

# Environmental Product Declaration



In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

**Group EPD for Brass Shower Thermostats,  
based on reference product no. 34558000**

from

**GROHE AG**

|                          |                                                                                           |
|--------------------------|-------------------------------------------------------------------------------------------|
| Programme:               | The International EPD® System, <a href="http://www.environdec.com">www.environdec.com</a> |
| Programme operator:      | EPD International AB                                                                      |
| EPD registration number: | S-P-06407                                                                                 |
| Publication date:        | 2022-07-25                                                                                |
| Valid until:             | 2027-07-24                                                                                |

*An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at [www.environdec.com](http://www.environdec.com)*



## General information

### Programme information

|                   |                                                                     |
|-------------------|---------------------------------------------------------------------|
| <b>Programme:</b> | The International EPD <sup>®</sup> System                           |
| <b>Address:</b>   | EPD International AB<br>Box 210 60<br>SE-100 31 Stockholm<br>Sweden |
| <b>Website:</b>   | <a href="http://www.environdec.com">www.environdec.com</a>          |
| <b>E-mail:</b>    | <a href="mailto:info@environdec.com">info@environdec.com</a>        |

|                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Accountabilities for PCR, LCA and independent, third-party verification</b>                                                                                               |
| <b>Product Category Rules (PCR)</b>                                                                                                                                          |
| CEN standard EN 15804 serves as the Core Product Category Rules (PCR)                                                                                                        |
| Product Category Rules (PCR): <i>PCR 2019:14 Construction products and construction services (EN 15804:A2)</i>                                                               |
| PCR review was conducted by: <i>IVL Swedish Environmental Research Institute, Secretariat of the International EPD System</i>                                                |
| <b>Life Cycle Assessment (LCA)</b>                                                                                                                                           |
| LCA accountability: <i>Susanne Dunschen, TÜV Rheinland Energy GmbH, Am Grauen Stein 33, 51105 Cologne, Germany, <a href="mailto:carbon@de.tuv.com">carbon@de.tuv.com</a></i> |
| <b>Third-party verification</b>                                                                                                                                              |
| Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:                                                                          |
| <input checked="" type="checkbox"/> EPD verification by individual verifier                                                                                                  |
| Third-party verifier: <i>Prof. Ing. Vladimír Kočí, PhD., Prague, Czech Republic, <a href="mailto:vladimir.koci@lca.cz">vladimir.koci@lca.cz</a></i>                          |
| Approved by: The International EPD <sup>®</sup> System                                                                                                                       |
| Procedure for follow-up of data during EPD validity involves third party verifier:                                                                                           |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                                                                                          |

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

## Company information



Owner of the EPD: GROHE AG

Contact: Tomas Kvillström

Phone: +46 733 661418

Email: [tomas.kvillstrom@grohe.com](mailto:tomas.kvillstrom@grohe.com)

Address (Administrative head quarters):

Feldmühleplatz 15, 40545 Düsseldorf, Germany

Description of the organisation: GROHE is a global brand for complete bathroom solutions and kitchen fittings and has a total of over 7,000 employees. Since 2014 GROHE has been part of the brand portfolio of LIXIL, a manufacturer of water and housing products. In order to offer "Pure Freude an Wasser", every product is based on the brand values of quality, technology, design and sustainability.

With water at the core of its business, GROHE contributes to LIXIL's corporate responsibility strategy with a resource-saving value chain: from CO<sub>2</sub>-neutral production (includes CO<sub>2</sub> compensation projects, more on [green.grohe.com](https://www.grohe.com/en/green)), water- and energy-saving product technologies, the removal of unnecessary plastic in the product packaging, all the way to the launch of Cradle to Cradle Certified® products.

GROHE has established structures worldwide to systematically comply with legal and regulatory requirements and to continuously improve in the areas of quality, environment, occupational health and safety and energy management. This claim is also served by the regular certification audits at all GROHE production sites worldwide by internal GROHE auditors as well as an independent external certification company (for more information see: <https://www.grohe.com/en/corporate/about-company/products/certificates.html>).

Product-related or management system-related certifications: The GROHE Group holds certifications for all essential Group facilities according to the international standards ISO 9001 (quality management), ISO 14001 (environmental management), ISO 45001 (health & safety management) and ISO 50001 (energy management).

Name and location of production site(s): LIXIL EMENA corporate functions are in Düsseldorf (D) and Hemer (D). LIXIL EMENA production sites, that exclusively produce for the GROHE brand, are in Hemer (D), Porta Westfalica (D), Lahr (D), Albergaria (Portugal), Klaeng (Thailand). Distribution centres in Hemer (D) und Porta Westfalica (D). The production site of the target product is a factory of GROHE AG situated in Albergaria, Portugal, so the primary activity data of the reference product in the manufacturing stage is inventoried from this factory.

