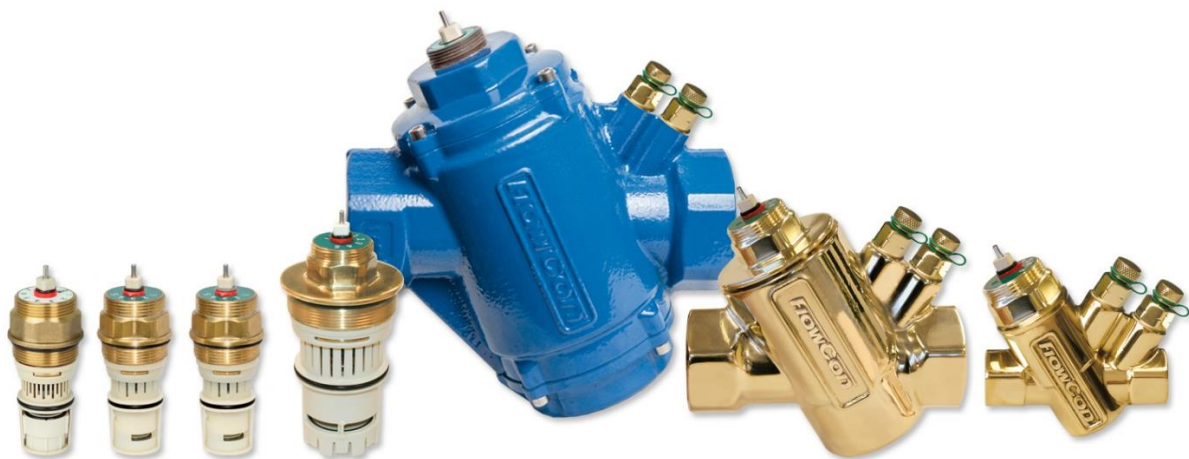


Owner: FlowCon International ApS
No.: MD-23227-EN
Issued: 15-10-2024
Valid to: 15-10-2029

3rd PARTY VERIFIED

EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804



Owner of declaration

FlowCon International ApS,
Trafikcenter Allé 17, 4200
Slagelse, Denmark
VAT nr.:DK79300918



Issued:
15-10-2024

Valid to:
15-10-2029

Programme

EPD Danmark
www.epddanmark.dk



- Industry EPD
- Product EPD

Basis of calculation

This EPD is developed and verified in accordance with the European standard EN 15804+A2.

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.

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.

EPD type

- Cradle-to-gate with modules C1-C4 and D
- Cradle-to-gate with options, modules C1-C4 and D
- Cradle-to-grave and module D
- Cradle-to-gate
- Cradle-to-gate with options

Declared product(s)

This EPD include 4 data sets covering FlowCon's Green product series.

1. One data set covering the inserts Green.0, Green.1, and Green.1HF. The results are shown as an average. This data set has to be combined, with either the AB15.B.I, AB20.B.I or AB25.B.I.K housing.
2. One data set covering Green.2 This data set has to be combined with either AB25.B.I or AB32.B.I housing.
3. One data set covering the fixed insert and housing combination Green.3.41.B.I and G.3.51.B.I. The results are shown as an average.
4. One data set covering the housings AB15.B.I, AB20.B.I, AB25.B.I.K, AB25.B.I and AB32.B.I. The housings are shown in one dataset, where a scaling factor is used to adjust to different sizes.

FlowCon's Green products are typically combined with an actuator which is not declared in this EPD.

Production site

FlowCon International ApS, Trafikcenter Allé 17, 4200 Slagelse, Denmark

Use of Guarantees of Origin

- No certificates used
- Electricity covered by GoO
- Biogas covered by GoO

Declared/ functional unit

Name	Value	Unit
Declared unit	1	Piece
Product name	Weight	Unit
Green.0	0,17	Kg/piece
Green.1	0,17	Kg/piece
Green.1HF	0,17	Kg/piece
Green.2	0,42	Kg/piece
Green.33.41.B.I	2,55	Kg/piece
Green.3.51.B.I	2,97	Kg/piece
Housing	0,34-1,25*	Kg/piece

**scaling factor for housings can be found on page 17.*

Year of production site data (A3)

2022

EPD version 1

15-10-2024

CEN standard EN 15804 serves as the core PCR, and PCR Part B: Requirements on the EPD for control valves as additional 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:  Linda Høiby


 Martha Katrine Sørensen
 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
X	X	X	MND	MND	MND	MND	MND	MND	MND	X	MND	X	X	X	X	X

Product information

Product description

The products are used to optimize hydronic HVAC (heating, ventilation, air conditioning) systems and thereby reduce the environmental footprint caused by temperature control of buildings. FlowCon Green is designed as a 3-in-1 solution combining a full-stroke modulating control valve, an automatic balancing valve, and a differential pressure control valve into one PICV (Pressure Independent Control Valve).

FlowCon Green is used to control airflow in heating or cooling waterborne HVAC systems. Green is a range of two-way pressure independent control valves (PICV), modulating to accept digital or analog input signals. Each valve has an external adjustable maximum flow rate setting. The products Green.0/1/1HF/2 are insert-based models, which have to be combined with a housing and the product Green.3 is a one-unit valve, which is a fixed combination of insert and housing.

For all Green products, the choice of valve actuator is up to customer choice. The actuator is not part of this EPD.

Following products are covered in this EPD:

Type of Valve	Housing size	DN Range
Green.0,.1,.1HF	AB (1/2"-1")	DN15-25
Green.2	AB (1"-1 1/4")	DN25-32
Green.3	(1 1/2"-2")	DN40-50

The main product components (without housings) are shown in the table below.

Material	Weight-% of declared product		
	Green.0/.1/.1HF	Green.2	Green.3
Brass	85%	84%	3%
Ductile Iron	-	-	86%
GFRP ¹	5%	7%	9%
Plastic	5%	4%	0%
Rubber	3%	2%	1%
Stainless steel	2%	3%	1%

All declared housings consist of 100% brass.

Application

Heating or cooling HVAC application.

All Green valves are PN25 rated (describing the static pressure the valve can handle, here PN25

is equal to 25 bar of static pressure) and work with water or water/glycol mixture in a media temperature range from -20° to +120°C. See technical data for further information.

