epddanmark

ECO PLATFORM EPD VERIFIED

Owner: FlowCon International ApS
No.: MD-23228-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

Programme
EPD Danmark
www.epddanmark.dk

☐ Industry EPD
☒ Product EPD

Declared product(s)
This EPD includes 4 data sets covering FlowCon's SM product series for the following sizes: SM.3, SM.4, SM.5 and SM.6. For each SM size, there is a selection of variations differing in flow range and pressure range. This EPD covers all possible variations, as an average modelling within the different sizes. This EPD does not cover additional actuators, which the SM typically is combined with.

Number of declared datasets/product variations:

- **SM.3** covers SM.3.0.B.0, SM.3.1.B.0 and SM.3.2.B.0.
- **SM.4** covers SM.4.1.B.0, SM.4.2.B.0 and SM.4.3.B.0
- **SM.5** covers SM.5.1.B.0 and SM.5.2.B.0.
- **SM.6** covers SM.6.2.B.0.

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**
SM.3	12,1	Kg/piece
SM.4	29,7	Kg/piece
SM.5	58,4	Kg/piece
SM.6	230,3	Kg/piece

Year of production site data (A3):
2022

EPD version 1:
15-10-2024

Issued: 15-10-2024
Valid to: 15-10-2024

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

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

☐ internal ☒ external

Third party verifier:

Linda Høibye

Martha Katrine Sørensen
EPD Danmark

Life cycle stages and modules (MND = module not declared, MNR = module not relevant)																
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 reduce energy consumption and thereby reduce the environmental footprint of buildings. FlowCon SM is an advanced pressure independent control valve. It is a 3-in-1 valve solution combining multi-rotation modulating control, dynamic balancing and differential pressure control into one flanged PICV (Pressure Independent Control Valve). FlowCon SM is used to control flow in heating or cooling waterborne HVAC systems.

FlowCon SM is a pressure independent dynamic control valve, which automatically keeps a constant differential pressure across the internal controlling orifice of the valve. The actuator will precisely and with full authority limit the flow requirement at any partial load. The SM products can be combined with different electrical actuators (the actuator is not part of this EPD).

Following products are covered in this EPD:

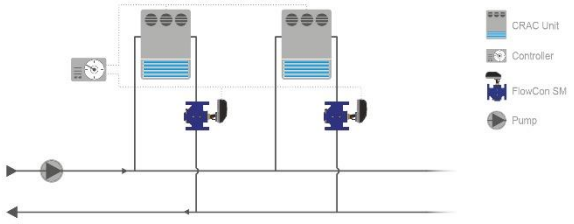
Type of Valve	Housing	DN Range
SM.3	(2”-3”)	DN50-80
SM.4	(3”-4”)	DN80-100
SM.5	(5”-6”)	DN125-150
SM.6	(8”-10”)	DN200-250

The main product components, making up more than 0,5% are shown in the table below.

	Weight-% of declared product			
Material	**SM.3**	**SM.4**	**SM.5**	**SM.6**
Ductile iron	87,8%	88,3%	88,7%	87,4%
Stainless Steel	7,7%	9,4%	9,8%	11,5%
Rubber	0,3%	0,3%	0,1%	0,2%
Copper	0,01%	0,0%	0,0%	0,0%
PS	0,0%	0,0%	0,6%	0,0%
PPS	0,0%	0,0%	0,0%	0,7%
GFRP	0,5%	0,6%	0,0%	0,0%
PC	0,01%	0,0%	0,0%	0,0%
Brass	0,0%	0,7%	0,4%	0,1%
PA Type 6	1,7%	0,7%	0,4%	0,1%
PE	0,1%	0,05%	0,03%	0,01%

Application

The FlowCon SM is designed for HVAC installations and is a 2-way regulation control valve used in heating or cooling circuits such as air handler units, chillers, CRAC units, cooling towers, heat exchangers and hot water tank systems, wherever dynamic balancing and fully accurate temperature control are required.



All SM valves are PN40 rated (describing the static pressure the valve can handle, here PN40 is equal to 40 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 SM valves are tested and comply with Pressure Equipment Directive (PED) 2014/68/EU and harmonized standards EN12266, EN12165 and EN10204. They will adhere to PED’s category I Module A or Category II Module A2 depending on size and will consequently bear the CE mark.
Performance data of the product with respect to its characteristics is in accordance with the relevant technical provision.