## Product information

The EPD covers a group of products of GROHE AG, produced at the Albergaria production site (Portugal):

- **Grotherm 800 THM shower exp 1/2" – Product no. 34558000 (Reference Product)**
- Precision Get THM shower exp – Product no. 34773000
- Grotherm 1000 Cosmo M THM shower exp – Product no. 34065DC2
- Grotherm 1000 Cosmo M THM shower exp – Product no. 34065GN2
- Precision Joy THM shower exp – Product no. 34333000
- Precision Clova THM shower exp – Product no. 34763000
- Grotherm 1000 Cosmo M THM shower exp – Product no. 34065AL2
- Grotherm 1000 Cosmopolitan THM shower exp UK – Product no. 34430000
- Grotherm 800 Cosmopolitan THM shower exp – Product no. 34765000
- Grotherm 800 Cosmopolitan THM shower exp F – Product no. 34771000
- Grotherm 1000 Cosmo M THM shower exp – Product no. 34065A02
- Grotherm 1000 Perf. THM shw. exp w/o un. – Product no. 34828000
- Precision Start THM shower exp 1/2" – Product no. 34594000
- Precision Start THM shower exp FIN – Product no. 34852000
- Grotherm 800 THM shower exp 1/2" F – Product no. 34562000
- Grotherm 1000 Perf. THM shw. exp 153mm CH – Product no. 34809000
- Precision Flow THM shower exp – Product no. 121250
- Grotherm 1000 Perf. THM shw. exp w/o unions – Product no. 34777000
- Grotherm 1000 Perf. THM shw. exp 120mm w/o unions – Product no. 34829000
- Precision Feel THM shower exp 153mm CH – Product no. 34811000
- Grotherm 800 THM shower exp 1/2" – Product no. 3455800D
- Precision Start THM shw 40mm w/o un. SC – Product no. 34848000
- Grotherm 800 THM shw. exp 40mm w/o un. SC – Product no. 34707000

The reference product was chosen as the representative product based on sales volume. The products represented in this group are all similar in composition, with their weight varying in a range of 10% (between 1.79 and 1.99 kg).

Product name: Grotherm 800 THM shower exp 1/2" (Representative Product for Group 3\_1)

Product identification: 34558000

Product description: Shower thermostat, with the following specifications

- wall mounted
- GROHE StarLight chrome finish
- GROHE SafeStop safety button at 38°C
- GROHE SafeStop Plus optional temperature limiter at 43°C included
- GROHE TurboStat compact cartridge with wax thermoelement
- integrated mixed water shut off
- volume handle with GROHE EcoButton (economy button with individually adjustable economy stop)
- ceramic headpart 1/2", 180°
- shower bottom outlet 1/2"
- dirt strainers
- built-in non return valves
- protected against backflow
- S-unions
- metal escutcheon
- GROHE EcoJoy technology for less water and perfect flow

UN CPC code: 42911

Geographical scope: Europe

## LCA information

The intended application of LCA is for ISO 14025:2006 Environmental Product Declaration (EPD) and allows B2B communication for environmental assessments of buildings. The target group are customers of GROHE AG in the construction sector (B2B).

The purpose of the life cycle assessment is to use the life cycle assessment method to check the raw materials, energy/resource inputs and pollutant discharge data used in the life cycle of the product group, and systematically quantify the environmental impact related information.

Functional unit / declared unit: The declared unit is the use of one brass shower thermostat over a period of 15 years. The weight of the reference product is 1.9 kg (excluding packaging material).

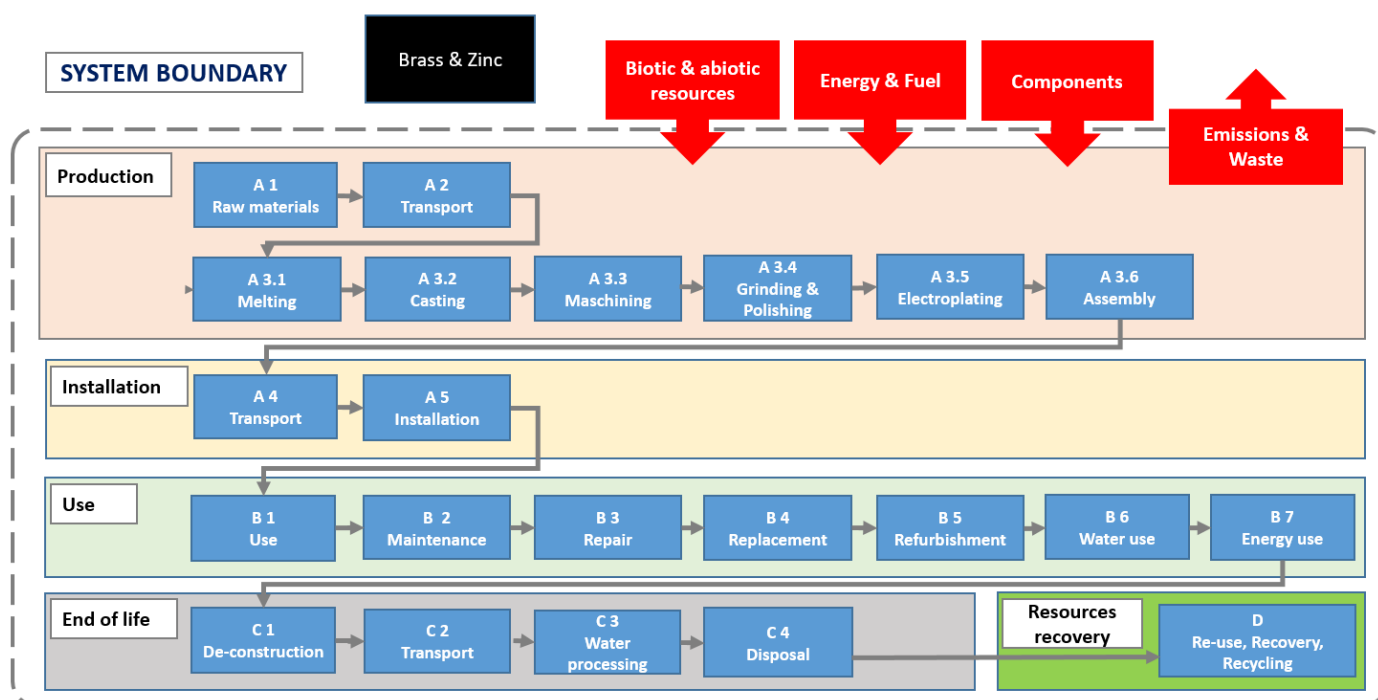
Reference service life: The RSL for the reference product is 15 years, based on GROHE warranties and literature data on household appliances<sup>1</sup>.

