

Owner: VOLA A/S  
No.: MD-22015-EN\_rev1  
Issued: 20-12-2022  
Issued first time: 19-10-2022  
Valid to: 19-10-2027

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3<sup>rd</sup> PARTY VERIFIED

# EPD

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VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804:2012  
+ A2:2019



**Owner of the declaration**

VOLA A/S  
Lunavej 2  
8700 Horsens  
Denmark  
VAT no.: 17531328



**Issued:**

20-12-2022

**Valid to:**

19-10-2027

**Programme**

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



- Industry EPD
- Product EPD

**Declared products**

HV1E-16  
HV1E2-19  
HV1E-40  
HV1E-27  
HV1E-60  
HV1E-64

**Production site**

VOLA A/S  
Lunavej 2  
8700 Horsens  
Denmark

**Product(s) use**

VOLA fixtures are used in kitchens and bathrooms.

**Declared/ functional unit**

1 fixture with RSL of 30 years

**Year of data**

2020

**EPD version**

The first issue

**Basis of calculation**

This EPD is developed 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 <input type="checkbox"/> internal <input checked="" type="checkbox"/> external
Third party verifier:  Ninkie Bendtsen

[Name]  
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, and 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 main product components are shown in Table 1. Values are given as intervals covering the seven products with six different surfaces. Specific recipes are used, and the composition of input materials is 100 % in mass -% of declared products.

**Table 1: Material composition of products**

Material	Amount [%]
Steel	6,47 – 51,54
Brass	38,19 – 83,94
Plastic	2,64 – 2,89
Rubber	0,36 – 0,38
Electronic	0,01 – 2,61
Other metals	0,14 – 0,54
Coating	0 – 0,27
PVD	0 – 1,24
Battery	2,37 – 2,52
Ceramics	0,003

**Table 2: Material composition of Sales and Transport Packaging for the final VOLA product**

Material	Amount [%]
LDPE	27,3
EPS	2,1
Cardboard	60,9
Paper	9,8
<b>Total</b>	<b>100</b>

## Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of 1 fixture from VOLA on the production site located in Denmark. Product-specific data are based on average values covering the period from 01.01.2020 to 31.12.2020. Background data are based on SimaPro 9.2 and are less than 10 years old. Only in a few cases are SimaPro 9.2 data supplemented with data from Ecoinvent 3.7.1 (2020). Generally, the used background datasets are of high quality, and the majority of the datasets are only a few years old. During 2020, VOLA switched to individual declaration and electricity produced from green sources i.e. wind energy in this case. Therefore, it was possible to account for the whole amount of wind energy provision for the year 2020.

## Hazardous substances

Declared products do not contain substances listed in the "Candidate List of Substances of Very High Concern for authorization" with the exception of lead contained in brass with a concentration above 0,1 %.

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

## Essential characteristics

There is no harmonized specification, but VOLA produces products according to relevant product standards. Components that are in contact with water are produced in lead-free brass, according to 4MS and California Assembly Bill AB1953. Components in stainless steel are produced in the material according to EN10088-3:2014 and AISI316 (American Iron and Steel Institute)

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

<http://www.vola.com>

## Reference Service Life (RSL)

A reference service life (RSL) for all products is declared for 30 years. The lifespan of products has been provided by the manufacturer VOLA based on "BUILD REPORT 2021" Version 2021 – lifetime tables: group 53 (3) = lifetime of 30 years (BUILD REPORT 2021).

Picture of products



**Figure 1: HV1E & HV1EN, HV1E/150 & HV1EN/150, HV1E2 & HV1EN2, and HV1E2/150**



**Figure 2: Battery 1,5 V AA**

Seven products (HV1E, HV1E2, HV1EN, HV1EN2, HV1EN-150, HV1E-150, and HV1E2-150) are calculated in six different surface groups (16 and 20, 19, 40, 27, 60, 64), see Figure 1 and Figure 2.

Group 4 called Colors have more surfaces: Grey (02), Blue (04), Orange (05), Light green (06), Yellow (08), Dark grey (09), Mocca (12), Bright red (14), Dark blue (15), Gloss black (17), Gloss white (18), Carmine red (21), Pink (25), Matt black (27), and Matt white (28).

Group 5 called Exclusive color with PVD on Brass have also more surfaces: Black (60), Deep black (62), Copper (63), Gold (65), and Nickel (68).

Group 6 called Exclusive color with PVD on Stainless steel have also more surfaces: Brushed black (61), Brushed copper (64), Brushed gold (70), and Dark brushed copper (71).

# LCA background

## Declared unit

The declared unit is taken as the input of materials in order to produce 1 fixture.

The LCI and LCIA results in this EPD relate to 1 fixture from VOLA for the types: HV1E, HV1E2, HV1EN, HV1EN2, HV1EN-150, HV1E-150, and HV1E2-150.

Table 3 Table 2 shows declared units for 6 product groups with 7 different surfaces (16 and 20, 19, 40, 27, 60, 64) and 7 different variations of products (HV1E, HV1E2, HV1EN, HV1EN2, HV1EN-150, HV1E-150, and HV1E2-150).

The results for:

- Group no. 1 refers to Table 7 to Table 11
- Group no. 2 refers to Table 12 to Table 16
- Group no. 3 refers to Table 17 to Table 21
- Group no. 4 refers to Table 22 to Table 26
- Group no. 5 refers to Table 27 to Table 31
- Group no. 6 refers to Table 32 to Table 36

## PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804, and Part B/ PCR-Part B: Requirements on the EPD for Bathroom and showers.

**Table 3: Declared unit**

Group no.	Surface/Material		Surface no.	Product name / Value							Unit	Conversion factor to 1 kg
				HV1E	HV1E2	HV1EN	HV1EN2	HV1E-150	HV1EN-150	HV1E2-150		
1	Polished and brushed chrome	Polished chrome	16	2,31	2,32	2,32	2,45	2,36	2,48	2,37	kg/piece	0,42
		Brushed chrome	20	2,32	2,34	2,45	2,47	2,37	2,50	2,39	kg/piece	0,42
2	Natural brass	Natural brass	19	2,31	2,32	2,39	2,41	2,36	2,44	2,37	kg/piece	0,41
3	Stainless steel	Stainless steel	40	2,22	2,23	2,35	2,36	2,25	2,38	2,26	kg/piece	0,44
4	Colors	Matt black	27	2,39	2,42	2,39	2,55	2,44	2,44	2,46	kg/piece	0,41
5	Exclusive color (PVD on Brass)	Black	60	2,37	2,39	2,46	2,48	2,41	2,49	2,42	kg/piece	0,41
6	Exclusive color (PVD on Stainless steel)	Brushed copper	64	2,28	2,30	2,41	2,43	2,31	2,44	2,34	kg/piece	0,41
Declared unit				1							piece	0,39 - 0,45

Flow diagram

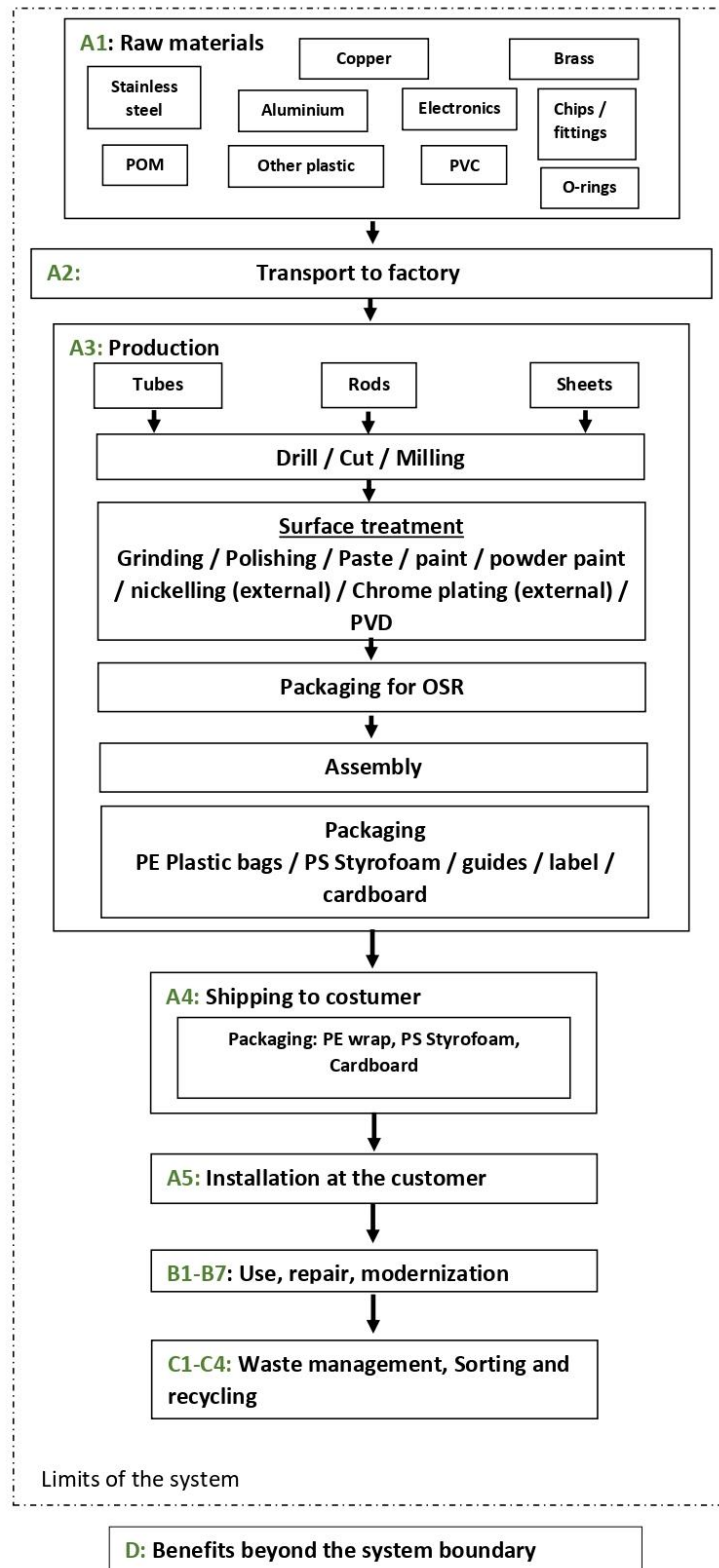


Figure 3: Flow diagram of product system with modules A1-D

The Flow diagram (Figure 3) conforms with the requirements of the modular approach and shows all phases. All phases are described below.

## System boundary

This EPD is based on a cradle-to-grave LCA, in which 100 weight-% has been accounted for.

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

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

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

#### A1: Extraction and processing of raw materials

VOLA uses the purest (primary) steel and brass to make sure the products are built to last. Components from plastic, rubber, batteries, electronic, ceramic, nickel, and chrome are reproduced from suppliers.

