ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	Bette GmbH & Co. KG
Publisher	Institut Bauen und Umwelt (IBU)
Programme holder	Institut Bauen und Umwelt (IBU)
Declaration number	EPD-BET-2012112-E
Issue date	09/11/2012
Valid to	08/11/2017

Steel/enamel baths, shower trays, shower areas and washbasins

Bette GmbH & Co. KG

www.bau-umwelt.com

Institut Bauen
und Umwelt e.V.

1 General information

Bette GmbH & Co. KG

Programme holder

IBU - Institut Bauen und Umwelt e.V.
Rheinufer108
D-53639 Königswinter

Declaration number

EPD-BET-2012112-E

This declaration is based on the Product Category Rules:

PCR steel/enamel baths and shower trays, 06-2011
(PCR tested and approved by the independent expert committee)

Issue date

09/11/2012

Valid to

08/11/2017

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

Prof. Dr.-Ing. Hans-Wolf Reinhardt
(Independent expert committee chairman)

Baths, shower trays, shower areas, washbasins and accessories

Owner of the declaration

Bette GmbH & Co. KG
Heinrich-Bette-Str. 1
D-33129 Delbrück

Declared product /declared unit

The environmental product declaration refers to the declared unit of 1 m^2 enamelled surface (with a surface weight of 18.2 kg and packaging of 0.74 kg) of an average product consisting of steel/enamel baths, shower trays and washbasins. 0.94 kg of fittings and 0.18 kg of packaging material for the fittings are declared per functional unit.

Scope:

The lifecycle assessment is based on consideration of production of the German works of Bette GmbH & CO. KG in Delbrück and the data basis for 2011.

Verification

CEN standard DIN EN 15804 serves as the core PCR
Independent verification of the declaration and data in accordance with ISO 14025
☐ internal ☒ external

Matthias Schulz
(Independent verifier appointed by the independent expert committee´)

2 Product

2.1 Product description

Bette bath objects – baths, shower trays, shower areas and washbasins are made of steel/enamel. The deep-drawn main casting is coated all round with ground enamel and visible surfaces are additionally coated with covering enamel.
Production data from the entire works was collected and declared as an average product. The average was formed by means of the production quantities. The same procedure was used for the fittings.

2.2 Application

The baths, shower trays, shower areas, washbasins and fittings are used in sanitary rooms for the purposes of bathing, showering and washing.

2.3 Technical data

- VDI 4100: Sound insulation in civil engineering – apartments – assessment and suggestions for increased sound insulation
- DIN 4109: Sound insulation in civil engineering, requirements and analysis
- DIN VDE 0100-701: Requirements for industrial premises, rooms and facilities of a specific kind – Part 701 rooms with a bath or a shower
- DIN 18040: Barrier-free construction.

Data from baths, shower trays, shower areas and washbasins is listed as examples in the following table:

Article number	Model designation	Dimensions (L x W x H) [mm]	Overall surface area [m²]
5920	**BETTE SHOWER TRAY** extra flat	900x900x65	0.98
5900	**BETTE SHOWER TRAY** flat	900x900x150	1.15
5931	**BETTE**FLOOR	900x900	0.94
A131	**BETTE**ONE washbasin	530x530x140	0.69
3710	**BETTE**FORM	1700x750x420	2.42
3800	**BETTE**FORM	1800x800x420	2.64

2.4 Placing on the market/Application rules

- DIN EN 14516:2010-12, Baths for domestic use; German version EN 14516:2006+A:2010.

- DIN EN 14527:2010-12, Shower trays for domestic use; German version EN 14527:2006+A1:2010.
- DIN EN 14688:2007- 02, Sanitary equipment items– washbasins

2.5 Delivery status

Model designation	Dimensions L [mm]	Dimensions W [mm]	Weight [kg]
BETTE BATHS	1080 – 2150	650 – 1480	20 - 85
BETTE SHOWER TRAYS	700 – 1800	600 – 1500	10- 55
BETTE SHOWER AREAS	800 – 1800	700 – 1000	20 - 50
BETTE WASHBASINS	350 – 1400	350 – 530	4 - 60
BETTE FITTINGS			2.5 – 22

2.6 Base materials/Ancillary materials

The following table shows the average composition of a steel/enamel product.

