | 207.13 | 2.14 | 20.26 | 0.00 | 0.00 | 0.00 | 3.81 | 0.00 | 0.00 | 0.00 | 0.00 | 8.45E-02 | 5.92 | 0.12 | -45.00 |
| **PERM** | MJ | 19.95 | 0.00 | -19.95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **PERT** | MJ | 227.08 | 2.14 | 0.32 | 0.00 | 0.00 | 0.00 | 3.81 | 0.00 | 0.00 | 0.00 | 0.00 | 8.45E-02 | 5.92 | 0.12 | -45.00 |
| **PENRE** | MJ | 540.64 | 28.20 | 2.64 | 0.00 | 0.00 | 0.00 | 7.16 | 0.00 | 0.00 | 0.00 | 0.00 | 1.12 | 9.52 | 0.64 | -225.00 |
| **PENRM** | MJ | 2.09 | 0.00 | -1.40 | 0.00 | 0.00 | 0.00 | 6.91E-04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -0.66 | 0.00 | 0.00 |
| **PENRT** | MJ | 542.73 | 28.20 | 1.24 | 0.00 | 0.00 | 0.00 | 7.16 | 0.00 | 0.00 | 0.00 | 0.00 | 1.12 | 8.86 | 0.64 | -225.00 |
| **SM** | kg | 2.53 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.06E-02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **RSF** | MJ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **NRSF** | MJ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **FW** | $m^3$ | 0.67 | 1.10E-03 | 1.13E-02 | 0.00 | 0.00 | 0.00 | 1.00E-02 | 0.00 | 0.00 | 0.00 | 0.00 | 4.34E-05 | 7.65E-03 | 1.55E-04 | -0.19 |
| **Waste categories** | | | | | | | | | | | | | | | | |
| **HWD** | kg | 1.83E-03 | 1.19E-09 | 6.34E-10 | 0.00 | 0.00 | 0.00 | 3.66E-05 | 0.00 | 0.00 | 0.00 | 0.00 | 4.72E-11 | 1.13E-08 | 1.41E-10 | -3.57E-08 |
| **NHWD** | kg | 1.39 | 4.01E-03 | 0.13 | 0.00 | 0.00 | 0.00 | 6.99E-02 | 0.00 | 0.00 | 0.00 | 0.00 | 1.59E-04 | 3.44E-02 | 3.21 | -1.28 |
| **RWD** | kg | 2.76E-02 | 5.54E-05 | 6.13E-05 | 0.00 | 0.00 | 0.00 | 5.19E-04 | 0.00 | 0.00 | 0.00 | 0.00 | 2.19E-06 | 1.35E-03 | 6.83E-06 | -3.12E-03 |
| **Output material flows** | | | | | | | | | | | | | | | | |
| **CRU** | kg | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| **MFR** | kg | 0,92 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,16 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 7,21 | 0,00 | 0,00 |
| **MER** | kg | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| **EEE** | MJ | 0,89 | 0,00 | 5,98 | 0,00 | 0,00 | 0,00 | 0,18 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 2,18 | 0,00 | 0,00 |
| **EET** | MJ | 1,62 | 0,00 | 10,80 | 0,00 | 0,00 | 0,00 | 0,35 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 5,01 | 0,00 | 0,00 |

**Key:**
**GWP-t** – climate change - total **GWP-f** – climate change - fossil **GWP-b** – climate change - biogenic **GWP-l** – climate change - land use and land use change **ODP** – ozone depletion **AP** - acidification **EP-fw** - eutrophication - aquatic freshwater **EP-m** - eutrophication - aquatic marine **EP-t** - eutrophication - terrestrial **POCP** - photochemical ozone formation **ADPF*²** - depletion of abiotic resources – fossil fuels **ADPE*²** - depletion of abiotic resources – minerals and metals **WDP*²** – water use **PERE** - use of renewable primary energy **PERM** - use of renewable primary energy resources used as raw materials **PERT** - total use of renewable primary energy **PENRE** - use of non-renewable primary energy **PENRM** - use of non-renewable primary energy resources used as raw materials **PENRT** - total use of non-renewable primary energy **SM** - use of secondary materials **RSF** - use of renewable secondary fuels **NRSF** - use of non-renewable secondary fuels **FW** - net use of freshwater **HWD** - hazardous waste disposed **NHWD** - non-hazardous waste disposed **RWD** - radioactive waste disposed **CRU** - components for reuse **MFR** - materials for recycling **MER** - materials for energy recovery **EEE** - exported electrical energy **EET** - exported thermal energy

