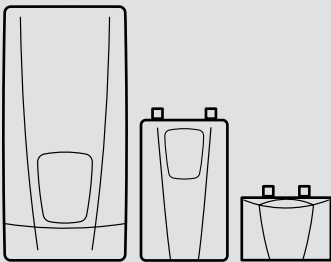


Product Carbon Footprint



Electric instantaneous water heater

Simply efficient.

CONTENTS

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The Product Life Cycle Accounting and Reporting Standard of the Greenhouse Gas Protocol (GHG Protocol) from 2011 was used to determine the carbon footprint..

Version 3.0, 10/2025

Explanation on the comparability of the data

The results presented in this report are specific to the assumptions and methods used by CLAGE GmbH. The results are not intended to serve as a basis for comparison with other companies or products. Even with similar products, different data qualities can lead to incomparable results. For a glossary and further insight into the process of PCF collection, the reader can refer to the GHG Protocol Product Life Cycle Accounting and Reporting Standard (WIR/WBCSD, 2011).

¹ https://ghgprotocol.org/sites/default/files/standards/Product-Life-Cycle-Accounting-Reporting-Standard_041613.pdf (21.09.2023)



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Claus-Holmer Gerdes began selling small instantaneous water heaters under the CLAGE brand in 1951. Today, as an owner-managed, medium-sized industrial company, we are still based in the Hanseatic City of Lüneburg in northern Germany. Around 290 employees work in the areas of development, production, sales and customer service. As a pioneer and market leader for small instantaneous water heaters, we also see ourselves as pioneers in the field of decentralised hot water supply. We are therefore constantly on the lookout for new detailed solutions for our range of electric instantaneous water heaters. Numerous awards and a high level of customer satisfaction are confirmation of our claim to be the experts for electric instantaneous water heaters.

Reliability, fairness and responsible action are key elements of our business success.

As a modern industrial company, we are actively committed to [environmental protection and climate neutrality](#). Our production is based in Germany and we operate sustainably, ethically and socially.



Corporate Responsibility

Sustainability: Our Foundation and Our Commitment

Sustainability is deeply embedded in our DNA and characterises our daily actions as well as our processes. Below, you will find an insight into our ongoing efforts to act responsibly and with a future-oriented approach.



Environmentally friendly packaging

Appliance boxes with single-colour flexographic printing without offset paper and inserts with 30% grass content conserve valuable natural resources.



Pallet packaging without film

The use of reusable rubber pallet straps saves over 67 km of plastic film every year.



100% renewable energy

The entire company (including production) has been powered by green electricity since 2019, which means no greenhouse gas emissions.



Water system for employees

No crates, no logistics and no plastic bottles thanks to the Zip HydroTap water system. This saves resources and greenhouse gas emissions.



Environmentally friendly advertising material

For printed matter and advertising materials, attention is paid to environmentally friendly and certified alternatives.



Electromobility

Since 2016, the fleet has been gradually converted to electric or hybrid vehicles. Such vehicles currently make up 43% of the fleet.



LED lighting

Almost all conventional light sources in the company (including production) have been replaced by LED technology.



Electric screwdriver

In production, compressed air screwdrivers are being replaced by more economical electric screwdrivers.



Development with foresight

We strive to develop repairable and recyclable appliances with low carbon footprint in order to conserve resources in the long term.



Energy-saving technology

Many of our instantaneous water heaters are equipped with an efficient energy-saving mode and also have a class A energy label.



Paper saving

The high degree of digitisation in the company avoids a lot of paper waste.



Climate-neutral parcel shipping

We have been sending our parcels via GLS climate-neutral shipping since 2019, which means that 60% of our shipments are climate-neutral.

1. Introduction

Our commitment to sustainability, environmental responsibility, and quality management is based on our certifications according to **DIN EN ISO 14001:2015**, **DIN EN ISO 9001:2015** and **DIN EN ISO 50001:2018**. These standards form the foundation for the systematic implementation of environmental standards, quality controls, and energy management.

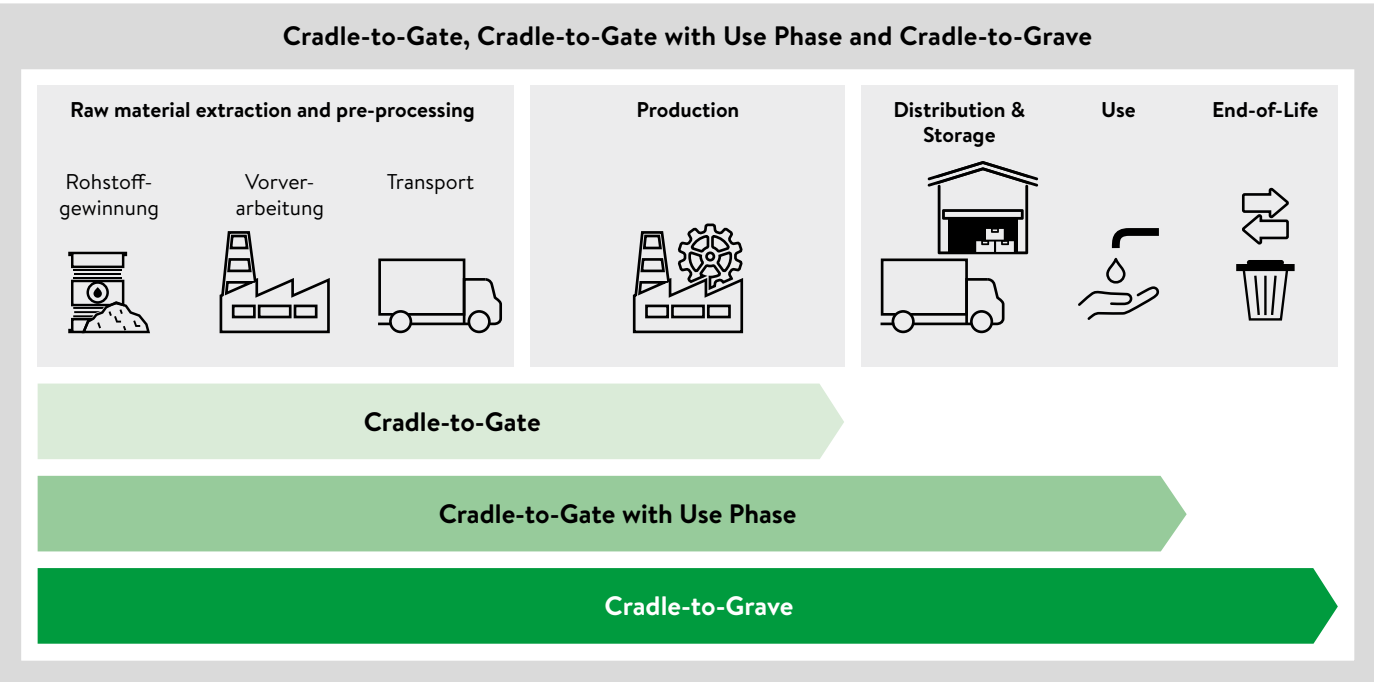
Given the increasing global need to reduce greenhouse gas (GHG) emissions, the **Product Carbon Footprint (PCF)** is becoming an increasingly important tool for assessing the climate impact of our products. Our goal is to create transparency, identify potential savings, and implement measures to reduce CO₂ emissions.

2. Definitions and Distinctions

2.1 PRODUCT CARBON FOOTPRINT

The carbon footprint, as defined by the **GHG Product Standard**, includes the accounting of all greenhouse gas (GHG) emissions throughout the entire life-cycle of a product. All relevant GHGs, as specified in the Kyoto Protocol, are taken into account and converted into **carbon dioxide equivalents (CO₂e)** to ensure standardised comparability.

