

Owner: Eijil Jensen A/S
Vandel Gravel Pit

No.: MD-24061-EN
Issued: 24-09-2024
Valid to: 24-09-2029

3rd PARTY VERIFIED

EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804





Owner of declaration

Eigil Jensen A/S
Stilbjergvej 2 A, 7190 Billund
52814812



EIGIL JENSEN A/S

Issued:

24-09-2024

Valid to:

24-09-2029

Programme

EPD Danmark
www.epddanmark.dk



- Industry EPD
- Product EPD

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.

Declared product(s)

Aggregates for concrete, asphalt and construction

Number of declared datasets/product variations: 9

Production site

Vandel, Denmark

Product(s) use

Fill aggregates for infrastructure and construction products, additives for concrete and asphalt products.

EPD type

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

Declared/ functional unit

[1 ton]

Year of production site data (A3)

[2022]

EPD version

1.1

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:

Guangli Du
BUILD, Aalborg University, Denmark

Martha Katrine Sørensen
EPD Danmark

Life cycle stages and modules (MND = module not declared)

Product			Construction process		Use								End of life				Beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport	Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Re-use, recovery and recycling potential	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X	



Product information

Product description

The main product components are shown in the table below.

Name	Description	Fraction
Vasket E-Sand 0-2 mm	Washed sand, free of clay and other impurities.	0-2 mm
Bundsikringsand	Sand, which is used as the bottom layer under a coating to divert rainwater away from the coating.	0-8 mm
Kosand	Sand, used for agriculture.	0-2 mm
Filtergrus 0-8 mm	Gravel used as filter material in sinks and the like.	0-8 mm
Kantgrus	Gravel used as an edge boundary in connection with paving.	0-32 mm
Vejgrus	Gravel used for laying on roads and paths.	16-32 mm
Stabilgrus II	Gravel, which is used as a bottom layer during coating.	0-32 mm
Sten 2-8 mm	Stones, used as filler material in connection with concrete work.	2-8 mm
Sten 8-16 mm	Stones, used as filler material in connection with concrete work.	8-16 mm
Sten 16-32 mm	Stones, used as filler material in connection with concrete work.	16-32 mm

Product packaging:

No packaging is used for the products.

Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of the rock, gravel and sand products on the production site located in Vandel. Product specific data are based on average values collected in the period 2021.

Background generic data are based on GaBi Professional database (version 2023.2) and 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. The technical representativeness is high where data represents processes from products with similar technology and only smaller deviations. Geographical representativeness is also good where data generally represents average data from an area where the area under study is included.

Hazardous substances

The products from Eigil Jensen A/S does not contain substances listed on the "Candidate List of Substances of Very High Concern for authorisation"

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

Essential characteristics

The products consist of glacial meltwater deposits from the last ice age. The materials are a mixture of igneous rocks, flint and limestone.

Reference Service Life (RSL)

Not applicable.



Picture of product(s)



Vasket E-Sand 0-2 mm



Bundsikringsand



Kosand



Filtergrus 0-8 mm



Kantgrus



Vejgrus



Stabilgrus II



Sten 2-8 mm



Sten 8-16 mm



Sten 16-32 mm

LCA background

Declared unit

The LCI and LCIA results in this EPD relates to 1 ton of aggregates for asphalt, concrete and construction.

The product consists of glacial meltwater deposits from the last ice age. The materials consist of sand gravel and stone and are a mixture of magmatic, flint and limestone material.

Name	Value	Unit	
Declared unit	1	ton	
Conversion factor to 1 kg.	0,001	-	
Final products	Density (kg/m ³)	Intended use	
Vasket E-Sand 0-2 mm	1500	Construction work	
Bundsikringssand	1500	Construction work	
Kosand	1500	Agriculture	
Filtergrus 0-8 mm	1500	Construction work	
Kantgrus	1700	Construction work	
Vejgrus	1700	Construction work	
Stabilgrus II	1650	Construction work	
Sten 2-8 mm	1500	Concrete	
Sten 8-16 mm	1500	Concrete	
Sten 16-32 mm	1500	Concrete	

The processes proceeded are similar for the production processes until final screening of the end-product. That is, the material is dug out with a dump truck and transported to a facility consisting of conveyors and sieves of various sizes. Through sieves of different sizes, the

material is sorted into different product groups. Within each product group the materials are sorted into different types, which bear the same characteristics. The products are picked up in the gravel pit and transported to the final destination.

The process involves the removal of natural resources. These are not restored. After excavation (and ongoing), the areas are established so that the topsoil is laid back so that it lies at the top, and water gets to the excavated areas. Through the original soil and added seeds, nature is reestablished with recreational opportunities.

The course is illustrated in the flow diagram.

Functional unit

1 ton of product.

PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804, and and PCR 2019:14 Construction products published by EPD-International.

Guarantee of Origin – certificates

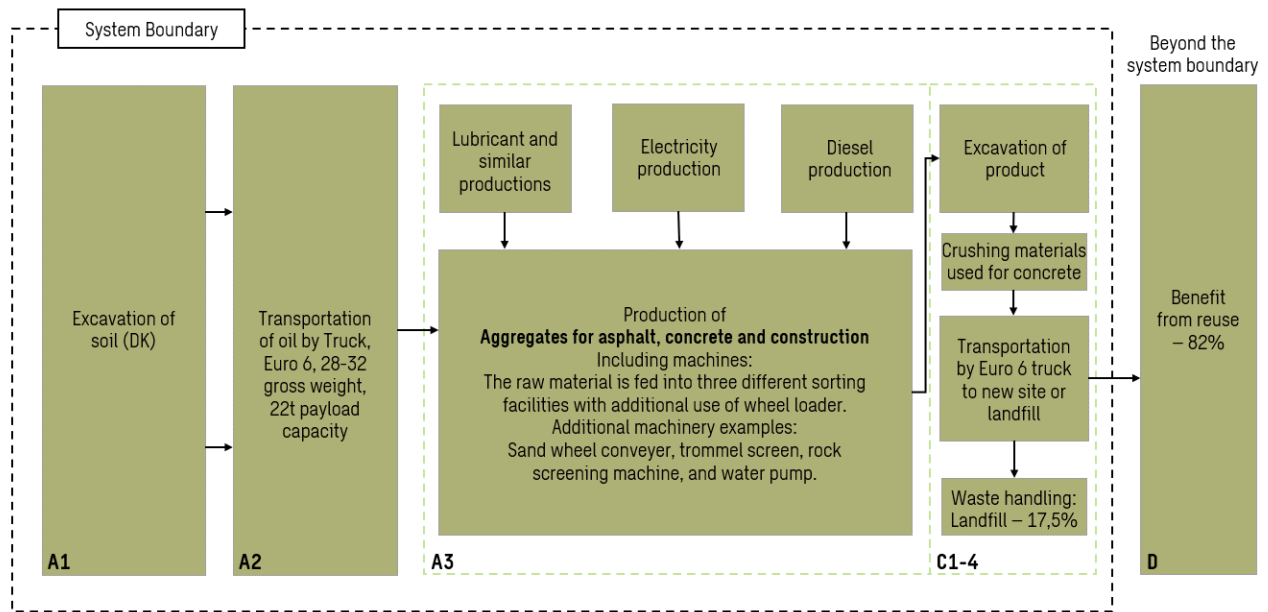
Foreground system:

No use of certified green electricity in the foreground system. The product is produced using electricity modelled as Danish residual electricity mix from 2021 in the production.

Background system:

No use of certified green electricity in the background system. Upstream processes are modelled using national energy mixes. Downstream processes are modelled using national energy mixes.

Flowdiagram



SWECO 

Figure 1 Visualization of life cycle stages for the products

System boundary

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

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

The environmental impact from infrastructure, construction, production equipment and tools that are not directly consumed in the production process are not accounted for in the Life Cycle Inventory (LCI). Personnel-related impacts, such as transportation to and from work, are neither accounted for in the LCI.

Various oils and lubricants used in the production process are approximated since no product specific dataset or EPD were found. Economic allocation has been used to distribute quantities among the different products.

Product stage (A1-A3) includes:

A1 – Extraction and processing of raw materials

The module encompasses the extraction and refinement of raw materials by Eigil Jensen which in this case includes removal of topsoil and excavation of raw materials.

A2 – Transport to the production site

The main resource used at the production site is diesel which is supplied to Eigil Jensen in Vandel through fuel trucks coming from Aarhus harbour.

A3 – Manufacturing processes

The product stage comprises the acquisition of all raw materials, products and energy, transport to the production site, 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.

In module A3 the raw material is fed into three different sorting facilities consisting of various vibrating screens for sorting the material in different sizes. Through sieves of different sizes, the material is sorted into different product groups. Based on the needed properties of the 10 final products some materials require additional machinery.

Construction process stage (A4-A5) includes:

Not included in this EPD.

Use stage (B1-B7) includes:

Not included in this EPD.

End of Life (C1-C4) includes:

All products are included for modules C1-C4+D. The modules C1, C2, C4, and D have the same processes for all products. Module C3 varies depending on whether the product is used for concrete/asphalt or not.

