Environmental Product Declaration

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

Nautic thermostat GB41205304 0

from

Villeroy & Boch Gustavsberg AB

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-05062
Publication date:	2021-12-13
Revision date:	2022-04-08
Valid until:	2026-12-12

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
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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
2022-04-08 Version 2
Editorial change: Corrected table headlines and changed Eco-platform logo

Company information

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

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 thermostat 160 cc lead free
Nautic thermostat 150 cc lead free
The two products are similar with the only difference being if it is 150 or 160 cc. In the LCA report, both are calculated, and in the environmental impact category that differs the most, the difference is 4%.

Product identification:
160 cc:
RSK number: 8425540
Part number: GB41205304 0
EAN number: 7393792229166

Care 160 cc:
RSK number: 8386857
Part number: GB41205304 067
EAN number: 7393792232104

Care 160 cc:
RSK number: 8425499
Part number: GB41205304 066
EAN number: 7393792229227

Care 160 cc:
RSK number: 8426592

Part number: GB41205352 0
EAN number: 7393792229333

150 cc:
RSK number 8425541
Part number: GB41215304 0
EAN number: 7393792229159

Care 150 cc:
RSK-number: 8425538
Part number: GB41215304 067
EAN number: 7393792232098

Care 150 cc:
RSK number: 8425539
Part number: GB41215304 066
EAN number: 7393792228619

Product description:
Nautic thermostat is an Energy A classified product that, saves energy and water during the usage phase. It comes in two versions, 160 cc and 150 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 aluminum.

LCA information

Declared unit:
1 kg of thermostat (shower set not included in EPD)

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.

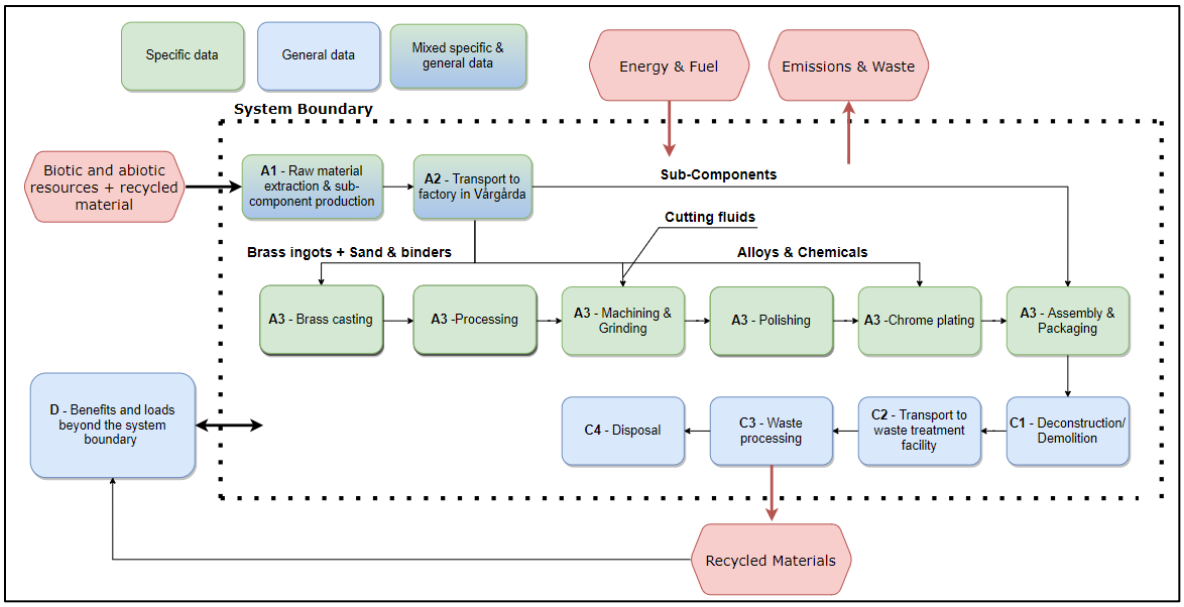
Database(s) and LCA software used:
Ecoinvent 3.7.1 and SimaPro 9.2

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 for Nautic thermostat 160cc lead free without showerset

The main material in the thermostat is lead-free brass (composition Cu 75-77%, Zn 19-22%, Si 2.7-3.5%, lead <0.1%). Other materials are used in different components.

