

Owner: VOLA A/S  
No.: MD-18006-EN  
ECO EPD: 00000729  
Issued: 13-06-2018  
Valid to: 13-06-2023

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3<sup>rd</sup> PARTY VERIFIED

**EPD**

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VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804



**Owner of declaration**

VOLA A/S  
Lunavej 2  
8700 Horsens



**Issued:**  
13-06-2018

**Valid to:**  
13-06-2023

**Programme operator**

Danish Technological Institute  
www.dti.dk



**Basis of calculation**

This EPD is developed in accordance with the European standard EN 15804.

**Comparability**

EPDs of construction products may not be comparable if they do not comply with the requirements in EN 15804. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database.

**Programme**

EPD Danmark  
www.epddanmark.dk



**Validity**

This EPD has been verified in accordance with ISO 14025 and is valid for 5 years from the date of issue.

**Use**

The intended use of an EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings.

**Declared products**

4311 – chromed brass  
4311 – stainless steel  
4911 – chromed brass  
4911 – stainless steel  
HV1EN – chromed brass  
HV1EN – stainless steel

**EPD type**

- Cradle-to-gate
- Cradle-to-gate with options
- Cradle-to-grave

**Production site**

VOLA A/S  
Lunavej 2  
8700 Horsens  
Denmark

CEN standard EN 15804 serves as the core PCR
Independent verification of the declaration and data, according to EN ISO 14025
<input type="checkbox"/> internal <input checked="" type="checkbox"/> external
Third party verifier:  <hr/> Kim Christiansen

**Products use**

VOLA basin mixer tap, build-in basin tap or mixer - all with on-off sensor are used in bathrooms etc.

**Declared unit**

1 fixture



Henrik Fred Larsen  
EPD Danmark

Life cycle stages and modules (MND = module not declared)																	
Product			Construction process		Use								End of life				Beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport	Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Re-use, recovery and recycling potential	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
<b>X</b>	<b>X</b>	<b>X</b>	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	

# Product information

## Product description

The main product components are shown in the table below. Values are given as intervals covering the six declared product variations. Specific recipes and some input materials (0-2 mass-%) are not shown in this table due to reasons of confidentiality.

Material	Weight-% of declared product
Brass	16-70
Stainless steel	1-57
Galvanised steel	0-20
Steel	0-14
PE	6-9
Electronics	3-9
ABS	2-5
PE foam	0-4
EPDM	0-2
Packaging material	kg per declared unit
Cardboard	0.2-1,3
Paper	0.02-0.05
LDPE	0.01-0,06

## Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of 1 fixture from VOLA on the production site located in Denmark. Product specific data are based on average values covering the period from 01.01.2016 to 31.12.2016. Background data are based on GaBi and are less than 10 years old. Only in a few cases are GaBi 8.2 data supplemented with data from Ecoinvent 3.3. Generally, the used background datasets are of high quality, and the majority of the datasets are only a few of years old.

## Dangerous substances

Our products do not contain substances listed in the "Candidate List of Substances of Very High Concern for authorisation"

(<http://echa.europa.eu/candidate-list-table>)

## Essential characteristics (CE)

There is no harmonized specification but VOLA fixtures are covered by difference technical specification example EN 817.

VOLA produces according to relevant product standards. Components which are in contact with water are produced in lead-free brass, according to 4MS and California Assembly Bill AB1953.

Components in stainless steel are produced in material according to EN10088-3:2014 and AISI316 (American Iron and Steel Institute)

Further technical information can be obtained by contacting the manufacturer or on the manufacturers website:

<http://www.vola.com>

Reference Service Life (RSL)