Base materials	Percent by weight[%]
Steel	91.6
Enamel glazing(frit)	7.5
Quartz	0.7
Titanium oxide	0.1
Urea	0.1

The following table shows the average composition of average fittings. Fittings are packed in boxes.

Base materials	Percent by weight [%]
Steel	67
Aluminium	17
Various plastics (PU, TPU, PP)	16

2.7 Manufacture

The production of steel/enamel products and their fittings can be divided up into the following processes:

1. Raw manufacture of the product:
   The main part of the raw manufacture is completed on highly modern, automated press lines.
- Deep-drawing: the inner body of the blanks is formed by deep-drawing high-alloy, titanium-enriched steel blanks.
- Processing the blank: after deep-drawing, the edges are cut to the required size and outflow and overflow holes are punched. The edge is initially raised with a die to then be flanged.
  The blank is also partly processed manually, in particular when realising specific customer wishes.
- Attaching gusset plates: gusset plates are welded to the blank for the internal transportation of products during the enamelling process. Gusset plates to attach the feet are also welded to the baths; baths, shower trays and shower areas receive a potential equalisation gusset plate.

2. Cleaning the raw product
   Whilst the use of greases and oils is necessary and beneficial during deep-drawing, these lubricants are an impediment for the enamelling process. The greases and oils must therefore be removed before enamelling. Cleaning is a continuously running automated process with the following steps: cleaning, degreasing, rinsing.
- Cleaning/Degreasing: Alkaline solutions in differing concentrations are used for both process steps to remove both grease and oils and also metallic residues left over from manufacture of the raw product.
- Rinsing: the solutions required for cleaning are rinsed off with water. The product is then dried.

3. Enamelling
   Enamelling involves coating a metallic surface with a layer of glass. The following part processes are passed through to produce the permanent bond between the steel and the enamel.
- Applying enamel: robots apply both the ground enamel and the covering enamel to the blanks. The enamel is also partly sprayed on manually.
- Drying the enamel: before the firing process the enamel layer is dried to evaporate the water required to apply the enamel.
- Firing the enamel: the enamel is fired at over 800°C. The enamel interlocks with the steel during the firing process. A high-strength and brilliant enamel surface approximately 300 µm thick is formed.

4. Packaging
   To guarantee safe transport of the steel/enamel products they are packed in cardboard packaging. The products are also provided with the company logo.

5. Production of fittings
   The fittings are made of different materials. They are supplied in various forms, i.e. as sections and sheet metal coils.
   The individual components are sawn, punched or bent out of the different materials. The components are subsequently joined together by means of various methods such as joining, gluing or clinching and processed further.
   Once all components have been manufactured they are assembled into the fitting products in individual assembly processes. Bought-in plastic parts (sealing tapes, sound insulation components, spacers) are also added.

2.8 Environment and health during manufacturing

During production of the articles from the bath, shower tray, shower area, washbasin and fittings groups, no health protection measures above and beyond those legally defined for industrial enterprises are necessary. Generally, the newest technologies in environmental and health protection are pursued; an intelligent energy management system is deployed.

2.9 Product processing/Installation

Installation instructions are provided with the articles. Appropriate handling for steel/enamel products is required, especially during transport and installation. **BETTE**ZUBEHÖR fittings, which also form a part of the underlying PCR, are available for simple, safe and professional installation. The **BETTE**FLOOR shower area together with the **BETTE**INSTALLATION SYSTEM FLUSH-TO-FLOOR installation system fulfils the increased requirements of VDI 4100 SSt III. Especially clean and long-lasting installation is possible with the optional **BETTE**UPSTAND tray edge with its raised edges. This permits silicone-free and therefore maintenance-free installation of the products.

