epddanmark

ECO PLATFORM EPD VERIFIED

Owner: Skamol Group
No.: MD-22123-EN
Issued: 30-11-2022
Valid to: 30-11-2027

3rd PARTY **VERIFIED**

EPD

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

skamol

Owner of declaration
Skamol Group
Hasselager Centervej 1
8260 Viby
VAT no. 41333715

Programme
EPD Danmark
www.epddanmark.dk

☐ Industry EPD
☒ Product EPD

Declared product(s)
Vermiculite insulation systems.

Number of declared datasets/product variations: 5

Group	Product name
V-1100	SkamoDoor Board 475 SkamoEnclosure Vermiculite Board SkamoStove Board 475 SkamoStove Board 600 SkamoStove Board 700 SkamoStove Board Decor 700 SkamoStove Shape 475 SkamoStove Shape 600 SkamoStove Shape 700 SkamoAlu V-1100 (375) SkamoAlu V-1100 (475) SkamoAlu V-1100 (510) SkamoAlu V-1100 (600) SkamoAlu V-1100 USW SkamoCeramic V-1100 (375) SkamoCeramic V-1100 (475) SkamoCeramic V-1100 (600) SkamoCeramic V-1100 (700) SkamoCeramic V-1100 (700) WR SkamoSteel V-1100 (475) SkamoSteel V-1100 (600) SkamoSteel V-1100 (700)
Vip 900	SkamoStove Board 900 SkamoStove Shape 900 SkamoAlu Vip 900 SkamoSteel Vip 900 SkamoSteel Vip 900 WR
Vip 12/ Vip 1250	SkamoStove Board 1200 SkamoStove Shape 1200 SkamoAlu Vip 12 SkamoAlu Vip 1250
Vip 12 HS	SkamoSteel Vip 12 HS SkamoSteel Vip 12 HS WR
Vip 12 HT	SkamoSteel Vip 12 HT SkamoSteel Vip 12 HT WR

Production site
Borgen 2B, 7860 Rødding, Denmark

Issued: 30-11-2022
Valid to: 30-11-2027

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

KimConsult

Kim Christiansen

Martha Katrine Sørensen
EPD Danmark

Product(s) use
The declared products are used for:

- Insulation system for stove applications
- Passive fire protection applications
- Insulation system for industrial applications

Declared/ functional unit
1 ton insulation board

Year of production site data (A3)
2021

EPD version
[revision no.], [publication date]: [Explanation of performed changes]

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

Skamol vermiculite insulation systems have the great advantage of being able to withstand repeated heating and cooling and they are offered in a wide range of design possibilities.

Vermiculite is a natural mineral. The layered atomic structure of vermiculite enables it to expand greatly when heating it fast. The expanded vermiculite is the key ingredient vermiculite insulation materials. Together with water glass, the mixture is highly workable and many custom shape insulation materials are made.

In some cases, other additives are used to promote certain properties.

The material contents declare 100 weight percent of the products and are declared in the table below.

Material	Weight (%) of declared product
Vermiculite	33-49
Waterglass	20-30
Olivine	22-44
Kaolin	0-40
Chamotte	0-40
Crushed material	0-7

Product packaging:

Products are packed with PE foil and cardboard. The composition of packaging is declared the table below.

Material	Weight-% of packaging
PE foil	0,15
Cardboard	15,93
EUR pallet	83,92

Representativity

This EPD is based on weighted average data from Skamol´s production site in Rødding. The data is from 2021.

Background data is from EcoInvent 3.8.

Hazardous substances

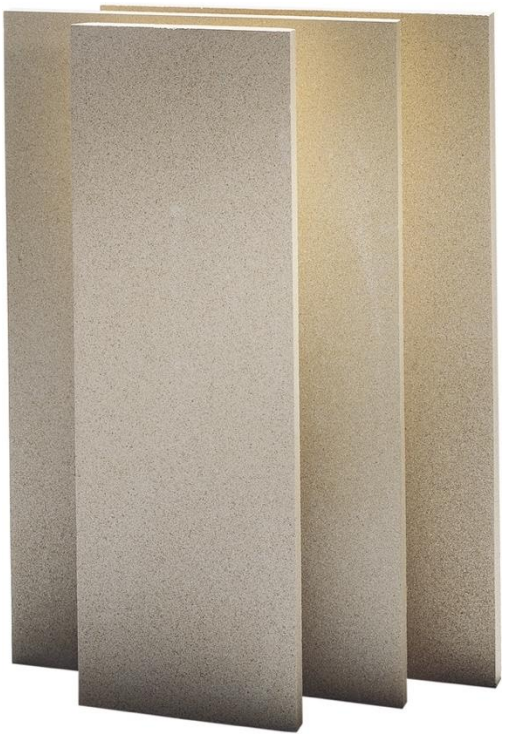
The products contain no REACH substances listed on the ”Candidate List of Substances of Very High Concern for authorisation”

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

Essential characteristics

Thermal conductivity (R-value) is declared in accordance with NPCR 012:2022 Part B for Thermal insulation products version 2.0, and the PCR Construction products and services ver. 2, Part A. Given the thermal conductivity is dependent on the density and thickness of the product, and the declared unit in this EPD is 1 ton, the table below provides an overview of the R-value of the five products with a thickness of 10mm. For further information on the R-value for the declared products, contact Skamol A/S.

