epddanmark

ECO PLATFORM EPD VERIFIED

Owner: FlowCon International ApS
No.: MD-24099-EN
Issued: 05-09-2025
Valid to: 05-09-2030

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 covers FlowCon's actuators for control and HVAC valves:

- FN.0.2
- FH
- FT.0.3
- SM.0.0.0.3

Number of declared datasets/product variations: 4

Production site
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
1 piece of actuator with a reference service life of 10 years.

Year of production site data (A3)
2023

EPD version
Version 1

Issued: 05-09-2025
Valid to: 05-09-2030

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

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)																
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	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Product information

Product description

The actuators are used in combination with a valve, consisting of either a housing and an insert (=regulation unit) or a housing with built-in regulation unit. However, these components are declared in separate EPDs.

The valve regulates the flow dynamically and pressure independently. With the matching actuator, the valve will work with 100% valve authority in all load situations, which means that the valve will be able to regulate flow precisely and effectively, regardless of the conditions it is operating under, regardless the load or pressure condition.

The actuators are responsible for converting an input signal into the required mechanical position. This EPD covers 4 different actuators. The main product components are shown in the table below.

Materials /components	Weight-% of declared product			
	FN.0.2	FH	FT.0.3	SM.0.0.0.3
Plastic composite housing	37	42	36	30
Cable	30	25	24	3
Printed circuit board	7	12		<0.1
Gasket	0.4	0.3	0.3	<0.1
Motor	8	7		2
Metal fittings	18	13	38	65
Thermal expansion unit			1	
Total	100	100	100	100

Product packaging

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

Material	Weight of packaging material (kg) per declared unit			
	FN.0.2	FH	FT.0.3	SM.0.0.0.3
Cardboard	0.058	0.058	0.016	0.099
Pallet	0.005	0.006	0.002	0.023
Plastic foil	0.0001	0.0001	0.0001	0.001

Application

Heating or cooling HVAC application.

Technical data

All actuator types comply with REACH EC 1907/2006 and RoHS EC 2015/863 and will bear the CE mark.
Performance data of the product with respect to its characteristics are in accordance with the relevant technical provision.

Specifications	FN.0.2	FH
Supply voltage	24V AC/DC ±10%, 50/60 Hz	24V AC/DC ±10%, 50/60 Hz
Power consumption	24V AC: 0.9VA stand-by, 2.5VA operating, 4.7VA max. 24V DC: 0.75W stand-by, 1.2W operating, 2.2W max.	24V AC: 1.5VA stand-by, 6VA operating, 8.5VA max. 24V DC: 0.6W stand-by, 2.6W operating, 4.1W max.
Control signal	Analog 0(2)-10V DC	Analog 0(2)-10VDC Digital 3-point floating and 2-position
Feedback signal	0(2)-10V DC	0-10V DC
Resolution	1:100 (0-10V)	1:100 (0-10V)
Operation time	22 sec/mm	22 sec/mm
Actuating force	220N (-40N/+60N)	450N (-100N/+150N)
Protection	IP54, 360°	IP54, 360°

Specifications	FT.0.3	SM.0.0.0.3
Supply voltage	230V AC ±10%, 50/60 Hz	24V AC/DC ±10%, 50/60 Hz
Power consumption	1.2W	2.0VA stand-by, 5.0VA operating, 12VA max.
Control signal	Digital 2-position	Analog 0(2)-10VDC or 0(4)-20mA Digital 3-point floating or 2-position
Feedback signal	-	0-10VDC
Resolution	-	1:1000 (0-10V)
Operation time	4.5 minutes (opening) and 9 minutes (closing)	32 sec/360° rotation
Actuating force	125N (-6.25N/+6.25N)	9Nm (opening) and 7.5Nm (closing)
Protection	IP54, 360°	IP54, 360°

Delivery status

Actuators function in combination with a valve. The actuator is delivered in a cardboard box to European customers. The actuators are delivered by truck (EURO 6).

Representativity

This declaration, including data collection and the modelled foreground system including results, represents the production of actuators, described as the declared product, with the product descriptions presented above on the production site located in Slagelse.

Product-specific data are collected from January 2023 to December 2023 (averaged data). Background data are based on ecoinvent version 3.10 EN15804 and are less than 10 years old. Generally, the used background datasets are of high quality, and most of the datasets are less than three years old. The ecoinvent database has been downloaded as an excel and the calculations were conducted in that excel. These calculations have not been verified.

Manufacture

The products arrive to FlowCons facilities where they are inspected. A sample actuator per lot is electrically measured according to its actuating force and open/close functionality. The actuators are then packed in cardboard boxes and plastic foil before being sent to customers.

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 situation, please contact the supplier.

Hazardous substances

The products covered in this EPD contains substances above 0.1% w/w listed in the "Candidate List of Substances of Very High Concern for authorisation" (http://echa.europa.eu/candidate-list-table). See below table.

Substance	w/w – Weight % of declared product
Lead (FN.02)	0.16%
Lead (FH)	0.13%
Lead (FT.0.3)	0.34%

The lead in SM.0.0.0.3 is below 0.1% w/w.

The products are covered by harmonised technical specification EN 60730. Declaration of performance according to EU regulation 305/2011 is available for all declared product variations.

Further technical information can be obtained by contacting the manufacturer or on the manufacturer's website: https://flowcon.com/

Reference Service Life (RSL)

The reference service life of the product is 10 years following the specifications in the c-PCR Part B: Requirements on the EPD for control valves, EN 50693 and EN15804. No need for maintenance if required. The assumptions of running time can be found under "Additional information" and "LCA background".

Extraordinary effects

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

Picture of products

FN.0.2

FH

FT.0.

SM.0.0.3

LCA background

Declared unit

The EPD is a product specific EPD and the LCI and LCIA results in this EPD relates to 1 piece of actuator.

The declared unit is 1 piece of product with a reference service life of 10 years. The RSL is a standard service life for actuators, according to the c-PCR Part B: Requirements on the EPD for control valves, which specifies how to develop EPDs for control valves.

Name	Value	Unit
Declared unit	1	piece

Name	Weight	Conversion factor to 1 kg
FN.0.2	0.246	4.073
FH	0.302	3.311
FT.0.3	0.136	7.353
SM.0.0.0.3	1.186	0.843

PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804, and c-PCR Part B: Requirements on the EPD for control valves v1 (from 28.12.2023) published by IBU and EN 506932019 – Product category rules for life cycle assessments of electronic and electrical products and systems. This EPD follows additional requirements specified in the Technical rules and Guidelines of EPD Danmark.

