Environmental Product Declaration

StoCleyer B

Sto SE & Co. KGaA

Publisher:	Sto SE & Co. KGaA
Programme operator:	Stichting NMD
Calculation number:	ReTHiNK-84469
Generation on:	19-11-2024
Issue date:	19-11-2024
Valid until:	19-11-2029
Status:	verified

R<THiNK

1 General information

1.1 PRODUCT

StoCleyer B

1.2 VALIDITY

Issue date: 19-11-2024

Valid until: 19-11-2029

1.3 OWNER OF THE DECLARATION

Building with conscience.

Manufacturer: Sto SE & Co. KGaA

Address: Ehrenbachstraße 1, D-79780 Stühlingen

E-mail: infoservice@sto.com

Website: https://www.sto.com

Production location: Elastolith Nederland B.V.

Address production location: Rietmolenweg 6, 7482 NX Haaksbergen

1.4 VERIFICATION OF THE DECLARATION

The independent verification is in accordance with the ISO 14025:2011. The LCA is in compliance with ISO 14040:2006 and ISO 14044:2006. The EN 15804:2012+A2:2019 serves as the core PCR.

☐ Internal ☒ External

Gert-Jan Vroege, Eco Intelligence

1.5 PRODUCT CATEGORY RULES

NMD Determination method Environmental performance Construction works v1.1 March 2022

1.6 COMPARABILITY

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804+A2. For the evaluation of the comparability, the following aspects have to be considered in particular: PCR used, functional or declared unit, geographical reference, the definition of the system boundary, declared modules, data selection (primary or secondary data, background database, data quality), scenarios used for use and disposal phases, and the life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPD program operators may differ. Comparability needs to be evaluated. For further guidance, see EN 15804+A2 (5.3 Comparability of EPD for construction products) and ISO 14025 (6.7.2 Requirements for comparability).

1.7 CALCULATION BASIS

LCA method R<THINK: NMD Determination method v 1.1 | set1+2

LCA software*: Simapro 9.1.1

Characterization method: Bepalingsmethode 'set 1', 'set2' & param (NMD 3.4) v1.00

LCA database profiles: EcoInvent version 3.6

Version database: v3.17 (2024-05-22)

** Simapro is used for calculating the characterized results of the Environmental profiles within R<THINK.*

1 General information

1.8 LCA BACKGROUND REPORT

This EPD is generated on the basis of the LCA background report 'StoCleyer B ' with the calculation identifier ReTHiNK-84469.

2 Product

2.1 PRODUCT DESCRIPTION

StoCleyer B is a mineral brick slip, optimized for external wall insulation systems.

The appearance is based on traditional hand-crafted bricks, with a weight less than a third of clay slips. There is a range of design options in regard to color shades, textures and formats. The material thickness varies between 4 to 8 mm.

StoCleyer B is made from more than 90 % mineral components, additives and water based polymer dispersions.

Length x height, specified in mm according to the WAAL-Format, used in the Netherlands:

- Strips: 210 x 50, approx. 72 pcs/m²
- Head (EK): 100 x 50 (EK), approx. 144 pcs/m²

1 kg Cleyer B excl mortar

2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

StoCleyer B is designed for use on all StoTherm systems and StoVentec R. It is also suitable for cladding all types of facade constructions such as solid walls, stud frames and the like.

Application and grouting is carried out in one step using the Sto Bonding and Pointing Mortar. StoCleyer B is applied and the mortar in the joint is then smoothed with a brush.

The substrate in general should be firm, dry and clean. Sto Cleyer B can be applied on both, mineral and organic substrates. Mineral substrates can be treated with a Primer. systems and ventilated curtain wall systems and solid substrates

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

50 years. Source: EPD-VDL-20190056-IBG1-DE

USED RSL (YR) IN THIS LCA CALCULATION:

50

RSL PARTS

no product parts applicable

2.4 TECHNICAL DATA

Criteria	Standard	Value	Unit	Notes
Density	EN ISO 2811	1.6-1.8	g/cm³	
Water vapour diffusionequivalent air layer thickness μ	EN ISO 7783	110	-	average value V2 medium
Water permeability rate w	EN 1062-3	< 0.1	kg/ (m²h0.5)	W3 low

2.5 DESCRIPTION PRODUCTION PROCESS

Raw materials, packaging components, and production supplies are received at the warehouse. Quartz sands and fillers are transported via tanker truck and deposited into silos located in the courtyard. Binders, delivered by truck, are transferred into IBC containers. Additional raw materials and additives arrive in various forms.