- > **Cradle-to-Gate:** Captures emissions from raw material extraction to the point where the product leaves the production facility
- > **Cradle-to-Gate with Use Phase:** Considers the entire life-cycle except for disposal (End-of-Life)
- > **Cradle-to-Grave:** Covers the entire life-cycle, including use and disposal

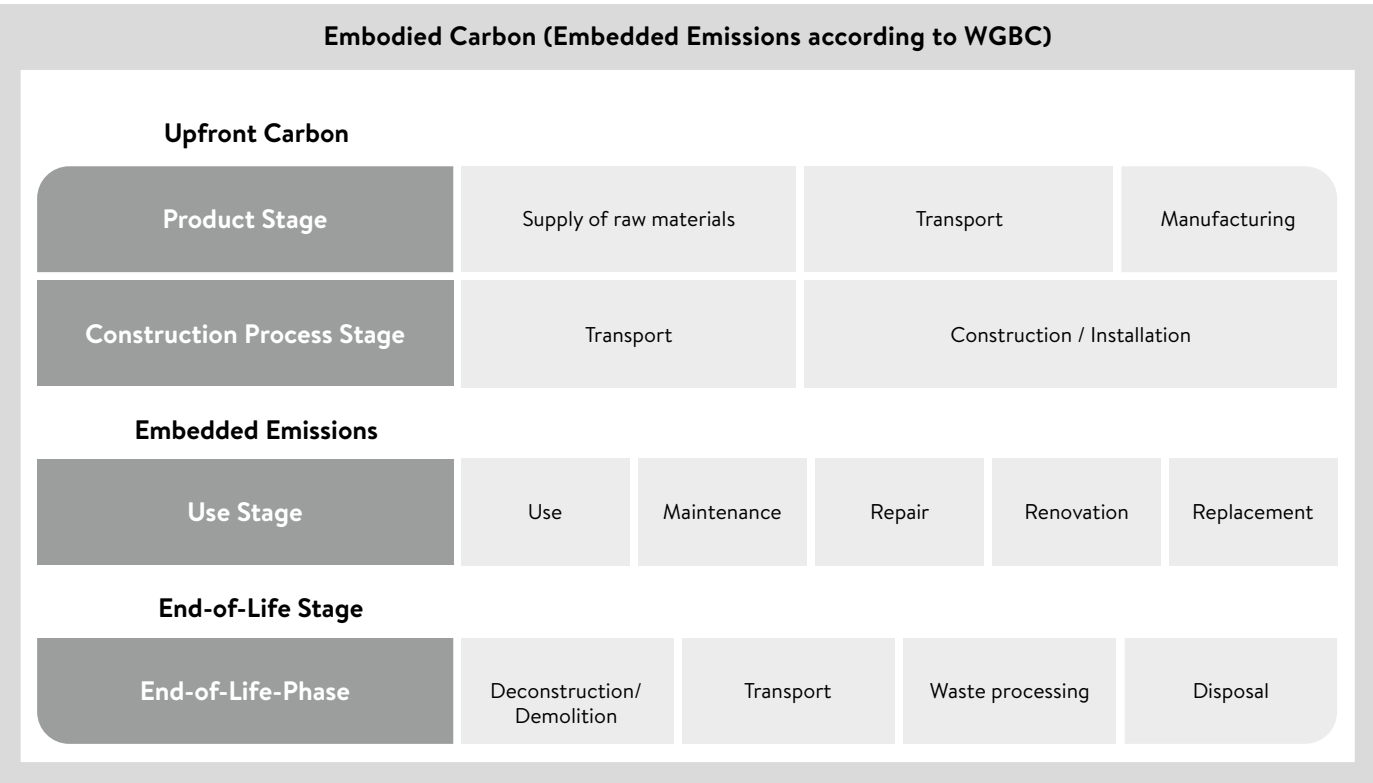


2.2 EMBODIED CARBON AND OPERATIONAL CARBON

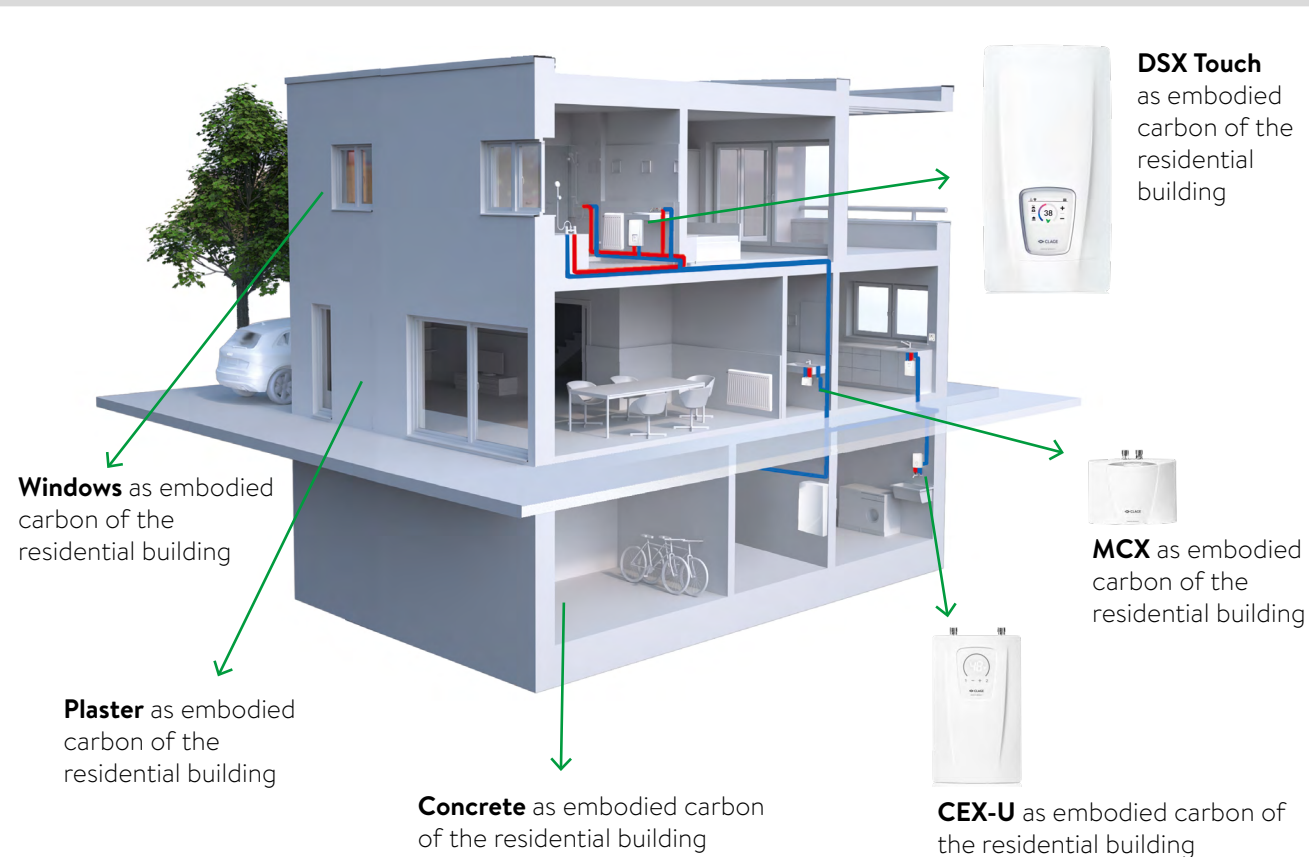
When assessing the climate impact of buildings, a distinction is often made between two concepts:

- > **Embodied Carbon (according to WGBC):**
Emissions generated during the life-cycle phases of building materials, including raw material extraction, manufacturing, transport, installation, and disposal.
- > **Operational Carbon:**
Emissions produced during a building's use phase, such as heating, cooling, or lighting.

The **Embodied Carbon Footprint** focuses exclusively on the "embedded" emissions and thus represents a partial aspect of the broader carbon footprint.



Electronic instantaneous water heaters as part of the embodied carbon of a residential building



2.3 GLOBAL WARMING POTENTIAL (GWP)

Some greenhouse gases, such as carbon dioxide (CO₂), remain in the atmosphere for centuries, while others, like methane (CH₄), break down after just a few years. The impact of these gases on the climate varies depending on their ability to absorb or reflect thermal radiation.

The Global Warming Potential (GWP) enables the comparability of the climate impact of different greenhouse gases (GHGs) by relating their effect to CO₂ over a defined time period (e.g. 20, 100 or 500 years). This conversion into **carbon dioxide equivalents (CO₂e)** provides a standardised basis for assessing and reporting national GHG emissions.