| Results per 1 m of Stainless steel chimney system, double-walled, 25 mm Isolierung, ICS25 DN180 (PG2) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Unit** | **A1-A3** | **A4** | **A5** | **B1** | **B2** | **B3** | **B4** | **B5** | **B6** | **B7** | **C1** | **C2** | **C3** | **C4** | **D** |
| **Additional environmental impact indicators** | | | | | | | | | | | | | | | | |
| **PM** | Disease incidence | 1.35E-05 | 2.94E-08 | 6.01E-09 | 0.00 | 0.00 | 0.00 | 2.40E-07 | 0.00 | 0.00 | 0.00 | 0.00 | 1.16E-09 | 9.69E-09 | 4.31E-09 | -1.49E-06 |
| **IRP*[1]** | kBq U235 eq. | 2.72 | 7.86E-03 | 9.57E-03 | 0.00 | 0.00 | 0.00 | 4.89E-02 | 0.00 | 0.00 | 0.00 | 0.00 | 3.11E-04 | 0.22 | 7.56E-04 | -0.52 |
| **ETP-fw*[2]** | CTUe | 270.95 | 36.40 | 0.52 | 0.00 | 0.00 | 0.00 | 4.62 | 0.00 | 0.00 | 0.00 | 0.00 | 1.44 | 1.56 | 0.50 | -80.50 |
| **HTP-c*[2]** | CTUh | 1.59E-06 | 4.92E-10 | 3.13E-11 | 0.00 | 0.00 | 0.00 | 3.12E-08 | 0.00 | 0.00 | 0.00 | 0.00 | 1.95E-11 | 1.49E-10 | 8.56E-12 | -2.95E-08 |
| **HTP-nc*[2]** | CTUh | 6.39E-07 | 2.75E-08 | 7.10E-10 | 0.00 | 0.00 | 0.00 | 1.23E-08 | 0.00 | 0.00 | 0.00 | 0.00 | 1.09E-09 | 3.45E-09 | 3.20E-10 | -5.76E-08 |
| **SQP*[2]** | Dimensionless. | 507.01 | 12.40 | 0.35 | 0.00 | 0.00 | 0.00 | 9.89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.49 | 3.51 | 0.16 | -29.60 |

**Key:**
**PM** – particulate matter emissions **IRP*[1]** – ionising radiation – human health **ETP-fw*[2]** - ecotoxicity – aquatic freshwater **HTP-c*[2]** - human toxicity potential – cancer effect **HTP-nc*[2]** - human toxicity potential – non-cancer effect **SQP*[2]** – land use related impacts / soil quality

**Disclaimers**

*1 This impact category deals mainly with the eventual impact of low-dose ionising 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 1 m of Stainless steel chimney system, double-walled, 50 mm Insulation, PM50 DN180 (PG3)**