In the C1-module the materials are being excavated with a diesel consumption.

The C2 module includes transport of the excavated materials to waste management.

The C3 module is divided into two scenarios:

Scenario 1* covers the products: Sten 2-8 mm, Sten 8-16 mm, and Sten 16-32 mm. These products are used in concrete/asphalt, so a crushing process is included in the C3 module to prepare the products for recycling. The C3

module is marked with one asterisk (*) in the result tables for the products included in scenario 1.

Scenario 2** covers the following products: Vasket E-Sand 0-2 mm, Bundsikringsand, Kosand, Filtergrus 0-8 mm, Kantgrus, Vejgrus, and Stabilgrus II. These products are not used in concrete/asphalt and can be reused directly as filling material after excavation, so there is no need for crushing or additional processing. Therefore, these products in scenario 2 will have no impact on the C3 module. The C3 module is marked with two asterisks (**) in the result tables for the products included in scenario 2.

The C4 module includes final disposal of waste. The distribution of materials sent to landfill and recycling/re-use is based on Dansk Affaldsstatistik 2020. The national statistic highlights the distribution of soil and stone aggregates for landfill, recycling/reuse, and incineration, which are used for the products.

In the statistic it is stated that 17,5% of soil and stone aggregates is sent to landfill.

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

In the D-module benefits and loads beyond the life cycle are included. For material being recycled/re-used, the fraction from Dansk Affaldsstatistik 2020 is used for all products which is 82,5% of the aggregates. Recycling processes as well as avoided products are reported in this module.



LCA results

The results are presented in individual sections for each product:

- Vasket E-Sand 0-2 mm
- Bundsikringssand
- Kosand
- Filtergrus 0-8 mm
- Kantgrus
- Vejgrus
- Stabilgrus II
- Sten 2-8 mm
- Sten 8-16 mm
- Sten 16-32 mm

The content of biogenic carbon is identical for all products.

Table 1 Biogenic carbon content at factory gate for all products

BIOGENIC CARBON CONTENT PER [ton]		
Parameter	Unit	At the factory gate
Biogenic carbon content in product	kg C	0
Biogenic carbon content in accompanying packaging	kg C	0

Vasket E-sand 0-2 mm
Table 2 Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER [ton] of Vasket E-sand 0-2 mm										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
GWP-total	kg CO ₂ eq.	4.04E-01	3.10E-03	1.62E+00	2.03E+00	3.08E-01	9.61E-01	0.00E+00	1.49E+00	-1.59E+00
GWP-fossil	kg CO ₂ eq.	3.99E-01	3.12E-03	1.62E+00	2.03E+00	3.04E-01	9.67E-01	0.00E+00	1.48E+00	-1.63E+00
GWP-biogenic	kg CO ₂ eq.	1.40E-03	-4.58E-05	-1.44E-02	-1.31E-02	1.07E-03	-1.42E-02	0.00E+00	6.83E-03	4.20E-02
GWP-luluc	kg CO ₂ eq.	3.67E-03	2.88E-05	1.10E-02	1.47E-02	2.81E-03	8.91E-03	0.00E+00	1.02E-03	-7.05E-03
GWP-GHG	kg CO ₂ eq.	3.76E-01	2.94E-03	1.54E+00	1.92E+00	2.86E-01	9.10E-01	0.00E+00	1.47E+00	-1.36E+00
ODP	kg CFC 11 eq.	3.20E-10	4.04E-16	3.65E-10	6.85E-10	3.95E-14	1.25E-13	0.00E+00	3.36E-08	-1.06E-11
AP	mol H ⁺ eq.	1.10E-03	3.05E-06	1.32E-02	1.43E-02	1.12E-03	9.46E-04	0.00E+00	9.38E-03	-8.42E-03
EP-freshwater	kg P eq.	2.21E-06	1.14E-08	6.34E-06	8.56E-06	1.11E-06	3.52E-06	0.00E+00	3.01E-04	-8.26E-06
EP-marine	kg N eq.	4.64E-04	8.61E-07	6.36E-03	6.83E-03	5.01E-04	2.67E-04	0.00E+00	3.57E-03	-2.97E-03
EP-terrestrial	mol N eq.	5.20E-03	1.09E-05	7.01E-02	7.54E-02	5.58E-03	3.37E-03	0.00E+00	3.82E-02	-3.28E-02
POCP	kg NMVOC eq.	1.41E-03	2.55E-06	1.86E-02	2.01E-02	1.46E-03	7.89E-04	0.00E+00	1.29E-02	-8.08E-03
ADPm ¹	kg Sb eq.	5.61E-08	2.06E-10	1.16E-07	1.72E-07	2.01E-08	6.38E-08	0.00E+00	3.63E-06	-1.72E-07
ADPf ¹	MJ	5.56E+00	4.23E-02	2.10E+01	2.66E+01	4.13E+00	1.31E+01	0.00E+00	2.85E+01	-2.56E+01
WDP ¹	m ³ world eq. deprived	7.25E-03	3.75E-05	2.13E-02	2.86E-02	3.67E-03	1.16E-02	0.00E+00	9.28E-01	-1.75E-01
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water 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 experienced with the indicator.									

Table 3 – Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER ton of Vasket E-sand 0-2 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
PM	[Disease incidence]	1.16E-08	2.35E-11	3.78E-07	3.90E-07	1.22E-08	7.27E-09	0.00E+00	1.79E-07	-4.93E-07
IRP ²	[kBq U235 eq.]	1.85E-03	1.18E-05	4.83E-02	5.02E-02	1.16E-03	3.67E-03	0.00E+00	5.07E-02	-2.89E-01
ETP-fw ¹	[CTUe]	3.92E+00	3.03E-02	1.20E+01	1.59E+01	2.96E+00	9.39E+00	0.00E+00	1.25E+01	-1.24E+01
HTP-c ¹	[CTUh]	8.07E-11	6.15E-13	3.03E-10	3.85E-10	6.01E-11	1.90E-10	0.00E+00	1.01E-09	-1.10E-09
HTP-nc ¹	[CTUh]	3.54E-09	2.74E-11	1.12E-08	1.47E-08	2.68E-09	8.47E-09	0.00E+00	1.17E-08	-1.01E-07
SQP ¹	-	2.26E+00	1.77E-02	7.16E+00	9.44E+00	1.73E+00	5.47E+00	0.00E+00	5.04E+01	-8.65E+00
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality									
Disclaimers	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. ² This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.									

Table 4 - Parameters describing resource use

RESOURCE USE PER ton of Vasket E-sand 0-2 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
PERE	[MJ]	3.95E-01	3.08E-03	1.67E+00	2.07E+00	3.01E-01	9.53E-01	0.00E+00	5.71E-01	-8.29E+00
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	3.95E-01	3.08E-03	1.67E+00	2.07E+00	3.01E-01	9.53E-01	0.00E+00	5.71E-01	-8.29E+00
PENRE	[MJ]	5.58E+00	4.25E-02	2.10E+01	2.67E+01	4.15E+00	1.32E+01	0.00E+00	2.85E+01	-2.56E+01
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	5.58E+00	4.25E-02	2.10E+01	2.67E+01	4.15E+00	1.32E+01	0.00E+00	2.85E+01	-2.56E+01
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m³]	4.87E-04	3.37E-06	1.94E-03	2.43E-03	3.29E-04	1.04E-03	0.00E+00	2.16E-02	-7.59E-03
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water									

Table 5 – End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER ton of Vasket E-sand 0-2 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
HWD	[kg]	1.68E-11	1.31E-13	2.07E-10	2.24E-10	1.28E-11	4.07E-11	0.00E+00	0.00E+00	6.25E-10
NHWD	[kg]	8.25E-04	6.47E-06	4.06E-03	4.89E-03	6.32E-04	2.00E-03	0.00E+00	1.75E+02	-3.43E+01
RWD	[kg]	1.01E-05	7.94E-08	4.06E-04	4.16E-04	7.76E-06	2.46E-05	0.00E+00	0.00E+00	-1.76E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E+02	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	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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									