Picture of product(s)



Product		Thickness (mm)	R-Value @200C ((m²×K)/W)
V-1100	375	10	0,08
	475	10	0,07
	600	10	0,06
	700	10	0,05
Vip 900		10	0,06
Vip 12 / Vip 1250		10	0,04
Vip 12 HS		10	0,05
Vip 12 HT		10	0,03

[https://www.skamol.com]

Reference Service Life (RSL)

The service life of the products is estimated to be 7 years for industrial applications, and 10 years for stove applications. This preference is based on track record experiences with durability.

LCA background

Declared unit

The LCI and LCIA results in this EPD relates to the declared unit of 1 ton insulation board.

Name	Value	Unit
Declared unit	1	Ton
V-1100 Vip 900 Vip 12/ Vip 1250 Vip 12 HS Vip 12 HT	Density. 375, 475, 600, 700 900 1200, 1250 1225 1400	kg/m^3
Conversion factor to 1 kg.	0,001	-

Functional unit

Not declared

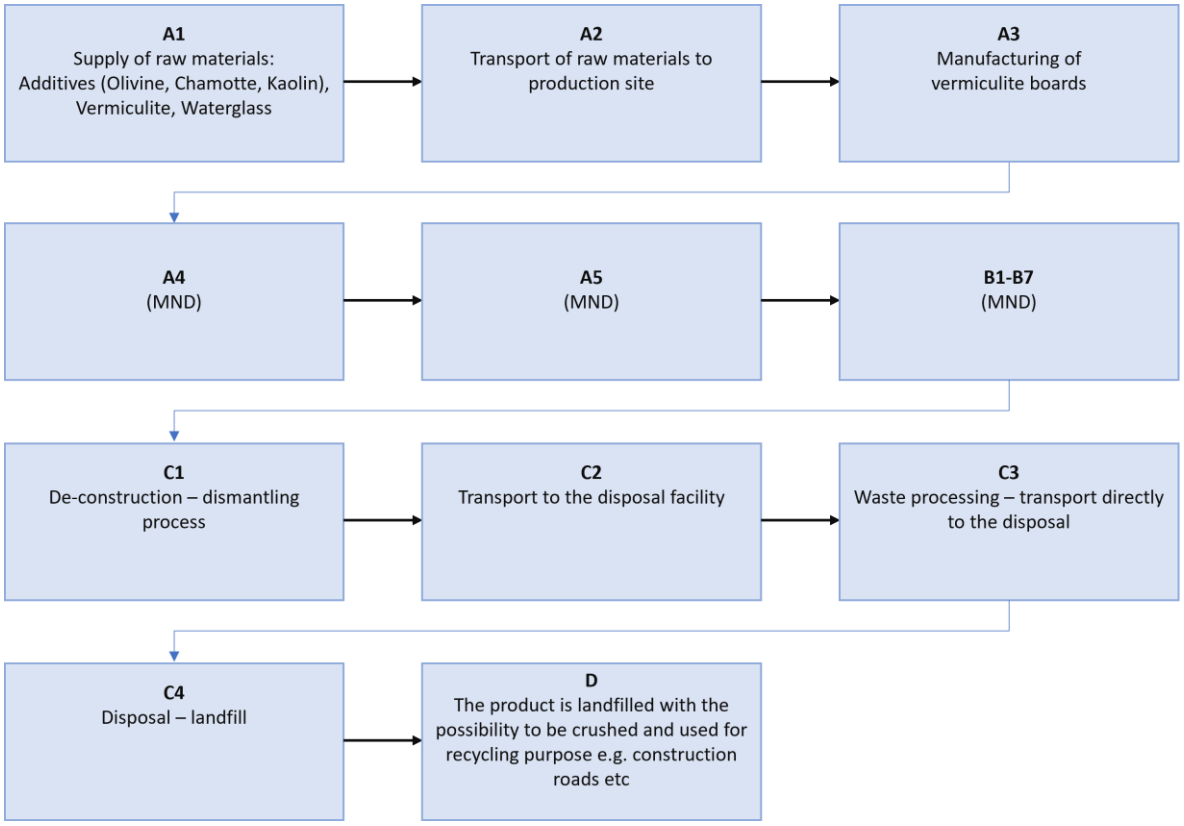
PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804, and the Norwegian PCR Construction products and services ver. 2, Part A, and the NPCR 012:2022 Part B for Thermal insulation products version 2.0 which is identical to PCR EN16783:2022 thermal insulation products.

Energy data

Electricity has been modelled using the Danish electricity mix from EcoInvent 3.8.

Flowchart



System boundary

This EPD is based on a cradle-to-grave LCA.

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.

Product stage (A1-A3) includes:

A1 – Extraction and processing of raw materials

This product stage comprises the acquisition of all raw materials included in the products and the packaging.

A2 – Transport to the production site

This product stage includes all transport by sea, rail and road between A1 and A3.

A3 – Manufacturing processes

The manufacturing process at Skamol is divided into 5 steps.

1. The raw vermiculite is heated with natural gas, ensuring the embedded water evaporates.
2. The vermiculite is mixed with waterglass and additives.
3. The mix is then pressed into shapes of either slabs or customized molds.
4. The pressed boards are dried in a drying facility.
5. The finished insulation boards are packed.