Energy modelling principles

Foreground system:

The product is produced using Danish residual energy mix. No Guarantees of Origin are used.

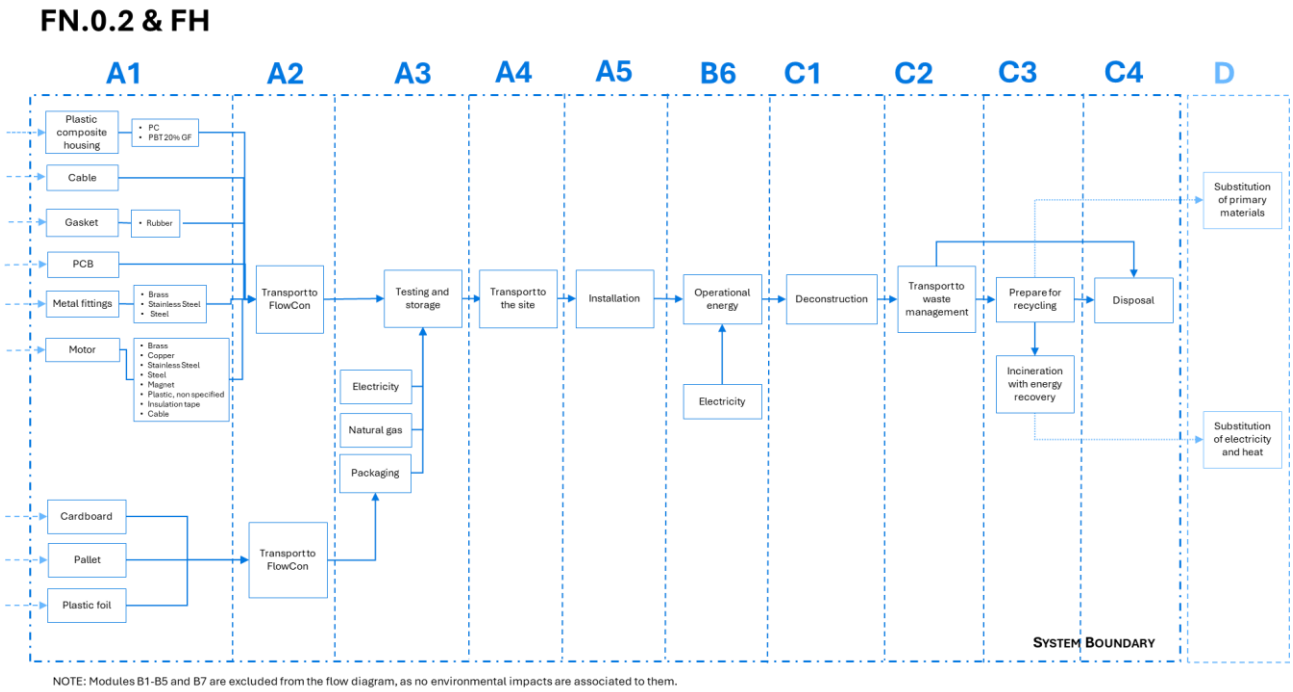
Background system:

Upstream and downstream processes are modelled using electricity grid mix.

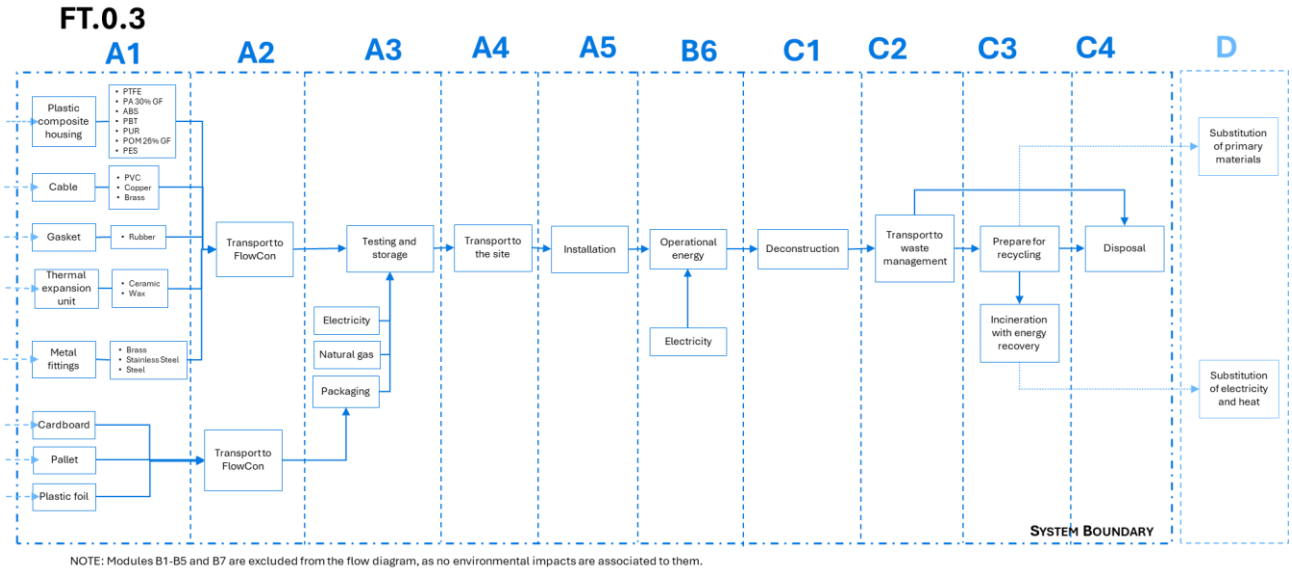
Geographical area

The geographical area is Europe.