| | Unit | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Core indicators** | | | | | | | | | | | | | | | | |
| **GWP-t** | kg $CO_2$ eq. | 45.84 | 4.45 | 3.93 | 0.00 | 0.00 | 0.00 | 0.85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 | 3.71 | 8.19E-02 | -15.70 |
| **GWP-f** | kg $CO_2$ eq. | 50.15 | 4.23 | 0.25 | 0.00 | 0.00 | 0.00 | 0.86 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 3.70 | 8.18E-02 | -15.70 |
| **GWP-b** | kg $CO_2$ eq. | -4.35 | 0.17 | 3.68 | 0.00 | 0.00 | 0.00 | -9.02E-03 | 0.00 | 0.00 | 0.00 | 0.00 | 5.45E-03 | 6.74E-03 | -2.65E-04 | 3.25E-02 |
| **GWP-l** | kg $CO_2$ eq. | 6.24E-02 | 4.32E-02 | 1.34E-04 | 0.00 | 0.00 | 0.00 | 1.65E-03 | 0.00 | 0.00 | 0.00 | 0.00 | 1.36E-03 | 2.18E-03 | 3.36E-04 | -2.69E-02 |
| **ODP** | kg CFC-11 eq. | 8.92E-07 | 8.14E-13 | 5.52E-13 | 0.00 | 0.00 | 0.00 | 1.78E-08 | 0.00 | 0.00 | 0.00 | 0.00 | 2.56E-14 | 1.50E-11 | 2.28E-13 | -9.79E-11 |
| **AP** | mol $H^+$ eq. | 0.25 | 6.30E-03 | 1.06E-03 | 0.00 | 0.00 | 0.00 | 3.82E-03 | 0.00 | 0.00 | 0.00 | 0.00 | 1.96E-04 | 2.30E-03 | 5.79E-04 | -6.52E-02 |
| **EP-fw** | kg P eq. | 1.16E-04 | 1.13E-05 | 1.03E-07 | 0.00 | 0.00 | 0.00 | 2.41E-06 | 0.00 | 0.00 | 0.00 | 0.00 | 3.57E-07 | 1.45E-06 | 1.22E-07 | -8.25E-06 |
| **EP-m** | kg N eq. | 4.43E-02 | 2.58E-03 | 3.83E-04 | 0.00 | 0.00 | 0.00 | 7.71E-04 | 0.00 | 0.00 | 0.00 | 0.00 | 8.00E-05 | 6.15E-04 | 1.51E-04 | -9.61E-03 |
| **EP-t** | mol N eq. | 0.57 | 2.69E-02 | 4.82E-03 | 0.00 | 0.00 | 0.00 | 1.00E-02 | 0.00 | 0.00 | 0.00 | 0.00 | 8.35E-04 | 8.08E-03 | 1.65E-03 | -0.11 |
| **POCP** | kg NMVOC eq. | 0.14 | 5.61E-03 | 1.02E-03 | 0.00 | 0.00 | 0.00 | 2.41E-03 | 0.00 | 0.00 | 0.00 | 0.00 | 1.75E-04 | 1.56E-03 | 4.53E-04 | -2.98E-02 |
| **ADPF*²** | MJ | 688.83 | 54.30 | 1.24 | 0.00 | 0.00 | 0.00 | 11.36 | 0.00 | 0.00 | 0.00 | 0.00 | 1.71 | 13.80 | 1.07 | -193.00 |
| **ADPE*²** | kg Sb eq. | 5.44E-04 | 2.80E-07 | 6.42E-09 | 0.00 | 0.00 | 0.00 | 4.67E-06 | 0.00 | 0.00 | 0.00 | 0.00 | 8.82E-09 | 1.38E-07 | 5.07E-09 | -3.11E-04 |
| **WDP*²** | $m^3$ world eq. deprived | 21.92 | 2.10E-02 | 0.48 | 0.00 | 0.00 | 0.00 | 0.37 | 0.00 | 0.00 | 0.00 | 0.00 | 6.61E-04 | 0.47 | 8.85E-03 | -4.32 |
| **Use of resources** | | | | | | | | | | | | | | | | |
| **PERE** | MJ | 141.05 | 4.11 | 40.54 | 0.00 | 0.00 | 0.00 | 3.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 9.13 | 0.21 | -36.80 |
| **PERM** | MJ | 40.23 | 0.00 | -40.23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **PERT** | MJ | 181.28 | 4.11 | 0.32 | 0.00 | 0.00 | 0.00 | 3.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 9.13 | 0.21 | -36.80 |
| **PENRE** | MJ | 654.63 | 54.30 | 4.06 | 0.00 | 0.00 | 0.00 | 11.33 | 0.00 | 0.00 | 0.00 | 0.00 | 1.71 | 43.61 | 1.07 | -193.00 |
| **PENRM** | MJ | 34.20 | 0.00 | -2.82 | 0.00 | 0.00 | 0.00 | 3.14E-02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -29.81 | 0.00 | 0.00 |
| **PENRT** | MJ | 688.83 | 54.30 | 1.24 | 0.00 | 0.00 | 0.00 | 11.36 | 0.00 | 0.00 | 0.00 | 0.00 | 1.71 | 13.80 | 1.07 | -193.00 |
| **SM** | kg | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **RSF** | MJ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **NRSF** | MJ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **FW** | $m^3$ | 0.61 | 2.11E-03 | 1.13E-02 | 0.00 | 0.00 | 0.00 | 9.99E-03 | 0.00 | 0.00 | 0.00 | 0.00 | 6.63E-05 | 1.43E-02 | 2.59E-04 | -0.14 |
| **Waste categories** | | | | | | | | | | | | | | | | |
| **HWD** | kg | 2.30E-03 | 2.29E-09 | 6.34E-10 | 0.00 | 0.00 | 0.00 | 4.60E-05 | 0.00 | 0.00 | 0.00 | 0.00 | 7.22E-11 | 1.75E-08 | 2.35E-10 | -3.38E-08 |
| **NHWD** | kg | 4.63 | 7.70E-03 | 0.13 | 0.00 | 0.00 | 0.00 | 0.19 | 0.00 | 0.00 | 0.00 | 0.00 | 2.42E-04 | 7.55E-02 | 5.36 | -0.94 |
| **RWD** | kg | 2.43E-02 | 1.07E-04 | 6.13E-05 | 0.00 | 0.00 | 0.00 | 4.60E-04 | 0.00 | 0.00 | 0.00 | 0.00 | 3.35E-06 | 2.08E-03 | 1.14E-05 | -3.53E-03 |
| **Output material flows** | | | | | | | | | | | | | | | | |
| **CRU** | kg | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **MFR** | kg | 0.92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.85 | 0.00 | 0.00 |
| **MER** | kg | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **EEE** | MJ | 0.92 | 0.00 | 5.98 | 0.00 | 0.00 | 0.00 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.14 | 0.00 | 0.00 |
| **EET** | MJ | 1.69 | 0.00 | 10.80 | 0.00 | 0.00 | 0.00 | 0.49 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.80 | 0.00 | 0.00 |