Construction process stage (A4-A5) includes:

Not decared

Use stge (B1-B7) includes:

Not declared

End of Life (C1-C4) includes:

C1 – De-construction demolition –

The de-construction process of the boards is a simple dismantling process and do not require any energy or material use related to the product handling.

C2 – Transport

This product stage include transport from the end user to the disposal facility.

C3 – Waste processing

The insulation boards do not require any waste processing, but can be transported directly to disposal at landfill.

C4 – Disposal

This product stage includes landfilling of the obsolete product.

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

In this EPD, a conservative approach that 100% of the product end up as landfill is assumed. This is however not completely representative, since products to some extend are crushed for recycling purpose and used for e.g. in construction of roads etc. However, since no quantitative data are available, recycling activities are not included.

LCA results

LCA Results for 1 ton V-1100

ENVIRONMENTAL IMPACTS PER TON V-1100								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
GWP-total	[kg CO_2 eq.]	1,21E+02	2,61E+02	1,69E+02	0,00E+00	1,12E+01	0,00E+00	5,28E+00
GWP-fossil	[kg CO_2 eq.]	1,22E+02	2,60E+02	1,50E+02	0,00E+00	1,12E+01	0,00E+00	5,26E+00
GWP-biogenic	[kg CO_2 eq.]	-1,67E+00	3,94E-01	1,88E+01	0,00E+00	2,21E-02	0,00E+00	1,51E-02
GWP-luluc	[kg CO_2 eq.]	1,57E-01	1,95E-01	1,25E-01	0,00E+00	5,66E-03	0,00E+00	4,86E-03
ODP	[kg CFC 11 eq.]	1,61E-05	4,94E-05	1,09E-05	0,00E+00	2,34E-06	0,00E+00	2,13E-06
AP	[mol H^+ eq.]	5,80E-01	3,21E+00	3,20E-01	0,00E+00	3,31E-02	0,00E+00	4,95E-02
EP-freshwater	[kg P eq.]	2,74E-02	2,13E-02	4,44E-02	0,00E+00	9,55E-04	0,00E+00	4,86E-04
EP-marine	[kg N eq.]	1,17E-01	7,74E-01	7,67E-02	0,00E+00	6,53E-03	0,00E+00	1,72E-02
EP-terrestrial	[mol N eq.]	1,31E+00	8,56E+00	7,93E-01	0,00E+00	7,08E-02	0,00E+00	1,88E-01
POCP	[kg NMVOC eq.]	3,38E-01	2,35E+00	2,24E-01	0,00E+00	2,57E-02	0,00E+00	5,35E-02
ADPm[1]	[kg Sb eq.]	3,66E-03	7,55E-04	2,92E-04	0,00E+00	4,78E-05	0,00E+00	1,13E-05
ADPf[1]	[MJ]	4,28E+02	4,49E+02	7,16E+02	0,00E+00	2,15E+01	0,00E+00	1,10E+01
WDP[1]	[m^3 world eq. deprived]	2,80E+01	2,10E+01	9,74E+01	0,00E+00	8,70E-01	0,00E+00	6,77E+00
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.							
Disclaimer	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.							

ADDITIONAL ENVIRONMENTAL IMPACTS PER TON V-1100								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
PM	[Disease incidence]	6,05E-06	1,58E-05	2,30E-06	0,00E+00	6,14E-07	0,00E+00	9,70E-07
IRP[2]	[kBq U235 eq.]	7,01E+00	1,76E+01	1,48E+01	0,00E+00	7,46E-01	0,00E+00	6,53E-01
ETP-fw[1]	[CTUe]	4,25E+01	8,47E+01	1,53E+01	0,00E+00	4,56E+00	0,00E+00	1,02E+00
HTP-c[1]	[CTUh]	7,12E-08	1,26E-07	3,02E-08	0,00E+00	4,02E-09	0,00E+00	2,01E-09
HTP-nc[1]	[CTUh]	5,00E-06	4,35E-06	3,73E-06	0,00E+00	2,51E-07	0,00E+00	7,19E-08
SQP[1]	-	8,89E+02	2,02E+03	1,39E+02	0,00E+00	1,11E+02	0,00E+00	2,50E+02
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.							
Disclaimers	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.							
	[2] This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.							

RESOURCE USE PER TON V-1100								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
PERE	[MJ]	4,32E+01	4,06E+01	4,52E+02	0,00E+00	1,52E+00	0,00E+00	8,51E-01
PERM	[MJ]	1,93E+02	1,60E+01	2,20E+02	0,00E+00	6,60E-01	0,00E+00	4,02E-01
PERT	[MJ]	2,36E+02	5,66E+01	6,72E+02	0,00E+00	2,18E+00	0,00E+00	1,25E+00
PENRE	[MJ]	5,06E+02	5,09E+02	9,29E+02	0,00E+00	2,37E+01	0,00E+00	1,25E+01
PENRM	[MJ]	9,85E+02	3,19E+03	1,60E+03	0,00E+00	1,44E+02	0,00E+00	1,35E+02
PENRT	[MJ]	1,49E+03	3,70E+03	2,53E+03	0,00E+00	1,67E+02	0,00E+00	1,48E+02
SM	[kg]	1,15E+01	3,70E+00	6,54E+01	0,00E+00	1,32E-01	0,00E+00	7,94E-02
RSF	[MJ]	1,38E+00	4,61E-01	1,37E+01	0,00E+00	1,70E-02	0,00E+00	1,40E-02
NRSF	[MJ]	5,14E+01	1,46E+00	2,68E+00	0,00E+00	3,41E-02	0,00E+00	2,01E-02
FW	[m^3]	6,76E-01	5,08E-01	2,29E+00	0,00E+00	2,13E-02	0,00E+00	1,59E-01
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^{2}$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.							

