

Environmental Product Declaration



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Gustavsberg Thermostatic bath and shower mixers

This EPD covers multiple products, bath and shower mixers of various collections from

Villeroy & Boch Gustavsberg AB



Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-09174
Publication date:	2023-06-26
Valid until:	2028-06-22

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): Construction Products 2019:14, Version 1.2.5 and EN 15804:2012+A2:2019 Sustainability of Construction Works
PCR review was conducted by: The Technical Committee on the International EPD® System. Contact via www.environdec.com info@environdec.com
Life Cycle Assessment (LCA)
LCA accountability: Kristin Fransson, AFRY, www.afry.com
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: <input type="checkbox"/> EPD verification by individual verifier Third-party verifier: Daniel Böckin, Miljögiraff AB, daniel@miljogiraff.se Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

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

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD:

Villeroy & Boch Gustavsberg AB
 Odelbergs väg 11
 134 40 Gustavsberg
 Tel: +46 8-570 391 00

Contact:

Mattias Virsgård

Description of the organisation:

Villeroy & Boch Gustavsberg's head office is situated on Värmdö, just outside Stockholm, Sweden, and we have production facilities in Gustavsberg and Vårgårda, Sweden. In addition to our production facilities in Sweden, we also have sales offices around the Nordic countries and in the Baltics. The company is a wholly owned subsidiary of the German Villeroy & Boch AG Group and thus belongs to one of the largest manufacturers of bathroom furnishing solutions in Europe.

Product-related or management system-related certifications

SS-EN ISO 9001:2015 – Quality Management System
 SS-EN ISO 14001:2015 – Environmental Management System
 SS-EN ISO 45001:2018 – Occupational Health and Safety Management Systems
 SS-EN ISO 50001 :2018 – Energy Management System
 EMAS, Eco Management and Audit Scheme – register, Site Vårgårda

Name and location of production site(s):

Villeroy & Boch Gustavsberg AB, Vårgårda, Sweden

Product information

Product name:

Gustavsberg Thermostatic bath and shower mixers

Product identification:

The following products are included in the EPD, see table for information on product names, article numbers and weights.

Product name	Article number	EAN-Number	Article weight (kg/piece)
Shower mixer Atlantic - thermostat, with shower connection up and down, 160 c-c	GB41201302	7391530081359	1.61
Shower mixer Atlantic - thermostat, with shower connection down, 160 c-c	GB41201304	7391530075785	1.54
Shower mixer Atlantic - thermostat, with shower connection down, lead-free, 160 c-c	GB412013040	7391530075792	1.57
Shower mixer Atlantic - thermostat 40 c-c, with shower connection up and down, 40 c-c	GB41201402	7391530075778	1.87
Shower mixer Atlantic - thermostat 40 c-c, with shower connection down, 40 c-c	GB41201404	7391530076423	1.79
Shower mixer Nordic - thermostat, With shower connection up and down, 160 c-c	GB41201702	7391530076508	1.60



Product name	Article number	EAN-Number	Article weight (kg/piece)
Shower mixer Nordic - thermostat, with shower connection down, 160 c-c	GB41201704	7391530076997	1.51
Shower mixer New Nautic - thermostat, outlet up & down, 160 c-c, lead free	GB412023020	7391530076331	1.67
Shower mixer New Nautic - thermostat, outlet downward, 160 c-c	GB41202304	7391530075747	1.50
Shower mixer New Nautic - thermostat, outlet downward, 160 c-c, lead free	GB412023040	7391530075754	1.54
Shower mixer New Nautic - thermostat, outlet downward, 160 c-c, lead free, grip-friendly knobs	GB41202304066	7391530075761	1.54
Tub faucet New Nautic - thermostat, downward shower connection and fixed bathtub spout, 160 c-c	GB41202333	7391530075945	1.90
Shower mixer New Nautic - thermostat, connection can be shifted, outlet up & down, 40 c-c, lead-free	GB412024020	7391530076362	1.79
Shower mixer New Nautic - thermostat, with pipe connection downwards, 40 c-c	GB41202404	7391530075815	1.78
Shower mixer New Nautic - thermostat, with pipe connection upwards, can be shifted, 40 c-c	GB41202427	7391530075839	1.76
Shower mixer Atlantic - thermostat, with shower connection up and down, 150 c-c	GB41211302	7391530076393	1.65
Shower mixer Atlantic - thermostat, with shower connection down, 150 c-c	GB41211304	7391530076430	1.56
Shower mixer Atlantic - thermostat, with shower connection down, lead-free, 150 c-c	GB412113040	7391530076447	1.61
Shower mixer Nordic - thermostat, with shower connection up and down, 150 c-c	GB41211702	7391530077024	1.64
Shower mixer Nordic - thermostat, with shower connection down, 150 c-c	GB41211704	7391530077031	1.55
Shower mixer New Nautic - thermostat, lead-free, outlet up & down, 150 c-c	GB412123020	7391530076379	1.71
Shower mixer New Nautic - thermostat, outlet downward, 150 c-c	GB41212304	7391530076270	1.55
Shower mixer New Nautic - thermostat, lead free mixer with outlet downward, 150 c-c	GB412123040	7391530075860	1.58
Shower mixer New Nautic - thermostat, lead free mixer with outlet downward, 150 c-c, grip-friendly knobs	GB41212304066	7391530075877	1.60
Shower mixer New Nautic - thermostat, outlet downward, 150 c-c, 60p	GB4121230460	7391530075884	1.55
Tub faucet New Nautic - thermostat, downward shower connection and fixed bathtub spout, 150 c-c	GB41212333	7391530075938	1.94
Shower mixer Skandic - thermostat Shower connection up and down, 160 c-c	GB41203602	7391530075976	1.81



