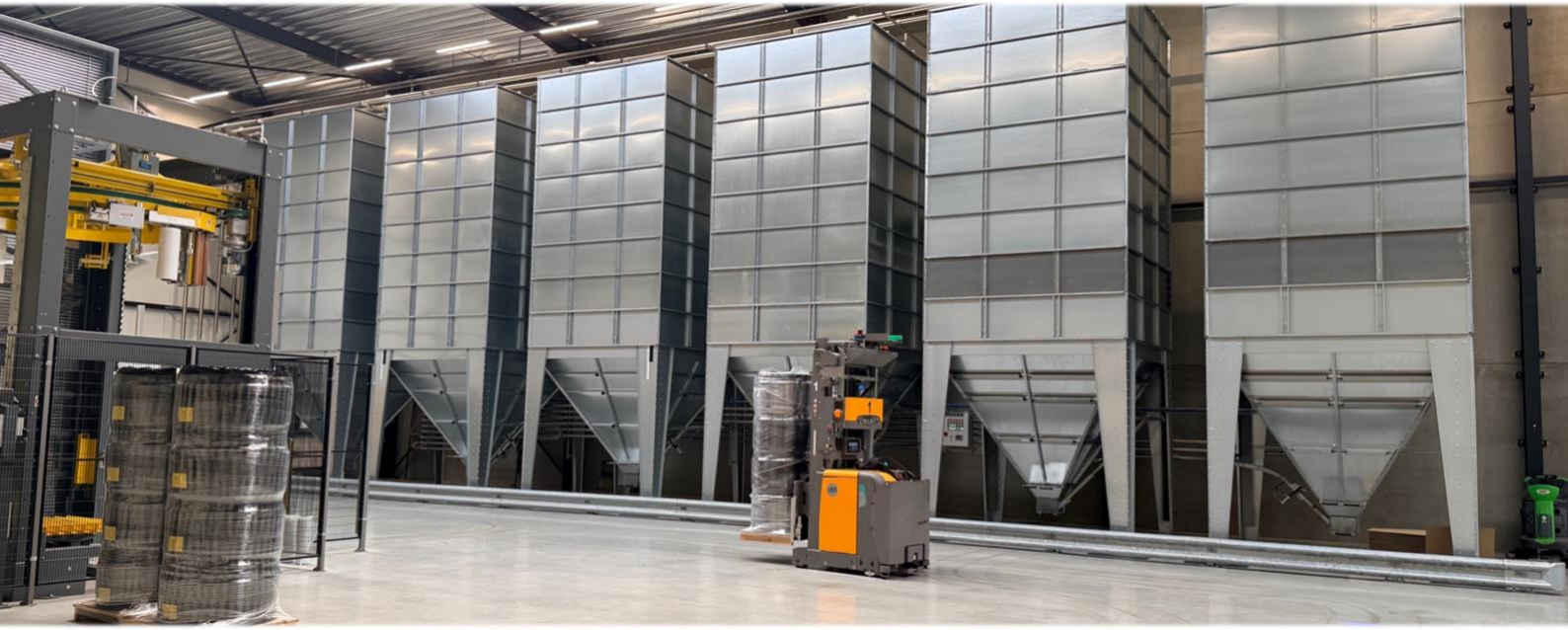
EcoReview
Part of the solution.

Environmental Product Declaration
Declaration according to
EN 15804+A2 &
NMD Assessment Method 1.2



Environmental Product Declaration

According to EN 15804+A2

(conform NMD Assessment Method 1.2)

For:

ROBOT-SOLID

ROBOT®
VLOERVERWARMING
VERTROUWDE NEDERLANDSE TECHNIEK

Unit (DU or FU)	1 piece (5-circuit manifold)	**LCA study by**	EcoReview B.V.
Declared by	ROBOT Vloerverwarming B.V.	**Calculation number**	2026.075
Owner of Declaration	ROBOT Vloerverwarming B.V.	**Issue Date**	31-12-2025
Verifier	Advieslab V.O.F.	**Expiry Date**	31-12-2030

General Information

Owner of Declaration

Name	ROBOT Vloerverwarming B.V.
Street	Kelvinring 56a
Postal Code	2952 BG
City	Alblasserdam, Netherlands
Contact	Marc Heusinkveld