The materials that are used to pack all raw materials are metal strips, cardboard, paper, wood, and plastic.

#### A2: Transport to the production site in Horsens, Denmark

The raw materials are transported to the manufacturing site. The modelling includes road and/or flight transportation of each raw material. The transportation of all raw materials is by trucks and/or airplanes.

#### A3: Manufacturing processes

The production of packaging materials is taken into account at this stage. The processing of any waste arising from this stage is also included. The main raw material is stainless steel and brass. These materials constitute 80-90 % of the total product. Stainless steel components have different qualities: 304L, and 316L. The brass components are of different qualities: CW508L, CW511, and CW614N. The rest of the components are mainly

made of different kinds of rubber and plastic materials.

From solid brass/stainless steel rods or pipes, components are rotated, drilled, or milled on CNC machines. Subsequently, the components are ground/polished to create a unique surface, either by manual or automatic processes. Some components are hand-soldered or soldered by induction. The finished polished components are treated with a surface finish depending on the finish the customer wishes. Production is based on LEAN-production, where stocks are minimized and where products are put into production as soon as they are sold (Make to order, MTO).

The colored surfaces in product group no 4. represented by surface no. 27 also include powder coating material. The waste of brass from production is 55-57 % from groups no. 1, 2, 4, and 5; 73 % of brass waste is from groups no. 3 and 6.

The waste of steel from production is 73 % for group no. 1, 63 % of steel waste is from groups no. 2, 4, and 5, 48-49 % of steel waste is from groups no. 3 and 6.

The brass and steel that are cut during manufacturing processes are recycled and transported by lorry to the sorting and collecting center.

The disposal of the packaging of raw materials is taken into account at this stage. 55 % of wood and 20 % of plastic are recycled, and 45 % of wood and 80 % of plastic are incinerated. The rest of the packaging material (cardboard, paper, and metal) is transported only to the sorting and collecting center, no further processes are included.

Transportation to the sorting and collecting center is covered by a European average EURO 5 lorry 16 t with a diesel engine, and distance to the recycling and incineration station is covered by a European average EURO 5 lorry >32 tons with a diesel engine.

**The construction process stage (A4-A5) includes:**

**A4: Transportation from the VOLA production site in Horsens, Denmark to customers**

Distribution to customers is based on the current European market situation and takes into account not only the current fleet mix with primarily Euro 5 vehicles but also vehicle loading with an average of 5 t and effective distances, see Table 37: Average transport to the building site (A4)Table 37. It is implemented within Europe using diesel-powered trucks.

**A5: Installation of products**

Installation is simple and does not require any relevant energy consumption or use of materials, due to manual installment by technicians.

Mounting instructions are included with the product or can be downloaded on: [www.VOLA.com](http://www.VOLA.com)

Apart from the waste of sales and transport packaging for the final VOLA product (paper, cardboard, plastics), no additional material flows are generated during installation.

Overall, 58 % of the sales and transport packaging for the final VOLA product is recycled, 19 % is transported to the landfill, and 23 % is incinerated, with the potential benefits reported in module D.

Waste packaging materials are transported 300 km to the recycling center, 100 km to the incineration station, and 50 km to the landfill. Transportation is covered by a European average EURO 5 lorry 16 t with a diesel engine.

**Use stage (B1-B7) includes:**

**B1: Use**

The product has a reference service life of a minimum of 30 years. This determined that the product will last at least 30 years provided that the requirements for maintenance and repair throughout this period are kept. The lifespan of products has been provided by the manufacturer, VOLA. This LCA phase scenario includes a use stage based in Europe. There are no direct emissions from the use of VOLA products.

**B2: Maintenance**

VOLA has declaimed this maintenance information. Maintenance instructions are part of the VOLA product, which also be downloaded at: [www.VOLA.com](http://www.VOLA.com)

Waste packaging materials resulting from the maintenance are omitted.

**B3: Repair**

The product is made of a few parts that can easily be changed and replaced by new parts. The service interval for the VOLA parts depends on use and water quality scenarios. The estimated service interval is approx. 10 years. Parts that are calculated for repair are hoses, cartridges, and pilators.

VOLA guarantees that it is possible to get spare parts a minimum of 30 years from the day the product is ordered. Service drawing is available on: [www.VOLA.com](http://www.VOLA.com)

**B4: Replacement**

There is no calculated replacement due to the declaration for a product life of 30 years.

**B5: Refurbishment**

No refurbishment is taken into account within 30 years.

**(B6-B7) Consumption data**

This use stage consists of energy and water consumption for the users with an assumption to be used in bathrooms and kitchens for 30 years. The energy and water use calculation follows the formula provided in the reference PCR. The energy is based on the European grid consumption mix. Water consumption is based on the European market for tap water.

Sensor "hand-free" washbasin taps ensure low water consumption thanks to efficient control electronics. The actual amount of water and energy that is consumed during use partly depends on user behaviour. The technical operating scenario is available in Table 4. The estimation has been made for the usage of tap aerators with 1,9 l/min water consumption, an average of 100 cycles per day, and a cycle time of 5 seconds, see Table 5 and Table 6.



**Table 4: Consumption data in the use stage – Operational energy use and water use**

Technical data		Battery (2 x AA)	Mains
Flow rate	l/min	1,9	1,9
Standby consumption of the PSU	W	-	≤ 0,3
Energy consumption of the PSU (100 cycles per day in 1 year)	kWh	-	0,9
Battery lifetime when used 100 times a day (type AA batteries)	years	2	-
Possible Cycle time settings	Sec.	(0 – 1 – 3 – 5 – 8 – 10 – 15 – 20)	(0 – 1 – 3 – 5 – 8 – 10 – 15 – 20)

**Table 5: Consumption data - cycle time (1,9 l/min)**

1,9 l/min water-saving aerators and Cycle time Settings of 5 sec. (Default sensor setting 120mm)								
Use scenario		Intensity of use			Water consumption		Energy consumption	
		Per day	Per year	Per RSL	[Litres]	[Litres]	[kWh]	[kWh]
					per year	per RSL	per year	per RSL
High-use (Public buildings)	0,16 liter per use	300	109.500	3.285.000	17.520	525.600	5,328	159,84
Medium (Office buildings)	0,16 liter per use	150	547.50	1.642.500	8.760	262.800	3,978	119,34
Average building	0,16 liter per use	100	365.00	1.095.000	5.840	175.200	3,528	105,84
Low (Private homes)	0,16 liter per use	30	109.50	328.500	1.752	52.560	2,898	86,94

**Table 6: Construction data**

Name	Value	Unit
Maximum load temperature permanent operation	60	°C
Maximum load temperature temporary operation	70	°C
Flow rate (indications for a pressure range of 1-3 bar)	0,3	m <sup>3</sup> /h
Sound emissions	0-20	dB

**End of life stage (C1-C4) includes:**

The end-of-life stage consists of the deconstruction/demolition, transport, waste management, and disposal processes to manage the product as waste after the use phase of 30 years life span.

The generated waste in modules C1-C4 is included up to the "end-of-waste" state or final disposal, with the potential net benefits reported in module D. The end-of-life stage is based on the European market.

**C1: Deconstruction, Demolition**

For the demolition of water basin mixers, the energy consumption is 0,1 kWh. The electricity is based on the European grid mix.

**C2: Transport**

This stage includes the transportation of the demolished product. It is considered that 2,5 % of product parts are transported 100 km to the incineration station, 89,4 % of the product is recycled and transported 300 km, and 8,1 % of the product is transported 50 km to the landfill. Transport is covered by a European average EURO 5 lorry 16 t with a diesel engine.

**C3: Waste Processing**

The end-of-life stage represents the waste scenario after a use stage where 2,5 % of the product parts are assumed to be incinerated in module C3 with energy recovery accounted for in module D. Overall, 89,4 % of the product will be recycled with energy recovery accounted for in module D.

**C4: Disposal**

Overall, 8,1 % of the product will be transported to a landfill.

**Beyond the system boundary (D) includes:**

Module D includes reuse, recovery, and/or recycling potential, expressed as net impact and benefits, due to reuse, recycling, and incineration of materials with energy recovery in modules A5 and C3.

The reused components made from raw materials in the product stage were assumed to replace similar components from raw materials. The plastic and rubber parts of the product are assumed to be incinerated at the end-of-life stage in module C3, whereas an energy recovery (75 % heat, 25 % electricity) and energy efficiency (80 % for heat, 25 % for electricity) from the incineration process is accounted for in module D.

The wooden pallet is part of a return system, and therefore only the transportation is a part of this study. If the wooden part was not part of a return system, then the benefits would be considerably higher for the system. The benefits of recycling chips are uncertain and not included in the assessment.

## LCA results

The significant difference in the environmental impact lies in the base material and the surface treatment, and not in the product manufacturing. Therefore, environmental calculations appear on the following pages based on the basic material (brass/stainless) and the following surface treatments (no. 1-6). The potential environmental impact variation between the products and colors is below 10 % within the six different surface groups, thus justifying their grouping in one group and represented by the results of one product.

Group no. 1. Polished and brushed chrome, represented by HV1E-16 – Polished chrome

Group no. 2. Natural brass, represented by HV1E2-19 – Natural brass

Group no. 3. Stainless steel, represented by HV1E-40 – Stainless steel

Group no. 4. Colors, represented by HV1E-27 – Matt black

Group no. 5. Exclusive color (PVD on Brass), represented by HV1E-60 – Black

Group no. 6. Exclusive color (PVD on Stainless steel), represented by HV1E-64 – Brushed copper

