ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	**Bette GmbH & Co. KG**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-BET-20180103-IBC1-EN
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Valid to	18.11.2023

Baths, showers, shower areas and washbasins made of glazed titanium-steel

Bette GmbH & Co. KG

Institut Bauen und Umwelt e.V.

www.ibu-epd.com / https://epd-online.com

1. General Information

Bette GmbH & Co. KG

Programme holder
IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number
EPD-BET-20180103-IBC1-EN

This declaration is based on the product category rules:
Sanitary products made from composite materials, 12.2018
(PCR checked and approved by the SVR)

Issue date
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Valid to
18.11.2023

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Hans Peters
(Managing Director IBU)

Baths, showers, shower areas and washbasins

Owner of the declaration
Bette GmbH & Co. KG
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Declared product / declared unit
The Environmental Product Declaration refers to the declared unit of 1 m2 enamelled surface (where the surface area weighs 18.5 kg and packaging weighs 0.75 kg) of an average product comprising baths, showers and washbasins made of steel/enamel.

Scope:
The LCA is based on an analysis of production at the German Bette GmbH & Co. KG plant in Delbrück and data supplied for 2016.

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

Verification

The standard /EN 15804/ serves as the core PCR
Independent verification of the declaration and data according to /ISO 14025:2010/
☐ internally ☒ externally

Juliane Franze
(Independent verifier appointed by SVR)

2. Product

2.1 Product description / Product definition

The bathroom products manufactured by Bette, i.e. baths, showers, shower areas and washbasins, are made of glazed titanium-steel. The deep-drawn base unit is coated on all sides with ground coat enamel while the visible areas are also coated with covering enamel.
Production data was collated from the plant as a whole and declared as an average product. The average was formed using the production volumes.

Directive (EU) No. 305/2011 (CPR) applies for placing the product on the market in the EU/EFTA (with the exception of Switzerland). The product requires a Declaration of Performance taking consideration of /DIN EN 14516/ Baths for domestic purposes, /DIN EN 14527/ Shower trays for domestic purposes, /DIN EN 14688/ Sanitary appliances – Washbasins – Functional requirements and test methods, /DIN EN 14296/ Sanitary appliances, and CE marking.
Use is governed by the respective national regulations.

2.2 Application

The baths, showers, shower areas and washbasins are used in sanitary applications in the areas of bathing, showering and washing.

2.3 Technical Data

The data on specific products from the category of baths, showers, shower areas and washbasins is listed as examples in the table below:

Item no.	Model	Dimensions (LxWxH) [mm]	Total area [m²]
5920	**BETTE**SHOWER extra-flat	900x900x65	0.98
5900	**BETTE**SHOWER flat	900x900x150	1.15
5931	**BETTE**FLOOR	900x900	0.94
A131	**BETTE**ONE washbasin	530x530x140	0.69
3710	**BETTE**FORM	1700x750x42	2.42
3800	**BETTE**FORM	1800x800x43	2.64

Constructional data

Name	Value	Unit
Width x length	-	mm
Sound insulation class	Depending on the installation system and installation situation	-
Temperature change resistance	No test required See EN 14516, 5.3.4. and EN 14527, 5.3.4	-
Chemical resistance	AA Min. A+	-
Anti-slip classification	B provided that the product features anti-slip at the customer's request	-

The product's performance values correspond with the declaration of performance in terms of its essential properties in accordance with /DIN EN 14516/ Baths for domestic purposes, /DIN EN 14527/ Shower trays for domestic purposes, /DIN EN 14688/ Sanitary appliances – Washbasins – Functional requirements and test methods, /DIN EN 14296/ Sanitary appliances.

2.4 Delivery status

Model	Dimension L [mm]	Dimension W [mm]	Weight [kg]
BETTEBATHS	1080-2150	650-1480	20-85
BETTESHOWERS	700-1800	600-1500	10-55
BETTESHOWER AREAS	800-1800	700-1000	20-50
BETTEWASHBASINS	350-1400	350-530	4-60

2.5 Base materials / Ancillary materials

The following table indicates the average composition of a glazed titanium-steel product. On average, the shares of all glazed titanium-steel products lie within these percentage ranges.