The representation of total emissions as CO₂e facilitates the definition and comparability of international reduction targets and commitments. It thus serves as a key foundation for global climate policy.

The greenhouse gases include, according to the Kyoto Protocol (2005)²:

- > Carbon Dioxide (CO₂)
- > Methane (CH₄)
- > Nitrous Oxide (N₂O)
- > Sulfur Hexafluoride (SF₆)
- > Partially Halogenated Fluorinated Hydrocarbons (HFC)
- > Perfluorinated Hydrocarbons (PFC)

2.4 ENVIRONMENTAL PRODUCT DECLARATION (EPD)

The Environmental Product Declaration (EPD) is a standardised document that assesses the environmental impact of a product throughout its life-cycle. While we do not create an official EPD, overlaps with our **PCF approach** demonstrate that we also:

- > analyse the climate impact (GWP) as a key environmental indicator,
- > consider the entire life-cycle of a product (Cradle-to-Gate with Use Phase)

However, EPDs go beyond the PCF by including additional environmental aspects such as resource consumption and land use. Our focus is clearly on carbon footprint accounting, which provides a solid foundation for developing sustainable products.

Connection between PCF and EPD

Product Carbon Footprint (PCF)

Balancing of greenhouse gas (GHG) emissions along the life cycle of a product

No uniform international standard yet

- > GHG-Protocol Product Standard
- > ISO 14067:2018
- > PAS 2050:2008

Comparison only possible with the same standard and system limits

Environmental Product Declaration (EPD)

Quantification and assessment of the environmental impact of a product

- > GHG emissions
- > Water consumption
- > Soil pollution
- > etc.

International standard according to ISO 14040/44

- > ISO 14025:2006
- > DIN EN 15804:2022

Comparison facilitated by Product Category Rules (PCR) within a product category

3. Our Analysis and Methodology

The following section presents the carbon footprints of selected reference products, which are particularly important for their environmental impact based on various criteria.

As a result, the respective calculated results can be understood as maximum values for the corresponding product series due to the complexity of the products considered. This also allows for the derivation of the carbon footprints of devices that are not part of this assessment.

Example: The **PCF** for the hydraulic mini instantaneous water heater MBH4 is required. Since this assessment only provides the carbon footprint of the electronic mini instantaneous water heater MCX3, which has a higher material and manufacturing effort due to additional components, a reference value of < 26 kg CO₂e* can be assumed for the MBH4.

The criteria include, among others:

- > High market penetration
- > Increased use of materials compared to other devices in the respective series

* Cradle-to-Gate

3.1 CUT-OFF-APPROACH

For the environmental assessment of the devices under consideration, the disposal phase was carried out in accordance with the internationally recognised cut-off system model. This approach follows the principle that re-cycling benefits are credited to the subsequent product and not to the product that provides the recycled material.

Those who use recycled material assume its environmental impact. Those who provide recycled material receive no credit.

The extent to which this approach affects the emissions of the individual life cycle phases is explained in the following chapters.

3.2 LIFE-CYCLE PHASES

Our carbon accounting considers the following life-cycle phases:

Cradle-to-Grave			
	Start of the Section	End of the Section	Part of the Survey
Raw Material Extraction and Pre-processing	Extraction of raw materials from the environment Production of preliminary products, including transportation routes, which are generated in the upstream processes	Raw materials/pre-products reach the CLAGE GmbH production facility	Yes
Production	Raw materials and preliminary products are received by CLAGE GmbH	Product leaves the CLAGE GmbH factory gate	Yes
Distribution and Storage	Product leaves the production facility	Product becomes the property of the customer	Yes
Use	User takes possession of the product	User hands in the product for disposal	Yes
Disposal/ Recycling / End-of-Life	User hands over the product	Return to the ecosphere/ entry into another product life cycle	Yes

With this approach, we establish a solid foundation for reducing emissions and developing sustainable products and processes.

3.2.1 RAW MATERIAL EXTRACTION AND PRE-PROCESSING

In order to ensure a reliable and traceable GHG balance, the following cut-off criterion is based on PAS 2050:2011:

Components with unknown material composition and a mass or emission share of less than 1% are not taken into account. For the ‘DSX Touch’ product, this affects <0.1% of the total weight and emissions. For all other devices, it was not necessary to apply the cut-off criterion.

Our devices contain both primary and recycled materials, which differ in terms of their manufacturing and processing methods. The cut-off approach takes into account the relevant differences in environmental accounting:



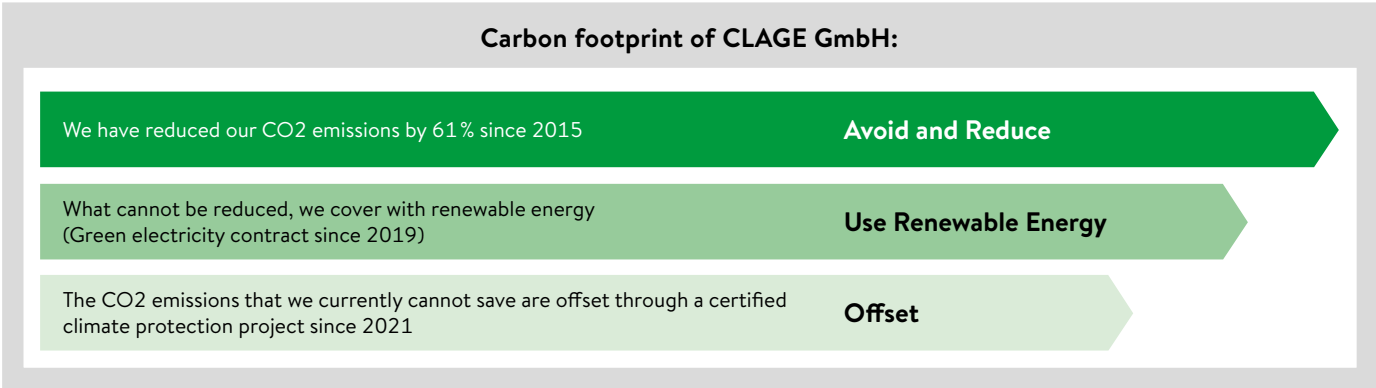
Allocation

Allocation is carried out using the cut-off approach. The reason for using this approach is that there is insufficient information available from suppliers and their suppliers, meaning that it is not possible, or only possible to a limited extent, to divide the manufacture of preliminary and intermediate products into several individual processes.

3.2.2 PRODUCTION

In the production phase of the product life cycle, we face the challenge of not being able to immediately and completely avoid some sources of emissions, as this requires long-term and continuous optimisation. Nevertheless, we are already minimising the emissions generated by the manufacture of our products as far as possible through the use of green electricity.

We offset the remaining emissions by supporting certified climate protection projects. These projects not only promote the reduction of greenhouse gases, but also contribute to the preservation of biodiversity.



³ <https://ecoinvent.org/the-ecoinvent-database/system-models/#!/allocation-cut-off> (21.09.2023)

3.2.3 DISTRIBUTION AND STORAGE*

The carbon accounting for the distribution and storage life-cycle phase was conducted based on actual data provided by our external service provider. The GHG emissions for the respective packaging units were recorded and subsequently converted into a standardised unit of measure (= 1 unit).