Technical data

All Green valves are tested and comply with Pressure Equipment Directive (PED) 2014/68/EU and harmonized standards EN12266, EN12165 and EN10204. They adhere to PED's Article 4, Paragraph 3 (Sound Engineering Practice) and consequently do not bear the CE mark.

Performance data of the product with respect to its characteristics are in accordance with the relevant technical provision.

	Green.0-2	Green.3
Max valve capacity, Kvs. (m ³ /h)	Kv (opening area) changes automatically depending on system pressure changes	
Flow rates (l/sec)	0,0103-1,29	0,528-3,79
Max. operational pressure	800 kPaD	
Number of ports -	2	2
Liquid temperature range °C	-20 to +120	
Ambient temperature range °C	+1 to +50	

Delivery status

The valves are delivered fully assembled in a cardboard box including packaging film to Europe. The products are delivered by trucks (EURO6).

Representativity

This declaration includes the assembling of Green.0-3 and housings on the production site located in Slagelse (module A3) where primary producer data has been used. A major part of material extraction and component production (A1) happens in China and other locations in Europe. Mainly generic data has been used in the modelling of A1, as no information on how the actual production happens is available. As a consequence of this, global averages for recycled input material have been used. For brass for housings primary data on forging waste has been

¹ Glass fibre reinforcement plastic

available and has therefore been included in the calculation. Data are collected in 2023 from production in January 2022 to December 2022 (averaged data). Background data are based on Ecoinvent version 3.10, EN 15804 cut-off, and is less than 10 years old. Generally, the used background datasets are of high quality, and all datasets have been updated within the last three years. The ecoinvent database has been downloaded as an excel and the calculations have been done in that excel. These calculations have not been verified.

Manufacture

The Green products are tested, assembled, stored and packed at FlowCon, before shipping.

Product packaging

The composition of the sales- and transport packaging of the products are shown in the table below.

Product	Green.0,1 ,1HF	Green.2	Green.3
Material	Packaging	Packaging	Packaging
Cardboard	0,021 kg	0,06 kg	0,51
Plastic foil	0,009 kg	0,005 kg	-
Total	0,02 kg	0,06 kg	0,51

Condition of use

During maintenance and valve use, there are no additional costs nor impacts for auxiliary materials or consumables. Regular maintenance is recommended to ensure that the product lasts at least 10 years. For more specific information about the expected service life in your particular situation, please contact the supplier.

Extraordinary effects

Due to the predominant use of brass and/or ductile iron which is considered nonflammable or flame retardant, no additional influence on the environment in case of fire is to be expected.

No change to the product is expected as a result of unforeseeable influences of water.

No impacts on the environment are expected in the case of an unforeseeable mechanical deconstruction.

Hazardous substances

The product contains lead at levels above 0,1%. Lead (CAS no: 7439-92-1) is in the "Candidate List of Substances of Very High Concern for authorization"²

Lead in brass alloys are under an exemption according to the Copper Development Association³.

Substance	Weight % of declared product
Lead (G.0)	1,706%
Lead (G.1)	1,703%
Lead (G.1HF)	1,691%
Lead (G.2)	1,689%
Lead (G.3)	0,020%
Lead (Housings)	2%

Picture of product(s)



Figure 1 Range of Green products (including inserts and housing, which are declared in this EPD).



Figure 2 Composition of the green-series, the left is showing different parts of the insert, the bottom left the housing. The actuator (above the housing), which also can be seen is not part of the EPD.

² <http://echa.europa.eu/candidate-list-table>

³ <https://copper.org/applications/rodbar/pdf/a1388-RoHS-FAQ.pdf>

LCA background

Declared unit

This EPD is an average EPD covering four inserts (Green.0, Green.1, Green.1HF and Green.2) and five housings. The housings AB15.B.I, AB20.B.I, and AB25.B.I.K can on customer choice be combined with Green.0, Green.1, and Green.1HF. Housing AB25.B.I and AB32.B.I must be combined with insert Green.2. Furthermore, the EPD covers the fixed insert and housing combination of Green.3.41.B.I and Green.3.51.B.I.

Name	Value	Unit
Declared unit	1	Piece
Product name	Weight [kg/piece]	Conversion factor to 1 kg
Green.0	0,17	5,88
Green.1	0,17	5,88
Green.1HF	0,17	5,88
Green.2	0,42	2,38
Green.3.41.B.I	2,55	0,39
Green.3.51.B.I	2,97	0,34

Name	Value	
Declared unit	1 housing (1 piece)	
Product name	Weight [kg/piece]	Scaling factor to 1 piece
AB15.B.I	0,34	1
AB20.B.I	0,37	1,11
AB25.B.I.K	0,53	1,58
AB25.B.I	1,42	4,21
AB32.B.I	1,25	3,69

Functional unit

Not defined.

PCR

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

Energy modeling principles

Foreground system:

The products are produced without using energy covered by GO's. The energy process at FlowCon is modeled using electricity, medium voltage, residual mix for Denmark.

Background system:

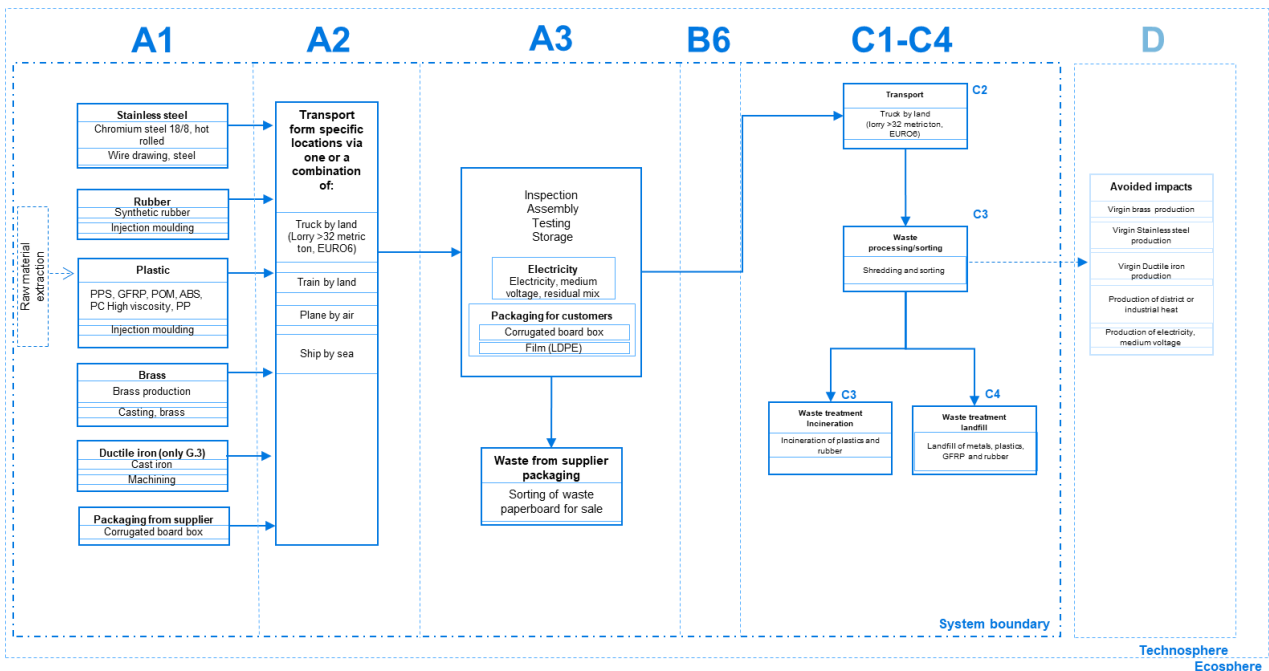
Upstream and downstream processes are modelled using electricity grid mix.

Geographical area

The geographical area is Europe.

Flow diagram

Green: G.0, G.1, G1HF, G2, G3



System boundary

This EPD is based on a cradle-to-gate LCA with B6, and modules C1-C4 and D (EN 15804+A2), in which 100% of the weight has been accounted for.

The general rules for the exclusion of inputs and outputs follows the requirements in EN 15804+A2, 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.

The excluded processes are the following:

Material/process	Unit	Estimated % of total mass/energy
Waste for Green.0-2 Valves in A3, happening at FlowCon	%	0,15 % (mass)
Waste for Green.3 Valves in A3, happening at FlowCon	%	0,05 % (mass)
Energy use in C1	%	Below 1%
Water use in A3	%	Below 1%

Production stage (A1-A3) includes:

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

The production stage **(A1)** 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, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3. The different components are modeled based on information on the location of the supplier. For the metals in the valves, the scrap content has been adjusted to reflect the current global recycled input rate for brass.

The transportation **(A2)** of goods from production in A1 to FlowCon in Denmark varies depending on the location of the supplier. It can involve transportation by truck, air, sea, rail, or a combination of those.

In general, the components of the Green products are premanufactured at different locations. They are assembled, tested and stored at FlowCon in Denmark. Energy used for testing and overhead has been included in the EPD under module **(A3)**. Furthermore, heating of FlowCons facility by natural gas has been included. The waste treatment of the cardboard the components are delivered in, are waste treated in A3 for all declared products.

Installation process A5 includes:

The construction process (A4 and A5) stages are not declared in this study. Hence, waste treatment of packaging material from FlowCon to the customer is not included. However, technical information regarding amount of CO2 eq. leaving the product system is stated in the table below. The packaging for housing is included in the inserts, why housing is not shown below.

Declared product	Waste material	Amount [kg CO2 eq.]
G.0, G.1, G.1HF	Cardboard	3,56E-02
G.2	Cardboard	1,02E-01
G.3	Cardboard	8,57E-01

B6 Energy use to operate building integrated technical systems includes:

No energy consumption of the valves. The energy consumption is related to the actuators which are not included in this EPD.

End of Life (C1-C4) includes:

The end-of-life stage includes:

- C1 - Deconstruction and demolition
- C2 - Transport to waste processing
- C3 - Waste processing for reuse, recovery and/or recycling
- C4 - Disposal

The deconstruction of the products is assumed to be done manually. As a result, no processes have been added to module C1. The valves are sold on the European market, in this EPD the transportation distance, technology and waste processing are modelled according to an average European scenario.

70% of the valves are assumed collected as a metal fraction and shredded and sorted at a recycling facility. The plastic, rubber and GFRP component inside the valve are assumed to be sorted away from the metal fractions and incinerated. 30% are assumed collected with mixed waste ending up at landfill.

The recycling, incineration, and landfill rates are shown in the table below:

Material fraction	Recycling rate [%]	Incineration [%]	Landfill [%]
Metals	70	0	30
Plastics	0	70	30
Rubber	0	70	30
GFRP	0	70	30

Re-use, recovery and recycling potential (D) includes:

The benefits and loads include:

- D, potential benefits from recycling and recovery outside the scope of the study
- D, potential loads related to processing to reach equivalent materials to virgin input material.

In this study, the recycling of the main components – brass, ductile iron and stainless steel is credited. Credit is only given to the net production of primary material. The loss rates from the sorting processes are taken into account when calculating the benefits of the avoided material extraction. Rubber and small fractions of plastic are incinerated with energy recovery and heat and electricity from this process is credited in module D.

LCA results

Usage and combination of LCA Results

Results from "Average for Green.0, Green.1, and Green.1HF" dataset should be combined with the results from the "Housing" dataset for the customer choice combination related to housing.

For the housing results, a scaling factor should be applied to the results based on the specific housing used.

Results from the dataset "Green 2" should also be combined with the "Housing" dataset, using the appropriate scaling factor.

The housings AB15.B.I, AB20.B.I, and AB25.B.I.K can be combined with Green.0, Green.1, and Green.1HF based on the customer choice of combination. Housing AB25.B.I and AB32.B.I should be combined with the Green.2 insert.

Neither the Green.0, Green.1, Green.1HF, and Green.2 inserts, nor the housing datasets should be used alone. A combination of datasets is always required for the consumer choice.

Data from "Average for Green 3" is used alone, as it represents a combined solution.

This EPD does not include the environmental impacts of Actuators, find a separate Environmental Product Declaration (EPD) for the used actuator, if available.

