ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	Grundfos Holding A/S
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-GRU-20240333-CCC2-EN
Issue date	11.10.2024
Valid to	10.10.2029

ALPHA1 L, UPS3, ALPHA SOLAR

Grundfos Holding A/S

Institut Bauen und Umwelt e.V.

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General Information

Grundfos Holding A/S

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-GRU-20240333-CCC2-EN

This declaration is based on the product category rules:

Pumps for liquids and liquids with solids, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

11.10.2024

Valid to

10.10.2029

Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

ALPHA1 L, UPS3, ALPHA SOLAR

Owner of the declaration

Grundfos Holding A/S
Poul Due Jensens Vej 7
8850 Bjerringbro
Denmark

Declared product / declared unit

1 piece of the ALPHA1 L model C, UPS3 model A, ALPHA SOLAR model B pump

Scope:

The declared product is 1 piece of ALPHA1 L model C, UPS3 model A, ALPHA SOLAR model B pump. The product is assembled in Bjerringbro, Denmark, and the life cycle assessment is based on data collected at the production site and from supplier up- and downstream of the supply chain. The declaration is for a representative product calculated based on a weighted average across the variations 25-180, 32-180, 15-130, 20-130 and 25-130.
The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally

Mrs Kim Allbury,
(Independent verifier)

Product

Product description/Product definition

ALPHA1 L model C, UPS3 model A, ALPHA SOLAR model B are high-efficiency circulator pump designed for domestic heating systems. ALPHA SOLAR model B is designed for thermal solar systems. The EPD is for a representative product of ALPHA1 L model C, UPS3 model A, ALPHA SOLAR model B calculated based on a weighted average across the following variations/product models:

- Cast iron 25:180
- Cast iron 32:180
- Cast iron 15:130
- Cast iron 20:180
- Cast iron 25:130

For the placing on the market in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) the following legal provisions apply:

Low Voltage Directive (2014/35/EU)
Standards used: EN 60335-1:2012+AC:2014+A11:2014+A13:2017+A1:2019+A2:2019+A15:2021, EN 60335-2-51:2003+A1:2008+A2:2012.

EMC Directive (2014/30/EU)
Standards used: EN 55014-1:2017, EN 55014-2:2015, EN IEC 61000-3-2:2019, EN 61000-3-3:2013.

Ecodesign Directive (2009/125/EC)
Commission regulation (EC) No 641/2009
Commission regulation (EU) No 622/2012
Standards used: EN 16297-1:2012, EN 16297-2:2012.

RoHS Directives (2011/65/EU) and (2015/863/EU)
Standard used: EN IEC 63000:2018.

The CE-marking takes into account the proof of conformity with the respective harmonized standards based on the legal provisions above.

For the application and use the respective national provisions apply.

Application

ALPHA1 L model C, UPS3 model A, ALPHA SOLAR model B are high-efficiency circulator pump designed for domestic heating systems. ALPHA Solar is designed for thermal solar systems

Technical Data

The performance data of the product according to the harmonised norms, based on the harmonisation provisions above apply. The relevant technical specifications according to the
PCR Part B are given in the table below. Characteristics that are the same for all three models are only given once. Others are given individually for all three models. The group discrimination reported in the table below only refers to the pump model. In particular, groups 1, 2 and 3 refer to ALPHA1 L model C and UPS3 model A; groups 4 and 5 refer to ALPHA Solar model B.

Constructional data

Name	Value	Unit
Frequency	50	Hz
Voltage	230	V
Pumped liquid (e.g. water)	Water	-
energy efficiency class	-	-
Head max. Gr 1	4	m
Head max. Gr 2	6	m
Head max. Gr 3	6.5	m
Head max. Gr 4	7,5	m
Head max. Gr 5	14.5	m
Flow max Gr 1	2.85	m^3h
Flow max Gr 2	3.55	m^3h
Flow max Gr 3	3.85	m^3h
Flow max Gr 4	3.4	m^3h
Flow max Gr 5	3.15	m^3h
Max. power input Gr 1	0.01133	kW
Max. power input Gr 2	0.01838	kW
Max. power input Gr 3	0.023556667	kW
Max. power input Gr 4	0.01912	kW
Max. power input Gr 5	0.02408	kW

Performance data of the product according to the harmonized standards, based on provisions for harmonization.