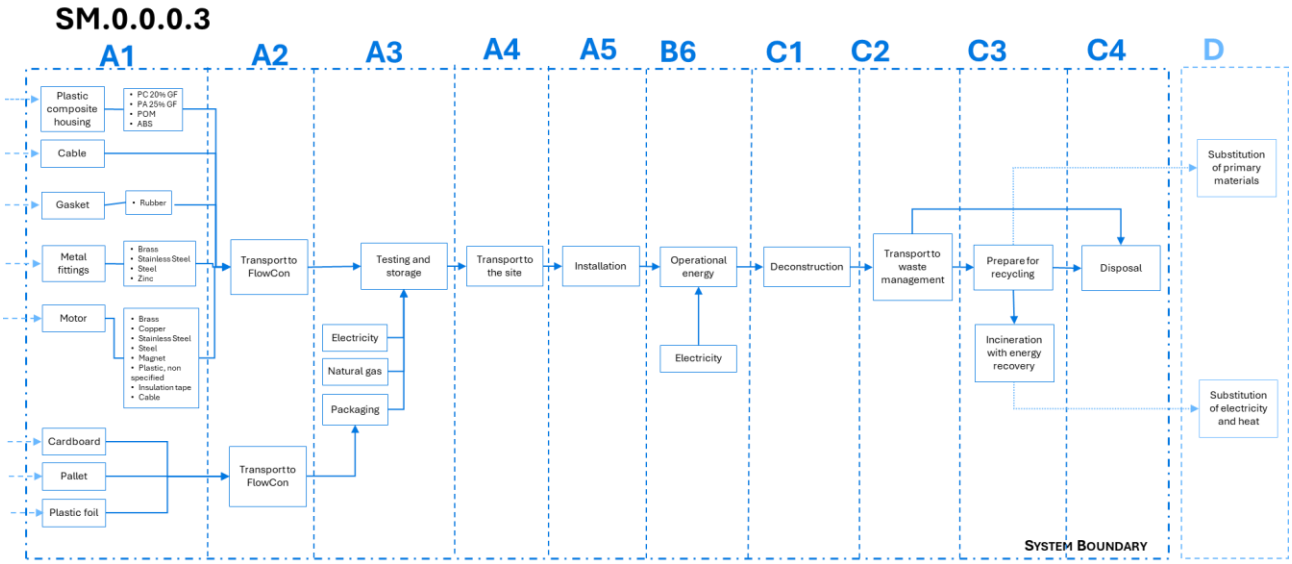
Flow Diagram



NOTE: Modules B1-B5 and B7 are excluded from the flow diagram, as no environmental impacts are associated to them.



NOTE: Modules B1-B5 and B7 are excluded from the flow diagram, as no environmental impacts are associated to them.



NOTE: Modules B1-B5 and B7 are excluded from the flow diagram, as no environmental impacts are associated to them.

System boundary

This EPD is based on a cradle-to-gate LCA with module A1-A3, A4, A5, B1-B7 and modules C1-C4 and D, in which 100 weight-% has been accounted for.

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

The excluded processes are the following:

Material/process	Unit	Estimated % of total mass/enegy
Production waste in A3	%	Between 0.00 and 0.013
Tools for manual installation in A5	%	Below 1
Repair/replacement	%	Between 0.00 and 0.123
Energy and material use in C1	%	Below 1.00

Product stage (A1-A3) includes:
A1 – Extraction and processing of raw materials
A2 – Transport to the production site
A3 – Manufacturing processes

The product stage comprises the acquisition of all raw materials, transport to FlowCon, electronic measurement of its actuating force and open/closing mechanism, packaging, transport to site, dismounting and waste processing up to the "end-of-waste" state or final disposal. The LCA results are declared in aggregated form for the product stage, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3.

The different components are modelled in module A1 based on information from the suppliers.

The transportation (A2) of goods from raw material extraction in module A1 to FlowCon's manufacturing facility in Denmark varies depending on the location of the supplier. Depending on the actuator, it involves transportation by truck, container ship and/or aircraft.

The actuators are tested and stored at FlowCon in Denmark. Energy in the form of electricity and heat is used for testing and storing the declared products. The use of electricity and heat in A3 is allocated based on revenue. Electricity in the Danish marked-based residual mix found in the Ecoinvent v3.10 database. No Guarantees of Origin has been used. Heating is solely natural gas and no biogas has been included.

Dataset	EF	Unit
Residual grid mix, DK, ref. year 2022	0.647	kg CO_2e/kWh

Construction stage (A4-A5) includes:
The construction process stages are declared in this study with A4 and A5. For A4 a worst-case scenario has been applied by the inclusion of the amount of transport necessary to reach the furthest customer of Flowcon in 2023.
Waste treatment of packaging material from FlowCon is included in module A5. Manual installation of the actuator in A5 has been excluded as it falls under the cut-off criteria. The final product packaging of the product leaves the system in A5. The packaging is assumed to be incinerated. Some packaging might not be collected directly at point of installation. However, to ensure calculation of the full impact from waste treatment of the packaging it is assumed that the lost packaging will be collected and incinerated at a later point.

Use stage (B1-B7) includes:
All use stages have been included, however, only B6 has any impacts. Based on the requirement in the c-PCR: Part B: Requirements on the EPD for control valves and the technical notes of the different valves, energy use in the activation and stand by is the total energy consumption for B6 modelled. It is assumed that the actuator is in stand-by for 95% of the time and in operation 5% of the 10 years.

Name	FN.0.2	FH	FT.0.3	SM.0.0.0.3
Power consumption activation [W]	1.2	2.6	1.2	5.0
Power consumption in stand by [W]	0.75	0.6	-	2.0
Total energy consumption (10 years) [kWh]	67.7	61.3	5.3	188.3

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. This EPD only covers Europe and therefore European conditions for transport, technology and waste processing up to end-of-waste are assumed. The actuators are marked as WEEE.

It is assumed that 65% of actuators are collected for waste treatment as required by the WEEE directive. The remaining 35% is assumes to be landfilled.

The collected actuators are shredded, sorted and the non-metal parts are sent to incineration after sorting.

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

The benefits and loads include:

- D, potential benefits from reuse, 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 is credited. Credit is only given to the net production of primary material. The loss rates from the recycling processes are considered when calculating the avoided materials.
Furthermore, credit is given for electricity and heat produced from incineration of non-recycled and non-landfilled materials. No credit it given to materials incinerated in A3.

LCA results

Note that in all the below results there is an imbalance in the biogenic carbon (GWP-biogenic). This imbalance is primarily caused by electricity in B6 and stems from biogenic emissions in the supply chain.

