epddanmark

ECO PLATFORM EPD VERIFIED

| | |
|---|---|
| Owner: | Combimix Aps |
| No.: | MD-22130-EN |
| Issued: | 24-03-2023 |
| Valid to: | 24-03-2028 |

3rd PARTY **VERIFIED**

# EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | **ISO 14025 & EN 15804**

**Owner of declaration**
Combimix ApS, Marktoften 6,
DK-8464 Galten, CVR-Nr.
DK-36934379

**Programme**
EPD Danmark
www.epddanmark.dk

☐ Industry EPD
☒ Product EPD

**Declared product(s)**
CM Flow Casting
CM Flow casting fiber
CM Project
CM Project Fiber
CM Project Selfdrying
CM 720 fine
CM 750 S
CM 760 Fiber
CM 920 Industrial
CM 940 Industrial Top

Number of declared datasets/product variations: 10

**Production site**
Marktoften 6, DK 8464 Galten, Denmark

**Product(s) use**
Combimix products are used as cement based, plastic- and fiber-reinforced products. Suitable for fast-hardening repair and putty compounds for floors, in wet and dry rooms.

**Declared/ functional unit**
This EPD refers to the declared unit of 1 kg floor screed product with a density of 1100 - 2200 kg/m$^3$.

**Year of production site data (A3)**
2021

**EPD version**
This is the original version of the EPD.

**Issued:** 24-03-2023
**Valid to:** 24-03-2028

**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

☐ internal ☒ external

Third party verifier:

*Ninkie Bendtsen*

*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 | MND | MND | MND | MND | MND | MND | MND | X | X | X | X | X |

# Product information

### Product description

The main product components are shown in Table 1. Specific recipes are used, and the composition of input materials is 100 % in mass -% of declared products.

**Table 1: Material composition of products**

| Product | Material / component | Weight-% of declared product |
|---|---|---|
| CM Flow Casting | Cement | 29% |
| | Sand | 54% |
| | Calcium carbonate | 12% |
| | Additives | 5% |
| CM Flow casting fiber | Cement | 29% |
| | Sand | 54% |
| | Calcium carbonate | 12% |
| | Additives | 5% |
| CM Project | Cement | 36% |
| | Sand | 54% |
| | Calcium carbonate | 2% |
| | Additives | 8% |
| CM Project Fiber | Cement | 36% |
| | Sand | 54% |
| | Calcium carbonate | 2% |
| | Additives | 8% |
| CM Project Selfdrying | Cement | 30% |
| | Sand | 57% |
| | Calcium carbonate | 2% |
| | Additives | 11% |
| CM 720 fine | Cement | 38% |
| | Sand | 50% |
| | Calcium carbonate | 3% |
| | Additives | 10% |
| CM 750 S | Cement | 44% |
| | Sand | 22% |
| | Calcium carbonate | 22% |
| | Additives | 13% |
| CM 760 Fiber | Cement | 30% |
| | Sand | 56% |
| | Calcium carbonate | 2% |
| | Additives | 11% |
| CM 920 Industrial | Cement | 30% |
| | Sand | 55% |
| | Calcium carbonate | 2% |
| | Additives | 13% |
| CM 940 Industrial Top | Cement | 38% |
| | Sand | 43% |
| | Additives | 19% |

### Product packaging:

There is no material used for the sales- and transport packaging of the product, since it is delivered in bulk directly to the customers, via truck.

### Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of 1 kg of product on the production sites located in Galten. Product specific data are based on average values collected in the year 2021. Background data are based on SimaPro 9.3 with database of EcoInvent 3.8 and are less than 10 years old. Generally, the used background datasets are of high quality, and the majority of the datasets are only a couple of years old.

### Hazardous substances

The products do not contain hazardous substance listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorization" higher than 0.1% of the weight of the product.

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

### Essential characteristics

The products are designed, produced and CE marked according to EN 13813:2002 Screed material and floor screeds. Screed material. Properties and requirements.

They are classified as seen in Tables 2 and 3 according to EN 13813:2002 Screed material and floor screeds.

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

https://www.combimix.com/us/products/floor-leveling/industrial-floors/

**Table 2: Technical specifications of Combimix floor screeds products part 1**

| | CM Flow casting | CM Flow casting fiber | CM Project | CM Project fiber | CM Project Selfdrying |
|---|---|---|---|---|---|
| **Standard** | EN 13813 | EN 13813 | EN 13813 | EN 13813 | EN 13813 |
| **Density (kg/m³)** | 1700 | 1700 | 1700 | 1700 | 1700 |
| **Reaction to fire** | Class A1 | Class A1 | Class A1 | Class A1 | Class A1 |
| **Product class acc. to EN 13813** | CT C20F4 | CT C20F4 | CT C30F5 | CT C30F5 | CT C30F6 |
| **Open time** | 30 min | 30 min | 30 min | 30 min | 30 min |
| **Slip** | 0,04–0,08 % | 0,04–0,08 % | 0,04 % | 0,04 % | 0,04 % |

**Table 3: Technical specifications of Combimix floor screed products part 2**

| | CM 720 | CM 750 S | CM 760 Fiber | CM 920 Industrial | CM 940 Industrial Top |
|---|---|---|---|---|---|
| **Standard** | EN 13813 | EN 13813 | EN 13813 | EN 13813 | EN 13813 |
| **Density (kg/m³)** | 1600 | 1600 | 1700 | 1700 | 1600 |
| **Reaction to fire** | Class A1 | Class A1 | Class A1 | Class A1 | Class A1 |
| **Product class acc. to EN 13813** | CT C30F6 | CT C25F6 | CT C30F7 | CT C30F8 | CT C30F8 |
| **Open time** | 10-25 min | 10-20 min | 10-25 min | 15-25 min | 15-25 min |
| **Slip** | 0,03–0,05 % | 0,03–0,05 % | 0,03–0,05 % | 0,03–0,05 % | 0,03–0,05 % |

### Reference Service Life (RSL)

The B1-B7 stage is not relevant as it is not applicable. Thus, this EPD does not include a Reference Service Life and the environmental impacts related to this stage have not been studied. Air, soil, and water impacts during the use phase have not been studied.

### Picture of product(s)


**Figure 1 Pictures of the Combimix floor screed compound products and example of bulk delivery of the product in powdered form.**

# LCA background

### Declared unit

Declared unit is taken as the input of materials in order to produce 1 kg of product.

The LCI and LCIA results in this EPD relate to 1 kg of product from Combimix for the products: CM Flow Casting, CM Flow casting fiber, CM Project, CM Project Fiber, CM Project Selfdrying, CM 720 fine, CM 750 S, CM 760 Fiber, CM 920 Industrial, CM 940 Industrial Top.

### Functional Unit

No functional unit is declared.

**Table 4: Declared unit**

| Name | Value | Unit |
|---|---|---|
| Declared unit | 1 | kg |
| Density | CM Flow casting: 1700 Kg/m$^3$<br>CM Flow casting fiber: 1700 Kg/m$^3$<br>CM Project: 1700 Kg/m$^3$<br>CM Project Fiber: 1700 Kg/m$^3$<br>CM Project Selfdrying: 1700 Kg/m$^3$<br>CM 720: 1600 Kg/m$^3$<br>CM 750 S: 1600 Kg/m$^3$<br>CM 760 fiber: 1700 Kg/m$^3$<br>CM 920 Industrial: 1700 Kg/m$^3$<br>CM 940 Industrial top: 1600 Kg/m$^3$ | Kg/m$^3$ |
| Conversion factor to 1 kg | 1 | - |

### PCR

This EPD is developed according to the core rules for EN 15804:2012+A2, 2019:14 .

### Guarantee of Origin – certificates

Foreground system:

The product is produced using country average mix for production in the site of Denmark.

Background system:

Upstream processes are modelled using an average country mix. Downstream processes are modelled using an average country mix for Denmark since the product is used in Denmark.