WASTE CATEGORIES AND OUTPUT FLOWS PER TON V-1100								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
HWD	[kg]	1,44E+02	1,09E+02	2,17E+02	0,00E+00	4,98E+00	0,00E+00	2,43E+00
NHWD	[kg]	2,94E+01	1,13E+02	8,36E+01	0,00E+00	6,71E+00	0,00E+00	1,00E+03
RWD	[kg]	5,28E-02	6,18E-02	1,33E-01	0,00E+00	2,43E-03	0,00E+00	1,86E-03
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	3,63E+00	2,75E+00	2,28E+01	0,00E+00	9,75E-02	0,00E+00	5,05E-02
MER	[kg]	3,74E-01	1,71E+00	2,30E-01	0,00E+00	5,49E-02	0,00E+00	2,80E-02
EEE	[MJ]	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
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 electric energy; EET = Exported thermal energy							

LCA Results for 1 ton Vip 900

ENVIRONMENTAL IMPACTS PER TON Vip 900								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
GWP-total	[kg CO_2 eq.]	9,38E+01	2,46E+02	1,69E+02	0,00E+00	1,12E+01	0,00E+00	5,28E+00
GWP-fossil	[kg CO_2 eq.]	9,68E+01	2,45E+02	1,50E+02	0,00E+00	1,12E+01	0,00E+00	5,26E+00
GWP-biogenic	[kg CO_2 eq.]	-3,14E+00	3,79E-01	1,88E+01	0,00E+00	2,21E-02	0,00E+00	1,51E-02
GWP-luluc	[kg CO_2 eq.]	1,40E-01	1,70E-01	1,25E-01	0,00E+00	5,66E-03	0,00E+00	4,86E-03
ODP	[kg CFC 11 eq.]	1,27E-05	4,77E-05	1,09E-05	0,00E+00	2,34E-06	0,00E+00	2,13E-06
AP	[mol H^+ eq.]	4,94E-01	2,63E+00	3,20E-01	0,00E+00	3,31E-02	0,00E+00	4,95E-02
EP-freshwater	[kg P eq.]	2,30E-02	1,98E-02	4,44E-02	0,00E+00	9,55E-04	0,00E+00	4,86E-04
EP-marine	[kg N eq.]	1,09E-01	6,31E-01	7,67E-02	0,00E+00	6,53E-03	0,00E+00	1,72E-02
EP-terrestrial	[mol N eq.]	1,24E+00	6,97E+00	7,93E-01	0,00E+00	7,08E-02	0,00E+00	1,88E-01
POCP	[kg NMVOC eq.]	3,08E-01	1,94E+00	2,24E-01	0,00E+00	2,57E-02	0,00E+00	5,35E-02
ADPm[1]	[kg Sb eq.]	2,80E-03	7,31E-04	2,92E-04	0,00E+00	4,78E-05	0,00E+00	1,13E-05
ADPf[1]	[MJ]	3,45E+02	4,24E+02	7,16E+02	0,00E+00	2,15E+01	0,00E+00	1,10E+01
WDP[1]	[m^3 world eq. deprived]	2,91E+01	1,96E+01	9,74E+01	0,00E+00	8,70E-01	0,00E+00	6,77E+00
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.							
Disclaimer	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.							

ADDITIONAL ENVIRONMENTAL IMPACTS PER TON Vip 900								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
PM	[Disease incidence]	5,85E-06	1,50E-05	2,30E-06	0,00E+00	6,14E-07	0,00E+00	9,70E-07
IRP[2]	[kBq U235 eq.]	6,35E+00	1,67E+01	1,48E+01	0,00E+00	7,46E-01	0,00E+00	6,53E-01
ETP-fw[1]	[CTUe]	3,50E+01	8,68E+01	1,53E+01	0,00E+00	4,56E+00	0,00E+00	1,02E+00
HTP-c[1]	[CTUh]	5,63E-08	1,12E-07	3,02E-08	0,00E+00	4,02E-09	0,00E+00	2,01E-09
HTP-nc[1]	[CTUh]	3,87E-06	4,28E-06	3,73E-06	0,00E+00	2,51E-07	0,00E+00	7,19E-08
SQP[1]	-	1,34E+03	2,10E+03	1,39E+02	0,00E+00	1,11E+02	0,00E+00	2,50E+02
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)							
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Disclaimers	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.							
	[2] This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.							