3.2.4 USE PHASE*

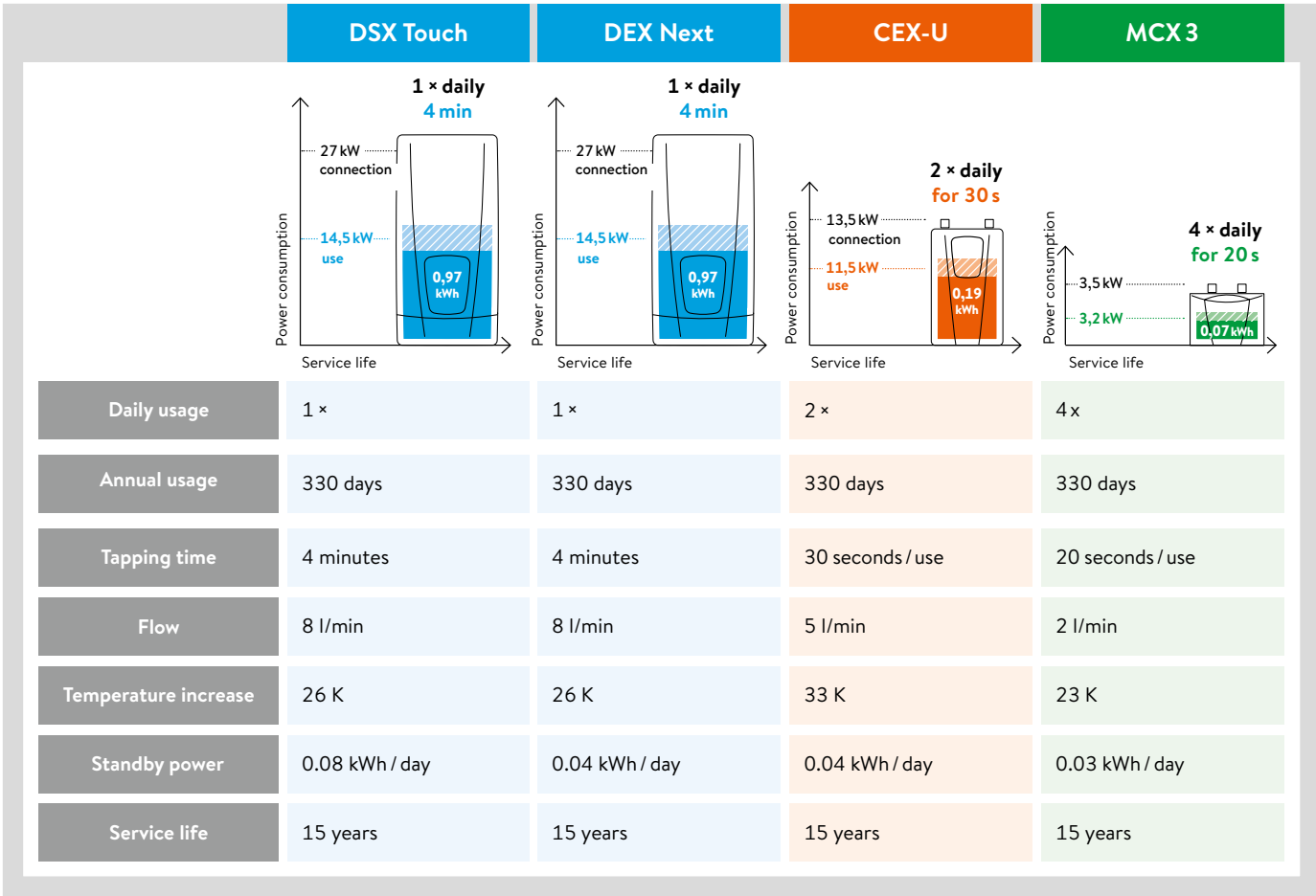
The use phase is based on the use cases outlined in our [Hot Water Guide](#). These are derived from user experience reports, industry averages, and recommendations.

Depending on their power output, instantaneous water heaters can supply hot water to multiple outlets. For example, a DX-series device installed in a bathroom can supply hot water to the shower, bathtub, and handwash basin. However, usage can vary significantly depending on the installation situation. Therefore, the following assumptions have been made for the carbon footprint assessment of the use phase:

- > Usage is based on a single user (if multiple people live in a household, the result must be multiplied by the number of people).
- > DX-Series device is assumed to supply hot water for a shower
- > CX- Series device is assumed to supply hot water for a kitchen sink
- > MX- Series device is assumed to supply hot water for a handwash basin

The assessment period corresponds to the use phase, which may vary in practice depending on several factors, including:

- > Regional water hardness at the installation location
- > Number of water draw-off cycles and duration of water usage



*The underlying data refers to the sales territory of Germany, Austria and Switzerland.

Not accounted:

Installation	Uncertainties in setting up a "classic" installation. Required materials are included in the delivery. Depending on the installation situation, additional materials may be needed, which must be provided by the installer.
Maintenance	The instantaneous water heaters are maintenance-free. It is recommended to have all electrical and water-side components checked by a professional every three years.

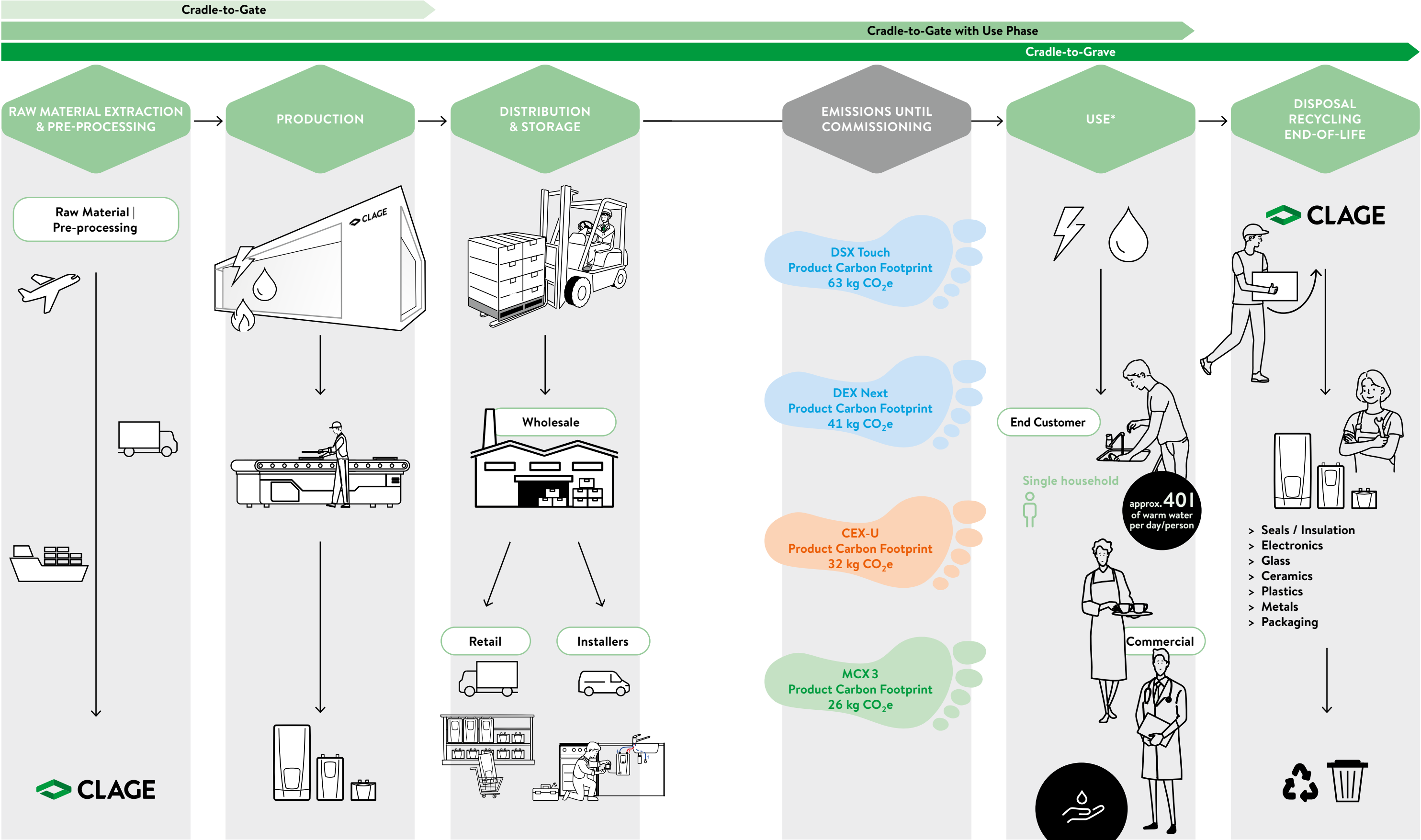
Our devices contain both materials that can be recycled (recyclable materials) and materials that must be disposed of at the end of their life cycle (EoL materials). The cut-off approach takes the differences in environmental accounting into account as follows:

3.2.5 DISPOSAL/ RECYCLING/ END-OF-LIFE (EOL)

EoL material	Recyclable material
Disposal (e.g. landfill, incineration, transport, collection)	Preparation for the recycling process (e.g. collection, transport, dismantling)

CLAGE GmbH offers its customers the opportunity to return old appliances in a professional manner. This offer is frequently used and ensures that disposal is carried out properly. The assumptions made for EoL accounting are therefore based on this take-back offer.