Average for Green.0, Green.1 and Green.1HF

ENVIRONMENTAL IMPACTS PER DU (1 AVERAGE PIECE) – GREEN.0, GREEN.1, GREEN.1HF								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ eq.]	1,12E+00	0,00E+00	0,00E+00	3,29E-03	1,23E-01	1,32E-03	-2,69E-01
GWP-fossil	[kg CO ₂ eq.]	1,15E+00	0,00E+00	0,00E+00	3,28E-03	1,21E-01	1,32E-03	-2,66E-01
GWP-biogenic ²	[kg CO ₂ eq.]	-2,74E-02	0,00E+00	0,00E+00	1,65E-06	1,56E-03	6,20E-06	-2,38E-03
GWP-luluc	[kg CO ₂ eq.]	2,88E-03	0,00E+00	0,00E+00	1,17E-06	2,36E-05	1,68E-07	-4,99E-04
ODP	[kg CFC 11 eq.]	1,66E-08	0,00E+00	0,00E+00	6,85E-11	1,88E-10	1,69E-11	-2,55E-09
AP	[mol H ⁺ eq.]	4,42E-02	0,00E+00	0,00E+00	7,76E-06	1,39E-04	5,75E-06	-1,76E-02
EP-freshwater	[kg P eq.]	3,41E-03	0,00E+00	0,00E+00	2,31E-07	7,90E-06	8,02E-07	-1,40E-03
EP-marine	[kg N eq.]	2,99E-03	0,00E+00	0,00E+00	2,04E-06	6,23E-05	2,84E-06	-9,36E-04
EP-terrestrial	[mol N eq.]	3,72E-02	0,00E+00	0,00E+00	2,20E-05	3,94E-04	1,65E-05	-1,28E-02
POCP	[kg NMVOC eq.]	1,09E-02	0,00E+00	0,00E+00	1,35E-05	1,15E-04	6,11E-06	-3,60E-03
ADPm ¹	[kg Sb eq.]	5,69E-04	0,00E+00	0,00E+00	9,39E-09	4,25E-07	1,62E-09	-2,42E-04
ADPf ¹	[MJ]	1,62E+01	0,00E+00	0,00E+00	4,93E-02	2,23E-01	1,27E-02	-3,44E+00
WDP ¹	[m ³ world eq. deprived]	7,51E-01	0,00E+00	0,00E+00	2,48E-04	6,52E-03	8,82E-05	-2,26E-01
Caption	GWP-total = Globale Warming Potential - total; 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 = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water depletion potential							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112.							
Disclaimer	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. ² The results of this indicator do not amount to 0. This is caused by the contribution of background processes. The results directly related to the declared product are equal to 0 across the life cycle.							

ADDITIONAL ENVIRONMENTAL IMPACTS PER DU (1 AVERAGE PIECE) – GREEN.0, GREEN.1, GREEN.1HF								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
PM	[Disease incidence]	1,25E-07	0,00E+00	0,00E+00	3,20E-10	6,74E-09	8,79E-11	-4,17E-08
IRP ²	[kBq U235 eq.]	1,12E-01	0,00E+00	0,00E+00	5,99E-05	1,63E-03	2,24E-05	-3,56E-02
ETP-fw ¹	[CTUe]	6,75E+01	0,00E+00	0,00E+00	1,17E-02	7,08E-01	2,37E-02	-2,54E+01
HTP-c ¹	[CTUh]	1,08E-08	0,00E+00	0,00E+00	2,10E-11	1,64E-10	3,14E-12	-3,37E-09
HTP-nc ¹	[CTUh]	4,41E-07	0,00E+00	0,00E+00	3,25E-11	1,83E-09	1,60E-11	-1,85E-07
SQP ¹	-	1,72E+01	0,00E+00	0,00E+00	4,96E-02	2,34E-01	2,96E-02	-5,82E+00
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112.							
Disclaimers	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.							
	² This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.							

RESOURCE USE PER DU (1 AVERAGE PIECE) – GREEN.0, GREEN.1, GREEN.1HF								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
PERE	[MJ]	2,40E+00	0,00E+00	0,00E+00	7,82E-04	2,64E-02	3,17E-04	-8,84E-01
PERM	[MJ]	2,18E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	2,62E+00	0,00E+00	0,00E+00	7,82E-04	2,64E-02	3,17E-04	-8,84E-01
PENRE	[MJ]	1,52E+01	0,00E+00	0,00E+00	4,93E-02	2,23E-01	1,27E-02	-3,44E+00
PENRM	[MJ]	9,24E-01	0,00E+00	0,00E+00	0,00E+00	-4,52E-01	0,00E+00	0,00E+00
PENRT	[MJ]	1,62E+01	0,00E+00	0,00E+00	4,93E-02	-2,29E-01	1,27E-02	-3,44E+00
SM	[kg]	4,85E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-6,56E-02
RSF	[MJ]	2,53E-02	0,00E+00	0,00E+00	7,26E-06	5,71E-05	1,47E-06	-4,16E-03
NRSF	[MJ]	1,65E-03	0,00E+00	0,00E+00	8,93E-08	2,83E-06	2,50E-08	-2,21E-05
FW	[m ³]	2,57E-02	0,00E+00	0,00E+00	7,17E-06	1,42E-04	-1,48E-04 ¹	-7,56E-03
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 = Net use of fresh water							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112.							
Disclaimers	¹ The ecoinvent database includes treatment of leachate in all sanitary landfilling processes for which reason this number is negative. However, no leachate is produced when landfilling the valves and this value should therefore be used with caution.							

WASTE CATEGORIES AND OUTPUT FLOWS PER DU (1 AVERAGE PIECE) – GREEN.0, GREEN.1, GREEN.1HF								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
HWD	[kg]	2,73E-01	0,00E+00	0,00E+00	7,17E-05	3,05E-03	1,90E-03	-9,01E-02
NHWD	[kg]	1,33E+01	0,00E+00	0,00E+00	1,44E-03	1,07E-01	1,89E-01	-5,33E+00
RWD	[kg]	1,00E-05	0,00E+00	0,00E+00	3,80E-09	1,11E-07	1,30E-09	-3,56E-06

CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	1,80E-02	0,00E+00	0,00E+00	0,00E+00	1,02E-01	0,00E+00	0,00E+00
MER	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,52E-02	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,21E-01	0,00E+00	0,00E+00
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							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112.							