Base materials	Percentage by mass [%]
Steel	91.6
Enamelled glass (frit)	7.5
Quartz	0.7
Titanium oxide	0.1
Urea	0.1

2.6 Manufacture

The production of steel/enamel products and their accessories is broken down into the following processes:

1. Production of blanks:

The essential steps involved in the production of blanks are carried out on ultra-modern, automated press lines.

- Deep-drawing: The interior body of the blanks is formed by deep-drawing high-alloy steel sheets with a titanium finish.
- Processing the blank: Deep-drawing is followed by trimming the edges to the requisite size and stamping the outlets and overflow holes. The edge is initially raised before being folded back. Some steps also involve manual processing of the blank, particularly when realising special customer requirements.
- Attaching flaps: Flaps are welded to the blanks for the purpose of in-plant transport of the products during the enamelling process. Flaps are also welded to the baths for securing the feet; baths, shower trays and shower areas are given equipotential bonding flaps.

2. Cleaning the raw materials

While the use of grease and oils is required during deep-drawing, these lubricants present an obstacle for the enamelling process. As a result, grease and oils need to be removed prior to enamelling. Cleaning is a continuous, automated process involving the following steps: cleaning, de-greasing, rinsing.

- Cleaning/De-greasing: Alkaline solutions of varying concentrations are used in these two process steps in order to remove both grease and oil from the blanks and residue from the production of blanks.
- Rinsing: The solutions required for cleaning are rinsed with water before the products are dried.

3. Enamelling

Enamelling involves applying a glass coating to a metallic surface. The following sub-processes are carried out in an effort to achieve a permanent bond between steel and enamel:

- Enamel application: Robots apply both the ground coat enamel and the covering enamel to the blanks. In some cases, the enamel is also sprayed on manually.
- Drying the enamel: Before the firing process, the enamel layer is dried to allow evaporation of the water required for the enamel.
- Firing the enamel: The enamel is fired at over 800 °C. During the firing process, the enamel interlinks with the steel to produce a high-strength and vibrant enamel surface which is approx. 300 µm thick.

4. Packaging

The steel/enamel products are packed in cardboard boxes to ensure safe transport. The products are also attributed the company logo.

2.7 Environment and health during manufacturing

During production of the items in the category of baths, showers, shower areas and washbasins, all work and safety guidelines specified by law for commercial enterprises are observed. As a general rule, the latest technologies are applied in the area of environmental and health protection, including an energy management system.

2.8 Product processing/Installation

Assembly instructions are enclosed with the products. Proper handling of glazed titanium-steel products must be ensured, particularly during transport and installation. Bette accessories listed below are available for easy, safe and proper installation. Using the Bette installation system Universal, the BetteFloor area complies with the increased requirements in accordance with VDI 4100. Particularly clean and lasting installation is made possible by the optional canted bath edge, the BetteUpstand. This permits silicone-free and therefore maintenance-free installation of the products.

2.9 Packaging

The glazed titanium-steel products are packed in cardboard boxes and transported on reusable wooden pallets. If several packing units are compiled on a single pallet, they are given extra stability using shrink film. Styrofoam and bitumen elements are also used as spacers in some cases. The cardboard boxes for Bette

bathroom products are recycled within the scope of the TÜV-certified Interseroh dual system.

2.10 Condition of use
The material composition of the products during the use phase corresponds with the composition in accordance with section 2.1.

2.11 Environment and health during use
The glazed titanium-steel products offered by Bette are resistant to temperature and UV. The closed, pore-free, hygienic enamel surface is resistant to impact and scratches.
The declared products do not have any impact during use.

2.12 Reference service life
The glazed titanium-steel products and corresponding accessories are durable products. When used and cared for as designated, their average useful life can last several generations.

The specialist fitter warranty indicates 30 years as a reference service life, whereby it goes without saying that a significantly longer useful life is also possible. The use phase is not taken into consideration in the EPD.

2.13 Extraordinary effects

Fire
The glazed titanium-steel products offered by Bette meet the criteria of building material class A in accordance with /DIN 4102-1/. The products are made of steel and glass and are non-combustible.