Base materials/Ancillary materials

Name	Value	Unit
Steel and stainless steel	19	%
Aluminium	8	%
Copper	7	%
Iron	43	%
Plastic in product	8	%
Ceramic	1	%
Magnet Nd	1	%
Electronics	7	%
Plastic in packaging	0.05	%
Cardboard and paper in packaging	7	%

REACH

The product does not contain substances listed in the Candidate List of Substances of Very High Concern for Authorisation (15.01.2018) exceeding 0.1 percentage by mass.

ISO 14001

The Bjerringbro production has been assessed and certified as meeting the requirements of ISO 14001:2015 (Certificate DE11/81829052.00).

Reference service life

No use stage scenario which refers to the lifetime of the product is declared. However, to facilitate building calculations, an estimated RSL of 10 years can be used. This is an EU consensus-based estimation, referenced on page 37 in Appendix 7: Lot 11 – Circulators in Buildings, prepared by AEA Energy & Environment for the European Commission in the context of the Eco Design Directive:

There is no definitive information on average circulator life available, there is consensus within the industry that it is at least 12 years. However, this is complicated by many factors, including many being scrapped prematurely when e.g. the boiler they are connected to is replaced.

The RSL of the declared product is not directly influencing the results in this study, as no declared use stage scenario is dependent on the RSL. The use stage sub-module B6 is declared per year as required by the PCR Part B.

LCA: Calculation rules

Declared Unit

The declared unit is 1 piece of product, including packaging.

Declared unit

Name	Value	Unit
Declared unit	1	pce.
Mass reference	2.14	kg/pce
conversion factor	2.14	-

Other declared units are allowed if the conversion is shown transparently.

The weighted average product has been calculated based on the mass of the inputs of all individual pump modules and their production volumes.

The LCA study to support these results is robust, based on the inclusion of different production locations, high geographical representativeness and careful selection of background datasets, thereby matching modeled production process and the actual production process.

System boundary

This LCA is a Cradle-to-Grave study. All major steps from the extraction of natural resources to the final disposal of the product are included in the scope of the analysis, following the modular approach of EN15804+A2:2019.
By decision no. 20170712-n of the SVR, the modules B3, B4 and B5 are by default declared as "MNR" (module not relevant).

Modules A1-A3 refer to the product stage and includes raw materials extraction and processing, transportation and distribution, and the manufacturing process. The product stage is included in this study, and according to EN 15804:2019 + A2 the system boundary with nature is set to include those processes that provide the material and energy inputs into the system and the following manufacturing, transport up to the factory gate as well as the processing of any waste arising from those processes.
Wastes and losses are included in the modules where they occur according to the polluter pays principle and the modular approach of EN 15804:2019+A2.

Module A4 regards the transportation to the construction place as well as the transport from the production site to the regional distribution centre, and finally to the point of sale.

Module A5 refers to the construction and installation process of the pumps, including the transportation of packaging waste to the treatment site and the waste treatment of packaging.
The use of energy during application (i.e. an electric hand drill) is negligible for the selected functional unit and is therefore not included in the scope of this study. The auxiliary materials are considered capital goods. There are no direct emission considered during the application process.

Modules B1-B7 refer to the use stage. In this study, all use stage modules are assessed, though B1, B2 and B7 are assessed to be zero. By decision no. 20170712-n of the SVR, the modules B3, B4 and B5 are by default declared as "MNR" (module not relevant). The modules include the provision and transport of all materials, products and related energy and water use, as well as waste processing up to the end-of-waste state or disposal of final residues during the use stage. They also include all impacts and aspects related to the losses during the use stage (i.e. production, transport, and waste processing and disposal of the lost products and materials).

Modules B6 contributions to operational energy use during the use stage comes from the electricity consumption of the product. The annual electricity consumption is calculated by multiplying the average power input, which is based on a defined load profile, with the annual running hours.