BIOGENIC CARBON CONTENT PER DU (1 AVERAGE PIECE) – GREEN.0, GREEN.1, GREEN.1HF		
Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	0,00E+00
Biogenic carbon content in accompanying packaging	[kg C]	9,72E-03
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO ₂	

Green.2

ENVIRONMENTAL IMPACTS PER DU (1 PIECE) – GREEN.2								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ eq.]	2,46E+00	0,00E+00	0,00E+00	8,16E-03	3,02E-01	3,58E-03	-6,65E-01
GWP-fossil	[kg CO ₂ eq.]	2,55E+00	0,00E+00	0,00E+00	8,16E-03	3,02E-01	3,56E-03	-6,57E-01
GWP-biogenic ²	[kg CO ₂ eq.]	-9,60E-02	0,00E+00	0,00E+00	4,09E-06	3,73E-05	2,03E-05	-6,00E-03
GWP-luluc	[kg CO ₂ eq.]	6,39E-03	0,00E+00	0,00E+00	2,90E-06	5,43E-05	4,93E-07	-1,23E-03
ODP	[kg CFC 11 eq.]	3,48E-08	0,00E+00	0,00E+00	1,70E-10	4,35E-10	4,36E-11	-6,32E-09
AP	[mol H ⁺ eq.]	1,08E-01	0,00E+00	0,00E+00	1,93E-05	3,24E-04	1,50E-05	-4,33E-02
EP-freshwater	[kg P eq.]	8,32E-03	0,00E+00	0,00E+00	5,74E-07	1,78E-05	2,08E-06	-3,46E-03
EP-marine	[kg N eq.]	7,08E-03	0,00E+00	0,00E+00	5,05E-06	1,47E-04	7,20E-06	-2,31E-03
EP-terrestrial	[mol N eq.]	8,90E-02	0,00E+00	0,00E+00	5,47E-05	9,24E-04	4,35E-05	-3,15E-02
POCP	[kg NMVOC eq.]	2,59E-02	0,00E+00	0,00E+00	3,35E-05	2,70E-04	1,59E-05	-8,88E-03
ADPm ¹	[kg Sb eq.]	1,40E-03	0,00E+00	0,00E+00	2,33E-08	9,57E-07	5,00E-09	-5,98E-04
ADPf ¹	[MJ]	3,57E+01	0,00E+00	0,00E+00	1,22E-01	5,15E-01	3,33E-02	-8,51E+00
WDP ¹	[m ³ world eq. deprived]	3,00E-07	0,00E+00	0,00E+00	7,95E-10	1,64E-08	2,25E-10	-1,03E-07
Caption	<p>GWP-total = Global Warming Potential - total; 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 = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water depletion potential</p> <p>The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10² or 195, while 1,12E-11 is the same as 1,12*10⁻¹¹ or 0,0000000000112.</p>							
Disclaimer	<p>¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.</p> <p>² The results of this indicator do not amount to 0. This is caused by the contribution of background processes. The results directly related to the declared product are equal to 0 across the life cycle.</p>							

ADDITIONAL ENVIRONMENTAL IMPACTS PER DU (1 PIECE) – GREEN.2								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
PM	[Disease incidence]	3,00E-07	0,00E+00	0,00E+00	7,95E-10	1,64E-08	2,25E-10	-1,03E-07
IRP ²	[kBq U235 eq.]	2,51E-01	0,00E+00	0,00E+00	1,49E-04	3,46E-03	6,58E-05	-8,84E-02
ETP-fw ¹	[CTUe]	1,58E+02	0,00E+00	0,00E+00	2,90E-02	1,71E+00	8,35E-02	-6,27E+01
HTP-c ¹	[CTUh]	2,47E-08	0,00E+00	0,00E+00	5,22E-11	3,58E-10	8,22E-12	-8,33E-09
HTP-nc ¹	[CTUh]	1,09E-06	0,00E+00	0,00E+00	8,08E-11	4,42E-09	4,23E-11	-4,58E-07
SQP ¹	-	4,00E+01	0,00E+00	0,00E+00	1,23E-01	3,67E-01	7,49E-02	-1,44E+01
Caption	<p>PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)</p> <p>The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10² or 195, while 1,12E-11 is the same as 1,12*10⁻¹¹ or 0,0000000000112.</p>							
Disclaimers	<p>¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.</p> <p>² This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.</p>							

RESOURCE USE PER DU (1 PIECE) – GREEN.2								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
PERE	[MJ]	5,73E+00	0,00E+00	0,00E+00	1,94E-03	5,80E-02	8,87E-04	-2,19E+00
PERM	[MJ]	6,24E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	6,36E+00	0,00E+00	0,00E+00	1,94E-03	5,80E-02	8,87E-04	-2,19E+00
PENRE	[MJ]	3,39E+01	0,00E+00	0,00E+00	1,22E-01	5,16E-01	3,01E-02	-8,51E+00
PENRM	[MJ]	1,82E+00	0,00E+00	0,00E+00	0,00E+00	-1,17E+00	0,00E+00	0,00E+00
PENRT	[MJ]	3,57E+01	0,00E+00	0,00E+00	1,22E-01	-6,52E-01	3,01E-02	-8,51E+00
SM	[kg]	1,20E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,62E-01
RSF	[MJ]	9,44E-03	0,00E+00	0,00E+00	6,68E-07	1,50E-05	1,94E-07	-1,64E-04
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m ³]	5,89E-02	1,78E-05	0,00E+00	1,78E-05	3,35E-04	-3,63E-04 ¹	-1,87E-02
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 = Net use of fresh water							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112.							
Disclaimers	¹ The ecoinvent database includes treatment of leachate in all sanitary landfilling processes for which reason this number is negative. However, no leachate is produced when landfilling the valves and this value should therefore be used with caution.							

WASTE CATEGORIES AND OUTPUT FLOWS PER DU (1 PIECE) – GREEN.2								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
HWD	[kg]	6,28E-01	0,00E+00	0,00E+00	1,78E-04	7,35E-03	7,67E-03	-2,23E-01
NHWD	[kg]	3,20E+01	0,00E+00	0,00E+00	3,57E-03	2,48E-01	4,66E-01	-1,32E+01
RWD	[kg]	2,34E-05	0,00E+00	0,00E+00	9,44E-09	2,41E-07	3,83E-09	-8,82E-06

CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	1,80E-02	0,00E+00	0,00E+00	0,00E+00	2,53E-01	0,00E+00	0,00E+00
MER	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,22E-01	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,29E-01	0,00E+00	0,00E+00
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							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112.							