Fire Protection

Name	Value
Building material class	A1
Burning droplets	d0
Smoke gas development	s1

Water
If a room in which the glazed titanium-steel products offered by Bette are installed is flooded with water, this does not impair the function of the products. No environmental impacts are incurred. It must be ensured that the structure is allowed to dry in full once the water has been removed in order to avoid subsequent damage.

Mechanical destruction
In the event of mechanical damage to the enamel surface, the formation of corrosion is possible if the damage has penetrated as far as the steel.

2.14 Re-use phase
The glazed titanium-steel products offered by Bette are recyclable. They can be directed to the blast furnace without prior separation for the production of steel. Other metallic components can be recovered by means of material recycling.

2.15 Disposal
The steel/enamel products can be recycled for which they should be collected and sent to recycling facilities. The recyclable materials can be returned to any waste metal dealer for recycling. Plastics should be disposed of via the plastics recycling system.
Waste designation /waste code/
- Cardboard & paper EWC 150101
- Mixed municipal solid waste EWC 200301
- Foil/Plastics EWC 150102
- Iron/Steel EWC 170405
- Wood EWC 170201

2.16 Further information
Additional information available on our homepage: https://www.my-bette.com

3. LCA: Calculation rules

3.1 Declared Unit
The Environmental Product Declaration refers to the declared unit of 1 m2 enamelled surface (where the unit area weighs 18.5 kg and packaging weighs 0.75 kg) of an average product comprising baths, showers and washbasins made of steel/enamel.
The steel in the average product has an average layer thickness of 2.36 mm and is coated with an enamel layer approx. 300 µm thick. This gives rise to a product density of approx. 6.52 g/cm³.
On account of the identical manufacturing methods for baths, showers, shower areas and washbasins, an average product was formed on the basis of the production volumes for the entire Delbrück plant.

Declared unit

Name	Value	Unit
Mass of enamel surface	0.8	kg
Layer thickness of enamel surface	2.37	mm
Mass of steel base unit	17.7	kg
Layer thickness of steel base unit	0.3	mm
Conversion factor to 1 kg if applicable with accessory parts	0.054	-

declared unit enamelled surface	1	m²

3.2 System boundary
Type of EPD: cradle to gate, with options

The Environmental Product Declaration refers to the production stage of the average product (Modules A1-A3):
- Raw processing (deep-drawing the steel and processing the blank)
- Pre-treatment (cleaning and de-greasing)
- Finishing (enamelling)
- Packaging (and disposal of offcuts)

This takes consideration of both the manufacture of the raw materials and ancillaries used.

Product installation (Module A5) includes disposal of the remaining packaging. Utilisation (C4) includes recycling and landfilling the product. The credits outside the system boundary (Module D) are also taken into consideration.

Transport to the construction site (A4), waste processing (C3)*, i.e. collection of baths and separation of waste, as well as the use stage (Module B) are not considered in this study.

The system boundaries to nature are designed for all modules in such a way that the processes supplying material and energy inputs to the system as well as the processing of all waste incurred during these processes are part of the system. The technical measures required for extracting raw materials (e.g. mining for mineral raw materials, crude oil production for petrochemicals-based raw materials or forestry/agriculture for renewable raw materials) are part of the system reviewed. Information on the system boundaries for individual raw materials is provided in the documentation available in the **/GaBi ts/** background data base used.

*This involves a purely methodical change compared to the previous EPD from 2011. The influence exerted by C3 can be regarded as negligible.

3.3 Estimates and assumptions

Aggregated average GaBi data sets were used for the on-site wastewater treatment plant and the photovoltaic system.

As a conservative estimate, the enamel melted when the enamelled steel melts is modelled in the disposal scenario as landfilling of plastic waste.

A collection rate of 90% was modelled in the EoL which corresponds to the average rate for high-quality steel products in the construction sector. As no scrap value for titanium-alloy steel sheets has been defined to date, the scrap value was modelled for normal alloyed steel. This selection represents a *"worst-case"* assumption which complies with /DIN EN ISO 14040/44/.