	SM.3, .4, .5, .6
Max valve capacity, Kvs. (m3/h)	Kv (opening area) changes automatically depending on system pressure changes
Flow rates (l/sec)	1,48-76,8
Max. operational pressure	800 kPaD
Number of ports -	2
Liquid temperature range °C	-20 to + 120
Ambient temperature range °C	+1 to +50

Delivery status

The valves SM.3, SM.4 and SM.5 are delivered to customers fully assembled, tested and packed in

a cardboard box. The products are delivered by land transport, by EURO6 trucks. SM6 is also delivered fully assembled and tested but is packed in a wood box and transported equally to the other products.

Representativity

This declaration includes the assembly of SM.3-.6 and the testing on the production site located in Slagelse (module A3) where producer data has been used. A major part of the production (A1) happens in China and generic data has been used in the modelling of A1, as no information on the actual extraction and production is available. As a consequence of this, global averages for recycled input material have been used. Data is collected in 2023 from production in January 2022 to December 2022 (averaged data). Background data are based on Ecoinvent version 3.10, EN15804 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 SM products are tested during incoming inspection at FlowCon's facilities according to FlowCon's ISO9001:2015. They are furthermore stored and packed, before shipping.

Product packaging

The composition of the sales- and transport packaging of the product is shown in the table below.

Product	SM.3	SM.4	SM.5
Material	Packaging	Packaging	Packaging
Cardboard	0,56 kg	0,95 kg	1,9 kg

Product	SM.6
Material	Packaging
Wood	33 kg

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 ductile iron and steel which are considered nonflammable or flame retardant, no additional influence on the environment in case of fire it 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

SM.3,.4,.5, and .6 do not contain substances listed on the "Candidate List of Substances of Very High Concern for authorisation".

Picture of product(s)

Figure 1 The different SM products, SM.6, SM.5, SM.4 and SM.3 (from left to right).

LCA background

Declared unit

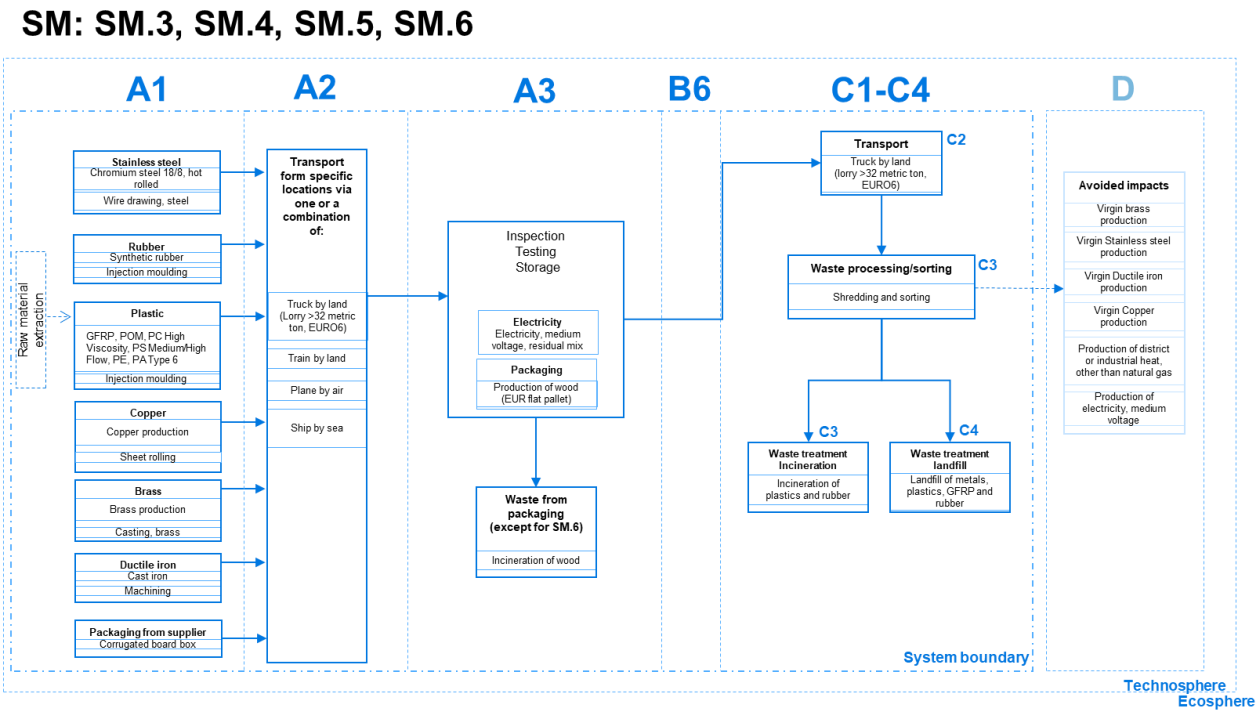
This EPD is an average EPD covering four product groups SM.3, SM.4, SM.5, and SM.6.