ENVIRONMENTAL IMPACTS PER FU (ONE PIECE 10 years) – Actuator FN.0.2												
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2 eq.]	7.26E+00	1.66E-01	1.80E-01	0.00E+00	2.30E+01	0.00E+00	0.00E+00	5.08E-03	2.49E-01	4.79E-03	-8.63E-01
GWP-fossil	[kg CO_2 eq.]	7.42E+00	1.66E-01	2.56E-03	0.00E+00	2.22E+01	0.00E+00	0.00E+00	5.08E-03	2.49E-01	4.78E-03	-8.49E-01
GWP-biogenic	[kg CO_2 eq.]	-1.77E-01	1.09E-04	1.77E-01	0.00E+00	7.77E-01	0.00E+00	0.00E+00	3.34E-06	2.81E-05	4.20E-06	-1.23E-02
GWP-luluc	[kg CO_2 eq.]	1.32E-02	5.51E-05	6.17E-07	0.00E+00	6.76E-02	0.00E+00	0.00E+00	1.69E-06	1.90E-05	4.51E-07	-1.99E-03
ODP	[kg CFC 11 eq.]	1.13E-06	3.29E-09	3.36E-11	0.00E+00	4.08E-07	0.00E+00	0.00E+00	1.01E-10	2.95E-10	2.11E-11	-1.12E-08
AP	[mol H^+ eq.]	6.92E-02	3.45E-04	1.69E-05	0.00E+00	1.30E-01	0.00E+00	0.00E+00	1.06E-05	1.25E-04	5.83E-06	-1.71E-02
EP-freshwater	[kg P eq.]	1.06E-02	1.12E-05	2.69E-07	0.00E+00	2.06E-02	0.00E+00	0.00E+00	3.44E-07	6.20E-06	8.18E-08	-2.61E-03
EP-marine	[kg N eq.]	1.36E-02	8.28E-05	8.53E-06	0.00E+00	2.04E-02	0.00E+00	0.00E+00	2.54E-06	4.63E-05	1.03E-04	-3.21E-03
EP-terrestrial	[mol N eq.]	1.18E-01	8.93E-04	7.49E-05	0.00E+00	1.83E-01	0.00E+00	0.00E+00	2.74E-05	4.21E-04	2.36E-05	-2.12E-02
POCP	[kg NMVOC eq.]	3.47E-02	5.73E-04	1.98E-05	0.00E+00	6.03E-02	0.00E+00	0.00E+00	1.76E-05	1.17E-04	9.13E-06	-5.55E-03
ADPm[1]	[kg Sb eq.]	2.64E-03	5.51E-07	6.47E-09	0.00E+00	2.99E-04	0.00E+00	0.00E+00	1.69E-08	1.31E-07	1.63E-09	-1.92E-04
ADPf[1]	[MJ]	1.10E+02	2.33E+00	1.91E-02	0.00E+00	5.16E+02	0.00E+00	0.00E+00	7.15E-02	2.21E-01	1.82E-02	-1.47E+01
WDP[1]	[m^3 world eq. deprived]	2.49E+00	1.14E-02	4.29E-03	0.00E+00	1.40E+01	0.00E+00	0.00E+00	3.49E-04	4.93E-02	7.72E-05	-4.71E-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 = Acidifcation; 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.											

ADDITIONAL ENVIRONMENTAL IMPACTS PER FU (ONE PIECE, 10 years) – Actuator FN.0.2												
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	4.44E-07	1.22E-08	1.63E-10	0.00E+00	4.65E-07	0.00E+00	0.00E+00	3.74E-10	1.00E-09	1.28E-10	-6.62E-08
IRP[2]	[kBq U235 eq.]	8.42E-01	3.02E-03	3.34E-05	0.00E+00	1.42E+01	0.00E+00	0.00E+00	9.27E-05	1.34E-03	1.71E-05	-3.32E-01
ETP-fw[1]	[CTUe]	2.35E+02	6.34E-01	1.06E-01	0.00E+00	9.22E+01	0.00E+00	0.00E+00	1.95E-02	2.33E+00	1.71E-01	-4.15E+01
HTP-c[1]	[CTUh]	3.89E-08	1.18E-09	2.38E-11	0.00E+00	5.27E-08	0.00E+00	0.00E+00	3.61E-11	1.12E-10	4.55E-12	-1.00E-08
HTP-nc[1]	[CTUh]	4.52E-07	1.51E-09	1.96E-10	0.00E+00	3.90E-07	0.00E+00	0.00E+00	4.62E-11	1.98E-09	1.10E-10	-1.36E-07
SQP[1]	-	4.83E+01	1.41E+00	7.31E-03	0.00E+00	1.15E+02	0.00E+00	0.00E+00	4.31E-02	8.54E-02	3.98E-02	-9.42E+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 FU (ONE PIECE, 10 years) – Actuator FN.0.2												
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	1.01E+01	4.00E-02	-1.05E+00	0.00E+00	1.41E+02	0.00E+00	0.00E+00	1.23E-03	2.04E-02	2.49E-04	-3.48E+00
PERM	[MJ]	1.54E+00	0.00E+00	-1.54E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.17E+01	4.00E-02	-2.59E+00	0.00E+00	1.41E+02	0.00E+00	0.00E+00	1.23E-03	2.04E-02	2.49E-04	-3.48E+00
PENRE	[MJ]	9.57E+01	2.33E+00	1.53E-02	0.00E+00	5.16E+02	0.00E+00	0.00E+00	7.15E-02	-2.59E+00	-1.75E+00	-1.47E+01
PENRM	[MJ]	3.68E+00	0.00E+00	-3.21E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.39E+00	-1.29E+00	0.00E+00
PENRT	[MJ]	9.94E+01	2.33E+00	1.21E-02	0.00E+00	5.16E+02	0.00E+00	0.00E+00	7.15E-02	-4.98E+00	-3.04E+00	-1.47E+01
SM	[kg]	7.50E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m^{3}]	6.72E-02	-2.82E-05	6.80E-05	0.00E+00	4.45E-01	0.00E+00	0.00E+00	9.60E-06	1.09E-03	6.12E-06	-1.53E-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.												