Bundsikringsand
Table 6 - Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER ton of Bundsikringsand										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
GWP-total	kg CO ₂ eq.	2.16E-01	2.23E-03	9.60E-01	1.18E+00	3.08E-01	9.61E-01	0.00E+00	1.49E+00	-1.59E+00
GWP-fossil	kg CO ₂ eq.	2.14E-01	2.25E-03	9.63E-01	1.18E+00	3.04E-01	9.67E-01	0.00E+00	1.48E+00	-1.63E+00
GWP-biogenic	kg CO ₂ eq.	7.47E-04	-3.30E-05	-1.05E-02	-9.83E-03	1.07E-03	-1.42E-02	0.00E+00	6.83E-03	4.20E-02
GWP-luluc	kg CO ₂ eq.	1.95E-03	2.07E-05	8.02E-03	1.00E-02	2.81E-03	8.91E-03	0.00E+00	1.02E-03	-7.05E-03
GWP-GHG	kg CO ₂ eq.	2.01E-01	2.11E-03	9.12E-01	1.11E+00	2.86E-01	9.10E-01	0.00E+00	1.47E+00	-1.36E+00
ODP	kg CFC 11 eq.	1.51E-10	2.91E-16	2.66E-10	4.17E-10	3.95E-14	1.25E-13	0.00E+00	3.36E-08	-1.06E-11
AP	mol H ⁺ eq.	9.47E-04	2.20E-06	9.49E-03	1.04E-02	1.12E-03	9.46E-04	0.00E+00	9.38E-03	-8.42E-03
EP-freshwater	kg P eq.	1.11E-06	8.17E-09	4.60E-06	5.72E-06	1.11E-06	3.52E-06	0.00E+00	3.01E-04	-8.26E-06
EP-marine	kg N eq.	4.29E-04	6.20E-07	4.61E-03	5.04E-03	5.01E-04	2.67E-04	0.00E+00	3.57E-03	-2.97E-03
EP-terrestrial	mol N eq.	4.76E-03	7.85E-06	5.08E-02	5.55E-02	5.58E-03	3.37E-03	0.00E+00	3.82E-02	-3.28E-02
POCP	kg NMVOC eq.	1.27E-03	1.84E-06	1.35E-02	1.48E-02	1.46E-03	7.89E-04	0.00E+00	1.29E-02	-8.08E-03
ADPm ¹	kg Sb eq.	2.80E-08	1.48E-10	8.23E-08	1.11E-07	2.01E-08	6.38E-08	0.00E+00	3.63E-06	-1.72E-07
ADPF ¹	MJ	2.94E+00	3.05E-02	1.19E+01	1.49E+01	4.13E+00	1.31E+01	0.00E+00	2.85E+01	-2.56E+01
WDP ¹	m ³ world eq. deprived	4.00E-03	2.70E-05	1.32E-02	1.72E-02	3.67E-03	1.16E-02	0.00E+00	9.28E-01	-1.75E-01
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPF = Abiotic Depletion Potential – fossil fuels; WDP = water 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 experienced with the indicator.									

Table 7 – Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER ton of Bundsikringsand										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
PM	[Disease incidence]	1.04E-08	1.69E-11	2.76E-07	2.86E-07	1.22E-08	7.27E-09	0.00E+00	1.79E-07	-4.93E-07
IRP ²	[kBq U235 eq.]	9.62E-04	8.53E-06	3.58E-03	4.56E-03	1.16E-03	3.67E-03	0.00E+00	5.07E-02	-2.89E-01
ETP-fw ¹	[CTUe]	2.08E+00	2.18E-02	8.50E+00	1.06E+01	2.96E+00	9.39E+00	0.00E+00	1.25E+01	-1.24E+01
HTP-c ¹	[CTUh]	4.28E-11	4.43E-13	2.08E-10	2.51E-10	6.01E-11	1.90E-10	0.00E+00	1.01E-09	-1.10E-09
HTP-nc ¹	[CTUh]	1.88E-09	1.97E-11	7.80E-09	9.70E-09	2.68E-09	8.47E-09	0.00E+00	1.17E-08	-1.01E-07
SQP ¹	-	1.21E+00	1.27E-02	4.94E+00	6.16E+00	1.73E+00	5.47E+00	0.00E+00	5.04E+01	-8.65E+00
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality									
Disclaimers	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. ² This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.									

Table 8 - Parameters describing resource use

RESOURCE USE PER ton of Bundsikringsand										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
PERE	[MJ]	2.10E-01	2.22E-03	8.61E-01	1.07E+00	3.01E-01	9.53E-01	0.00E+00	5.71E-01	-8.29E+00
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	2.10E-01	2.22E-03	8.61E-01	1.07E+00	3.01E-01	9.53E-01	0.00E+00	5.71E-01	-8.29E+00
PENRE	[MJ]	2.95E+00	3.06E-02	1.20E+01	1.49E+01	4.15E+00	1.32E+01	0.00E+00	2.85E+01	-2.56E+01
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	2.95E+00	3.06E-02	1.20E+01	1.49E+01	4.15E+00	1.32E+01	0.00E+00	2.85E+01	-2.56E+01
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m³]	2.63E-04	2.43E-06	1.00E-03	1.27E-03	3.29E-04	1.04E-03	0.00E+00	2.16E-02	-7.59E-03
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water									

Table 9 – End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER ton of Bundsikringsand										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
HWD	[kg]	8.93E-12	9.47E-14	3.67E-11	4.57E-11	1.28E-11	4.07E-11	0.00E+00	0.00E+00	6.25E-10
NHWD	[kg]	4.40E-04	4.66E-06	1.80E-03	2.25E-03	6.32E-04	2.00E-03	0.00E+00	1.75E+02	-3.43E+01
RWD	[kg]	5.40E-06	5.72E-08	2.22E-05	2.76E-05	7.76E-06	2.46E-05	0.00E+00	0.00E+00	-1.76E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E+02	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	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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									

Kosand
Table 10 - Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER ton of Ko sand										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
GWP-total	kg CO ₂ eq.	5.89E-01	3.97E-03	2.05E+00	2.65E+00	3.08E-01	9.61E-01	0.00E+00	1.49E+00	-1.59E+00
GWP-fossil	kg CO ₂ eq.	5.81E-01	3.99E-03	2.06E+00	2.64E+00	3.04E-01	9.67E-01	0.00E+00	1.48E+00	-1.63E+00
GWP-biogenic	kg CO ₂ eq.	2.05E-03	-5.86E-05	-1.83E-02	-1.63E-02	1.07E-03	-1.42E-02	0.00E+00	6.83E-03	4.20E-02
GWP-luluc	kg CO ₂ eq.	5.38E-03	3.68E-05	1.39E-02	1.93E-02	2.81E-03	8.91E-03	0.00E+00	1.02E-03	-7.05E-03
GWP-GHG	kg CO ₂ eq.	5.47E-01	3.76E-03	1.96E+00	2.51E+00	2.86E-01	9.10E-01	0.00E+00	1.47E+00	-1.36E+00
ODP	kg CFC 11 eq.	2.60E-10	5.17E-16	4.63E-10	7.23E-10	3.95E-14	1.25E-13	0.00E+00	3.36E-08	-1.06E-11
AP	mol H ⁺ eq.	1.23E-03	3.91E-06	1.67E-02	1.79E-02	1.12E-03	9.46E-04	0.00E+00	9.38E-03	-8.42E-03
EP-freshwater	kg P eq.	2.71E-06	1.45E-08	8.04E-06	1.08E-05	1.11E-06	3.52E-06	0.00E+00	3.01E-04	-8.26E-06
EP-marine	kg N eq.	4.97E-04	1.10E-06	8.06E-03	8.56E-03	5.01E-04	2.67E-04	0.00E+00	3.57E-03	-2.97E-03
EP-terrestrial	mol N eq.	5.62E-03	1.39E-05	8.88E-02	9.45E-02	5.58E-03	3.37E-03	0.00E+00	3.82E-02	-3.28E-02
POCP	kg NMVOC eq.	1.51E-03	3.26E-06	2.36E-02	2.51E-02	1.46E-03	7.89E-04	0.00E+00	1.29E-02	-8.08E-03
ADPm ¹	kg Sb eq.	6.27E-08	2.63E-10	1.46E-07	2.09E-07	2.01E-08	6.38E-08	0.00E+00	3.63E-06	-1.72E-07
ADPF ¹	MJ	8.02E+00	5.41E-02	2.66E+01	3.46E+01	4.13E+00	1.31E+01	0.00E+00	2.85E+01	-2.56E+01
WDP ¹	m ³ world eq. deprived	9.53E-03	4.80E-05	2.70E-02	3.66E-02	3.67E-03	1.16E-02	0.00E+00	9.28E-01	-1.75E-01
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPF = Abiotic Depletion Potential – fossil fuels; WDP = water 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 experienced with the indicator.									

Table 11 – Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER ton of Kosand										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
PM	[Disease incidence]	1.27E-08	3.00E-11	4.79E-07	4.92E-07	1.22E-08	7.27E-09	0.00E+00	1.79E-07	-4.93E-07
IRP ²	[kBq U235 eq.]	2.49E-03	1.52E-05	6.12E-02	6.37E-02	1.16E-03	3.67E-03	0.00E+00	5.07E-02	-2.89E-01
ETP-fw ¹	[CTUe]	5.70E+00	3.88E-02	1.52E+01	2.09E+01	2.96E+00	9.39E+00	0.00E+00	1.25E+01	-1.24E+01
HTP-c ¹	[CTUh]	1.17E-10	7.87E-13	3.84E-10	5.02E-10	6.01E-11	1.90E-10	0.00E+00	1.01E-09	-1.10E-09
HTP-nc ¹	[CTUh]	5.15E-09	3.50E-11	1.42E-08	1.94E-08	2.68E-09	8.47E-09	0.00E+00	1.17E-08	-1.01E-07
SQP ¹	-	3.31E+00	2.26E-02	9.07E+00	1.24E+01	1.73E+00	5.47E+00	0.00E+00	5.04E+01	-8.65E+00
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality									
Disclaimers	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. ² This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.									