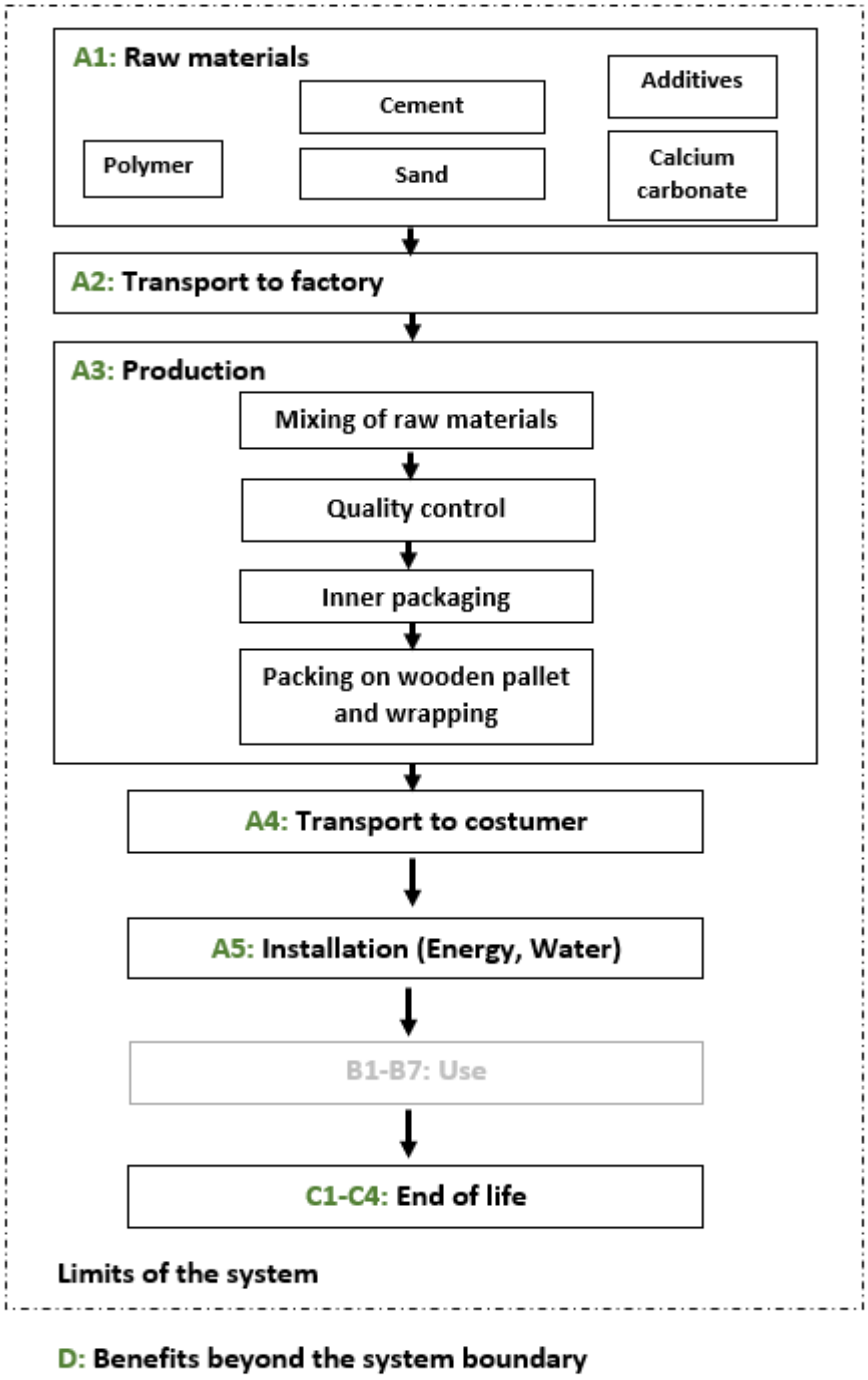


**Figure 2: Flow diagram of product system with modules A1-D. B1-B7 modules are not included in the declaration.**

The Flow diagram above conforms with the requirements of the modular approach and shows all phases. All phases are described below. Use phase B1-B7 is not declared in this EPD.

**System boundary**

This EPD is based on a cradle-to-gate with options and covers the life cycle sub-modules A1-A3, A4, A5, C1-C4, and D, in which 100 weight-% has been accounted for.

The general rules for cut-off 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.

The system boundaries of this EPD include Module A1, A2, A3, A4, A5, C1, C2, C3, C4, and Module D.

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

A1 – Extraction and processing of raw materials

A2 – Transport to the production site

A3 – Manufacturing processes

This product stage includes the acquisition of all raw materials, products, 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 one production site.

A1: The extraction, supply and transport of raw materials and their packaging to Combimix ApS in included here. Raw materials are purchased from European suppliers. Generic data from the Ecoinvent 3.8 database for raw material production has been coupled with primary activity data from recipes.

All semifinished products are represented as primary materials. Components from polymers, cement additives and calcium carbonate are preproduced from suppliers. The materials that are used to pack all raw materials are cardboard, paper, wood, and plastic big bags. Cement and sand materials are delivered in bulk due to considerable amounts transported. Thus, no packaging is considered for these materials.

There is no packaging material used for the final product, since it is delivered in bulk directly to the customers, via truck.

A2: The raw materials are transported to the manufacturing site. The modelling includes road and/or maritime transportations of each raw material from 2021.

A3: The processing of any waste arising from this stage is also included. The main raw material is sand cement, and calcium carbonate. These materials constitute 80-90 % of the total product. Cement is received in different types: aluminate cement and Portland cement. The remaining 10-20 % of the products consists of additives.

The rest of the components are mainly different kinds of additives of inorganic nature but in a much smaller amount.

Combimix ApS use electricity from the Danish grid mix. energy consumption at the location of Combimix ApS in

The disposal of the packaging of raw materials is taken into account at this stage. Of the packaging, 100 % is incinerated due to it having been in direct contact with concrete. For the product, 100 % is send to landfill due to the it being non-recyclable.

Transportation to the incineration and landfill stations is covered by a European average EURO 5 lorry 16-32 tons with a diesel engine.

**Construction process stage (A4-A5) includes:**

A4: The product is sold directly to customers or stores where the product is sold to others. The distance is calculated by finding the distance between the production site and the customer on the Danish market for each product. For all products produced in Denmark, the costumers are located in Denmark.

A5: The installation of the product into the building requires water and energy for blending the raw materials. Mixing electricity consumption is estimated as 0,216 MJ/kg. This is equivalent to the use of a 1200-Watt handheld mixer for 3 minutes, see Table 48: Installation of the product in the building (A5) part 1 and Table 49: Installation of the product in the building (A5) part 2.

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

B1 to B7 are not declared as they are not applicable: the product does not need maintenance or replacement during its RSL. Thus, this EPD does not include the product use and maintenance stage (B1-B7) and the environmental impacts related to this stage have not been studied. Air, soil, and water impacts during the use phase have not been studied

**End of Life (C1-C4) includes:**

The end-of-life stage analyses the impacts related to the disposal of self-levelling compounds on a surface when that surface reaches the end of its service life, see Table 51. The consumption of energy and natural resources is considered negligible for disassembling end-of-life products. Therefore, the impact of demolition is considered zero in Module (C1). Module (C2) includes the transport of the product waste to the closest disposal facilities. All end-of-life product is sent to the closest disposal facilities, estimating a transportation distance equal to 50 km via road transport by a Euro 5 lorry of 16-32 metric ton. Module (C3) is considered zero, as no further waste processing for reuse, recovery or recycling takes place in this analysis.

Module (C4) is the disposal of the product.
In this case, the landfill is considered the final disposal method.

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

The product itself provide no benefit in module D due to it being send to a landfill at end-of-life. This is because it contains cement products. Since there is no final packaging of the product, there is no potential impact in Module D.

# LCA results

Results for CM Flow casting

**Table 5: Environmental impact indicators (CM Flow casting)**

| ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **GWP- total** | kg $CO_2$-eq. | 1,47E-01 | 1,25E-01 | 1,80E-02 | 0,00E+00 | 8,32E-03 | 0,00E+00 | 5,28E-03 | 0,00E+00 |
| **GWP-fossil** | kg $CO_2$-eq. | 1,46E-01 | 1,24E-01 | 1,71E-02 | 0,00E+00 | 8,31E-03 | 0,00E+00 | 5,27E-03 | 0,00E+00 |
| **GWP-biogenic** | kg $CO_2$-eq. | 1,33E-03 | 1,27E-04 | 8,38E-04 | 0,00E+00 | 7,08E-06 | 0,00E+00 | 5,22E-06 | 0,00E+00 |
| **GWP- luluc** | kg $CO_2$-eq. | 4,52E-04 | 7,43E-05 | 3,53E-05 | 0,00E+00 | 3,26E-06 | 0,00E+00 | 4,97E-06 | 0,00E+00 |
| **ODP** | kg CFC 11 -eq. | 1,39E-08 | 2,71E-08 | 4,71E-10 | 0,00E+00 | 1,92E-09 | 0,00E+00 | 2,13E-09 | 0,00E+00 |
| **AP** | mol $H^+$-eq. | 7,74E-04 | 4,85E-04 | 6,91E-05 | 0,00E+00 | 3,37E-05 | 0,00E+00 | 4,95E-05 | 0,00E+00 |
| **EP-freshwater** | kg P-eq. | 2,82E-05 | 1,16E-05 | 1,32E-05 | 0,00E+00 | 5,35E-07 | 0,00E+00 | 4,82E-07 | 0,00E+00 |
| **EP- marine** | kg N-eq. | 1,72E-04 | 1,33E-04 | 1,52E-05 | 0,00E+00 | 1,02E-05 | 0,00E+00 | 1,72E-05 | 0,00E+00 |
| **EP-terrestrial** | mol N-eq. | 1,87E-03 | 1,45E-03 | 1,68E-04 | 0,00E+00 | 1,11E-04 | 0,00E+00 | 1,88E-04 | 0,00E+00 |
| **POCP** | kg NMVOC -eq. | 5,24E-04 | 4,53E-04 | 3,84E-05 | 0,00E+00 | 3,40E-05 | 0,00E+00 | 5,48E-05 | 0,00E+00 |
| **ADP-minerals&metals** | kg Sb-eq. | 6,03E-07 | 7,73E-07 | 2,33E-07 | 0,00E+00 | 2,89E-08 | 0,00E+00 | 1,20E-08 | 0,00E+00 |
| **ADP-fossil** | MJ | 1,58E+00 | 1,85E+00 | 2,46E-01 | 0,00E+00 | 1,26E-01 | 0,00E+00 | 1,47E-01 | 0,00E+00 |
| **WDP** | $m^3$ | 2,07E-03 | 7,17E-03 | 9,79E-03 | 0,00E+00 | 3,76E-04 | 0,00E+00 | 6,62E-03 | 0,00E+00 |
| **Capture** | 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 6: Additional environmental impact indicators (CM Flow casting)**

| ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PM** | disease inc. | 1,13E-08 | 7,86E-09 | 4,21E-10 | 0,00E+00 | 7,17E-10 | 0,00E+00 | 9,97E-10 | 0,00E+00 |
| **IRP** | kBq U235 eq | 1,37E-02 | 1,03E-02 | 4,29E-03 | 0,00E+00 | 6,46E-04 | 0,00E+00 | 6,53E-04 | 0,00E+00 |
| **ETP-fw** | CTUe | 2,95E+00 | 1,62E+00 | 4,22E-01 | 0,00E+00 | 9,81E-02 | 0,00E+00 | 9,29E-02 | 0,00E+00 |
| **HTP-c** | CTUh | 4,71E-11 | 6,83E-11 | 9,96E-12 | 0,00E+00 | 3,18E-12 | 0,00E+00 | 2,36E-12 | 0,00E+00 |
| **HTP-nc** | CTUh | 1,46E-09 | 1,61E-09 | 2,84E-10 | 0,00E+00 | 1,03E-10 | 0,00E+00 | 6,15E-11 | 0,00E+00 |
| **SQP** | Dimensionless | 1,80E+00 | 9,03E-01 | 2,99E-01 | 0,00E+00 | 8,63E-02 | 0,00E+00 | 3,09E-01 | 0,00E+00 |
| **Capture** | 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.<br>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 7: Parameters describing resource use (CM Flow casting)**

| RESOURCE USE PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PERE** | MJ | 1,40E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PERM** | MJ | 1,24E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PERT** | MJ | 1,41E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PENRE** | MJ | 1,61E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **PENRM** | MJ | 7,56E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PENRT** | MJ | 1,68E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **SM** | 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 |
| **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 |
| **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 |
| **FW** | $m^3$ | 2,35E-02 | 7,15E-03 | 8,94E-03 | 0,00E+00 | 3,78E-04 | 0,00E+00 | 6,63E-03 | 0,00E+00 |
| **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 8: End-of-life (waste categories and output flows) (CM Flow casting)**

| WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **HWD** | kg | 2,24E-06 | 5,11E-06 | 2,78E-07 | 0,00E+00 | 3,28E-07 | 0,00E+00 | 2,22E-07 | 0,00E+00 |
| **NHWD** | kg | 3,09E-02 | 6,06E-02 | 1,64E-03 | 0,00E+00 | 6,46E-03 | 0,00E+00 | 1,00E+00 | 0,00E+00 |
| **RWD** | kg | 7,84E-06 | 1,22E-05 | 1,08E-06 | 0,00E+00 | 8,50E-07 | 0,00E+00 | 9,64E-07 | 0,00E+00 |
| **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 |
| **MFR** | kg | 4,90E-04 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+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 |
| **EEE** | MJ | 2,86E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **EET** | MJ | 2,75E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **Caption** | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy, EET = exported thermal energy | | | | | | | | |