Within the mixing facility, both the base mortar and adhesive mortar are produced using mixing mills, after which they are discharged into containers and buckets for further use.

The work preparation department handles the coloring of the base material, utilizing mixers for the process. Paste pigments, dispensed from color dispensers, are employed to achieve the desired color.

During production, brick slips are manufactured, with mortars of varying colors applied to achieve the required shade. Texture is imparted using specialized tools, while different types of spreading sands are incorporated to either create a sandy surface or introduce color variations.

The brick slips are then subjected to drying in chambers, maintained at approximately 65°C for a duration of around 15 hours. Currently, these drying chambers are heated using gas. Following the drying process, the brick slips undergo inspection, and once approved, they are sorted, mixed, and packaged in cardboard boxes. In the warehouse, the packaged brick slips and buckets of adhesive mortar are stored or made ready for shipment.

2.6 CONSTRUCTION DESCRIPTION

The Sto-Bonding and Pointing Mortar is applied manually to the substrate. It forms the adhesive layer and joint for StoCleyer B. The application quantity is measured by the notched trowel and used completely. Only as much material is applied as can be covered within the open time of the adhesive. If the application is carried out correctly, no waste is

2 Product

generated. With a slightly sliding motion, StoCleyer B will be pressed firmly and full-faced into the freshly applied mortar. Gaps and cavities must be avoid. Then the joint areas are smoothed, using a flat paint brush.

Specific information on application and other actions with this product are described in detail in the relevant technical product documentation.

Direct contact with the eyes and skin must be avoided through personal protective measures.

The adhesive must not reach the sewer system, surface water, or ground water. The water used to clean the equipment should be collected in accordance with the appendices in the technical data sheets and disposed of via a suitable treatment plant. Excess material can be stored and used at the next construction site.

3 Calculation rules

3.1 FUNCTIONAL UNIT

StoCleyer B

1kg StoCleyer B

Reference unit: kilogram (kg)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	kg
Conversion factor to 1 kg	1.000000	kg

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with options, modules C1-C4 and module D EPD. The life cycle stages included are as shown below:

(X = module included, ND = module not declared)

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	ND	ND	X	X	X	X	X	X	X

The modules of the EN15804 contain the following:

Module A1 = Raw material supply	Module B5 = Refurbishment
Module A2 = Transport	Module B6 = Operational energy use
Module A3 = Manufacturing	Module B7 = Operational water use
Module A4 = Transport	Module C1 = De-construction / Demolition
Module A5 = Construction - Installation process	Module C2 = Transport
Module B1 = Use	Module C3 = Waste Processing
Module B2 = Maintenance	Module C4 = Disposal
Module B3 = Repair	Module D = Benefits and loads beyond the product system boundaries
Module B4 = Replacement	

3.4 REPRESENTATIVENESS

This EPD is representative for StoCleyer B, a product of Sto SE&Co KGaA. The results of this EPD are representative for the Netherlands.

3.5 CUT-OFF CRITERIA

In the Life cycle assessment the following cut-off criteria are applied:

3 Calculation rules

PRODUCT STAGE (A1-A3)

All input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. production waste) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

CONSTRUCTION PROCESS STAGE (A4-A5)

All input flows (e.g. transportation to the construction site, additional raw material use for construction, installation energy (use)of energy use for assembly , etc.) and output flows (e.g. construction waste, packaging waste, etc.) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

USE STAGE (B1-B7)

All (known) input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. emissions to soil, air and water, construction waste, packaging waste, end-of-life waste, etc.) related to the building fabric are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

END OF LIFE STAGE (C1-C4)

All input flows (e.g. energy use for demolition or disassembly, transport to waste processing, etc.) and output flows (e.g. end-of-life waste processing of the product, etc.) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

All benefits and loads beyond the system boundary resulting from reusable products, recyclable materials and/or useful energy carriers leaving the product system are considered in this LCA.

