Environmental Product Declaration

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

Nautic washbasin mixers, lead free

from

Villeroy & Boch Gustavsberg AB

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-05060
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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
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CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR) Construction Products 2019:14, Version 1.1 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*
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: *Mats Zackrisson, RISE Research Institutes of Sweden* Approved by: The International EPD® System
LCA report and EPD prepared by: AFRY, www.afry.com
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

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

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

Differences versus previous version
2021-12-13 Version 1
2022-09-19 Version 2
Editorial change: Change in name of EPD to clarify and avoid mixing up with similar products in other materials.

Company information

Owner & Contact of the EPD:
Villeroy & Boch Gustavsberg AB
Odelbergs väg 11
134 40 Gustavsberg
Tel: +46 8-570 391 00
www.gustavsberg.se

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 as well. 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:
Villeroy & Boch Gustavsberg AB, Vårgårda, Sweden

Product information

Product name:
Nautic washbasin mixer

Product identification:
RSK-number: 8278510
Part number: GB412160470, GB41216047060 (60-pack)
EAN-number: 7393792235013

Part number: GB412161470

With longer spout:
RSK-number: 8278509
Part number: GB41216047064
EAN-number: 7393792235006

Product description:
New Nautic washbasin mixer is an Energy A classified product that helps saving energy and water during the usage phase. It has soft move technology for smooth and precise handling with cold-start, only cold water when the lever is in straight forward position.

UN CPC code:
42911 - Sinks, wash-basins, baths and other sanitary ware and parts thereof, of iron, steel, copper or aluminum.

LCA information

Declared unit:
1 kg of brass mixer

Reference service life:
No RSL is declared. This EPD is based on a cradle-to-gate assessment

Time representativeness:
The LCA is based on production data from 2020 but is considered to be an average year of production.

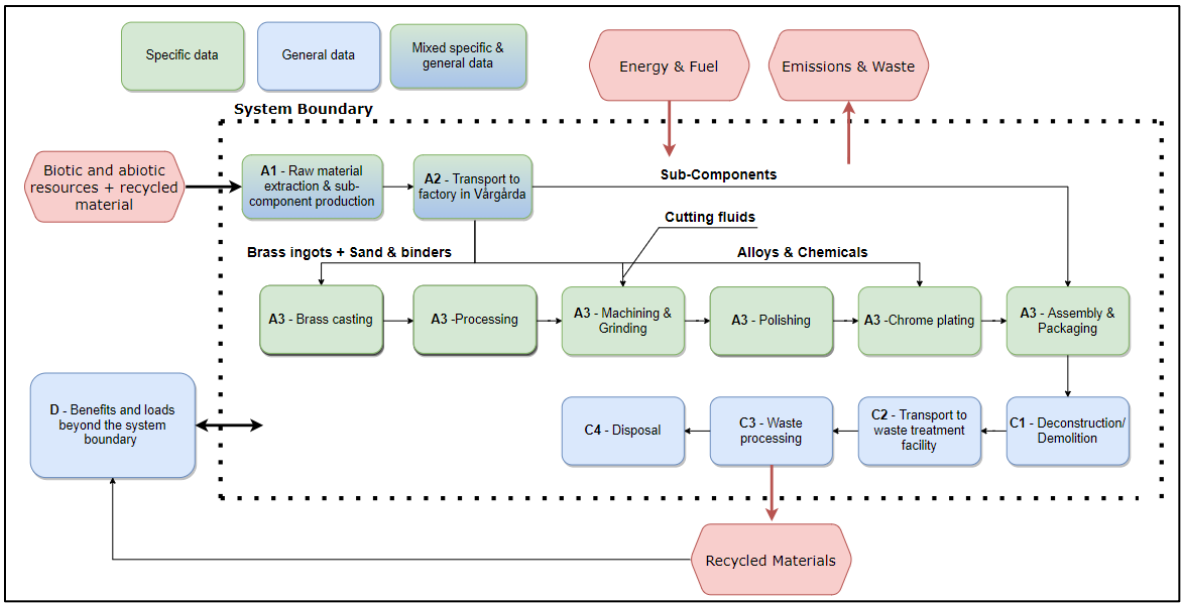
Database(s) and LCA software used:
Ecoinvent 3.7.1 and SimaPro 9.2

Description of system boundaries:
Cradle to gate with modules C1–C4 and module D (A1–A3 + C + D).