3.4 Cut-off criteria

All data from the data collection of operations was taken into consideration in the analysis, i.e. all raw materials used according to the recipe, including packaging materials and auxiliaries, the thermal energy used as well as electricity and diesel consumption. Assumptions were made as regards the transport requirements associated with all input and output data taken into consideration or the actual transport distances were applied.

Accordingly, material and energy flows with a share of less than 1 per cent were also considered.

It can be assumed that the processes ignored would have contributed less than 5% to the impact categories under review.

The manufacture of machinery, plants and other infrastructure required for production of the items under review was not taken into consideration in the LCA.

3.5 Background data

All background data of relevance for modelling the baths, showers and washbasins was taken from the /GaBi Database 2018, version SP35/. The characterisation factors used are /CML 2001, updated in April 2013/.

3.6 Data quality

Manufacturing of the average product under review was modelled using primary data supplied by Bette. The production data involves up-to-date industry data supplied by Bette for 2016. The corresponding background data sets were available in the GaBi Database for all of the relevant pre-products used. The composition of enamel was estimated on the basis of the CAS numbers available and the corresponding MSDS data sheets, and any missing data was supplemented by expert knowledge. The background data used for almost all data sets was last revised less than 4 years ago, with the exception of the FEFCO data set for boxes made from corrugated board. The data quality can be regarded as high.

3.7 Period under review

The data for this Life Cycle Analysis is based on data records from 2016. The data from the previous EPD from 2011 was applied and compared as a basis for this.

3.8 Allocation

All products produced at the location are part of the study with the result that there are no co-products and no allocation is required.

Credits for electricity and heat for thermal utilisation of the packaging waste are allocated in Modules A1-A3.

Packaging material is recycled, landfilled or burned in a waste incineration plant, whereby any emissions incurred are taken consideration of in the model. In line with its elementary composition and ensuing calorific values, credits for (energy) recovery are considered in Module D.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

The ised background daatabase is the /GaBi Database 2018, version SP35/..

4. LCA: Scenarios and additional technical information

The following technical information forms the basis for the declared modules:

Packaging material
Average packaging material used per m2 product (incl. waste incurred during the packaging process):

Corrugated board: 340g
EPS foam: 1.5g
EPDM rubber: 0.7g
Nylon felt: 0.7g
HD-PE plastic corners and transport wedges: 3g
Bitumen mat: 430g
Polyethylene plastic foil: 15g

Wood: 110 g

Construction installation process (A5)

Name	Value	Unit
Auxiliary	0	kg
Water consumption	0	m^3
Other resources	0	kg
Electricity consumption	0	kWh
Other energy carriers	0	MJ
Material loss	0	kg
Output substances following waste treatment on site	0	kg
Dust in the air	0	kg
VOC in the air	0	kg
Waste for recycling (packaging material)	0.75	kg

End of life (C3-C4) of 1 m² surface of an average bath, shower, shower area and washbasin product

Name	Value	Unit
Landfilling Average product, enamel	3.18	kg
Collected separately	0	kg
Collected as mixed construction waste	0	kg
Reuse	0	kg
Recycling Steel	15.3	kg
Energy recovery	0	kg

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

Module D includes the credits for steel as well as for electricity and thermal energy following utilisation of the packaging materials. A 90% collection rate was assumed for the enamelled steel areas (Brimacombe et al.). The re-melt rate for steel was assumed in accordance with the industry average /*worldsteel*/. The waste incineration plants display net efficiency of 38% (German conditions), whereby 72% is generated as thermal energy and 28% as electric energy.