WASTE CATEGORIES AND OUTPUT FLOWS PER FU (ONE PIECE, 10 years) – Actuator FN.0.2												
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	7.68E-01	3.40E-03	1.12E-03	0.00E+00	1.31E+00	0.00E+00	0.00E+00	1.04E-04	1.65E-02	2.87E-05	-1.43E-01
NHWD	[kg]	2.84E+01	7.17E-02	6.26E-02	0.00E+00	1.01E+02	0.00E+00	0.00E+00	2.20E-03	1.71E-01	2.42E-01	-6.30E+00
RWD	[kg]	5.71E-05	1.86E-07	2.33E-09	0.00E+00	8.27E-04	0.00E+00	0.00E+00	5.71E-09	9.35E-08	1.20E-09	-1.87E-05

CRU	[kg]	9.40E-02	0.00E+00	3.75E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	2.69E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.14E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	1.79E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.88E-01	0.00E+00	0.00E+00

EET	[MJ]	0.00E+00	0.00E+00	4.63E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E+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 FU (ONE PIECE, 10 years) – Actuator FN.0.2		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in product	[kg C]	0.00E+00
Biogenic carbon content in accompanying packaging	[kg C]	4.83E-02
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

ENVIRONMENTAL IMPACTS PER FU (ONE PIECE 10 years) – Actuator FH												
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2 eq.]	1.30E+01	1.94E-01	1.80E-01	0.00E+00	2.09E+01	0.00E+00	0.00E+00	5.58E-03	2.92E-01	6.48E-03	-5.56E-01
GWP-fossil	[kg CO_2 eq.]	1.31E+01	1.94E-01	2.62E-03	0.00E+00	2.01E+01	0.00E+00	0.00E+00	5.57E-03	2.92E-01	6.48E-03	-5.59E-01
GWP-biogenic	[kg CO_2 eq.]	-1.77E-01	1.28E-04	1.77E-01	0.00E+00	7.04E-01	0.00E+00	0.00E+00	3.67E-06	4.93E-05	5.75E-06	3.82E-03
GWP-luluc	[kg CO_2 eq.]	2.22E-02	6.45E-05	6.20E-07	0.00E+00	6.12E-02	0.00E+00	0.00E+00	1.85E-06	1.14E-05	5.72E-07	-8.66E-04
ODP	[kg CFC 11 eq.]	1.70E-06	3.85E-09	3.38E-11	0.00E+00	3.70E-07	0.00E+00	0.00E+00	1.11E-10	2.69E-10	2.64E-11	-5.46E-09
AP	[mol H^+ eq.]	1.10E-01	4.04E-04	1.70E-05	0.00E+00	1.18E-01	0.00E+00	0.00E+00	1.16E-05	1.06E-04	7.38E-06	-1.10E-02
EP-freshwater	[kg P eq.]	1.88E-02	1.31E-05	2.70E-07	0.00E+00	1.87E-02	0.00E+00	0.00E+00	3.77E-07	4.01E-06	1.05E-07	-4.03E-03
EP-marine	[kg N eq.]	2.17E-02	9.69E-05	8.57E-06	0.00E+00	1.85E-02	0.00E+00	0.00E+00	2.79E-06	4.58E-05	1.41E-04	-3.48E-03
EP-terrestrial	[mol N eq.]	2.06E-01	1.05E-03	7.53E-05	0.00E+00	1.66E-01	0.00E+00	0.00E+00	3.01E-05	4.05E-04	2.98E-05	-2.72E-02
POCP	[kg NMVOC eq.]	5.93E-02	6.71E-04	1.99E-05	0.00E+00	5.47E-02	0.00E+00	0.00E+00	1.93E-05	1.09E-04	1.16E-05	-5.92E-03
ADPm[1]	[kg Sb eq.]	4.96E-03	6.45E-07	6.50E-09	0.00E+00	2.71E-04	0.00E+00	0.00E+00	1.85E-08	8.91E-08	2.09E-09	-1.25E-04
ADPf[1]	[MJ]	1.84E+02	2.73E+00	1.92E-02	0.00E+00	4.67E+02	0.00E+00	0.00E+00	7.84E-02	1.59E-01	2.27E-02	-6.92E+00
WDP[1]	[m^3 world eq. deprived]	4.33E+00	1.33E-02	4.31E-03	0.00E+00	1.27E+01	0.00E+00	0.00E+00	3.83E-04	5.24E-02	9.99E-05	-2.18E-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 = Acidifcation; 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.											

ADDITIONAL ENVIRONMENTAL IMPACTS PER FU (ONE PIECE, 10 years) – Actuator FH												
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	7.55E-07	1.43E-08	1.64E-10	0.00E+00	4.21E-07	0.00E+00	0.00E+00	4.10E-10	7.74E-10	1.61E-10	-7.33E-08
IRP[2]	[kBq U235 eq.]	1.52E+00	3.54E-03	3.36E-05	0.00E+00	1.29E+01	0.00E+00	0.00E+00	1.02E-04	7.53E-04	2.21E-05	-9.93E-02
ETP-fw[1]	[CTUe]	4.12E+02	7.42E-01	1.07E-01	0.00E+00	8.35E+01	0.00E+00	0.00E+00	2.13E-02	2.20E+00	2.34E-01	-5.76E+01
HTP-c[1]	[CTUh]	5.24E-08	1.38E-09	2.39E-11	0.00E+00	4.78E-08	0.00E+00	0.00E+00	3.96E-11	1.01E-10	5.84E-12	-9.27E-09

HTP-nc[1]	[CTUh]	6.56E-07	1.76E-09	1.97E-10	0.00E+00	3.53E-07	0.00E+00	0.00E+00	5.07E-11	1.45E-09	1.51E-10	-5.47E-08
SQP[1]	-	7.60E+01	1.65E+00	7.34E-03	0.00E+00	1.04E+02	0.00E+00	0.00E+00	4.73E-02	6.32E-02	5.04E-02	-8.19E+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 FU (ONE PIECE, 10 years) – Actuator FH

Parameter	Unit	A1-A3	A4	A5	B1-B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	1.77E+01	4.68E-02	-1.05E+00	0.00E+00	1.28E+02	0.00E+00	0.00E+00	1.35E-03	1.27E-02	3.22E-04	-1.87E+00
PERM	[MJ]	1.54E+00	0.00E+00	-1.54E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.43E+00	-1.85E+00	0.00E+00
PERT	[MJ]	1.92E+01	4.68E-02	-2.59E+00	0.00E+00	1.28E+02	0.00E+00	0.00E+00	1.35E-03	-3.42E+00	-1.85E+00	-1.87E+00
PENRE	[MJ]	1.69E+02	2.73E+00	1.46E-02	0.00E+00	4.67E+02	0.00E+00	0.00E+00	7.84E-02	-3.78E+00	-2.41E+00	-6.92E+00
PENRM	[MJ]	5.29E+00	0.00E+00	-3.88E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.43E+00	-1.85E+00	0.00E+00
PENRT	[MJ]	1.75E+02	2.73E+00	1.07E-02	0.00E+00	4.67E+02	0.00E+00	0.00E+00	7.84E-02	-7.21E+00	-4.26E+00	-6.92E+00
SM	[kg]	7.50E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m^3]	1.16E-01	3.66E-04	6.83E-05	0.00E+00	4.03E-01	0.00E+00	0.00E+00	1.05E-05	1.13E-03	6.12E-06	-6.88E-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.											