**Key:**
**GWP-t** – climate change - total **GWP-f** – climate change - fossil **GWP-b** – climate change - biogenic **GWP-l** – climate change - land use and land use change **ODP** – ozone depletion **AP** - acidification **EP-fw** - eutrophication - aquatic freshwater **EP-m** - eutrophication - aquatic marine **EP-t** - eutrophication - terrestrial **POCP** - photochemical ozone formation **ADPF*²** - depletion of abiotic resources – fossil fuels **ADPE*²** - depletion of abiotic resources – minerals and metals **WDP*²** – water use **PERE** - use of renewable primary energy **PERM** - use of renewable primary energy resources used as raw materials **PERT** - total use of renewable primary energy **PENRE** - use of non-renewable primary energy **PENRM** - use of non-renewable primary energy resources used as raw materials **PENRT** - total use of non-renewable primary energy **SM** - use of secondary materials **RSF** - use of renewable secondary fuels **NRSF** - use of non-renewable secondary fuels **FW** - net use of freshwater **HWD** - hazardous waste disposed **NHWD** - non-hazardous waste disposed **RWD** - radioactive waste disposed **CRU** - components for reuse **MFR** - materials for recycling **MER** - materials for energy recovery **EEE** - exported electrical energy **EET** - exported thermal energy

| Results per 1 m of Stainless steel chimney system, double-walled, 50 mm Insulation, PM50 DN180 (PG3) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Unit** | **A1-A3** | **A4** | **A5** | **B1** | **B2** | **B3** | **B4** | **B5** | **B6** | **B7** | **C1** | **C2** | **C3** | **C4** | **D** |
| **Additional environmental impact indicators** | | | | | | | | | | | | | | | | |
| **PM** | Disease incidence | 3.91E-06 | 5.66E-08 | 6.01E-09 | 0.00 | 0.00 | 0.00 | 5.76E-08 | 0.00 | 0.00 | 0.00 | 0.00 | 1.77E-09 | 1.66E-08 | 7.21E-09 | -1.12E-06 |
| **IRP*[1]** | kBq U235 eq. | 2.85 | 1.51E-02 | 9.57E-03 | 0.00 | 0.00 | 0.00 | 5.25E-02 | 0.00 | 0.00 | 0.00 | 0.00 | 4.76E-04 | 0.34 | 1.26E-03 | -0.60 |
| **ETP-fw*[2]** | CTUe | 243.34 | 70.00 | 0.52 | 0.00 | 0.00 | 0.00 | 5.17 | 0.00 | 0.00 | 0.00 | 0.00 | 2.20 | 2.50 | 0.83 | -60.80 |
| **HTP-c*[2]** | CTUh | 3.57E-06 | 9.46E-10 | 3.13E-11 | 0.00 | 0.00 | 0.00 | 7.10E-08 | 0.00 | 0.00 | 0.00 | 0.00 | 2.98E-11 | 2.38E-10 | 1.43E-11 | -2.36E-08 |
| **HTP-nc*[2]** | CTUh | 4.27E-07 | 5.29E-08 | 7.10E-10 | 0.00 | 0.00 | 0.00 | 8.92E-09 | 0.00 | 0.00 | 0.00 | 0.00 | 1.67E-09 | 5.76E-09 | 5.34E-10 | -4.26E-08 |
| **SQP*[2]** | Dimensionless. | 644.03 | 23.80 | 0.35 | 0.00 | 0.00 | 0.00 | 13.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.75 | 5.44 | 0.27 | -24.00 |