2.10 Packaging

The steel/enamel products are packed in cardboard packaging and transported on wooden pallets. If several packaging units are assembled on the same pallet they are additionally stabilised with shrink-wrap foil. Polystyrene elements are also partially used as

spacers. The fittings are supplied in cardboard packaging. Individual internally arranged components are also partly packaged in foil. The cardboard packaging of BETTE bath objects is disposed of by Interseroh as part of the TÜV-certified dual system.

2.11 Condition of use

The material composition of the products in the use phase corresponds to the composition according to Chapter 2.1.

2.12 Environment and health during use

Bette steel/enamel products are temperature and UV light-resistant. The closed, pore-free, hygienic enamel surface is impervious to impacts and scratches. There are no negative effects from the declared products during use.

2.13 Reference service life

The steel/enamel products and the corresponding fittings are very long-lasting products. With appropriate use and care their average service life stretches across several generations. This is also reflected in the installer's 30-year guarantee on Bette products, although a significantly longer service life is of course possible.

1.1 effects

2.14 Extraordinary

Fire: Bette steel/enamel products and fittings fulfil the criteria of construction material class A in accordance with DIN 4102-1. The products consist of steel, glass and aluminium (fittings) and are not flammable. Products with plastic materials can cause thick black smoke in case of fire. Combustion gases from plastics always have toxic potential. The main products are CO, CO_2, soot and water. Styrenes, aldehydes, alkenes and aromatics can also occur.
Water: if a room in which Bette steel/enamel products are installed is flooded with water this has no detrimental effect on the function of the products. There are no consequences for the environment. It should be ensured that the structure is completely dried once the water has been removed to avoid subsequent damage.
Mechanical destruction: if the enamel surface is mechanically damaged, corrosion can occur during continued use if the damage goes right down to the steel.

2.15 Re-use phase

Bette steel/enamel products are completely recyclable. They can be fed into furnaces during steel production without prior separation. Left-over metallic components can be put back into circulation through material recycling. Plastic parts which are used in the fittings can be separated from steel and aluminium components and reprocessed into new granulate.

2.16 Disposal

Steel/enamel products and fittings are highly suitable for recycling and should be collected and recycled. The materials can be handed in to any scrap metal dealer. Plastics should be disposed of via the dual system.

Waste designation	Waste key
Cardboard & paper	150101
Aluminium	170402
Mixed urban waste	200301
Foil/plastics	150102
Iron/steel	170405

2.17 Further information

Further information can be found on our home page: www.bette.de.

3 LCA: Calculation rules

3.1 Declared unit

The environmental product declaration refers to the declared unit of 1 m^2 of enamelled surface (with a surface weight of 18.2 kg and packaging weighing 0.74 kg) of an average product consisting of steel/enamel baths, shower trays and washbasins. 0.94 kg fittings and 0.18 kg packaging material are declared per functional unit.

The steel of the average product has an average layer thickness of 2.37 mm and is covered with an enamel layer approximately 300 µm thick. This means a raw thickness of the product of approximately 6.52 g/cm^3.

Due to the identical method of manufacturing baths, shower trays, shower areas and washbasins an average product based on the production quantities of the entire Delbrück works was formed.

The fittings are different for the different products.

The weight percentage of the materials used for the fittings is listed In Chapter 2.6 (base/auxiliary materials). An average fitting was determined using production quantities.

Chapter 6 (section on interpretation) contains fitting conversion factors for the various products.

3.2 System boundary

Type of the EPD: cradle to gate with options

The environmental production declaration refers to the production stage (modules A1-A3):

- Roughing
- Pre-treatment
- Refinement
- Packaging

Recycling (C3-C4) including credits beyond the system boundary (module D). Product installation (module A4-A5), disposal of packaging and the use stage (module B) are not included in this study.