CM Flow casting fiber

**Table 9: Environmental impact indicators (CM Flow casting fiber)**

| ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **GWP- total** | kg $CO_2$-eq. | 1,48E-01 | 1,25E-01 | 1,80E-02 | 0,00E+00 | 8,32E-03 | 0,00E+00 | 5,28E-03 | 0,00E+00 |
| **GWP-fossil** | kg $CO_2$-eq. | 1,46E-01 | 1,24E-01 | 1,71E-02 | 0,00E+00 | 8,31E-03 | 0,00E+00 | 5,27E-03 | 0,00E+00 |
| **GWP-biogenic** | kg $CO_2$-eq. | 1,34E-03 | 1,27E-04 | 8,38E-04 | 0,00E+00 | 7,08E-06 | 0,00E+00 | 5,22E-06 | 0,00E+00 |
| **GWP- luluc** | kg $CO_2$-eq. | 4,52E-04 | 7,43E-05 | 3,53E-05 | 0,00E+00 | 3,26E-06 | 0,00E+00 | 4,97E-06 | 0,00E+00 |
| **ODP** | kg CFC 11 -eq. | 1,39E-08 | 2,71E-08 | 4,71E-10 | 0,00E+00 | 1,92E-09 | 0,00E+00 | 2,13E-09 | 0,00E+00 |
| **AP** | mol $H^{+-}$ eq. | 7,78E-04 | 4,85E-04 | 6,91E-05 | 0,00E+00 | 3,37E-05 | 0,00E+00 | 4,95E-05 | 0,00E+00 |
| **EP-freshwater** | kg P-eq. | 2,84E-05 | 1,16E-05 | 1,32E-05 | 0,00E+00 | 5,35E-07 | 0,00E+00 | 4,82E-07 | 0,00E+00 |
| **EP- marine** | kg N-eq. | 1,73E-04 | 1,33E-04 | 1,52E-05 | 0,00E+00 | 1,02E-05 | 0,00E+00 | 1,72E-05 | 0,00E+00 |
| **EP-terrestrial** | mol N-eq. | 1,88E-03 | 1,45E-03 | 1,68E-04 | 0,00E+00 | 1,11E-04 | 0,00E+00 | 1,88E-04 | 0,00E+00 |
| **POCP** | kg NMVOC -eq. | 5,26E-04 | 4,53E-04 | 3,84E-05 | 0,00E+00 | 3,40E-05 | 0,00E+00 | 5,48E-05 | 0,00E+00 |
| **ADP-minerals&metals** | kg Sb-eq. | 6,10E-07 | 7,73E-07 | 2,33E-07 | 0,00E+00 | 2,89E-08 | 0,00E+00 | 1,20E-08 | 0,00E+00 |
| **ADP-fossil** | MJ | 1,59E+00 | 1,85E+00 | 2,46E-01 | 0,00E+00 | 1,26E-01 | 0,00E+00 | 1,47E-01 | 0,00E+00 |
| **WDP** | $m^3$ | 2,40E-02 | 7,17E-03 | 9,79E-03 | 0,00E+00 | 3,76E-04 | 0,00E+00 | 6,62E-03 | 0,00E+00 |
| **Capture** | 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 10: Additional environmental impact indicators (CM Flow casting fiber)**

| ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PM** | disease inc. | 1,13E-08 | 7,86E-09 | 4,21E-10 | 0,00E+00 | 7,17E-10 | 0,00E+00 | 9,97E-10 | 0,00E+00 |
| **IRP** | kBq U235 eq | 1,38E-02 | 1,03E-02 | 4,29E-03 | 0,00E+00 | 6,46E-04 | 0,00E+00 | 6,53E-04 | 0,00E+00 |
| **ETP-fw** | CTUe | 2,95E+00 | 1,62E+00 | 4,22E-01 | 0,00E+00 | 9,81E-02 | 0,00E+00 | 9,29E-02 | 0,00E+00 |
| **HTP-c** | CTUh | 4,71E-11 | 6,83E-11 | 9,96E-12 | 0,00E+00 | 3,18E-12 | 0,00E+00 | 2,36E-12 | 0,00E+00 |
| **HTP-nc** | CTUh | 1,46E-09 | 1,61E-09 | 2,84E-10 | 0,00E+00 | 1,03E-10 | 0,00E+00 | 6,15E-11 | 0,00E+00 |
| **SQP** | Dimensionless | 1,80E+00 | 9,03E-01 | 2,99E-01 | 0,00E+00 | 8,63E-02 | 0,00E+00 | 3,09E-01 | 0,00E+00 |
| **Capture** | 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.<br>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 11: Parameters describing resource use (CM Flow casting fiber)**

| RESOURCE USE PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PERE** | MJ | 1,41E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PERM** | MJ | 1,24E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PERT** | MJ | 1,42E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PENRE** | MJ | 1,62E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **PENRM** | MJ | 7,56E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PENRT** | MJ | 1,69E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **SM** | 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 |
| **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 |
| **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 |
| **FW** | $m^3$ | 2,36E-02 | 7,15E-03 | 8,96E-03 | 0,00E+00 | 3,78E-04 | 0,00E+00 | 6,63E-03 | 0,00E+00 |
| **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 12: End-of-life (waste categories and output flows) (CM Flow casting fiber)**

| WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **HWD** | kg | 2,25E-06 | 5,11E-06 | 2,77E-07 | 0,00E+00 | 3,28E-07 | 0,00E+00 | 2,22E-07 | 0,00E+00 |
| **NHWD** | kg | 3,10E-02 | 6,06E-02 | 1,64E-03 | 0,00E+00 | 6,46E-03 | 0,00E+00 | 1,00E+00 | 0,00E+00 |
| **RWD** | kg | 7,86E-06 | 1,22E-05 | 1,08E-06 | 0,00E+00 | 8,50E-07 | 0,00E+00 | 9,64E-07 | 0,00E+00 |
| **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 |
| **MFR** | 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 |
| **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 |
| **EEE** | MJ | 2,86E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **EET** | MJ | 2,75E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **Caption** | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy, EET = exported thermal energy | | | | | | | | |

CM Project

**Table 13: Environmental impact indicators (CM Project)**

| ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **GWP- total** | kg $CO_2$-eq. | 1,93E-01 | 1,25E-01 | 1,80E-02 | 0,00E+00 | 8,32E-03 | 0,00E+00 | 5,28E-03 | 0,00E+00 |
| **GWP-fossil** | kg $CO_2$-eq. | 1,91E-01 | 1,24E-01 | 1,71E-02 | 0,00E+00 | 8,31E-03 | 0,00E+00 | 5,27E-03 | 0,00E+00 |
| **GWP-biogenic** | kg $CO_2$-eq. | 1,43E-03 | 1,27E-04 | 8,38E-04 | 0,00E+00 | 7,08E-06 | 0,00E+00 | 5,22E-06 | 0,00E+00 |
| **GWP- luluc** | kg $CO_2$-eq. | 4,73E-04 | 7,43E-05 | 3,53E-05 | 0,00E+00 | 3,26E-06 | 0,00E+00 | 4,97E-06 | 0,00E+00 |
| **ODP** | kg CFC 11 -eq. | 1,80E-08 | 2,71E-08 | 4,71E-10 | 0,00E+00 | 1,92E-09 | 0,00E+00 | 2,13E-09 | 0,00E+00 |
| **AP** | mol $H^{+-}$ eq. | 9,58E-04 | 4,85E-04 | 6,92E-05 | 0,00E+00 | 3,37E-05 | 0,00E+00 | 4,95E-05 | 0,00E+00 |
| **EP-freshwater** | kg P-eq. | 3,12E-05 | 1,16E-05 | 1,32E-05 | 0,00E+00 | 5,35E-07 | 0,00E+00 | 4,82E-07 | 0,00E+00 |
| **EP- marine** | kg N-eq. | 2,13E-04 | 1,33E-04 | 1,52E-05 | 0,00E+00 | 1,02E-05 | 0,00E+00 | 1,72E-05 | 0,00E+00 |
| **EP-terrestrial** | mol N-eq. | 2,32E-03 | 1,45E-03 | 1,68E-04 | 0,00E+00 | 1,11E-04 | 0,00E+00 | 1,88E-04 | 0,00E+00 |
| **POCP** | kg NMVOC -eq. | 6,69E-04 | 4,53E-04 | 3,84E-05 | 0,00E+00 | 3,40E-05 | 0,00E+00 | 5,48E-05 | 0,00E+00 |
| **ADP-minerals&metals** | kg Sb-eq. | 8,25E-07 | 7,73E-07 | 2,33E-07 | 0,00E+00 | 2,89E-08 | 0,00E+00 | 1,20E-08 | 0,00E+00 |
| **ADP-fossil** | MJ | 2,32E+00 | 1,85E+00 | 2,46E-01 | 0,00E+00 | 1,26E-01 | 0,00E+00 | 1,47E-01 | 0,00E+00 |
| **WDP** | $m^3$ | 3,81E-02 | 7,17E-03 | 1,15E-02 | 0,00E+00 | 3,76E-04 | 0,00E+00 | 6,62E-03 | 0,00E+00 |
| **Capture** | 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 14: Additional environmental impact indicators (CM Project)**

| ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PM** | disease inc. | 1,03E-08 | 7,86E-09 | 4,22E-10 | 0,00E+00 | 7,17E-10 | 0,00E+00 | 9,97E-10 | 0,00E+00 |
| **IRP** | kBq U235 eq | 1,44E-02 | 1,03E-02 | 4,29E-03 | 0,00E+00 | 6,46E-04 | 0,00E+00 | 6,53E-04 | 0,00E+00 |
| **ETP-fw** | CTUe | 3,33E+00 | 1,62E+00 | 4,22E-01 | 0,00E+00 | 9,81E-02 | 0,00E+00 | 9,29E-02 | 0,00E+00 |
| **HTP-c** | CTUh | 5,14E-11 | 6,83E-11 | 9,98E-12 | 0,00E+00 | 3,18E-12 | 0,00E+00 | 2,36E-12 | 0,00E+00 |
| **HTP-nc** | CTUh | 1,49E-09 | 1,61E-09 | 2,84E-10 | 0,00E+00 | 1,03E-10 | 0,00E+00 | 6,15E-11 | 0,00E+00 |
| **SQP** | Dimensionless | 1,97E+00 | 9,03E-01 | 2,99E-01 | 0,00E+00 | 8,63E-02 | 0,00E+00 | 3,09E-01 | 0,00E+00 |

| | |
|---|---|
| **Capture** | 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.<br>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 15: Parameters describing resource use (CM Project)**

| RESOURCE USE PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PERE** | MJ | 1,53E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PERM** | MJ | 1,89E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PERT** | MJ | 1,55E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PENRE** | MJ | 2,15E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **PENRM** | MJ | 3,22E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PENRT** | MJ | 2,48E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **SM** | 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 |
| **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 |
| **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 |
| **FW** | $m^3$ | 3,72E-02 | 7,15E-03 | 1,06E-02 | 0,00E+00 | 3,78E-04 | 0,00E+00 | 6,63E-03 | 0,00E+00 |
| **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 16: End-of-life (waste categories and output flows) (CM Project)**

| WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **HWD** | kg | 2,76E-06 | 5,11E-06 | 2,77E-07 | 0,00E+00 | 3,28E-07 | 0,00E+00 | 2,22E-07 | 0,00E+00 |
| **NHWD** | kg | 3,84E-02 | 6,06E-02 | 1,64E-03 | 0,00E+00 | 6,46E-03 | 0,00E+00 | 1,00E+00 | 0,00E+00 |
| **RWD** | kg | 9,26E-06 | 1,22E-05 | 1,08E-06 | 0,00E+00 | 8,50E-07 | 0,00E+00 | 9,64E-07 | 0,00E+00 |
| **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 |
| **MFR** | 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 |
| **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 |
| **EEE** | MJ | 3,60E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **EET** | MJ | 3,45E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

| Caption | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy, EET = exported thermal energy |
|---|---|

CM Project fiber

**Table 17: Environmental impact indicators (CM Project fiber)**

| ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **GWP- total** | kg $CO_2$-eq. | 1,94E-01 | 1,25E-01 | 1,80E-02 | 0,00E+00 | 8,32E-03 | 0,00E+00 | 5,28E-03 | 0,00E+00 |
| **GWP-fossil** | kg $CO_2$-eq. | 1,92E-01 | 1,24E-01 | 1,71E-02 | 0,00E+00 | 8,31E-03 | 0,00E+00 | 5,27E-03 | 0,00E+00 |
| **GWP-biogenic** | kg $CO_2$-eq. | 1,43E-03 | 1,27E-04 | 8,38E-04 | 0,00E+00 | 7,08E-06 | 0,00E+00 | 5,22E-06 | 0,00E+00 |
| **GWP- luluc** | kg $CO_2$-eq. | 4,73E-04 | 7,43E-05 | 3,53E-05 | 0,00E+00 | 3,26E-06 | 0,00E+00 | 4,97E-06 | 0,00E+00 |
| **ODP** | kg CFC 11 -eq. | 1,80E-08 | 2,71E-08 | 4,71E-10 | 0,00E+00 | 1,92E-09 | 0,00E+00 | 2,13E-09 | 0,00E+00 |
| **AP** | mol $H^{+-}$ eq. | 9,61E-04 | 4,85E-04 | 6,92E-05 | 0,00E+00 | 3,37E-05 | 0,00E+00 | 4,95E-05 | 0,00E+00 |
| **EP-freshwater** | kg P-eq. | 3,14E-05 | 1,16E-05 | 1,32E-05 | 0,00E+00 | 5,35E-07 | 0,00E+00 | 4,82E-07 | 0,00E+00 |
| **EP- marine** | kg N-eq. | 2,14E-04 | 1,33E-04 | 1,52E-05 | 0,00E+00 | 1,02E-05 | 0,00E+00 | 1,72E-05 | 0,00E+00 |
| **EP-terrestrial** | mol N-eq. | 2,33E-03 | 1,45E-03 | 1,68E-04 | 0,00E+00 | 1,11E-04 | 0,00E+00 | 1,88E-04 | 0,00E+00 |
| **POCP** | kg NMVOC -eq. | 6,71E-04 | 4,53E-04 | 3,84E-05 | 0,00E+00 | 3,40E-05 | 0,00E+00 | 5,48E-05 | 0,00E+00 |
| **ADP-minerals&metals** | kg Sb-eq. | 8,32E-07 | 7,73E-07 | 2,33E-07 | 0,00E+00 | 2,89E-08 | 0,00E+00 | 1,20E-08 | 0,00E+00 |
| **ADP-fossil** | MJ | 2,33E+00 | 1,85E+00 | 2,46E-01 | 0,00E+00 | 1,26E-01 | 0,00E+00 | 1,47E-01 | 0,00E+00 |
| **WDP** | $m^3$ | 3,82E-02 | 7,17E-03 | 1,15E-02 | 0,00E+00 | 3,76E-04 | 0,00E+00 | 6,62E-03 | 0,00E+00 |
| **Capture** | 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 18: Additional environmental impact indicators (CM Project fiber)**

| ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PM** | disease inc. | 1,04E-08 | 7,86E-09 | 4,22E-10 | 0,00E+00 | 7,17E-10 | 0,00E+00 | 9,97E-10 | 0,00E+00 |
| **IRP** | kBq U235 eq | 1,45E-02 | 1,03E-02 | 4,29E-03 | 0,00E+00 | 6,46E-04 | 0,00E+00 | 6,53E-04 | 0,00E+00 |
| **ETP-fw** | CTUe | 3,34E+00 | 1,62E+00 | 4,22E-01 | 0,00E+00 | 9,81E-02 | 0,00E+00 | 9,29E-02 | 0,00E+00 |
| **HTP-c** | CTUh | 5,14E-11 | 6,83E-11 | 9,98E-12 | 0,00E+00 | 3,18E-12 | 0,00E+00 | 2,36E-12 | 0,00E+00 |
| **HTP-nc** | CTUh | 1,49E-09 | 1,61E-09 | 2,84E-10 | 0,00E+00 | 1,03E-10 | 0,00E+00 | 6,15E-11 | 0,00E+00 |
| **SQP** | Dimensionless | 1,97E+00 | 9,03E-01 | 2,99E-01 | 0,00E+00 | 8,63E-02 | 0,00E+00 | 3,09E-01 | 0,00E+00 |
| **Capture** | 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.<br>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 (CM Project fiber)**

| RESOURCE USE PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PERE** | MJ | 1,53E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PERM** | MJ | 2,37E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PERT** | MJ | 1,55E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PENRE** | MJ | 2,16E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **PENRM** | MJ | 3,22E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PENRT** | MJ | 2,48E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **SM** | 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 |
| **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 |
| **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 |
| **FW** | $m^3$ | 3,73E-02 | 7,15E-03 | 1,06E-02 | 0,00E+00 | 3,78E-04 | 0,00E+00 | 6,63E-03 | 0,00E+00 |
| **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 20: End-of-life (waste categories and output flows) (CM Project fiber)**

| WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **HWD** | kg | 2,76E-06 | 5,11E-06 | 2,77E-07 | 0,00E+00 | 3,28E-07 | 0,00E+00 | 2,22E-07 | 0,00E+00 |
| **NHWD** | kg | 3,84E-02 | 6,06E-02 | 1,64E-03 | 0,00E+00 | 6,46E-03 | 0,00E+00 | 1,00E+00 | 0,00E+00 |
| **RWD** | kg | 9,28E-06 | 1,22E-05 | 1,08E-06 | 0,00E+00 | 8,50E-07 | 0,00E+00 | 9,64E-07 | 0,00E+00 |
| **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 |
| **MFR** | 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 |
| **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 |
| **EEE** | MJ | 3,60E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **EET** | MJ | 3,46E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **Caption** | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy, EET = exported thermal energy | | | | | | | | |