Table 12 - Parameters describing resource use

RESOURCE USE PER ton of Kosand										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
PERE	[MJ]	5.78E-01	3.94E-03	2.12E+00	2.70E+00	3.01E-01	9.53E-01	0.00E+00	5.71E-01	-8.29E+00
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	5.78E-01	3.94E-03	2.12E+00	2.70E+00	3.01E-01	9.53E-01	0.00E+00	5.71E-01	-8.29E+00
PENRE	[MJ]	8.05E+00	5.43E-02	2.66E+01	3.48E+01	4.15E+00	1.32E+01	0.00E+00	2.85E+01	-2.56E+01
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	8.05E+00	5.43E-02	2.66E+01	3.48E+01	4.15E+00	1.32E+01	0.00E+00	2.85E+01	-2.56E+01
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m³]	6.89E-04	4.31E-06	2.46E-03	3.15E-03	3.29E-04	1.04E-03	0.00E+00	2.16E-02	-7.59E-03
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water									

Table 13 – End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER ton of Kosand										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
HWD	[kg]	2.46E-11	1.68E-13	2.62E-10	2.87E-10	1.28E-11	4.07E-11	0.00E+00	0.00E+00	6.25E-10
NHWD	[kg]	1.21E-03	8.28E-06	5.14E-03	6.35E-03	6.32E-04	2.00E-03	0.00E+00	1.75E+02	-3.43E+01
RWD	[kg]	1.49E-05	1.02E-07	5.14E-04	5.29E-04	7.76E-06	2.46E-05	0.00E+00	0.00E+00	-1.76E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E+02	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	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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									

Filtergrus 0-8 mm

Table 14 - Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER ton of Filtergrus 0-8 mm										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
GWP-total	kg CO ₂ eq.	1.45E+00	7.99E-03	3.27E+00	4.73E+00	3.08E-01	9.61E-01	0.00E+00	1.49E+00	-1.59E+00
GWP-fossil	kg CO ₂ eq.	1.43E+00	8.03E-03	3.28E+00	4.72E+00	3.04E-01	9.67E-01	0.00E+00	1.48E+00	-1.63E+00
GWP-biogenic	kg CO ₂ eq.	5.06E-03	-1.18E-04	-3.59E-02	-3.10E-02	1.07E-03	-1.42E-02	0.00E+00	6.83E-03	4.20E-02
GWP-luluc	kg CO ₂ eq.	1.33E-02	7.40E-05	2.73E-02	4.07E-02	2.81E-03	8.91E-03	0.00E+00	1.02E-03	-7.05E-03
GWP-GHG	kg CO ₂ eq.	1.35E+00	7.56E-03	3.11E+00	4.46E+00	2.86E-01	9.10E-01	0.00E+00	1.47E+00	-1.36E+00
ODP	kg CFC 11 eq.	5.14E-10	1.04E-15	9.08E-10	1.42E-09	3.95E-14	1.25E-13	0.00E+00	3.36E-08	-1.06E-11
AP	mol H ⁺ eq.	1.89E-03	7.86E-06	3.23E-02	3.42E-02	1.12E-03	9.46E-04	0.00E+00	9.38E-03	-8.42E-03
EP-freshwater	kg P eq.	6.41E-06	2.92E-08	1.56E-05	2.21E-05	1.11E-06	3.52E-06	0.00E+00	3.01E-04	-8.26E-06
EP-marine	kg N eq.	6.53E-04	2.22E-06	1.57E-02	1.64E-02	5.01E-04	2.67E-04	0.00E+00	3.57E-03	-2.97E-03
EP-terrestrial	mol N eq.	7.60E-03	2.80E-05	1.73E-01	1.81E-01	5.58E-03	3.37E-03	0.00E+00	3.82E-02	-3.28E-02
POCP	kg NMVOC eq.	2.07E-03	6.56E-06	4.60E-02	4.81E-02	1.46E-03	7.89E-04	0.00E+00	1.29E-02	-8.08E-03
ADPm ¹	kg Sb eq.	1.43E-07	5.30E-10	2.79E-07	4.23E-07	2.01E-08	6.38E-08	0.00E+00	3.63E-06	-1.72E-07
ADPF ¹	MJ	1.98E+01	1.09E-01	4.06E+01	6.05E+01	4.13E+00	1.31E+01	0.00E+00	2.85E+01	-2.56E+01
WDP ¹	m ³ world eq. deprived	2.23E-02	9.66E-05	4.47E-02	6.71E-02	3.67E-03	1.16E-02	0.00E+00	9.28E-01	-1.75E-01
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPF = Abiotic Depletion Potential – fossil fuels; WDP = water 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 experienced with the indicator.									

Table 15 – Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER ton of Filtergrus 0-8 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
PM	[Disease incidence]	1.80E-08	6.04E-11	9.39E-07	9.57E-07	1.22E-08	7.27E-09	0.00E+00	1.79E-07	-4.93E-07
IRP ²	[kBq U235 eq.]	6.01E-03	3.05E-05	1.22E-02	1.82E-02	1.16E-03	3.67E-03	0.00E+00	5.07E-02	-2.89E-01
ETP-fw ¹	[CTUe]	1.41E+01	7.80E-02	2.90E+01	4.31E+01	2.96E+00	9.39E+00	0.00E+00	1.25E+01	-1.24E+01
HTP-c ¹	[CTUh]	2.87E-10	1.58E-12	7.09E-10	9.98E-10	6.01E-11	1.90E-10	0.00E+00	1.01E-09	-1.10E-09
HTP-nc ¹	[CTUh]	1.27E-08	7.04E-11	2.66E-08	3.94E-08	2.68E-09	8.47E-09	0.00E+00	1.17E-08	-1.01E-07
SQP ¹	-	8.19E+00	4.55E-02	1.68E+01	2.51E+01	1.73E+00	5.47E+00	0.00E+00	5.04E+01	-8.65E+00
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality									
Disclaimers	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. ² This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.									

Table 16 - Parameters describing resource use

RESOURCE USE PER ton of Filtergrus 0-8 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
PERE	[MJ]	1.43E+00	7.92E-03	2.93E+00	4.37E+00	3.01E-01	9.53E-01	0.00E+00	5.71E-01	-8.29E+00
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.43E+00	7.92E-03	2.93E+00	4.37E+00	3.01E-01	9.53E-01	0.00E+00	5.71E-01	-8.29E+00
PENRE	[MJ]	1.98E+01	1.09E-01	4.08E+01	6.07E+01	4.15E+00	1.32E+01	0.00E+00	2.85E+01	-2.56E+01
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	1.98E+01	1.09E-01	4.08E+01	6.07E+01	4.15E+00	1.32E+01	0.00E+00	2.85E+01	-2.56E+01
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m³]	1.67E-03	8.68E-06	3.42E-03	5.10E-03	3.29E-04	1.04E-03	0.00E+00	2.16E-02	-7.59E-03
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water									

Table 17 – End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER ton of Filtergrus 0-8 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
HWD	[kg]	6.07E-11	3.38E-13	1.25E-10	1.86E-10	1.28E-11	4.07E-11	0.00E+00	0.00E+00	6.25E-10
NHWD	[kg]	2.99E-03	1.67E-05	6.15E-03	9.16E-03	6.32E-04	2.00E-03	0.00E+00	1.75E+02	-3.43E+01
RWD	[kg]	3.67E-05	2.05E-07	7.55E-05	1.12E-04	7.76E-06	2.46E-05	0.00E+00	0.00E+00	-1.76E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E+02	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	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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									

Kantgrus
Table 18 - Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER ton of Kantgrus										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
GWP-total	kg CO ₂ eq.	1.45E+00	7.99E-03	4.05E+00	5.51E+00	3.08E-01	9.61E-01	0.00E+00	1.49E+00	-1.59E+00
GWP-fossil	kg CO ₂ eq.	1.43E+00	8.03E-03	4.06E+00	5.50E+00	3.04E-01	9.67E-01	0.00E+00	1.48E+00	-1.63E+00
GWP-biogenic	kg CO ₂ eq.	5.06E-03	-1.18E-04	-3.60E-02	-3.11E-02	1.07E-03	-1.42E-02	0.00E+00	6.83E-03	4.20E-02
GWP-luluc	kg CO ₂ eq.	1.33E-02	7.40E-05	2.74E-02	4.08E-02	2.81E-03	8.91E-03	0.00E+00	1.02E-03	-7.05E-03
GWP-GHG	kg CO ₂ eq.	1.35E+00	7.56E-03	3.86E+00	5.21E+00	2.86E-01	9.10E-01	0.00E+00	1.47E+00	-1.36E+00
ODP	kg CFC 11 eq.	5.14E-10	1.04E-15	9.13E-10	1.43E-09	3.95E-14	1.25E-13	0.00E+00	3.36E-08	-1.06E-11
AP	mol H ⁺ eq.	1.89E-03	7.86E-06	3.29E-02	3.48E-02	1.12E-03	9.46E-04	0.00E+00	9.38E-03	-8.42E-03
EP-freshwater	kg P eq.	6.41E-06	2.92E-08	1.59E-05	2.23E-05	1.11E-06	3.52E-06	0.00E+00	3.01E-04	-8.26E-06
EP-marine	kg N eq.	6.53E-04	2.22E-06	1.59E-02	1.66E-02	5.01E-04	2.67E-04	0.00E+00	3.57E-03	-2.97E-03
EP-terrestrial	mol N eq.	7.60E-03	2.80E-05	1.75E-01	1.83E-01	5.58E-03	3.37E-03	0.00E+00	3.82E-02	-3.28E-02
POCP	kg NMVOC eq.	2.07E-03	6.56E-06	4.66E-02	4.87E-02	1.46E-03	7.89E-04	0.00E+00	1.29E-02	-8.08E-03
ADPm ¹	kg Sb eq.	1.43E-07	5.30E-10	2.89E-07	4.32E-07	2.01E-08	6.38E-08	0.00E+00	3.63E-06	-1.72E-07
ADPF ¹	MJ	1.98E+01	1.09E-01	5.24E+01	7.23E+01	4.13E+00	1.31E+01	0.00E+00	2.85E+01	-2.56E+01
WDP ¹	m ³ world eq. deprived	2.23E-02	9.66E-05	5.34E-02	7.58E-02	3.67E-03	1.16E-02	0.00E+00	9.28E-01	-1.75E-01
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPF = Abiotic Depletion Potential – fossil fuels; WDP = water 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 experienced with the indicator.									