Time representativeness: The inventory period of the reference product is from April 2020 to March 2021.

Database(s) and LCA software used: For the calculation of environmental impacts, the database GaBi Professional, 2022 Edition was used, which also contains data from Ecoinvent Database, Version 3.8, 2021.

Description of system boundaries:

Cradle to grave and module D (A + B + C + D)



<sup>1</sup> JRC (2014); NAHB (2007)

A1: This module describes raw material supply including raw material extraction/preparation and pre-treatment processes.

A2: This module describes the transport of raw materials to the production site in Albergaria, Portugal. Calculation is based on actual transported weights and distances. Assumptions on average load capacity etc. are described in the background information.

A3: This module describes the environmental impacts from energies and utilities used for manufacturing the brass thermostats, in the production steps shown in Figure 1.

A4: This module describes the transport of the product from the production site in Albergaria, Portugal to the main target markets in Europe via ship and truck and is based on actual transport weights and distances. Assumptions on average load capacity etc. are described in the background information.

A5: This module describes impacts related to installing the thermostat in the shower. Since this is a manual process, the environmental impacts are negligible.

B1: Environmental impacts resulting from the use of the product are described in modules B6 and B7.

B2-B5: Maintenance, repair, replacement and/or refurbishment were not deemed relevant within the Reference Service Life (RSL).

B6: This module describes the environmental impacts resulting from the energy use during use of the product. Energy is needed to heat the water used for showering. Assumptions made on the average energy consumption are described in the background information.

B7: This module describes the environmental impacts resulting from the water running through the product when in use. Assumptions made on the average water consumption are described in the background information.

C1: This module describes impacts related to removing the thermostat at the product end-of-life. Since this is a manual process, the environmental impacts are negligible.

C2: This module describes the transport of the discarded thermostats to final disposal. Average distance from demolition site to waste processing site for final disposal is assumed to be 100 km.

C3: This module describes the disassembly of the brass thermostat at the end-of-life. No data on the energy requirements for this stage was available and reference studies show that the energy input is very low. Environmental impacts coming from this stage were therefore neglected.

C4: This module describes the disposal of the thermostat at the product end-of-life. A combination of recycling and incineration is assumed based on literature data, see the background information for further details.

D: This module describes benefits and burdens associated with recovery/recycling that affects previous or future life cycles. For this product it includes benefits from the recycling of plastic, brass and other metal parts as well as energy recovery from incineration processes. Assumed recycling rates were based on literature data (see C4).

## Background information

The following assumptions were made for the LCA calculation:

- For recycled input materials (brass and copper), only the energy needed for processing the materials before reuse was considered. For brass, an existing dataset for secondary material was used, while for copper, the assumption on the energy needed for reprocessing was taken from literature data<sup>2</sup> and an average of the world energy mix for heating and the world electricity mix<sup>3</sup> was applied.
- Information on the amount of energies and utilities needed for manufacturing the thermostats (A3) was available on a production facility level, per year. Allocation to each thermostat was done by dividing the overall annual consumption values by the amount of pieces manufactured in the Albergaria facility per year. The same approach was chosen for emissions to air and water occurring during production.
- For the electricity used during the production process (A3), the electricity grid mix for Portugal was used. CO<sub>2</sub>e emissions from energy consumption are offset by GROHE AG for all major production facilities.

| Energy Source | Share Portugal |
|---------------|----------------|
| Natural gas   | 34 %           |
| Hydro         | 26 %           |
| Wind          | 23 %           |
| Biofuels      | 6 %            |
| Lignite       | 4 %            |
| Photovoltaics | 3 %            |

- No credits were given for recycling of production wastes / residues.
- For the energy consumption during the use phase of the thermostats (B6), the average energy mix for heat generation in Europe<sup>4</sup> was considered, and two scenarios were calculated, using the electricity grid mix for Europe and the French grid mix. For the use of the products an energy consumption of 1.8 MWh per year was assumed. This assumption is based on the energy consumption of handshowers produced by GROHE (at the Lahr site).