**Group 1: Polished and brushed chrome is represented by HV1E-16**

**Table 7: Environmental impact indicators**

ENVIRONMENTAL IMPACTS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO <sub>2</sub> -eq.	3,09E+01	5,33E-01	2,16E-01	0,00E+00	7,07E+00	2,80E+00	0,00E+00	0,00E+00	4,27E+01	5,91E+01	4,04E-02	1,30E-01	5,19E-01	5,22E-02	-2,43E-01
GWP-fossil	kg CO <sub>2</sub> -eq.	3,07E+01	5,32E-01	1,12E-01	0,00E+00	1,40E+01	2,76E+00	0,00E+00	0,00E+00	4,13E+01	5,78E+01	3,90E-02	1,30E-01	5,18E-01	5,05E-03	-2,02E-01
GWP-biogenic	kg CO <sub>2</sub> -eq.	1,15E-01	5,75E-04	1,04E-01	0,00E+00	-1,81E+01	4,19E-02	0,00E+00	0,00E+00	1,33E+00	1,20E+00	1,26E-03	1,25E-04	1,23E-03	4,72E-02	-3,99E-02
GWP-luluc	kg CO <sub>2</sub> -eq.	5,98E-02	3,18E-04	8,33E-06	0,00E+00	1,12E+01	2,10E-03	0,00E+00	0,00E+00	9,76E-02	1,00E-01	9,22E-05	6,12E-05	4,42E-04	2,76E-06	-3,06E-04
ODP	kg CFC11-eq.	1,81E-06	1,16E-07	4,44E-09	0,00E+00	2,79E-06	3,01E-07	0,00E+00	0,00E+00	2,08E-06	3,86E-06	1,97E-09	2,92E-08	4,17E-09	7,07E-10	-9,84E-09
AP	mol H <sup>+</sup> -eq.	1,70E+00	2,07E-03	1,27E-04	0,00E+00	1,39E-01	2,43E-02	0,00E+00	0,00E+00	2,35E-01	3,22E-01	2,22E-04	5,17E-04	1,16E-03	2,28E-05	-9,34E-04
EP-freshwater	kg P-eq.	1,35E-01	4,94E-05	2,13E-06	0,00E+00	4,95E-03	1,51E-03	0,00E+00	0,00E+00	4,16E-02	4,17E-02	3,93E-05	9,77E-06	1,14E-04	1,02E-06	-8,01E-05
EP-marine	kg N-eq.	9,39E-02	5,68E-04	9,00E-05	0,00E+00	1,11E-01	3,24E-03	0,00E+00	0,00E+00	3,92E-02	6,21E-02	3,70E-05	1,51E-04	2,11E-04	9,86E-05	-2,15E-04
EP-terrestrial	mol N-eq.	1,25E+00	6,20E-03	4,79E-04	0,00E+00	4,44E-01	3,59E-02	0,00E+00	0,00E+00	3,45E-01	5,90E-01	3,26E-04	1,64E-03	2,10E-03	7,63E-05	-2,05E-03
POCP	kg NMVOC-eq.	3,49E-01	1,94E-03	1,55E-04	0,00E+00	7,57E-02	1,10E-02	0,00E+00	0,00E+00	9,49E-02	1,92E-01	8,96E-05	5,06E-04	5,50E-04	3,32E-05	-5,88E-04
ADPE	kg Sb-eq.	4,20E-02	3,31E-06	1,06E-07	0,00E+00	2,51E-04	3,49E-04	0,00E+00	0,00E+00	3,88E-04	2,86E-04	3,67E-07	5,93E-07	1,36E-06	8,08E-09	-1,16E-06
ADPF	MJ	4,01E+02	7,91E+00	2,90E-01	0,00E+00	2,47E+02	3,53E+01	0,00E+00	0,00E+00	8,80E+02	9,94E+02	8,31E-01	1,94E+00	2,81E+00	5,63E-02	-2,44E+00
WDP	m <sup>3</sup>	3,28E+01	3,07E-02	6,27E-03	0,00E+00	6,32E+01	7,73E-01	0,00E+00	0,00E+00	1,03E+01	7,55E+03	9,71E-03	6,43E-03	1,53E-01	2,33E-03	-9,77E-02
<b>Caption</b>	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 use															
<b>Disclaimer</b>	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 experience with the indicator.															

**Table 8: Additional environmental impact indicators**

ADDITIONAL ENVIRONMENTAL IMPACTS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease Incidence	4,20E-06	3,36E-08	1,95E-09	0,00E+00	1,90E-06	2,64E-07	0,00E+00	0,00E+00	7,50E-07	3,10E-06	7,08E-10	9,68E-09	7,22E-09	3,87E-10	-9,44E-09
IRP	kBq U235 eq	3,46E+00	4,41E-02	1,68E-03	0,00E+00	1,35E+00	2,19E-01	0,00E+00	0,00E+00	2,41E+01	2,07E+01	2,28E-02	1,03E-02	3,36E-02	2,88E-04	-2,45E-02
ETP-fw	CTUe	1,40E+04	6,94E+00	6,52E-01	0,00E+00	1,27E+03	1,53E+02	0,00E+00	0,00E+00	5,57E+02	1,05E+03	5,26E-01	1,58E+00	4,93E+00	3,03E-01	-3,47E+00
HTP-c	CTUh	3,66E-07	2,92E-10	1,99E-11	0,00E+00	3,10E-08	2,99E-08	0,00E+00	0,00E+00	1,71E-08	2,43E-07	1,62E-11	5,79E-11	7,57E-11	2,71E-12	-1,14E-10
HTP-nc	CTUh	2,24E-05	6,89E-09	7,39E-10	0,00E+00	7,76E-07	2,10E-07	0,00E+00	0,00E+00	5,49E-07	3,43E-06	5,19E-10	1,61E-09	3,02E-09	1,03E-10	-2,34E-09
SQP	-	5,97E+02	3,86E+00	1,58E-01	0,00E+00	8,61E+02	1,85E+01	0,00E+00	0,00E+00	1,59E+02	2,24E+02	1,50E-01	1,15E+00	2,34E-01	1,19E-01	-6,95E-01
<b>Caption</b>	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															
<b>Disclaimers</b>	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 experience with the indicator. 2 This impact category deals mainly with the eventual impact of low-dose ionizing radiation on the 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.															

Table 9: Parameters describing resource use

RESOURCE USE PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	2,02E+02	1,68E-01	-3,76E+00	0,00E+00	4,55E+02	4,07E+00	0,00E+00	0,00E+00	1,81E+02	1,37E+02	1,71E-01	3,28E-02	2,27E+00	1,32E-03	-1,40E+00
PERM	MJ	1,96E-01	0,00E+00	3,77E+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	0,00E+00	0,00E+00
PERT	MJ	2,02E+02	1,68E-01	5,98E-03	0,00E+00	4,55E+02	4,07E+00	0,00E+00	0,00E+00	1,81E+02	1,37E+02	1,71E-01	3,28E-02	2,27E+00	1,32E-03	-1,40E+00
PENRE	MJ	4,20E+02	8,40E+00	-3,16E+00	0,00E+00	2,81E+02	3,76E+01	0,00E+00	0,00E+00	9,23E+02	1,05E+03	8,72E-01	2,06E+00	2,99E+00	5,98E-02	-2,59E+00
PENRM	MJ	8,62E+00	0,00E+00	3,47E+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	0,00E+00	0,00E+00
PENRT	MJ	4,28E+02	8,40E+00	3,08E-01	0,00E+00	2,81E+02	3,76E+01	0,00E+00	0,00E+00	9,23E+02	1,05E+03	8,72E-01	2,06E+00	2,99E+00	5,98E-02	-2,59E+00
SM	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	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	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m <sup>3</sup>	3,25E+01	3,06E-02	6,25E-03	0,00E+00	6,12E+01	7,61E-01	0,00E+00	0,00E+00	1,01E+01	7,20E+03	9,53E-03	6,44E-03	1,52E-01	2,33E-03	-9,67E-02
<b>Caption</b>	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 freshwater															

Table 10: End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	1,17E-02	2,19E-05	8,34E-07	0,00E+00	3,79E-04	1,43E-04	0,00E+00	0,00E+00	6,69E-04	1,75E-03	6,32E-07	5,20E-06	7,89E-07	1,19E-07	-1,93E-06
NHWD	kg	1,18E+01	2,59E-01	6,65E-02	0,00E+00	3,57E+00	1,86E+00	0,00E+00	0,00E+00	3,07E+00	1,30E+01	2,90E-03	8,23E-02	1,06E-02	2,55E-01	-4,11E-02
RWD	kg	1,29E-03	5,22E-05	1,96E-06	0,00E+00	8,70E-04	1,51E-04	0,00E+00	0,00E+00	6,47E-03	5,94E-03	6,11E-06	1,30E-05	7,74E-06	3,32E-07	-8,35E-06
CRU	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	2,57E+00	0,00E+00	1,85E-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	1,94E+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	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	2,99E-03	0,00E+00	2,10E-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	2,32E-01	0,00E+00	0,00E+00
EET	MJ	2,87E-02	0,00E+00	5,59E+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	2,28E+00	0,00E+00	0,00E+00
<b>Caption</b>	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; EE = Exported energy, EET = exported thermal energy															

Table 11: Biogenic carbon content

BIOGENIC CARBON CONTENT PER FIXTURE		
Parameter	Unit	At the factory gate
Biogenic carbon content in a product	kg C	0
Biogenic carbon content in accompanying packaging	kg C	0,1178
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub>	

**Group 2: Natural brass is represented by HV1E2-19**

**Table 12: Environmental impact indicators**

ENVIRONMENTAL IMPACTS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO <sub>2</sub> -eq.	3,02E+01	9,53E-01	2,17E-01	0,00E+00	7,07E+00	3,89E+00	0,00E+00	0,00E+00	4,27E+01	5,91E+01	4,04E-02	1,32E-01	5,21E-01	5,25E-02	-2,43E-01
GWP-fossil	kg CO <sub>2</sub> -eq.	3,00E+01	9,51E-01	1,14E-01	0,00E+00	1,40E+01	3,85E+00	0,00E+00	0,00E+00	4,13E+01	5,78E+01	3,90E-02	1,31E-01	5,20E-01	5,32E-03	-2,03E-01
GWP-biogenic	kg CO <sub>2</sub> -eq.	1,11E-01	1,03E-03	1,03E-01	0,00E+00	-1,81E+01	3,14E-02	0,00E+00	0,00E+00	1,33E+00	1,20E+00	1,26E-03	1,26E-04	1,23E-03	4,72E-02	-4,01E-02
GWP-luluc	kg CO <sub>2</sub> -eq.	5,82E-02	5,68E-04	8,23E-06	0,00E+00	1,12E+01	2,84E-03	0,00E+00	0,00E+00	9,76E-02	1,00E-01	9,22E-05	6,19E-05	4,43E-04	2,75E-06	-3,05E-04
ODP	kg CFC11-eq.	1,78E-06	2,07E-07	4,42E-09	0,00E+00	2,79E-06	4,96E-07	0,00E+00	0,00E+00	2,08E-06	3,86E-06	1,97E-09	2,95E-08	4,16E-09	6,98E-10	-9,87E-09
AP	mol H <sup>+</sup> -eq.	1,65E+00	3,71E-03	1,26E-04	0,00E+00	1,39E-01	2,92E-02	0,00E+00	0,00E+00	2,35E-01	3,22E-01	2,22E-04	5,23E-04	1,16E-03	2,26E-05	-9,34E-04
EP-freshwater	kg P-eq.	1,31E-01	8,84E-05	2,11E-06	0,00E+00	4,95E-03	1,69E-03	0,00E+00	0,00E+00	4,16E-02	4,17E-02	3,93E-05	9,87E-06	1,14E-04	1,02E-06	-8,00E-05
EP-marine	kg N-eq.	9,12E-02	1,02E-03	8,95E-05	0,00E+00	1,11E-01	4,37E-03	0,00E+00	0,00E+00	3,92E-02	6,21E-02	3,70E-05	1,52E-04	2,11E-04	9,85E-05	-2,15E-04
EP-terrestrial	mol N-eq.	1,22E+00	1,11E-02	4,77E-04	0,00E+00	4,44E-01	4,85E-02	0,00E+00	0,00E+00	3,45E-01	5,90E-01	3,26E-04	1,66E-03	2,11E-03	7,56E-05	-2,05E-03
POCP	kg NMVOC-eq.	3,39E-01	3,46E-03	1,54E-04	0,00E+00	7,57E-02	1,49E-02	0,00E+00	0,00E+00	9,49E-02	1,92E-01	8,97E-05	5,11E-04	5,50E-04	3,31E-05	-5,89E-04
ADPE	kg Sb-eq.	4,07E-02	5,91E-06	1,05E-07	0,00E+00	2,51E-04	3,63E-04	0,00E+00	0,00E+00	3,88E-04	2,86E-04	3,67E-07	5,99E-07	1,36E-06	8,08E-09	-1,16E-06
ADPF	MJ	3,93E+02	1,41E+01	2,88E-01	0,00E+00	2,47E+02	5,09E+01	0,00E+00	0,00E+00	8,80E+02	9,94E+02	8,32E-01	1,96E+00	2,82E+00	5,58E-02	-2,44E+00
WDP	m <sup>3</sup>	3,19E+01	5,49E-02	6,32E-03	0,00E+00	6,32E+01	9,14E-01	0,00E+00	0,00E+00	1,03E+01	7,55E+03	9,72E-03	6,50E-03	1,53E-01	2,30E-03	-9,76E-02
<b>Caption</b>	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 use															
<b>Disclaimer</b>	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 experience with the indicator.															