WASTE CATEGORIES AND OUTPUT FLOWS PER FU (ONE PIECE, 10 years) – Actuator FH

Parameter	Unit	A1-A3	A4	A5	B1-B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	1.26E+00	3.98E-03	1.12E-03	0.00E+00	1.18E+00	0.00E+00	0.00E+00	1.14E-04	1.48E-02	3.70E-05	-1.21E-01
NHWD	[kg]	4.50E+01	8.40E-02	6.28E-02	0.00E+00	9.14E+01	0.00E+00	0.00E+00	2.42E-03	1.88E-01	3.33E-01	-2.78E+00
RWD	[kg]	1.05E-04	2.18E-07	2.34E-09	0.00E+00	7.49E-04	0.00E+00	0.00E+00	6.26E-09	5.30E-08	1.55E-09	-4.70E-06

CRU	[kg]	9.40E-02	0.00E+00	3.75E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	5.96E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.14E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	1.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.70E-01	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	4.65E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.73E+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 FU (ONE PIECE, 10 years) – Actuator FH

Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	0.00E+00
Biogenic carbon content in accompanying packaging	[kg C]	4.84E-02
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

ENVIRONMENTAL IMPACTS PER FU (ONE PIECE 10 years) – Actuator FT.0.3												
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2 eq.]	8.38E-01	7.94E-02	7.60E-02	0.00E+00	1.79E+00	0.00E+00	0.00E+00	2.80E-03	1.18E-01	1.99E-03	-2.42E-01
GWP-fossil	[kg CO_2 eq.]	9.14E-01	7.93E-02	7.87E-04	0.00E+00	1.72E+00	0.00E+00	0.00E+00	2.80E-03	1.18E-01	1.98E-03	-2.41E-01
GWP-biogenic	[kg CO_2 eq.]	-7.52E-02	5.22E-05	7.52E-02	0.00E+00	6.03E-02	0.00E+00	0.00E+00	1.84E-06	2.74E-05	1.71E-06	-9.07E-04
GWP-luluc	[kg CO_2 eq.]	-3.15E-04	2.64E-05	1.76E-07	0.00E+00	5.25E-03	0.00E+00	0.00E+00	9.31E-07	1.09E-05	2.05E-07	-3.00E-04
ODP	[kg CFC 11 eq.]	3.62E-07	1.58E-09	9.57E-12	0.00E+00	3.17E-08	0.00E+00	0.00E+00	5.57E-11	1.96E-10	9.81E-12	-2.14E-09
AP	[mol H^+ eq.]	1.43E-02	1.65E-04	4.82E-06	0.00E+00	1.01E-02	0.00E+00	0.00E+00	5.83E-06	6.83E-05	2.67E-06	-6.54E-03
EP-freshwater	[kg P eq.]	2.42E-03	5.37E-06	7.92E-08	0.00E+00	1.60E-03	0.00E+00	0.00E+00	1.90E-07	3.67E-06	3.67E-08	-1.22E-03
EP-marine	[kg N eq.]	1.68E-03	3.97E-05	2.44E-06	0.00E+00	1.59E-03	0.00E+00	0.00E+00	1.40E-06	2.37E-05	4.20E-05	-6.93E-04
EP-terrestrial	[mol N eq.]	2.09E-02	4.28E-04	2.14E-05	0.00E+00	1.42E-02	0.00E+00	0.00E+00	1.51E-05	2.17E-04	1.08E-05	-9.35E-03
POCP	[kg NMVOC eq.]	6.34E-03	2.75E-04	5.67E-06	0.00E+00	4.69E-03	0.00E+00	0.00E+00	9.69E-06	6.18E-05	4.16E-06	-2.27E-03
ADPm[1]	[kg Sb eq.]	1.67E-04	2.64E-07	1.84E-09	0.00E+00	2.32E-05	0.00E+00	0.00E+00	9.31E-09	7.97E-08	7.29E-10	-8.04E-05
ADPf[1]	[MJ]	2.44E+01	1.12E+00	5.46E-03	0.00E+00	4.00E+01	0.00E+00	0.00E+00	3.94E-02	1.29E-01	8.42E-03	-3.01E+00
WDP[1]	[m^3 world eq. deprived]	4.30E-01	5.46E-03	1.22E-03	0.00E+00	1.09E+00	0.00E+00	0.00E+00	1.93E-04	3.76E-02	3.43E-05	-1.10E-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 = Acidifcation; 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.											

ADDITIONAL ENVIRONMENTAL IMPACTS PER FU (ONE PIECE, 10 years) – Actuator FT.0.3												
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	7.52E-08	5.84E-09	4.69E-11	0.00E+00	3.61E-08	0.00E+00	0.00E+00	2.06E-10	5.72E-10	5.87E-11	-2.99E-08
IRP[2]	[kBq U235 eq.]	7.10E-02	1.45E-03	9.50E-06	0.00E+00	1.11E+00	0.00E+00	0.00E+00	5.11E-05	7.61E-04	7.61E-06	-3.06E-02
ETP-fw[1]	[CTUe]	3.78E+01	3.04E-01	2.99E-02	0.00E+00	7.16E+00	0.00E+00	0.00E+00	1.07E-02	1.74E+00	6.94E-02	-1.73E+01
HTP-c[1]	[CTUh]	1.19E-08	5.63E-10	6.82E-12	0.00E+00	4.09E-09	0.00E+00	0.00E+00	1.99E-11	6.10E-11	2.04E-12	-3.68E-09
HTP-nc[1]	[CTUh]	1.12E-07	7.22E-10	5.59E-11	0.00E+00	3.03E-08	0.00E+00	0.00E+00	2.55E-11	1.02E-09	4.50E-11	-5.27E-08
SQP[1]	-	5.92E+00	6.74E-01	2.09E-03	0.00E+00	8.91E+00	0.00E+00	0.00E+00	2.38E-02	5.21E-02	1.82E-02	-3.11E+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 FU (ONE PIECE, 10 years) – Actuator FT.0.3