Name	Value	Unit
Declared unit	1	Piece
Product name	**Weight [kg/piece]**	**Conversion factor to 1 kg**
SM.3	12,1	0,082
SM.4	29,7	0,034
SM.5	58,4	0,017
SM.6	230,3	0,0043

PCR

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

Flow diagram



Energy modelling principles

Foreground system:

The products are produced without using energy covered by GO's. The energy process at FlowCon is modelled 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.

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 following processes are cut-off:

Material/process	Unit	Estimated % of total mass/energy
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 modelled based on information on the location of the supplier. For ductile iron, which is the main component of the valve, the scrap content has been adjusted to match the current global recycled input rate for ductile iron.

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 SM products are premanufactured at different locations, assembled, tested and stored at FlowCon in Denmark **(A3)**. Energy used for testing, storing, as well as overhead have been allocated to the different products based on sales data. The waste from packaging from suppliers are handled in A3. No waste of supplier packaging occurs for SM.6.

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 biogenic carbon leaving the product system is stated in the table below.

Declared product	Waste material	Amount [kg CO2 eq.]
SM.3	Cardboard	9,51E-01
SM.4	Cardboard	1,61E+00
SM.5	Cardboard	3,23E+00
SM.6	Wood	5,50E+01

B6 Energy use to operate building integrated technical systems includes:

There is no energy consumption of the valves. The energy consumption is related to the actuator (the actuator is not part of 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 re-use, 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, copper 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 of LCA Results

The average dataset for SM.3 covers SM.3.0.B.0, SM.3.1.B.0 and SM.3.2.B.0.

The average dataset for SM.4 covers SM.4.1.B.0, SM.4.2.B.0 and SM.4.3.B.0

The average dataset for SM.5 covers SM.5.1.B.0 and SM.5.2.B.0.

The dataset SM.6 covers SM.6.2.B.0.