The system boundaries to Nature are each laid for all modules in such a way that the processes supplying material and energy input to the system and the treatment of all waste caused by these processes are part of the system. The technical measures necessary for extracting the raw materials (e.g. mining for mineral raw materials, oil production for petrochemical-based raw materials or forestry /agriculture for renewable raw materials) belong to the system under investigation. Information on the system boundary of individual raw materials can be found in the GaBi 5 documentation.

The results represent Bette's average production mix for Germany.

3.3 Estimates and assumptions

A data record for corrugated cardboard which is no longer current was used for the packaging but it

nevertheless represents the best available quality. A conventional sewage treatment plant was assumed for waste water treatment. For EoL, a collection rate of 95% was modelled, which represents the average rate for high-quality steel products in the construction sector. Since no scrap value has yet been defined for titanium alloy steel plates, the scrap value for normally alloyed steel was modelled. This selection is a worst case assumption which complies with ISO 14040/44.

The enamel in the End of Life which is burnt during the re-melting of the enamelled steel is modelled as a conservative estimate as the disposal of plastic waste.

3.4 Cut-off criteria

All data from the operating data collected, i.e. all source materials used according to the formulation, the thermal energy used and the electricity and diesel consumed, was taken into account in the lifecycle assessment. Assumptions were made for transportation expenses for all inputs and outputs included or the actual transport distances applied.

Material and energy streams with a share of less than 1 percent were therefore also included.

It can be assumed that the disregarded processes would have contributed less than 5% to the included impact categories.

The manufacture of the machines, plant and other infrastructure necessary to produce the article examined was not included in the lifecycle assessment.

3.5 Background data

The GaBi 5 software system for integrated balancing developed by PE INERNATIONAL AG was used to model the baths, shower trays and washbasins and the fittings. The consistent data records contained in the GaBi database are documented in the online GaBi documentation (GaBi 5). The GaBi database basic data was used for energy, transport and auxiliary materials. The lifecycle assessment was produced for the reference area of Germany. This means that in addition to the production processes under these boundary conditions the prestages relevant for Germany such as electricity or energy source provision were applied. The electricity mix for Germany with the reference year 2008 was used.

3.6 Data quality

All background data records relevant for manufacture were taken from the GaBi 5 software's database or provided by Bette. The composition of the enamel was estimated on the basis of the available CAS numbers and the corresponding MSDS data sheets and missing information complemented with expert knowledge. The last audit of the background data used was less than four years ago (with the exception of corrugated cardboard). The production data is current industry data from Bette for 2011.

3.7 Period under review

The data basis for this lifecycle assessment is based on data acquisitions from 2011.

3.8 Allocation

No by-products are generated in the works in Delbrück so no allocation was made as part of the ecological lifecycle assessment. Packaging materials are recycled, disposed of or burnt in a waste incinerator. These are input-specifically modelled in the model. Emissions which are caused in the process are included in the model. Credits for recycling are included in module D according to their elementary composition and the resulting fuel values.

3.9 Comparability

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

4 LCA: Scenarios and further technical information

The following technical information forms the basis for the declared modules or can be used for the development of specific scenarios in the context of a building assessment if modules are not declared (MND).

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

For recycling	
Steel	15.9 kg
For disposal	
Average product	0.91 kg
Enamel	1.38 kg

End of life (C3-C4) of fittings

For recycling	
Aluminium	0.151 kg
Steel	0.595 kg
For energy reclamation	
Plastic	0.142 kg
For disposal	
Average fittings	0.047 kg

Information on the categories of "collected separately" and "mixed building waste" are not necessary in this case as the baths etc. including fittings are collected as one unit and do not represent mixed building waste.

Re-use, reclamation and recycling potential (D)

Module D contains credits for steel and aluminium and also for electricity and thermal energy as a result of the thermal recycling of packaging materials. A collection rate of 95 % for the enamelled steel surfaces was assumed (Brimacombe et al.). The same collection rate was also used for the fittings. The re-melting rate for the steel was assumed according to the industrial average (data records from the world steel association). European Aluminium Association (EAA) data records were used for the aluminium in which a differentiation is made between correctly sorted waste (during manufacture) and aluminium waste in the EoL.