Module C1-C4 refers to the End-of-life stage. A product reaches the end-of-life of its service life when it no longer provides any functionality. This life cycle stage includes all activities from the end-of-life of the pump, until all materials and components are processed, reused, recycled or disposed of. In accordance with EN15804+A2 and the PCR Part A C1-C4 are included.

Module D refers to the burdens and benefits beyond the system boundaries. According to EN15804:A2+2019 module D includes the reuse, recovery and/or recycling potentials, expressed in net impacts and benefits. Contributions to module D comes from waste incineration processes in A5 and C4 as well as material recycling in C3. The specific fractions and net flows are shown in the scenarios section.

Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Europe

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. Software and database used LCA for Experts / Ecoinvent 3.8

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The biogenic carbon content quantifies the amount of biogenic carbon in a construction product leaving the factory gate, and it shall be separately declared for the product and for any accompanying packaging. In the product there is no biogenic carbon that exceeds the minimal reporting requirement of 5%. There is biogenic carbon in the cardboard and paper packaging.

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.0669	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO2.

The following technical information forms the basis for the declared gate-to-grave modules and can be used for developing specific scenarios in the context of a building assessment. This includes module A4 and A5,

Transport from the gate to the site (A4)

Name	Value	Unit
Litres of fuel	0.0322	l/100km
Transport distance	1513	km
Capacity utilisation (including empty runs)	85	%
Gross density of products transported	450	kg/m^3

Assembly (A5)

Name	Value	Unit
Cardboard and paper packaging waste	0.147	kg
Plastic packaging waste	0.001	kg
Packaging waste for incineration with energy recovery (plastic, paper and cardboard)	0.15	kg

Use stage

As the B6 indicator results for this product only come from the electricity consumption dataset, there is a linear correlation between the product groups based on the electricity consumption. By multiplying the reported impacts of B6 with the factors in the table below the impacts can be calculated for the other lifting weights. The group discrimination reported in the Operational energy use (B6) table only refers to the pump model. In particular, groups 1, 2 and 3 refer to ALPHA1 L model C and UPS3 model A; groups 4 and 5 refer to ALPHA Solar model B.

Name	Value	Unit
Lifting weight 4m	1.00	
Lifting weight 6m	1.62	
Lifting weight 6.5m	2.08	
Lifting weight 7.5m	0.84	
Lifting weight 14.5m	1.06	

*ALPHA1L model C and UPS3 model A is only 4, 6, 6.5 and based on 5000 running hours
**ALPHA Solar is model B only 7.5 and 14.5 and based on 2500 running hours

An estimated RSL of 10 years can be used to facilitate building calculations. This is an EU consensus-based estimation, referenced in Appendix 7: Lot 11 – Circulators in Buildings, prepared by AEA Energy & Environment for the European Commission in the context of the Eco Design Directive.

Reference service life

Name	Value	Unit
Life Span according to the manufacturer	10	a

Operational energy use (B6)

Name	Value	Unit
Electricity consumption Gr 1	56.7	kWh/year
Electricity consumption Gr 2	91.9	kWh/year
Electricity consumption Gr 3	117.8	kWh/year
Electricity consumption Gr 4	47.8	kWh/year
Electricity consumption Gr 5	60.2	kWh/year
Average power input Gr 1	0.01133	kW
Average power input Gr 2	0.01838	kW
Average power input Gr 3	0.02356	kW
Average power input Gr 4	0.01912	kW
Average power input Gr 5	0.02408	kW
Running hours Gr 1	5000	hours/year
Running hours Gr 2	5000	hours/year
Running hours Gr 3	5000	hours/year
Running hours Gr 4	2500	hours/year
Running hours Gr 5	2500	hours/year

End of life (C1-C4)

Name	Value	Unit
Disassembly of the pump	1.99	kg
Transport (C2)	500	km
Recycling (metals)	1.63	kg
Plastic waste for incineration with energy recovery	0.17	kg
Landfilling	0.19	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Net scenarios have been used to calculate module D.