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 SM.3

ENVIRONMENTAL IMPACTS PER DU (1 AVERAGE PIECE) – SM.3.0, SM.3.1, SM.3.2								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2 eq.]	6,58E+01	0,00E+00	0,00E+00	2,39E-01	6,36E+00	4,98E-02	-9,42E+00
GWP-fossil	[kg CO_2 eq.]	6,50E+01	0,00E+00	0,00E+00	2,39E-01	6,24E+00	4,95E-02	-9,37E+00
GWP-biogenic[2]	[kg CO_2 eq.]	6,77E-01	0,00E+00	0,00E+00	1,20E-04	1,26E-01	2,66E-04	-4,19E-02
GWP-luluc	[kg CO_2 eq.]	6,43E-02	0,00E+00	0,00E+00	8,49E-05	1,73E-03	9,75E-06	-5,89E-03
ODP	[kg CFC 11 eq.]	6,81E-07	0,00E+00	0,00E+00	4,98E-09	1,34E-08	1,17E-09	-7,32E-08
AP	[mol H^+ eq.]	5,83E-01	0,00E+00	0,00E+00	5,65E-04	9,90E-03	4,08E-04	-6,30E-02
EP-freshwater	[kg P eq.]	3,68E-02	0,00E+00	0,00E+00	1,68E-05	5,79E-04	6,09E-05	-5,96E-03
EP-marine	[kg N eq.]	9,31E-02	0,00E+00	0,00E+00	1,48E-04	4,41E-03	1,23E-04	-9,40E-03
EP-terrestrial	[mol N eq.]	1,01E+00	0,00E+00	0,00E+00	1,60E-03	2,72E-02	1,11E-03	-1,04E-01
POCP	[kg NMVOC eq.]	3,11E-01	0,00E+00	0,00E+00	9,81E-04	8,03E-03	4,07E-04	-3,46E-02
ADPm[1]	[kg Sb eq.]	3,49E-03	0,00E+00	0,00E+00	6,84E-07	3,12E-05	8,37E-08	-4,22E-04
ADPf[1]	[MJ]	7,91E+02	0,00E+00	0,00E+00	3,59E+00	1,62E+01	8,70E-01	-1,14E+02
WDP[1]	[m^3 world eq. deprived]	1,70E+01	0,00E+00	0,00E+00	1,80E-02	4,11E-01	5,43E-03	-2,27E+00
Caption	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							
	The numbers are declared in scientific notation, e.g. 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) – SM.3.0, SM.3.1, SM.3.2								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	5,40E-06	0,00E+00	0,00E+00	2,33E-08	4,91E-07	6,20E-09	-8,65E-07
IRP[2]	[kBq U235 eq.]	3,17E+00	0,00E+00	0,00E+00	4,36E-03	1,20E-01	1,27E-03	-8,11E-01
ETP-fw[1]	[CTUe]	1,22E+03	0,00E+00	0,00E+00	8,51E-01	5,08E+01	9,14E-01	-5,65E+02
HTP-c[1]	[CTUh]	2,44E-06	0,00E+00	0,00E+00	1,53E-09	1,19E-08	2,13E-10	-1,98E-06
HTP-nc[1]	[CTUh]	6,28E-06	0,00E+00	0,00E+00	2,37E-09	1,32E-07	1,06E-09	-1,75E-06
SQP[1]	-	7,97E+02	0,00E+00	0,00E+00	3,61E+00	1,77E+01	2,10E+00	-3,50E+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, e.g. 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) – SM.3.0, SM.3.1, SM.3.2								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	9,95E+01	0,00E+00	0,00E+00	5,70E-02	1,94E+00	1,90E-02	-1,14E+01
PERM	[MJ]	5,82E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	1,05E+02	0,00E+00	0,00E+00	5,70E-02	1,94E+00	1,90E-02	-1,14E+01
PENRE	[MJ]	7,53E+02	0,00E+00	0,00E+00	3,59E+00	1,61E+01	8,63E-01	-1,14E+02
PENRM	[MJ]	9,89E+00	0,00E+00	0,00E+00	0,00E+00	-6,93E+00	0,00E+00	0,00E+00
PENRT	[MJ]	7,63E+02	0,00E+00	0,00E+00	3,59E+00	9,24E+00	8,63E-01	-1,14E+02
SM	[kg]	4,32E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-5,05E+00
RSF	[MJ]	9,23E-01	0,00E+00	0,00E+00	1,96E-05	6,38E-04	5,20E-06	-8,23E-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]	4,33E-01	0,00E+00	0,00E+00	5,22E-04	9,72E-03	-1,04E-02[1]	-6,77E-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, e.g. 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) – SM.3.0, SM.3.1, SM.3.2								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	1,50E+01	0,00E+00	0,00E+00	5,22E-03	2,02E-01	3,72E-02	-3,03E+00
NHWD	[kg]	2,41E+02	0,00E+00	0,00E+00	1,05E-01	6,97E+00	1,32E+01	-2,75E+01
RWD	[kg]	2,45E-04	0,00E+00	0,00E+00	2,77E-07	8,16E-06	7,39E-08	-5,12E-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	8,32E+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]	6,72E+00	0,00E+00	0,00E+00	0,00E+00	1,31E+00	0,00E+00	0,00E+00
EET	[MJ]	1,73E+01	0,00E+00	0,00E+00	0,00E+00	3,39E+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, e.g. 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) – SM.3.0, SM.3.1, SM.3.2		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in product	[kg C]	0,00E+00
Biogenic carbon content in accompanying packaging	[kg C]	2,59E-01
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