3.6 ALLOCATION

no allocation has taken place

3.7 DATA COLLECTION & REFERENCE PERIOD

2023

3.8 ESTIMATES AND ASSUMPTIONS

The LCA was prepared with as few estimates and assumptions as possible. Where assumptions were necessary, a worst-case approach was chosen.

3.9 DATA QUALITY

In accordance with NMD review table Appendix E:

Completeness

- All environmental interventions that can reasonably be expected have been characterized and have a value
- All streams have been qualified and quantified
- Mass balance at process level; closure >95%
- Company-level mass balance; closure >95%

Representativeness

- The processes chosen are common for the period studied in the LCA
- The location of the process is directly related to the area of interest
- The data are from a specific company

Consistency and reproducibility

- Process description fully quantitatively reproducible with the environmental interventions used

No horizontal or vertical aggregation was used in this LCA.

3.10 POWER MIX

The data was collected by Elastolith, all data was collected over 1 production year which is representative of the current production of the products.

4 Scenarios and additional technical information

4.1 TRANSPORT TO CONSTRUCTION SITE (A4)

For the transport from production place to assembly/user, the following scenario is assumed for module A4 of this EPD.

	Value and unit
Vehicle type used for transport	Lorry (Truck) 16-32t, EURO6 | market for (EU)
Fuel type and consumption of vehicle	not available
Distance	150 km
Capacity utilisation (including empty returns)	50 % (loaded up and return empty)
Bulk density of transported products	inapplicable
Volume capacity utilisation factor	1

4.2 ASSEMBLY (A5)

The following information describes the scenarios for flows entering the system and flows leaving the system at module A5.

FLOWS ENTERING THE SYSTEM

There are no significant environment impacts as a result of materials or energy used in the construction stage (A5).

FLOWS LEAVING THE SYSTEM

The following output flows leaving the system at module A5 are assumed.

Description	Value	Unit
Output materials as result of loss during construction	3	%
Output materials as result of waste processing of materials used for installation/assembly at the building site	0.000	kg
Output materials as result of waste processing of used packaging	0.023	kg

4.3 USE STAGE (B1)

No significant environment impact in the use stage modules, because there is no (significant) emission to air, soil or water.

4.4 MAINTENANCE (B2)

For maintenance no input or output flows are moddeled.

4 Scenarios and additional technical information

4.5 REPAIR (B3)

Repairs are not applicable within the functional unit and to achieve the reference service life.

4.6 OPERATIONAL ENERGY USE (B6)

Description	Service cycle (yr)	Number of cycles (n)	Amount per cycle	Total Amount	Unit

4.7 OPERATIONAL WATER USE (B7)

Description	Service cycle (yr)	Number of cycles (n)	Amount per cycle	Total Amount	Unit

4.8 DE-CONSTRUCTION, DEMOLITION (C1)

No inputs are needed for the product at the de-construction / demolition phase

4.9 TRANSPORT END-OF-LIFE (C2)

The following distances and transport conveyance are assumed for transportation during end of life for the different types of waste processing.

Waste Scenario	Transport conveyance	Not removed (stays in work) [km]	Landfill [km]	Incineration [km]	Recycling [km]	Re-use [km]
coarse ceramic (i.a. brickwork, tiles) (NMD ID 32)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0

The transport conveyance(s) used in the scenario(s) for transport during end of life has the following characteristics.

	Value and unit
Vehicle type used for transport	Lorry (Truck), unspecified (default) | market group for (GLO)
Fuel type and consumption of vehicle	not available
Capacity utilisation (including empty returns)	50 % (loaded up and return empty)

4 Scenarios and additional technical information

Bulk density of transported products	inapplicable
Volume capacity utilisation factor	1

4.10 END OF LIFE (C3, C4)

The scenario(s) assumed for end of life of the product are given in the following tables. First the assumed percentages per type of waste processing are displayed, followed by the assumed amounts.

Waste Scenario	Region	Not removed (stays in work) [%]	Landfill [%]	Incineration [%]	Recycling [%]	Re-use [%]
coarse ceramic (i.a. brickwork, tiles) (NMD ID 32)	NL	0	1	0	99	0

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
coarse ceramic (i.a. brickwork, tiles) (NMD ID 32)	0.000	0.010	0.000	0.990	0.000
Total	**0.000**	**0.010**	**0.000**	**0.990**	**0.000**

4.11 BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

The presented Benefits and loads beyond the system boundary in this EPD are based on the following calculated Net output flows in kilograms and Energy recovery displayed in MJ Lower Heating Value.