Name	Value	Unit
Energy recovery (thermal + electric energy) from incineration (A5+C4)	-2.57	MJ
Metals to recycling (net amounts) (C3)	-0.62	Kg

LCA: Results

The LCA results in module B6 are given over a period of one year, according to PCR Part B. To obtain the results from module B6 over the entire life cycle, the LCA results of module B6 must be multiplied by the estimated RSL of 10 years. In order to calculate module B6, the factors are hereby presented based on the lifting height:

- Lifting height 4m: factor 1.0
- Lifting height 6m: factor 1.62
- Lifting height 6.5m: factor 2.08
- Lifting height 7.5m: factor 0.84
- Lifting height 14.5m: factor 1.06

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ALPHA 1L model C. UPS3 model A, ALPHA SOLAR model B

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	1.39E+01	3.12E-01	1.89E-01	0	0	MNR	MNR	MNR	2.36E+01	0	0	8.46E-02	6.72E-01	4E-01	-1.88E+00
GWP-fossil	kg CO_2 eq	1.4E+01	3.14E-01	7.79E-02	0	0	MNR	MNR	MNR	2.36E+01	0	0	8.51E-02	6.73E-01	4E-01	-1.88E+00
GWP-biogenic	kg CO_2 eq	-6.25E-02	-4.65E-03	1.11E-01	0	0	MNR	MNR	MNR	9.18E-03	0	0	-1.26E-03	-1.17E-03	3.48E-05	1.82E-03
GWP-luluc	kg CO_2 eq	1.6E-02	2.92E-03	1.21E-05	0	0	MNR	MNR	MNR	2.19E-03	0	0	7.9E-04	3.01E-04	4.3E-06	-4.84E-04
ODP	kg CFC11 eq	2.93E-07	4.1E-14	5.18E-10	0	0	MNR	MNR	MNR	2.35E-10	0	0	1.11E-14	1.11E-08	1.29E-09	-4.53E-08
AP	mol H^+ eq	1.21E-01	2.02E-03	5.33E-05	0	0	MNR	MNR	MNR	3.64E-02	0	0	5.48E-04	1.22E-03	1.02E-04	-5.11E-03
EP-freshwater	kg P eq	1.96E-03	1.15E-06	5.78E-06	0	0	MNR	MNR	MNR	2.36E-05	0	0	3.12E-07	7.79E-05	1.28E-06	-3.84E-04
EP-marine	kg N eq	2.96E-02	9.93E-04	2.74E-05	0	0	MNR	MNR	MNR	1.03E-02	0	0	2.69E-04	3.14E-04	5.53E-05	-1.4E-03
EP-terrestrial	mol N eq	1.39E-01	1.1E-02	2.43E-04	0	0	MNR	MNR	MNR	1.08E-01	0	0	2.98E-03	3.17E-03	4.79E-04	-1.47E-02
POCP	kg NMVOC eq	4.47E-02	1.92E-03	5.81E-05	0	0	MNR	MNR	MNR	2.84E-02	0	0	5.19E-04	8.34E-04	1.18E-04	-6.67E-03
ADPE	kg Sb eq	1.25E-03	2.09E-08	1.56E-08	0	0	MNR	MNR	MNR	1.16E-06	0	0	5.66E-09	6.34E-06	3.07E-08	-8.96E-07
ADPF	MJ	1.77E+02	4.29E+00	6.41E-02	0	0	MNR	MNR	MNR	5.25E+02	0	0	1.16E+00	2.35E+00	1.1E-01	-2.9E+01
WDP	m^3 world eq deprived	7.28E+00	3.81E-03	7.38E-03	0	0	MNR	MNR	MNR	2.01E+00	0	0	1.03E-03	5.5E-02	2.67E-02	-1.33E-01

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ALPHA 1L model C. UPS3 model A, ALPHA SOLAR model B