Table 19 – Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER ton of Kantgrus										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
PM	[Disease incidence]	1.80E-08	6.04E-11	9.45E-07	9.63E-07	1.22E-08	7.27E-09	0.00E+00	1.79E-07	-4.93E-07
IRP ²	[kBq U235 eq.]	6.01E-03	3.05E-05	1.21E-01	1.27E-01	1.16E-03	3.67E-03	0.00E+00	5.07E-02	-2.89E-01
ETP-fw ¹	[CTUe]	1.41E+01	7.80E-02	3.00E+01	4.41E+01	2.96E+00	9.39E+00	0.00E+00	1.25E+01	-1.24E+01
HTP-c ¹	[CTUh]	2.87E-10	1.58E-12	7.58E-10	1.05E-09	6.01E-11	1.90E-10	0.00E+00	1.01E-09	-1.10E-09
HTP-nc ¹	[CTUh]	1.27E-08	7.04E-11	2.80E-08	4.07E-08	2.68E-09	8.47E-09	0.00E+00	1.17E-08	-1.01E-07
SQP ¹	-	8.19E+00	4.55E-02	1.79E+01	2.61E+01	1.73E+00	5.47E+00	0.00E+00	5.04E+01	-8.65E+00
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality									
Disclaimers	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. ² This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.									

Table 20 - Parameters describing resource use

RESOURCE USE PER ton of Kantgrus										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
PERE	[MJ]	1.43E+00	7.92E-03	4.18E+00	5.61E+00	3.01E-01	9.53E-01	0.00E+00	5.71E-01	-8.29E+00
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.43E+00	7.92E-03	4.18E+00	5.61E+00	3.01E-01	9.53E-01	0.00E+00	5.71E-01	-8.29E+00
PENRE	[MJ]	1.98E+01	1.09E-01	5.26E+01	7.26E+01	4.15E+00	1.32E+01	0.00E+00	2.85E+01	-2.56E+01
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	1.98E+01	1.09E-01	5.26E+01	7.26E+01	4.15E+00	1.32E+01	0.00E+00	2.85E+01	-2.56E+01
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m³]	1.67E-03	8.68E-06	4.85E-03	6.53E-03	3.29E-04	1.04E-03	0.00E+00	2.16E-02	-7.59E-03
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water									

Table 21 – End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER ton of Kantgrus										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
HWD	[kg]	6.07E-11	3.38E-13	5.17E-10	5.78E-10	1.28E-11	4.07E-11	0.00E+00	0.00E+00	6.25E-10
NHWD	[kg]	2.99E-03	1.67E-05	1.01E-02	1.31E-02	6.32E-04	2.00E-03	0.00E+00	1.75E+02	-3.43E+01
RWD	[kg]	3.67E-05	2.05E-07	1.01E-03	1.05E-03	7.76E-06	2.46E-05	0.00E+00	0.00E+00	-1.76E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E+02	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	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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									

Vejgrus
Table 22 - Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER ton of Vejgrus										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
GWP-total	kg CO ₂ eq.	1.29E+00	7.23E-03	3.67E+00	4.97E+00	3.08E-01	9.61E-01	0.00E+00	1.49E+00	-1.59E+00
GWP-fossil	kg CO ₂ eq.	1.27E+00	7.27E-03	3.68E+00	4.96E+00	3.04E-01	9.67E-01	0.00E+00	1.48E+00	-1.63E+00
GWP-biogenic	kg CO ₂ eq.	4.49E-03	-1.07E-04	-3.27E-02	-2.83E-02	1.07E-03	-1.42E-02	0.00E+00	6.83E-03	4.20E-02
GWP-luluc	kg CO ₂ eq.	1.18E-02	6.70E-05	2.49E-02	3.67E-02	2.81E-03	8.91E-03	0.00E+00	1.02E-03	-7.05E-03
GWP-GHG	kg CO ₂ eq.	1.20E+00	6.84E-03	3.50E+00	4.70E+00	2.86E-01	9.10E-01	0.00E+00	1.47E+00	-1.36E+00
ODP	kg CFC 11 eq.	4.66E-10	9.41E-16	8.28E-10	1.29E-09	3.95E-14	1.25E-13	0.00E+00	3.36E-08	-1.06E-11
AP	mol H ⁺ eq.	1.77E-03	7.12E-06	2.98E-02	3.16E-02	1.12E-03	9.46E-04	0.00E+00	9.38E-03	-8.42E-03
EP-freshwater	kg P eq.	5.71E-06	2.64E-08	1.44E-05	2.01E-05	1.11E-06	3.52E-06	0.00E+00	3.01E-04	-8.26E-06
EP-marine	kg N eq.	6.24E-04	2.01E-06	1.44E-02	1.51E-02	5.01E-04	2.67E-04	0.00E+00	3.57E-03	-2.97E-03
EP-terrestrial	mol N eq.	7.23E-03	2.54E-05	1.59E-01	1.66E-01	5.58E-03	3.37E-03	0.00E+00	3.82E-02	-3.28E-02
POCP	kg NMVOC eq.	1.96E-03	5.94E-06	4.22E-02	4.42E-02	1.46E-03	7.89E-04	0.00E+00	1.29E-02	-8.08E-03
ADPm ¹	kg Sb eq.	1.28E-07	4.79E-10	2.62E-07	3.90E-07	2.01E-08	6.38E-08	0.00E+00	3.63E-06	-1.72E-07
ADPF ¹	MJ	1.75E+01	9.85E-02	4.76E+01	6.52E+01	4.13E+00	1.31E+01	0.00E+00	2.85E+01	-2.56E+01
WDP ¹	m ³ world eq. deprived	1.99E-02	8.74E-05	4.84E-02	6.84E-02	3.67E-03	1.16E-02	0.00E+00	9.28E-01	-1.75E-01
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPF = Abiotic Depletion Potential – fossil fuels; WDP = water 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 experienced with the indicator.									

Table 23 – Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER ton of Vejgrus										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
PM	[Disease incidence]	1.70E-08	5.47E-11	8.57E-07	8.74E-07	1.22E-08	7.27E-09	0.00E+00	1.79E-07	-4.93E-07
IRP ²	[kBq U235 eq.]	5.34E-03	2.76E-05	1.09E-01	1.15E-01	1.16E-03	3.67E-03	0.00E+00	5.07E-02	-2.89E-01
ETP-fw ¹	[CTUe]	1.25E+01	7.06E-02	2.72E+01	3.97E+01	2.96E+00	9.39E+00	0.00E+00	1.25E+01	-1.24E+01
HTP-c ¹	[CTUh]	2.55E-10	1.43E-12	6.87E-10	9.44E-10	6.01E-11	1.90E-10	0.00E+00	1.01E-09	-1.10E-09
HTP-nc ¹	[CTUh]	1.13E-08	6.37E-11	2.54E-08	3.67E-08	2.68E-09	8.47E-09	0.00E+00	1.17E-08	-1.01E-07
SQP ¹	-	7.26E+00	4.12E-02	1.62E+01	2.35E+01	1.73E+00	5.47E+00	0.00E+00	5.04E+01	-8.65E+00
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality									
Disclaimers	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. ² This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.									