<sup>2</sup> BIR (2008)

<sup>3</sup> IEA (2019)

<sup>4</sup> IEA (2019)

| Energy Source      | Share Energy Mix EU-28 | Share Electricity EU-28 (Scenario) | Share Electricity France (Scenario) |
|--------------------|------------------------|------------------------------------|-------------------------------------|
| Natural gas        | 43.4 %                 | 19.1 %                             | 5.3 %                               |
| Lignite            | 19.7 %                 | 9.1 %                              | -                                   |
| Biofuels / Bio gas | 18.6 %                 | 2.1 %                              | 0.4 %                               |
| Waste              | 8.6 %                  | -                                  | -                                   |
| Oil                | 2.6 %                  | -                                  | -                                   |
| Geothermal         | 1.4 %                  | -                                  | -                                   |
| Nuclear            | 0.4 %                  | 25.3 %                             | 71.0 %                              |
| Solar thermal / PV | 0.1 %                  | 3.8 %                              | 1.8 %                               |
| Hydro              | -                      | 11.6 %                             | 12.2 %                              |
| Wind               | -                      | 11.6 %                             | 4.9 %                               |
| Hard coal          | -                      | 9.7 %                              | 1.5 %                               |
| Biomass            | -                      | 3.1 %                              | 0.7 %                               |
| Rest               | 5.3 %                  | 4.6 %                              | 2.2 %                               |

- For the water consumption during the use phase of the product (B7), an average water consumption of 125 liters per day was assumed, with 20% falling on faucet use<sup>5</sup>. This value was extrapolated to the RSL of 15 years.
- For transports to the end of life treatment (C2), an average distance of 100 km was assumed.
- For the end of life scenarios, the following waste treatment quotas were assumed for the different materials, based on literature values available for Europe<sup>6</sup>:

| Material | Recycling | Incineration | Landfilling |
|----------|-----------|--------------|-------------|
| Zinc     | 52%       | 48%          | -           |
| Copper   | 80%       | 20%          | -           |
| Brass    | 93%       | 7%           | -           |
| Steel    | 85%       | 15%          | -           |
| Plastic  | 33%       | 43%          | 25%         |
| Paper    | 74%       | 26%          | -           |

- Credits for recycling were given only for primary materials as well as for recovered energy from incineration for all materials listed above.

<sup>5</sup> WRF (2016)

<sup>6</sup> UNEP (2011); Statista (2021); EPRC (2020); JRC (2020)

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation:

|                      | Product stage       |           |               | Construction process stage |                           | Use stage |             |        |             |               |                        |                       | End of life stage          |           |                  |          | Resource recovery stage            |
|----------------------|---------------------|-----------|---------------|----------------------------|---------------------------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|------------------------------------|
|                      | Raw material supply | Transport | Manufacturing | Transport                  | Construction installation | Use       | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential |
| Module               | A1                  | A2        | A3            | A4                         | A5                        | B1        | B2          | B3     | B4          | B5            | B6                     | B7                    | C1                         | C2        | C3               | C4       | D                                  |
| Modules declared     | x                   | x         | x             | x                          | x                         | x         | x           | x      | x           | x             | x                      | x                     | x                          | x         | x                | x        | X                                  |
| Geography            | GLO                 | GLO       | PT            | GLO                        | -                         | -         | -           | -      | -           | -             | EU                     | EU                    | -                          | EU        | -                | EU       | EU                                 |
| Specific data used   | 100%                |           |               |                            |                           | -         | -           | -      | -           | -             | -                      | -                     | -                          | -         | -                | -        | -                                  |
| Variation – products | <10%                |           |               |                            |                           | -         | -           | -      | -           | -             | -                      | -                     | -                          | -         | -                | -        | -                                  |
| Variation – sites    | -                   |           |               |                            |                           | -         | -           | -      | -           | -             | -                      | -                     | -                          | -         | -                | -        | -                                  |

## Content information

| Product components <sup>7</sup>            | Weight, kg | Post-consumer material, weight-% | Renewable material, weight-% |
|--------------------------------------------|------------|----------------------------------|------------------------------|
| Brass                                      | 0,8        | 0%                               | 0%                           |
| Brass scrap                                | 0,4        | 0%                               | 0%                           |
| Secondary Copper                           | 0,4        | 100%                             | 0%                           |
| Zinc                                       | 0,2        | 0%                               | 0%                           |
| Plastic parts                              | 0,1        | 0%                               | 0%                           |
| Steel                                      | < 0,1      | 0%                               | 0%                           |
| Copper                                     | < 0,1      | 0%                               | 0%                           |
| Other materials (EPDM, resin, grease etc.) | < 0,1      | 0%                               | 0%                           |
| TOTAL                                      | 1.91       | 0%                               | 0%                           |
| Packaging materials                        | Weight, kg | Weight-% (versus the product)    |                              |
| Cardboard                                  | 0.46       | 24%                              |                              |
| Paper                                      | 0.09       | 5%                               |                              |
| TOTAL                                      | 0.55       | 29%                              |                              |

| Dangerous substances from the candidate list of SVHC for Authorisation | EC No. | CAS No. | Weight-% per functional or declared unit |
|------------------------------------------------------------------------|--------|---------|------------------------------------------|
| Brass can contain between 0.1 and 3.5% of lead <sup>8</sup> .          |        |         |                                          |

<sup>7</sup> Excluding production residues

<sup>8</sup> For current regulation, please see 4MSI (2021), to be found at <https://www.umweltbundesamt.de/en/topics/water/drinking-water/distributing-drinking-water/approval-harmonization-4ms-initiative#undefined>