Average SM.4

ENVIRONMENTAL IMPACTS PER DU (1 AVERAGE PIECE) –SM.4.1, SM.4.2, SM.4.3								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2 eq.]	1,62E+02	0,00E+00	0,00E+00	5,91E-01	1,51E+01	1,15E-01	-2,35E+01
GWP-fossil	[kg CO_2 eq.]	1,59E+02	0,00E+00	0,00E+00	5,91E-01	1,48E+01	1,14E-01	-2,34E+01
GWP-biogenic[2]	[kg CO_2 eq.]	2,46E+00	0,00E+00	0,00E+00	2,96E-04	3,14E-01	6,63E-04	-9,61E-02
GWP-luluc	[kg CO_2 eq.]	1,41E-01	0,00E+00	0,00E+00	2,10E-04	4,27E-03	2,43E-05	-1,39E-02
ODP	[kg CFC 11 eq.]	1,64E-06	0,00E+00	0,00E+00	1,23E-08	3,30E-08	2,88E-09	-1,80E-07
AP	[mol H^+ eq.]	1,31E+00	0,00E+00	0,00E+00	1,40E-03	2,44E-02	1,01E-03	-1,20E-01
EP-freshwater	[kg P eq.]	8,38E-02	0,00E+00	0,00E+00	4,16E-05	1,43E-03	1,52E-04	-1,17E-02
EP-marine	[kg N eq.]	2,14E-01	0,00E+00	0,00E+00	3,66E-04	1,09E-02	2,84E-04	-2,19E-02
EP-terrestrial	[mol N eq.]	2,31E+00	0,00E+00	0,00E+00	3,96E-03	6,70E-02	2,75E-03	-2,37E-01
POCP	[kg NMVOC eq.]	7,17E-01	0,00E+00	0,00E+00	2,42E-03	1,98E-02	1,00E-03	-8,00E-02
ADPm[1]	[kg Sb eq.]	7,16E-03	0,00E+00	0,00E+00	1,69E-06	7,71E-05	2,08E-07	-5,14E-04
ADPf[1]	[MJ]	1,92E+03	0,00E+00	0,00E+00	8,87E+00	3,99E+01	2,15E+00	-2,83E+02
WDP[1]	[m^3 world eq. deprived]	7,17E-01	0,00E+00	0,00E+00	2,42E-03	1,98E-02	1,00E-03	-8,00E-02
Caption	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							
	The numbers are declared in scientific notation, e.g. 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) –SM.4.1, SM.4.2, SM.4.3								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	8,63E-06	0,00E+00	0,00E+00	5,75E-08	1,21E-06	1,53E-08	-2,12E-06
IRP[2]	[kBq U235 eq.]	5,11E+00	0,00E+00	0,00E+00	1,08E-02	2,97E-01	3,14E-03	-1,94E+00
ETP-fw[1]	[CTUe]	2,02E+03	0,00E+00	0,00E+00	2,10E+00	1,25E+02	2,31E+00	-1,34E+03
HTP-c[1]	[CTUh]	4,49E-06	0,00E+00	0,00E+00	3,78E-09	2,93E-08	5,26E-10	-4,88E-06
HTP-nc[1]	[CTUh]	9,25E-06	0,00E+00	0,00E+00	5,85E-09	3,24E-07	2,61E-09	-3,90E-06
SQP[1]	-	9,15E+02	0,00E+00	0,00E+00	8,92E+00	4,38E+01	5,20E+00	-7,80E+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, e.g. 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) –SM.4.1, SM.4.2, SM.4.3								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	2,11E+02	0,00E+00	0,00E+00	1,41E-01	4,80E+00	4,70E-02	-2,85E+01
PERM	[MJ]	9,88E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	2,21E+02	0,00E+00	0,00E+00	1,41E-01	4,80E+00	4,70E-02	-2,85E+01
PENRE	[MJ]	1,83E+03	0,00E+00	0,00E+00	8,87E+00	3,99E+01	2,14E+00	-2,83E+02
PENRM	[MJ]	1,60E+01	0,00E+00	0,00E+00	0,00E+00	-1,12E+01	0,00E+00	0,00E+00
PENRT	[MJ]	1,85E+03	0,00E+00	0,00E+00	8,87E+00	2,87E+01	2,14E+00	-2,83E+02
SM	[kg]	1,09E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,25E+01
RSF	[MJ]	1,27E+00	0,00E+00	0,00E+00	4,83E-05	1,58E-03	1,29E-05	-2,49E-03
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]	1,02E+00	0,00E+00	0,00E+00	1,29E-03	2,39E-02	-2,54E-02[1]	-1,57E-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 = Net use of fresh water							
	The numbers are declared in scientific notation, e.g. 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) –SM.4.1, SM.4.2, SM.4.3								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	3,94E+01	0,00E+00	0,00E+00	1,29E-02	4,96E-01	9,76E-02	-8,35E+00
NHWD	[kg]	5,71E+02	0,00E+00	0,00E+00	2,58E-01	1,70E+01	3,24E+01	-5,73E+01
RWD	[kg]	5,91E-04	0,00E+00	0,00E+00	6,83E-07	2,02E-05	1,84E-07	-1,20E-04
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	2,21E+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]	8,97E+00	0,00E+00	0,00E+00	0,00E+00	1,98E+00	0,00E+00	0,00E+00
EET	[MJ]	2,31E+01	0,00E+00	0,00E+00	0,00E+00	5,04E+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, e.g. 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) –SM.4.1, SM.4.2, SM.4.3		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in product	[kg C]	0,00E+00
Biogenic carbon content in accompanying packaging	[kg C]	4,40E-01
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