Table 24 - Parameters describing resource use

RESOURCE USE PER ton of Vejgrus										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
PERE	[MJ]	1.27E+00	7.17E-03	3.79E+00	5.06E+00	3.01E-01	9.53E-01	0.00E+00	5.71E-01	-8.29E+00
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.27E+00	7.17E-03	3.79E+00	5.06E+00	3.01E-01	9.53E-01	0.00E+00	5.71E-01	-8.29E+00
PENRE	[MJ]	1.76E+01	9.89E-02	4.77E+01	6.54E+01	4.15E+00	1.32E+01	0.00E+00	2.85E+01	-2.56E+01
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	1.76E+01	9.89E-02	4.77E+01	6.54E+01	4.15E+00	1.32E+01	0.00E+00	2.85E+01	-2.56E+01
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m³]	1.49E-03	7.85E-06	4.40E-03	5.89E-03	3.29E-04	1.04E-03	0.00E+00	2.16E-02	-7.59E-03
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water									

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

WASTE CATEGORIES AND OUTPUT FLOWS PER ton of Vejgrus										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
HWD	[kg]	5.39E-11	3.06E-13	4.69E-10	5.23E-10	1.28E-11	4.07E-11	0.00E+00	0.00E+00	6.25E-10
NHWD	[kg]	2.65E-03	1.51E-05	9.19E-03	1.19E-02	6.32E-04	2.00E-03	0.00E+00	1.75E+02	-3.43E+01
RWD	[kg]	3.26E-05	1.85E-07	9.20E-04	9.52E-04	7.76E-06	2.46E-05	0.00E+00	0.00E+00	-1.76E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E+02	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	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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									

Stabilgrus II

Table 26 - Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER ton of Stabilgrus II										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
GWP-total	kg CO ₂ eq.	1.57E+00	8.53E-03	4.32E+00	5.90E+00	3.08E-01	9.61E-01	0.00E+00	1.49E+00	-1.59E+00
GWP-fossil	kg CO ₂ eq.	1.55E+00	8.58E-03	4.33E+00	5.89E+00	3.04E-01	9.67E-01	0.00E+00	1.48E+00	-1.63E+00
GWP-biogenic	kg CO ₂ eq.	5.47E-03	-1.26E-04	-3.84E-02	-3.31E-02	1.07E-03	-1.42E-02	0.00E+00	6.83E-03	4.20E-02
GWP-luluc	kg CO ₂ eq.	1.44E-02	7.90E-05	2.93E-02	4.37E-02	2.81E-03	8.91E-03	0.00E+00	1.02E-03	-7.05E-03
GWP-GHG	kg CO ₂ eq.	1.46E+00	8.07E-03	4.12E+00	5.58E+00	2.86E-01	9.10E-01	0.00E+00	1.47E+00	-1.36E+00
ODP	kg CFC 11 eq.	5.86E-10	1.11E-15	9.74E-10	1.56E-09	3.95E-14	1.25E-13	0.00E+00	3.36E-08	-1.06E-11
AP	mol H ⁺ eq.	1.99E-03	8.40E-06	3.51E-02	3.71E-02	1.12E-03	9.46E-04	0.00E+00	9.38E-03	-8.42E-03
EP-freshwater	kg P eq.	7.00E-06	3.12E-08	1.69E-05	2.40E-05	1.11E-06	3.52E-06	0.00E+00	3.01E-04	-8.26E-06
EP-marine	kg N eq.	6.75E-04	2.37E-06	1.70E-02	1.76E-02	5.01E-04	2.67E-04	0.00E+00	3.57E-03	-2.97E-03
EP-terrestrial	mol N eq.	7.88E-03	2.99E-05	1.87E-01	1.95E-01	5.58E-03	3.37E-03	0.00E+00	3.82E-02	-3.28E-02
POCP	kg NMVOC eq.	2.16E-03	7.01E-06	4.97E-02	5.19E-02	1.46E-03	7.89E-04	0.00E+00	1.29E-02	-8.08E-03
ADPm ¹	kg Sb eq.	1.57E-07	5.66E-10	3.08E-07	4.66E-07	2.01E-08	6.38E-08	0.00E+00	3.63E-06	-1.72E-07
ADPF ¹	MJ	2.14E+01	1.16E-01	5.59E+01	7.74E+01	4.13E+00	1.31E+01	0.00E+00	2.85E+01	-2.56E+01
WDP ¹	m ³ world eq. deprived	2.42E-02	1.03E-04	5.69E-02	8.12E-02	3.67E-03	1.16E-02	0.00E+00	9.28E-01	-1.75E-01
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPF = Abiotic Depletion Potential – fossil fuels; WDP = water 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 experienced with the indicator.									

Table 27 – Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER ton of Stabilgrus II										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
PM	[Disease incidence]	1.88E-08	6.45E-11	1.01E-06	1.03E-06	1.22E-08	7.27E-09	0.00E+00	1.79E-07	-4.93E-07
IRP ²	[kBq U235 eq.]	6.53E-03	3.26E-05	1.29E-01	1.35E-01	1.16E-03	3.67E-03	0.00E+00	5.07E-02	-2.89E-01
ETP-fw ¹	[CTUe]	1.52E+01	8.33E-02	3.20E+01	4.73E+01	2.96E+00	9.39E+00	0.00E+00	1.25E+01	-1.24E+01
HTP-c ¹	[CTUh]	3.11E-10	1.69E-12	8.09E-10	1.12E-09	6.01E-11	1.90E-10	0.00E+00	1.01E-09	-1.10E-09
HTP-nc ¹	[CTUh]	1.37E-08	7.52E-11	2.98E-08	4.36E-08	2.68E-09	8.47E-09	0.00E+00	1.17E-08	-1.01E-07
SQP ¹	-	8.85E+00	4.86E-02	1.91E+01	2.80E+01	1.73E+00	5.47E+00	0.00E+00	5.04E+01	-8.65E+00
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality									
Disclaimers	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. ² This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.									

Table 28 - Parameters describing resource use

RESOURCE USE PER ton of Stabilgrus II										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
PERE	[MJ]	1.54E+00	8.46E-03	4.45E+00	6.01E+00	3.01E-01	9.53E-01	0.00E+00	5.71E-01	-8.29E+00
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.54E+00	8.46E-03	4.45E+00	6.01E+00	3.01E-01	9.53E-01	0.00E+00	5.71E-01	-8.29E+00
PENRE	[MJ]	2.15E+01	1.17E-01	5.61E+01	7.77E+01	4.15E+00	1.32E+01	0.00E+00	2.85E+01	-2.56E+01
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	2.15E+01	1.17E-01	5.61E+01	7.77E+01	4.15E+00	1.32E+01	0.00E+00	2.85E+01	-2.56E+01
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m³]	1.81E-03	9.27E-06	5.17E-03	6.99E-03	3.29E-04	1.04E-03	0.00E+00	2.16E-02	-7.59E-03
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water									

Table 29 – End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER ton of Stabilgrus II										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3**	C4	D
HWD	[kg]	6.56E-11	3.61E-13	5.52E-10	6.18E-10	1.28E-11	4.07E-11	0.00E+00	0.00E+00	6.25E-10
NHWD	[kg]	3.23E-03	1.78E-05	1.08E-02	1.41E-02	6.32E-04	2.00E-03	0.00E+00	1.75E+02	-3.43E+01
RWD	[kg]	3.97E-05	2.18E-07	1.08E-03	1.12E-03	7.76E-06	2.46E-05	0.00E+00	0.00E+00	-1.76E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E+02	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	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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									

Sten 2-8 mm

Table 30 - Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER ton of Sten 2-8 mm										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3*	C4	D
GWP-total	kg CO ₂ eq.	2.50E+00	1.29E-02	6.48E+00	8.99E+00	3.08E-01	9.61E-01	2.73E-01	1.49E+00	-1.59E+00
GWP-fossil	kg CO ₂ eq.	2.47E+00	1.29E-02	6.50E+00	8.98E+00	3.04E-01	9.67E-01	2.63E-01	1.48E+00	-1.63E+00
GWP-biogenic	kg CO ₂ eq.	8.72E-03	-1.90E-04	-5.77E-02	-4.91E-02	1.07E-03	-1.42E-02	9.17E-03	6.83E-03	4.20E-02
GWP-luluc	kg CO ₂ eq.	2.29E-02	1.19E-04	4.39E-02	6.69E-02	2.81E-03	8.91E-03	6.35E-04	1.02E-03	-7.05E-03
GWP-GHG	kg CO ₂ eq.	2.32E+00	1.22E-02	6.18E+00	8.51E+00	2.86E-01	9.10E-01	2.40E-01	1.47E+00	-1.36E+00
ODP	kg CFC 11 eq.	7.09E-10	1.68E-15	1.46E-09	2.17E-09	3.95E-14	1.25E-13	4.77E-09	3.36E-08	-1.06E-11
AP	mol H ⁺ eq.	2.69E-03	1.27E-05	5.26E-02	5.53E-02	1.12E-03	9.46E-04	1.31E-03	9.38E-03	-8.42E-03
EP-freshwater	kg P eq.	1.06E-05	4.71E-08	2.54E-05	3.60E-05	1.11E-06	3.52E-06	2.33E-04	3.01E-04	-8.26E-06
EP-marine	kg N eq.	8.43E-04	3.57E-06	2.55E-02	2.63E-02	5.01E-04	2.67E-04	2.38E-04	3.57E-03	-2.97E-03
EP-terrestrial	mol N eq.	1.00E-02	4.52E-05	2.81E-01	2.91E-01	5.58E-03	3.37E-03	2.11E-03	3.82E-02	-3.28E-02
POCP	kg NMVOC eq.	2.73E-03	1.06E-05	7.45E-02	7.73E-02	1.46E-03	7.89E-04	7.14E-04	1.29E-02	-8.08E-03
ADPm ¹	kg Sb eq.	2.30E-07	8.54E-10	4.62E-07	6.93E-07	2.01E-08	6.38E-08	5.78E-07	3.63E-06	-1.72E-07
ADPF ¹	MJ	3.40E+01	1.75E-01	8.39E+01	1.18E+02	4.13E+00	1.31E+01	6.56E+00	2.85E+01	-2.56E+01
WDP ¹	m ³ world eq. deprived	3.74E-02	1.56E-04	8.54E-02	1.23E-01	3.67E-03	1.16E-02	1.95E-01	9.28E-01	-1.75E-01
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPF = Abiotic Depletion Potential – fossil fuels; WDP = water 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 experienced with the indicator.									