## Environmental Information

### Potential environmental impact – mandatory indicators according to EN 15804

| Results per functional or declared unit |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |             |           |               |             |    |    |    |    |    |    |           |           |    |             |    |             |             |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-----------|---------------|-------------|----|----|----|----|----|----|-----------|-----------|----|-------------|----|-------------|-------------|
| Indicator                               | Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A1          | A2          | A3        | Tot.<br>A1-A3 | A4          | A5 | B1 | B2 | B3 | B4 | B5 | B6        | B7        | C1 | C2          | C3 | C4          | D           |
| GWP-fossil                              | kg CO <sub>2</sub> eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 9,41 E+00   | 1,70 E-01   | 1,88 E+00 | 1,15 E+01     | 3,30 E-01   | 0  | 0  | 0  | 0  | 0  | 0  | 2,18 E+03 | 1,10 E+01 | 0  | 2,06 E-02   | 0  | 2,09 E-03   | - 1,20 E+01 |
| GWP-biogenic                            | kg CO <sub>2</sub> eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | - 8,85 E-02 | - 1,67 E-03 | 5,91 E-03 | - 8,43 E-02   | - 2,59 E-03 | 0  | 0  | 0  | 0  | 0  | 0  | 8,09 E+01 | 1,39 E+00 | 0  | - 2,02 E-04 | 0  | - 2,23 E-05 | - 1,58 E-01 |
| GWP-luluc                               | kg CO <sub>2</sub> eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2,62 E-02   | 1,15 E-03   | 1,95 E-03 | 2,93 E-02     | 1,83 E-03   | 0  | 0  | 0  | 0  | 0  | 0  | 1,85 E+00 | 3,02 E-03 | 0  | 1,39 E-04   | 0  | 1,02 E-06   | - 3,41 E-02 |
| GWP-total                               | kg CO <sub>2</sub> eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 9,35 E+00   | 1,70 E-01   | 1,89 E+00 | 1,14 E+01     | 3,29 E-01   | 0  | 0  | 0  | 0  | 0  | 0  | 2,26 E+03 | 1,23 E+01 | 0  | 2,05 E-02   | 0  | 2,07 E-03   | - 1,22 E+01 |
| ODP                                     | kg CFC 11 eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3,92 E-07   | 1,68 E-14   | 2,01 E-08 | 4,12 E-07     | 3,01 E-14   | 0  | 0  | 0  | 0  | 0  | 0  | 1,29 E-10 | 4,88 E-11 | 0  | 2,03 E-15   | 0  | 2,81 E-15   | - 6,47 E-07 |
| AP                                      | mol H <sup>+</sup> eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 4,33 E-01   | 3,33 E-04   | 4,10 E-03 | 4,38 E-01     | 2,69 E-03   | 0  | 0  | 0  | 0  | 0  | 0  | 4,53 E+00 | 1,96 E-02 | 0  | 4,02 E-05   | 0  | 6,20 E-06   | - 7,76 E-01 |
| EP-freshwater                           | kg P eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3,35 E-02   | 6,12 E-07   | 9,93 E-05 | 3,36 E-02     | 9,85 E-07   | 0  | 0  | 0  | 0  | 0  | 0  | 2,58 E-02 | 1,57 E-03 | 0  | 7,39 E-08   | 0  | 3,90 E-07   | - 6,13 E-02 |
| EP-marine                               | kg N eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2,56 E-02   | 1,36 E-04   | 1,50 E-03 | 2,72 E-02     | 7,89 E-04   | 0  | 0  | 0  | 0  | 0  | 0  | 1,36 E+00 | 1,14 E-02 | 0  | 1,64 E-05   | 0  | 1,37 E-06   | - 4,25 E-02 |
| EP-terrestrial                          | mol N eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3,33 E-01   | 1,55 E-03   | 1,28 E-02 | 3,47 E-01     | 8,74 E-03   | 0  | 0  | 0  | 0  | 0  | 0  | 1,52 E+01 | 6,00 E-02 | 0  | 1,87 E-04   | 0  | 1,50 E-05   | - 5,67 E-01 |
| POCP                                    | kg NMVOC eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 9,10 E-02   | 2,96 E-04   | 3,20 E-03 | 9,45 E-02     | 2,07 E-03   | 0  | 0  | 0  | 0  | 0  | 0  | 3,08 E+00 | 1,59 E-02 | 0  | 3,57 E-05   | 0  | 4,41 E-06   | - 1,55 E-01 |
| ADP-minerals&metals*                    | kg Sb eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1,07 E-02   | 1,73 E-08   | 1,51 E-06 | 1,07 E-02     | 2,96 E-08   | 0  | 0  | 0  | 0  | 0  | 0  | 4,25 E-04 | 1,31 E-06 | 0  | 2,08 E-09   | 0  | 1,45 E-10   | - 1,92 E-02 |
| ADP-fossil*                             | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1,39 E+02   | 2,25 E+00   | 2,87 E+01 | 1,70 E+02     | 4,28 E+00   | 0  | 0  | 0  | 0  | 0  | 0  | 2,16 E+04 | 1,57 E+02 | 0  | 2,71 E-01   | 0  | 2,97 E-02   | - 1,79 E+02 |
| WDP                                     | m³                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 4,39 E+01   | 1,92 E-03   | 2,10 E+00 | 4,60 E+01     | 3,15 E-03   | 0  | 0  | 0  | 0  | 0  | 0  | 2,51 E+02 | 5,89 E+03 | 0  | 2,31 E-04   | 0  | - 2,06 E-05 | - 1,89 E+01 |
| Acronyms                                | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption |             |             |           |               |             |    |    |    |    |    |    |           |           |    |             |    |             |             |

\* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

## Potential environmental impact – additional mandatory and voluntary indicators

| Results per functional or declared unit |                        |           |           |           |                   |           |    |    |    |    |    |    |           |           |    |           |    |           |             |
|-----------------------------------------|------------------------|-----------|-----------|-----------|-------------------|-----------|----|----|----|----|----|----|-----------|-----------|----|-----------|----|-----------|-------------|
| Indicator                               | Unit                   | A1        | A2        | A3        | Tot.<br>A1-<br>A3 | A4        | A5 | B1 | B2 | B3 | B4 | B5 | B6        | B7        | C1 | C2        | C3 | C4        | D           |
| GWP-GHG <sup>9</sup>                    | kg CO <sub>2</sub> eq. | 9,44 E+00 | 1,72 E-01 | 1,88 E+00 | 1,15 E+01         | 3,32 E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 2,18 E+03 | 1,10 E+01 | 0  | 2,07 E-02 | 0  | 2,09 E-03 | - 1,21 E+01 |

## Use of resources

| Results per functional or declared unit |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |              |              |                   |              |    |    |    |    |    |    |              |              |    |              |    |              |                   |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|--------------|-------------------|--------------|----|----|----|----|----|----|--------------|--------------|----|--------------|----|--------------|-------------------|
| Indicator                               | Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | A1           | A2           | A3           | Tot.<br>A1-<br>A3 | A4           | A5 | B1 | B2 | B3 | B4 | B5 | B6           | B7           | C1 | C2           | C3 | C4           | D                 |
| PERE                                    | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3,66<br>E+01 | 1,56<br>E-01 | 2,02<br>E+01 | 5,70<br>E+01      | 2,50<br>E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 2,91<br>E+04 | 2,77<br>E+01 | 0  | 1,88<br>E-02 | 0  | 2,44<br>E-03 | -<br>4,15<br>E+01 |
| PERM                                    | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0,00<br>E+00 | 0,00<br>E+00 | 0,00<br>E+00 | 0,00<br>E+00      | 0,00<br>E+00 | 0  | 0  | 0  | 0  | 0  | 0  | 0,00<br>E+00 | 0,00<br>E+00 | 0  | 0,00<br>E+00 | 0  | 0,00<br>E+00 | 0,00<br>E+00      |
| PERT                                    | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3,66<br>E+01 | 1,56<br>E-01 | 2,02<br>E+01 | 5,70<br>E+01      | 2,50<br>E-01 | 0  | 0  | 0  | 0  | 0  | 0  | 2,91<br>E+04 | 2,77<br>E+01 | 0  | 1,88<br>E-02 | 0  | 2,44<br>E-03 | -<br>4,15<br>E+01 |
| PENRE                                   | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1,40<br>E+02 | 2,26<br>E+00 | 2,87<br>E+01 | 1,71<br>E+02      | 4,30<br>E+00 | 0  | 0  | 0  | 0  | 0  | 0  | 2,17<br>E+04 | 1,57<br>E+02 | 0  | 2,73<br>E-01 | 0  | 2,97<br>E-02 | -<br>1,81<br>E+02 |
| PENRM                                   | MJ.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1,15<br>E-02 | 0,00<br>E+00 | 2,16<br>E-03 | 1,37<br>E-02      | 0,00<br>E+00 | 0  | 0  | 0  | 0  | 0  | 0  | 4,98<br>E-10 | 1,02<br>E-12 | 0  | 0,00<br>E+00 | 0  | 2,01<br>E-16 | -<br>2,07<br>E-02 |
| PENRT                                   | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1,40<br>E+02 | 2,26<br>E+00 | 2,87<br>E+01 | 1,71<br>E+02      | 4,30<br>E+00 | 0  | 0  | 0  | 0  | 0  | 0  | 2,17<br>E+04 | 1,57<br>E+02 | 0  | 2,73<br>E-01 | 0  | 2,97<br>E-02 | -<br>1,81<br>E+02 |
| SM                                      | kg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 9,06<br>E-01 | 0,00<br>E+00 | 0,00<br>E+00 | 0,00<br>E+00      | 0,00<br>E+00 | 0  | 0  | 0  | 0  | 0  | 0  | 0,00<br>E+00 | 0,00<br>E+00 | 0  | 0,00<br>E+00 | 0  | 0,00<br>E+00 | 0,00<br>E+00      |
| RSF                                     | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0,00<br>E+00 | 0,00<br>E+00 | 0,00<br>E+00 | 0,00<br>E+00      | 0,00<br>E+00 | 0  | 0  | 0  | 0  | 0  | 0  | 0,00<br>E+00 | 0,00<br>E+00 | 0  | 0,00<br>E+00 | 0  | 0,00<br>E+00 | 0,00<br>E+00      |
| NRSF                                    | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0,00<br>E+00 | 0,00<br>E+00 | 0,00<br>E+00 | 0,00<br>E+00      | 0,00<br>E+00 | 0  | 0  | 0  | 0  | 0  | 0  | 0,00<br>E+00 | 0,00<br>E+00 | 0  | 0,00<br>E+00 | 0  | 0,00<br>E+00 | 0,00<br>E+00      |
| FW                                      | m³                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1,02<br>E+00 | 1,80<br>E-04 | 4,45<br>E-02 | 1,07<br>E+00      | 2,90<br>E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 9,42<br>E+00 | 1,37<br>E+02 | 0  | 2,17<br>E-05 | 0  | 3,84<br>E-07 | -<br>4,41<br>E-01 |
| Acronyms                                | PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water |              |              |              |                   |              |    |    |    |    |    |    |              |              |    |              |    |              |                   |

