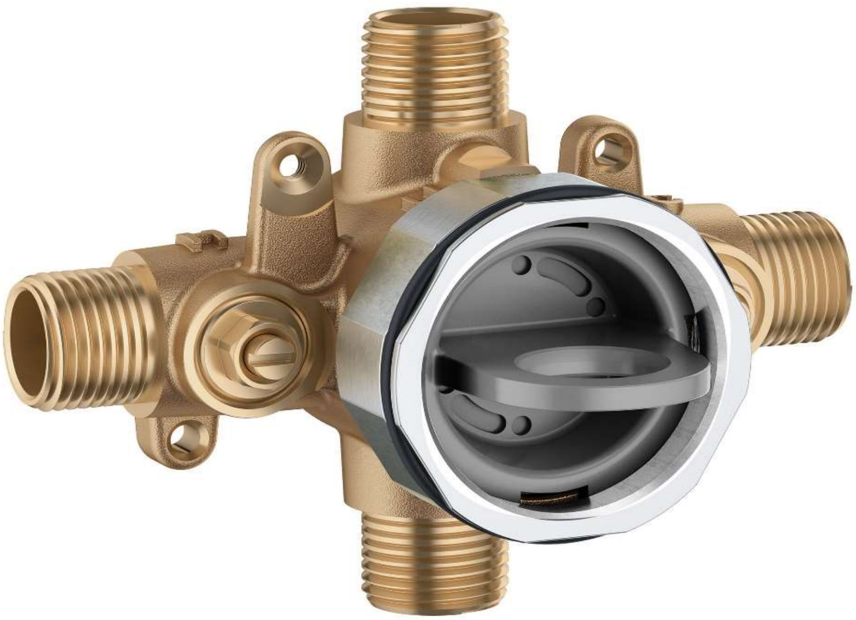
## Environmental Product Declaration

# Flash Shower Rough-In Valve

Flush Valve



Designed for fast and efficient installation, the Flash Shower Rough-In Valve provides flexibility for every situation. The Rough-In Valve features a flat back and compact body to ensure a secure and simplified install process that can accommodate smaller spaces. A flush plug is included, which allows both Hot & Cold to be flushed simultaneously for quicker installation and less downtime. Stainless steel fixation ring, with sure-grip flats, keeps flush plug and cartridge in place without screws.

**Flash Shower Rough-In Valves:**

**Universal Connections: RU101, RU101SS**
**Stub-Out Connections: RU102, RU102SS**
**PEX Crimp Connections: RU107, RU107E, RU107ESS, RU107SS**
**PEX Cold Expansion Connections: RU108, RU108E, RU108ESS, RU108SS**
**CPVC Connections: RU109, RU109SS**

**Making life healthier, safer and more beautiful at home, at work, and throughout the world.**

CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

| | | |
|---|---|---|
| PROGRAM OPERATOR | UL Environment | |
| DECLARATION HOLDER | LIXIL Water Technology | |
| DECLARATION NUMBER | 4789961563.122.1 | |
| DECLARED PRODUCT | Flush Shower Rough-In Valve | |
| REFERENCE PCR | IBU Part B PCR for Bathroom Fittings v.1.0 (2012) with UL Addendum v.1.0 (2018) | |
| REFERENCE PCR STANDARD | ☒ EN 15804 (2012)<br>☐ ISO 21930 (2007)<br>☒ ISO 21930 (2017) | |
| DATE OF ISSUE | July 1, 2021 | |
| PERIOD OF VALIDITY | 5 Years | |
| CONTENTS OF THE DECLARATION | Product definition and information about building physics<br>Information about basic material and the material's origin<br>Description of the product's manufacturing<br>Indication of product processing<br>Information about the in-use conditions<br>Life cycle assessment results<br>Testing results and verifications | |
| The PCR review was conducted by: | | Institut Bauen und Umwelt e.V.<br>The Independent Expert Committee (SRV)<br>epd.ulenvironment.com |
| This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories<br>☐ INTERNAL ☒ EXTERNAL | | Grant R. Martin<br>Grant R. Martin, UL Environment |
| This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by | | Thomas Gloria<br>Thomas Gloria, Industrial Ecology Consultants |

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## Product Definition and Information

### Production Description

Designed for fast and efficient installation, the Flash Shower Rough-In Valve provides flexibility for every situation. The Rough-In Valve features a flat back and compact body to ensure a secure and simplified install process that can accommodate smaller spaces. A flush plug is included, which allows both Hot & Cold to be flushed simultaneously for quicker installation and less downtime. Stainless steel fixation ring, with sure-grip flats, keeps flush plug and cartridge in place without screws.