RESOURCE USE PER TON Vip 900								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
PERE	[MJ]	3,91E+01	3,69E+01	4,52E+02	0,00E+00	1,52E+00	0,00E+00	8,51E-01
PERM	[MJ]	1,77E+02	1,46E+01	2,20E+02	0,00E+00	6,60E-01	0,00E+00	4,02E-01
PERT	[MJ]	2,16E+02	5,15E+01	6,72E+02	0,00E+00	2,18E+00	0,00E+00	1,25E+00
PENRE	[MJ]	4,20E+02	4,78E+02	9,29E+02	0,00E+00	2,37E+01	0,00E+00	1,25E+01
PENRM	[MJ]	7,91E+02	3,05E+03	1,60E+03	0,00E+00	1,44E+02	0,00E+00	1,35E+02
PENRT	[MJ]	1,21E+03	3,53E+03	2,53E+03	0,00E+00	1,67E+02	0,00E+00	1,48E+02
SM	[kg]	1,07E+01	3,33E+00	6,54E+01	0,00E+00	1,32E-01	0,00E+00	7,94E-02
RSF	[MJ]	1,19E+00	4,24E-01	1,37E+01	0,00E+00	1,70E-02	0,00E+00	1,40E-02
NRSF	[MJ]	3,82E+01	1,26E+00	2,68E+00	0,00E+00	3,41E-02	0,00E+00	2,01E-02
FW	[m^3]	6,99E-01	4,72E-01	2,29E+00	0,00E+00	2,13E-02	0,00E+00	1,59E-01
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.							

WASTE CATEGORIES AND OUTPUT FLOWS PER TON Vip 900								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
HWD	[kg]	1,19E+02	1,02E+02	2,17E+02	0,00E+00	4,98E+00	0,00E+00	2,43E+00
NHWD	[kg]	2,23E+01	1,20E+02	8,36E+01	0,00E+00	6,71E+00	0,00E+00	1,00E+03
RWD	[kg]	4,96E-02	5,73E-02	1,33E-01	0,00E+00	2,43E-03	0,00E+00	1,86E-03
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	3,16E+00	2,47E+00	2,28E+01	0,00E+00	9,75E-02	0,00E+00	5,05E-02
MER	[kg]	2,97E-01	1,52E+00	2,30E-01	0,00E+00	5,49E-02	0,00E+00	2,80E-02
EEE	[MJ]	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
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 electric energy; EET = Exported thermal energy							

LCA Results for 1 ton Vip 12 / Vip 1250

ENVIRONMENTAL IMPACTS PER TON Vip 12 / Vip 1250								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
GWP-total	[kg CO_2 eq.]	1,63E+02	1,55E+02	1,69E+02	0,00E+00	1,12E+01	0,00E+00	5,28E+00
GWP-fossil	[kg CO_2 eq.]	1,63E+02	1,55E+02	1,50E+02	0,00E+00	1,12E+01	0,00E+00	5,26E+00
GWP-biogenic	[kg CO_2 eq.]	-8,95E-01	2,39E-01	1,88E+01	0,00E+00	2,21E-02	0,00E+00	1,51E-02
GWP-luluc	[kg CO_2 eq.]	2,21E-01	1,09E-01	1,25E-01	0,00E+00	5,66E-03	0,00E+00	4,86E-03
ODP	[kg CFC 11 eq.]	2,21E-05	3,00E-05	1,09E-05	0,00E+00	2,34E-06	0,00E+00	2,13E-06
AP	[mol H^+ eq.]	8,22E-01	1,70E+00	3,20E-01	0,00E+00	3,31E-02	0,00E+00	4,95E-02
EP-freshwater	[kg P eq.]	6,03E-02	1,26E-02	4,44E-02	0,00E+00	9,55E-04	0,00E+00	4,86E-04
EP-marine	[kg N eq.]	1,41E-01	4,08E-01	7,67E-02	0,00E+00	6,53E-03	0,00E+00	1,72E-02
EP-terrestrial	[mol N eq.]	1,44E+00	4,50E+00	7,93E-01	0,00E+00	7,08E-02	0,00E+00	1,88E-01
POCP	[kg NMVOC eq.]	3,92E-01	1,25E+00	2,24E-01	0,00E+00	2,57E-02	0,00E+00	5,35E-02
ADPm[1]	[kg Sb eq.]	9,40E-03	4,60E-04	2,92E-04	0,00E+00	4,78E-05	0,00E+00	1,13E-05
ADPf[1]	[MJ]	8,13E+02	2,68E+02	7,16E+02	0,00E+00	2,15E+01	0,00E+00	1,10E+01
WDP[1]	[m^3 world eq. deprived]	9,68E+01	1,24E+01	9,74E+01	0,00E+00	8,70E-01	0,00E+00	6,77E+00
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.							
Disclaimer	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.							

	ADDITIONAL ENVIRONMENTAL IMPACTS PER TON Vip 12 / Vip 1250							
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
PM	[Disease incidence]	6,59E-06	9,49E-06	2,30E-06	0,00E+00	6,14E-07	0,00E+00	9,70E-07
IRP[2]	[kBq U235 eq.]	2,56E+01	1,05E+01	1,48E+01	0,00E+00	7,46E-01	0,00E+00	6,53E-01
ETP-fw[1]	[CTUe]	3,98E+01	5,42E+01	1,53E+01	0,00E+00	4,56E+00	0,00E+00	1,02E+00
HTP-c[1]	[CTUh]	7,44E-08	7,13E-08	3,02E-08	0,00E+00	4,02E-09	0,00E+00	2,01E-09
HTP-nc[1]	[CTUh]	6,44E-06	2,69E-06	3,73E-06	0,00E+00	2,51E-07	0,00E+00	7,19E-08
SQP[1]	-	7,03E+02	1,31E+03	1,39E+02	0,00E+00	1,11E+02	0,00E+00	2,50E+02
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.							
Disclaimers	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.							
	[2] This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.							