Average SM.5

ENVIRONMENTAL IMPACTS PER DU (1 AVERAGE PIECE) – SM.5.1, SM.5.2								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2 eq.]	3,12E+02	0,00E+00	0,00E+00	1,15E+00	2,87E+01	2,02E-01	-4,56E+01
GWP-fossil	[kg CO_2 eq.]	3,07E+02	0,00E+00	0,00E+00	1,15E+00	2,80E+01	2,01E-01	-4,54E+01
GWP-biogenic[2]	[kg CO_2 eq.]	4,77E+00	0,00E+00	0,00E+00	5,76E-04	6,15E-01	1,08E-03	-1,71E-01
GWP-luluc	[kg CO_2 eq.]	2,73E-01	0,00E+00	0,00E+00	4,08E-04	8,31E-03	4,40E-05	-2,62E-02
ODP	[kg CFC 11 eq.]	3,12E-06	0,00E+00	0,00E+00	2,39E-08	6,41E-08	5,53E-09	-3,48E-07
AP	[mol H^+ eq.]	2,47E+00	0,00E+00	0,00E+00	2,71E-03	4,74E-02	1,94E-03	-2,09E-01
EP-freshwater	[kg P eq.]	1,58E-01	0,00E+00	0,00E+00	8,09E-05	2,78E-03	2,93E-04	-2,08E-02
EP-marine	[kg N eq.]	4,10E-01	0,00E+00	0,00E+00	7,12E-04	2,11E-02	5,27E-04	-4,15E-02
EP-terrestrial	[mol N eq.]	4,43E+00	0,00E+00	0,00E+00	7,70E-03	1,30E-01	5,23E-03	-4,45E-01
POCP	[kg NMVOC eq.]	1,38E+00	0,00E+00	0,00E+00	4,71E-03	3,83E-02	1,92E-03	-1,51E-01
ADPm[1]	[kg Sb eq.]	1,31E-02	0,00E+00	0,00E+00	3,28E-06	1,50E-04	3,64E-07	-6,39E-04
ADPf[1]	[MJ]	3,68E+03	0,00E+00	0,00E+00	1,72E+01	7,75E+01	4,11E+00	-5,47E+02
WDP[1]	[m^3 world eq. deprived]	1,38E+00	0,00E+00	0,00E+00	4,71E-03	3,83E-02	1,92E-03	-1,51E-01
Caption	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							
	The numbers are declared in scientific notation, e.g. 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) – SM.5.1, SM.5.2								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	2,58E-05	0,00E+00	0,00E+00	1,12E-07	2,36E-06	2,95E-08	-4,09E-06
IRP[2]	[kBq U235 eq.]	1,47E+01	0,00E+00	0,00E+00	2,09E-02	5,77E-01	5,68E-03	-3,69E+00
ETP-fw[1]	[CTUe]	6,05E+03	0,00E+00	0,00E+00	4,09E+00	2,43E+02	3,48E+00	-2,60E+03
HTP-c[1]	[CTUh]	1,37E-05	0,00E+00	0,00E+00	7,35E-09	5,69E-08	1,01E-09	-9,59E-06
HTP-nc[1]	[CTUh]	2,75E-05	0,00E+00	0,00E+00	1,14E-08	6,30E-07	4,96E-09	-7,38E-06
SQP[1]	-	2,72E+03	0,00E+00	0,00E+00	1,73E+01	8,53E+01	1,00E+01	-1,44E+02
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, e.g. 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) – SM.5.1, SM.5.2								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	4,09E+02	0,00E+00	0,00E+00	2,74E-01	9,34E+00	8,71E-02	-5,39E+01
PERM	[MJ]	1,98E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	4,28E+02	0,00E+00	0,00E+00	2,74E-01	9,34E+00	8,71E-02	-5,39E+01
PENRE	[MJ]	3,52E+03	0,00E+00	0,00E+00	1,72E+01	7,76E+01	4,11E+00	-5,47E+02
PENRM	[MJ]	1,99E+01	0,00E+00	0,00E+00	0,00E+00	-1,40E+01	0,00E+00	0,00E+00
PENRT	[MJ]	3,54E+03	0,00E+00	0,00E+00	1,72E+01	6,36E+01	4,11E+00	-5,47E+02
SM	[kg]	2,13E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,84E+00
RSF	[MJ]	2,53E+00	0,00E+00	0,00E+00	9,40E-05	3,07E-03	2,47E-05	-4,77E-03
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]	1,87E+00	0,00E+00	0,00E+00	2,51E-03	4,62E-02	-4,95E-02[1]	-2,94E-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 = Net use of fresh water							
	The numbers are declared in scientific notation, e.g. 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) – SM.5.1, SM.5.2								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	7,68E+01	0,00E+00	0,00E+00	2,51E-02	9,53E-01	6,67E-02	-1,62E+01
NHWD	[kg]	1,10E+03	0,00E+00	0,00E+00	5,02E-01	3,28E+01	6,29E+01	-1,04E+02
RWD	[kg]	1,13E-03	0,00E+00	0,00E+00	1,33E-06	3,93E-05	3,32E-07	-2,27E-04
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	4,04E+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]	1,88E+01	0,00E+00	0,00E+00	0,00E+00	2,65E+00	0,00E+00	0,00E+00
EET	[MJ]	4,84E+01	0,00E+00	0,00E+00	0,00E+00	6,84E+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, e.g. 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) – SM.5.1, SM.5.2		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in product	[kg C]	0,00E+00
Biogenic carbon content in accompanying packaging	[kg C]	8,80E-01
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