BIOGENIC CARBON CONTENT PER DU (1 PIECE) – GREEN.2		
Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	0,00E+00
Biogenic carbon content in accompanying packaging	[kg C]	2,78E-02
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO ₂	

Average for Green.3

ENVIRONMENTAL IMPACTS PER DU (1 AVERAGE PIECE) - G.3.41.B.I AND G.3.51.B.I								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ eq.]	1,53E+01	0,00E+00	0,00E+00	5,44E-02	1,88E+00	1,91E-02	-2,13E+00
GWP-fossil	[kg CO ₂ eq.]	1,53E+01	0,00E+00	0,00E+00	5,43E-02	1,85E+00	1,90E-02	-2,12E+00
GWP-biogenic ²	[kg CO ₂ eq.]	-6,02E-02	0,00E+00	0,00E+00	2,73E-05	2,66E-02	8,88E-05	-8,71E-03
GWP-luluc	[kg CO ₂ eq.]	2,91E-02	0,00E+00	0,00E+00	1,93E-05	3,91E-04	2,59E-06	-9,91E-04
ODP	[kg CFC 11 eq.]	1,73E-07	0,00E+00	0,00E+00	1,13E-09	3,09E-09	2,75E-10	-1,09E-08
AP	[mol H ⁺ eq.]	9,59E-02	0,00E+00	0,00E+00	1,28E-04	2,29E-03	9,41E-05	-1,67E-02
EP-freshwater	[kg P eq.]	5,60E-03	0,00E+00	0,00E+00	3,83E-06	1,31E-04	1,34E-05	-1,58E-03
EP-marine	[kg N eq.]	2,19E-02	0,00E+00	0,00E+00	3,37E-05	1,02E-03	4,20E-05	-2,15E-03
EP-terrestrial	[mol N eq.]	2,11E-01	0,00E+00	0,00E+00	3,64E-04	6,44E-03	2,66E-04	-2,44E-02
POCP	[kg NMVOC eq.]	6,63E-02	0,00E+00	0,00E+00	2,23E-04	1,88E-03	9,84E-05	-7,97E-03
ADPm ¹	[kg Sb eq.]	3,48E-04	0,00E+00	0,00E+00	1,55E-07	7,05E-06	2,42E-08	-1,35E-04
ADPf ¹	[MJ]	1,92E+02	0,00E+00	0,00E+00	8,16E-01	3,68E+00	2,06E-01	-2,37E+01
WDP ¹	[m ³ world eq. deprived]	5,26E+00	0,00E+00	0,00E+00	4,10E-03	1,04E-01	1,39E-03	-3,12E-01
Caption	GWP-total = Globale Warming Potential - total; 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 = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water depletion potential							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112.							
Disclaimer	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.							
	² The results of this indicator do not amount to 0. This is caused by the contribution of background processes. The results directly related to the declared product are equal to 0 across the life cycle.							

ADDITIONAL ENVIRONMENTAL IMPACTS PER DU (1 AVERAGE PIECE) – G.3.41.B.I AND G.3.51.B.I								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
PM	[Disease incidence]	6,81E-07	0,00E+00	0,00E+00	5,29E-09	1,12E-07	1,44E-09	-1,53E-07
IRP ²	[kBq U235 eq.]	3,28E-01	0,00E+00	0,00E+00	9,91E-04	2,70E-02	3,43E-04	-1,10E-01
ETP-fw ¹	[CTUe]	1,46E+02	0,00E+00	0,00E+00	1,93E-01	1,17E+01	3,30E-01	-1,70E+02
HTP-c ¹	[CTUh]	3,11E-07	0,00E+00	0,00E+00	3,48E-10	2,71E-09	5,08E-11	-5,93E-07
HTP-nc ¹	[CTUh]	6,74E-07	0,00E+00	0,00E+00	5,38E-10	3,02E-08	2,57E-10	-1,20E-07
SQP ¹	-	5,50E+01	0,00E+00	0,00E+00	8,20E-01	3,90E+00	4,85E-01	-7,39E+00
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112.							
Disclaimers	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.							
	² This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.							

RESOURCE USE PER DU (1 AVERAGE PIECE) – G.3.41.B.I AND G.3.51.B.I								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
PERE	[MJ]	8,61E+00	0,00E+00	0,00E+00	1,29E-02	4,38E-01	4,94E-03	-1,57E+00
PERM	[MJ]	5,25E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	1,39E+01	0,00E+00	0,00E+00	1,29E-02	4,38E-01	4,94E-03	-1,57E+00
PENRE	[MJ]	1,85E+02	0,00E+00	0,00E+00	8,16E-01	3,17E+00	2,06E-01	-2,37E+01

RESOURCE USE PER DU (1 AVERAGE PIECE) – G.3.41.B.I AND G.3.51.B.I

Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
PENRM	[MJ]	8,50E+00	0,00E+00	0,00E+00	0,00E+00	-5,95E+00	0,00E+00	0,00E+00
PENRT	[MJ]	1,93E+02	0,00E+00	0,00E+00	8,16E-01	-2,78E+00	2,06E-01	-2,37E+01
SM	[kg]	8,77E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,08E+00
RSF	[MJ]	6,41E-02	0,00E+00	0,00E+00	4,45E-06	1,42E-04	1,23E-06	-6,21E-05
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m ³]	1,26E-01	0,00E+00	0,00E+00	1,19E-04	2,31E-03	-2,42E-03 ¹	-9,98E-03
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 = Net use of fresh water							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112.							
Disclaimers	¹ The ecoinvent database includes treatment of leachate in all sanitary landfilling processes for which reason this number is negative. However, no leachate is produced when landfilling the valves and this value should therefore be used with caution.							

WASTE CATEGORIES AND OUTPUT FLOWS PER DU (1 AVERAGE PIECE) – G.3.41.B.I AND G.3.51.B.I

Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
HWD	[kg]	2,00E+00	0,00E+00	0,00E+00	1,19E-03	4,92E-02	2,38E-02	-2,82E-01
NHWD	[kg]	5,81E+01	0,00E+00	0,00E+00	2,38E-02	1,73E+00	3,10E+00	-7,10E+00
RWD	[kg]	4,18E-05	0,00E+00	0,00E+00	6,29E-08	1,84E-06	1,99E-08	-7,33E-06

CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	1,80E-02	0,00E+00	0,00E+00	0,00E+00	1,74E+00	0,00E+00	0,00E+00
MER	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,13E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,91E+00	0,00E+00	0,00E+00
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							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112.							