Waste Scenario	Net output flow [kg]	Energy recovery [MJ]
coarse ceramic (i.a. brickwork, tiles) (NMD ID 32)	0.990	0.000
Total	**0.990**	**0.000**

5 Results

For the impact assessment, the characterization factors of the LCIA method Bepalingsmethode 'set 1', 'set2' & param (NMD 3.4) v1.00 are used. Long-term emissions (>100 years) are not considered in the impact assessment. The results of the impact assessment are only relative statements that do not make any statements about end-points of the impact categories, exceedance of threshold values, safety margins or risks. The following tables show the results of the indicators of the impact assessment, of the use of resources as well as of waste and other output flows.

5.1 ENVIRONMENTAL IMPACT INDICATORS PER KILOGRAM

CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B6	B7	C1	C2	C3	C4	D
AP	mol H+ eqv.	3.35E-3	4.98E-4	4.58E-4	4.31E-3	7.20E-5	1.46E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.95E-5	1.01E-5	5.00E-7	-7.60E-5
GWP-total	kg CO2 eqv.	4.47E-1	8.59E-2	1.23E-1	6.56E-1	2.51E-2	6.23E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.82E-3	1.62E-3	5.28E-5	-1.28E-2
GWP-b	kg CO2 eqv.	-3.33E-3	3.96E-5	-3.02E-2	-3.35E-2	1.35E-5	2.94E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.15E-6	9.33E-6	1.04E-7	-2.14E-5
GWP-f	kg CO2 eqv.	4.47E-1	8.58E-2	1.53E-1	6.86E-1	2.51E-2	3.28E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.82E-3	1.61E-3	5.27E-5	-1.28E-2
GWP-luluc	kg CO2 eqv.	3.76E-3	3.15E-5	3.76E-4	4.17E-3	8.92E-6	1.26E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.50E-6	3.07E-7	1.47E-8	-1.84E-5
EP-m	kg N eqv.	4.35E-4	1.75E-4	1.00E-4	7.11E-4	1.42E-5	2.72E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.39E-5	4.02E-6	1.72E-7	-2.19E-5
EP-fw	kg P eq	3.70E-5	8.66E-7	4.94E-6	4.29E-5	2.00E-7	1.34E-6	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.87E-8	5.02E-8	5.90E-10	-2.92E-7
EP-T	mol N eqv.	4.76E-3	1.93E-3	1.03E-3	7.73E-3	1.59E-4	2.97E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.54E-4	4.46E-5	1.90E-6	-3.08E-4
ODP		6.03E-8	1.89E-8	1.72E-8	9.64E-8	5.70E-9	3.57E-9	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.50E-9	2.09E-10	2.17E-11	-1.69E-9

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

5 Results

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B6	B7	C1	C2	C3	C4	D
	kg CFC 11 eqv.																
POCP	kg NMVOC eqv.	1.71E-3	5.52E-4	3.28E-4	2.60E-3	6.10E-5	9.62E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.38E-5	1.22E-5	5.51E-7	-6.78E-5
ADP-f	MJ	8.52E+0	1.29E+0	2.55E+0	1.24E+1	3.79E-1	4.03E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.03E-1	2.16E-2	1.47E-3	-1.95E-1
ADP-mm	kg Sb-eqv.	6.19E-6	2.17E-6	8.14E-7	9.18E-6	6.92E-7	3.28E-7	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.73E-7	4.54E-9	4.82E-10	-2.36E-7
WDP	m3 world eqv.	3.51E-1	4.63E-3	2.77E-2	3.84E-1	1.07E-3	1.24E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.68E-4	9.80E-5	6.60E-5	-6.25E-2

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B6	B7	C1	C2	C3	C4	D
ETP-fw	CTUe	1.28E+1	1.15E+0	2.51E+0	1.64E+1	3.05E-1	6.50E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.17E-2	1.75E-2	9.55E-4	-4.65E-1
PM	disease incidence	2.51E-8	7.72E-9	3.46E-9	3.63E-8	1.60E-9	1.29E-9	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.13E-10	2.23E-10	9.72E-12	-1.08E-9
	CTUh	9.46E-10	3.74E-11	7.50E-11	1.06E-9	8.49E-12	1.03E-10	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.97E-12	4.16E-13	2.21E-14	-7.96E-12