Product name	Article number	EAN-Number	Article weight (kg/piece)
Shower mixer Skandic - thermostat, Black with shower connection up and down, 160 c-c	GB4120360253	7391530081069	1.81
Shower mixer Skandic - thermostat, Shower connection downwards 160 c-c	GB41203604	7391530075983	1.74
Shower mixer Skandic - thermostat, Black with downward shower connection 160 c-c	GB4120360453	7391530081076	1.74
Tub faucet Skandic - thermostat, With fixed bathtub spout, downward shower connection, 160 c-c	GB41203633	7391530076072	2.13
Tub faucet Skandic - thermostat, Black with fixed bath spout, downward shower connection, 160 c-c	GB4120363353	7391530081427	2.13
Shower mixer Skandic - thermostat, Shower connection up and down, 40 c-c	GB41203802	7391530076010	2.05
Shower mixer Skandic - thermostat, Shower connection downwards 40 c-c	GB41203804	7391530076027	1.98
Shower mixer Estetic - thermostat, Chrome with shower connection up and down, 160 c-c	GB41208402	7391530076096	1.88
Shower mixer Estetic - thermostat, Black with shower connection up and down, 160 c-c	GB4120840253	7391530076102	1.88
Shower mixer Estetic - thermostat, Chrome with shower connection down, 160 c-c	GB41208404	7391530076119	1.80
Shower mixer Estetic - thermostat, Black with shower connection down, 160 c-c	GB4120840453	7391530076126	1.80
Tub faucet Estetic - thermostat, Chrome with fixed bath spout, downward shower connection, 160 c-c	GB41208433	7391530076225	2.20
Tub faucet Estetic - thermostat, Black with fixed bath spout, downward shower connection, 160 c-c	GB4120843353	7391530076232	2.20
Shower mixer Skandic - thermostat, Shower connection up and down, 150 c-c	GB41213602	7391530075969	1.85
Shower mixer Skandic - thermostat, Black with shower connection up and down, 150 c-c	GB4121360253	7391530081052	1.85
Shower mixer Skandic - thermostat, Shower connection downwards 150 c-c	GB41213604	7391530076041	1.78
Tub faucet Skandic - thermostat, With fixed bathtub spout, downward shower connection, 150 c-c	GB41213633	7391530076089	2.17
Tub faucet Skandic - thermostat, Black with fixed bath spout, downward shower connection, 150 c-c	GB4121363353	7391530081434	2.17
Shower mixer Estetic - thermostat, Chrome with shower connection up and down, 150 c-c	GB41218402	7391530076164	1.92
Shower mixer Estetic - thermostat, Black with shower connection up and down, 150 c-c	GB4121840253	7391530076171	1.92
Shower mixer Estetic - thermostat, Chrome with shower connection down, 150 c-c	GB41218404	7391530076188	1.84



Product name	Article number	EAN-Number	Article weight (kg/piece)
Shower mixer Estetic - thermostat, Black with shower connection down, 150 c-c	GB4121840453	7391530076195	1.84
Tub faucet Estetic - thermostat, Chrome with downward shower connection and fixed bathtub spout, 150 c-c	GB41218433	7391530076249	2.24
Tub faucet Estetic - thermostat, Black with downward shower connection and fixed bath spout, 150 c-c	GB4121843353	7391530076256	2.24

Product description:

The product comes in three versions, 160 cc, 150 cc and 40 cc. These different measurements are to accommodate different markets where the standardized distance between warm- and cold-water pipes differs. The product has safe touch to prevent scalding from touching the thermostat.