<sup>9</sup> The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

## Waste production and output flows

### Waste production

| Results per functional or declared unit |      |              |              |              |                   |              |    |    |    |    |    |    |              |              |    |              |    |              |                   |
|-----------------------------------------|------|--------------|--------------|--------------|-------------------|--------------|----|----|----|----|----|----|--------------|--------------|----|--------------|----|--------------|-------------------|
| Indicator                               | Unit | A1           | A2           | A3           | Tot.<br>A1-<br>A3 | A4           | A5 | B1 | B2 | B3 | B4 | B5 | B6           | B7           | C1 | C2           | C3 | C4           | D                 |
| Hazardous waste disposed                | kg   | 1,57<br>E-06 | 1,19<br>E-11 | 2,85<br>E-09 | 1,57<br>E-06      | 2,19<br>E-11 | 0  | 0  | 0  | 0  | 0  | 0  | 3,31<br>E-06 | 1,43<br>E-08 | 0  | 1,44<br>E-12 | 0  | 4,58<br>E-12 | -<br>1,03<br>E-06 |
| Non-hazardous waste disposed            | kg   | 1,90<br>E-01 | 3,68<br>E-04 | 4,61<br>E-01 | 6,52<br>E-01      | 6,51<br>E-04 | 0  | 0  | 0  | 0  | 0  | 0  | 1,52<br>E+02 | 3,89<br>E+01 | 0  | 4,44<br>E-05 | 0  | 2,94<br>E-02 | -<br>6,77<br>E-02 |
| Radioactive waste disposed              | kg   | 1,58<br>E-03 | 4,19<br>E-06 | 8,14<br>E-04 | 2,40<br>E-03      | 7,47<br>E-06 | 0  | 0  | 0  | 0  | 0  | 0  | 6,04<br>E-02 | 5,27<br>E-03 | 0  | 5,06<br>E-07 | 0  | 3,65<br>E-07 | -<br>6,48<br>E-04 |

### Output flows

| Results per functional or declared unit |      |     |     |     |                   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----------------------------------------|------|-----|-----|-----|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Indicator                               | Unit | A1  | A2  | A3  | Tot.<br>A1-<br>A3 | A4  | A5  | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1  | C2  | C3  | C4  | D   |
| Components for re-use                   | kg   | INA | INA | INA | INA               | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA |
| Material for recycling                  | kg   | INA | INA | INA | INA               | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA |
| Materials for energy recovery           | kg   | INA | INA | INA | INA               | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA |
| Exported energy, electricity            | MJ   | INA | INA | INA | INA               | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA |
| Exported energy, thermal                | MJ   | INA | INA | INA | INA               | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA | INA |

### Information on biogenic carbon content

| Results per functional or declared unit |      |          |
|-----------------------------------------|------|----------|
| BIOTENIC CARBON CONTENT                 | Unit | QUANTITY |
| Biogenic carbon content in product      | kg C | 0        |
| Biogenic carbon content in packaging    | kg C | 0,07     |

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

## Remarks on LCA results

The main driver in all impact categories, with the exception of Ozone depletion, Resource use (minerals and metals) and Water use, is module B6, the energy consumption during the use phase of the product.

It shall be noted that the impact resulting from energy consumption during the use phase of the product over a period of 15 years varies greatly, depending on the energy mix being considered. Generally, the following can be stated: The higher the share in renewable energies in the energy mix, the lower will be the impacts in module B6.

For example: The calculated scenarios show that the greenhouse gas emissions resulting from the use of the product over a period of 15 years with the assumed annual energy consumption for water heating with the EU-28 energy mix are 30% lower than the emissions from a use of the EU-28 electricity grid mix. However, when comparing the two electricity scenarios, a use of the French electricity grid mix leads to one fifth of the greenhouse gas emissions compared to the use of the EU-28 electricity grid mix for water heating.

In order to generate results per year, please divide all results by 15.

Results per kg of packed product for the system boundaries “cradle to gate” are shown in the table below.