RESOURCE USE PER TON Vip 12 / Vip 1250								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
PERE	[MJ]	1,47E+02	2,35E+01	4,52E+02	0,00E+00	1,52E+00	0,00E+00	8,51E-01
PERM	[MJ]	2,14E+02	9,25E+00	2,20E+02	0,00E+00	6,60E-01	0,00E+00	4,02E-01
PERT	[MJ]	3,61E+02	3,27E+01	6,72E+02	0,00E+00	2,18E+00	0,00E+00	1,25E+00
PENRE	[MJ]	1,22E+03	3,02E+02	9,29E+02	0,00E+00	2,37E+01	0,00E+00	1,25E+01
PENRM	[MJ]	1,40E+03	1,92E+03	1,60E+03	0,00E+00	1,44E+02	0,00E+00	1,35E+02
PENRT	[MJ]	2,61E+03	2,22E+03	2,53E+03	0,00E+00	1,67E+02	0,00E+00	1,48E+02
SM	[kg]	1,99E+01	2,12E+00	6,54E+01	0,00E+00	1,32E-01	0,00E+00	7,94E-02
RSF	[MJ]	6,35E+00	2,69E-01	1,37E+01	0,00E+00	1,70E-02	0,00E+00	1,40E-02
NRSF	[MJ]	6,09E+01	8,05E-01	2,68E+00	0,00E+00	3,41E-02	0,00E+00	2,01E-02
FW	[m^3]	2,28E+00	2,99E-01	2,29E+00	0,00E+00	2,13E-02	0,00E+00	1,59E-01
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = T½otal use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^{2}$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.							

WASTE CATEGORIES AND OUTPUT FLOWS PER TON Vip 12 / Vip 1250								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
HWD	[kg]	3,03E+02	6,42E+01	2,17E+02	0,00E+00	4,98E+00	0,00E+00	2,43E+00
NHWD	[kg]	2,58E+01	7,47E+01	8,36E+01	0,00E+00	6,71E+00	0,00E+00	1,00E+03
RWD	[kg]	2,55E-01	3,63E-02	1,33E-01	0,00E+00	2,43E-03	0,00E+00	1,86E-03
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	1,18E+01	1,57E+00	2,28E+01	0,00E+00	9,75E-02	0,00E+00	5,05E-02
MER	[kg]	3,71E-01	9,68E-01	2,30E-01	0,00E+00	5,49E-02	0,00E+00	2,80E-02
EEE	[MJ]	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
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 electric energy; EET = Exported thermal energy							

LCA Results for 1 ton Vip 12 HS

ENVIRONMENTAL IMPACTS PER TON Vip 12 HS								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
GWP-total	[kg CO_2 eq.]	4,26E+02	1,91E+02	1,69E+02	0,00E+00	1,12E+01	0,00E+00	5,28E+00
GWP-fossil	[kg CO_2 eq.]	4,26E+02	1,91E+02	1,50E+02	0,00E+00	1,12E+01	0,00E+00	5,26E+00
GWP-biogenic	[kg CO_2 eq.]	-9,19E-01	3,00E-01	1,88E+01	0,00E+00	2,21E-02	0,00E+00	1,51E-02
GWP-luluc	[kg CO_2 eq.]	3,11E-01	1,22E-01	1,25E-01	0,00E+00	5,66E-03	0,00E+00	4,86E-03
ODP	[kg CFC 11 eq.]	5,18E-05	3,79E-05	1,09E-05	0,00E+00	2,34E-06	0,00E+00	2,13E-06
AP	[mol H^+ eq.]	1,92E+00	1,75E+00	3,20E-01	0,00E+00	3,31E-02	0,00E+00	4,95E-02
EP-freshwater	[kg P eq.]	6,26E-02	1,53E-02	4,44E-02	0,00E+00	9,55E-04	0,00E+00	4,86E-04
EP-marine	[kg N eq.]	5,84E-01	4,16E-01	7,67E-02	0,00E+00	6,53E-03	0,00E+00	1,72E-02
EP-terrestrial	[mol N eq.]	6,29E+00	4,59E+00	7,93E-01	0,00E+00	7,08E-02	0,00E+00	1,88E-01
POCP	[kg NMVOC eq.]	1,77E+00	1,30E+00	2,24E-01	0,00E+00	2,57E-02	0,00E+00	5,35E-02
ADPm[1]	[kg Sb eq.]	3,09E-03	5,82E-04	2,92E-04	0,00E+00	4,78E-05	0,00E+00	1,13E-05
ADPf[1]	[MJ]	1,21E+03	3,29E+02	7,16E+02	0,00E+00	2,15E+01	0,00E+00	1,10E+01
WDP[1]	[m^3 world eq. deprived]	6,04E+01	1,50E+01	9,74E+01	0,00E+00	8,70E-01	0,00E+00	6,77E+00
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.							
Disclaimer	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.							