Manufacturing Location: Monterrey, MX

### Application

Flush valve and faucet products are used in a variety of bathroom applications, including, but not limited to, hospitality, healthcare, education, government, military, office, and residential settings.

### Environmental Activities and Certification

The LIXIL Group promotes conservation of water and raw materials and sustainable practices across the entire lifecycle of our products from inputs, procurement, through use and disposal. On September 17, 2017 LIXIL Group Corporation announced placement in the Dow Jones Sustainability Indices (DJSI) for sustainability performance. LIXIL Group was included in the DJSI Asia-Pacific Index as the highest scoring company in the Building Products Industry, and ranked third globally in this industry group.

### Techincal Data

For the declared product, the following technical data in the delivery status must be provided with reference to the test standard:

**Technical Data**

| Category | Value |
|---|---|
| Width | 4-7/8" |
| Height | 3-5/8" |
| Depth | 1-3/4" - 2-3/4" |

### Market Placement / Application Rules

The standards that can be applied for the Flash Shower Rough-In Valve are:
- ANSI A117.1 (ADA Compliant)
- ASME A112.18.1/CSA B125.1
- ASSE 1016/ASME A112.1016/CSA B125.16

### Properties of Declared Product as Delivered

The product arrives to the site of installation packaged in a cardboard box with similar dimensions to the product size stated above. Installation instructions are available online, and additional installation materials may be required.

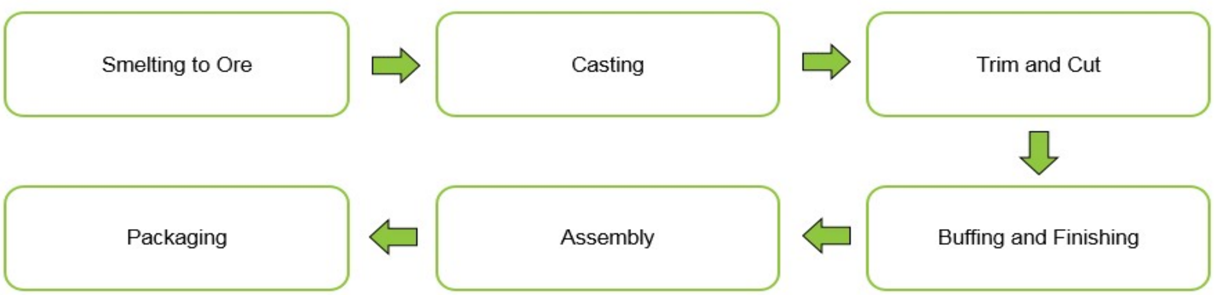
## Material Composition

The composition of the Flash Shower Rough-In Valve is as follows:

| Component | Percentage in mass (%) |
|---|---|
| Brass | 80.05% |
| Plastics | 9.39% |
| Rubber | 0.65% |
| Stainless Steel | 7.95% |
| Zinc-Plated Steel | 1.96% |
| **Total** | **100.00%** |

## Manufacturing

The primary manufacturing processes in the product of flush valve and faucet products are processes such as smelting, casting, trimming, and buffing of metal parts. These parts, along with other pre-fabricated components, are assembled into the final faucet products.
Manufacturing Location: Monterrey, MX




## Environmental and Health During Manufacturing

LIXIL is committed to producing and distributing faucet products with minimal environmental impact, where health and safety is the primary focus for all employees and associates.
• Environmental operations, GHG, energy, water, waste, VOC, surface treatment and H&S are being routinely monitored. Inspections, audits, and reviews are conducted periodically to ensure that applicable standards are met and environment management program effectiveness is evaluated.
• Code of Conduct covers human rights, labor practices and decent work. Management of LIXIL is aware of their environmental roles and responsibilities, providing appropriate training, supporting accountability, and recognizing outstanding performance.
• Any waste metals during machining are separated and recycled. Process water is treated internally before being discharged to municipal wastewater treatment.

## Product Processing/Installation

The product is installed using an electric drill, in additon to caulk, which is used to create a waterproof seal along the edges of the installed product. No noise reduction measures are typically required or undertaken during the installation of these products. The installation phase also considers the disposal of packaging materials.

## Packaging

These products are primarily packaged with cardboard, paper, and plastic wrap. All of these materials are recyclable.