ENVIRONMENTAL IMPACTS PER DU (1 PIECE) – SM.6.2								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2 eq.]	1,17E+03	0,00E+00	0,00E+00	4,53E+00	1,09E+02	7,94E-01	-1,82E+02
GWP-fossil	[kg CO_2 eq.]	1,19E+03	0,00E+00	0,00E+00	4,53E+00	1,07E+02	7,89E-01	-1,81E+02
GWP-biogenic[2]	[kg CO_2 eq.]	-2,32E+01	0,00E+00	0,00E+00	2,27E-03	2,43E+00	4,37E-03	-6,97E-01
GWP-luluc	[kg CO_2 eq.]	8,60E-01	0,00E+00	0,00E+00	1,61E-03	3,28E-02	1,76E-04	-1,04E-01
ODP	[kg CFC 11 eq.]	1,26E-05	0,00E+00	0,00E+00	9,44E-08	2,52E-07	2,18E-08	-1,38E-06
AP	[mol H^+ eq.]	9,33E+00	0,00E+00	0,00E+00	1,07E-02	1,86E-01	7,68E-03	-7,64E-01
EP-freshwater	[kg P eq.]	6,09E-01	0,00E+00	0,00E+00	3,19E-04	1,10E-02	1,16E-03	-7,63E-02
EP-marine	[kg N eq.]	1,53E+00	0,00E+00	0,00E+00	2,81E-03	8,28E-02	2,06E-03	-1,63E-01
EP-terrestrial	[mol N eq.]	1,66E+01	0,00E+00	0,00E+00	3,04E-02	5,09E-01	2,07E-02	-1,73E+00
POCP	[kg NMVOC eq.]	5,20E+00	0,00E+00	0,00E+00	1,86E-02	1,50E-01	7,58E-03	-5,91E-01
ADPm[1]	[kg Sb eq.]	4,86E-02	0,00E+00	0,00E+00	1,29E-05	5,92E-04	1,46E-06	-1,53E-03
ADPf[1]	[MJ]	1,43E+04	0,00E+00	0,00E+00	6,80E+01	3,05E+02	1,63E+01	-2,18E+03
WDP[1]	[m^3 world eq. deprived]	5,20E+00	0,00E+00	0,00E+00	1,86E-02	1,50E-01	7,58E-03	-5,91E-01
Caption	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							
	The numbers are declared in scientific notation, e.g. 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) – SM.6.2								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	1,02E-04	0,00E+00	0,00E+00	4,41E-07	9,30E-06	1,17E-07	-1,62E-05
IRP[2]	[kBq U235 eq.]	5,90E+01	0,00E+00	0,00E+00	8,26E-02	2,28E+00	2,27E-02	-1,45E+01
ETP-fw[1]	[CTUe]	2,56E+04	0,00E+00	0,00E+00	1,61E+01	9,59E+02	1,44E+01	-1,01E+04
HTP-c[1]	[CTUh]	5,43E-05	0,00E+00	0,00E+00	2,90E-08	2,24E-07	3,97E-09	-3,74E-05
HTP-nc[1]	[CTUh]	1,05E-04	0,00E+00	0,00E+00	4,48E-08	2,48E-06	1,96E-08	-2,80E-05
SQP[1]	-	1,14E+04	0,00E+00	0,00E+00	6,84E+01	3,37E+02	3,96E+01	-5,63E+02
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, e.g. 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) – SM.6.2								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	1,74E+03	0,00E+00	0,00E+00	1,08E+00	3,68E+01	3,46E-01	-2,22E+02
PERM	[MJ]	4,62E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	2,20E+03	0,00E+00	0,00E+00	1,08E+00	3,68E+01	3,46E-01	-2,22E+02
PENRE	[MJ]	1,37E+04	0,00E+00	0,00E+00	6,80E+01	2,99E+02	1,63E+01	-2,18E+03
PENRM	[MJ]	7,08E+01	0,00E+00	0,00E+00	0,00E+00	-4,96E+01	0,00E+00	0,00E+00
PENRT	[MJ]	1,38E+04	0,00E+00	0,00E+00	6,80E+01	2,50E+02	1,63E+01	-2,18E+03
SM	[kg]	7,43E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-9,60E+01
RSF	[MJ]	1,13E+01	0,00E+00	0,00E+00	3,71E-04	3,71E-04	1,21E-02	9,76E-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]	7,45E+00	0,00E+00	0,00E+00	9,89E-03	9,89E-03	1,82E-01[1]	-1,95E-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 = Net use of fresh water							
	The numbers are declared in scientific notation, e.g. 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) – SM.6.2								
Parameter	**Unit**	**A1-A3**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	3,30E+02	0,00E+00	0,00E+00	9,88E-02	3,74E+00	3,38E-01	-6,89E+01
NHWD	[kg]	4,27E+03	0,00E+00	0,00E+00	1,98E+00	1,28E+02	2,48E+02	-3,92E+02
RWD	[kg]	4,54E-03	0,00E+00	0,00E+00	5,24E-06	1,55E-04	1,32E-06	-8,96E-04
CRU	[kg]	3,30E+01	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	1,60E+02	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	8,00E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,06E+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, e.g. 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) – SM.6.2		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in product	[kg C]	0,00E+00
Biogenic carbon content in accompanying packaging	[kg C]	1,50E+01
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