**Key:**
**PM** – particulate matter emissions **IRP*[1]** – ionising radiation – human health **ETP-fw*[2]** - ecotoxicity – aquatic freshwater **HTP-c*[2]** - human toxicity potential – cancer effect **HTP-nc*[2]** - human toxicity potential – non-cancer effect **SQP*[2]** – land use related impacts / soil quality

**Disclaimers**

*1 This impact category deals mainly with the eventual impact of low-dose ionising 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

At the client's request. correction factors for alternative internal diameters were developed that can be applied to the results.

| PG 1: Single-walled, PPL | | PG 2: Double-walled, ICS 25 | | PG 3: Double-walled, PM 50 | |
|---|---|---|---|---|---|
| **inner diameter [mm]** | **correction factor** | **inner diameter [mm]** | **correction factor** | **inner diameter [mm]** | **correction factor** |
| 80 | 0.54 | | | | |
| 100 | 0.67 | | | | |
| 113 | 0.76 | 80 | 0.52 | 80 | 0,57 |
| 120 | 0.80 | 100 | 0.61 | 100 | 0,66 |
| 130 | 0.87 | 130 | 0.76 | 130 | 0,79 |
| 140 | 0.94 | 150 | 0.86 | 150 | 0,87 |
| **150** | **1** | **180** | **1** | **180** | **1** |
| 160 | 1.07 | 200 | 1.10 | 200 | 1,09 |
| 180 | 1.20 | 230 | 1.25 | 230 | 1,22 |
| 200 | 1.34 | 250 | 1.35 | 250 | 1,31 |
| 230 | 1.54 | 300 | 1.75 | 300 | 1,68 |
| 250 | 1.67 | 350 | 2.02 | 350 | 1,92 |
| 300 | 2.00 | 400 | 2.49 | 400 | 2,35 |
| 350 | 2.34 | 450 | 2.79 | 450 | 2,61 |
| 400 | 4.45 | 500 | 3.08 | 500 | 2,87 |
| 450 | 5.01 | 600 | 3.97 | 600 | 3,68 |
| 500 | 5.56 | 700 | 4.60 | 700 | 4,24 |
| 600 | 6.67 | 800 | 5.24 | 800 | 4,81 |
| 700 | 7.78 | 900 | 5.87 | 900 | 5,37 |
| 800 | 8.89 | | | 1000 | 5,94 |
| 900 | 10.01 | | | 1100 | 6,50 |
| 1000 | 11.12 | | | 1200 | 7,07 |

**Figure 4**: Correction factors for alternative internal diameters

## 6.4 Interpretation, LCA presentation and critical review

**Evaluation**

The environmental impacts of

- PRIMA PLUS (single walled, DN 150)
- ICS 25 (double walled, 25 mm Insulation, DN 180)
- PERMETER 50 (double walled, 50 mm Insulation, DN 180)

differ significantly from one another. The differences lie mainly in the mass of the respective preliminary products and raw materials used, as well as differing internal diameters. This was to be expected, particularly given the double-pipe construction of PG2 and PG3 and the higher use of insulation material in PG3.

In terms of manufacturing, the environmental impacts of stainless steel chimney systems in all three product groups arise mainly from the use of stainless steel sheets or their pre-chains and the use of electrical energy. The comparatively high influence of packaging (cardboard) on the predicted environmental impacts can also be observed in all product groups. In product groups 2 and 3, the environmental impacts are primarily due to the use of insulation materials and their respective pre-chains.
Furthermore, powder coating plays an important role in product group 3 in terms of environmental impacts.

In scenario C4, only marginal expenses are to be expected for physical pre-treatment and landfill operation. In the case of landfill, it is difficult to allocate the impacts to the individual raw materials.

When recycling the products, around 32 % of the environmental impacts of the core indicators (excluding WDP, as this is not supported by the software) occurring in the life cycle can be credited to PG 1 for stainless steel, around 27 % to PG 2 and around 18 % to PG 3 in scenario D.
The charts below show the distribution of the main environmental impacts.