|                                                                       | A1        | A2        | A3       | Tot.A1-A3 |
|-----------------------------------------------------------------------|-----------|-----------|----------|-----------|
| Climate Change, fossil [g CO <sub>2</sub> eq.]                        | 3,84E+00  | 6,96E-02  | 7,67E-01 | 4,68E+00  |
| Climate Change, biogenic [kg CO <sub>2</sub> eq.]                     | -3,61E-02 | -6,84E-04 | 2,41E-03 | -3,44E-02 |
| Climate Change, land use and land use change [kg CO <sub>2</sub> eq.] | 1,07E-02  | 4,71E-04  | 7,96E-04 | 1,20E-02  |
| Climate Change - total [kg CO <sub>2</sub> eq.]                       | 3,82E+00  | 6,93E-02  | 7,70E-01 | 4,66E+00  |
| Ozone depletion [kg CFC-11 eq.]                                       | 1,60E-07  | 6,87E-15  | 8,20E-09 | 1,68E-07  |
| Acidification [Mole of H <sup>+</sup> eq.]                            | 1,77E-01  | 1,36E-04  | 1,67E-03 | 1,79E-01  |
| Eutrophication, freshwater [kg P eq.]                                 | 1,37E-02  | 2,50E-07  | 4,05E-05 | 1,37E-02  |
| Eutrophication, marine [kg N eq.]                                     | 1,04E-02  | 5,54E-05  | 6,12E-04 | 1,11E-02  |
| Eutrophication, terrestrial [Mole of N eq.]                           | 1,36E-01  | 6,34E-04  | 5,21E-03 | 1,42E-01  |
| Photochemical ozone formation, human health [kg NMVOC eq.]            | 3,71E-02  | 1,21E-04  | 1,31E-03 | 3,86E-02  |
| Resource use, mineral and metals [kg Sb eq.]                          | 4,36E-03  | 7,05E-09  | 6,17E-07 | 4,37E-03  |
| Resource use, fossils [MJ]                                            | 5,69E+01  | 9,18E-01  | 1,17E+01 | 6,95E+01  |
| Water use [m <sup>3</sup> world equiv.]                               | 1,79E+01  | 7,82E-04  | 8,58E-01 | 1,88E+01  |

## Additional information

The GROHE brand stands for quality, technology, design and sustainability. Thus, sustainability also means responsibility – responsibility towards people and the environment. The various aspects of responsibility range from energy-saving technologies and production processes to resource efficiency, customer service and social and societal responsibility.

Therefore, environmental protection and resource conservation as well as occupational health and safety requirements are integral and important components of our business strategy.

### Products

We encourage our customers and end users to make benefit of our sustainable technologies, like the energy saving faucets, and products with reduced water flow. But also – to choose their source of energy wisely whenever possible – to reduce the CO<sub>2</sub> emissions driven by the need to heat water.

### Maintenance & Repair

All products benefit from careful cleaning and from regular motion of moving parts. In some areas, limescale can have a negative effect on performance and it is therefore recommended to clean mosseurs and shower outlets from time to time. GROHE warranty includes a spare part guarantee of 15 years to secure a long life span of the products.

### Re-use and recycle

Our products have a long lifespan thanks to their durable design and quality materials. Still, at the very end of their lifecycle we encourage end users and installers to follow the local recommendations and secure that metal and plastic parts are recycled in the best possible way, and that packaging is collected and can become new packaging material.

If you want to read more about the multiple sustainability initiatives of GROHE and access our sustainability report – please visit [green.grohe.com](https://green.grohe.com)

## References

4MSI Joint Management Committee (2021) Acceptance of Metallic Materials Used for Products in Contact with Drinking Water, 16th revision – Part B – Positive List of compositions for metallic material

Bureau of International Recycling (BIR) (2008) Report on the Environmental Benefits of Recycling

DIN EN 15804: 2022, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

DIN EN ISO 14020:2003, Environmental labels and declarations - General principles

DIN EN ISO 14021: 2021, Environmental labels and declarations - Self-declared environmental claims (Type II environmental labelling)

DIN EN ISO 14025:2020, Environmental labels and declarations - Type III environmental declarations - Principles and procedures

Ecoinvent Database, Version 3.8, 2021

European Commission, Joint Research Centre (JRC) (2014) MEErP Preparatory Study on Taps and Showers – Final report. Cordella, M.; Garbarino, E.; Calero, M.; Mathieux, F.; Wolf, O.

European Commission, Joint Research Centre (JRC) (2020) European Platform on Life Cycle Assessment, Annex C V2.1, viewed on 06/28/2022, under [https://eplca.jrc.ec.europa.eu/permalink/Annex\\_C\\_V2.1\\_May2020.xlsx](https://eplca.jrc.ec.europa.eu/permalink/Annex_C_V2.1_May2020.xlsx)

European Paper Recycling Council (EPRC) (2020) Monitoring Report 2020 – European Declaration on Paper Recycling 2016 – 2020

GaBi Professional Database, GaBi Databases 2022 Edition

General Programme Instructions of the International EPD® System. Version 4.0.

International Energy Agency (IEA) (2019) Heat generation by source, Europe 1990-2019; viewed on 06/15/2022, under <https://www.iea.org/regions/europe>

National Association of Home Builders (NAHB) / Bank of America Home Equity (2007) Study of Life Expectancy of Home Components. Seiders D.; Ahluwalia, G.; Melman, S.; Quint, R.; Chaluvadi, A.; Liang, M.

PCR 2019:14 Construction products and construction services (EN 15804:A2), version 1.11

Statista (2021) Plastics post-consumer waste treatment in the European Union (EU-27)\* in 2020, by type; viewed on 05/17/2022, under <https://www.statista.com/statistics/869617/plastics-post-consumer-treatment-european-union/>

UNEP (2011) Recycling Rates of Metals – A Status Report, A Report of the Working Group on the Global Metal Flows to the International Resource Panel. Graedel, T.E.; Allwood, J.; Birat, J.-P.; Reck, B.K.; Siley, S.F.; Sonnemann, G.; Buchert, M.; Hagelüken, C.

World Research Foundation (WRF) (2016) Residential End Uses of Water, Version 2 – Executive Report