Declaration for

Calculation Number	2026.075
Issue Date	31-12-2025
Expiry Date	31-12-2030
Product	ROBOT-SOLID
Declared / Functional Unit	1 piece (5-circuit manifold)
Reference Service Life	50 years
Scalable product	Yes, see detailed product description
Geographical Representation	Representative for products sold on the Dutch market
Product Description	Component(s) for floor heating system

Declaration Information

This Environmental Product Declaration is in accordance with EN 15804+A2. This certificate is based on an LCA-dossier developed according to ISO14040 and EN15804+A2 and the NMD Assessment Method 1.2. EPD of construction products may not be comparable if they do not comply to comparable norms and standards. Substances of Very High Concern (SVHC) that are listed on the 'Candidate List of Substances of Very High Concern for authorization' are declared when contents exceed the limits for registration with ECHA.

This LCA study was conducted by: Emiel de Weger & Martijn Blaak, EcoReview B.V.

Demonstration of Verification

Statement	CEN standard EN15804 serves as the core PCR. Verification of the claim and data was carried out independently.
Verifier	External
Name	Anne Kees Jeeninga, Advieslab V.O.F.
Signature	

LCA Information

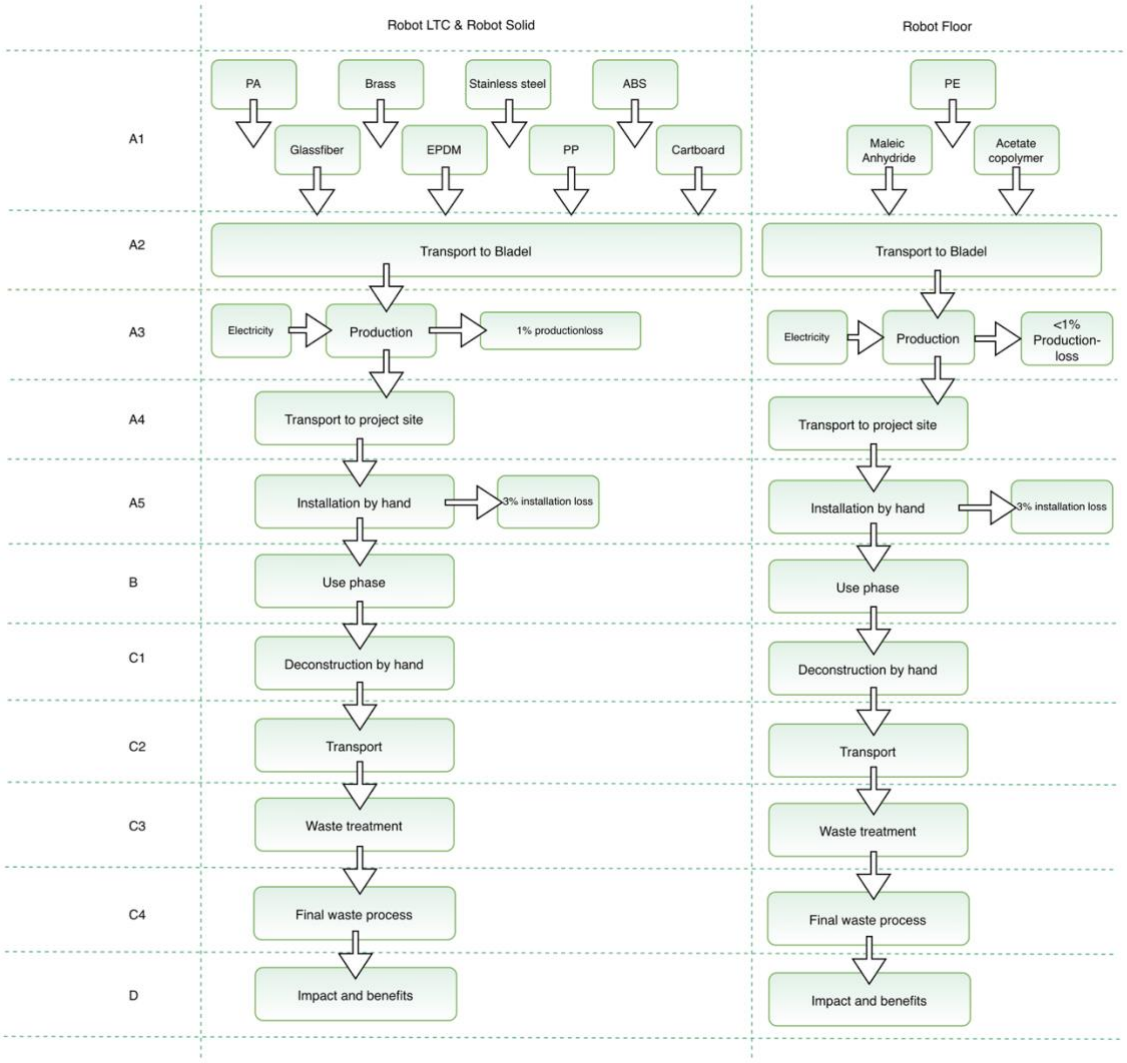
LCA Standard	*ISO 14040:2006*
Product Category Rules (PCR)	EN 15804+A2 + NMD Assessment Method 1.2
Additional PCR	Not Applicable
Standard Database (EN15804+A1)	Ecoinvent 3.6
Standard Database (EN15804+A2)	Ecoinvent 3.9.1
System Model	Allocation, cut-off by classification
LCA Software	SimaPro 10.2.0.3
Year of Data Collection	2025