UN CPC code:

42911 - Sinks, wash-basins, baths and other sanitary ware and parts thereof, of iron, steel, copper or aluminium.

Geographical scope:

N – Northern Europe and the Baltic region

LCA information

The EPD pertains to a “worst-case” scenario related to the products listed above.

Functional unit / declared unit:

1 kg

Reference service life:

No RSL is declared. This EPD is based on a cradle-to-gate assessment

Allocation

Allocations have been made for several input factors. To summarise the allocation method energy use, chemicals and wastes have been allocated based on physical aspects, in this case, mass. The energy, wastes, water, emissions, and chemicals used as cutting fluids are allocated based on total mass of production at Villeroy & Boch’s manufacturing facility in Vårgårda 2022. The chemicals used in the chromium processing and as casting fillers are allocated based on the total mass casted at Villeroy & Boch’s manufacturing facility in Vårgårda in 2022. I.e., one kg mixer is allocated 0.00032% of the chemicals used for casting and chroming and 0.000006% of the wastes and emissions generated, and energy and water used.

The "polluter pays principle" has been used to allocate recycled materials in accordance with the standards used. The recycling of materials does not imply benefits for the system, and the effects of using recycled materials do not have a negative impact on the results, but rather an environmental gain.

Time representativeness:

The information underlying this EPD is taken from the reference year 2022, taking into account inputs and outputs for the whole calendar year.

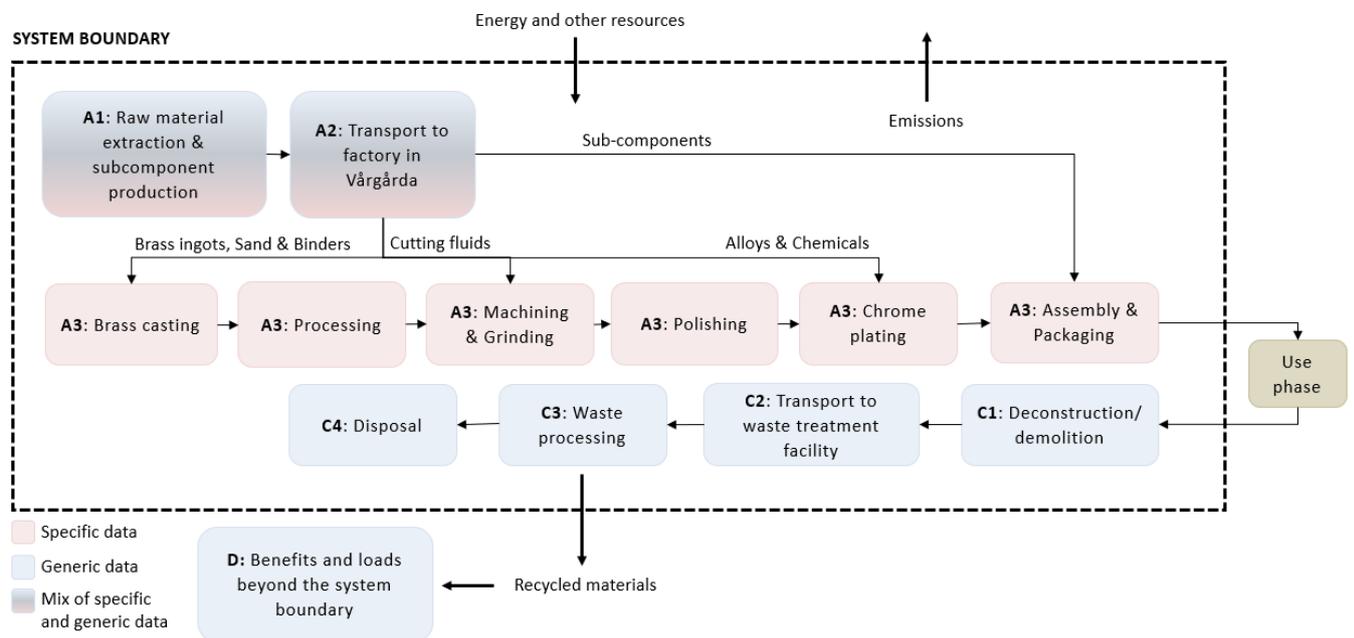
Database(s) and LCA software used:

Ecoinvent 3.8.1, Industry Data 2.0, ELCD and SimaPro 9.4.0.2

Description of system boundaries:

Cradle to gate with modules C1–C4 and module D (A1–A3 + C + D)

System diagram:



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

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO/EUR	GLO/EUR	SE										EUR	EUR	EUR	EUR	
Specific data used	16% of the total GWP-GHG impact stems from specific data			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Range ratio GWP-GHG	60%	66%	0%										0%	0%	0%	36%	73%

A1: Raw Material

This stage includes raw material extraction and production of bought components.

A2: Transport

This stage includes transportation of raw materials to production sites and of components to final site of assembly.

A3: Manufacturing

This stage includes resource use in the manufacturing facility in Vårgårda such as use of energy. It also includes treatment of waste generated from the manufacturing processes. The manufacturing includes casting, chrome plating, assembling, and packing. Data from the full year of 2022 has been used in the calculations.

The climate impact of the electricity mix is 12.1 gCO₂-eq/kWh.

C1: Deconstruction

This stage includes impacts from energy use related to deconstruction of the fire damper.

C2: Waste Transport

Includes the transportation of the discarded product to a waste treatment facility. 100 km transportation is assumed.

C3: Waste Processing

This stage includes sorting of waste.

C4: Waste disposal

This stage includes waste disposal processes, such as landfill or incineration. Incineration is assumed for plastics, 95% of the conventional brass is assumed to be recycled, other metals are assumed to have a recycling rate of 90%

D: Benefits and loads outside the system boundary

This stage includes benefits and burdens associated with recovery/recycling that affects future life cycles. For this product it includes benefits from the recycling of brass and metals, as well as energy recovery from waste incineration

Content information for worst case product

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Brass	0.001	94%	
Lead free brass	0.89	75%	
Plastic	0.09	0%	
Stainless steel	0.01		
Aluminium	0.01		
TOTAL	1		
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Cardboard	0.053	3.1%	0.011
Paper	0.002	0.1%	0.006
TOTAL	0.055		

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
Lead	231-100-4	7439-92-1	0.05 - <0.8*

* Lead free products contain maximum 0.1% lead while products with conventional brass contain <0.8% lead.

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per kg thermostatic mixer							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	5.50E+00	0.00E+00	1.63E-02	9.75E-04	2.29E-01	-4.54E-01
GWP-biogenic	kg CO ₂ eq.	8.32E-02	0.00E+00	1.41E-05	2.69E-05	2.45E-05	-2.90E-03
GWP-luluc	kg CO ₂ eq.	2.21E-02	0.00E+00	6.51E-06	2.09E-06	3.22E-06	-2.65E-03
GWP-total	kg CO ₂ eq.	5.60E+00	0.00E+00	1.63E-02	1.00E-03	2.29E-01	-4.60E-01
ODP	kg CFC 11 eq.	3.05E-07	0.00E+00	3.77E-09	6.15E-11	9.94E-10	-2.54E-08
AP	mol H ⁺ eq.	2.52E-01	0.00E+00	4.63E-05	5.88E-06	6.44E-05	-2.93E-02
EP-freshwater	kg P eq.	1.84E-02	0.00E+00	1.07E-06	8.96E-07	9.15E-07	-2.31E-03
EP-marine	kg N eq.	1.44E-02	0.00E+00	9.40E-06	1.19E-06	3.58E-05	-1.58E-03
EP-terrestrial	mol N eq.	1.85E-01	0.00E+00	1.02E-04	1.13E-05	2.95E-04	-2.15E-02
POCP	kg NMVOC eq.	5.42E-02	0.00E+00	3.94E-05	3.16E-06	7.46E-05	-5.85E-03
ADP-minerals&metals*	kg Sb eq.	3.19E-03	0.00E+00	5.77E-08	9.15E-09	2.32E-08	-7.11E-04
ADP-fossil*	MJ	1.04E+02	0.00E+00	2.47E-01	1.98E-02	7.90E-02	-8.60E+00
WDP*	m ³	6.01E+00	0.00E+00	7.52E-04	2.24E-04	1.04E-02	-5.50E-01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption						