4. System Flowchart Product Life Cycle



* For the calculation, electricity procurement from the national energy mix is assumed.

4.1 PRODUCT CARBON FOOTPRINTS THROUGHOUT THE LIFE CYCLE

	Raw material extraction & pre-processing	Production	Distribution & Storage	Usage 1 year / 15 years	Disposal, Recycling End-of-Life
DSX Touch	60,62	1,60	1,06	136 / 2.039	8,03
DEX Next	38,89	1,1kg	0,99	130 / 1.946	6,94
CEX-U	29,70	1,30	0,58	30 / 454	4,84
MCX 3	25,01	0,97	0,34	14 / 215	2,47

Figures in kg CO₂e



Product Presentations >

5. DSX Touch

5.1 PRODUCT PRESENTATION

Fully electronically controlled high-tech instantaneous water heater with real glass touch display and Bluetooth remote control for convenient and economical hot water supply to one or more tapping points. The Multiple Power System (MPS®) allows the maximum power consumption to be set during installation: 18, 21, 24 or 27 kW.



Energy efficiency class A (Scale: A+ to F)	DSX Touch ○ / DSX Touch Black Edition ●			
Maximum operating pressure[MPa (bar)]:	1 (10) ¹⁾			
Water connections (thread connections):	G 1/2"			
Hot water output at Δt = 28 K ^{2) 3) 4)} [l/min]:	9.2	10.7	12.3	13.8
Switch-on flow rate / max. flow rate [l/min]:	1.5 / automatic ⁵⁾			
Nominal power rating [kW]:	18	21	24	27
Voltage [3~ / PE 400 V AC]:	permanent connection			
Nominal current ³⁾ [A]:	26	30	35	39
Required cable diameter ³⁾ [mm²]:	4.0	4.0	6.0	6.0
Test mark VDE GS & EMV / Protection class:	✓ / IP 25			
Specific water resistance at 15 °C [Ωcm] ≥ :	1100			
Nominal volume [litres]:	0.4			
Weight filled with water [kg]:	approx. 4.5			
Dimensions (height × width × depth) [cm]:	46.8 × 23.9 × 9.6			

1) Also approved for pressureless operation 2) Temperature increase e.g. from 12 °C to 40 °C 3) Depending on the selected power rating 4) Mixed water 5) Depending on line pressure, selected temperature and inlet temperature

5.2 ANALYSIS UNIT AND FUNCTIONAL UNIT

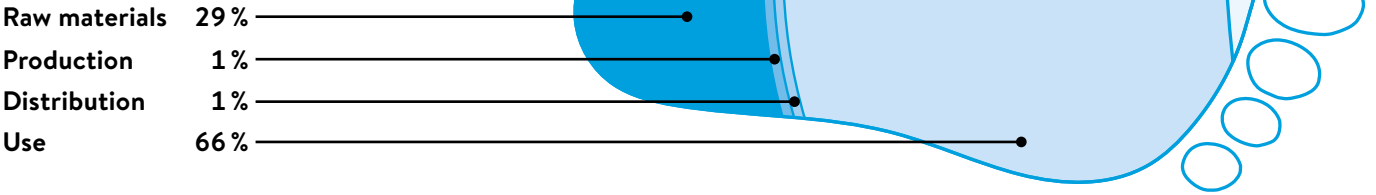
The analysis unit is a fully electronically controlled instantaneous water heater designed for convenient and energy-efficient hot water supply to a single outlet. The Multiple Power System (MPS®) allows the maximum power consumption to be set at 27 kW during installation. This modern, fully electronically controlled instantaneous water heater continuously measures inlet and outlet temperatures as well as flow rate. Based on the selected target temperature, the device adjusts power consumption as needed, requiring 14.5 kW under the given usage profile.

5.3 MATERIAL DECLARATION

Material	Weight in kg	Mass percentage in %
ABS plastic	1.6044	25.41 %
Paper and cardboard	1.3667	21.64 %
Copper	0.8237	13.04 %
Electronic component	0.4987	7.90 %
Plastic PPE	0.4928	7.80 %
Glass	0.3732	5.91 %
Iron	0.3472	5.50 %
Plastic PA	0.2401	3.80 %
Zinc	0.2057	3.26 %
Synthetic rubber	0.1194	1.89 %
Nickel	0.0522	0.83 %
Plastic PE	0.0283	0.45 %
Alkaline battery	0.0220	0.35 %
Chrome	0.0220	0.35 %
Printed circuit board	0.0204	0.32 %
Lead	0.0096	0.15 %
Adhesives	0.0095	0.15 %
Plastic PBT	0.0080	0.13 %
Plastic PVC	0.0080	0.13 %
Aluminium	0.0079	0.13 %
Silicone	0.0079	0.12 %
Oxygen	0.0068	0.11 %
Plastic PPS	0.0059	0.09 %
Plastic PP	0.0041	0.06 %
Cellulose fibres	0.0039	0.06 %
Tin	0.0034	0.05 %
Plastic PMMA	0.0033	0.05 %
Plastic POM	0.0033	0.05 %
Plastic PTFE	0.0029	0.05 %
Silicon	0.0020	0.03 %
Plastic PC	0.0019	0.03 %
Plastic PET	0.0019	0.03 %
Natural rubber	0.0019	0.03 %
Manganese	0.0018	0.03 %
Neodymium	0.0018	0.03 %

In our current material declaration, only components with a minimum weight of one gram are listed. This means that components weighing less than one gram are not included in the listing. This approach simplifies the documentation process and ensures that the focus remains on the key material components that constitute significant portions of the products.

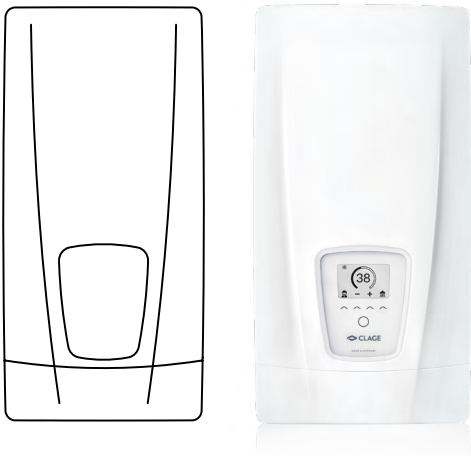
Composition of the Product Carbon Footprint for one year of use



6. DEX Next

6.1 PRODUCT PRESENTATION

Electronically controlled comfort instantaneous water heater with a real glass e-paper display and sensor buttons for high user comfort, providing an efficient and convenient hot water supply to one or multiple outlets. The Multiple Power System (MPS®) allows the maximum power consumption to be set during installation: 18, 21, 24 or 27 kW.