Scope of Declaration

Lifecycle Stage	Module	Declared	Description
Production stage	A1	X	Raw Material supply
	A2	X	Transport
	A3	X	Manufacturing
Construction stage	A4	X	Transport
	A5	X	Installation
Use stage	B1	X	Use
	B2	X	Maintenance
	B3	X	Repair
	B4	X	Replacement
	B5	X	Refurbishment
	B6	MND	Operational Energy Use
	B7	MND	Operational Water Use
End-of-Life stage	C1	X	Deconstruction
	C2	X	Transport
	C3	X	Waste Processing
	C4	X	Disposal
Benefits and loads beyond the system boundaries	D	X	Reuse, Recycle, Recycling potential

X = Module Declared
MND = Module Not Declared

Process Diagram



Detailed Product Description

General Product Information

Manifold for underfloor heating.

1. A manifold consists of an upper and lower bar, constructed from hollow injection-moulded polyamide block segments. These blocks are arranged in series next to each other and are held together by two threaded rods. For this environmental profile, a configuration of 5 blocks on top and 5 blocks on the bottom is assumed. In this configuration—and therefore also in the environmental profile—this corresponds to a 5-circuit manifold. The minimum configuration is 1 circuit, and the maximum is 20 circuits. ROBOT-SOLID is equipped with composite insert nipples.
2. The upper and lower bars are interconnected using moulded polypropylene fastening materials. A manifold ensures that the water, coming from the central heating system or heat pump, is evenly circulated through the underfloor heating system.
3. The functional unit is a 5-circuit manifold.
4. Lifespan: 50 years, validated by KIWA through the KIWA LTV CV certificate.
5. Scaling:
    a. Standard scaling unit: 5-circuit manifold
    b. Minimum scaling unit: 1-circuit manifold
    c. Scaling applies to: upper bar, lower bar, and mounting bracket. Scaling for the upper and lower bars is linear. For fastening materials, an additional bracket is added from 16 circuits onwards.
6. The weight of the functional unit is 4,93 kg.
7. Dimensions: width 430 mm, height 390 mm, depth 135 mm.

ROBOT-SOLID has been published in the Nationale Milieudatabase (NMD). See link for environmental cost indicator (ECI or MKI in Dutch) per component.

Example Image

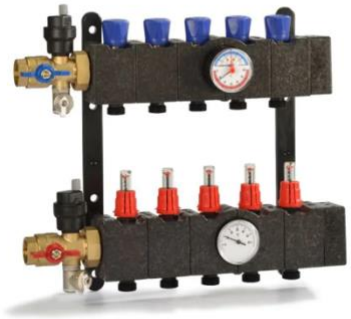


Figure: Representation of product.