Data quality:
Raw material input, energy, water and chemical consumption from manufacturing and waste in manufacturing is primary data collected from Villeroy & Boch. A mix of specific and general data is used for extraction and refining of raw materials and components, and for transportation.

LCA practitioner:
AFRY Sweden, www.afry.com

System diagram:



	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

A1: Raw Material
This stage includes raw material extraction, including melting and forming of brass. 50% of brass is produced from recycled metals. Also, production of raw materials for components as well as component manufacturing is included. Transportation of inputs to brass production and component manufacturing is included in this module.

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 production of the brass housings for the faucets, surface treatment of the housings and assembly of the finished product. It also includes treatment of waste generated from the manufacturing processes up to the end-of-waste state. The manufacturing processes at Villeroy & Boch includes casting, machining, grinding, polishing and chrome plating. The electricity used in manufacturing is the residual electricity mix of the Swedish energy supplier Vattenfall and consists of 42% hydropower and 58% nuclear power. The climate impact of the electricity mix is 15.4 g CO2 eq./kWh.

C1: Deconstruction
This stage includes impacts related to removing the mixers at product end-of-life. The environmental impacts generated during this phase are very low and therefore can be neglected.

C2: Waste Transport
Includes the transportation of the discarded product to a waste treatment facility.

C3: Waste Processing
This stage includes sorting and recycling processes. 95% of the brass in the product is assumed to be recycled.

C4: Waste disposal
This stage includes waste disposal processes such as landfilling or incineration. Brass mixers are generally recycled at the end of their life. However, some of the non-brass metals, plastics and rubbers in the product are assumed to be landfilled or incinerated.

D: Benefits and loads outside the system boundary
This stage includes benefits and burdens associated with recovery/recycling that affects previous or future life cycles. For this product it includes benefits from the recycling of brass.

Content information

The main material in the washbasin mixer is lead-free brass (composition Cu 75-77%, Zn 19-22%, Si 2.7-3.5%, lead <0.1%). The amount of recycled metals in brass is ca. 50%. Zinc is used in the lever and other materials are used in different components.

Material	Weight per product, g	Weight per kg product, g
Lead-free brass	786.3	707.3
Zinc	125	112.4
Stainless steel	53.7	48.3
Polyamide	52.9	47.6
Steel	23	20.7
Ceramics	19.9	17.9
Polyoxymethylene (POM)	19.7	17.7
Soft PEX	18	16.2
ABS	5	4.5
EPDM	4.05	3.6
TPE	2.5	2.2
NBR	1.4	1.3
PTFE	0.2	0.18
TOTAL	**1111.7**	**1000**
Packaging materials		
Cardboard box	124	111.5