ADDITIONAL ENVIRONMENTAL IMPACTS PER TON Vip 12 HS								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
PM	[Disease incidence]	3,05E-05	1,18E-05	2,30E-06	0,00E+00	6,14E-07	0,00E+00	9,70E-07
IRP[2]	[kBq U235 eq.]	2,20E+01	1,29E+01	1,48E+01	0,00E+00	7,46E-01	0,00E+00	6,53E-01
ETP-fw[1]	[CTUe]	7,82E+01	7,26E+01	1,53E+01	0,00E+00	4,56E+00	0,00E+00	1,02E+00
HTP-c[1]	[CTUh]	1,40E-07	8,16E-08	3,02E-08	0,00E+00	4,02E-09	0,00E+00	2,01E-09
HTP-nc[1]	[CTUh]	9,34E-06	3,45E-06	3,73E-06	0,00E+00	2,51E-07	0,00E+00	7,19E-08
SQP[1]	-	8,78E+02	1,78E+03	1,39E+02	0,00E+00	1,11E+02	0,00E+00	2,50E+02
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.							
Disclaimers	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.							
	[2] This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.							

RESOURCE USE PER TON Vip 12 HS								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
PERE	[MJ]	1,41E+02	2,77E+01	4,52E+02	0,00E+00	1,52E+00	0,00E+00	8,51E-01
PERM	[MJ]	2,17E+02	1,10E+01	2,20E+02	0,00E+00	6,60E-01	0,00E+00	4,02E-01
PERT	[MJ]	3,58E+02	3,86E+01	6,72E+02	0,00E+00	2,18E+00	0,00E+00	1,25E+00
PENRE	[MJ]	1,45E+03	3,69E+02	9,29E+02	0,00E+00	2,37E+01	0,00E+00	1,25E+01
PENRM	[MJ]	5,04E+03	2,40E+03	1,60E+03	0,00E+00	1,44E+02	0,00E+00	1,35E+02
PENRT	[MJ]	6,50E+03	2,77E+03	2,53E+03	0,00E+00	1,67E+02	0,00E+00	1,48E+02
SM	[kg]	1,50E+01	2,48E+00	6,54E+01	0,00E+00	1,32E-01	0,00E+00	7,94E-02
RSF	[MJ]	2,12E+00	3,21E-01	1,37E+01	0,00E+00	1,70E-02	0,00E+00	1,40E-02
NRSF	[MJ]	4,40E+01	8,86E-01	2,68E+00	0,00E+00	3,41E-02	0,00E+00	2,01E-02
FW	[m^3]	1,44E+00	3,62E-01	2,29E+00	0,00E+00	2,13E-02	0,00E+00	1,59E-01
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^{2}$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.							

WASTE CATEGORIES AND OUTPUT FLOWS PER TON Vip 12 HS								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
HWD	[kg]	3,17E+02	7,82E+01	2,17E+02	0,00E+00	4,98E+00	0,00E+00	2,43E+00
NHWD	[kg]	3,25E+01	1,04E+02	8,36E+01	0,00E+00	6,71E+00	0,00E+00	1,00E+03
RWD	[kg]	1,63E-01	4,37E-02	1,33E-01	0,00E+00	2,43E-03	0,00E+00	1,86E-03
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	5,85E+00	1,83E+00	2,28E+01	0,00E+00	9,75E-02	0,00E+00	5,05E-02
MER	[kg]	1,39E+00	1,10E+00	2,30E-01	0,00E+00	5,49E-02	0,00E+00	2,80E-02
EEE	[MJ]	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
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 electric energy; EET = Exported thermal energy							

LCA Results for 1 ton Vip 12 HT

ENVIRONMENTAL IMPACTS PER TON Vip 12 HT								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
GWP-total	[kg CO_2 eq.]	6,96E+01	2,22E+02	1,69E+02	0,00E+00	1,12E+01	0,00E+00	5,28E+00
GWP-fossil	[kg CO_2 eq.]	7,36E+01	2,21E+02	1,50E+02	0,00E+00	1,12E+01	0,00E+00	5,26E+00
GWP-biogenic	[kg CO_2 eq.]	-4,09E+00	3,50E-01	1,88E+01	0,00E+00	2,21E-02	0,00E+00	1,51E-02
GWP-luluc	[kg CO_2 eq.]	1,09E-01	1,40E-01	1,25E-01	0,00E+00	5,66E-03	0,00E+00	4,86E-03
ODP	[kg CFC 11 eq.]	9,67E-06	4,42E-05	1,09E-05	0,00E+00	2,34E-06	0,00E+00	2,13E-06
AP	[mol H^+ eq.]	3,46E-01	1,97E+00	3,20E-01	0,00E+00	3,31E-02	0,00E+00	4,95E-02
EP-freshwater	[kg P eq.]	1,72E-02	1,77E-02	4,44E-02	0,00E+00	9,55E-04	0,00E+00	4,86E-04
EP-marine	[kg N eq.]	7,43E-02	4,67E-01	7,67E-02	0,00E+00	6,53E-03	0,00E+00	1,72E-02
EP-terrestrial	[mol N eq.]	7,89E-01	5,16E+00	7,93E-01	0,00E+00	7,08E-02	0,00E+00	1,88E-01
POCP	[kg NMVOC eq.]	2,03E-01	1,46E+00	2,24E-01	0,00E+00	2,57E-02	0,00E+00	5,35E-02
ADPm[1]	[kg Sb eq.]	2,07E-03	6,78E-04	2,92E-04	0,00E+00	4,78E-05	0,00E+00	1,13E-05
ADPf[1]	[MJ]	2,58E+02	3,82E+02	7,16E+02	0,00E+00	2,15E+01	0,00E+00	1,10E+01
WDP[1]	[m^3 world eq. deprived]	1,80E+01	1,73E+01	9,74E+01	0,00E+00	8,70E-01	0,00E+00	6,77E+00
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.							
Disclaimer	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.							