Results EN15804+A1

Set 1	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	A1-D
ECI A1	euro	**13,48**	**0,01**	**0,47**	**0,00**	**0,03**	**0,39**	**0,00**	**-4,94**	**9,43**
ECI A1	euro	1,35E+01	1,12E-02	4,68E-01	0,00E+00	2,57E-02	3,87E-01	1,22E-03	-4,94E+00	9,43E+00
Core Impact Indicators										
ADPE	kg Sb eq	3,39E-02	2,00E-06	1,02E-03	0,00E+00	5,44E-06	9,97E-06	6,60E-08	-9,46E-04	3,40E-02
ADPF	kg Sb eq	1,91E-01	8,67E-04	5,87E-03	0,00E+00	1,57E-03	2,80E-03	6,13E-05	-4,67E-02	1,56E-01
GWP1	kg CO2 eq	2,83E+01	1,16E-01	2,03E+00	0,00E+00	2,13E-01	6,41E+00	8,83E-03	-5,74E+00	3,13E+01
ODP1	kg CFC-11 eq	1,18E-06	2,20E-08	4,33E-08	0,00E+00	3,78E-08	1,78E-07	1,41E-09	-4,67E-07	9,93E-07
POCP	kg C2H4	3,37E-02	7,28E-05	1,22E-03	0,00E+00	1,29E-04	2,53E-04	6,09E-06	-1,05E-02	2,49E-02
AP	kg SO2 eq	5,33E-01	4,31E-04	1,59E-02	0,00E+00	9,37E-04	2,52E-03	3,29E-05	-1,78E-01	3,75E-01
EP	kg PO4--- eq	3,92E-02	8,33E-05	1,64E-03	0,00E+00	1,84E-04	4,09E-04	6,93E-06	-1,02E-02	3,13E-02
Toxicity Indicators for Dutch Market										
HTP	kg 1,4-DB eq	9,58E+01	2,52E-02	2,86E+00	0,00E+00	8,97E-02	4,89E-01	4,01E-03	-3,88E+01	6,05E+01
FAETP	kg 1,4-DB eq	1,95E+00	1,06E-03	5,71E-02	0,00E+00	2,62E-03	2,22E-02	2,89E-03	-6,88E-01	1,34E+00
MAETP	kg 1,4-DB eq	7,73E+03	2,84E+00	2,43E+02	0,00E+00	9,42E+00	6,56E+01	1,12E+00	-3,04E+03	5,02E+03
TETP	kg 1,4-DB eq	2,80E-01	1,43E-04	7,73E-03	0,00E+00	3,17E-04	1,34E-03	1,06E-05	-4,35E-02	2,46E-01

ECI A1 = Environmental Cost Indicator (Milieukosten Indicator (MKI) in Dutch); ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; GWP1 = Global warming potential; ODP1 = Depletion potential of the stratospheric ozone layer; POCP = Formation potential of tropospheric ozone photochemical oxidants; AP = Acidification potential of land and water; EP = Eutrophication potential; HTP = Human toxicity potential; FAETP = Freshwater aquatic ecotoxicity potential; MAETP = Marine aquatic ecotoxicity potential; TETP = Terrestrial ecotoxicity potential