## Use Conditions

The use phase of flush valve and faucet products includes the operational water use over the lifetime of the products. Additionally, faucet products consider the operational energy use required to provide hot tap water. Both operational energy and water use are calculated using the methodology detailed in the product category rules.

## Environmental and Health During Use

There is no harmful emissive potential. No damage to health or impairment is expected under normal use corresponding to the intended use of the product.

## Reference Service Life

The Reference Service Life is 10 years.

## Extraordinary Effects

**Fire**
No danger to the environment is anticipated during exposure to fire.

**Water**
No substances are used which have a negative impact on ecological water quality on contact by the product with water.

**Mechanical Destruction**
No danger to the environment is anticipated during mechanical destruction.

## Re-use Phase

These products are not typically reusable.

## Disposal

While flush valve and faucet products are able to be recycled, this study adpots the conservative assumption of a 100% landfill scenario.

## Further Information

LIXIL Water Technologies
One Centennial Avenue
Piscataway, NJ, 08854

# Life Cycle Assessment

## Declared Unit

The declaration refers to the declared unit of 1 unit (or piece) of the Flash Shower Rough-In Valve.

| Name | Value | Unit |
|---|---|---|
| Declared unit | 1 | Piece |
| Mass | 0.767 | kg |
| Conversion factor to 1 kg | 1.30 | - |
| Declared unit | 8.5E-04 | ton |

## System Boundary

This is a cradle-to-gate with options Environmental Product Declaration. The following life cycle phases were considered:

| 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 gate to the site | Construction/ installation process | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Deconstruction /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 | X | X | X | X | X | X | X | X | X | X | X | MND |

**Description of the System Boundary Stages Corresponding to the PCR**

**(X = Included; MND = Module Not Declared)**

*This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of waste state or disposal of final residues.

## Estimates and Assumptions

**End of Life**

In the end of life phase, a 100% landfill scenario was assumed.

## Cut-off Criteria

In the assessment, all available data from the production process are considered, i.e. all raw materials used, auxiliary materials (e.g. lubricants), thermal energy consumption and electric power consumption - including material and energy flows contributing less than 1% of mass or energy (if available). In case a specific flow contributing less than 1% in mass or energy is not available, worst case assumption proxies are selected to represent the respective environmental impacts. Impacts relating to the production of machines and facilities required during production are out of the scope of this assessment.

No known flows are deliberately exluded from this EPD.

## Background data

For life cycle modeling of the considered products, the SimaPro 9.1.1 software is used. Primary data was collected from the LIXIL owned facilities. Secondary data was used for upstream raw material production and downstream inventory flows. This secondary data was sourced from either the Ecoinvent 3.5 or USLCI databases.

## Data Quality

The data sources used are complete and representative of North America in terms of the geographic and technological coverage and are a recent vintage (i.e. less than ten years old). The data used for primary data are based on direct information sources of the manufacturer. Secondary data sets were used for raw materials extraction and processing, end of life, transportation, and energy production flows. Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty.

## Period Under Review

The period under review is 2018 Fiscal Year.

## Allocation

Impacts associated with recycled materials were assigned to the previous product system using the cut-off method for end of life allocation. To determine the manufacturing impacts per product, total facility inputs were allocated on a unit basis. No credits from recycling or energy recovery are included.

## Comparability

A comparison or an evaluation of EPD data is only possible if all 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. Environmental delarations from different programs may not be comparable. Full conformance with the selected PCR allows EPD comparability only when all stages of a  product's life cycle have been considered. However, variations and deviations are possible.

## LCA: Modeling Scenarios and Additional Technical Information

The following technical information is a basis for the declared modules or can be used for developing specific scenarios in the context of a building assessment if modules are not declared. Any information omitted from the following scenario tables was done so intentionally as it was unrelated and had no presentable values.

**Transport to Building Site (A4)**

| Name | Value | Unit |
|---|---|---|
| Liters of fuel | 38 | l/100km |
| Transport distance | 1651 | km |
| Capacity utilization (including empty runs) | 90 | % |
| Gross density of products transported | - | kg/m$^3$ |
| Capacity utilization volume factor | 0.11 | - |

**Installation into the Building (A5)**

| Name | Value | Unit |
|---|---|---|
| Auxiliary materials | | kg |
| Water consumption | - | m$^3$ |
| Other resources | 0.05 | kg |
| Electricity consumption | 3.9E-04 | kWh |
| Other energy carriers | - | MJ |
| Waster materials at construction site | 2.50 | kg |
| Output substance (landfill) | 2.00 | kg |
| Output substance (incineration) | 0.50 | kg |
| Direct Emissions to ambient air, soil, and water | 0.21* | kg $CO_2$ |