ADDITIONAL ENVIRONMENTAL IMPACTS PER TON Vip 12 HT								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
PM	[Disease incidence]	3,68E-06	1,37E-05	2,30E-06	0,00E+00	6,14E-07	0,00E+00	9,70E-07
IRP[2]	[kBq U235 eq.]	4,38E+00	1,50E+01	1,48E+01	0,00E+00	7,46E-01	0,00E+00	6,53E-01
ETP-fw[1]	[CTUe]	2,97E+01	8,53E+01	1,53E+01	0,00E+00	4,56E+00	0,00E+00	1,02E+00
HTP-c[1]	[CTUh]	4,48E-08	9,36E-08	3,02E-08	0,00E+00	4,02E-09	0,00E+00	2,01E-09
HTP-nc[1]	[CTUh]	2,98E-06	4,03E-06	3,73E-06	0,00E+00	2,51E-07	0,00E+00	7,19E-08
SQP[1]	-	5,28E+02	2,09E+03	1,39E+02	0,00E+00	1,11E+02	0,00E+00	2,50E+02
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.							
Disclaimers	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.							
	[2] This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.							

RESOURCE USE PER TON Vip 12 HT								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
PERE	[MJ]	2,69E+01	3,19E+01	4,52E+02	0,00E+00	1,52E+00	0,00E+00	8,51E-01
PERM	[MJ]	1,66E+02	1,27E+01	2,20E+02	0,00E+00	6,60E-01	0,00E+00	4,02E-01
PERT	[MJ]	1,92E+02	4,45E+01	6,72E+02	0,00E+00	2,18E+00	0,00E+00	1,25E+00
PENRE	[MJ]	3,08E+02	4,28E+02	9,29E+02	0,00E+00	2,37E+01	0,00E+00	1,25E+01
PENRM	[MJ]	6,01E+02	2,79E+03	1,60E+03	0,00E+00	1,44E+02	0,00E+00	1,35E+02
PENRT	[MJ]	9,10E+02	3,22E+03	2,53E+03	0,00E+00	1,67E+02	0,00E+00	1,48E+02
SM	[kg]	9,80E+00	2,85E+00	6,54E+01	0,00E+00	1,32E-01	0,00E+00	7,94E-02
RSF	[MJ]	8,81E-01	3,70E-01	1,37E+01	0,00E+00	1,70E-02	0,00E+00	1,40E-02
NRSF	[MJ]	3,00E+01	1,01E+00	2,68E+00	0,00E+00	3,41E-02	0,00E+00	2,01E-02
FW	[m^3]	4,39E-01	4,19E-01	2,29E+00	0,00E+00	2,13E-02	0,00E+00	1,59E-01
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water							
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.							

WASTE CATEGORIES AND OUTPUT FLOWS PER TON Vip 12 HT								
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**
HWD	[kg]	8,76E+01	9,06E+01	2,17E+02	0,00E+00	4,98E+00	0,00E+00	2,43E+00
NHWD	[kg]	1,77E+01	1,22E+02	8,36E+01	0,00E+00	6,71E+00	0,00E+00	1,00E+03
RWD	[kg]	3,38E-02	5,06E-02	1,33E-01	0,00E+00	2,43E-03	0,00E+00	1,86E-03
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	2,53E+00	2,11E+00	2,28E+01	0,00E+00	9,75E-02	0,00E+00	5,05E-02
MER	[kg]	2,28E-01	1,26E+00	2,30E-01	0,00E+00	5,49E-02	0,00E+00	2,80E-02
EEE	[MJ]	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
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 electric energy; EET = Exported thermal energy							

BIOGENIC CARBON CONTENT PER TON PRODUCT		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in product	[kg C]	-
Biogenic carbon content in accompanying packagaing	[kg C]	9,98
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

Additional information

LCA interpretation

The contribution analysis determine that transportation of raw materials is the process contributing the most to each impact category. The only exception is VIP 12 HS, where raw material extraction is the process that contributes the most. The reason for this, is that the chamotte used in VIP 12 HS is produced by heating clay to 1200-1800°C using natural gas.

Technical information on scenarios

Reference service life

RSL information		Unit
Reference service Life	7-10	Years
Outdoor environment		Not relevant
Design application parameters	Information regarding usage, installation and further instruction can be found on the manufacture's webpage: https://www.skamol.com/download-centre	
Assumed quality of work		
Declared product properties		
Indoor environment		
Usage conditions		
Maintenance		

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+A2:2019 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+A2:2019 chapter 7.4.2.

References

Publisher	www.epddanmark.dk
Programme operator	Danish Technological Institute Buildings & Environment Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA-practitioner	*Tomas Sander Poulsen, Jonatan Hoffmann Bohr* Provice ApS Havnevej 45A 4000 Roskilde
LCA software /background data	*OpenLCA 1.11.0* *EcoInvent 3.8*
3rd party verifier	*Kim Christiansen* *kimconsult.dk* *Marienborg Alle 91C* *2860 Søborg*

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]
PCR Construction products and services ver. 2, Part A
NPCR 012:2022 Part B for Thermal insulation products version 2.0

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”