5. LCA: Results

The environmental impacts of 1 m² surface area of an average product comprising baths, showers and washbasins made of steel/enamel and manufactured by Bette in Germany are indicated below. The following tables depict the results of the indicators concerning impact estimates, use of resources as well as the waste and other output flows with reference to the declared unit.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	MND	X	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	MND	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m² surface area of an average product (baths, showers and washbasins)

Parameter	Unit	A1-A3	A5	C4	D
Global warming potential	[kg CO_2-Eq.]	7.99E+1	1.23E+0	5.07E-2	-2.53E+1
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	-1.46E-7	2.75E-14	1.15E-14	1.37E-7
Acidification potential of land and water	[kg SO_2-Eq.]	1.74E-1	2.91E-4	3.00E-4	-4.91E-2
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	1.97E-2	3.19E-5	4.14E-5	-3.73E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	2.28E-2	1.15E-5	2.35E-5	-1.14E-2
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	7.92E-4	1.58E-7	1.94E-8	-7.15E-5
Abiotic depletion potential for fossil resources	[MJ]	9.18E+2	4.75E-1	6.55E-1	-2.48E+2

RESULTS OF THE LCA - RESOURCE USE: 1 m² surface area of an average product (baths, showers and washbasins)

Parameter	Unit	A1-A3	A5	C4	D
Renewable primary energy as energy carrier	[MJ]	1.21E+2	-5.37E+0	8.41E-2	1.37E+1
Renewable primary energy resources as material utilization	[MJ]	6.44E+0	5.49E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	1.27E+2	1.17E-1	8.41E-2	1.37E+1
Non-renewable primary energy as energy carrier	[MJ]	9.41E+2	-1.54E+1	6.79E-1	-2.40E+2
Non-renewable primary energy as material utilization	[MJ]	1.30E+1	1.59E+1	0.00E+0	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	9.54E+2	5.35E-1	6.79E-1	-2.40E+2
Use of secondary material	[kg]	2.93E+0	3.38E-1	IND	IND
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m³]	8.48E-2	3.01E-3	1.30E-4	3.17E-2

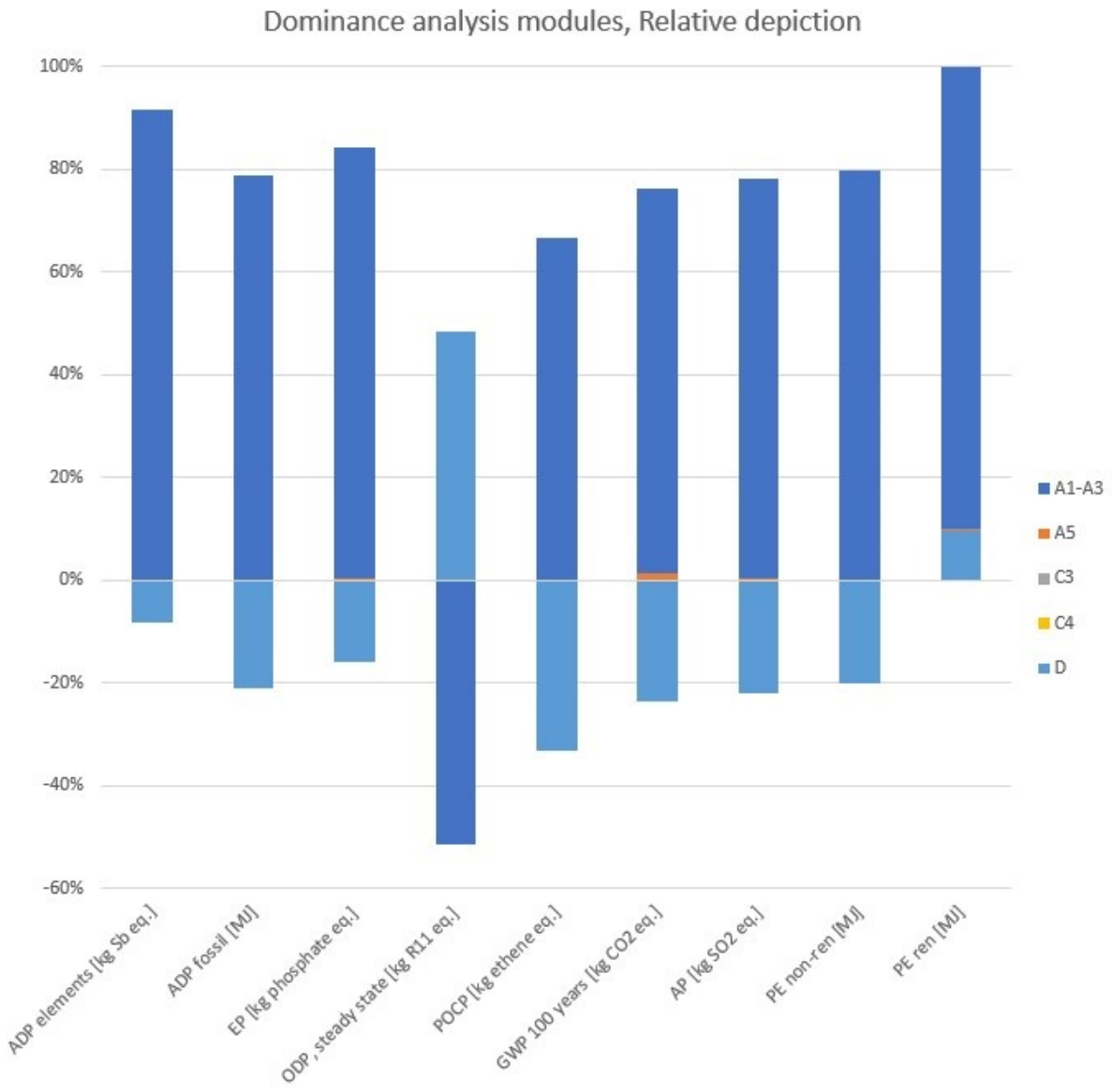
RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² surface area of an average product (baths, showers and washbasins)