Energy efficiency class A (Scale: A+ to F)	DEX Next (18, 21, 24 or 27 kW adjustable)
Maximum operating pressure[MPa (bar)]:	1 (10) ¹⁾
Water connections (thread connections):	G 1/2"
Hot water output at Δt = 28 K ²⁾ ³⁾ [l/min]:	9,2 ⁴⁾ 10,7 ⁴⁾ 12,3 ⁴⁾ 13,8 ⁴⁾
Switch-on flow rate / max. flow rate [l/min]:	1,5 / 8,0 ⁵⁾
Nominal power rating [kW]:	18 21 24 27
Voltage [3~ / PE 400 V AC]:	permanent connection
Nominal current ³⁾ [A]:	26 30 35 39
Required cable diameter ³⁾ [mm²]:	4,2 4,0 6,0 6,0
Test mark VDE GS & EMV / Protection class:	✓ / IP 25
Specific water resistance at 15 °C [Ωcm] ≥ :	1100
Nominal volume [litres]:	0.4
Weight filled with water [kg]:	approx. 4.5
Dimensions (height × width × depth) [cm]:	46.8 × 23.9 × 9.6

1) Also approved for pressureless operation 2) Temperature increase e.g. from 12 °C to 40 °C 3) Depending on the selected power rating 4) Mixed water 5) Limited flow amount for optimal temperature increase

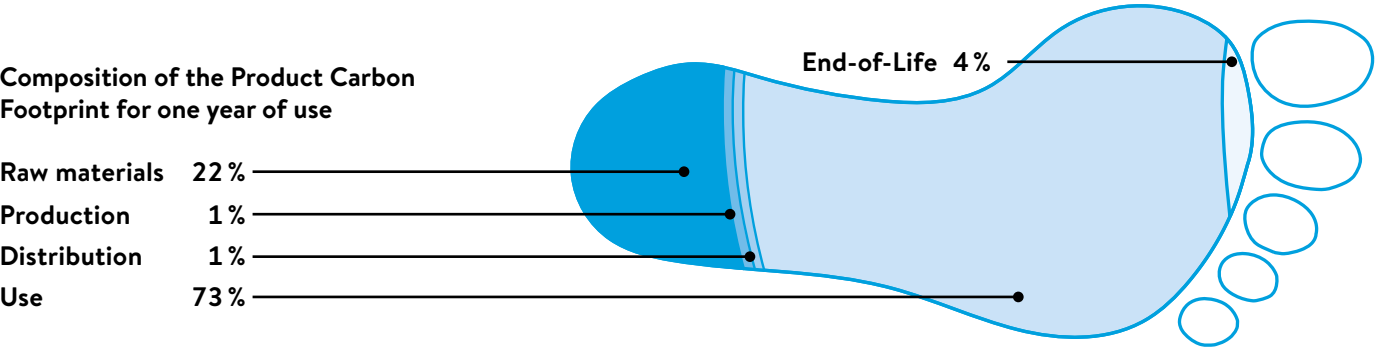
6.2 ANALYSIS UNIT AND FUNCTIONAL UNIT

The analysis unit is an electronically controlled instantaneous water heater designed for efficient and convenient hot water supply to a single outlet. The Multiple Power System (MPS®) allows the maximum power consumption to be set at 27 kW during installation. This modern electronically controlled water heater continuously measures inlet and outlet temperatures as well as flow rate. Based on the set target temperature, the device adjusts power consumption as needed, requiring 14.5 kW under the given usage profile.

6.3 MATERIAL DECLARATION

Material	Weight in kg	Mass percentage %
ABS plastic	1.3102	22.85 %
Paper and cardboard	1.1236	19.59 %
Copper	0.7718	13.46 %
Printed circuit board	0.5610	9.78 %
Plastic PPE	0.4662	8.13 %
Glass	0.3303	5.76 %
Eisen	0.2970	5.18 %
Plastic PA	0.2285	3.98 %
Electronic component	0.2206	3.85 %
Zinc	0.2056	3.58 %
Synthetic rubber	0.0931	1.62 %
Nickel	0.0203	0.35 %
Plastic PE	0.0194	0.34 %
Chrome	0.0116	0.20 %
Lead	0.0097	0.17 %
Adhesives	0.0094	0.16 %
Aluminium	0.0079	0.14 %
Silicone	0.0079	0.14 %
Oxygen	0.0068	0.12 %
Plastic PC	0.0047	0.08 %
Plastic PVC	0.0040	0.07 %
Plastic POM	0.0035	0.06 %
Plastic PBT	0.0027	0.05 %
Plastic PTFE	0.0027	0.05 %
Tin	0.0026	0.04 %
Plastic PPS	0.0022	0.04 %
Cellulose fibres	0.0021	0.04 %
Natural rubber	0.0018	0.03 %
Plastic PS	0.0015	0.03 %
Plastic PET	0.0013	0.02 %
Silicon	0.0013	0.02 %
Manganese	0.0011	0.02 %

In our current material declaration, only components with a minimum weight of one gram are listed. This means that components weighing less than one gram are not included in the listing. This approach simplifies the documentation process and ensures that the focus remains on the key material components that constitute significant portions of the products.



7. CEX-U

7.1 PRODUCT PRESENTATION

Electronically controlled compact instantaneous water heater as an under-sink unit for energy-efficient hot water supply to one or two outlets, such as a kitchen sink or a double washbasin. The Multiple Power System (MPS®) allows the maximum power consumption to be set during installation: 11 or 13.5 kW.



	
Energy efficiency class A (Scale: A+ to F)	CEX-U (11 or 13.5 kW)
Maximum operating pressure[MPa (bar)]:	1 (10) ¹⁾
Water connections (thread connections):	G 3/8"
Hot water output at Δt = 33 K ²⁾ ³⁾ [l/min]:	4.8 5.8 ⁴⁾
Switch-on flow rate / max. flow rate [l/min]:	2 / 5 ⁵⁾
Nominal power rating [kW]:	11 13.5
Voltage [3~ / PE 400 V AC]:	permanent connection
Nominal current ³⁾ [A]:	16 20
Required cable diameter ³⁾ [mm ²]:	1.5 2.5
Test mark VDE GS & EMV / Protection class:	✓ / IP 24
Specific water resistance at 15 °C [Ωcm] ≥ :	1000
Nominal volume [litres]:	0.3
Weight filled with water [kg]:	approx. 2.7
Dimensions (height × width × depth) [cm]:	29.4 × 17.7 × 10.4

1) Also approved for pressureless operation 2) Temperature increase e.g. from 12 °C to 45 °C 3) Depending on the selected power rating 4) Mixed water 5) Limited flow amount for optimal temperature increase 6) Related to rated voltage 230 V or 400 V

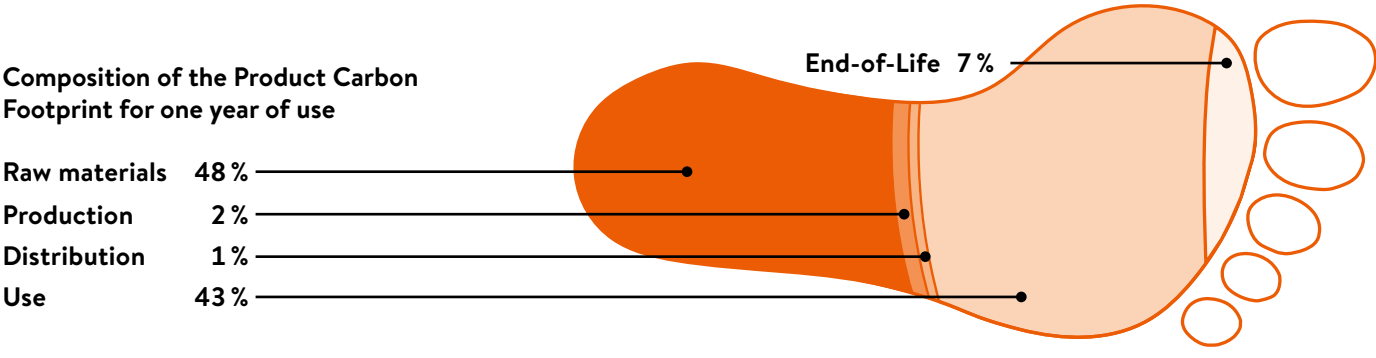
7.2 ANALYSIS UNIT AND FUNCTIONAL UNIT

The analysis unit is an electronically controlled under-sink instantaneous water heater in a compact format, designed for efficient and convenient hot water supply to a single outlet. The Multiple Power System (MPS®) allows the maximum power consumption to be set at 13.5 kW during installation. This modern electronically controlled water heater continuously measures inlet and outlet temperatures as well as the flow rate. Based on the set target temperature, the device adjusts power consumption as needed, requiring 11.5 kW under the given usage profile.