Material	Weight per product, g	Weight per kg product, g
Lead-free brass	1642.9	938.8
ABS	32.6	18.6
Polysulfone	28.5	16.3
POM	17.7	10.1
PA (GLO)	5.4	3.1
Syntethic rubber	3.7	2.1
Polyphenylene sulfide	2.5	1.4
Aluminium oxide	4.6	2.6
Stainless steel	10.5	6.0
TOTAL	**1.75**	**1000**
Packaging materials		
Cardboard box	130	74.3

Environmental Information for Nautic thermostat 160 cc lead free without showerset

Potential environmental impact – mandatory indicators according to EN 15804

Results per 1 kg of thermostat										
Indicator	**Unit**	**A1**	**A2**	**A3**	**Tot.A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	4,11E+00	1,59E-01	3,69E-01	4,64E+00	0	1,63E-02	1,03E-03	1,30E-01	-2,04E+00
GWP-biogenic	kg CO_2 eq.	-1,36E-02	3,17E-04	4,43E-02	3,10E-02	0	3,95E-05	5,27E-05	1,69E-05	5,76E-03
GWP-luluc	kg CO_2 eq.	5,25E-03	5,38E-05	2,05E-02	2,58E-02	0	5,57E-06	1,94E-06	7,79E-07	-2,96E-03
GWP-total	kg CO_2 eq.	4,10E+00	1,60E-01	4,34E-01	4,69E+00	0	1,63E-02	1,08E-03	1,30E-01	-2,04E+00
ODP	kg CFC 11 eq.	2,43E-07	3,82E-08	7,97E-08	3,61E-07	0	3,70E-09	6,42E-11	4,04E-10	-1,21E-07
AP	mol H^+ eq.	3,29E-01	9,99E-04	4,98E-03	3,35E-01	0	4,53E-05	5,95E-06	3,25E-05	-1,90E-01
EP-freshwater	kg P eq.	4,38E-02	1,02E-05	1,40E-04	4,40E-02	0	1,11E-06	9,41E-07	4,18E-07	-2,55E-02
EP-freshwater	kg PO4 eq.	1,42E-01	1,26E-04	7,27E-04	1,43E-01	0	8,09E-06	3,34E-06	1,58E-05	-8,26E-02
EP-marine	kg N eq.	1,94E-02	2,37E-04	6,17E-04	2,02E-02	0	9,43E-06	1,24E-06	1,78E-05	-1,10E-02
EP-terrestrial	mol N eq.	2,73E-01	2,61E-03	4,88E-03	2,81E-01	0	1,02E-04	1,17E-05	1,54E-04	-1,56E-01
POCP	kg NMVOC eq.	7,03E-02	8,23E-04	1,71E-03	7,28E-02	0	3,92E-05	3,27E-06	3,78E-05	-3,98E-02
ADP-minerals&metals*	kg Sb eq.	1,27E-03	3,83E-07	8,50E-06	1,28E-03	0	5,97E-08	9,43E-09	8,66E-09	-7,38E-04
ADP-fossil*	MJ	4,95E+01	2,53E+00	3,44E+01	8,64E+01	0	2,47E-01	2,05E-02	3,20E-02	-2,31E+01
WDP*	m^3	3,99E+00	7,59E-03	1,01E+00	5,00E+00	0	6,86E-04	2,06E-04	6,47E-03	-1,84E+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 kg thermostat

Indicator	Unit	A1	A2	A3	Tot.A1-A3	C1	C2	C3	C4	D
PERE	MJ	5,28E+01	2,68E+00	3,47E+01	9,03E+01	0	2,62E-01	2,15E-02	3,46E-02	-2,47E+01
PERM	MJ	0	0	0	0	0	0	0	0	0
PERT	MJ	5,28E+01	2,68E+00	3,47E+01	9,03E+01	0	2,62E-01	2,15E-02	3,46E-02	-2,47E+01
PENRE	MJ	1,21E+01	2,98E-02	1,07E+01	2,29E+01	0	3,37E-03	3,46E-03	1,00E-03	-6,80E+00
PENRM	MJ.	0	0	0	0	0	0	0	0	0
PENRT	MJ	1,21E+01	2,98E-02	1,07E+01	2,29E+01	0	3,37E-03	3,46E-03	1,00E-03	-6,80E+00
SM	kg	0.73	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 kg thermostat

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 per kg thermostat

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	0.49	0.49	0	0	0	0.89	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 kg thermostat		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	0.015

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

Additional information

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 compliance with 4MS, RoHS II and REACH directives. Important to recycle this material separately from normal brass components.

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].

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

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