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per 1 kg of brass mixer										
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	4.91E+00	1.92E-01	3.91E-01	5.50E+00	0	1.63E-02	1.03E-03	2.74E-01	-1.52E+00
GWP-biogenic	kg CO_2 eq.	3.95E-02	2.65E-04	4.06E-02	8.04E-02	0	3.95E-05	5.27E-05	3.73E-05	4.29E-03
GWP-luluc	kg CO_2 eq.	5.42E-03	8.76E-05	2.07E-02	2.62E-02	0	5.57E-06	1.94E-06	1.78E-06	-2.21E-03
GWP-total	kg CO_2 eq.	4.96E+00	1.92E-01	4.52E-01	5.60E+00	0	1.63E-02	1.08E-03	2.74E-01	-1.52E+00
ODP	kg CFC 11 eq.	9.40E-07	4.36E-08	8.26E-08	1.07E-06	0	3.70E-09	6.42E-11	1.07E-09	-9.00E-08
AP	mol H^+ eq.	2.55E-01	2.88E-03	5.10E-03	2.63E-01	0	4.53E-05	5.95E-06	7.35E-05	-1.42E-01
EP-freshwater	kg P eq.	3.33E-02	1.03E-05	1.50E-04	3.34E-02	0	1.11E-06	9.41E-07	9.30E-07	-1.90E-02
EP-freshwater	kg PO4 eq.	1.09E-01	2.86E-04	7.90E-04	1.10E-01	0	8.09E-06	3.34E-06	3.41E-05	-6.15E-02
EP-marine	kg N eq.	1.67E-02	7.02E-04	6.79E-04	1.81E-02	0	9.43E-06	1.24E-06	3.93E-05	-8.17E-03
EP-terrestrial	mol N eq.	2.27E-01	7.78E-03	5.27E-03	2.40E-01	0	1.02E-04	1.17E-05	3.44E-04	-1.16E-01
POCP	kg NMVOC eq.	5.85E-02	2.13E-03	1.80E-03	6.24E-02	0	3.92E-05	3.27E-06	8.53E-05	-2.97E-02
ADP-minerals&metals*	kg Sb eq.	1.13E-03	3.95E-07	8.61E-06	1.14E-03	0	5.97E-08	9.43E-09	1.94E-08	-5.50E-04
ADP-fossil*	MJ	5.90E+01	2.85E+00	3.47E+01	9.65E+01	0	2.47E-01	2.05E-02	8.22E-02	-1.72E+01
WDP*	m^3	6.01E+00	7.23E-03	1.02E+00	7.03E+00	0	6.86E-04	2.06E-04	1.43E-02	-1.37E+00
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.*

Use of resources per 1 kg of brass mixer

Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
PERE	MJ	6.29E+01	3.02E+00	3.51E+01	1.01E+02	0	2.62E-01	2.15E-02	8.84E-02	-1.84E+01
PERM	MJ	0	0	0	0	0	0	0	0	0
PERT	MJ	6.29E+01	3.02E+00	3.51E+01	1.01E+02	0	2.62E-01	2.15E-02	8.84E-02	-1.84E+01
PENRE	MJ	1.14E+01	2.92E-02	1.09E+01	2.24E+01	0	3.37E-03	3.46E-03	2.23E-03	-5.06E+00
PENRM	MJ.	0	0	0	0	0	0	0	0	0
PENRT	MJ	1.14E+01	2.92E-02	1.09E+01	2.24E+01	0	3.37E-03	3.46E-03	2.23E-03	-5.06E+00
SM	kg	0.54	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0
FW	m^3	0	0	0	0	0	0	0	0	0
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 = Net use of fresh water									

Waste production and output flows

Waste production* per 1 kg of brass mixer

Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0	0	0	0	0	0	0	0	0
Non-hazardous waste disposed	kg	0	0	0	0	0	0	0	0	0
Radioactive waste disposed	kg	0	0	0	0	0	0	0	0	0

**These indicators are presented according to Environdec's guidelines on resource use and waste indicators (https://www.environdec.com/resources/indicators).*

Output flows

Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
Components for re-use	kg	0	0	0	0	0	0	0	0	0
Material for recycling	kg	0	0	0.362	0.362	0	0	0	0.664	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0	0

Information on biogenic carbon content

Results per per 1 kg of brass mixer		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	0.0199

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Additional 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.

This product is produced with ECOBRASS, CUPHIN®, CuZn21Si3P.
This alloy is approved according to DIN 50930 – 6 This alloy can be used in drinking water applications for faucets including faucet extensions.
Also, this alloy complies with 4MS, RoHS II and REACH directives.

It is important when re-cycling to separate products in ECOBRASS from normal brass components, to not contaminate the different materials.

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 (Folkeson 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.

References

EPD International (2021): General Programme Instructions for the International EPD® System. Version 4.0. www.environdec.com.

EPD International (2019): Product Category Rules (PCR) Construction products 2019:14, version 1.1

EN15804-A2:2019. Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products

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> [Accessed 27-08-2021].

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

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

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