7.3 MATERIAL DECLARATION

Material	Weight in kg	Mass percentage in %
ABS plastic	0.6920	21.01 %
Paper and cardboard	0.6275	19.05 %
Plastic PA	0.4508	13.69 %
Copper	0.4475	13.59 %
Glass	0.4292	13.03 %
Iron	0.1367	4.15 %
Electronic component	0.1207	3.66 %
Zinc	0.1101	3.34 %
Plastic PVC	0.0895	2.72 %
Synthetic rubber	0.0408	1.24 %
Nickel	0.0294	0.89 %
Plastic PE	0.0217	0.66 %
Chrome	0.0191	0.58 %
Printed circuit board	0.0180	0.55 %
Aluminium	0.0079	0.24 %
Natural rubber	0.0078	0.24 %
Oxygen	0.0068	0.21 %
Silicone	0.0060	0.18 %
Lead	0.0053	0.16 %
Adhesives	0.0053	0.16 %
Plastic PS	0.0040	0.12 %
Plastic PBT	0.0037	0.11 %
Plastic POM	0.0035	0.11 %
Plastic PPS	0.0020	0.06 %
Manganese	0.0017	0.05 %
Tin	0.0015	0.05 %
Plastic PC	0.0013	0.04 %
Molybdaen	0.0013	0.04 %
Silicon	0.0012	0.04 %

In our current material declaration, only components with a minimum weight of one gram are listed. This means that components weighing less than one gram are not included in the listing. This approach simplifies the documentation process and ensures that the focus remains on the key material components that constitute significant portions of the products.



8. MCX3

8.1 PRODUCT PRESENTATION

Electronically controlled instantaneous water heater in mini format for the energy-efficient supply of a washbasin or kitchenette. The heat output is automatically regulated by the electronics. This ensures the perfect hot water temperature, and mixing with cold water is no longer necessary. Button control panel with coloured LEDs for setting the outlet temperature to 35°C, 38°C, or a maximum of 45°C.



	⌕
Energy efficiency class A (Scale: A+ to F)	MCX3
Maximum operating pressure [MPa (bar)]:	1 (10) ¹⁾
Water connections (thread connections):	G 3/8"
Hot water output at Δt = 25 K ²⁾ [l/min]:	2.0
Switch-on flow rate / max. flow rate ³⁾ [l/min]:	1.2 / 2.0
Nominal power rating ⁴⁾ [kW]:	3.5
Voltage [1~ / N / PE 220 – 240 V AC]:	with plug
Nominal current ⁴⁾ [A]:	15
Required cable diameter [mm²]:	1.5
Test mark VDE GS & EMV / Protection class:	✓ / IP 25
Specific water resistance at 15 °C [Ωcm] ≥ :	1100
Nominal volume [litres]:	0.2
Weight filled with water [kg]:	approx. 1.5
Dimensions (height × width × depth) [cm]:	13.5 × 18.6 × 8.7

1) Also approved for pressureless operation 2) Temperature increase e.g. from 15 °C to 40 °C 3) Limited flow amount for optimal temperature increase 4) Related to rated voltage 230 V

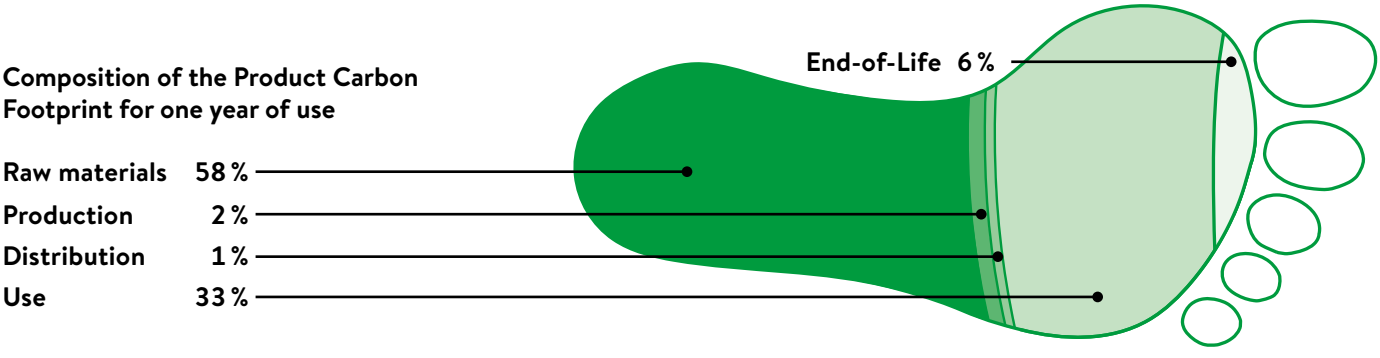
8.2 ANALYSIS UNIT AND FUNCTIONAL UNIT

The analysis unit is an electronically controlled instantaneous water heater designed for the efficient and convenient hot water supply to a single outlet, with a power output of 3.5 kW. This modern electronically controlled water heater continuously measures inlet and outlet temperatures as well as the flow rate. Based on the set target temperature, the device adjusts its power consumption as required, operating at 3.2 kW under the given usage profile.

8.3 MATERIAL DECLARATION

Material	Weight in kg	Mass percentage in %
Paper and cardboard	0.4100	20.63 %
Plastic PPE	0.2933	14.76 %
Plastic PS	0.2893	14.56 %
Copper	0.2064	10.38 %
Electronic component	0.1810	9.11 %
Glass	0.1441	7.25 %
Iron	0.0992	4.99 %
Zinc	0.0964	4.85 %
Printed circuit board	0.0621	3.12 %
Safety plug	0.0510	2.57 %
Plastic PVC	0.0506	2.55 %
Plastic PE	0.0245	1.23 %
Plastic PA	0.0153	0.77 %
Synthetic rubber	0.0086	0.43 %
Nickel	0.0078	0.39 %
Chrome	0.0072	0.36 %
Silicone	0.0070	0.35 %
Lead	0.0046	0.23 %
Natural rubber	0.0045	0.23 %
Adhesives	0.0042	0.21 %
Aluminium	0.0040	0.20 %
Oxygen	0.0034	0.17 %
Plastic POM	0.0026	0.13 %
Tin	0.0020	0.10 %
Plastic PET	0.0014	0.07 %
Plastic PK	0.0013	0.07 %
Plastic PBT	0.0013	0.07 %

In our current material declaration, only components with a minimum weight of one gram are listed. This means that components weighing less than one gram are not included in the listing. This approach simplifies the documentation process and ensures that the focus remains on the key material components that constitute significant portions of the products.



9. Quality Assurance

9.1 DATA

For some components, whose manufacturing and processing methods were not fully known at the time of assessment, assumptions were made based on average or widely used manufacturing processes.

For the carbon footprint assessment in Version 1.0, primary data from the reference year 2022 was initially used, focusing solely on the manufacturing phase. To ensure a more comprehensive evaluation, including the distribution, storage, and use phases, the reference year was updated to 2023. For the upstream process - covering raw material extraction and the procurement of pre-products – secondary data from the LCI database Ecoinvent and supplier information were used in both the previous and current versions. Through close collaboration with our suppliers, several datasets were updated, reducing the share of secondary data in the assessment.

This version includes all currently available data, which has replaced previous data due to adjustments in the installed components. By updating the data, we ensure that our carbon footprint assessment stays up to date, comprehensive, and representative of our ongoing commitment to sustainability.

The CO₂e factors provided and used for invoicing from the Ecoinvent database are based on a GWP of 100 years and the IPCC report from 2021. The CO₂ equivalent factors used for the calculation are data sets that refer to a specific geographical location and are divided into the following geographies for the calculation of version 2.0:

Geographical Market Coverage of Datasets				
	DSX Touch	DEX Next	CEX-U	MCX 3
GLO Global Total Market	62%	63%	61%	65%
DE Market for the Geographical Market for Germany	4%	4%	6%	4%
RoW If specific data for a geographical location is available, it is separated from the global market, and the remaining market is classified as "Rest of the World."	14%	14%	16%	14%
RER Market for the European Region	20%	19%	17%	18%

Since the geographical regions refer solely to the generic CO₂-equivalence factors and thus reflect the calculation basis, the following table provides an overview of the sourcing of our materials (at the first level):

Procurement of materials	
Germany and the EU	71.76%
Switzerland	4.40%
Rest of the world	23.84%

Data provision for the distribution and storage phase	
Pallet shipping via service provider	The calculation of transport emissions is certified according to DIN EN 16258:2013 standard.