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

**Charts**
The following charts show the B modules related to the specified RSL during the 50-year building service life.

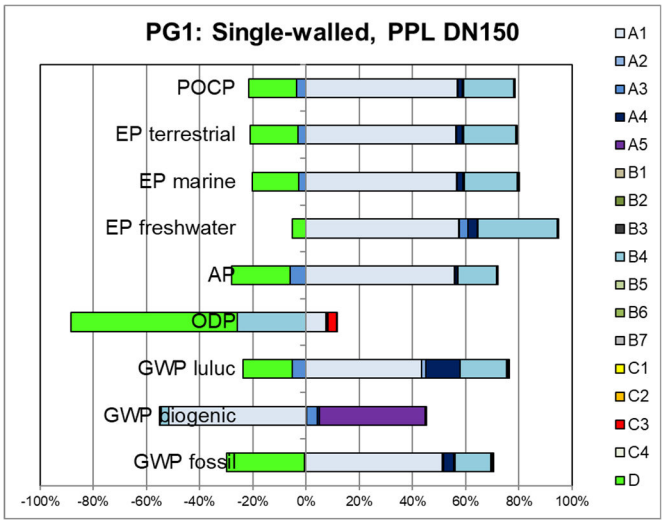



**Figure 5**: Percentage of the modules in environmental impact categories

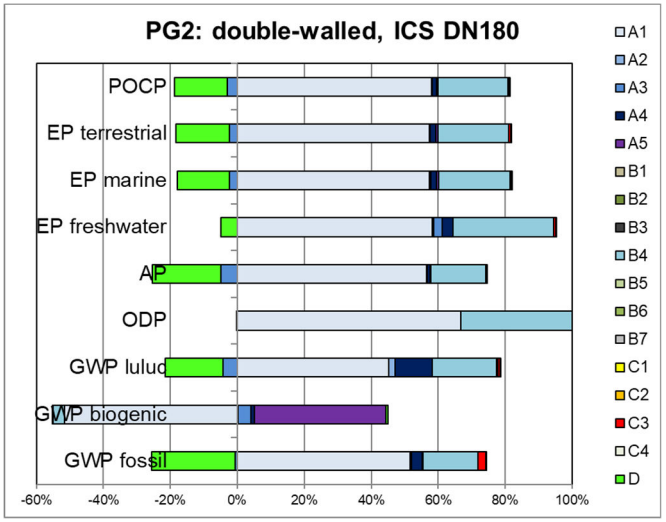



**Figure 6**: Percentage of the modules in environmental impact categories

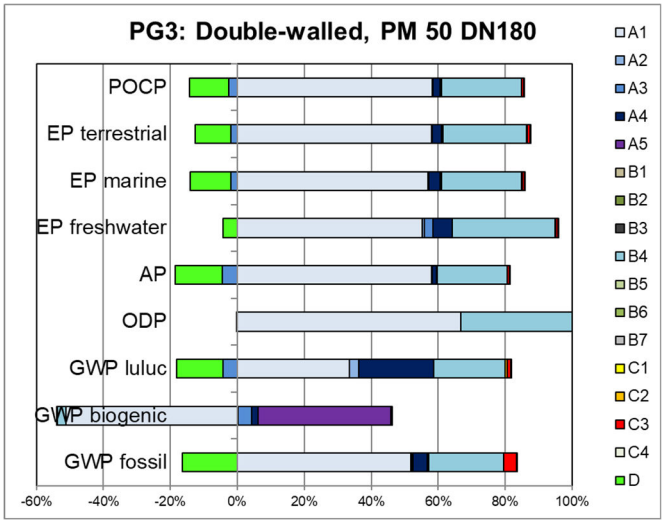



**Figure 7**: Percentage of the modules in environmental impact categories

| | |
|---|---|
| **Report** | The LCA report underlying this EPD was developed according to the requirements of DIN EN ISO 14040 and DIN EN ISO 14044 as well as DIN EN 15804 and DIN EN ISO 14025. It is not addressed to third parties for reasons of confidentiality. It is deposited with the ift Rosenheim. The results and conclusions reported to the target group are complete, correct, without bias and transparent. The results of the study are not designed to be used for comparative statements intended for publication. |
| **Critical review** | The critical review of the LCA and the report took place in the course of verification of the EPD and was carried out by Prof. Dr.-Ing. Eric Brehm, an external verifier. |