The waste incineration plants have a net efficiency of 38 % (German conditions). 72 % is produced as thermal energy and 28 % as electrical energy.

5 LCA: Results

The environmental impact for 1 m^2 surface of an average product consisting of steel/enamel baths and shower trays and washbasins manufactured by Bette in Germany is shown below. 0.94 kg of fittings and 0.18 kg of packaging material are shown separately for the fittings per functional unit. The following tables show the results of the indicators of the impact assessment, the use of resources and waste and other output streams relating to the declared unit.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCUDED 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	Deconstruction / demolition	Transport	Waste processing	Disposal	Reuse, recovery, recycling potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X

ENVIRONMENTAL IMPACT		1 m^2 surface of the **average product** (baths, shower trays and washbasins)				**Fittings** for 1 m^2 surface of the average product (baths, shower trays and washbasins)			
		Production	Disposal		Credit	Production	Disposal		Credit
Parameter	**Unit**	**A1-A3**	**C3**	**C4**	**D**	**A1-A3**	**C3**	**C4**	**D**
GWP	[kg CO_2 eq.]	80.3	0	0.116	-24.8	4.17	0.3599	0	-2.5
ODP	[kg CFC11 eq.]	1.3E-006	0	3.72E-010	7.67E-007	4.22E-008	2.869E-011	0	1.01E-008
AP	[kg SO_2 eq.]	0.213	0	0.000376	-0.0584	0.0181	9.075E-005	0	-0.011
EP	[kg PO_4^{3-} eq.]	0.0197	0	0.000378	-0.00169	0.00126	7.281E-006	0	-0.00047
POCP	[kg Ethen eq.]	0.0346	0	5.46E-005	-0.0129	0.00164	5.081E-006	0	-0.000909
ADPE	[kg Sb eq.]	0.000846	0	2.38E-008	-0.000116	6.49E-005	5.127E-008	0	-4.45E-006
ADPF	[MJ]	912	0	1.67	-264	57.5	0.182	0	-25.9
Key	GWP = Global warming potential ; ODP = Depletion potential of the stratospheric ozone layer ; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Potential for abiotic depletion of non-fossil resources; ADPF = Potential for abiotic depletion of fossil resources								

RESOURCE USE		1 m^2 surface of the **average product** (baths, shower trays and washbasins)				**Fittings** for 1 m^2 surface of the average product (baths, shower trays and washbasins)			
		Production	Disposal		Credit	Production	Disposal		Credit
Parameter	**Unit**	**A1-A3**	**C3**	**C4**	**D**	**A1-A3**	**C3**	**C4**	**D**
PERE	[MJ]	116	0	0	0	10.97	0	0	0
PERM	[MJ]	0	0	0	0	0	0	0	0
PERT	[MJ]	116	0	0.0811	12.2	10.97	0.0149	0	-6.02
PENRE	[MJ]	990	0	0	0	59.91	0	0	0
PENRM	[MJ]	0	0	0	0	4.04	0	0	0
PENRT	[MJ]	990	0	1.74	-238	63.3	0.206	0	-28
SM	[kg]	1.75	0	0	0	0.056	0	0	0
RSF	[MJ]	0.0111	0	0.00142	-0.000142	-0.0168	1.81E-005	0	-0.000519
NRSF	[MJ]	0.11	0	0.0034	-0.00149	-0.178	5.97E-005	0	-0.00485
FW (*)	[m³]	-	-	-	-	-	-	-	-
Key	PERE = Renewable primary energy as energy carrier; PERM = Renewable primary energy resources as material utilization; PERT = Total use of renewable primary energy resources; PENRE = Non-renewable primary energy as energy carrier; PENRM = Non-renewable primary energy as material utilization; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

(*) The LCI information on the materials high-alloy steel and corrugated cardboard does not contain sufficient information to calculate the water measurement. These are industrial data records in which the data for water input and output was not consistently taken into account. There are also inconsistencies for the waste water treatment process. For these reasons the use of fresh water resources cannot currently be evaluated.