Parameter	Unit	A1-A3	A4	A5	B1-B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	1.74E+00	1.91E-02	-3.02E-01	0.00E+00	1.10E+01	0.00E+00	0.00E+00	6.76E-04	1.21E-02	1.11E-04	-7.97E-01
PERM	[MJ]	6.53E-01	0.00E+00	-6.53E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	2.40E+00	1.91E-02	-9.55E-01	0.00E+00	1.10E+01	0.00E+00	0.00E+00	6.76E-04	1.21E-02	1.11E-04	-7.97E-01
PENRE	[MJ]	1.16E+01	1.12E+00	3.48E-03	0.00E+00	4.00E+01	0.00E+00	0.00E+00	3.94E-02	-1.10E+00	-7.10E-01	-3.01E+00
PENRM	[MJ]	1.49E+00	0.00E+00	-1.69E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-9.65E-01	-5.20E-01	-3.81E+00
PENRT	[MJ]	1.30E+01	1.12E+00	1.80E-03	0.00E+00	4.00E+01	0.00E+00	0.00E+00	3.94E-02	-2.07E+00	-1.23E+00	-6.82E+00
SM	[kg]	8.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.53E-02
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m^3]	1.18E-02	1.50E-04	1.92E-05	0.00E+00	3.46E-02	0.00E+00	0.00E+00	5.29E-06	8.53E-04	3.57E-06	-3.70E-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.											

WASTE CATEGORIES AND OUTPUT FLOWS PER FU (ONE PIECE, 10 years) – Actuator FT.0.3

Parameter	Unit	A1-A3	A4	A5	B1-B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	2.26E-01	1.63E-03	3.16E-04	0.00E+00	1.01E-01	0.00E+00	0.00E+00	5.74E-05	1.14E-02	1.28E-05	-1.06E-01
NHWD	[kg]	5.84E+00	3.44E-02	1.81E-02	0.00E+00	7.84E+00	0.00E+00	0.00E+00	1.21E-03	9.22E-02	9.84E-02	-1.83E+00
RWD	[kg]	5.22E-06	8.92E-08	6.63E-10	0.00E+00	6.42E-05	0.00E+00	0.00E+00	3.15E-09	5.33E-08	5.34E-10	-2.28E-06
CRU	[kg]	3.95E-02	0.00E+00	2.40E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	2.45E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.10E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	5.19E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.28E-01	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	1.34E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.88E-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 FU (ONE PIECE, 10 years) – Actuator FT.0.3

Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	0.00E+00
Biogenic carbon content in accompanying packaging	[kg C]	2.05E-02
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

ENVIRONMENTAL IMPACTS PER FU (ONE PIECE 10 years) – Actuator SM.0.0.0.3												
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2 eq.]	1.08E+01	7.18E-01	4.22E-02	0.00E+00	6.40E+01	0.00E+00	0.00E+00	3.30E-02	7.34E-01	1.16E-02	-1.57E+00
GWP-fossil	[kg CO_2 eq.]	1.09E+01	7.18E-01	5.17E-03	0.00E+00	6.17E+01	0.00E+00	0.00E+00	3.30E-02	7.34E-01	1.16E-02	-1.55E+00
GWP-biogenic	[kg CO_2 eq.]	-3.68E-02	4.72E-04	3.71E-02	0.00E+00	2.16E+00	0.00E+00	0.00E+00	9.99E-08	-3.51E-05	9.16E-06	-2.30E-02
GWP-luluc	[kg CO_2 eq.]	8.66E-03	2.39E-04	1.06E-06	0.00E+00	1.88E-01	0.00E+00	0.00E+00	1.34E-05	7.89E-05	1.67E-06	-3.75E-03
ODP	[kg CFC 11 eq.]	2.10E-07	1.43E-08	5.77E-11	0.00E+00	1.14E-06	0.00E+00	0.00E+00	4.89E-10	7.36E-10	8.44E-11	-1.74E-08
AP	[mol H^+ eq.]	7.79E-02	1.49E-03	2.90E-05	0.00E+00	3.63E-01	0.00E+00	0.00E+00	7.57E-05	4.42E-04	2.21E-05	-1.60E-02
EP-freshwater	[kg P eq.]	5.10E-03	4.86E-05	4.58E-07	0.00E+00	5.74E-02	0.00E+00	0.00E+00	2.61E-06	2.36E-05	2.88E-07	-3.07E-03
EP-marine	[kg N eq.]	2.27E-02	3.59E-04	1.47E-05	0.00E+00	5.69E-02	0.00E+00	0.00E+00	1.76E-05	1.54E-04	2.25E-04	-6.86E-03
EP-terrestrial	[mol N eq.]	1.53E-01	3.87E-03	1.29E-04	0.00E+00	5.10E-01	0.00E+00	0.00E+00	1.90E-04	1.42E-03	9.05E-05	-3.57E-02
POCP	[kg NMVOC eq.]	4.98E-02	2.48E-03	3.40E-05	0.00E+00	1.68E-01	0.00E+00	0.00E+00	1.06E-04	3.94E-04	3.39E-05	-9.25E-03
ADPm[1]	[kg Sb eq.]	9.42E-04	2.39E-06	1.11E-08	0.00E+00	8.32E-04	0.00E+00	0.00E+00	1.10E-07	4.71E-07	5.64E-09	-4.43E-04
ADPf[1]	[MJ]	1.63E+02	1.01E+01	3.27E-02	0.00E+00	1.44E+03	0.00E+00	0.00E+00	4.64E-01	8.20E-01	7.21E-02	-2.08E+01
WDP[1]	[m^3 world eq. deprived]	5.06E+00	4.94E-02	7.39E-03	0.00E+00	3.91E+01	0.00E+00	0.00E+00	2.11E-03	6.22E-02	2.58E-04	-1.16E+00
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 = Acidifcation; 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.											