ETP-fw=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (SQP)

5 Results

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B6	B7	C1	C2	C3	C4	D
HTP-c																	
HTP-nc	CTUh	2.00E-8	1.26E-9	1.69E-9	2.30E-8	3.21E-10	7.68E-10	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.00E-10	1.18E-11	6.79E-13	-2.53E-10
IR	kBq U235 eqv.	2.12E-2	5.42E-3	3.56E-3	3.02E-2	1.66E-3	1.04E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.31E-4	6.86E-5	6.04E-6	-3.20E-4
SQP	Pt	2.65E+0	1.12E+0	1.20E+0	4.98E+0	2.65E-1	1.71E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.91E-2	3.61E-3	3.09E-3	-1.53E+0

ETP-fw=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (SQP)

CLASSIFICATION OF DISCLAIMERS TO THE DECLARATION OF CORE AND ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

ILCD classification	Indicator	Disclaimer
ILCD type / level 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 / level 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2

5 Results

ILCD classification	Indicator	Disclaimer
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2

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 disposal in underground 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.

CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A1

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B6	B7	C1	C2	C3	C4	D
ADPE	Kg Sb	6.19E-6	2.17E-6	8.14E-7	9.18E-6	6.92E-7	3.28E-7	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.73E-7	4.54E-9	4.82E-10	-2.36E-7
GWP	Kg CO2 Equiv.	4.38E-1	8.51E-2	1.51E-1	6.74E-1	2.49E-2	3.25E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.76E-3	1.59E-3	5.17E-5	-1.25E-2
ODP	Kg CFC-11 Equiv.	5.33E-8	1.51E-8	1.53E-8	8.36E-8	4.55E-9	3.11E-9	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.20E-9	1.74E-10	1.72E-11	-1.51E-9
POCP	Kg Ethene Equiv.	3.84E-4	5.14E-5	5.82E-5	4.94E-4	1.24E-5	1.67E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.08E-6	9.09E-7	5.51E-8	-8.14E-6
AP	Kg SO2 Equiv.	2.86E-3	3.74E-4	3.69E-4	3.60E-3	5.90E-5	1.20E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.97E-5	7.36E-6	3.78E-7	-5.34E-5
EP	Kg PO43- Equiv.	3.54E-4	7.35E-5	6.10E-5	4.88E-4	9.15E-6	1.72E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.84E-6	1.64E-6	7.29E-8	-1.26E-5

ADPE=Depletion of abiotic resources-elements | **GWP**=Global warming | **ODP**=Ozone layer depletion | **POCP**=Photochemical oxidants creation | **AP**=Acidification of soil and water | **EP**=Eutrophication

5 Results

NATIONAL ANNEX NMD

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B6	B7	C1	C2	C3	C4	D
ADPF	Kg Sb	4.34E-3	6.26E-4	1.35E-3	6.31E-3	1.80E-4	2.05E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.97E-5	1.13E-5	7.04E-7	-1.03E-4
HTP	kg 1.4 DB	2.23E-1	3.58E-2	2.87E-2	2.88E-1	9.96E-3	1.04E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.85E-3	3.78E-4	2.34E-5	-4.45E-3
FAETP	kg 1.4 DB	1.64E-2	1.05E-3	1.63E-3	1.91E-2	2.75E-4	6.54E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.31E-5	6.52E-6	5.54E-7	-7.86E-5
MAETP	kg 1.4 DB	2.73E+1	3.76E+0	3.30E+0	3.44E+1	1.05E+0	1.22E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.99E-1	2.46E-2	1.98E-3	-2.03E-1
TETP	kg 1.4 DB	2.51E-3	1.27E-4	3.99E-4	3.03E-3	3.55E-5	9.55E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.01E-5	4.64E-6	5.87E-8	-2.49E-5

ADPF=Depletion of abiotic resources-fossil fuels | **HTP**=Human toxicity | **FAETP**=Ecotoxicity. fresh water | **MAETP**=Ecotoxicity. marine water (MAETP) | **TETP**=Ecotoxicity. terrestric