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

Product illustrations

4311



4911



HV1EN



# LCA background

## Declared unit

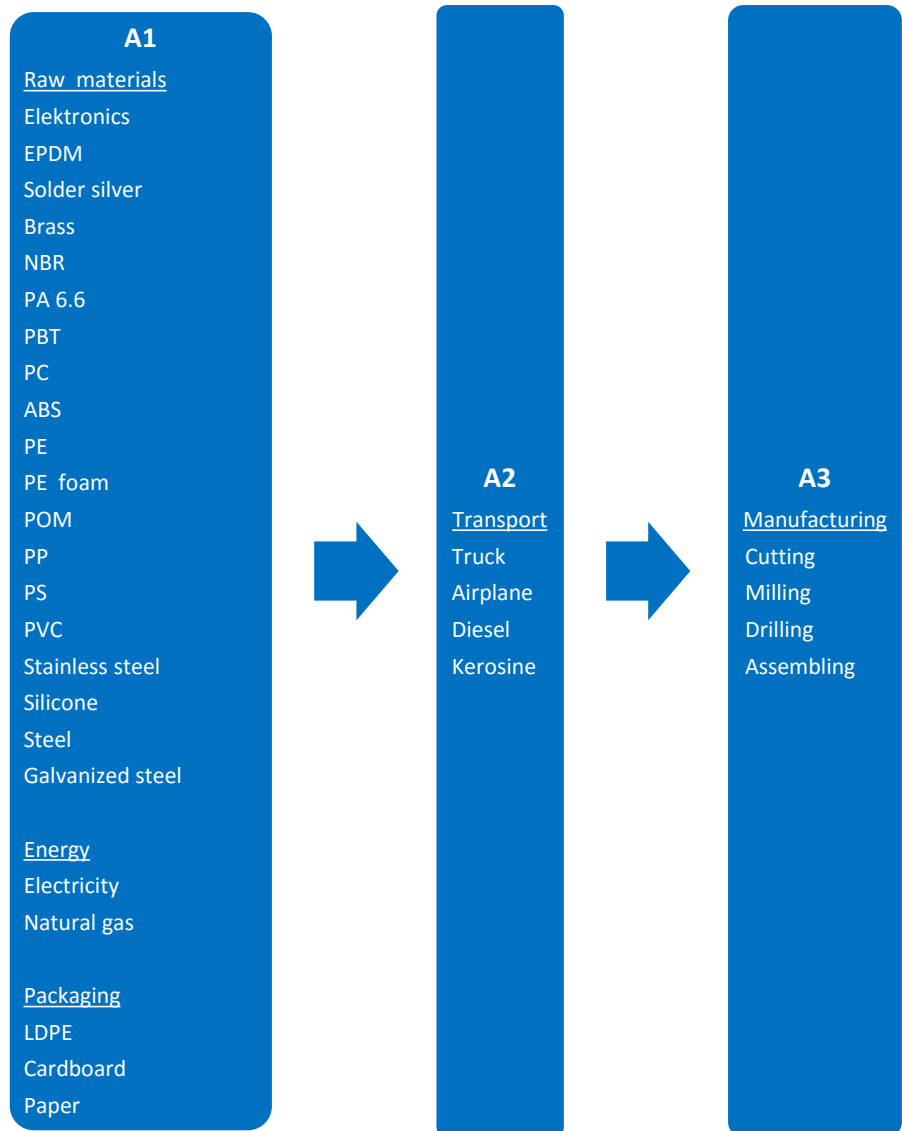
The LCI and LCIA results in this EPD relates to 1 fixture from VOLA for the types: VOLA 4311 – chromed brass, VOLA 4311 – stainless steel, VOLA 4911 - chromed brass, VOLA 4911 - stainless steel, VOLA HV1EN - chromed brass and VOLA HV1EN - stainless steel.

Name	Value	Unit
Declared unit	1	piece
4311 – chromed brass	4,67	kg/piece
4311 – stainless steel	4,64	kg/piece
4911 – chromed brass	6,62	kg/piece
4911 – stainless steel	6,56	kg/piece
HV1EN – chromed brass	2,68	kg/piece
HV1EN – stainless steel	2,50	kg/piece
Conversion factor to 1 kg.	0.15-0.40	-

## PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804.

Flow diagram



**System boundary**

This EPD is based on a cradle-to-gate LCA, in which >99 weight-% has been accounted for.

The general rules for the exclusion of inputs and outputs follows the requirements in EN 15804, 6.3.5, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of energy usage and mass for unit processes.

**Product stage (A1-A3) includes:**

- A1 – Extraction and processing of raw materials
- A2 – Transport to the production site
- A3 – Manufacturing processes

The product stage comprises the acquisition of all raw materials, products and energy, transport to the production site, packaging and waste processing up to the "end-of-waste" state or final disposal. The LCA results are declared in aggregated form for the product stage, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3.

Virtually all components are manufactured in Denmark. The raw material and few purchased components are mostly from Europe. From solid brass/stainless steel rods or pipes, components are rotated, drilled or milled on CNC machines.

Subsequently, the components are ground/polished to create a unique surface, either by manual or automatic processes. Some components are hand-soldered or soldered by induction.

The finished polished components are treated with a surface finish depending on the finish the customer wishes.

Production is based on LEAN-production, where stocks are minimized and where products are put into production as soon as they are sold (Make to order, MTO).

Each fixture is tested individually before it is packaged and shipped to the world.

VOLA A/S is certified according to the quality standards ISO 9001:2015, ISO 14001:2015 (environment) and OHSAS 18001:2008 (work environment).

# LCA results

ENVIRONMENTAL IMPACTS PER FIXTURE							
Parameter	Unit	4311 chromed brass	4311 stainless steel	4911 chromed brass	4911 stainless steel	HV1EN-chromed brass	HV1EN stainless steel
		A1-A3	A1-A3	A1-A3	A1-A3	A1-A3	A1-A3
GWP	[kg CO <sub>2</sub> -eq.]	4,39E+01	3,23E+01	6,87E+01	5,31E+01	4,19E+01	3,16E+01
ODP	[kg CFC11-eq.]	1,04E-06	3,15E-07	1,78E-06	7,52E-07	1,15E-06	1,20E-07
AP	[kg SO <sub>2</sub> -eq.]	6,48E-01	4,29E-01	1,28E+00	9,64E-01	7,57E-01	2,18E-01
EP	[kg PO <sub>4</sub> <sup>3-</sup> -eq.]	4,05E-01	2,63E-01	8,30E-01	6,24E-01	4,86E-01	1,04E-01
POCP	[kg ethene-eq.]	3,20E-02	2,17E-02	6,12E-02	4,65E-02	3,58E-02	1,16E-02
ADPE	[kg Sb-eq.]	6,96E-03	5,20E-03	1,42E-02	1,16E-02	8,43E-03	3,26E-03
ADPF	[MJ]	5,27E+02	4,09E+02	7,97E+02	6,40E+02	4,75E+02	3,79E+02
Caption	GWP = Global warming potential; ODP = Ozone depletion potential; AP = Acidification potential of soil and water; EP = Eutrophication potential; POCP = Photochemical ozone creation potential; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources						