9.2 INFORMATION ON THE AUDIT STATEMENT

Lea Welzel, Climate and Policy Advisor, hereby confirms that she has reviewed the contents of this paper for plausibility. The review ensured that the information and arguments presented are logically consistent, that relevant facts and sources have been correctly cited, and that the conclusions are meaningful and comprehensible in the context of the topic.

The plausibility check aims to ensure that the content presented is consistent with current scientific findings, political contexts, and relevant discussions in the field of climate and politics.

Date: 6 May 2025

9.3 EXAMINATION RESULT

The data and results presented in this paper are, to the best of our knowledge and belief, current and correct at the time of submission. However, it should be noted that the information provided is based on available sources and data, which are subject to continuous change and updating.

The climate and policy advisor, Lea Welzel, and contact person, Luisa Jarck, point out that it is possible that new findings, research results or updated data may be published after the submission of this paper, which may lead to a modification or revision of the results presented. Consequently, the data and results presented here should be viewed and interpreted in the context of these dynamic developments.

Date: 6 May 2025

10. List of Abbreviations

Abbreviation	Explanation
ABS	Acrylnitrile Butadiene Styrene
CH ₄	Methane
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalents
DE	Geography Germany
EPD	Environmental Product Declaration
EU	European Union
FKW	Fluorinated Hydrocarbons
GHG	Greenhouse Gas
GLO	Geography Global
GWP	Global Warming Potential
HFC	Partially Halogenated Fluorinated Hydrocarbons
MPS	Multiple Power System
N ₂ O	Lachgas
IPCC	Intergovernmental Panel on Climate Change
PA	Polyamid
PBT	Polybutylenterephthalat
PC	Polycarbonat
PCF	Product Carbon Footprint

Abbreviation	Explanation
PE	Polyethylen
PET	Polyethylene Terephthalate
PFC	Perfluorinated Hydrocarbons
PMMA	Polymethyl Methacrylate
POM	Polyoxymethylen
PP	Polypropylen
PPE	Polyphenylene Ether
PPS	Polyphenylene Sulfide
PS	Polystyrene
PTFE	Polytetrafluorethylen
PVC	Polyvinyl Chloride
RER	Geography Europe
RoW	Geografie Rest of the World
SF ₆	Sulphur Hexafluoride
PK	Polyketone
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

11. Definitions

Term	Explanation
Carbon Dioxide Equivalents (CO ₂ e)	Unit of measurement for standardizing the climate impact of greenhouse gases according to the IPCC
CO ₂ Equivalence Factor	The climate impact of a material, component, or process relative to a specified quantity. It is based on the Global Warming Potential (GWP) and indicates how many kilograms of CO ₂ equivalents are generated during the production, use, or disposal of a material or product
Cradle-to-Gate	Analysis of processes from raw material extraction to the delivery process
Cradle-to-gate with Use Phase	Accounts for greenhouse gas emissions from raw material extraction to the end of the product’s use phase, but excludes the disposal phase
Cradle-to-Grave	Analysis of processes throughout the entire life cycle of a product
DIN EN ISO 9001:2015	Requirements for Quality Management Systems
DIN EN ISO 14001:2015	Requirements for Environmental Management Systems
DIN EN ISO 50001:2018	Requirements for Energy Management Systems
DIN EN 15804:2022	Sustainability of Construction Works – Environmental Product Declarations – Core Rules for the Product Category of Construction Products
DIN EN 16258:2013	Method for Calculating and Declaring Energy Consumption and Greenhouse Gas Emissions in Transport Services
Embodied Carbon	CO ₂ emissions generated during the manufacturing, transportation, construction, maintenance, or disposal of materials, which are incorporated into a product or building
Global Warming Potential (GWP)	A measure used to assess the climate impact of different greenhouse gases in comparison to carbon dioxide (CO ₂)
IPCC Report	Review Paper on the State of Climate Research
ISO 14067:2018	Carbon Footprint of Products – Requirements and Guidelines for Quantification
ISO 14025:2006	Environmental Labels and Declarations – Type III Environmental Declarations – Principles and Procedures
Carbon Dioxide Equivalent (CO ₂ e)	A unit of measurement that standardizes the climate impact of different greenhouse gases. It indicates the amount of carbon dioxide (CO ₂) that would be required to produce the same warming effect as a given quantity of another greenhouse gas
Operational Carbon	The CO ₂ emissions generated during the operation of a building, including activities such as heating, cooling, lighting, and appliance use
PAS2050:2011	Standard by the British Standards Institution (BSI) for the calculation of the carbon footprint of products and services
Scope 1	Includes all direct greenhouse gas emissions, such as primary energy sources consumed directly in company facilities. Examples include natural gas, heating oil, petrol, and diesel
Scope 2	Includes indirect greenhouse gas emissions resulting from the generation of purchased energy, such as electricity, steam, heating, or cooling

12. Sources

PCF for adhesives in CO₂e/kg
Industrieverband Klebstoffe e.V.: Typische „Product Carbon Footprint“ (PCF)-Werte für Industrieklebstoffe, URL: <https://www.klebstoffe.com/nachhaltigkeit/product-carbon-footprint/> (Stand: 27.09.2023)

PCF for plastics PC, ABS, POM, PBT, PA 6 and PA 6.6
Dr. Jochen Burkard: Presentation from 28.07.2023

PCF for plastic PTFE
Bundesamt für Wirtschaft und Ausfuhrkontrolle: Informationsblatt CO₂-Faktoren, Version 2.0 (01.05.2023), URL: https://www.bafa.de/SharedDocs/Downloads/DE/Energie/eew_infoblatt_co2_faktoren_2023.html (Stand 27.09.2023)

PCF for alkaline Batteries
Öko-Institut e.V.: Wiederaufladbare Batterien in Standardgrößen, Entwicklung der Vergabekriterien für ein Klimaschutzbezogenes Umweltzeichen (18.06.2012), URL: <https://www.oeko.de/impressum> (27.09.2023)

PCF for glass fibre reinforced plastic
SABIC Deutschlang GmbH (08/2023)

Distinction between carbon footprint according to GHG and embodied carbon
NordESG: Die Verwirrung um „Embodied Carbon“ und „Scope Emissions“ (05.03.2024), URL: <https://nordesg.de/die-verwirrung-um-embodied-carbon-und-scope-emissions/>

All additional data were provided by the database provider Ecoinvent
Ecoinvent, Version 3.9.1 (12.2022), URL: <https://ecoquery.ecoinvent.org/3.9.1/cutoff/search?query=market+for+display¤tPage=2&pageSize=5> (27.09.2023)

Compilation of example usage profiles
<https://www.waerme-plus.de/downloads> (14.05.2024)

Emission factor for electricity generation in Germany for 2023
<https://de.statista.com/statistik/daten/studie/1421117/umfrage/emissionen-strom-deutschland-und-frankreich/> (12/2024)

Definition of the PCF (Product Carbon Footprint) and guidelines for document preparation
https://businesspf.hs-pforzheim.de/fileadmin/user_upload/uploads_redakteur/Forschung/INEC/Dokumente/Hottenroth_et_al_Carbon_Footprints_fuer_Produkte_web.pdf (10/2023)

History of changes

Version	Comment	Status
1.0	First publication	10/2023
2.0	Expansion of the Cradle-to-Gate approach to include the distribution and storage phase Expansion of the Cradle-to-Gate approach to include the use phase Change of the reference year from 2022 to 2023 → Including the revision of primary data for the accounting of the raw material extraction, preprocessing and production phase Substitution of selected secondary data based on supplier information in the raw material extraction and preprocessing phase Chapter 8.1: Specification of datasets used by geographical location per functional unit, instead of an overall summary	06/2024
3.0	Change from cradle-to-gate to cradle-to-grave approach→ By adding the end-of-life phase, updating the raw material extraction and preprocessing phase with regard to component changes, material conversions, etc.	05/2025



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