**Table 13: Additional environmental impact indicators**

ADDITIONAL ENVIRONMENTAL IMPACTS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease Incidence	4,07E-06	6,01E-08	1,94E-09	0,00E+00	1,90E-06	3,38E-07	0,00E+00	0,00E+00	7,50E-07	3,10E-06	7,09E-10	9,78E-09	7,23E-09	3,83E-10	-9,45E-09
IRP	kBq U235 eq	3,36E+00	7,89E-02	1,67E-03	0,00E+00	1,35E+00	3,12E-01	0,00E+00	0,00E+00	2,41E+01	2,07E+01	2,28E-02	1,04E-02	3,36E-02	2,85E-04	-2,45E-02
ETP-fw	CTUe	1,36E+04	1,24E+01	6,52E-01	0,00E+00	1,27E+03	1,73E+02	0,00E+00	0,00E+00	5,56E+02	1,05E+03	5,26E-01	1,60E+00	4,95E+00	3,03E-01	-3,47E+00
HTP-c	CTUh	3,49E-07	5,22E-10	1,98E-11	0,00E+00	3,10E-08	3,64E-08	0,00E+00	0,00E+00	1,71E-08	2,43E-07	1,62E-11	5,85E-11	7,61E-11	2,73E-12	-1,14E-10
HTP-nc	CTUh	2,17E-05	1,23E-08	7,40E-10	0,00E+00	7,76E-07	2,28E-07	0,00E+00	0,00E+00	5,49E-07	3,43E-06	5,19E-10	1,62E-09	3,03E-09	1,03E-10	-2,34E-09
SQP	-	5,80E+02	6,91E+00	1,56E-01	0,00E+00	8,61E+02	2,61E+01	0,00E+00	0,00E+00	1,59E+02	2,24E+02	1,50E-01	1,16E+00	2,34E-01	1,19E-01	-6,98E-01
<b>Caption</b>	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															
<b>Disclaimers</b>	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 experience with the indicator. 2 This impact category deals mainly with the eventual impact of low-dose ionizing radiation on the 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.															

Table 14: Parameters describing resource use

RESOURCE USE PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	2,11E+02	3,00E-01	-3,75E+00	0,00E+00	4,55E+02	5,04E+00	0,00E+00	0,00E+00	1,81E+02	1,37E+02	1,71E-01	3,31E-02	2,28E+00	1,32E-03	-1,39E+00
PERM	MJ	1,96E-01	0,00E+00	3,75E+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	0,00E+00	0,00E+00
PERT	MJ	2,11E+02	3,00E-01	5,89E-03	0,00E+00	4,55E+02	5,04E+00	0,00E+00	0,00E+00	1,81E+02	1,37E+02	1,71E-01	3,31E-02	2,28E+00	1,32E-03	-1,39E+00
PENRE	MJ	4,11E+02	1,50E+01	-3,25E+00	0,00E+00	2,81E+02	5,42E+01	0,00E+00	0,00E+00	9,23E+02	1,05E+03	8,72E-01	2,08E+00	3,00E+00	5,93E-02	-2,59E+00
PENRM	MJ	8,67E+00	0,00E+00	3,56E+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	0,00E+00	0,00E+00
PENRT	MJ	4,20E+02	1,50E+01	3,05E-01	0,00E+00	2,81E+02	5,42E+01	0,00E+00	0,00E+00	9,23E+02	1,05E+03	8,72E-01	2,08E+00	3,00E+00	5,93E-02	-2,59E+00
SM	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	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	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m <sup>3</sup>	3,16E+01	5,47E-02	6,29E-03	0,00E+00	6,12E+01	9,00E-01	0,00E+00	0,00E+00	1,01E+01	7,20E+03	9,54E-03	6,51E-03	1,52E-01	2,30E-03	-9,66E-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 freshwater															

Table 15: End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	1,14E-02	3,91E-05	8,29E-07	0,00E+00	3,79E-04	1,80E-04	0,00E+00	0,00E+00	6,69E-04	1,75E-03	6,33E-07	5,26E-06	7,89E-07	1,18E-07	-1,94E-06
NHWD	kg	1,14E+01	4,63E-01	6,69E-02	0,00E+00	3,57E+00	2,52E+00	0,00E+00	0,00E+00	3,07E+00	1,30E+01	2,90E-03	8,32E-02	1,06E-02	2,49E-01	-4,14E-02
RWD	kg	1,26E-03	9,33E-05	1,94E-06	0,00E+00	8,70E-04	2,42E-04	0,00E+00	0,00E+00	6,47E-03	5,94E-03	6,12E-06	1,31E-05	7,75E-06	3,28E-07	-8,36E-06
CRU	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	2,58E+00	0,00E+00	1,84E-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	1,96E+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	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	2,99E-03	0,00E+00	2,09E-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	2,32E-01	0,00E+00	0,00E+00
EET	MJ	2,87E-02	0,00E+00	5,58E+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	2,28E+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; EE = Exported energy, EET = exported thermal energy															

Table 16: Biogenic carbon content

BIOGENIC CARBON CONTENT PER FIXTURE		
Parameter	Unit	At the factory gate
Biogenic carbon content in a product	kg C	0
Biogenic carbon content in accompanying packaging	kg C	0,1173
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub>	

**Group 3: Stainless steel is represented by HV1E-40**

**Table 17: Environmental impact indicators**

ENVIRONMENTAL IMPACTS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO <sub>2</sub> -eq.	2,93E+01	5,13E-01	2,14E-01	0,00E+00	7,07E+00	2,72E+00	0,00E+00	0,00E+00	4,27E+01	5,91E+01	4,03E-02	1,26E-01	5,20E-01	5,21E-02	-2,52E-01
GWP-fossil	kg CO <sub>2</sub> -eq.	2,91E+01	5,12E-01	1,11E-01	0,00E+00	1,40E+01	2,69E+00	0,00E+00	0,00E+00	4,13E+01	5,78E+01	3,90E-02	1,25E-01	5,18E-01	4,96E-03	-2,11E-01
GWP-biogenic	kg CO <sub>2</sub> -eq.	1,27E-01	5,54E-04	1,03E-01	0,00E+00	-1,81E+01	2,80E-02	0,00E+00	0,00E+00	1,33E+00	1,20E+00	1,26E-03	1,21E-04	1,23E-03	4,72E-02	-3,98E-02
GWP-luluc	kg CO <sub>2</sub> -eq.	4,28E-02	3,06E-04	8,24E-06	0,00E+00	1,12E+01	2,06E-03	0,00E+00	0,00E+00	9,76E-02	1,00E-01	9,21E-05	5,90E-05	4,43E-04	2,68E-06	-3,10E-04
ODP	kg CFC11-eq.	1,61E-06	1,12E-07	4,40E-09	0,00E+00	2,79E-06	2,92E-07	0,00E+00	0,00E+00	2,08E-06	3,86E-06	1,97E-09	2,82E-08	4,31E-09	6,71E-10	-1,19E-08
AP	mol H <sup>+</sup> -eq.	8,94E-01	1,99E-03	1,25E-04	0,00E+00	1,39E-01	2,37E-02	0,00E+00	0,00E+00	2,35E-01	3,22E-01	2,22E-04	4,99E-04	1,16E-03	2,19E-05	-9,88E-04
EP-freshwater	kg P-eq.	7,01E-02	4,76E-05	2,11E-06	0,00E+00	4,95E-03	1,47E-03	0,00E+00	0,00E+00	4,16E-02	4,17E-02	3,92E-05	9,42E-06	1,14E-04	1,01E-06	-8,08E-05
EP-marine	kg N-eq.	5,96E-02	5,47E-04	8,91E-05	0,00E+00	1,11E-01	3,13E-03	0,00E+00	0,00E+00	3,92E-02	6,21E-02	3,70E-05	1,45E-04	2,12E-04	9,83E-05	-2,34E-04
EP-terrestrial	mol N-eq.	7,50E-01	5,96E-03	4,74E-04	0,00E+00	4,44E-01	3,50E-02	0,00E+00	0,00E+00	3,45E-01	5,90E-01	3,26E-04	1,59E-03	2,12E-03	7,31E-05	-2,27E-03
POCP	kg NMVOC-eq.	2,15E-01	1,86E-03	1,53E-04	0,00E+00	7,57E-02	1,07E-02	0,00E+00	0,00E+00	9,49E-02	1,92E-01	8,96E-05	4,87E-04	5,54E-04	3,23E-05	-6,49E-04
ADPE	kg Sb-eq.	2,07E-02	3,18E-06	1,05E-07	0,00E+00	2,51E-04	3,37E-04	0,00E+00	0,00E+00	3,88E-04	2,86E-04	3,66E-07	5,72E-07	1,36E-06	7,88E-09	-1,19E-06
ADPF	MJ	3,74E+02	7,61E+00	2,87E-01	0,00E+00	2,47E+02	3,45E+01	0,00E+00	0,00E+00	8,80E+02	9,94E+02	8,31E-01	1,87E+00	2,82E+00	5,38E-02	-2,58E+00
WDP	m <sup>3</sup>	2,14E+01	2,95E-02	6,22E-03	0,00E+00	6,32E+01	7,59E-01	0,00E+00	0,00E+00	1,03E+01	7,55E+03	9,71E-03	6,20E-03	1,53E-01	2,22E-03	-9,82E-02
<b>Caption</b>	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 use															
<b>Disclaimer</b>	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 experience with the indicator.															