RESOURCE USE PER FIXTURE							
Parameter	Unit	4311 chromed brass	4311 stainless steel	4911 chromed brass	4911 stainless steel	HV1EN chromed brass	HV1EN stainless steel
		A1-A3	A1-A3	A1-A3	A1-A3	A1-A3	A1-A3
PERE	[MJ]	2,14E+02	1,99E+02	3,03E+02	2,91E+02	1,54E+02	1,64E+02
PERM*	[MJ]	2,20E+01	2,20E+01	2,10E+01	2,10E+01	3,52E+00	3,52E+00
PERT	[MJ]	2,27E+02	2,12E+02	3,16E+02	3,04E+02	1,67E+02	1,77E+02
PENRE	[MJ]	5,71E+02	4,28E+02	8,68E+02	6,78E+02	5,15E+02	3,97E+02
PENRM**	[MJ]	2,19E+01	2,19E+01	2,74E+01	2,74E+01	1,43E+01	1,43E+01
PENRT	[MJ]	5,85E+02	4,42E+02	8,82E+02	6,92E+02	5,29E+02	4,11E+02
SM	[kg]	-	-	-	-	-	-
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 <sup>3</sup> ]	3,21E-01	2,17E-01	5,34E-01	3,87E-01	3,28E-01	1,80E-01
Caption	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 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						

\* Contribution from packaging material per product type: All      \*\* Contribution from packaging material per product type: 2,4 MJ (4311); 2,6 MJ (4911) and 0,41 MJ (HV1EN)

OUTPUT FLOWS AND WASTE CATEGORIES PER FIXTURE							
Parameter	Unit	4311 chromed brass	4311 stainless steel	4911 chromed brass	4911 stainless steel	HV1EN chromed brass	HV1EN stainless steel
		A1-A3	A1-A3	A1-A3	A1-A3	A1-A3	A1-A3
HWD	[kg]	3,81E-06	3,74E-06	4,28E-06	4,18E-06	3,31E-06	3,20E-06
NHWD	[kg]	6,59E-01	1,21E+00	9,01E-01	1,71E+00	6,49E-01	2,25E+00
RWD	[kg]	1,04E-02	1,12E-02	1,42E-02	1,59E-02	8,25E-03	1,20E-02
CRU	[kg]	-	-	-	-	-	-
MFR	[kg]	-	-	-	-	-	-
MER	[kg]	-	-	-	-	-	-
EEE	[MJ]	-	-	-	-	-	-
EET	[MJ]	-	-	-	-	-	-
Caption	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; EEE = Exported electrical energy; EET = Exported thermal energy						



## Additional information

### Indoor air

*The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonized test methods according to the provisions of the respective technical committees for European product standards are not available.*

### Soil and water

*The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonized test methods according to the provisions of the respective technical committees for European product standards are not available.*

## References

<b>Publisher</b>	 <a href="http://www.epddanmark.dk">http://www.epddanmark.dk</a>
<b>Program operator</b>	Danish Technological Institute Sustainable Construction Kongsvang Allé 29 DK-8000 Aarhus C <a href="http://www.teknologisk.dk">http://www.teknologisk.dk</a>
<b>LCA-practitioner</b>	Danish Technological Institute Sustainable Construction Gregersensvej DK-2630 Taastrup <a href="http://www.teknologisk.dk">http://www.teknologisk.dk</a>
<b>LCA software /background data</b>	Thinkstep GaBi 8.2 2017 incl. databases + Ecoinvent 3.3 2017  <a href="http://www.gabi-software.com">http://www.gabi-software.com</a> <a href="http://www.ecoinvent.org">http://www.ecoinvent.org</a>
<b>3<sup>rd</sup> party verifier</b>	Kim Christiansen – kimconsult.dk

### General program instructions

Version 1.9

[www.epddanmark.dk](http://www.epddanmark.dk)

#### EN 15804

DS/EN 15804 + A1:2013 - "Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products"

#### EN 15942

DS/EN 15942:2011 – " Sustainability of construction works – Environmental product declarations – Communication format business-to-business"

#### ISO 14025

DS/EN ISO 14025:2010 – " Environmental labels and declarations – Type III environmental declarations – Principles and procedures"

#### ISO 14040

DS/EN ISO 14040:2008 – " Environmental management – Life cycle assessment – Principles and framework"

#### ISO 14044

DS/EN ISO 14044:2008 – " Environmental management – Life cycle assessment – Requirements and guidelines"