Table 31 – Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER ton of Sten 2-8 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3*	C4	D
PM	[Disease incidence]	2.44E-08	9.73E-11	1.51E-06	1.54E-06	1.22E-08	7.27E-09	5.13E-09	1.79E-07	-4.93E-07
IRP ²	[kBq U235 eq.]	1.02E-02	4.91E-05	1.93E-01	2.03E-01	1.16E-03	3.67E-03	1.64E-01	5.07E-02	-2.89E-01
ETP-fw ¹	[CTUe]	2.42E+01	1.26E-01	4.80E+01	7.23E+01	2.96E+00	9.39E+00	7.96E-01	1.25E+01	-1.24E+01
HTP-c ¹	[CTUh]	4.94E-10	2.55E-12	1.21E-09	1.71E-09	6.01E-11	1.90E-10	2.79E-10	1.01E-09	-1.10E-09
HTP-nc ¹	[CTUh]	2.19E-08	1.13E-10	4.47E-08	6.67E-08	2.68E-09	8.47E-09	4.71E-09	1.17E-08	-1.01E-07
SQP ¹	-	1.41E+01	7.33E-02	2.86E+01	4.28E+01	1.73E+00	5.47E+00	9.39E-01	5.04E+01	-8.65E+00
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality									
Disclaimers	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. ² This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.									

Table 32 - Parameters describing resource use

RESOURCE USE PER ton of Sten 2-8 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3*	C4	D
PERE	[MJ]	2.46E+00	1.28E-02	6.68E+00	9.15E+00	3.01E-01	9.53E-01	1.11E+00	5.71E-01	-8.29E+00
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	2.46E+00	1.28E-02	6.68E+00	9.15E+00	3.01E-01	9.53E-01	1.11E+00	5.71E-01	-8.29E+00
PENRE	[MJ]	3.41E+01	1.76E-01	8.42E+01	1.18E+02	4.15E+00	1.32E+01	6.56E+00	2.85E+01	-2.56E+01
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	3.41E+01	1.76E-01	8.42E+01	1.18E+02	4.15E+00	1.32E+01	6.56E+00	2.85E+01	-2.56E+01
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m³]	2.86E-03	1.40E-05	7.76E-03	1.06E-02	3.29E-04	1.04E-03	4.55E-03	2.16E-02	-7.59E-03
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water									

Table 33 – End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER ton of Sten 2-8 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3*	C4	D
HWD	[kg]	1.05E-10	5.45E-13	8.28E-10	9.33E-10	1.28E-11	4.07E-11	0.00E+00	0.00E+00	6.25E-10
NHWD	[kg]	5.16E-03	2.68E-05	1.62E-02	2.14E-02	6.32E-04	2.00E-03	0.00E+00	1.75E+02	-3.43E+01
RWD	[kg]	6.33E-05	3.30E-07	1.62E-03	1.69E-03	7.76E-06	2.46E-05	0.00E+00	0.00E+00	-1.76E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E+02	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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									

Sten 8-16 mm

Table 34 - Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER ton of Sten 8-16 mm										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3*	C4	D
GWP-total	kg CO ₂ eq.	2.50E+00	1.29E-02	6.48E+00	8.99E+00	3.08E-01	9.61E-01	2.73E-01	1.49E+00	-1.59E+00
GWP-fossil	kg CO ₂ eq.	2.47E+00	1.29E-02	6.50E+00	8.98E+00	3.04E-01	9.67E-01	2.63E-01	1.48E+00	-1.63E+00
GWP-biogenic	kg CO ₂ eq.	8.73E-03	-1.90E-04	-5.77E-02	-4.91E-02	1.07E-03	-1.42E-02	9.17E-03	6.83E-03	4.20E-02
GWP-luluc	kg CO ₂ eq.	2.29E-02	1.19E-04	4.39E-02	6.69E-02	2.81E-03	8.91E-03	6.35E-04	1.02E-03	-7.05E-03
GWP-GHG	kg CO ₂ eq.	2.32E+00	1.22E-02	6.18E+00	8.51E+00	2.86E-01	9.10E-01	2.40E-01	1.47E+00	-1.36E+00
ODP	kg CFC 11 eq.	8.23E-10	1.68E-15	1.46E-09	2.28E-09	3.95E-14	1.25E-13	4.77E-09	3.36E-08	-1.06E-11
AP	mol H ⁺ eq.	2.70E-03	1.27E-05	5.26E-02	5.54E-02	1.12E-03	9.46E-04	1.31E-03	9.38E-03	-8.42E-03
EP-freshwater	kg P eq.	1.09E-05	4.71E-08	2.54E-05	3.63E-05	1.11E-06	3.52E-06	2.33E-04	3.01E-04	-8.26E-06
EP-marine	kg N eq.	8.44E-04	3.57E-06	2.55E-02	2.63E-02	5.01E-04	2.67E-04	2.38E-04	3.57E-03	-2.97E-03
EP-terrestrial	mol N eq.	1.00E-02	4.52E-05	2.81E-01	2.91E-01	5.58E-03	3.37E-03	2.11E-03	3.82E-02	-3.28E-02
POCP	kg NMVOC eq.	2.75E-03	1.06E-05	7.45E-02	7.73E-02	1.46E-03	7.89E-04	7.14E-04	1.29E-02	-8.08E-03
ADPm ¹	kg Sb eq.	2.41E-07	8.54E-10	4.62E-07	7.04E-07	2.01E-08	6.38E-08	5.78E-07	3.63E-06	-1.72E-07
ADPF ¹	MJ	3.41E+01	1.75E-01	8.39E+01	1.18E+02	4.13E+00	1.31E+01	6.56E+00	2.85E+01	-2.56E+01
WDP ¹	m ³ world eq. deprived	3.78E-02	1.56E-04	8.54E-02	1.23E-01	3.67E-03	1.16E-02	1.95E-01	9.28E-01	-1.75E-01
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPF = Abiotic Depletion Potential – fossil fuels; WDP = water 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 experienced with the indicator.									

Table 35 – Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER ton of Sten 8-16 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3*	C4	D
PM	[Disease incidence]	2.45E-08	9.73E-11	1.51E-06	1.54E-06	1.22E-08	7.27E-09	5.13E-09	1.79E-07	-4.93E-07
IRP ²	[kBq U235 eq.]	1.03E-02	4.91E-05	1.93E-01	2.03E-01	1.16E-03	3.67E-03	1.64E-01	5.07E-02	-2.89E-01
ETP-fw ¹	[CTUe]	2.43E+01	1.26E-01	4.80E+01	7.23E+01	2.96E+00	9.39E+00	7.96E-01	1.25E+01	-1.24E+01
HTP-c ¹	[CTUh]	4.95E-10	2.55E-12	1.21E-09	1.71E-09	6.01E-11	1.90E-10	2.79E-10	1.01E-09	-1.10E-09
HTP-nc ¹	[CTUh]	2.19E-08	1.13E-10	4.47E-08	6.68E-08	2.68E-09	8.47E-09	4.71E-09	1.17E-08	-1.01E-07
SQP ¹	-	1.41E+01	7.33E-02	2.86E+01	4.28E+01	1.73E+00	5.47E+00	9.39E-01	5.04E+01	-8.65E+00
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality									
Disclaimers	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. ² This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.									