# 7 General information regarding the EPD

**Comparability**

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

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

**Communication**

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

**Verification**

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

The Declaration is based on the The Declaration is based on the PCR documents “PCR Part A” PCR-A-2.0:2025 and "Rohrleitungssysteme einschließlich Verbindungs- und Anschlusstechnik“ PCR RS-1.0: 2022.

| |
|---|
| The European standard EN 15804 serves as the core PCR [a)] |
| Independent external verification of the Declaration and statement according to EN ISO 14025:2010 |
| Independent third party verifier: [b)]<br>Erik, Brehm |
| [a)] Product category rules<br>[b)] Optional for business-to-business communication<br>Mandatory for business-to-consumer communication<br>(see EN ISO 14025:2010, 9.4) |

**Revisions of this document**

| No. | Date | Note: | Practitioner | Verifier |
|---|---|---|---|---|
| 1 | 30.10.2025 | External verification | Brechleiter | Brehm |
| 2 | 12.11.2025 | Editorial changes | Brechleiter | - |
| 2 | 18.12.2025 | Editorial changes | Brechleiter | - |

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# 9 Annex

## Description of life cycle scenarios for Stainless steel chimney systems

| Product stage | | | Con-struction process stage | | Use stage* | | | | | | | End-of-life stage | | | | Benefits and loads from beyond the system boundaries |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| Raw material supply | Transport | Manufacture | Transport | Construction/installation process | Use | Maintenance | Repair | Replacement | Modification/refurbishment | Operational energy use | Operational water use | Deconstruction/demolition | Transport | Waste processing | Disposal | Reuse Recovery Recycling potential |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

* For the declared B modules, the calculation of the results is based on the specified RSL related to one year.

**Table 7**: Overview of applied life cycle stages

Calculation of the scenarios was based on a defined RSL (see Section 4 Use stage).

The scenarios were based on information provided by the manufacturer. The scenarios were furthermore based on the research project “EPDs for transparent building components. (1)

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

✓ Included in the LCA
— Not included in the LCA

### A4 Transport

| No. | Scenario | Description |
|---|---|---|
| A4 | Direct shipment to construction site/branch | 40 t truck (Euro 0-6 mix, GLO), diesel, 27 t payload, 90 % capacity used[1], about 700 km to construction site and return with 0 % load |

[1] capacity used: used loading capacity of truck

| A4 Transport to the construction site | Transport weight [kg/m] | Density [kg/m³] | Volume capacity utilisation factor[2] |
|---|---|---|---|
| PG1 | 7.5 | 66.5 | < 1 |
| PG2 | 15.9 | 85.1 | < 1 |
| PG3 | 30.6 | 133.3 | < 1 |

[2] Volume capacity utilisation factor:
= 1 product completely fills packaging (without air inclusion)
< 1 packaging contains unused volume (e.g.: air, filling material
> 1 product is packed in compressed form

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

### A5 Construction/installation process

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

In case of deviating consumption during installation/assembly of the products which forms part of the site management, they are covered at the construction works level.

Ancillary materials, consumables, use of energy and water, use of other resources, material losses, direct emissions as well as waste materials during installation are negligible.

It is assumed that the packaging material in the module “construction / installation” is sent to waste handling. Waste is only thermally recycled or disposed of in line with the conservative approach. Films/foils / protective covers, wood and cardboard in waste incineration plants. Benefits from A5 are specified in module D. Benefits from waste incineration: electricity replaces electricity mix (RER); thermal energy replaces thermal energy from natural gas (RER).
Transport to the recycling plants is not taken into account.

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

### B1 Use

There are no known emissions into the air, soil or water, nor are any to be expected based on the material composition of the products. With regard to indoor air, this is not relevant as the products are used exclusively outdoors.

### B2 Cleaning, servicing and maintenance

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

### B2.1 Cleaning

| No. | Scenario | Description |
|---|---|---|
| **B2.1** | **Annually, manually or in accordance with national regulations for combustion heaters.** | **Manual cleaning by chimney sweeps** |
| Ancillary materials, consumables, use of energy and water, material losses and waste as well as transport distances during cleaning are negligible. | | |

### B2.2 Servicing and maintenance

| No. | Scenario | Description |
|---|---|---|
| **B2.2** | **Annually, manually or in accordance with national regulations for combustion heaters.** | **Regular inspection by chimney sweeps**<br><br>**When used as intended and cleaning intervals are observed, no components within the RSL need to be replaced.** |

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

For updated information refer to the respective instructions for assembly/installation, operation and maintenance from Schiedel s.r.o.