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

Potential environmental impact – additional mandatory and voluntary indicators

Results per kg thermostatic mixer							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	5.51E+00	0.00E+00	1.63E-02	9.78E-04	2.29E-01	-4.57E-01

Use of resources

Results per kg thermostatic mixer							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	2.11E+01	0.00E+00	3.53E-03	3.73E-03	2.25E-03	-2.89E+00
PERM	MJ	4.87E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.12E+01	0.00E+00	3.53E-03	3.73E-03	2.25E-03	-2.89E+00
PENRE	MJ	1.09E+02	0.00E+00	2.62E-01	2.08E-02	8.48E-02	-8.81E+00
PENRM	MJ	4.04E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.13E+02	0.00E+00	2.62E-01	2.08E-02	8.48E-02	-8.81E+00
SM	kg	4.17E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	1.91E-01	0.00E+00	4.13E-05	5.78E-06	2.48E-04	-1.33E-02
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water						

¹ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

Waste production and output flows

Waste production

Results per kg thermostatic mixer							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Radioactive waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Output flows

Results per kg thermostatic mixer							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	5.73E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Other environmental performance indicators

The table below shows results for total climate impact from modules A1-A3 (Cradle-to-gate) for all included product variations.

Results per kg thermostatic mixer	
Product	GWP-total (A1-A3) [kg CO2-eq]
GB41213602	3.78
GB4121360253	3.66
GB412123020	5.58
GB41212304	3.34
GB412123040	5.45
GB41212304066	5.39
GB4121230460	3.34
GB41212333	3.83
GB41213604	3.62
GB41213633	4.02
GB4121363353	4.02
GB41211702	3.51
GB41211704	3.33
GB41218402	3.87
GB4121840253	3.75
GB41218404	3.72
GB4121840453	3.60
GB41218433	4.08
GB4121843353	4.08
GB41211304	3.38
GB412113040	5.48
GB41211302	3.56
GB412023020	5.47
GB41202304	3.20
GB412023040	5.36
GB41202304066	5.36
GB41202333	3.72
GB41203602	3.68
GB4120360253	3.53
GB41203604	3.49
GB4120360453	3.36
GB41203633	3.93
GB4120363353	3.92
GB41201702	3.39
GB41201704	3.16
GB41208402	3.77
GB4120840253	3.64
GB41208404	3.59
GB4120840453	3.47
GB41208433	4.00
GB4120843353	3.99
GB41201304	3.23
GB412013040	5.39
GB41201302	3.44
GB41201402	3.10
GB41202404	2.71
GB41202427	2.89
GB412024020	5.39
GB41203802	3.26
GB41203804	3.10
GB41201404	2.93

Additional environmental information

Drinking water is by far our most important natural resource and fundamental for our health. Worldwide the limitations regarding materials and their influences on drinking water quality are increasingly getting stricter. Therefore, the proper choice of suitable alloys for drinking water installations is one of the most crucial aspects. Technical, economic, and – with growing interest – hygienical characteristics have to be considered. More than 20 percent of Sweden's energy use comes from heating and production of hot water. In a two-year project, RISE has shown that large savings are possible by using energy-efficient mixers (Folkesson et al., 2017). Researchers at RISE have carried out measurements in apartment buildings with mixers in different energy classes from Villeroy & Boch Gustavsberg & others. Good energy-rated mixers have functions that reduce hot water use, such as cold start or resilient controls. The results show that it is possible to save about 28% of the hot water used.

For Showermixers with Energyclass mixers above are combined with showerset or showercolumnkits, more information about this on the homepage www.gustavsberg.com

These products are designed and constructed to enable reuse, by in future change components and thereby reach new and updated functionality and flowrates, this to enhance their lifetime and reduce use of material and resources.

References

EPD International (2021): General Programme Instructions of the International EPD® System. Version 4.0.

EPD International (2022): PCR 2019:14. Construction products 2019:14. Version 1.2.5

Ecoinvent v.3. Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B. (2016): The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: <http://link.springer.com/10.1007/s11367-016-1087-8>

Folkesson, B., Fernqvist, N., Normann, A. (2017): Vattenanvändning med energieffektiva blandare. Report 2017:11, Swedish Energy Agency.

Näslund, J. and Fransson, K. (2023): Life Cycle Assessment of thermostatic bathroom mixers

SimaPro. SimaPro LCA Package, Pré Consultants, the Netherlands, www.pre-sustainability.com