CM Project Selfdrying

**Table 21: Environmental impact indicators (CM Project selfdrying)**

| ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **GWP- total** | kg $CO_2$-eq. | 2,30E-01 | 1,25E-01 | 1,80E-02 | 0,00E+00 | 8,32E-03 | 0,00E+00 | 5,28E-03 | 0,00E+00 |
| **GWP-fossil** | kg $CO_2$-eq. | 2,28E-01 | 1,24E-01 | 1,71E-02 | 0,00E+00 | 8,31E-03 | 0,00E+00 | 5,27E-03 | 0,00E+00 |
| **GWP-biogenic** | kg $CO_2$-eq. | 1,50E-03 | 1,27E-04 | 8,38E-04 | 0,00E+00 | 7,08E-06 | 0,00E+00 | 5,22E-06 | 0,00E+00 |
| **GWP- luluc** | kg $CO_2$-eq. | 4,82E-04 | 7,43E-05 | 3,53E-05 | 0,00E+00 | 3,26E-06 | 0,00E+00 | 4,97E-06 | 0,00E+00 |
| **ODP** | kg CFC 11 -eq. | 1,93E-08 | 2,71E-08 | 4,71E-10 | 0,00E+00 | 1,92E-09 | 0,00E+00 | 2,13E-09 | 0,00E+00 |
| **AP** | mol $H^{+-}$ eq. | 1,09E-03 | 4,85E-04 | 6,91E-05 | 0,00E+00 | 3,37E-05 | 0,00E+00 | 4,95E-05 | 0,00E+00 |
| **EP-freshwater** | kg P-eq. | 3,40E-05 | 1,16E-05 | 1,32E-05 | 0,00E+00 | 5,35E-07 | 0,00E+00 | 4,82E-07 | 0,00E+00 |
| **EP- marine** | kg N-eq. | 2,48E-04 | 1,33E-04 | 1,52E-05 | 0,00E+00 | 1,02E-05 | 0,00E+00 | 1,72E-05 | 0,00E+00 |
| **EP-terrestrial** | mol N-eq. | 2,71E-03 | 1,45E-03 | 1,68E-04 | 0,00E+00 | 1,11E-04 | 0,00E+00 | 1,88E-04 | 0,00E+00 |
| **POCP** | kg NMVOC -eq. | 7,94E-04 | 4,53E-04 | 3,84E-05 | 0,00E+00 | 3,40E-05 | 0,00E+00 | 5,48E-05 | 0,00E+00 |
| **ADP-minerals&metals** | kg Sb-eq. | 9,84E-07 | 7,73E-07 | 2,33E-07 | 0,00E+00 | 2,89E-08 | 0,00E+00 | 1,20E-08 | 0,00E+00 |
| **ADP-fossil** | MJ | 3,06E+00 | 1,85E+00 | 2,46E-01 | 0,00E+00 | 1,26E-01 | 0,00E+00 | 1,47E-01 | 0,00E+00 |
| **WDP** | $m^3$ | 5,28E-02 | 7,17E-03 | 1,02E-02 | 0,00E+00 | 3,76E-04 | 0,00E+00 | 6,62E-03 | 0,00E+00 |

| | |
|---|---|
| **Capture** | 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 22: Additional environmental impact indicators (CM Project selfdrying)**

| ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PM** | disease inc. | 1,12E-08 | 7,86E-09 | 4,21E-10 | 0,00E+00 | 7,17E-10 | 0,00E+00 | 9,97E-10 | 0,00E+00 |
| **IRP** | kBq U235 eq | 1,53E-02 | 1,03E-02 | 4,29E-03 | 0,00E+00 | 6,46E-04 | 0,00E+00 | 6,53E-04 | 0,00E+00 |
| **ETP-fw** | CTUe | 3,35E+00 | 1,62E+00 | 4,22E-01 | 0,00E+00 | 9,81E-02 | 0,00E+00 | 9,29E-02 | 0,00E+00 |
| **HTP-c** | CTUh | 5,33E-11 | 6,83E-11 | 9,96E-12 | 0,00E+00 | 3,18E-12 | 0,00E+00 | 2,36E-12 | 0,00E+00 |
| **HTP-nc** | CTUh | 1,52E-09 | 1,61E-09 | 2,84E-10 | 0,00E+00 | 1,03E-10 | 0,00E+00 | 6,15E-11 | 0,00E+00 |
| **SQP** | Dimensionless | 2,08E+00 | 9,03E-01 | 2,99E-01 | 0,00E+00 | 8,63E-02 | 0,00E+00 | 3,09E-01 | 0,00E+00 |
| **Capture** | 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.<br>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 23: Parameters describing resource use (CM Project selfdrying)**

| RESOURCE USE PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PERE** | MJ | 1,63E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PERM** | MJ | 1,89E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PERT** | MJ | 1,65E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PENRE** | MJ | 2,61E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **PENRM** | MJ | 6,65E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PENRT** | MJ | 3,27E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **SM** | 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 |
| **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 |
| **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 |
| **FW** | $m^3$ | 5,14E-02 | 7,15E-03 | 9,37E-03 | 0,00E+00 | 3,78E-04 | 0,00E+00 | 6,63E-03 | 0,00E+00 |
| **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 24: End-of-life (waste categories and output flows) (CM Project selfdrying)**

| WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **HWD** | kg | 2,88E-06 | 5,11E-06 | 2,77E-07 | 0,00E+00 | 3,28E-07 | 0,00E+00 | 2,22E-07 | 0,00E+00 |
| **NHWD** | kg | 3,97E-02 | 6,06E-02 | 1,64E-03 | 0,00E+00 | 6,46E-03 | 0,00E+00 | 1,00E+00 | 0,00E+00 |
| **RWD** | kg | 1,00E-05 | 1,22E-05 | 1,08E-06 | 0,00E+00 | 8,50E-07 | 0,00E+00 | 9,64E-07 | 0,00E+00 |
| **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 |
| **MFR** | 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 |
| **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 |
| **EEE** | MJ | 4,45E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **EET** | MJ | 4,28E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **Caption** | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy, EET = exported thermal energy | | | | | | | | |

CM 720 Fine

**Table 25: Environmental impact indicators (CM 720 Fine)**

| ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **GWP- total** | kg $CO_2$-eq. | 2,05E-01 | 1,25E-01 | 1,80E-02 | 0,00E+00 | 8,32E-03 | 0,00E+00 | 5,28E-03 | 0,00E+00 |
| **GWP-fossil** | kg $CO_2$-eq. | 2,03E-01 | 1,24E-01 | 1,71E-02 | 0,00E+00 | 8,31E-03 | 0,00E+00 | 5,27E-03 | 0,00E+00 |
| **GWP-biogenic** | kg $CO_2$-eq. | 1,41E-03 | 1,27E-04 | 8,38E-04 | 0,00E+00 | 7,08E-06 | 0,00E+00 | 5,22E-06 | 0,00E+00 |
| **GWP- luluc** | kg $CO_2$-eq. | 4,52E-04 | 7,43E-05 | 3,53E-05 | 0,00E+00 | 3,26E-06 | 0,00E+00 | 4,97E-06 | 0,00E+00 |
| **ODP** | kg CFC 11 -eq. | 1,92E-08 | 2,71E-08 | 4,71E-10 | 0,00E+00 | 1,92E-09 | 0,00E+00 | 2,13E-09 | 0,00E+00 |
| **AP** | mol $H^{+-}$ eq. | 1,02E-03 | 4,85E-04 | 6,92E-05 | 0,00E+00 | 3,37E-05 | 0,00E+00 | 4,95E-05 | 0,00E+00 |
| **EP-freshwater** | kg P-eq. | 3,28E-05 | 1,16E-05 | 1,32E-05 | 0,00E+00 | 5,35E-07 | 0,00E+00 | 4,82E-07 | 0,00E+00 |
| **EP- marine** | kg N-eq. | 2,27E-04 | 1,33E-04 | 1,52E-05 | 0,00E+00 | 1,02E-05 | 0,00E+00 | 1,72E-05 | 0,00E+00 |
| **EP-terrestrial** | mol N-eq. | 2,48E-03 | 1,45E-03 | 1,68E-04 | 0,00E+00 | 1,11E-04 | 0,00E+00 | 1,88E-04 | 0,00E+00 |
| **POCP** | kg NMVOC -eq. | 7,15E-04 | 4,53E-04 | 3,84E-05 | 0,00E+00 | 3,40E-05 | 0,00E+00 | 5,48E-05 | 0,00E+00 |
| **ADP-minerals&metals** | kg Sb-eq. | 8,86E-07 | 7,73E-07 | 2,33E-07 | 0,00E+00 | 2,89E-08 | 0,00E+00 | 1,20E-08 | 0,00E+00 |
| **ADP-fossil** | MJ | 2,51E+00 | 1,85E+00 | 2,46E-01 | 0,00E+00 | 1,26E-01 | 0,00E+00 | 1,47E-01 | 0,00E+00 |
| **WDP** | $m^3$ | 4,09E-02 | 7,17E-03 | 1,15E-02 | 0,00E+00 | 3,76E-04 | 0,00E+00 | 6,62E-03 | 0,00E+00 |
| **Capture** | 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 26: Additional environmental impact indicators (CM 720 Fine)**

| ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PM** | disease inc. | 1,08E-08 | 7,86E-09 | 4,22E-10 | 0,00E+00 | 7,17E-10 | 0,00E+00 | 9,97E-10 | 0,00E+00 |
| **IRP** | kBq U235 eq | 1,53E-02 | 1,03E-02 | 4,29E-03 | 0,00E+00 | 6,46E-04 | 0,00E+00 | 6,53E-04 | 0,00E+00 |
| **ETP-fw** | CTUe | 3,51E+00 | 1,62E+00 | 4,22E-01 | 0,00E+00 | 9,81E-02 | 0,00E+00 | 9,29E-02 | 0,00E+00 |
| **HTP-c** | CTUh | 5,23E-11 | 6,83E-11 | 9,98E-12 | 0,00E+00 | 3,18E-12 | 0,00E+00 | 2,36E-12 | 0,00E+00 |
| **HTP-nc** | CTUh | 1,50E-09 | 1,61E-09 | 2,84E-10 | 0,00E+00 | 1,03E-10 | 0,00E+00 | 6,15E-11 | 0,00E+00 |
| **SQP** | Dimensionless | 1,93E+00 | 9,03E-01 | 2,99E-01 | 0,00E+00 | 8,63E-02 | 0,00E+00 | 3,09E-01 | 0,00E+00 |
| **Capture** | 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.<br>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 27: Parameters describing resource use (CM 720 Fine)**

| RESOURCE USE PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PERE** | MJ | 1,60E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PERM** | MJ | 1,89E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PERT** | MJ | 1,62E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PENRE** | MJ | 2,31E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **PENRM** | MJ | 3,72E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PENRT** | MJ | 2,68E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **SM** | 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 |
| **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 |
| **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 |
| **FW** | $m^3$ | 3,99E-02 | 7,15E-03 | 1,06E-02 | 0,00E+00 | 3,78E-04 | 0,00E+00 | 6,63E-03 | 0,00E+00 |
| **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 28: End-of-life (waste categories and output flows) (CM 720 Fine)**

| WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **HWD** | kg | 2,93E-06 | 5,11E-06 | 2,77E-07 | 0,00E+00 | 3,28E-07 | 0,00E+00 | 2,22E-07 | 0,00E+00 |
| **NHWD** | kg | 4,10E-02 | 6,06E-02 | 1,64E-03 | 0,00E+00 | 6,46E-03 | 0,00E+00 | 1,00E+00 | 0,00E+00 |
| **RWD** | kg | 9,89E-06 | 1,22E-05 | 1,08E-06 | 0,00E+00 | 8,50E-07 | 0,00E+00 | 9,64E-07 | 0,00E+00 |
| **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 |
| **MFR** | 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 |
| **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 |
| **EEE** | MJ | 4,10E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **EET** | MJ | 3,93E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **Caption** | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy, EET = exported thermal energy | | | | | | | | |