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

### B3 Repair

| No. | Scenario | Description |
|---|---|---|
| **B3** | **Normal use and heavy use** | **In accordance with EN 15804:**<br>**The module “Repair“ covers a combination of all planned technical and associated administrative actions […].** |
| Ancillary materials, consumables, use of energy and water, waste, material losses and transport distances during repair are negligible.<br><br>Since only one scenario is used, the results are shown in the relevant summary table. | | |

### B4 Replacement

| No | Scenario | Description |
|---|---|---|
| B4 | Normal use and heavy use | **One-time replacement in 25 years (RSL)*:**<br><br>**In the selected scenario, environmental impacts arise from the manufacturing, installation and disposal phases. Auxiliary/operating materials, energy/water consumption, material losses, waste materials and transport routes are taken into account.** |

*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 construction works level.

It is assumed that 1-time replacement will be necessary during the RSL of 25 years and the 50-year building service life. The results include the RSL related to one year.

For updated information refer to the respective instructions for assembly/installation, operation and maintenance from Schiedel s.r.o.

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

### B5 Modification/refurbishment

According to the manufacturer, the elements are part of improvement/modernisation work on a building. However, replacement/conversion of the chimney system as part of the heating system renovation is covered by the 25-year RSL.

For updated information refer to the respective instructions for assembly/installation, operation and maintenance from Schiedel s.r.o.

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

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

### B6 Operational energy use

| No. | Scenario | Description |
|---|---|---|
| B6 | Static component | No energy consumed when used |

There is no energy consumption during normal use.

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

### B7 Operational water use

There's no water consumption when used as intended.

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

### C1 Deconstruction, demolition

| No. | Scenario | Description |
|---|---|---|
| C1 | **Dismantling, manual** (based on EN 17213) | • **deconstruction 95 %**<br>• **residues on landfill** |

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

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

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

### C2 Transport

| No. | Scenario | Description |
|---|---|---|
| C2 | **Transport** | **Transport to collection point using 40 t truck (Euro 0-6 mix), diesel, 27 t payload, 50% capacity used, 100 km** (1) |

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

### C3 Waste management

| No. | Scenario | Description |
|---|---|---|
| C3 | **Current market situation (based on EN 17213)** | **Share for recirculation of materials:**<br>• **Steel 100 % in melt**<br>• **Stainless steel 100 % in melt**<br>• **Plastics 100 % thermal recycling**<br>• **Remainder to landfill** |

Electricity consumption of incineration plant 0.5 MJ/kg.

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

The table below describes the disposal processes and their percentage by mass/weight. The calculation is based on the above mentioned proportions in percent related to the declared unit of the product system.

| C3 Disposal | Unit | PG 1 | PG 2 | PG 3 |
|---|---|---|---|---|
| Collection process, collected separately | kg | 2.82 | 9.51 | 14.50 |
| Collection process, collected as mixed construction waste | kg | 0.15 | 0.50 | 0.77 |
| Recovery system, for reuse | kg | 0 | 0 | 0 |
| Recovery system, for recycling | kg | 2.80 | 7.21 | 8.85 |
| Recovery system, for energy recovery | kg | 0.02 | 0.57 | 1.33 |
| Disposal | kg | 0.15 | 3.21 | 5.35 |

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

### C4 Disposal

| No. | Scenario | Description |
|---|---|---|
| **C4** | **Disposal** | **The non-recordable amounts and losses within the reuse/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 only one scenario is used, the results are shown in the summary table.

### D Benefits and loads from beyond the system boundaries

| No. | Scenario | Description[1] |
|---|---|---|
| **D** | **Recycling potential** | • **Steel scrap from C3 replaces 70.2% of steel;**<br>• **Stainless steel scrap from C3 replaces 70.2% of stainless steel**<br><br>**Benefits from waste incineration:**<br>• **electricity replaces electricity mix (RER)**<br>• **thermal energy replaces thermal energy from natural gas (RER).** |

[1] Value correction factor 70.2% according to metal specific data set.

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

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

## Imprint

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**Notes**
This EPD is mainly based on the work and findings of the Institut für Fenstertechnik e.V., Rosenheim (ift Rosenheim) and specifically on the “ift-Richtlinie NA-01/5 Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen”. (Guideline NA-01/5 - Guidance on preparing Type III Environmental Product Declarations)



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