** $CO_2$ emissions to air from disposal of packaging*

**Maintenance (B2)**

| Name | Value | Unit |
|---|---|---|
| Information on maintenance | - | - |
| Maintenance cycle | - | Number / RSL |
| Water consumption (from tap, to sewer) | - | m$^3$ |
| Auxiliary materials (cleaing agent) | - | kg |
| Other resources | - | kg |
| Electricity consumption | - | kWh |
| Other energy carriers | - | MJ |
| Material loss | - | kg |

**Replacement (B4) / Refurbishment (B5)**

| Name | Value | Unit |
|---|---|---|
| Replacement cycle | - | Number / RSL |
| Replacement cycle | 6.5 | Number / ESL |

**Operational Energy Use (B6) and Water Use (B7)**

| Name | Value | Unit |
|---|---|---|
| Water consumption (from tap, to sewer) | 390.1 | m$^3$ |
| Electricity consumption | 9.4E+03 | kWh |
| Other energy carriers | - | MJ |
| Equipment output | - | kW |
| Direct Emissions to ambient air, soil, and water | - | kg |
| Further assumptions | * | - |

** 10 years of use, 365 days per year, 282 seconds per day, 0.1 gallons per flush*

**End of Life (C1 - C4)**

| Name | Value | Unit |
|---|---|---|
| Collected separately | - | kg |
| Collected as mixed construction waste | 0.77 | kg |
| Reuse | - | kg |
| Recycling | - | kg |
| Energy recovery | - | kg |
| Landfilling | 0.77 | kg |

## LCA Results

Results shown below were calculated using TRACI 2.1 Methodology.

**TRACI 2.1 Impact Assessment**

| Parameter | Parameter | Unit | A1-A3 | A4 | A5 | B6 | B7 | C2 | C4 |
|---|---|---|---|---|---|---|---|---|---|
| GWP | Global warming potential | kg $CO_2$-Eq. | 1.0E+01 | 1.2E-01 | 1.4E+00 | 6.3E+03 | 4.2E+02 | 4.7E-03 | 7.9E-03 |
| ODP | Depletion potential of the stratospheric ozone layer | kg CFC-11 Eq. | 1.0E-06 | 4.5E-12 | 1.1E-07 | 1.0E-07 | 1.4E-04 | 2.0E-13 | 2.7E-09 |
| AP Air | Acidification potential for air emissions | kg $SO_2$-Eq. | 2.3E-01 | 7.0E-04 | 1.2E-03 | 5.4E+01 | 1.8E+00 | 6.1E-05 | 6.1E-05 |
| EP | Eutrophication potential | kg N-Eq. | 2.4E-01 | 3.9E-05 | 1.4E-02 | 7.3E-01 | 2.0E+00 | 3.7E-06 | 2.7E-05 |
| SP | Smog formation potential | kg $O_3$-Eq. | 1.1E+00 | 1.9E-02 | 1.9E-02 | 3.6E+02 | 2.3E+01 | 1.6E-03 | 1.5E-03 |
| FFD | Fossil Fuel Depletion | MJ-surplus | 1.5E+01 | 2.1E-01 | 3.4E-01 | 5.0E+03 | 3.5E+02 | 9.3E-03 | 2.5E-02 |

**All use and end of life stages have been considered, and only those stages with non-zero values have been reported above. All stages not shown above have values of zero.*

Results shown below were calculated using CML 2001 - April 2013 Methodology.