5.2 INDICATORS DESCRIBING RESOURCE USE AND ENVIRONMENTAL INFORMATION BASED ON LIFE CYCLE INVENTORY (LCI)

PARAMETERS DESCRIBING RESOURCE USE

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B6	B7	C1	C2	C3	C4	D
PERE	MJ	4.48E-1	1.62E-2	-2.23E-3	4.62E-1	5.42E-3	1.51E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.29E-3	1.23E-3	1.19E-5	-3.09E-1

PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

5 Results

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B6	B7	C1	C2	C3	C4	D
PERM	MJ	0.00E+0	0.00E+0	2.86E-1	2.86E-1	0.00E+0	8.59E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	4.48E-1	1.62E-2	2.84E-1	7.48E-1	5.42E-3	2.37E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.29E-3	1.23E-3	1.19E-5	-3.09E-1
PENRE	MJ	8.87E+0	1.37E+0	2.57E+0	1.28E+1	4.02E-1	4.19E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.09E-1	2.31E-2	1.56E-3	-2.06E-1
PENRM	MJ	2.57E-1	0.00E+0	2.04E-1	4.61E-1	0.00E+0	1.38E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-6.59E-3
PENRT	MJ	9.13E+0	1.37E+0	2.77E+0	1.33E+1	4.02E-1	4.33E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.09E-1	2.31E-2	1.56E-3	-2.13E-1
SM	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	M3	9.11E-3	1.58E-4	1.02E-3	1.03E-2	4.05E-5	3.41E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.25E-5	7.23E-6	1.57E-6	-1.46E-3

PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B6	B7	C1	C2	C3	C4	D
HWD	Kg	9.57E-6	3.28E-6	3.29E-6	1.61E-5	9.92E-7	5.67E-7	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.60E-7	3.77E-8	2.20E-9	-3.07E-7
NHWD	Kg	1.76E-1	8.21E-2	2.14E-2	2.79E-1	1.84E-2	1.17E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.52E-3	3.01E-3	1.00E-2	-1.18E-3
RWD	Kg	2.41E-5	8.50E-6	4.06E-6	3.66E-5	2.58E-6	1.28E-6	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.75E-7	9.71E-8	9.67E-9	-3.87E-7

HWD=hazardous waste disposed | **NHWD**=non hazardous waste disposed | **RWD**=radioactive waste disposed

5 Results

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B6	B7	C1	C2	C3	C4	D
CRU	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	Kg	0.00E+0	0.00E+0	1.28E-1	1.28E-1	0.00E+0	3.38E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.90E-1	0.00E+0	0.00E+0
MER	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EE	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-2.19E-1
EET	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.39E-1
EEE	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-8.06E-2

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EE**=Exported energy | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

5 Results

5.3 INFORMATION ON BIOGENIC CARBON CONTENT PER KILOGRAM

BIOGENIC CARBON CONTENT

The following Information describes the biogenic carbon content in (the main parts of) the product at the factory gate per kilogram:

Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0.00075	kg C
Biogenic carbon content in accompanying packaging	0.008173	kg C

UPTAKE OF BIOGENIC CARBON DIOXIDE

The following amount of carbon dioxide uptake is taken into account. Related uptake and release of carbon dioxide in downstream processes are not taken into account in this number although they do appear in the presented results. One kilogram of biogenic Carbon content is equivalent to 44/12 kg of biogenic carbon dioxide uptake.

Uptake Biogenic Carbon dioxide	Amount	Unit
product	0.00275	kg CO2 (biogenic)
Packaging	0.02997	kg CO2 (biogenic)