**Table 18: Additional environmental impact indicators**

ADDITIONAL ENVIRONMENTAL IMPACTS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease Incidence	3,04E-06	3,23E-08	1,93E-09	0,00E+00	1,90E-06	2,58E-07	0,00E+00	0,00E+00	7,50E-07	3,10E-06	7,08E-10	9,34E-09	7,29E-09	3,70E-10	-1,04E-08
IRP	kBq U235 eq	2,86E+00	4,24E-02	1,67E-03	0,00E+00	1,35E+00	2,15E-01	0,00E+00	0,00E+00	2,41E+01	2,07E+01	2,27E-02	9,94E-03	3,37E-02	2,77E-04	-2,53E-02
ETP-fw	CTUe	7,19E+03	6,67E+00	6,46E-01	0,00E+00	1,27E+03	1,49E+02	0,00E+00	0,00E+00	5,57E+02	1,05E+03	5,25E-01	1,53E+00	4,95E+00	3,02E-01	-3,58E+00
HTP-c	CTUh	4,41E-07	2,81E-10	1,98E-11	0,00E+00	3,10E-08	2,98E-08	0,00E+00	0,00E+00	1,71E-08	2,43E-07	1,62E-11	5,58E-11	7,60E-11	2,67E-12	-1,18E-10
HTP-nc	CTUh	1,10E-05	6,63E-09	7,32E-10	0,00E+00	7,76E-07	2,03E-07	0,00E+00	0,00E+00	5,49E-07	3,43E-06	5,19E-10	1,55E-09	3,03E-09	1,01E-10	-2,46E-09
SQP	-	3,75E+02	3,72E+00	1,56E-01	0,00E+00	8,61E+02	1,81E+01	0,00E+00	0,00E+00	1,59E+02	2,24E+02	1,50E-01	1,11E+00	2,42E-01	1,14E-01	-8,14E-01
<b>Caption</b>	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															
<b>Disclaimers</b>	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 experience with the indicator. 2 This impact category deals mainly with the eventual impact of low-dose ionizing radiation on the 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.															



Table 19: Parameters describing resource use

RESOURCE USE PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	2,50E+02	1,62E-01	-3,76E+00	0,00E+00	4,55E+02	4,03E+00	0,00E+00	0,00E+00	1,81E+02	1,37E+02	1,71E-01	3,16E-02	2,27E+00	1,30E-03	-1,40E+00
PERM	MJ	1,96E-01	0,00E+00	3,77E+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	0,00E+00	0,00E+00
PERT	MJ	2,50E+02	1,62E-01	5,92E-03	0,00E+00	4,55E+02	4,03E+00	0,00E+00	0,00E+00	1,81E+02	1,37E+02	1,71E-01	3,16E-02	2,27E+00	1,30E-03	-1,40E+00
PENRE	MJ	3,91E+02	8,08E+00	-3,17E+00	0,00E+00	2,81E+02	3,68E+01	0,00E+00	0,00E+00	9,23E+02	1,05E+03	8,71E-01	1,99E+00	3,00E+00	5,72E-02	-2,74E+00
PENRM	MJ	8,62E+00	0,00E+00	3,47E+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	0,00E+00	0,00E+00
PENRT	MJ	4,00E+02	8,08E+00	3,05E-01	0,00E+00	2,81E+02	3,68E+01	0,00E+00	0,00E+00	9,23E+02	1,05E+03	8,71E-01	1,99E+00	3,00E+00	5,72E-02	-2,74E+00
SM	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	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	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m <sup>3</sup>	2,12E+01	2,94E-02	6,20E-03	0,00E+00	6,12E+01	7,46E-01	0,00E+00	0,00E+00	1,01E+01	7,20E+03	9,53E-03	6,21E-03	1,52E-01	2,21E-03	-9,71E-02
<b>Caption</b>	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 freshwater															

Table 20: End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	5,81E-03	2,10E-05	8,25E-07	0,00E+00	3,79E-04	1,38E-04	0,00E+00	0,00E+00	6,69E-04	1,75E-03	6,32E-07	5,01E-06	8,14E-07	1,15E-07	-2,29E-06
NHWD	kg	1,80E+01	2,49E-01	6,58E-02	0,00E+00	3,57E+00	1,81E+00	0,00E+00	0,00E+00	3,07E+00	1,30E+01	2,90E-03	7,94E-02	1,12E-02	2,38E-01	-5,01E-02
RWD	kg	1,07E-03	5,02E-05	1,94E-06	0,00E+00	8,70E-04	1,47E-04	0,00E+00	0,00E+00	6,47E-03	5,94E-03	6,11E-06	1,25E-05	7,81E-06	3,15E-07	-9,30E-06
CRU	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	2,57E+00	0,00E+00	1,85E-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	2,00E+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	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	2,99E-03	0,00E+00	2,10E-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	2,32E-01	0,00E+00	0,00E+00
EET	MJ	2,87E-02	0,00E+00	5,59E+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	2,28E+00	0,00E+00	0,00E+00
<b>Caption</b>	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; EE = Exported energy, EET = exported thermal energy															

Table 21: Biogenic carbon content

BIOGENIC CARBON CONTENT PER FIXTURE		
Parameter	Unit	At the factory gate
Biogenic carbon content in a product	kg C	0
Biogenic carbon content in accompanying packaging	kg C	0,1178
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub>	

**Group 4: Colors is represented by HV1E-27 – Matt Black**

**Table 22: Environmental impact indicators**

ENVIRONMENTAL IMPACTS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO <sub>2</sub> -eq.	3,13E+01	5,52E-01	2,21E-01	0,00E+00	7,07E+00	2,83E+00	0,00E+00	0,00E+00	4,27E+01	5,91E+01	4,04E-02	1,32E-01	5,21E-01	5,23E-02	-2,44E-01
GWP-fossil	kg CO <sub>2</sub> -eq.	3,11E+01	5,51E-01	1,13E-01	0,00E+00	1,40E+01	2,80E+00	0,00E+00	0,00E+00	4,13E+01	5,78E+01	3,90E-02	1,32E-01	5,19E-01	5,11E-03	-2,03E-01
GWP-biogenic	kg CO <sub>2</sub> -eq.	1,11E-01	5,96E-04	1,08E-01	0,00E+00	-1,81E+01	2,83E-02	0,00E+00	0,00E+00	1,33E+00	1,20E+00	1,26E-03	1,26E-04	1,23E-03	4,72E-02	-4,03E-02
GWP-luluc	kg CO <sub>2</sub> -eq.	6,00E-02	3,29E-04	8,69E-06	0,00E+00	1,12E+01	2,14E-03	0,00E+00	0,00E+00	9,76E-02	1,00E-01	9,22E-05	6,19E-05	4,43E-04	2,73E-06	-3,06E-04
ODP	kg CFC11-eq.	1,85E-06	1,20E-07	4,60E-09	0,00E+00	2,79E-06	3,10E-07	0,00E+00	0,00E+00	2,08E-06	3,86E-06	1,97E-09	2,96E-08	4,15E-09	6,93E-10	-9,96E-09
AP	mol H <sup>+</sup> -eq.	1,69E+00	2,14E-03	1,31E-04	0,00E+00	1,39E-01	2,50E-02	0,00E+00	0,00E+00	2,35E-01	3,22E-01	2,22E-04	5,23E-04	1,16E-03	2,25E-05	-9,37E-04
EP-freshwater	kg P-eq.	1,34E-01	5,12E-05	2,22E-06	0,00E+00	4,95E-03	1,55E-03	0,00E+00	0,00E+00	4,16E-02	4,17E-02	3,93E-05	9,88E-06	1,14E-04	1,02E-06	-8,01E-05
EP-marine	kg N-eq.	9,38E-02	5,88E-04	9,31E-05	0,00E+00	1,11E-01	3,28E-03	0,00E+00	0,00E+00	3,92E-02	6,21E-02	3,70E-05	1,52E-04	2,11E-04	9,85E-05	-2,16E-04
EP-terrestrial	mol N-eq.	1,25E+00	6,41E-03	4,94E-04	0,00E+00	4,44E-01	3,67E-02	0,00E+00	0,00E+00	3,45E-01	5,90E-01	3,27E-04	1,66E-03	2,10E-03	7,51E-05	-2,06E-03
POCP	kg NMVOC-eq.	3,49E-01	2,00E-03	1,60E-04	0,00E+00	7,57E-02	1,12E-02	0,00E+00	0,00E+00	9,49E-02	1,92E-01	8,97E-05	5,11E-04	5,50E-04	3,29E-05	-5,93E-04
ADPE	kg Sb-eq.	4,17E-02	3,42E-06	1,10E-07	0,00E+00	2,51E-04	3,60E-04	0,00E+00	0,00E+00	3,88E-04	2,86E-04	3,67E-07	5,99E-07	1,36E-06	8,02E-09	-1,16E-06
ADPF	MJ	4,08E+02	8,19E+00	3,01E-01	0,00E+00	2,47E+02	3,61E+01	0,00E+00	0,00E+00	8,80E+02	9,94E+02	8,32E-01	1,96E+00	2,82E+00	5,54E-02	-2,44E+00
WDP	m <sup>3</sup>	3,30E+01	3,18E-02	6,39E-03	0,00E+00	6,32E+01	7,86E-01	0,00E+00	0,00E+00	1,03E+01	7,55E+03	9,72E-03	6,50E-03	1,53E-01	2,29E-03	-9,76E-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 use															
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 experience with the indicator.															

**Table 23: Additional environmental impact indicators**

ADDITIONAL ENVIRONMENTAL IMPACTS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease Incidence	4,20E-06	3,48E-08	2,03E-09	0,00E+00	1,90E-06	2,70E-07	0,00E+00	0,00E+00	7,50E-07	3,10E-06	7,09E-10	9,79E-09	7,23E-09	3,81E-10	-9,50E-09
IRP	kBq U235 eq.	3,52E+00	4,57E-02	1,75E-03	0,00E+00	1,35E+00	2,23E-01	0,00E+00	0,00E+00	2,41E+01	2,07E+01	2,28E-02	1,04E-02	3,36E-02	2,84E-04	-2,45E-02
ETP-fw	CTUe	1,39E+04	7,18E+00	6,72E-01	0,00E+00	1,27E+03	1,57E+02	0,00E+00	0,00E+00	5,57E+02	1,05E+03	5,26E-01	1,60E+00	4,94E+00	3,03E-01	-3,48E+00
HTP-c	CTUh	3,65E-07	3,02E-10	2,06E-11	0,00E+00	3,10E-08	3,00E-08	0,00E+00	0,00E+00	1,71E-08	2,43E-07	1,62E-11	5,85E-11	7,61E-11	2,71E-12	-1,14E-10
HTP-nc	CTUh	2,23E-05	7,13E-09	7,57E-10	0,00E+00	7,76E-07	2,16E-07	0,00E+00	0,00E+00	5,49E-07	3,43E-06	5,19E-10	1,62E-09	3,03E-09	1,02E-10	-2,34E-09
SQP	-	5,98E+02	4,00E+00	1,64E-01	0,00E+00	8,61E+02	1,90E+01	0,00E+00	0,00E+00	1,59E+02	2,24E+02	1,50E-01	1,16E+00	2,34E-01	1,18E-01	-7,00E-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															
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 experience with the indicator. 2 This impact category deals mainly with the eventual impact of low-dose ionizing radiation on the 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.															