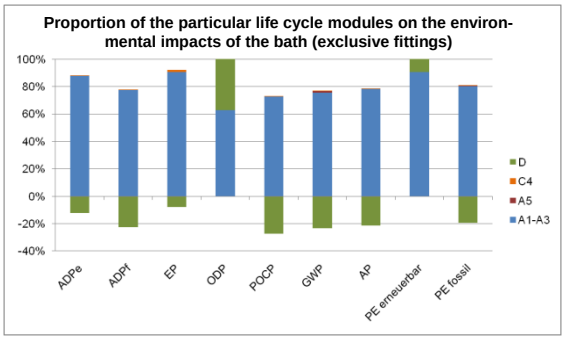
OUTPUT FLOWS AND WASTE CATEGORIES		1 m^2 surface of the **average product** (bath, shower tray and washbasin)				**fittings** for 1 m^2 surface of the average product (bath, shower tray and washbasins)			
		Production	Disposal		Credit	Production	Disposal		Credit
Parameter	**Unit**	**A1-A3**	**C3**	**C4**	**D**	**A1-A3**	**C3**	**C4**	**D**
HWD (*)	[kg]	-	-	-	-	-	-	-	-
NHWD	[kg]	176	0	2.44	-66.5	15.1	0.135	0	-5.8
RWD	[kg]	0.028	0	3.05E-005	0.00761	0.00227	9.49E-006	0	-0.000984
CRU	[kg]	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	15.9	0	0	0	0.746
MER	[kg]	0	0	0	0	0	0.142	0	
EE (electricity)	[MJ]	0	0	0	0	0	0	0	0
EE (thermal energy)	[MJ]	0	0	0	0	0	0	0	0
Key	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy								

(*) The Independent expert committee (SVA) of the IBU clearly defined the calculation rules for the declaration of waste at its last meeting on 04/10/2012. The data basis of the background data records used from the databases must be revised to that effect. This environmental product declaration therefore adheres to the interim approved by the expert committee and is produced without a waste declaration.

6 LCA: Interpretation

6.1 1 m² surface of baths, shower trays, shower areas and washbasins

The environmental impacts of the baths, shower trays, shower areas and washbasins are affected by modules A1-A3 and module D.



For the manufacture (module A1-A3) of 1 m² of surface for steel/enamel baths, shower trays, shower areas and washbasins the use of non-renewable primary energy is 990 MJ/ m². Regenerative primary energy use is 116 MJ/ m².

During manufacture, raw production dominates renewable primary energy use by approximately 59%. Approximately 73% thereof is energy for processing and approximately 19% for the provision of the steel. Approximately 28% is destined for processing of which 99 % is for processing energy.

Non-renewable primary energy consumption is also mainly affected by raw processing (73%) and processing (19%). With raw processing 92% is attributable to the provision of the steel, with processing 91% on processing energy and 9% on enamel production.
Analysis of waste production is shown separately for both main fractions – non-hazardous waste (including stockpile goods, ore processing residues, municipal waste) and radioactive waste. Non-hazardous waste represents the greatest proportion in the manufacture of the baths, shower trays, shower areas and washbasins.

79% of greenhouse gases are determined by raw processing which originate almost 100 % from the provision of steel. 15 % of greenhouse gas emissions originate from processing whereby 81 % originate from the processing energy. The raw processing (including steel provision) with respective values between 76 and 95% also contributes mainly to the eutrophication, ozone depletion, acidification and summer smog potential and the potential for abiotic resource depletion (fossil).

The potential for elementary abiotic resource depletion is dominated by processing (75 %).