CM 750 S

**Table 29: Environmental impact indicators (CM 750 S)**

| ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **GWP- total** | kg $CO_2$-eq. | 2,83E-01 | 1,25E-01 | 1,80E-02 | 0,00E+00 | 8,32E-03 | 0,00E+00 | 5,28E-03 | 0,00E+00 |
| **GWP-fossil** | kg $CO_2$-eq. | 2,81E-01 | 1,24E-01 | 1,71E-02 | 0,00E+00 | 8,31E-03 | 0,00E+00 | 5,27E-03 | 0,00E+00 |
| **GWP-biogenic** | kg $CO_2$-eq. | 1,74E-03 | 1,27E-04 | 8,39E-04 | 0,00E+00 | 7,08E-06 | 0,00E+00 | 5,22E-06 | 0,00E+00 |
| **GWP- luluc** | kg $CO_2$-eq. | 3,31E-04 | 7,43E-05 | 3,53E-05 | 0,00E+00 | 3,26E-06 | 0,00E+00 | 4,97E-06 | 0,00E+00 |
| **ODP** | kg CFC 11 -eq. | 2,51E-08 | 2,71E-08 | 4,72E-10 | 0,00E+00 | 1,92E-09 | 0,00E+00 | 2,13E-09 | 0,00E+00 |
| **AP** | mol $H^{+-}$ eq. | 1,33E-03 | 4,85E-04 | 6,93E-05 | 0,00E+00 | 3,37E-05 | 0,00E+00 | 4,95E-05 | 0,00E+00 |
| **EP-freshwater** | kg P-eq. | 5,04E-05 | 1,16E-05 | 1,32E-05 | 0,00E+00 | 5,35E-07 | 0,00E+00 | 4,82E-07 | 0,00E+00 |
| **EP- marine** | kg N-eq. | 2,89E-04 | 1,33E-04 | 1,52E-05 | 0,00E+00 | 1,02E-05 | 0,00E+00 | 1,72E-05 | 0,00E+00 |
| **EP-terrestrial** | mol N-eq. | 3,16E-03 | 1,45E-03 | 1,68E-04 | 0,00E+00 | 1,11E-04 | 0,00E+00 | 1,88E-04 | 0,00E+00 |
| **POCP** | kg NMVOC -eq. | 9,44E-04 | 4,53E-04 | 3,85E-05 | 0,00E+00 | 3,40E-05 | 0,00E+00 | 5,48E-05 | 0,00E+00 |
| **ADP-minerals&metals** | kg Sb-eq. | 1,44E-06 | 7,73E-07 | 2,33E-07 | 0,00E+00 | 2,89E-08 | 0,00E+00 | 1,20E-08 | 0,00E+00 |
| **ADP-fossil** | MJ | 4,25E+00 | 1,85E+00 | 2,46E-01 | 0,00E+00 | 1,26E-01 | 0,00E+00 | 1,47E-01 | 0,00E+00 |
| **WDP** | $m^3$ | 7,79E-02 | 7,17E-03 | 1,32E-02 | 0,00E+00 | 3,76E-04 | 0,00E+00 | 6,62E-03 | 0,00E+00 |

| | |
|---|---|
| **Capture** | 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 30: Additional environmental impact indicators (CM 750 S)**

| ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PM** | disease inc. | 1,72E-08 | 7,86E-09 | 4,22E-10 | 0,00E+00 | 7,17E-10 | 0,00E+00 | 9,97E-10 | 0,00E+00 |
| **IRP** | kBq U235 eq | 2,52E-02 | 1,03E-02 | 4,30E-03 | 0,00E+00 | 6,46E-04 | 0,00E+00 | 6,53E-04 | 0,00E+00 |
| **ETP-fw** | CTUe | 4,62E+00 | 1,62E+00 | 4,23E-01 | 0,00E+00 | 9,81E-02 | 0,00E+00 | 9,29E-02 | 0,00E+00 |
| **HTP-c** | CTUh | 5,85E-11 | 6,83E-11 | 9,99E-12 | 0,00E+00 | 3,18E-12 | 0,00E+00 | 2,36E-12 | 0,00E+00 |
| **HTP-nc** | CTUh | 1,55E-09 | 1,61E-09 | 2,84E-10 | 0,00E+00 | 1,03E-10 | 0,00E+00 | 6,15E-11 | 0,00E+00 |
| **SQP** | Dimensionless | 1,55E+00 | 9,03E-01 | 2,99E-01 | 0,00E+00 | 8,63E-02 | 0,00E+00 | 3,09E-01 | 0,00E+00 |
| **Capture** | 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.<br>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 31: Parameters describing resource use (CM 750 S)**

| RESOURCE USE PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PERE** | MJ | 2,35E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PERM** | MJ | 2,16E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PERT** | MJ | 2,37E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PENRE** | MJ | 3,56E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **PENRM** | MJ | 9,92E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PENRT** | MJ | 4,55E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **SM** | 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 |
| **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 |
| **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 |
| **FW** | $m^3$ | 7,58E-02 | 7,15E-03 | 1,22E-02 | 0,00E+00 | 3,78E-04 | 0,00E+00 | 6,63E-03 | 0,00E+00 |
| **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 32: End-of-life (waste categories and output flows) (CM 750 S)**

| WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **HWD** | kg | 3,66E-06 | 5,11E-06 | 2,78E-07 | 0,00E+00 | 3,28E-07 | 0,00E+00 | 2,22E-07 | 0,00E+00 |
| **NHWD** | kg | 4,80E-02 | 6,06E-02 | 1,64E-03 | 0,00E+00 | 6,46E-03 | 0,00E+00 | 1,00E+00 | 0,00E+00 |
| **RWD** | kg | 1,36E-05 | 1,22E-05 | 1,08E-06 | 0,00E+00 | 8,50E-07 | 0,00E+00 | 9,64E-07 | 0,00E+00 |
| **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 |
| **MFR** | 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 |
| **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 |
| **EEE** | MJ | 5,36E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **EET** | MJ | 5,15E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **Caption** | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy, EET = exported thermal energy | | | | | | | | |

CM 760 Fiber

**Table 33: Environmental impact indicators (CM 760 Fiber)**

| ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **GWP- total** | kg $CO_2$-eq. | 2,30E-01 | 1,25E-01 | 1,80E-02 | 0,00E+00 | 8,32E-03 | 0,00E+00 | 5,28E-03 | 0,00E+00 |
| **GWP-fossil** | kg $CO_2$-eq. | 2,29E-01 | 1,24E-01 | 1,71E-02 | 0,00E+00 | 8,31E-03 | 0,00E+00 | 5,27E-03 | 0,00E+00 |
| **GWP-biogenic** | kg $CO_2$-eq. | 1,35E-03 | 1,27E-04 | 8,38E-04 | 0,00E+00 | 7,08E-06 | 0,00E+00 | 5,22E-06 | 0,00E+00 |
| **GWP- luluc** | kg $CO_2$-eq. | 4,83E-04 | 7,43E-05 | 3,53E-05 | 0,00E+00 | 3,26E-06 | 0,00E+00 | 4,97E-06 | 0,00E+00 |
| **ODP** | kg CFC 11 -eq. | 1,94E-08 | 2,71E-08 | 4,71E-10 | 0,00E+00 | 1,92E-09 | 0,00E+00 | 2,13E-09 | 0,00E+00 |
| **AP** | mol $H^{+-}$ eq. | 1,09E-03 | 4,85E-04 | 6,92E-05 | 0,00E+00 | 3,37E-05 | 0,00E+00 | 4,95E-05 | 0,00E+00 |
| **EP-freshwater** | kg P-eq. | 3,42E-05 | 1,16E-05 | 1,32E-05 | 0,00E+00 | 5,35E-07 | 0,00E+00 | 4,82E-07 | 0,00E+00 |
| **EP- marine** | kg N-eq. | 2,49E-04 | 1,33E-04 | 1,52E-05 | 0,00E+00 | 1,02E-05 | 0,00E+00 | 1,72E-05 | 0,00E+00 |
| **EP-terrestrial** | mol N-eq. | 2,72E-03 | 1,45E-03 | 1,68E-04 | 0,00E+00 | 1,11E-04 | 0,00E+00 | 1,88E-04 | 0,00E+00 |
| **POCP** | kg NMVOC -eq. | 7,96E-04 | 4,53E-04 | 3,84E-05 | 0,00E+00 | 3,40E-05 | 0,00E+00 | 5,48E-05 | 0,00E+00 |
| **ADP-minerals&metals** | kg Sb-eq. | 9,91E-07 | 7,73E-07 | 2,33E-07 | 0,00E+00 | 2,89E-08 | 0,00E+00 | 1,20E-08 | 0,00E+00 |
| **ADP-fossil** | MJ | 3,07E+00 | 1,85E+00 | 2,46E-01 | 0,00E+00 | 1,26E-01 | 0,00E+00 | 1,47E-01 | 0,00E+00 |
| **WDP** | $m^3$ | 5,30E-02 | 7,17E-03 | 1,07E-02 | 0,00E+00 | 3,76E-04 | 0,00E+00 | 6,62E-03 | 0,00E+00 |
| **Capture** | 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 34: Additional environmental impact indicators (CM 760 Fiber)**

| ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PM** | disease inc. | 1,12E-08 | 7,86E-09 | 4,21E-10 | 0,00E+00 | 7,17E-10 | 0,00E+00 | 9,97E-10 | 0,00E+00 |
| **IRP** | kBq U235 eq | 1,54E-02 | 1,03E-02 | 4,29E-03 | 0,00E+00 | 6,46E-04 | 0,00E+00 | 6,53E-04 | 0,00E+00 |
| **ETP-fw** | CTUe | 3,36E+00 | 1,62E+00 | 4,22E-01 | 0,00E+00 | 9,81E-02 | 0,00E+00 | 9,29E-02 | 0,00E+00 |
| **HTP-c** | CTUh | 5,34E-11 | 6,83E-11 | 9,97E-12 | 0,00E+00 | 3,18E-12 | 0,00E+00 | 2,36E-12 | 0,00E+00 |
| **HTP-nc** | CTUh | 1,52E-09 | 1,61E-09 | 2,84E-10 | 0,00E+00 | 1,03E-10 | 0,00E+00 | 6,15E-11 | 0,00E+00 |
| **SQP** | Dimensionless | 2,10E+00 | 9,03E-01 | 2,99E-01 | 0,00E+00 | 8,63E-02 | 0,00E+00 | 3,09E-01 | 0,00E+00 |
| **Capture** | 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.<br>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 35: Parameters describing resource use (CM 760 Fiber)**

| RESOURCE USE PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PERE** | MJ | 1,68E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PERM** | MJ | 2,02E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PERT** | MJ | 1,70E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PENRE** | MJ | 2,62E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **PENRM** | MJ | 6,62E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PENRT** | MJ | 3,28E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **SM** | 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 |
| **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 |
| **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 |
| **FW** | $m^3$ | 5,15E-02 | 7,15E-03 | 9,78E-03 | 0,00E+00 | 3,78E-04 | 0,00E+00 | 6,63E-03 | 0,00E+00 |
| **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 36: End-of-life (waste categories and output flows) (CM 760 Fiber)**

| WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **HWD** | kg | 2,89E-06 | 5,11E-06 | 2,77E-07 | 0,00E+00 | 3,28E-07 | 0,00E+00 | 2,22E-07 | 0,00E+00 |
| **NHWD** | kg | 3,98E-02 | 6,06E-02 | 1,64E-03 | 0,00E+00 | 6,46E-03 | 0,00E+00 | 1,00E+00 | 0,00E+00 |
| **RWD** | kg | 1,00E-05 | 1,22E-05 | 1,08E-06 | 0,00E+00 | 8,50E-07 | 0,00E+00 | 9,64E-07 | 0,00E+00 |
| **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 |
| **MFR** | 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 |
| **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 |
| **EEE** | MJ | 5,22E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **EET** | MJ | 5,01E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **Caption** | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy, EET = exported thermal energy | | | | | | | | |

CM 920 Industrial

**Table 37: Environmental impact indicators (CM 920 Industrial)**

| ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **GWP- total** | kg $CO_2$-eq. | 2,66E-01 | 1,25E-01 | 1,80E-02 | 0,00E+00 | 8,32E-03 | 0,00E+00 | 5,28E-03 | 0,00E+00 |
| **GWP-fossil** | kg $CO_2$-eq. | 2,63E-01 | 1,24E-01 | 1,71E-02 | 0,00E+00 | 8,31E-03 | 0,00E+00 | 5,27E-03 | 0,00E+00 |
| **GWP-biogenic** | kg $CO_2$-eq. | 2,22E-03 | 1,27E-04 | 8,38E-04 | 0,00E+00 | 7,08E-06 | 0,00E+00 | 5,22E-06 | 0,00E+00 |
| **GWP- luluc** | kg $CO_2$-eq. | 4,90E-04 | 7,43E-05 | 3,53E-05 | 0,00E+00 | 3,26E-06 | 0,00E+00 | 4,97E-06 | 0,00E+00 |
| **ODP** | kg CFC 11 -eq. | 2,15E-08 | 2,71E-08 | 4,71E-10 | 0,00E+00 | 1,92E-09 | 0,00E+00 | 2,13E-09 | 0,00E+00 |
| **AP** | mol $H^{+-}$ eq. | 1,21E-03 | 4,85E-04 | 6,92E-05 | 0,00E+00 | 3,37E-05 | 0,00E+00 | 4,95E-05 | 0,00E+00 |
| **EP-freshwater** | kg P-eq. | 3,92E-05 | 1,16E-05 | 1,32E-05 | 0,00E+00 | 5,35E-07 | 0,00E+00 | 4,82E-07 | 0,00E+00 |
| **EP- marine** | kg N-eq. | 2,73E-04 | 1,33E-04 | 1,52E-05 | 0,00E+00 | 1,02E-05 | 0,00E+00 | 1,72E-05 | 0,00E+00 |
| **EP-terrestrial** | mol N-eq. | 2,98E-03 | 1,45E-03 | 1,68E-04 | 0,00E+00 | 1,11E-04 | 0,00E+00 | 1,88E-04 | 0,00E+00 |
| **POCP** | kg NMVOC -eq. | 9,06E-04 | 4,53E-04 | 3,84E-05 | 0,00E+00 | 3,40E-05 | 0,00E+00 | 5,48E-05 | 0,00E+00 |
| **ADP-minerals&metals** | kg Sb-eq. | 1,27E-06 | 7,73E-07 | 2,33E-07 | 0,00E+00 | 2,89E-08 | 0,00E+00 | 1,20E-08 | 0,00E+00 |
| **ADP-fossil** | MJ | 4,16E+00 | 1,85E+00 | 2,46E-01 | 0,00E+00 | 1,26E-01 | 0,00E+00 | 1,47E-01 | 0,00E+00 |
| **WDP** | $m^3$ | 7,52E-02 | 7,17E-03 | 1,07E-02 | 0,00E+00 | 3,76E-04 | 0,00E+00 | 6,62E-03 | 0,00E+00 |

| | |
|---|---|
| **Capture** | 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 38: Additional environmental impact indicators (CM 920 Industrial)**

| ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PM** | disease inc. | 1,24E-08 | 7,86E-09 | 4,21E-10 | 0,00E+00 | 7,17E-10 | 0,00E+00 | 9,97E-10 | 0,00E+00 |
| **IRP** | kBq U235 eq | 1,76E-02 | 1,03E-02 | 4,29E-03 | 0,00E+00 | 6,46E-04 | 0,00E+00 | 6,53E-04 | 0,00E+00 |
| **ETP-fw** | CTUe | 3,66E+00 | 1,62E+00 | 4,22E-01 | 0,00E+00 | 9,81E-02 | 0,00E+00 | 9,29E-02 | 0,00E+00 |
| **HTP-c** | CTUh | 5,56E-11 | 6,83E-11 | 9,97E-12 | 0,00E+00 | 3,18E-12 | 0,00E+00 | 2,36E-12 | 0,00E+00 |
| **HTP-nc** | CTUh | 1,56E-09 | 1,61E-09 | 2,84E-10 | 0,00E+00 | 1,03E-10 | 0,00E+00 | 6,15E-11 | 0,00E+00 |
| **SQP** | Dimensionless | 2,13E+00 | 9,03E-01 | 2,99E-01 | 0,00E+00 | 8,63E-02 | 0,00E+00 | 3,09E-01 | 0,00E+00 |
| **Capture** | 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.<br>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 39: Parameters describing resource use (CM 920 Industrial)**

| RESOURCE USE PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PERE** | MJ | 1,84E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PERM** | MJ | 1,89E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PERT** | MJ | 1,86E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PENRE** | MJ | 3,30E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **PENRM** | MJ | 1,15E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PENRT** | MJ | 4,45E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **SM** | 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 |
| **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 |
| **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 |
| **FW** | $m^3$ | 7,30E-02 | 7,15E-03 | 9,78E-03 | 0,00E+00 | 3,78E-04 | 0,00E+00 | 6,63E-03 | 0,00E+00 |
| **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 40: End-of-life (waste categories and output flows) (CM 920 Industrial)**

| WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **HWD** | kg | 3,21E-06 | 5,11E-06 | 2,77E-07 | 0,00E+00 | 3,28E-07 | 0,00E+00 | 2,22E-07 | 0,00E+00 |
| **NHWD** | kg | 4,34E-02 | 6,06E-02 | 1,64E-03 | 0,00E+00 | 6,46E-03 | 0,00E+00 | 1,00E+00 | 0,00E+00 |
| **RWD** | kg | 1,11E-05 | 1,22E-05 | 1,08E-06 | 0,00E+00 | 8,50E-07 | 0,00E+00 | 9,64E-07 | 0,00E+00 |
| **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 |
| **MFR** | 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 |
| **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 |
| **EEE** | MJ | 4,45E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **EET** | MJ | 4,28E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **Caption** | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy, EET = exported thermal energy | | | | | | | | |

CM 940 Industrial Top

**Table 41: Environmental impact indicators (CM 940 Industrial Top)**

| ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **GWP- total** | kg $CO_2$-eq. | 3,37E-01 | 1,25E-01 | 1,80E-02 | 0,00E+00 | 8,32E-03 | 0,00E+00 | 5,28E-03 | 0,00E+00 |
| **GWP-fossil** | kg $CO_2$-eq. | 3,36E-01 | 1,24E-01 | 1,71E-02 | 0,00E+00 | 8,31E-03 | 0,00E+00 | 5,27E-03 | 0,00E+00 |
| **GWP-biogenic** | kg $CO_2$-eq. | 3,26E-04 | 1,27E-04 | 8,38E-04 | 0,00E+00 | 7,08E-06 | 0,00E+00 | 5,22E-06 | 0,00E+00 |
| **GWP- luluc** | kg $CO_2$-eq. | 4,53E-04 | 7,43E-05 | 3,53E-05 | 0,00E+00 | 3,26E-06 | 0,00E+00 | 4,97E-06 | 0,00E+00 |
| **ODP** | kg CFC 11 -eq. | 2,94E-08 | 2,71E-08 | 4,71E-10 | 0,00E+00 | 1,92E-09 | 0,00E+00 | 2,13E-09 | 0,00E+00 |
| **AP** | mol $H^{+-}$ eq. | 1,53E-03 | 4,85E-04 | 6,92E-05 | 0,00E+00 | 3,37E-05 | 0,00E+00 | 4,95E-05 | 0,00E+00 |
| **EP-freshwater** | kg P-eq. | 4,94E-05 | 1,16E-05 | 1,32E-05 | 0,00E+00 | 5,35E-07 | 0,00E+00 | 4,82E-07 | 0,00E+00 |
| **EP- marine** | kg N-eq. | 3,41E-04 | 1,33E-04 | 1,52E-05 | 0,00E+00 | 1,02E-05 | 0,00E+00 | 1,72E-05 | 0,00E+00 |
| **EP-terrestrial** | mol N-eq. | 3,72E-03 | 1,45E-03 | 1,68E-04 | 0,00E+00 | 1,11E-04 | 0,00E+00 | 1,88E-04 | 0,00E+00 |
| **POCP** | kg NMVOC -eq. | 1,15E-03 | 4,53E-04 | 3,84E-05 | 0,00E+00 | 3,40E-05 | 0,00E+00 | 5,48E-05 | 0,00E+00 |
| **ADP-minerals&metals** | kg Sb-eq. | 1,73E-06 | 7,73E-07 | 2,33E-07 | 0,00E+00 | 2,89E-08 | 0,00E+00 | 1,20E-08 | 0,00E+00 |
| **ADP-fossil** | MJ | 5,64E+00 | 1,85E+00 | 2,46E-01 | 0,00E+00 | 1,26E-01 | 0,00E+00 | 1,47E-01 | 0,00E+00 |
| **WDP** | $m^3$ | 1,06E-01 | 7,17E-03 | 1,15E-02 | 0,00E+00 | 3,76E-04 | 0,00E+00 | 6,62E-03 | 0,00E+00 |
| **Capture** | 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 42: Additional environmental impact indicators (CM 940 Industrial Top)**

| ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PM** | disease inc. | 1,43E-08 | 7,86E-09 | 4,22E-10 | 0,00E+00 | 7,17E-10 | 0,00E+00 | 9,97E-10 | 0,00E+00 |
| **IRP** | kBq U235 eq | 2,22E-02 | 1,03E-02 | 4,29E-03 | 0,00E+00 | 6,46E-04 | 0,00E+00 | 6,53E-04 | 0,00E+00 |
| **ETP-fw** | CTUe | 4,55E+00 | 1,62E+00 | 4,22E-01 | 0,00E+00 | 9,81E-02 | 0,00E+00 | 9,29E-02 | 0,00E+00 |
| **HTP-c** | CTUh | 6,35E-11 | 6,83E-11 | 9,98E-12 | 0,00E+00 | 3,18E-12 | 0,00E+00 | 2,36E-12 | 0,00E+00 |
| **HTP-nc** | CTUh | 1,61E-09 | 1,61E-09 | 2,84E-10 | 0,00E+00 | 1,03E-10 | 0,00E+00 | 6,15E-11 | 0,00E+00 |
| **SQP** | Dimensionless | 2,17E+00 | 9,03E-01 | 2,99E-01 | 0,00E+00 | 8,63E-02 | 0,00E+00 | 3,09E-01 | 0,00E+00 |

| | |
|---|---|
| **Capture** | 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.<br>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 43: Parameters describing resource use (CM 940 Industrial Top)**

| RESOURCE USE PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **PERE** | MJ | 2,34E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PERM** | MJ | 4,03E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PERT** | MJ | 2,38E-01 | 3,93E-02 | 2,34E-01 | 0,00E+00 | 1,77E-03 | 0,00E+00 | 1,25E-03 | 0,00E+00 |
| **PENRE** | MJ | 4,39E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **PENRM** | MJ | 1,65E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **PENRT** | MJ | 6,04E+00 | 1,96E+00 | 3,55E+00 | 0,00E+00 | 1,33E-01 | 0,00E+00 | 1,56E-01 | 0,00E+00 |
| **SM** | 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 |
| **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 |
| **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 |
| **FW** | $m^3$ | 1,03E-01 | 7,15E-03 | 1,06E-02 | 0,00E+00 | 3,78E-04 | 0,00E+00 | 6,63E-03 | 0,00E+00 |
| **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 44: End-of-life (waste categories and output flows) (CM 940 Industrial Top)**

| WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **A4** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| **HWD** | kg | 4,13E-06 | 5,11E-06 | 2,77E-07 | 0,00E+00 | 3,28E-07 | 0,00E+00 | 2,22E-07 | 0,00E+00 |
| **NHWD** | kg | 5,57E-02 | 6,06E-02 | 1,64E-03 | 0,00E+00 | 6,46E-03 | 0,00E+00 | 1,00E+00 | 0,00E+00 |
| **RWD** | kg | 1,43E-05 | 1,22E-05 | 1,08E-06 | 0,00E+00 | 8,50E-07 | 0,00E+00 | 9,64E-07 | 0,00E+00 |
| **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 |
| **MFR** | 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 |
| **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 |
| **EEE** | MJ | 5,89E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| **EET** | MJ | 5,66E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

| | |
|---|---|
| **Caption** | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy, EET = exported thermal energy |

For all 10 Floor Screed products

**Table 45: Biogenic carbon content per 1 kg for all 10 Floor Screed products**

| BIOGENIC CARBON CONTENT PER 1 kg | | |
|---|---|---|
| **Parameter** | **Unit** | **At the factory gate** |
| Biogenic carbon content in product | [kg C] | 0 |
| Biogenic carbon content in accompanying packagaing | [kg C] | 0 |
| Note | 1 kg biogenic carbon is equivalent to 44/12 kg of $CO_2$ | |

# Additional information

### LCA interpretation

The characterized results for CM Flow casting show that A1-A3 and A4 being by-far the biggest contributors, while C1-C4 account of only a small part. In most of the impact categories A1-A3 accounts for the majority of the impact; only for ODP and ADP is the impact from the other modules higher. The majority of life cycle energy consumption takes place during the production phase (A1-A3). Besides the cement also the dispersion powder influences the results significantly, although this is only used up to 5%. Significant contributions to Primary Energy Demand – Non-renewable (PENRT) derive from the energy resources used in the production of raw materials.

### Technical information on scenarios

**Table 46: Information related to module A4**

| Scenario information | Value | Unit |
|---|---|---|
| Fuel type | Diesel | - |
| Vehicle type | Euro 5 | - |
| Transport distance | CM Flow casting: 244<br>CM Flow casting fiber: 244<br>CM Project: 244<br>CM Project Fiber: 244<br>CM Project Selfdrying: 244<br>CM 720 Fine: 244<br>CM 750 S: 244<br>CM 760 Fiber: 244<br>CM 920 Industrial: 244<br>CM 940 Industrial Top: 244 | km |
| Capacity utilisation (including empty runs) | 85 % for trucks | % |
| Gross density of products transported | 930 kg/m3 (with lorry) | $kg/m^3$ |
| Capacity utilization volume factor | 1 | - |

**Table 47: Information related to module A5 (1 of 2) pr kg**

| Scenario information | Value | | | | | Unit |
|---|---|---|---|---|---|---|
| | **CM Flow casting** | **CM Flow casting fiber** | **CM Project** | **CM Project fiber** | **CM Project Selfdrying** | |
| Ancillary materials | - | - | - | - | - | kg |
| Water use | 0,16 | 0,16 | 0,2 | 0,2 | 0,17 | L/kg |
| Other resource use | - | - | - | - | - | kg |
| Energy type and consumption | 0,019 | 0,019 | 0,019 | 0,019 | 0,019 | MJ/kg |
| Waste materials | - | - | - | - | - | kg |
| Output materials | - | - | - | - | - | kg |
| Direct emissions to air, soil or water | - | - | - | - | - | kg |

**Table 48 Information related to module A5 (2 of 2) pr kg**

| Scenario information | Value | | | | | Unit |
|---|---|---|---|---|---|---|
| | **CM 720 Fine** | **CM 750 S** | **CM 760 Fiber** | **CM 920 Industrial** | **CM 940 Industrial Top** | |
| Ancillary materials | - | - | - | - | - | kg |
| Water use | 0,2 | 0,24 | 0,18 | 0,18 | 0,2 | L/kg |
| Other resource use | - | - | - | - | - | kg |
| Energy type and consumption | 0,019 | 0,019 | 0,019 | 0,019 | 0,019 | MJ/kg |
| Waste materials | - | - | - | - | - | kg |
| Output materials | - | - | - | - | - | kg |
| Direct emissions to air, soil or water | - | - | - | - | - | kg |

**Use (B1-B7)**

Modules not declared.

**Table 49: Information related to modules C1-C4**

| Scenario information | Value | Unit |
|---|---|---|
| Collected separately | - | kg |
| Collected with mixed waste | - | kg |
| For reuse | - | kg |
| For recycling | - | kg |
| For energy recovery | - | kg |
| For final disposal | 1 | kg |
| Assumptions for scenario development | | As appropriate |

**Table 50: Re-use, recovery and recycling potential (D)**

| Scenario information/Materiel | Value | Unit |
|---|---|---|
| No Energy recovery | 0 | MJ |
| No materiale recovery | 0 | Kg |

### Indoor air

*The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on the relevant measurements are not available.*

### 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.*

# References

| | |
|---|---|
| **Publisher** | www.epddanmark.dk |
| **Programme operator** | Danish Technological Institute<br>Buildings & Environment<br>Gregersensvej<br>DK-2630 Taastrup<br>www.teknologisk.dk |
| **LCA-practitioner** | Odyssefs Papagiannidis<br>Bureau Veritas, HSE Danmark<br>Oldenborggade 25-31<br>7000 Fredericia<br>Denmark<br><br>Julie M. Vejsgaard Larsen<br>Bureau Veritas, HSE Danmark<br>Oldenborggade 25-31<br>7000 Fredericia<br>Denmark |
| **LCA software /background data** | SimaPro 9.3/ Ecoinvent 3.8<br>Generic data are primarily based on life cycle inventory data from SimaPro 9.3 Professional Database 2020 and Ecoinvent version 3.8 |
| **3rd party verifier** | Ninkie Bendtsen<br>Niras A/S<br>Sortemosevej 19<br>3450 Allerød<br>Denmark<br>www.niras.dk |

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

**EN 15804:2012+A2:2019**

Sustainability of construction works-Environmental Product Declarations-Core rules for the product category of construction products.

**ISO 14025**

DS/EN ISO 14025:2010 – "Miljømærker og -deklarationer - Type III-miljøvaredeklarationer - Principper og procedurer

**ISO 14040**

DS/EN ISO 14040:2008 – "Miljøledelse – Livscyklusvurdering – Principper og struktur"

**ISO 14044**

DS/EN ISO 14044:2008 – "Miljøledelse – Livscyklusvurdering – Krav og vejledning"