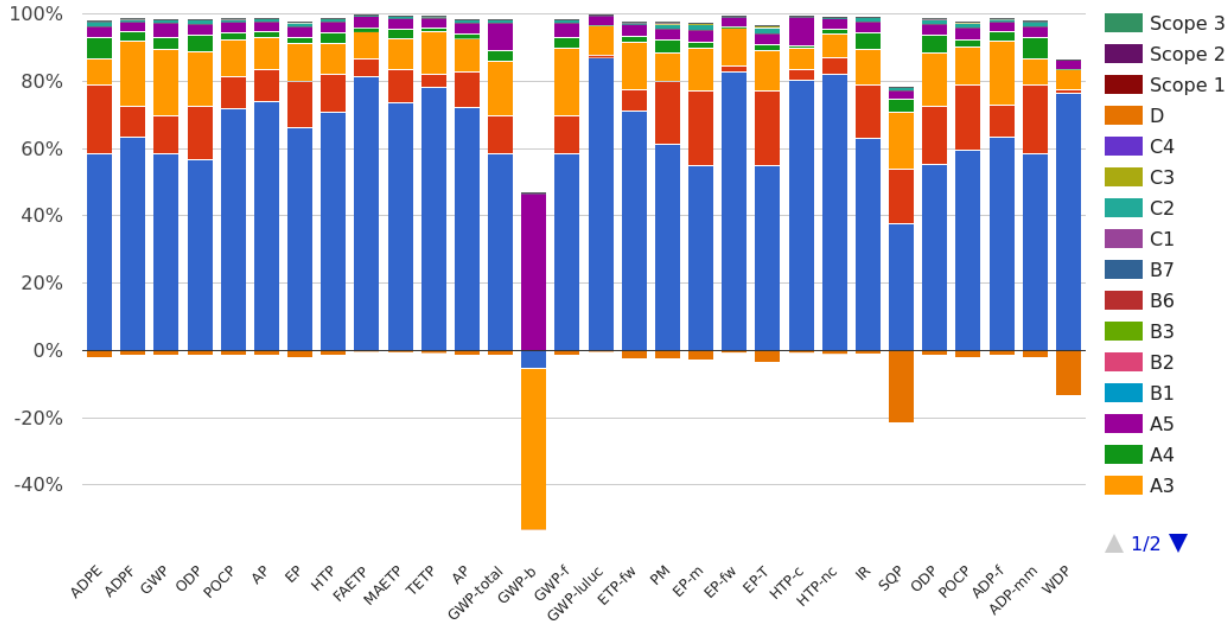
5 Results

5.4 ENVIRONMENTAL COST INDICATOR NL PER KILOGRAM

Using the environmental cost indicator (ECI) method, which is presented in the NMD Determination Method (2020), the results are aggregated to the single-point score. The ECI is a relevant valuation method, especially in the Dutch construction sector. In the Netherlands, it is a prerequisite for public tenders. The aim of the indicator is to show the shadow price for environmental impacts of a product or project. The application of single-point scores is an additional assessment tool for eco-balance results. However, it must be pointed out that weightings are always based on a value maintenance and not on a scientific basis (EN 14040). The ECI results are shown in the following table.

Module EN15804	ECI NL	Share in total (%)
A1 Raw Materials Supply	€ 0.06	68,1 %
A2 Transport	€ 0.01	11,4 %
A3 Manufacturing	€ 0.01	14,3 %
A4 Transport from the gate to the site	€ 0.00	2,9 %
A5 Construction - Installation process	€ 0.00	3,8 %
B1 Use	€ 0.00	0,0 %
B2 Maintenance	€ 0.00	0,0 %
B3 Repair	€ 0.00	0,0 %
B6 Operational Energy Use	€ 0.00	0,0 %
B7 Operational Water Use	€ 0.00	0,0 %
C1 De-construction / demolition	€ 0.00	0,0 %
C2 Transport	€ 0.00	0,9 %
C3 Waste processing	€ 0.00	0,2 %
C4 Disposal	€ 0.00	0,0 %
D Benefits and loads beyond the product system boundary	€ 0.00	-1,6 %
ECI NL per functional unit	**€ 0.09**	

6 Interpretation of results



- Module A1 is the module with the heaviest impact: 66%. This is due to the impact of some raw materials, including the Vinyl Acetate and the flame retardant. The production phase A3 entails heating the product somewhat, which leads to CO2-emissions. Transport emissions in A2 and A4 have a fairly large impact as well.

7 References

ISO 14040
ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006

ISO 14044
ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14040:2006

ISO 14025
ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

EN 15804+A1
EN 15804+A1: 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

EN 15804+A2
EN 15804+A2: 2019: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

NMD-verification protocol
NMD-verification protocol version 1.0, July 2020, foundation NMD

NMD Determination method
NMD Determination method Environmental performance Construction works v1.1 March 2022, foundation NMD

NMD Flat-rate values for processing scenarios at the end of life

NMD Flat-rate values for processing scenarios at the end of life, version may 2024, foundation NMD

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