Table 24: Parameters describing resource use

RESOURCE USE PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	2,06E+02	1,74E-01	-3,92E+00	0,00E+00	4,55E+02	4,10E+00	0,00E+00	0,00E+00	1,81E+02	1,37E+02	1,71E-01	3,32E-02	2,27E+00	1,31E-03	-1,39E+00
PERM	MJ	1,96E-01	0,00E+00	3,93E+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	0,00E+00	0,00E+00
PERT	MJ	2,06E+02	1,74E-01	6,25E-03	0,00E+00	4,55E+02	4,10E+00	0,00E+00	0,00E+00	1,81E+02	1,37E+02	1,71E-01	3,32E-02	2,27E+00	1,31E-03	-1,39E+00
PENRE	MJ	4,27E+02	8,69E+00	-3,20E+00	0,00E+00	2,81E+02	3,85E+01	0,00E+00	0,00E+00	9,23E+02	1,05E+03	8,73E-01	2,08E+00	2,99E+00	5,89E-02	-2,60E+00
PENRM	MJ	8,64E+00	0,00E+00	3,52E+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	0,00E+00	0,00E+00
PENRT	MJ	4,35E+02	8,69E+00	3,20E-01	0,00E+00	2,81E+02	3,85E+01	0,00E+00	0,00E+00	9,23E+02	1,05E+03	8,73E-01	2,08E+00	2,99E+00	5,89E-02	-2,60E+00
SM	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	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	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m <sup>3</sup>	3,27E+01	3,17E-02	6,36E-03	0,00E+00	6,12E+01	7,73E-01	0,00E+00	0,00E+00	1,01E+01	7,20E+03	9,54E-03	6,51E-03	1,52E-01	2,28E-03	-9,66E-02
<b>Caption</b>	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 freshwater															

Table 25: End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	1,17E-02	2,26E-05	8,64E-07	0,00E+00	3,79E-04	1,48E-04	0,00E+00	0,00E+00	6,69E-04	1,75E-03	6,33E-07	5,26E-06	7,88E-07	1,17E-07	-1,96E-06
NHWD	kg	1,20E+01	2,68E-01	6,82E-02	0,00E+00	3,57E+00	1,86E+00	0,00E+00	0,00E+00	3,07E+00	1,30E+01	2,91E-03	8,32E-02	1,06E-02	2,48E-01	-4,15E-02
RWD	kg	1,31E-03	5,40E-05	2,03E-06	0,00E+00	8,70E-04	1,55E-04	0,00E+00	0,00E+00	6,47E-03	5,94E-03	6,12E-06	1,32E-05	7,74E-06	3,25E-07	-8,41E-06
CRU	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	2,58E+00	0,00E+00	1,84E-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	2,01E+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	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	2,99E-03	0,00E+00	2,09E-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	2,32E-01	0,00E+00	0,00E+00
EET	MJ	2,87E-02	0,00E+00	5,58E+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	2,28E+00	0,00E+00	0,00E+00
<b>Caption</b>	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; EE = Exported energy, EET = exported thermal energy															

Table 26: Biogenic carbon content

BIOGENIC CARBON CONTENT PER FIXTURE		
Parameter	Unit	At the factory gate
Biogenic carbon content in a product	kg C	0
Biogenic carbon content in accompanying packaging	kg C	0,1173
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub>	

**Group 5: Exclusive color (PVD on Brass) is represented by HV1E-60 – Black**

**Table 27: Environmental impact indicators**

ENVIRONMENTAL IMPACTS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO <sub>2</sub> -eq.	3,03E+01	5,48E-01	2,23E-01	0,00E+00	7,07E+00	3,09E+00	0,00E+00	0,00E+00	4,27E+01	5,91E+01	4,03E-02	1,35E-01	5,21E-01	5,95E-02	-2,44E-01
GWP-fossil	kg CO <sub>2</sub> -eq.	3,02E+01	5,47E-01	1,17E-01	0,00E+00	1,40E+01	3,06E+00	0,00E+00	0,00E+00	4,13E+01	5,78E+01	3,90E-02	1,35E-01	5,19E-01	1,23E-02	-2,03E-01
GWP-biogenic	kg CO <sub>2</sub> -eq.	1,10E-01	5,92E-04	1,06E-01	0,00E+00	-1,81E+01	3,06E-02	0,00E+00	0,00E+00	1,33E+00	1,20E+00	1,26E-03	1,29E-04	1,23E-03	4,72E-02	-4,06E-02
GWP-luluc	kg CO <sub>2</sub> -eq.	5,83E-02	3,27E-04	8,46E-06	0,00E+00	1,12E+01	2,37E-03	0,00E+00	0,00E+00	9,76E-02	1,00E-01	9,21E-05	6,34E-05	4,42E-04	3,43E-06	-3,06E-04
ODP	kg CFC11-eq.	1,80E-06	1,19E-07	4,54E-09	0,00E+00	2,79E-06	3,21E-07	0,00E+00	0,00E+00	2,08E-06	3,86E-06	1,97E-09	3,03E-08	4,17E-09	9,05E-10	-9,98E-09
AP	mol H <sup>+</sup> -eq.	1,64E+00	2,13E-03	1,29E-04	0,00E+00	1,39E-01	2,63E-02	0,00E+00	0,00E+00	2,35E-01	3,22E-01	2,22E-04	5,35E-04	1,16E-03	2,83E-05	-9,37E-04
EP-freshwater	kg P-eq.	1,30E-01	5,09E-05	2,17E-06	0,00E+00	4,95E-03	1,64E-03	0,00E+00	0,00E+00	4,16E-02	4,17E-02	3,93E-05	1,01E-05	1,14E-04	1,11E-06	-8,01E-05
EP-marine	kg N-eq.	9,11E-02	5,84E-04	9,21E-05	0,00E+00	1,11E-01	3,53E-03	0,00E+00	0,00E+00	3,92E-02	6,21E-02	3,70E-05	1,56E-04	2,11E-04	1,01E-04	-2,16E-04
EP-terrestrial	mol N-eq.	1,21E+00	6,38E-03	4,91E-04	0,00E+00	4,44E-01	3,93E-02	0,00E+00	0,00E+00	3,45E-01	5,90E-01	3,26E-04	1,70E-03	2,11E-03	9,68E-05	-2,07E-03
POCP	kg NMVOC-eq.	3,38E-01	1,99E-03	1,58E-04	0,00E+00	7,57E-02	1,21E-02	0,00E+00	0,00E+00	9,49E-02	1,92E-01	8,96E-05	5,23E-04	5,51E-04	4,07E-05	-5,93E-04
ADPE	kg Sb-eq.	4,05E-02	3,40E-06	1,08E-07	0,00E+00	2,51E-04	3,65E-04	0,00E+00	0,00E+00	3,88E-04	2,86E-04	3,66E-07	6,13E-07	1,36E-06	1,02E-08	-1,16E-06
ADPF	MJ	3,96E+02	8,14E+00	2,96E-01	0,00E+00	2,47E+02	3,90E+01	0,00E+00	0,00E+00	8,80E+02	9,94E+02	8,31E-01	2,01E+00	2,81E+00	7,16E-02	-2,45E+00
WDP	m <sup>3</sup>	3,20E+01	3,16E-02	6,50E-03	0,00E+00	6,32E+01	8,75E-01	0,00E+00	0,00E+00	1,03E+01	7,55E+03	9,71E-03	6,65E-03	1,53E-01	2,99E-03	-9,77E-02
<b>Caption</b>	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 use															
<b>Disclaimer</b>	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 experience with the indicator.															

**Table 28: Additional environmental impacts**

ADDITIONAL ENVIRONMENTAL IMPACTS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease Incidence	4,07E-06	3,46E-08	1,99E-09	0,00E+00	1,90E-06	2,90E-07	0,00E+00	0,00E+00	7,50E-07	3,10E-06	7,08E-10	1,00E-08	7,24E-09	4,96E-10	-9,53E-09
IRP	kBq U235 eq	3,40E+00	4,54E-02	1,72E-03	0,00E+00	1,35E+00	2,46E-01	0,00E+00	0,00E+00	2,41E+01	2,07E+01	2,27E-02	1,07E-02	3,36E-02	3,61E-04	-2,45E-02
ETP-fw	CTUe	1,35E+04	7,14E+00	6,70E-01	0,00E+00	1,27E+03	1,65E+02	0,00E+00	0,00E+00	5,57E+02	1,05E+03	5,26E-01	1,64E+00	4,94E+00	3,16E-01	-3,48E+00
HTP-c	CTUh	3,53E-07	3,00E-10	2,04E-11	0,00E+00	3,10E-08	3,61E-08	0,00E+00	0,00E+00	1,71E-08	2,43E-07	1,62E-11	5,99E-11	7,61E-11	3,58E-12	-1,15E-10
HTP-nc	CTUh	2,16E-05	7,09E-09	7,61E-10	0,00E+00	7,76E-07	2,22E-07	0,00E+00	0,00E+00	5,49E-07	3,43E-06	5,19E-10	1,66E-09	3,03E-09	1,19E-10	-2,35E-09
SQP	-	5,79E+02	3,98E+00	1,61E-01	0,00E+00	8,61E+02	2,04E+01	0,00E+00	0,00E+00	1,59E+02	2,24E+02	1,50E-01	1,19E+00	2,35E-01	1,56E-01	-7,06E-01
<b>Caption</b>	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															
<b>Disclaimers</b>	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 experience with the indicator. 2 This impact category deals mainly with the eventual impact of low-dose ionizing radiation on the 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.															