Additional information

LCA interpretation

SM.3/SM.4/SM.5/SM.6

Error! Reference source not found. The largest contribution to the environmental impact categories is module A1, where raw material and components are produced. The negative impact in GWP-biogenic is related to the production of the wood and cardboard packaging from the supply chain and the contribution of A3 in the same impact category is due to the waste treatment of the wood packaging. The difference in the biogenic carbon for SM.6 comes from the re-use of the wooden box to the consumer, so no waste treatment is happening in module A3.

Technical information on scenarios

End of life (C1-C4)

Scenario information	SM.3 [kg / piece]	SM.4 [kg / piece]	SM.5 [kg / piece]	SM.6 [kg / piece]
Collected separately	8,54	22,48	40,85	161,20
Collected with mixed waste	3,66	9,64	17,51	69,08
For reuse	0,00	0,00	0,00	0,00
For recycling	8,31	22,13	40,40	159,58
For energy recovery	0,22	0,36	0,45	1,60
For final disposal	3,66	9,64	17,51	69,08

Re-use, recovery and recycling potential (D)

Product	Scenario information/Materiel	Value	Unit
SM.3	Ductile Iron	4,68E+00	Kg
	Copper	3,18E-04	Kg
	Brass	1,00E-01	Kg
	Stainless steel	2,72E-01	Kg
	Scenario information/Materiel	**Value**	**Unit**
SM.4	Ductile Iron	1,15E+01	Kg
	Copper	3,18E-04	Kg
	Brass	1,01E-01	Kg
	Stainless steel	8,90E-01	Kg
	Scenario information/Materiel	**Value**	**Unit**
SM.5	Ductile Iron	2,26E+01	Kg
	Brass	1,02E-01	Kg
	Copper	3,18E-04	Kg
	Stainless steel	1,74E+00	Kg
	Scenario information/Materiel	**Value**	**Unit**
SM.6	Ductile Iron	8,79E+01	Kg
	Brass	1,02E-01	Kg
	Copper	3,18E-04	Kg
	Stainless steel	8,01E+00	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

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

General programme instructions
General Programme Instructions, version 2.0, spring 2020
www.epddanmark.dk

Pressure Equipment Directive 2014/68/EU-PED
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Ecoinvent database 3.10
Allocation cut-off EN15804 System model.

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EF reference package
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