Credits from steel which accrue as waste during production run to between 0% (ozone depletion potential) and 14% (potential for elementary abiotic resource depletion) in modules A1-A3 depending on the environmental category.

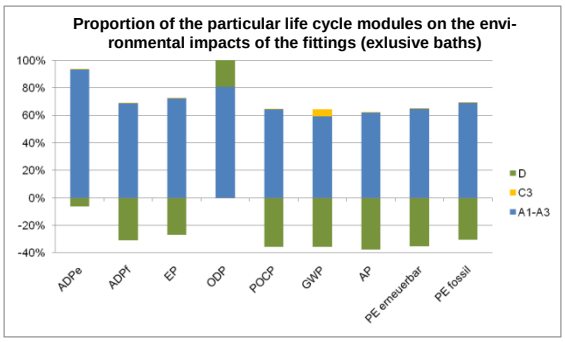
In summary, the dominance of steel is visible in raw processing and also the energy for processing. Pretreatment and also packaging play a lesser role.

Credits from recycling the steel in module D result from the environmental categories of acidification, greenhouse gases, summer smog potential and the abiotic depletion potential (fossil) running to approx. 20-25 % of the total environmental impacts. For the eutrophication potential it is approx. 5 %, whilst module D is responsible for 37% of the environmental impacts in the environmental category of ozone depletion potential.

The lifecycle of the baths, shower trays, shower areas and washbasins is of significantly greater relevance than the lifecycle of the fittings.

6.2 Fittings for 1 m² for baths, shower trays and shower areas

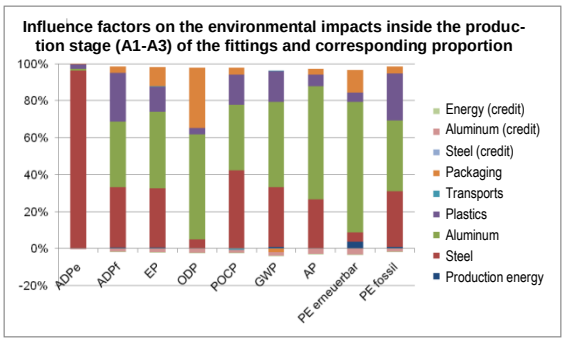
For the lifecycle for the fittings for 1 m² of baths, shower trays and shower areas it is clear that apart from modules A1-A3 only the credits from module D make a contribution to the overall result. Apart from for the GWP, module C3 plays no part.



In manufacturing (module A1-A3) of 1 m² fittings, the use of non-renewable primary energy is at 63 MJ/ m². The use of regenerative primary energy amounts to 11 MJ/ m². In manufacturing, both renewable and non-renewable primary energy use dominates for the provision of the steel and aluminium. Also relevant are the provision of plastic and packaging.

Non-hazardous waste represents the largest proportion in the manufacture of the fittings.

The processes of steel and aluminium provision have the greatest influence in all environmental categories. The influences differ.



Aluminium has the greatest proportion of acidification (63 %) and ozone depletion potential (60 %) and also renewable primary energy needs (74 %). Steel has the greatest proportion of potential for abiotic resource depletion (95 %) and summer smog potential (45 %). The provision of plastic is present in all impact categories. The share of environmental influences is between approx. 4 and 25 %. The corrugated cardboard packaging plays a role in the ozone depletion potential and the renewable primary energy requirement. Further processes play only a subordinate role in the results of the individual impact categories for the manufacture of fittings.

The following information can be used to calculate the quantity of fittings for individual specific products:

Product	Fitting type	Share of fittings in % of the overall product (inc. fittings)	Fittings required per 1 m^2 of product [kg/m^2]	Additional fittings kg/kg Product]
Bath	Feet	2.7	0.510	0.028
Shower tray	Foot system	4.6	0.874	0.048
Shower area	Installation frame	29.8	7.735	0.425
Washbasin	-	0	0	0

7 Requisite evidence

No requisite evidence is required according to the PCR.

8 References

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