Table 29: Parameters describing resource use

RESOURCE USE PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	2,00E+02	1,73E-01	-3,75E+00	0,00E+00	4,55E+02	4,80E+00	0,00E+00	0,00E+00	1,81E+02	1,37E+02	1,71E-01	3,39E-02	2,27E+00	1,59E-03	-1,39E+00
PERM	MJ	1,96E-01	0,00E+00	3,75E+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	0,00E+00	0,00E+00
PERT	MJ	2,00E+02	1,73E-01	6,06E-03	0,00E+00	4,55E+02	4,80E+00	0,00E+00	0,00E+00	1,81E+02	1,37E+02	1,71E-01	3,39E-02	2,27E+00	1,59E-03	-1,39E+00
PENRE	MJ	4,14E+02	8,64E+00	-3,24E+00	0,00E+00	2,81E+02	4,16E+01	0,00E+00	0,00E+00	9,23E+02	1,05E+03	8,72E-01	2,13E+00	2,99E+00	7,61E-02	-2,60E+00
PENRM	MJ	8,67E+00	0,00E+00	3,56E+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	0,00E+00	0,00E+00
PENRT	MJ	4,23E+02	8,64E+00	3,14E-01	0,00E+00	2,81E+02	4,16E+01	0,00E+00	0,00E+00	9,23E+02	1,05E+03	8,72E-01	2,13E+00	2,99E+00	7,61E-02	-2,60E+00
SM	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	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	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m <sup>3</sup>	3,17E+01	3,15E-02	6,48E-03	0,00E+00	6,12E+01	8,61E-01	0,00E+00	0,00E+00	1,01E+01	7,20E+03	9,53E-03	6,67E-03	1,52E-01	2,99E-03	-9,66E-02
<b>Caption</b>	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 freshwater															

Table 30: End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	1,13E-02	2,25E-05	8,52E-07	0,00E+00	3,79E-04	1,49E-04	0,00E+00	0,00E+00	6,69E-04	1,75E-03	6,32E-07	5,38E-06	7,92E-07	1,42E-07	-1,96E-06
NHWD	kg	1,15E+01	2,67E-01	6,86E-02	0,00E+00	3,57E+00	2,13E+00	0,00E+00	0,00E+00	3,07E+00	1,30E+01	2,90E-03	8,52E-02	1,06E-02	3,17E-01	-4,19E-02
RWD	kg	1,27E-03	5,37E-05	2,00E-06	0,00E+00	8,70E-04	1,63E-04	0,00E+00	0,00E+00	6,47E-03	5,94E-03	6,11E-06	1,35E-05	7,75E-06	4,23E-07	-8,41E-06
CRU	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	2,57E+00	0,00E+00	1,84E-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	1,99E+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	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	2,99E-03	0,00E+00	2,09E-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	2,32E-01	0,00E+00	0,00E+00
EET	MJ	2,87E-02	0,00E+00	5,58E+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	2,28E+00	0,00E+00	0,00E+00
<b>Caption</b>	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; EE = Exported energy, EET = exported thermal energy															

Table 31: Biogenic carbon content

BIOGENIC CARBON CONTENT PER FIXTURE		
Parameter	Unit	At the factory gate
Biogenic carbon content in a product	kg C	0
Biogenic carbon content in accompanying packaging	kg C	0,1173
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub>	

**Group 6: Exclusive color (PVD on Stainless steel) is represented by HV1E-64 - Brushed copper**

**Table 32: Environmental impact indicators**

ENVIRONMENTAL IMPACTS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO <sub>2</sub> -eq.	2,97E+01	5,27E-01	2,26E-01	0,00E+00	7,07E+00	2,76E+00	0,00E+00	0,00E+00	4,27E+01	5,91E+01	4,04E-02	1,30E-01	5,21E-01	6,04E-02	-2,54E-01
GWP-fossil	kg CO <sub>2</sub> -eq.	2,95E+01	5,27E-01	1,17E-01	0,00E+00	1,40E+01	2,73E+00	0,00E+00	0,00E+00	4,13E+01	5,78E+01	3,90E-02	1,30E-01	5,20E-01	1,33E-02	-2,13E-01
GWP-biogenic	kg CO <sub>2</sub> -eq.	1,20E-01	5,69E-04	1,10E-01	0,00E+00	-1,81E+01	2,81E-02	0,00E+00	0,00E+00	1,33E+00	1,20E+00	1,26E-03	1,25E-04	1,23E-03	4,72E-02	-4,07E-02
GWP-luluc	kg CO <sub>2</sub> -eq.	4,33E-02	3,15E-04	8,84E-06	0,00E+00	1,12E+01	2,09E-03	0,00E+00	0,00E+00	9,76E-02	1,00E-01	9,22E-05	6,11E-05	4,44E-04	3,43E-06	-3,10E-04
ODP	kg CFC11-eq.	1,66E-06	1,15E-07	4,69E-09	0,00E+00	2,79E-06	2,99E-07	0,00E+00	0,00E+00	2,08E-06	3,86E-06	1,97E-09	2,92E-08	4,36E-09	8,95E-10	-1,21E-08
AP	mol H <sup>+</sup> -eq.	8,98E-01	2,05E-03	1,33E-04	0,00E+00	1,39E-01	2,42E-02	0,00E+00	0,00E+00	2,35E-01	3,22E-01	2,22E-04	5,16E-04	1,17E-03	2,82E-05	-9,93E-04
EP-freshwater	kg P-eq.	7,03E-02	4,89E-05	2,26E-06	0,00E+00	4,95E-03	1,50E-03	0,00E+00	0,00E+00	4,16E-02	4,17E-02	3,93E-05	9,75E-06	1,14E-04	1,12E-06	-8,09E-05
EP-marine	kg N-eq.	6,00E-02	5,62E-04	9,49E-05	0,00E+00	1,11E-01	3,19E-03	0,00E+00	0,00E+00	3,92E-02	6,21E-02	3,70E-05	1,50E-04	2,13E-04	1,00E-04	-2,37E-04
EP-terrestrial	mol N-eq.	7,54E-01	6,13E-03	5,04E-04	0,00E+00	4,44E-01	3,57E-02	0,00E+00	0,00E+00	3,45E-01	5,90E-01	3,26E-04	1,64E-03	2,13E-03	9,64E-05	-2,29E-03
POCP	kg NMVOC-eq.	2,17E-01	1,92E-03	1,63E-04	0,00E+00	7,57E-02	1,09E-02	0,00E+00	0,00E+00	9,49E-02	1,92E-01	8,96E-05	5,04E-04	5,57E-04	4,08E-05	-6,57E-04
ADPE	kg Sb-eq.	2,07E-02	3,27E-06	1,12E-07	0,00E+00	2,51E-04	3,45E-04	0,00E+00	0,00E+00	3,88E-04	2,86E-04	3,67E-07	5,91E-07	1,36E-06	1,03E-08	-1,19E-06
ADPF	MJ	3,81E+02	7,83E+00	3,06E-01	0,00E+00	2,47E+02	3,51E+01	0,00E+00	0,00E+00	8,80E+02	9,94E+02	8,31E-01	1,94E+00	2,83E+00	7,12E-02	-2,59E+00
WDP	m <sup>3</sup>	2,18E+01	3,04E-02	6,56E-03	0,00E+00	6,32E+01	7,69E-01	0,00E+00	0,00E+00	1,03E+01	7,55E+03	9,71E-03	6,41E-03	1,53E-01	2,97E-03	-9,82E-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 use															
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 experience with the indicator.															

**Table 33: Additional environmental impact indicators**

ADDITIONAL ENVIRONMENTAL IMPACTS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease Incidence	3,06E-06	3,33E-08	2,07E-09	0,00E+00	1,90E-06	2,62E-07	0,00E+00	0,00E+00	7,50E-07	3,10E-06	7,08E-10	9,66E-09	7,33E-09	4,94E-10	-1,06E-08
IRP	kBq U235 eq.	2,93E+00	4,37E-02	1,78E-03	0,00E+00	1,35E+00	2,18E-01	0,00E+00	0,00E+00	2,41E+01	2,07E+01	2,28E-02	1,03E-02	3,37E-02	3,60E-04	-2,53E-02
ETP-fw	CTUe	7,20E+03	6,86E+00	6,86E-01	0,00E+00	1,27E+03	1,52E+02	0,00E+00	0,00E+00	5,57E+02	1,05E+03	5,26E-01	1,58E+00	4,96E+00	3,16E-01	-3,60E+00
HTP-c	CTUh	4,42E-07	2,89E-10	2,10E-11	0,00E+00	3,10E-08	2,99E-08	0,00E+00	0,00E+00	1,71E-08	2,43E-07	1,62E-11	5,78E-11	7,67E-11	3,66E-12	-1,20E-10
HTP-nc	CTUh	1,10E-05	6,82E-09	7,75E-10	0,00E+00	7,76E-07	2,08E-07	0,00E+00	0,00E+00	5,49E-07	3,43E-06	5,19E-10	1,60E-09	3,04E-09	1,21E-10	-2,48E-09
SQP	-	3,81E+02	3,82E+00	1,67E-01	0,00E+00	8,61E+02	1,84E+01	0,00E+00	0,00E+00	1,59E+02	2,24E+02	1,50E-01	1,14E+00	2,46E-01	1,56E-01	-8,25E-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															
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 experience with the indicator. 2 This impact category deals mainly with the eventual impact of low-dose ionizing radiation on the 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.															

Table 34: Parameters describing resource use

RESOURCE USE PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	2,62E+02	1,66E-01	-3,92E+00	0,00E+00	4,55E+02	4,06E+00	0,00E+00	0,00E+00	1,81E+02	1,37E+02	1,71E-01	3,27E-02	2,28E+00	1,61E-03	-1,40E+00
PERM	MJ	1,96E-01	0,00E+00	3,93E+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	0,00E+00	0,00E+00
PERT	MJ	2,62E+02	1,66E-01	6,35E-03	0,00E+00	4,55E+02	4,06E+00	0,00E+00	0,00E+00	1,81E+02	1,37E+02	1,71E-01	3,27E-02	2,28E+00	1,61E-03	-1,40E+00
PENRE	MJ	3,99E+02	8,31E+00	-3,23E+00	0,00E+00	2,81E+02	3,74E+01	0,00E+00	0,00E+00	9,23E+02	1,05E+03	8,72E-01	2,06E+00	3,01E+00	7,56E-02	-2,76E+00
PENRM	MJ	8,64E+00	0,00E+00	3,56E+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	0,00E+00	0,00E+00
PENRT	MJ	4,08E+02	8,31E+00	3,26E-01	0,00E+00	2,81E+02	3,74E+01	0,00E+00	0,00E+00	9,23E+02	1,05E+03	8,72E-01	2,06E+00	3,01E+00	7,56E-02	-2,76E+00
SM	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	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	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m <sup>3</sup>	2,15E+01	3,03E-02	6,53E-03	0,00E+00	6,12E+01	7,56E-01	0,00E+00	0,00E+00	1,01E+01	7,20E+03	9,53E-03	6,43E-03	1,52E-01	2,97E-03	-9,72E-02
<b>Caption</b>	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 freshwater															