BIOGENIC CARBON CONTENT PER DU (1 AVERAGE PIECE) – G.3.41.B.I AND G.3.51.B.I

Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	0,00E+00
Biogenic carbon content in accompanying packaging	[kg C]	2,34E-01
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO ₂	

Housings (AB15.B.I)

Each of the listed housings below is declared individually, but the impacts need to be multiplied by the correct scaling factor. The scaling factor is presented below, for the different housing types.

Housing	AB15.B.I	AB20.B.I	AB25.B.I.K	AB25.B.I	AB32.B.I
Scaling factor	1	1,11	1,58	4,21	3,69
Combination possibility	G.0, G.1, G.1HF	G.0, G.1, G.1HF	G.0, G.1, G.1HF	G.2	G.2

ENVIRONMENTAL IMPACTS PER DU (1 PIECE) – AB15								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ eq.]	5,12E+00	0,00E+00	0,00E+00	6,66E-03	1,63E-01	1,02E-03	-8,84E-01
GWP-fossil	[kg CO ₂ eq.]	4,82E+00	0,00E+00	0,00E+00	6,65E-03	1,56E-01	1,02E-03	-8,78E-01
GWP-biogenic ²	[kg CO ₂ eq.]	2,91E-01	0,00E+00	0,00E+00	3,34E-06	7,20E-03	5,61E-06	-4,33E-03
GWP-luluc	[kg CO ₂ eq.]	7,76E-03	0,00E+00	0,00E+00	2,36E-06	4,82E-05	2,46E-07	-1,65E-03
ODP	[kg CFC 11 eq.]	5,23E-08	0,00E+00	0,00E+00	1,39E-10	3,73E-10	3,18E-11	-8,32E-09
AP	[mol H ⁺ eq.]	2,76E-01	0,00E+00	0,00E+00	1,57E-05	2,75E-04	1,12E-05	-6,16E-02
EP-freshwater	[kg P eq.]	2,18E-02	0,00E+00	0,00E+00	4,68E-07	1,64E-05	1,70E-06	-4,92E-03
EP-marine	[kg N eq.]	1,62E-02	0,00E+00	0,00E+00	4,12E-06	1,25E-04	2,79E-06	-3,25E-03
EP-terrestrial	[mol N eq.]	2,14E-01	0,00E+00	0,00E+00	4,46E-05	7,53E-04	3,00E-05	-4,45E-02
POCP	[kg NMVOC eq.]	6,02E-02	0,00E+00	0,00E+00	2,73E-05	2,23E-04	1,10E-05	-1,25E-02
ADPm ¹	[kg Sb eq.]	3,74E-03	0,00E+00	0,00E+00	1,90E-08	8,70E-07	1,99E-09	-8,54E-04
ADPf ¹	[MJ]	5,94E+01	0,00E+00	0,00E+00	9,98E-02	4,51E-01	2,36E-02	-1,11E+01
WDP ¹	[m ³ world eq. deprived]	3,65E+00	0,00E+00	0,00E+00	5,01E-04	1,11E-02	1,41E-04	-7,76E-01
Caption	GWP-total = Globale Warming Potential - total; 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 = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water depletion potential The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112.							
Disclaimer	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. ² The results of this indicator do not amount to 0. This is caused by the contribution of background processes. The results directly related to the declared product are equal to 0 across the life cycle.							

ADDITIONAL ENVIRONMENTAL IMPACTS PER DU (1 PIECE) – AB15								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
PM	[Disease incidence]	7,75E-07	0,00E+00	0,00E+00	6,48E-10	1,37E-08	1,70E-10	-1,44E-07
IRP ²	[kBq U235 eq.]	4,84E-01	0,00E+00	0,00E+00	1,21E-04	3,35E-03	3,16E-05	-1,06E-01
ETP-fw ¹	[CTUe]	4,06E+02	0,00E+00	0,00E+00	2,37E-02	1,43E+00	1,74E-02	-8,93E+01
HTP-c ¹	[CTUh]	5,48E-08	0,00E+00	0,00E+00	4,26E-11	3,32E-10	5,77E-12	-1,12E-08
HTP-nc ¹	[CTUh]	2,89E-06	0,00E+00	0,00E+00	6,58E-11	3,67E-09	2,84E-11	-6,53E-07
SQP ¹	-	1,02E+02	0,00E+00	0,00E+00	1,00E-01	4,98E-01	5,80E-02	-2,02E+01
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless) The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112.							
Disclaimers	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. ² This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.							

RESOURCE USE PER DU (1 PIECE) – AB15								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
PERE	[MJ]	1,34E+01	0,00E+00	0,00E+00	1,58E-03	5,42E-02	4,91E-04	-2,91E+00
PERM	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	1,34E+01	0,00E+00	0,00E+00	1,58E-03	5,42E-02	4,91E-04	-2,91E+00
PENRE	[MJ]	5,94E+01	0,00E+00	0,00E+00	9,98E-02	4,51E-01	2,36E-02	-1,11E+01
PENRM	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	5,94E+01	0,00E+00	0,00E+00	9,98E-02	4,51E-01	2,36E-02	-1,11E+01
SM	[kg]	1,10E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,53E-01
RSF	[MJ]	2,75E-03	0,00E+00	0,00E+00	5,44E-07	1,79E-05	1,42E-07	-2,22E-04
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m ³]	1,16E-01	1,45E-05	0,00E+00	1,45E-05	2,63E-04	-2,85E-04 ¹	-2,59E-02
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 = Net use of fresh water							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112.							
Disclaimers	¹ The ecoinvent database includes treatment of leachate in all sanitary landfilling processes for which reason this number is negative. However, no leachate is produced when landfilling the valves and this value should therefore be used with caution.							