ADDITIONAL ENVIRONMENTAL IMPACTS PER FU (ONE PIECE, 10 years) – Actuator SM.0.0.0.3												
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	5.60E-07	5.28E-08	2.80E-10	0.00E+00	1.29E-06	0.00E+00	0.00E+00	2.46E-09	3.74E-09	4.92E-10	-1.15E-07
IRP[2]	[kBq U235 eq.]	7.44E-01	1.31E-02	5.74E-05	0.00E+00	3.96E+01	0.00E+00	0.00E+00	3.85E-04	5.66E-03	5.78E-05	-3.34E-01
ETP-fw[1]	[CTUe]	3.12E+02	2.75E+00	1.84E-01	0.00E+00	2.57E+02	0.00E+00	0.00E+00	1.25E-01	4.09E+00	3.71E-01	-1.56E+02
HTP-c[1]	[CTUh]	1.23E-07	5.10E-09	4.07E-11	0.00E+00	1.47E-07	0.00E+00	0.00E+00	1.74E-10	3.82E-10	1.59E-11	-5.59E-08
HTP-nc[1]	[CTUh]	4.74E-07	6.53E-09	3.37E-10	0.00E+00	1.09E-06	0.00E+00	0.00E+00	2.99E-10	8.08E-09	2.43E-10	-1.23E-07
SQP[1]	-	4.36E+01	6.10E+00	1.25E-02	0.00E+00	3.19E+02	0.00E+00	0.00E+00	2.81E-01	3.09E-01	1.51E-01	-1.47E+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 FU (ONE PIECE, 10 years) – Actuator SM.0.0.0.3												
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	1.05E+01	1.73E-01	-1.79E+00	0.00E+00	3.93E+02	0.00E+00	0.00E+00	6.17E-03	7.93E-02	8.42E-04	-3.89E+00
PERM	[MJ]	2.36E+00	0.00E+00	-2.36E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.29E+01	1.73E-01	-4.14E+00	0.00E+00	3.93E+02	0.00E+00	0.00E+00	6.17E-03	7.93E-02	8.42E-04	-3.89E+00
PENRE	[MJ]	1.43E+02	1.01E+01	1.41E-02	0.00E+00	1.44E+03	0.00E+00	0.00E+00	4.64E-01	-6.17E+00	-3.73E+00	-2.08E+01
PENRM	[MJ]	1.13E+01	0.00E+00	-1.58E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-7.34E+00	-3.95E+00	0.00E+00
PENRT	[MJ]	1.54E+02	1.01E+01	-1.69E-03	0.00E+00	1.44E+03	0.00E+00	0.00E+00	4.64E-01	-1.35E+01	-7.68E+00	-2.08E+01
SM	[kg]	2.57E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.08E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m^3]	1.36E-03	1.36E-03	1.17E-04	0.00E+00	1.24E+00	0.00E+00	0.00E+00	6.20E-05	1.30E-03	4.75E-05	-2.99E-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.											

WASTE CATEGORIES AND OUTPUT FLOWS PER FU (ONE PIECE, 10 years) – Actuator SM.0.0.0.3												
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	1.18E+00	1.47E-02	1.92E-03	0.00E+00	3.63E+00	0.00E+00	0.00E+00	8.18E-04	3.84E-02	9.84E-05	-3.82E-01
NHWD	[kg]	2.91E+01	3.11E-01	1.07E-01	0.00E+00	2.81E+02	0.00E+00	0.00E+00	1.54E-02	5.55E-01	5.21E-01	-6.05E+00
RWD	[kg]	5.15E-05	8.07E-07	4.01E-09	0.00E+00	2.30E-03	0.00E+00	0.00E+00	2.81E-08	3.94E-07	4.06E-09	-2.22E-05
CRU	[kg]	1.41E-01	0.00E+00	4.76E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	2.68E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.54E-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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	3.07E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	7.93E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.96E+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 FU (ONE PIECE, 10 years) – Actuator SM.0.0.0.3		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in product	[kg C]	0.00E+00
Biogenic carbon content in accompanying packaging	[kg C]	7.41E-02
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

Additional information

LCA interpretation

The electricity use in B6 is the most significant contributor to the impact of the actuator.

Technical information on scenarios

Reference service life

RSL information		Unit
Reference service Life	10	Years

Use (B1-B7)

Scenario information	FN.0.2	FH	FT.0.3	SM.0.0.0.3	Unit
B6 – Use of energy					
Power consumption during operation	1.2	2.6	1.2	5.0	W
Power consumption in standby	0.75	0.6	-	2.0	W
Fraction of standby time	95				%
Actuator unit power consumption, Total over RSL (10 years)	67.7	61.3	5.3	188.3	kWh

End of life (C1-C4)

Scenario information	FN.0.2	FH	FT.0.3	SM.0.0.0.3	Unit
Collected separately	1.62E-01	1.96E-01	8.49E-02	7.98E-01	kg
Collected with mixed waste	8.72E-02	1.05E-01	4.57E-02	4.30E-01	kg
For reuse	0.00E+00	0.00E+00	0.00E+00	0.00E+00	kg
For recycling	6.80E-02	6.80E-02	4.10E-02	5.53E-01	kg
For energy recovery	9.39E-02	1.28E-01	4.39E-02	2.45E-01	kg
For final disposal	8.72E-02	1.05E-01	4.57E-02	4.30E-01	kg

Re-use, recovery and recycling potential (D)

Scenario information/Material	FN.0.2	FH	FT.0.3	SM.0.0.0.3	Unit
Displaced material	5.71E-02	5.71E-02	3.28E-02	3.84E-01	kg
EET	1.26E+00	1.73E+00	5.88E-01	2.96E+00	MJ
EEE	4.88E-01	6.70E-01	2.28E-01	1.15E+00	MJ

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

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Programme operator	Danish Technological Institute Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA-practitioner	Mariana Cipriano Jordão, Amanda Worsøe Andersen and Renata Guimarães Viegand Maagøe A/S Nørre Søgade 35 DK-1370 København K www.viegandmaagoe.dk
LCA software /background data	ecoinvent v3.10 EN 15804 reference package 3.1
3rd party verifier	Linda Høibye Life Cycle Assessment Consulting

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

EN 15804
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