Parameter	Unit	A1-A3	A5	C4	D
Hazardous waste disposed	[kg]	1.52E-4	3.26E-9	1.17E-8	-1.61E-5
Non-hazardous waste disposed	[kg]	4.50E+0	1.04E-1	3.19E+0	2.64E+0
Radioactive waste disposed	[kg]	8.94E-3	2.40E-5	9.83E-6	-4.44E-4
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	4.70E+0	0.00E+0	0.00E+0	1.53E+1
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	2.15E+0	0.00E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	4.95E+0	0.00E+0	0.00E+0

Note on CO_2 bound in the product: The cellulose bound in the packaging (corrugated board and plywood board) leads to an inclusion of 0.817 kg of biogenic CO_2 in A1-A3. This is not of significance for the GWP as it corresponds to 1%.

6. LCA: Interpretation

The environmental impacts by the manufacture of baths, showers, shower areas and washbasins, and packaging are characterised by Modules A1-A3 and Module D.



The provision of raw materials and recycling, especially of steel, have an overriding influence. The energy required during production has some influence on the individual impact categories. Packaging, transport and waste processing have a minor influence.

Water consumption (FW)
The product stage (A1-A3) has a significant influence on water consumption, accounting for 0.08 m3. Water consumption here is largely accounted for by direct water consumption during production as well as water consumption during steel production and steel processing.

Renewable and non-renewable primary energy (PE)
The entire primary energy requirements comprise primary energy and the primary energy resources used as raw materials (energetic + material use). The greatest influence is exerted by the production stage with energy-intensive steel production and processing (750 MJ PE non-renewable) as well as direct energy consumption during the manufacturing phases (112 MJ PE non-renewable).

Waste
The greatest share of waste produced is non-hazardous waste for disposal, whereby the production stage (4.5 kg) and disposal at the end of life (3.2 kg) account for a relevant contribution. Radioactive waste for disposal is incurred through the use of energy in the upstreams of preliminary products (electricity production).

Global warming potential (GWP)
A significant influence on the global warming potential is made by the production stage through steel as an energy-intensive raw material (67 kg CO2 equiv.) and electricity and heat supply (7 kg CO2 equiv.). The significant emissions are triggered by carbon dioxide released during the incineration process.

Ozone depletion potential (ODP)
The negative ODP value during the production stage and the positive recycling potential value are noteworthy. The explanation for this is supplied by the World Steel data sets provided for steel products; a system expansion process is performed in order to avoid allocations of by-products. The credits for the OPD by using blast furnace slag in the production of cement can be greater than the influence exerted by the steel manufacturing chain. This gives rise to a negative value.