Table 36 - Parameters describing resource use

RESOURCE USE PER ton of Sten 8-16 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3*	C4	D
PERE	[MJ]	2.46E+00	1.28E-02	6.68E+00	9.16E+00	3.01E-01	9.53E-01	1.11E+00	5.71E-01	-8.29E+00
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	2.46E+00	1.28E-02	6.68E+00	9.16E+00	3.01E-01	9.53E-01	1.11E+00	5.71E-01	-8.29E+00
PENRE	[MJ]	3.42E+01	1.76E-01	8.42E+01	1.19E+02	4.15E+00	1.32E+01	6.56E+00	2.85E+01	-2.56E+01
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	3.42E+01	1.76E-01	8.42E+01	1.19E+02	4.15E+00	1.32E+01	6.56E+00	2.85E+01	-2.56E+01
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m³]	2.87E-03	1.40E-05	7.76E-03	1.06E-02	3.29E-04	1.04E-03	4.55E-03	2.16E-02	-7.59E-03
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water									

Table 37 – End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER ton of Sten 8-16 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3*	C4	D
HWD	[kg]	1.05E-10	5.45E-13	8.28E-10	9.33E-10	1.28E-11	4.07E-11	0.00E+00	0.00E+00	6.25E-10
NHWD	[kg]	5.16E-03	2.68E-05	1.62E-02	2.14E-02	6.32E-04	2.00E-03	0.00E+00	1.75E+02	-3.43E+01
RWD	[kg]	6.33E-05	3.30E-07	1.62E-03	1.69E-03	7.76E-06	2.46E-05	0.00E+00	0.00E+00	-1.76E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E+02	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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									

Sten 16-32 mm

Table 38 - Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER ton of Sten 16-32 mm										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3*	C4	D
GWP-total	kg CO ₂ eq.	2.50E+00	1.29E-02	6.48E+00	8.99E+00	3.08E-01	9.61E-01	2.73E-01	1.49E+00	-1.59E+00
GWP-fossil	kg CO ₂ eq.	2.47E+00	1.29E-02	6.50E+00	8.98E+00	3.04E-01	9.67E-01	2.63E-01	1.48E+00	-1.63E+00
GWP-biogenic	kg CO ₂ eq.	8.73E-03	-1.90E-04	-5.77E-02	-4.91E-02	1.07E-03	-1.42E-02	9.17E-03	6.83E-03	4.20E-02
GWP-luluc	kg CO ₂ eq.	2.29E-02	1.19E-04	4.39E-02	6.69E-02	2.81E-03	8.91E-03	6.35E-04	1.02E-03	-7.05E-03
GWP-GHG	kg CO ₂ eq.	2.32E+00	1.22E-02	6.18E+00	8.51E+00	2.86E-01	9.10E-01	2.40E-01	1.47E+00	-1.36E+00
ODP	kg CFC 11 eq.	8.23E-10	1.68E-15	1.46E-09	2.28E-09	3.95E-14	1.25E-13	4.77E-09	3.36E-08	-1.06E-11
AP	mol H ⁺ eq.	2.70E-03	1.27E-05	5.26E-02	5.54E-02	1.12E-03	9.46E-04	1.31E-03	9.38E-03	-8.42E-03
EP-freshwater	kg P eq.	1.09E-05	4.71E-08	2.54E-05	3.63E-05	1.11E-06	3.52E-06	2.33E-04	3.01E-04	-8.26E-06
EP-marine	kg N eq.	8.44E-04	3.57E-06	2.55E-02	2.63E-02	5.01E-04	2.67E-04	2.38E-04	3.57E-03	-2.97E-03
EP-terrestrial	mol N eq.	1.00E-02	4.52E-05	2.81E-01	2.91E-01	5.58E-03	3.37E-03	2.11E-03	3.82E-02	-3.28E-02
POCP	kg NMVOC eq.	2.75E-03	1.06E-05	7.45E-02	7.73E-02	1.46E-03	7.89E-04	7.14E-04	1.29E-02	-8.08E-03
ADPm ¹	kg Sb eq.	2.41E-07	8.54E-10	4.62E-07	7.04E-07	2.01E-08	6.38E-08	5.78E-07	3.63E-06	-1.72E-07
ADPF ¹	MJ	3.41E+01	1.75E-01	8.39E+01	1.18E+02	4.13E+00	1.31E+01	6.56E+00	2.85E+01	-2.56E+01
WDP ¹	m ³ world eq. deprived	3.78E-02	1.56E-04	8.54E-02	1.23E-01	3.67E-03	1.16E-02	1.95E-01	9.28E-01	-1.75E-01
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPF = Abiotic Depletion Potential – fossil fuels; WDP = water 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 experienced with the indicator.									

Table 39 – Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER ton of Sten 16-32 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3*	C4	D
PM	[Disease incidence]	2.45E-08	9.73E-11	1.51E-06	1.54E-06	1.22E-08	7.27E-09	5.13E-09	1.79E-07	-4.93E-07
IRP ²	[kBq U235 eq.]	1.03E-02	4.91E-05	1.93E-01	2.03E-01	1.16E-03	3.67E-03	1.64E-01	5.07E-02	-2.89E-01
ETP-fw ¹	[CTUe]	2.43E+01	1.26E-01	4.80E+01	7.23E+01	2.96E+00	9.39E+00	7.96E-01	1.25E+01	-1.24E+01
HTP-c ¹	[CTUh]	4.95E-10	2.55E-12	1.21E-09	1.71E-09	6.01E-11	1.90E-10	2.79E-10	1.01E-09	-1.10E-09
HTP-nc ¹	[CTUh]	2.19E-08	1.13E-10	4.47E-08	6.68E-08	2.68E-09	8.47E-09	4.71E-09	1.17E-08	-1.01E-07
SQP ¹	-	1.41E+01	7.33E-02	2.86E+01	4.28E+01	1.73E+00	5.47E+00	9.39E-01	5.04E+01	-8.65E+00
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality									
Disclaimers	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. ² This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.									

Table 40 - Parameters describing resource use

RESOURCE USE PER ton of Sten 16-32 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3*	C4	D
PERE	[MJ]	2.46E+00	1.28E-02	6.68E+00	9.16E+00	3.01E-01	9.53E-01	1.11E+00	5.71E-01	-8.29E+00
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	2.46E+00	1.28E-02	6.68E+00	9.16E+00	3.01E-01	9.53E-01	1.11E+00	5.71E-01	-8.29E+00
PENRE	[MJ]	3.42E+01	1.76E-01	8.42E+01	1.19E+02	4.15E+00	1.32E+01	6.56E+00	2.85E+01	-2.56E+01
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	3.42E+01	1.76E-01	8.42E+01	1.19E+02	4.15E+00	1.32E+01	6.56E+00	2.85E+01	-2.56E+01
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m³]	2.87E-03	1.40E-05	7.76E-03	1.06E-02	3.29E-04	1.04E-03	4.55E-03	2.16E-02	-7.59E-03
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water									

Table 41 – End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER ton of Sten 16-32 mm										
Parameter	Unit	A1	A2	A3	A1-A3	C1	C2	C3*	C4	D
HWD	[kg]	1.05E-10	5.45E-13	8.28E-10	9.33E-10	1.28E-11	4.07E-11	0.00E+00	0.00E+00	6.25E-10
NHWD	[kg]	5.16E-03	2.68E-05	1.62E-02	2.14E-02	6.32E-04	2.00E-03	0.00E+00	1.75E+02	-3.43E+01
RWD	[kg]	6.33E-05	3.30E-07	1.62E-03	1.69E-03	7.76E-06	2.46E-05	0.00E+00	0.00E+00	-1.76E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E+02	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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									

Additional information

LCA interpretation

The overall results presented showed, that the life cycle stage Production (A1-A3), has the largest impact on the core environmental impact indicators for all products except Vasket E-Sand, Bundsikringsand, and Kosand. These products have lower values in production because of the economic allocation of diesel, electricity, chemicals, etc., and the products have a lower price than the other products. Similarly, Sten 2-8 mm, Sten 8-16 mm, and Sten 16-32 mm have the same impact as they have the same price. The environmental impact categories are significantly influenced by the impact of the C1-C4 modules. This is because the landfill process used in C4 has a large impact on the End-of-Life stages. The products Sten 2-8 mm, Sten 8-16 mm, and Sten 16-32 mm have a greater environmental impact compared to the other products, as they are used for concrete and therefore have an impact in module C3 for crushing concrete. Other than this, the products have the same environmental impact in the C and D modules, as they undergo the same End-of-Life treatment.

Technical information on scenarios

End of life (C1-C4)

Scenario information	Value		Unit
	Scenario 1	Scenario 2	
Collected separately	1000	1000	kg
Collected with mixed waste	0	0	kg
For reuse	0	824.5	kg
For recycling	824.5	0	kg
For energy recovery	0.7 (not included)	0.7 (not included)	kg
For final disposal	174.8	174.8	kg
Assumptions for scenario development			As appropriate

Re-use, recovery and recycling potential (D)

Scenario information/Materiel	Value	Unit
Displaced material	824.5	kg
Energy recovery from waste incineration	0	MJ


Indoor air

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

Soil and water

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

References

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Programme operator	Danish Technological Institute Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA-practitioner	Marie Laursen Bjørneboe Heidi Stranddorf Sweco Danmark, Ørestad Boulevard 41, 2300 København S Denmark
LCA software /background data	LCA for Experts from Sphera (version 10.7). Generic data and background data is primarily based on data from the database Managed LCA Content (MLC) from Sphera (version 2023.2) and Ecoinvent database version 3.8 (Ecoinvent. 2021). EN 15804 reference package 3.1
3rd party verifier	<i>Guangli Du Department of the Built Environment Aalborg University, Denmark</i>

General programme instructions

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

EN 15804

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

Product-specific cPCR

EPD-International - PCR 2019:14 PCR 2019:14 Construction products (EN 15804:A2) (1.3.1)

EN 15942

DS/EN 15942:2011 – " Sustainability of construction works – Environmental product declarations – Communication format business-to-business"



ISO 14025

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

ISO 14040

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

ISO 14044

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