**CML 4.1 Impact Assessment**

| Parameter | Parameter | Unit | A1-A3 | A4 | A5 | B6 | B7 | C2 | C4 |
|---|---|---|---|---|---|---|---|---|---|
| GWP | Global warming potential | kg $CO_2$-Eq. | 1.0E+01 | 1.2E-01 | 1.7E+00 | 6.3E+03 | 4.2E+02 | 4.7E-03 | 8.0E-03 |
| ODP | Depletion potential of the stratospheric ozone layer | kg CFC-11 Eq. | 8.1E-07 | 4.4E-12 | 1.0E-07 | 4.6E-08 | 1.3E-04 | 1.9E-13 | 2.0E-09 |
| AP Air | Acidification potential for air emissions | kg $SO_2$-Eq. | 2.5E-01 | 5.8E-04 | 1.1E-03 | 5.8E+01 | 1.8E+00 | 4.7E-05 | 5.2E-05 |
| EP | Eutrophication potential | kg$(PO_4)^3$-Eq. | 1.1E-01 | 1.0E-04 | 5.5E-03 | 1.9E+00 | 9.4E-01 | 1.0E-05 | 1.7E-05 |
| POCP | Formation potential of tropospheric ozone photochemical oxidants | kg ethane-Eq. | 1.0E-02 | 2.7E-05 | 3.2E-04 | 2.3E+00 | 1.1E-01 | -1.0E-05 | 2.2E-06 |
| ADPE | Abiotic depletion potential for non-fossil resources | kg Sb-Eq. | 1.6E-02 | 0.0E+00 | 2.3E-06 | 0.0E+00 | 1.3E-02 | 0.0E+00 | 8.6E-08 |
| ADPF | Abiotic depletion potential for fossil resources | MJ | 1.3E+02 | 1.5E+00 | 3.1E+00 | 8.7E+04 | 4.7E+03 | 6.7E-02 | 1.9E-01 |

**All use and end of life stages have been considered, and only those stages with non-zero values have been reported above. All stages not shown above have values of zero.*

Results below contain the resource use throughout the life cycle of the product.

**Resource Use**

| Parameter | Parameter | Unit | A1-A3 | A4 | A5 | B6 | B7 | C2 | C4 |
|---|---|---|---|---|---|---|---|---|---|
| PERE | Renewable primary energy as energy carrier | MJ, lower calorific value | 1.4E+01 | 0.0E+00 | 1.5E-01 | 0.0E+00 | 4.6E+02 | 0.0E+00 | 2.3E-03 |
| PERM | Renewable primary energy resources as material utilization | MJ, lower calorific value | 3.4E+01 | 0.0E+00 | 1.1E-01 | 0.0E+00 | 1.1E+02 | 0.0E+00 | 7.8E-04 |
| PERT | Total use of renewable primary energy resources | MJ, lower calorific value | 4.8E+01 | 0.0E+00 | 2.6E-01 | 0.0E+00 | 5.7E+02 | 0.0E+00 | 3.1E-03 |
| PENRE | Nonrenewable primary energy as energy carrier | MJ, lower calorific value | 1.5E+02 | 1.6E+00 | 3.6E+00 | 9.0E+04 | 6.0E+03 | 7.1E-02 | 2.0E-01 |
| PENRM | Nonrenewable primary energy as material utilization | MJ, lower calorific value | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| PENRT | Total use of nonrenewable primary energy resources | MJ, lower calorific value | 1.5E+02 | 1.6E+00 | 3.6E+00 | 9.0E+04 | 6.0E+03 | 7.1E-02 | 2.0E-01 |
| SM | Use of secondary material | MJ, lower calorific value | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| RSF | Use of renewable secondary fuels | MJ, lower calorific value | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NRSF | Use of nonrenewable secondary fuels | MJ, lower calorific value | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| FW | Use of net fresh water | $m^3$ | 6.6E-02 | 0.0E+00 | 5.3E-03 | 0.0E+00 | 3.8E+02 | 0.0E+00 | 1.4E-04 |

**All use and end of life stages have been considered, and only those stages with non-zero values have been reported above. All stages not shown above have values of zero.*

Results below contain the output flows and wastes throughout the life cycle of the product.

**Output Flows and Waste Categories**

| Parameter | Parameter | Unit | A1-A3 | A4 | A5 | B6 | B7 | C2 | C4 |
|---|---|---|---|---|---|---|---|---|---|
| HWD | Hazardous waste disposed | kg | 2.1E-03 | 0.0E+00 | 4.0E-06 | 0.0E+00 | 8.3E-03 | 0.0E+00 | 2.9E-07 |
| NHWD | Non-hazardous waste disposed | kg | 1.9E+00 | 0.0E+00 | 2.2E+00 | 0.0E+00 | 6.8E+01 | 0.0E+00 | 7.7E-01 |
| RWD | Radioactive waste disposed | kg | 3.8E-04 | 0.0E+00 | 7.3E-06 | 0.0E+00 | 2.0E-02 | 0.0E+00 | 1.1E-06 |
| CRU | Components for re-use | kg | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| MFR | Materials for recycling | kg | 7.8E-01 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.2E-01 |
| MER | Materials for energy recovery | kg | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| EEE | Exported electrical energy | MJ | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| EEE | Exported thermal energy | MJ | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |

**All use and end of life stages have been considered, and only those stages with non-zero values have been reported above. All stages not shown above have values of zero.*

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

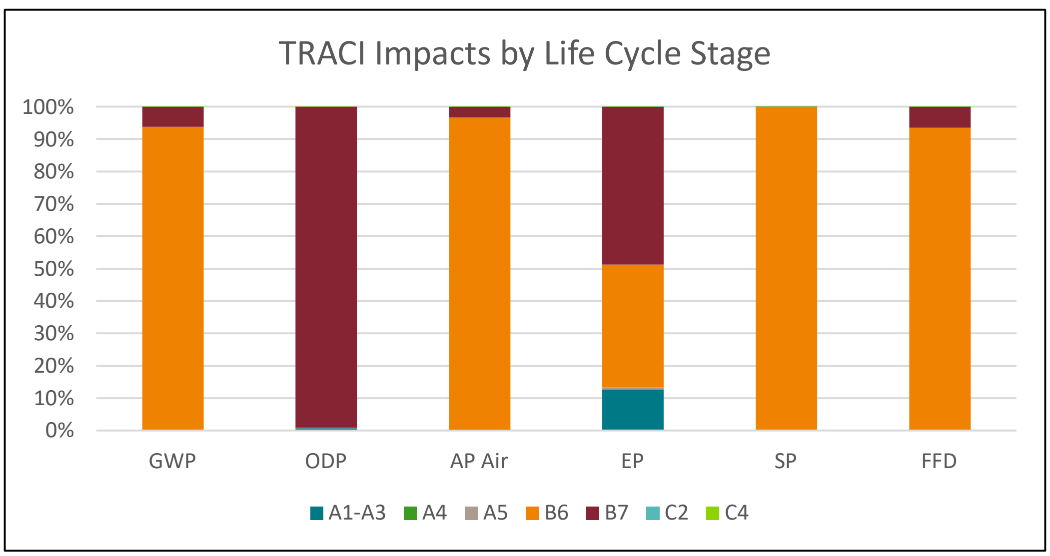
**Greenhouse Gas Emissions and Removals**

| Parameter | Parameter | Unit | A1-A3 | A4 | A5 | B6 | B7 | C2 | C4 |
|---|---|---|---|---|---|---|---|---|---|
| BCRP | Biogenic Carbon Removal from Product | kg $CO_2$ | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| BCEP | Biogenic Carbon Emissions from Product | kg $CO_2$ | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| BCRK | Biogenic Carbon Removal from Packaging | kg $CO_2$ | 7.5E-01 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| BCEK | Biogenic Carbon Emissions from Packaging | kg $CO_2$ | 0.0E+00 | 0.0E+00 | 7.5E-01 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| BCEW | Biogenic Cabron Emissions from Combustion of Waste from Renewable Sources Used in Production Process | kg $CO_2$ | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| CCE | Calcination Carbon Emissions | kg $CO_2$ | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| CCR | Carbonation Carbon Removal | kg $CO_2$ | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| CWNR | Cabron Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process | kg $CO_2$ | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |

**All use and end of life stages have been considered, and only those stages with non-zero values have been reported above. All stages not shown above have values of zero.*

## Interpretation

Generally, the operational energy use (B6) or operational water use (B7) phase drives the environmental impacts across the full life cycle of the product. The one exception to this trend is in the eutrophication category, where production (A1-A3) contributes to over 20% of the environmental impact.



## References


- PCR Part A — UL Environment and Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Life Cycle Assessment Calculation Rules and Report Requirements. December 2017, version 3.0
- PCR Part B — UL Environment and Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Bathroom Fittings and Showers. February 2018, version 1.6
- ISO 14025 — ISO 14025:2011-10, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.
- ISO 14040 — ISO 14040:2009-11, Environmental management — Life cycle assessment — Principles and framework.
- ISO 14044 — ISO 14044:2006-10, Environmental management — Life cycle assessment — Requirements and guidelines.
- EN 15804 — EN 15804:2012-04: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction product.
- ULE 2017 — UL Environment, General Program Instructions, 2017.
- TRACI 2.1 — US EPA, Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI).
- CML 2001 — Center of Environmental Science of Leiden University impact categories and characterisation methods for impact assessment (CML).
- SimaPro 9.1.1 — PRé Consultants. SimaPro Life Cycle Assessment version 9.1.1 (software).
- ISO 21930:2017 — ISO 21930:2017(E), Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services


## Contact Information

### Study Commissioner

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