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	4.26E+01	3.12E-01	2.51E-03	0	0	MNR	MNR	MNR	7.19E+01	0	0	8.46E-02	2.39E-01	3.17E-03	-2.05E+00
PERM	MJ	8.84E-07	4.11E-12	9.33E-10	0	0	MNR	MNR	MNR	1.06E-08	0	0	1.11E-12	3.88E-08	1.77E-09	-1.58E-07
PERT	MJ	4.26E+01	3.12E-01	2.51E-03	0	0	MNR	MNR	MNR	7.19E+01	0	0	8.46E-02	2.39E-01	3.17E-03	-2.05E+00
PENRE	MJ	1.77E+02	4.31E+00	6.42E-02	0	0	MNR	MNR	MNR	5.25E+02	0	0	1.17E+00	2.35E+00	1.1E-01	-2.9E+01
PENRM	MJ	7.62E-05	5.12E-08	1.65E-10	0	0	MNR	MNR	MNR	6.28E-07	0	0	1.39E-08	0	0	-2.59E-08
PENRT	MJ	1.77E+02	4.31E+00	6.42E-02	0	0	MNR	MNR	MNR	5.25E+02	0	0	1.17E+00	2.35E+00	1.1E-01	-2.9E+01
SM	kg	1.19E+00	0	0	0	0	MNR	MNR	MNR	0	0	0	0	0	0	0
RSF	MJ	ND	ND	ND	0	0	MNR	MNR	MNR	ND	0	0	ND	ND	ND	ND
NRSF	MJ	0	0	0	0	0	MNR	MNR	MNR	0	0	0	0	0	0	0

FW	m^3	1.86E-01	3.42E-04	1.73E-04	0	0	MNR	MNR	MNR	1.2E-01	0	0	9.27E-05	1.28E-03	6.22E-04	-3.83E-03

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 = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2:
1 piece ALPHA 1L model C. UPS3 model A, ALPHA SOLAR model B

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	3.08E-06	1.33E-11	4.3E-14	0	0	MNR	MNR	MNR	3.04E-08	0	0	3.61E-12	0	0	-6.11E-10
NHWD	kg	2.91E-01	0	1.48E-01	0	0	MNR	MNR	MNR	0	0	0	0	0	3.61E-01	0
RWD	kg	3.21E-03	8.07E-06	2.6E-08	0	0	MNR	MNR	MNR	8.18E-02	0	0	2.18E-06	0	0	-4.83E-04
CRU	kg	ND	ND	ND	0	0	MNR	MNR	MNR	ND	0	0	ND	ND	ND	ND
MFR	kg	0	0	0	0	0	MNR	MNR	MNR	0	0	0	0	1.63E +00	0	0
MER	kg	0	0	0	0	0	MNR	MNR	MNR	0	0	0	0	0	0	0
EEE	MJ	0	0	2.06E-01	0	0	MNR	MNR	MNR	0	0	0	0	0	6.58E-01	0
EET	MJ	0	0	4.23E-01	0	0	MNR	MNR	MNR	0	0	0	0	0	1.29E+00	0

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

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 piece ALPHA 1L model C. UPS3 model A, ALPHA SOLAR model B

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease incidence	1.16E-06	7.52E-09	4.23E-10	0	0	MNR	MNR	MNR	3.29E-07	0	0	2.04E-09	1.2E-08	6.15E-10	-8.68E-08
IR	kBq U235 eq	8.91E-01	1.2E-03	1.56E-04	0	0	MNR	MNR	MNR	1.23E+01	0	0	3.26E-04	1.74E-02	3.55E-04	-9.7E-02
ETP-fw	CTUe	1.45E+02	3.08E+00	3.25E-01	0	0	MNR	MNR	MNR	4.57E+01	0	0	8.33E-01	6.42E+00	7.98E-01	-4.6E+00
HTP-c	CTUh	9.86E-08	6.25E-11	2.27E-11	0	0	MNR	MNR	MNR	2.71E-09	0	0	1.69E-11	2.12E-10	3.63E-11	-5.86E-09
HTP-nc	CTUh	2.48E-07	2.78E-09	7.62E-10	0	0	MNR	MNR	MNR	8.72E-08	0	0	7.52E-10	1.9E-08	1.23E-09	-7.21E-09
SQP	SQP	8.2E+01	1.79E+00	3.88E-02	0	0	MNR	MNR	MNR	7.1E+01	0	0	4.86E-01	1.6E+00	8.47E-02	-3.68E +00

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. 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 or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

This EPD was created using a software tool.

References

Standards

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