WASTE CATEGORIES AND OUTPUT FLOWS PER DU (1 PIECE) – AB15								
Parameter	Unit	A1-A3	B6	C1	C2	C3	C4	D
HWD	[kg]	1,35E+00	0,00E+00	0,00E+00	1,45E-04	5,60E-03	3,99E-05	-2,96E-01
NHWD	[kg]	9,29E+01	0,00E+00	0,00E+00	2,91E-03	1,99E-01	3,62E-01	-1,86E+01
RWD	[kg]	5,14E-05	0,00E+00	0,00E+00	7,69E-09	2,28E-07	1,85E-09	-1,14E-05

CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,37E-01	0,00E+00	0,00E+00
MER	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
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							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112.							

BIOGENIC CARBON CONTENT PER DU (1 PIECE) – AB15		
Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	0,00E+00
Biogenic carbon content in accompanying packaging	[kg C]	0,00E+00
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO ₂	

Additional information

LCA interpretation

Green.0, Green.1, Green.1HF and Green.2

The largest contribution is the A1 stage which includes the production of raw materials and components included in the product. Specifically, the production of brass makes up a large part of the contribution. A2 and A3 are also visible in most impact categories but with a significantly smaller contribution. The negative contribution in GWP-biogenic comes partially from the cardboard packaging entering in both A1 and A3.

Green.3

The largest contribution of Green.3 is related to module A1. This stage includes the production of raw materials and components included in the product, which also explains the large contribution. There is a negative contribution in GWP-biogenic, which comes partially from the cardboard packaging in A1 and A3.

Housing

For housing is the largest contribution related to module A1. This stage includes the production of raw materials and components included in the product, which also explains the large contribution. A2 and A3 are also visible in most impact categories but with a significantly smaller contribution.

Technical information on scenarios

In the table below the amount that is "collected separately" means that the waste is sorted in a metal-fraction at the construction site. Hereby, the insert, housing and pipes which it might be attached to is collected in a metal container to be sent to the waste treatment plant separately from other mixed waste fraction. Under "collected with mixed waste" is everything that is assumed to be sent to landfill as "general waste", due to a collection efficiency of 70%.

End of life (C1-C4)

Scenario information	Green.0 [kg / piece]	Green.1 [kg / piece]	Green.1HF [kg / piece]	Green.2 [kg / piece]	Green.3 [kg / piece]
Collected separately	0,12	0,12	0,12	0,29	1,93
Collected with mixed waste	0,05	0,05	0,05	0,12	0,83
For reuse	0,00	0,00	0,00	0,00	0,00
For recycling	0,10	0,10	0,10	0,25	1,74
For energy recovery	0,01	0,01	0,02	0,04	0,19
For final disposal	0,05	0,05	0,05	0,12	0,83

Scenario information	AB15.B.I [kg/piece]	AB20.B.I [kg/piece]	AB25.B.I.K [kg/piece]	AB25.B.I [kg/piece]	AB32.B.I [kg/piece]
Collected separately	0,24	0,26	0,37	0,10	0,87
Collected with mixed waste	0,10	0,11	0,16	0,43	0,37
For reuse	0,00	0,00	0,00	0,00	0,00
For recycling	0,24	0,26	0,37	0,10	0,87
For energy recovery	0,00	0,00	0,00	0,00	0,00
For final disposal	0,10	0,11	0,16	0,43	0,37

Re-use, recovery, and recycling potential (D)

Product	Scenario information/Materiel	Value	Unit
Green.0	Brass	6,43E-02	Kg
	Stainless steel	1,19E-03	Kg
	Scenario information/Materiel	Value	Unit
Green.1	Brass	6,43E-02	Kg
	Stainless steel	1,32E-03	Kg
	Scenario information/Materiel	Value	Unit

Product	Scenario information/Materiel	Value	Unit
Green.1HF	Brass	6,45E-02	Kg
	Stainless steel	1,34E-03	Kg
Green.2	Brass	1,59E-01	Kg
	Stainless steel	3,21E-03	Kg
Green.3, Average of DN40 and DN50	Brass	3,52E-02	Kg
	Ductile Iron	4,77E-01	Kg
	Stainless steel	5,70E-01	Kg

	Scenario information/Materiel	Value	Unit
AB15.B.I	Brass	1,53E-01	Kg
AB20.B.I	Brass	1,70E-01	Kg
AB25.B.I.K	Brass	2,43E-01	Kg
AB25.B.I	Brass	6,45E-01	Kg
AB32.B.I	Brass	5,65E-01	Kg



Indoor air

The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.1.

Soil and water

The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.2.

References

<p>Publisher</p>	<p> epddanmark www.epddanmark.dk <small>Template version 2023.2</small></p>
<p>Programme operator</p>	<p>Danish Technological Institute Gregersensvej DK-2630 Taastrup www.teknologisk.dk</p>
<p>LCA-practitioner</p>	<p> Viegand Maagøe A/S Nørre Søgade 35 DK-1370 København K www.viegandmaagoe.dk</p>
<p>LCA software / background data</p>	<p><i>EN 15804 reference package 3.1 / Ecoinvent 3.10</i></p>
<p>3rd party verifier</p>	<p>Life Cycle Assessment Consulting Linda Høibye</p>

General programme instructions

General Programme Instructions, version 2.0, spring 2020
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Pressure Equipment Directive 2014/68/EU-PED

Directive 2014/68/EU of the European Parliament and of the Council of 15 May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment (recast)

EN 12165

EN 12165:2016 – “Copper and copper alloys - Wrought and unwrought forging stock”

EN 12266

EN 12266-1/2:2021 – “Industrial valves – Testing of metallic valves – Part 1: Pressure test, test procedures and acceptance criteria – Mandatory requirements” and “Industrial valves – Testing of metallic valves - Part 2: Tests, test procedures and acceptance criteria - Supplementary requirements”

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EN 15942

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Ecoinvent database 3.10

Allocation cut-off EN15804 System model.

The ecoinvent database version 3 (part I): overview and methodology

EcoInvent. (u.d.). The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, . [online] 21(9), pp.1218–1230.

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Technical data

FlowCon (2024) – “Product Tech Notes”, Link: <https://flowcon.com/tech-notes>

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European Commission, European Platform on LCA (EPLCA), (2022) – “Environmental Footprint reference packages, EF reference package 3.1”, Link: <https://eplca.jrc.ec.europa.eu/LCDN/developerEF.html>