Results EN15804+A2

Set 2	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	A1-D
ECI A2	euro	**6,90**	**0,02**	**0,39**	**0,00**	**0,05**	**0,79**	**0,00**	**-3,04**	**5,11**
ECI A2	euro	6,90E+00	2,49E-02	3,87E-01	0,00E+00	4,82E-02	7,89E-01	2,39E-03	-3,04E+00	5,11E+00
GWP2	kg CO2 eq	2,79E+01	1,29E-01	2,35E+00	0,00E+00	2,38E-01	6,42E+00	1,04E-02	-8,74E+00	2,83E+01
GWP-F	kg CO2 eq	2,99E+01	1,29E-01	1,11E+00	0,00E+00	2,36E-01	6,42E+00	9,67E-03	-8,73E+00	2,91E+01
GWP-B	kg CO2 eq	-2,10E+00	9,56E-05	1,24E+00	0,00E+00	3,69E-04	1,09E-03	7,12E-04	-3,88E-03	-8,59E-01
GWP-L	kg CO2 eq	4,79E-02	4,22E-05	9,79E-04	0,00E+00	8,43E-04	6,33E-04	3,88E-06	-1,02E-02	4,02E-02
ODP2	kg CFC11 eq	2,74E-07	2,84E-09	1,22E-08	0,00E+00	4,21E-09	1,52E-07	1,61E-10	-2,19E-07	2,26E-07
AP2	mol H+ eq	6,14E-01	4,95E-04	1,84E-02	0,00E+00	1,13E-03	3,08E-03	3,96E-05	-4,19E-01	2,18E-01
EP-FW	kg P eq	3,03E-03	8,39E-07	8,43E-05	0,00E+00	2,35E-06	1,88E-05	7,33E-08	-1,81E-03	1,32E-03
EP-M	kg N eq	4,80E-02	1,88E-04	2,49E-03	0,00E+00	4,30E-04	8,59E-04	1,61E-05	-2,06E-02	3,13E-02
EP-T	mol N eq	6,28E-01	2,02E-03	1,84E-02	0,00E+00	4,59E-03	9,59E-03	1,66E-04	-3,00E-01	3,63E-01
POCP2	kg NMVOC eq	1,81E-01	7,73E-04	5,86E-03	0,00E+00	1,57E-03	2,80E-03	6,13E-05	-8,87E-02	1,03E-01
ADP-MM	kg Sb eq	7,28E-03	2,05E-07	2,19E-04	0,00E+00	7,40E-07	5,49E-06	1,35E-08	-5,34E-03	2,16E-03
ADP-F	MJ	4,02E+02	1,88E+00	1,25E+01	0,00E+00	3,39E+00	5,33E+00	1,32E-01	-1,22E+02	3,04E+02
WDP	m3 depriv.	1,66E+01	8,57E-03	4,85E-01	0,00E+00	2,08E-02	3,06E-01	8,50E-04	-6,53E+00	1,09E+01
PM	disease inc.	2,36E-06	1,13E-08	7,03E-08	0,00E+00	2,33E-08	3,14E-08	1,09E-09	-1,01E-06	1,49E-06
IR	kBq U-235 eq	8,35E-01	8,60E-04	2,52E-02	0,00E+00	1,32E-03	1,59E-02	1,09E-04	-2,41E-01	6,38E-01
ETP-FW	CTUe	7,88E+02	8,86E-01	2,87E+01	0,00E+00	2,50E+00	6,53E+01	2,02E+00	-4,76E+02	4,11E+02
HTP-C	CTUh	1,00E-07	4,01E-11	3,03E-09	0,00E+00	1,25E-10	1,14E-09	7,38E-12	-5,92E-08	4,52E-08
HTP-NC	CTUh	6,94E-06	8,23E-10	2,10E-07	0,00E+00	2,72E-09	1,43E-08	2,26E-10	-5,41E-06	1,75E-06
SQP	Pt	2,38E+02	1,98E+00	2,00E+00	0,00E+00	2,67E+00	2,81E+00	2,66E-01	-1,34E+02	1,14E+02

ECI A2 = Environmental Cost Indicator (Milieukosten Indicator (MKI) in Dutch); GWP-Total = Climate change; GWP-F = Climate change – Fossil; GWP-B = Climate change – Biogenic; GWP-L = Climate change – Land use and LU change; ODP2 = Ozone depletion; AP2 = Acidification; EP-FW = Eutrophication, freshwater; EP-M = Eutrophication, marine; EP-T = Eutrophication, terrestrial; POCP2 = Photochemical ozone formation; ADP-MM = Resource use, minerals and metals; ADP-F = Resource use, fossils; WDP = Water use; PM = Particulate matter; IR = Ionising radiation; ETP-FW = Ecotoxicity, freshwater; HTP-C = Human toxicity, cancer; HTP-NC = Human toxicity, non-cancer; SQP = Land use

Results Parameters

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	A1-D
Resource Use										
PERE	MJ	4,76E+01	2,44E-02	6,01E-02	0,00E+00	4,79E-02	5,83E-01	4,79E-03	-1,88E+01	2,95E+01
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	4,76E+01	2,44E-02	6,01E-02	0,00E+00	4,79E-02	5,83E-01	4,79E-03	-1,88E+01	2,95E+01
PENRE	MJ	4,02E+02	1,88E+00	1,25E+01	0,00E+00	3,39E+00	5,33E+00	1,32E-01	-1,22E+02	3,04E+02
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	4,02E+02	1,88E+00	1,25E+01	0,00E+00	3,39E+00	5,33E+00	1,32E-01	-1,22E+02	3,04E+02
PET	MJ	4,50E+02	1,91E+00	1,26E+01	0,00E+00	3,44E+00	5,91E+00	1,37E-01	-1,41E+02	3,33E+02
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
SF-R	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
SF-NR	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	4,36E-01	2,80E-04	1,29E-02	0,00E+00	8,72E-04	9,77E-03	8,75E-05	-1,58E-01	3,03E-01
Waste Categories										
HWD	kg	4,36E-03	1,18E-05	1,34E-04	0,00E+00	2,16E-05	2,06E-05	6,65E-07	-4,46E-04	4,10E-03
NHWD	kg	5,52E+00	1,71E-01	8,66E-01	0,00E+00	2,24E-01	1,63E-01	5,09E-01	-2,76E+00	4,69E+00
RWD	kg	5,63E-04	5,45E-07	1,69E-05	0,00E+00	7,75E-07	1,13E-05	6,09E-08	-1,48E-04	4,45E-04
Output Flows										
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	1,52E-03	0,00E+00	5,60E-02	0,00E+00	0,00E+00	1,86E+00	0,00E+00	0,00E+00	1,92E+00
MER	MJ	2,15E-02	0,00E+00	1,86E-01	0,00E+00	0,00E+00	2,32E+00	1,05E-03	0,00E+00	2,53E+00
EE-E	MJ	0,00E+00	0,00E+00	3,34E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,12E+01	1,15E+01
EE-T	MJ	0,00E+00	0,00E+00	5,75E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,93E+01	1,99E+01