Acidification potential (AP) and Eutrophication potential (EP)
The acidification potential and the eutrophication potential are primarily incurred by energy-intensive processes such as steel manufacturing and electricity supply during the production stage where nitrogen oxides account for the greatest share (72.5% of all EP, sulphur dioxide 57.5% of AP).

Photochemical ozone creation potential (POCP)
The photochemical ozone creation potential is influenced significantly by the supply of raw materials for steel in particular (0.03 kg ethene equiv.). Carbon monoxide, sulphur oxides and nitrogen oxides account for the largest share of photochemical ozone creation potential.

Abiotic depletion of resources (fossil) (ADPf)
ADP arises through the consumption of non-renewable fossil energy resources such as natural gas and crude oil. The main contributions here are made by the thermal energy (112 MJ) used as well as the provision of raw materials for steel (710 MJ).

Abiotic depletion of resources (elements) (ADPe)
ADP elements primarily arises through non-regenerative material resources. A significant influence is exerted by the provision of borax mineral raw materials (colemanite ore) for the enamel (0.0006 kg Sb equiv.).

Changes over the previous EPD
A comparison of the analysis depicted in /EPD product 2012/ indicates that the structure of the environmental impacts is very similar. Then too, the use of raw materials and the recycling potential of steel played an overriding role in terms of environmental impact. Minor changes can be explained by updating the background data sets as well as a slight increase in the average mass of the functional unit, and a minimum change to the end-of-life scenario.
More extensive changes can be seen in the OPD category. They can be explained by the changes in the Worldsteel data set on electrogalvanised steel.

7. Requisite evidence

No evidence required in accordance with the PCR

8. References

/PCR B/
Product Category Rules for Building Products, Part B: Requirements on the EPD for sanitary products made from composite materials, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, version 1.6, 2017-11

/Brimacombe et al 2005/
Brimacombe et al.: The Sustainability of Steel and the Value in Recycling, 2005

/GaBi ts/
thinkstep AG; GaBi 8: GaBi Software for Life Cycle Assessment TM; Stuttgart, Echterdingen, 1992-2018

/GaBi Databases 2018, version SP35/
Documentation of GaBi 8 datasets in the Databases for Life Cycle Assessment; copyright, TM Stuttgart, Echterdingen, 1992-2018.
http://documentation.gabisoftware.com/

/DIN EN ISO 14040/44/
ISO 14040:2006 Environmental management -- Life cycle assessment -- Principles and framework & ISO 14044:2006 Environmental management -- Life cycle assessment -- Requirements and guidelines 2006-07

/DIN EN ISO 14025/
DIN EN ISO 14025:2009-11, Environmental labels and declarations – Type III environmental declarations – Principles and procedures

/DIN EN 15804/
DIN EN 15804:2012-04, Sustainability of construction works – Environmental product declarations – Core rules for the construction products product category; German version

/DIN EN 14516/
DIN EN 14516:2010-12, Baths for domestic purposes; German version EN 14516:2006+A1:2010

/DIN EN 14296/
DIN EN 14296:2015-09 Sanitary appliances – Communal washing troughs; German version EN 14296:2015

/**DIN EN 14527**/
DIN EN 14527:2010-12, Showers for domestic purposes; German version EN 14527:2006+A1:2010

/DIN EN 14688/
DIN EN 14688:2007-02, Sanitary appliances – Wash basins – Functional requirements and test methods; German version EN 14688:2006

/DIN EN 717-1/
DIN EN 717-1:2005-01, Wood-based panels – Determination of formaldehyde release – Part 1: Formaldehyde emissions in accordance with the test chamber method; German version

/DIN EN 717-1/
DIN EN 717-1:2005-01, Plastics – Phenol-formaldehyde mouldings – Determination of free ammonia and ammonium compounds; Colorimetric

comparison (ISO 120:1977); German version EN ISO 120:1998

/VDI 4100/
VDI 4100:2012-10, Sound insulation between rooms in buildings – Dwellings – Assessment and proposals for enhanced sound insulation between rooms

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/EWC 20 03 01/ Waste code EWC 20 03 01 Mixed municipal solid waste

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