Table 35: End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER FIXTURE																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	5,82E-03	2,16E-05	8,80E-07	0,00E+00	3,79E-04	1,42E-04	0,00E+00	0,00E+00	6,69E-04	1,75E-03	6,32E-07	5,19E-06	8,23E-07	1,42E-07	-2,33E-06
NHWD	kg	1,82E+01	2,56E-01	6,97E-02	0,00E+00	3,57E+00	1,83E+00	0,00E+00	0,00E+00	3,07E+00	1,30E+01	2,90E-03	8,21E-02	1,14E-02	3,08E-01	-5,08E-02
RWD	kg	1,09E-03	5,17E-05	2,07E-06	0,00E+00	8,70E-04	1,50E-04	0,00E+00	0,00E+00	6,47E-03	5,94E-03	6,11E-06	1,30E-05	7,84E-06	4,19E-07	-9,39E-06
CRU	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	2,57E+00	0,00E+00	1,84E-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	2,05E+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	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	2,99E-03	0,00E+00	2,09E-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	2,32E-01	0,00E+00	0,00E+00
EET	MJ	2,87E-02	0,00E+00	5,58E+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	2,28E+00	0,00E+00	0,00E+00
<b>Caption</b>	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; EE = Exported energy, EET = exported thermal energy															

Table 36: Biogenic carbon content

BIOGENIC CARBON CONTENT PER FIXTURE		
Parameter	Unit	At the factory gate
Biogenic carbon content in a product	kg C	0
Biogenic carbon content in accompanying packaging	kg C	0,1173
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub>	

# Additional information

## Technical information on scenarios

**Table 37: Average transport to the building site (A4)**

Scenario information	Value	Unit
Fuel type	Diesel	-
Vehicle type	Euro 5	-
Average transport distance	HV1E (16 and 20, 19, 40, 27, 60, 64): 452 km HV1E2 (16 and 20, 19, 40, 27, 60, 64): 804 km HV1EN (16 and 20, 19, 40, 27, 60, 64): 630 km HV1E-150 (16 and 20, 19, 40, 27, 60, 64): 945 km HV1EN2 (16 and 20, 19, 40, 27, 60, 64): 1.299 km HV1EN-150 (16 and 20, 19, 40, 27, 60, 64): 986 km HV1E2-150 (16 and 20, 19, 40, 27, 60, 64): 1.299 km	km
Capacity utilization (including empty runs)	85 % for trucks	%
Gross density of products transported	930 kg/m <sup>3</sup> (with lorry) 697 kg/m <sup>3</sup> (with flight) 442 kg/m <sup>3</sup> (with steel cage)	kg/m <sup>3</sup>
Capacity utilization volume factor	1	-

**Table 38: Installation of the product in the building (A5)**

Scenario information	Value							Unit
Ancillary materials	Installation is simple and does not entail any relevant energy consumption or use of materials. Mounting instructions are included with the product or can be downloaded on <a href="http://www.VOLA.com">www.VOLA.com</a> Packaging materials are cardboard, paper, LDPE, and EPS foil.							kg
Water use	Not relevant							m <sup>3</sup>
Other resource use	Not relevant							kg
Energy type and consumption	Not relevant							kWh
Waste materials	Materials	Group 1 HV1E-16	Group 2 HV1E2-19	Group 3 HV1E-40	Group 4 HV1E-27	Group 5 HV1E-60	Group 6 HV1E-64	kg
	EPS foil	0,091	0,091	0,091	0,091	0,091	0,091	
	LDPE	0,007	0,007	0,007	0,008	0,009	0,009	
	Cardboard	0,203	0,203	0,203	0,203	0,203	0,203	
	Paper	0,032	0,032	0,033	0,043	0,032	0,043	
	<b>SUMMARY</b>	<b>0,334</b>	<b>0,335</b>	<b>0,334</b>	<b>0,345</b>	<b>0,335</b>	<b>0,346</b>	
Output materials	0							kg
Direct emissions to air, soil, or water	0							kg



**Table 39: Reference service life**

RSL information	Unit
Reference service Life	30 Years
Declared product properties	As appropriate
Design application parameters	As appropriate
Assumed quality of work	As appropriate
Outdoor environment	As appropriate
Indoor environment	As appropriate
Usage conditions	As appropriate
Maintenance	As appropriate

**Table 40: Use (B1-B7)**

Scenario information	Value	Unit
<b>B1 – Use</b>		
	Sensor “hand-free” washbasin taps ensure low water consumption thanks to efficient control electronics. The actual amount of water and energy that is consumed during use partly depends on user behavior. The technical operating scenario is available in the “Consumption data” (B6-B7).	
<b>B2 - Maintenance</b>		
Maintenance process	Maintenance instructions are included with the VOLA product and can also be downloaded on <a href="http://www.vola.com">www.vola.com</a>	-
Maintenance cycle	1.560 times	/RSL
Ancillary materials for maintenance (specify which)	Cloth, little soap for cleaning, cotton bud, and detergents that are meant for the cleaning surface of the product (according to the maintenance instructions included in the VOLA product).  Soap (7,8 kg/RSL) Water (816 l/RSL) Acetic acid (3,6 l/RSL)	kg/RSL
Waste materials resulting from the maintenance (specify which)	0	kg
Net freshwater consumption during maintenance	0,816	m <sup>3</sup>
Energy input during maintenance	0	kWh
<b>B3 – Repair</b>		
Repair process	The product is made of parts that can be changed and replaced by new parts. Inspection is performed and a description of needed repair is noted on a sales order in agreement with the customer and Technical Support. The repair is carried out and the product and returned to the customer.  If repair is impossible, the customer will be contacted by technical support and a new product can be offered.	-
Inspection process	As part of the repair process.	-
Repair cycle	0,1	/year

Ancillary materials (specify which)	NA							kg/RSL
Waste materials (specify which)	Materials	Group 1 HV1E-16	Group 2 HV1E2-19	Group 3 HV1E-40	Group 4 HV1E-27	Group 5 HV1E-60	Group 6 HV1E-64	kg/RSL
	Hoses	0,119	0,145	0,119	0,119	0,145	0,119	
	Cartridges	0,046	0,046	0,046	0,046	0,046	0,046	
	Pilator	0,001	0,002	0,001	0,001	0,002	0,001	
	<b>SUMMARY</b>	<b>0,166</b>	<b>0,193</b>	<b>0,166</b>	<b>0,166</b>	<b>0,193</b>	<b>0,166</b>	
Net freshwater consumption during repair	0							m <sup>3</sup>
Energy input during repair	0							kg/RSL
<b>B6 + B7 – Use of energy and water</b>								
Ancillary materials specified by material	Not specified							kg
Net freshwater consumption	175 m <sup>3</sup> (100 cycles per day, lifespan of 30 years) with the standard 1,9 l/min flow rate							m <sup>3</sup>
Type of energy carrier	106							kWh/RSL
The power output of equipment	≤ 0,0003							kW
Characteristic performance	Not specified							As appropriate
Further assumptions for scenario development	Not specified							As appropriate

**Table 41: End of life (C1-C4)**

Scenario information	Value						Unit
Collected separately	Group 1 HV1E-16	Group 2 HV1E2-19	Group 3 HV1E-40	Group 4 HV1E-27	Group 5 HV1E-60	Group 6 HV1E-64	kg
	2,31E+00	2,32E+00	2,22E+00	2,39E+00	2,37E+00	2,28E+00	
Collected with mixed waste	-						kg
Reuse	0						kg
Recycling	Group 1 HV1E-16	Group 2 HV1E2-19	Group 3 HV1E-40	Group 4 HV1E-27	Group 5 HV1E-60	Group 6 HV1E-64	kg
	1,94E+00	1,97E+00	1,87E+00	2,00E+00	1,98E+00	1,90E+00	
Energy recovery	Group 1 HV1E-16	Group 2 HV1E2-19	Group 3 HV1E-40	Group 4 HV1E-27	Group 5 HV1E-60	Group 6 HV1E-64	kg
	6,43E-02	6,48E-02	6,43E-02	6,46E-02	6,48E-02	6,46E-02	
Landfilling	Group 1 HV1E-16	Group 2 HV1E2-19	Group 3 HV1E-40	Group 4 HV1E-27	Group 5 HV1E-60	Group 6 HV1E-64	kg
	2,54E-01	2,47E-01	2,37E-01	2,83E-01	2,86E-01	2,72E-01	
Assumptions for scenario development	-						As appropriate

**Table 42: Re-use, recovery, and recycling potential (D)**

Scenario information/Material	Value						Unit
	Group 1 HV1E-16	Group 2 HV1E2-19	Group 3 HV1E-40	Group 4 HV1E-27	Group 5 HV1E-60	Group 6 HV1E-64	
Energy recovery	6,43E-02	6,48E-02	6,43E-02	6,46E-02	6,48E-02	6,46E-02	kg
Materials recovery	1,80E+00	1,82E+00	1,73E+00	1,85E+00	1,83E+00	1,76E+00	kg


### Indoor air

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

### Soil and water

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

## References

<p><b>Publisher</b></p>	 <a href="http://www.epddanmark.dk">www.epddanmark.dk</a>
<p><b>Program operator</b></p>	<p>Danish Technological Institute          Buildings &amp; Environment          Gregersensvej          DK-2630 Taastrup  <a href="http://www.teknologisk.dk">www.teknologisk.dk</a></p>
<p><b>LCA-practitioner</b></p>	<p>Kristyna Davidova          Bureau Veritas, HSE Danmark          Oldenborggade 25-31          7000 Fredericia          Denmark          E-mail: <a href="mailto:kristyna.davidova@bureauveritas.com">kristyna.davidova@bureauveritas.com</a></p> <p>Odyssefs Papagiannidis          Bureau Veritas, HSE Danmark          Oldenborggade 25-31          7000 Fredericia          Denmark          E-mail: <a href="mailto:odyssefs.papagiannidis@bureauveritas.com">odyssefs.papagiannidis@bureauveritas.com</a></p>
<p><b>LCA software /background data</b></p>	<p>SimaPro 9.2/ Ecoinvent 3.7.1 (2021)          Generic data are primarily based on life cycle inventory data from SimaPro 9.2 Professional Database 2020 and Ecoinvent version 3.7.1</p>
<p><b>3<sup>rd</sup> party verifier</b></p>	<p>Ninkie Bendtsen          Niras A/S          Sortemosevej 19          3450 Allerød          Denmark  <a href="http://www.niras.dk">www.niras.dk</a></p>

## General program instructions

Version 2.0, [www.epddanmark.dk](http://www.epddanmark.dk)

### EN 15804

DS/EN 15804 + A2:2019 –“ Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products”

### Product specific PCR

Part B: Requirements on the EPD for Bathroom and showers.

From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU)

### EN 15942

DS/EN 15942:2011 –“ Sustainability of Construction Works – Environmental product declarations – Communication format business-to-business”

### ISO 14025

DS/EN ISO 14025:2010 –“ Environmental Labels and Declarations – Type III environmental declarations – Principles and procedures”

### ISO 14040

DS/EN ISO 14040:2008 –“ Environmental Management – Life cycle assessment – Principles and framework”

### ISO 14044

DS/EN ISO 14044:2008 –“ Environmental Management – Life cycle assessment – Requirements and guidelines”

### PEF 2018

Product Environmental Footprint Category Rules Guidance 2018

### BUILD REPORT 2021

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<https://build.dk/Pages/BUILD-levetidstabel.aspx>