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials [MJ]; PERM = Use of renewable primary energy resources used as raw materials [MJ]; PERT = Total use of renewable primary energy resources [MJ]; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials [MJ]; PENRM = Use of non-renewable primary energy resources used as raw materials [MJ]; PENRT = Total use of non-renewable primary energy resources [MJ]; PET = Total Energy [MJ]; SM = Use of secondary material [kg]; SF-R = Use of renewable secondary fuels [MJ]; SF-NR = Use of non-renewable secondary fuels [MJ]; FW = Use of net fresh water [m3]; HWD = Hazardous waste disposed [kg]; NHWD = Non-hazardous waste disposed [kg]; RWD = Radioactive waste disposed [kg]; CRU = Components for re-use [kg]; MFR = Materials for recycling [kg]; MER = Materials for energy recovery [kg]; EE-E = Exported electric energy [MJ], EE-T = Exported thermal energy [MJ]

Biogenic Carbon Content

In the table below, information describing the biogenic carbon content at factory gate (A1-A3) is described.

Biogenic Carbon Content	Amount (in kg C)
Biogenic Carbon in Product	0,00E+00
Biogenic Carbon in Packaging	3,32E+00
Note: 1 kg biogenic carbon (C) is equivalent to 44/12 kg CO_2	

If the mass of biogenic carbon containing materials in the product is less than 5% of the mass of the product, the declaration of biogenic carbon may be omitted (= 0 kg).

If the mass of biogenic carbon containing materials in the packaging is less than 5% of the mass of the product, the declaration of biogenic carbon may be omitted (= 0 kg).

Disclaimers on Indicators

According to EN15804+A2, the following disclaimers shall be made.

Disclaimer	Statement
Disclaimer 1	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 disposals in underground d facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.
Disclaimer 2	The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

The disclaimers from the table above apply to the relevant core and additional environmental impact indicators defined below and follow the ILCD classification.

ILCD Classification	Indicator	Disclaimer
ILCD Type 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD Type 2	Acidification potential, accumulated exceedance (AP)	None
	Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-FW)	None
	Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-M)	None
	Eutrophication potential, accumulated exceedance (EP-T)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential human exposure efficiency relative to U235 (IR)	1
ILCD Type 3	Abiotic depletion potential for non-fossil resources (ADP-MM)	2
	Abiotic depletion potential for fossil resources (ADP-F)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential comparative toxic unit for ecosystems (ETP-FW)	2
	Potential comparative toxic unit for humans (HTP-C)	2
	Potential comparative toxic unit for humans (HTP-NC)	2
	Potential soil quality index (SQP)	2

References

CML - Department of Industrial Ecology, CML-IA Characterisation Factors, Dated August 2016, Leiden University, Leiden, Netherlands Available at: https://www.universiteitleiden.nl/en/research/research-output/science/cml-ia-characterisation-factors.

PRé Sustainability - Simapro 10.2.0.3

EN 15804: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products', I.S. EN 15804:2012+A1:2013 and EN 15804:2019+A2.

ISO 14040: Environmental management - Life cycle assessment – Principles and Framework', International Organization for Standardization, ISO14040:2006.

ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines', International Organization for Standardization, ISO14044:2006.

ISO 14025: Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures', International Organization for Standardization, ISO14025:2006.

NMD Environmental Performance Assessment Method for Buildings version 1.2 (December 2024)