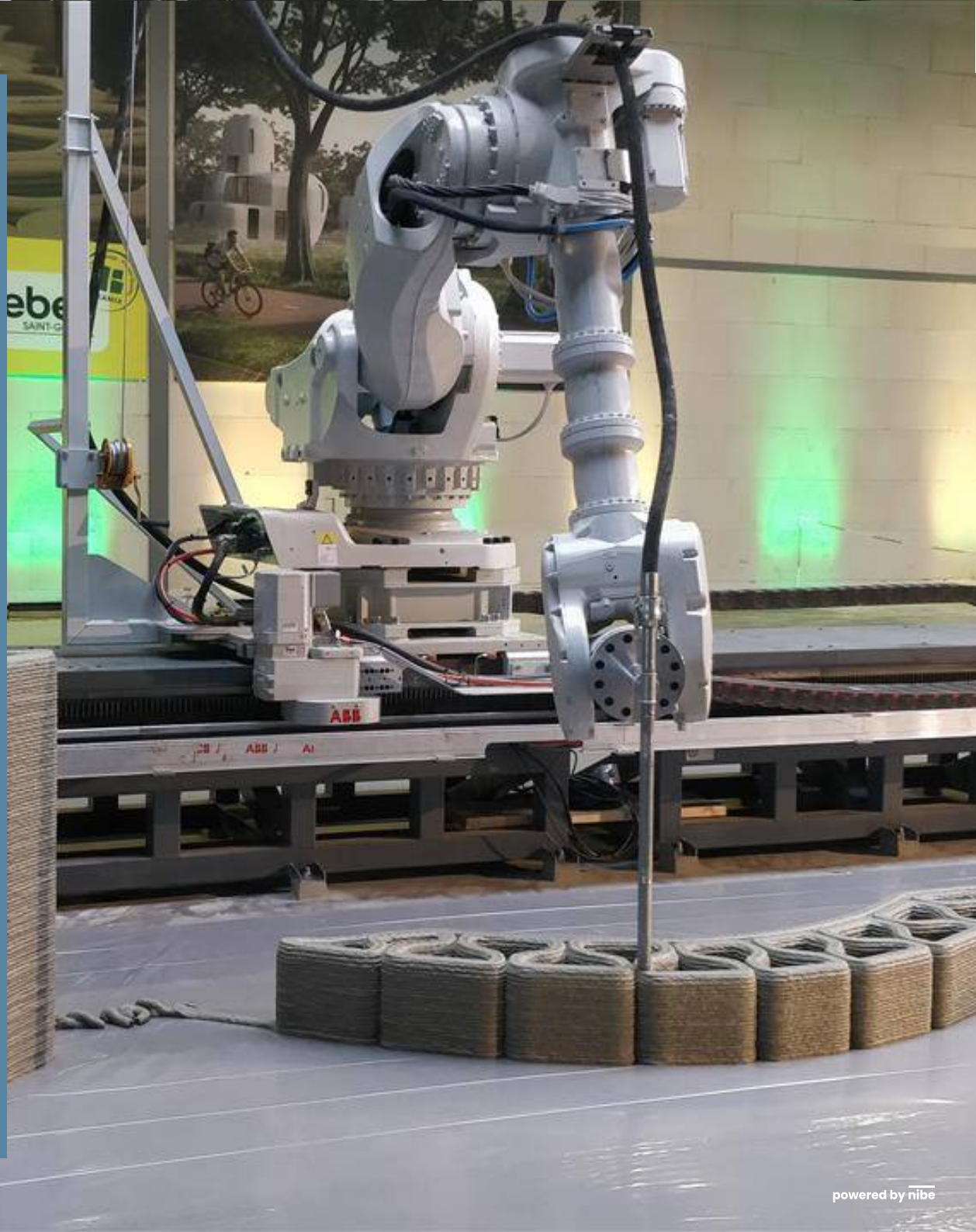
Environmental Product Declaration

Weber 3D ECO (BB EIH)

Saint-Gobain Weber Benelux

Publisher:	Saint-Gobain Weber Benelux
Programme operator:	Stichting NMD
Calculation number:	ReTHiNK-97631
Generation on:	14-05-2025
Issue date:	14-05-2025
Valid until:	14-05-2030
Status:	verified

R<THiNK



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1 General information

1.1 PRODUCT

Weber 3D ECO (BB EIH)

1.2 VALIDITY

Issue date: 14-05-2025

Valid until: 14-05-2030

1.3 OWNER OF THE DECLARATION

Manufacturer: Saint-Gobain Weber Benelux

Address: Hastelweg 161, 5652CJ Eindhoven

E-mail: info@weberbeamix.nl

Website: https://www.nl.weber/ https://www.belgium.weber/

Production location: Saint-Gobain Weber Beamix Eindhoven

Address production location: Hastelweg 161, 5652CJ Eindhoven

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+A2:2019 serves as the core PCR.

☐ Internal ☒ External

Pien van den Heuvel , So. Sustainability

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+A2:2019. 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+A2:2019 and ISO 14025.

1.7 CALCULATION BASIS

LCA method R<THINK: NMD Determination method v 1.2 | set1+2

LCA software*: Simapro 9.6

Characterization method: R<THINK characterization method (see references for more details)

LCA database profiles: ecoinvent (for version see references)

Version database: v3.19 (20250306)

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

1.8 LCA BACKGROUND REPORT

This EPD is generated on the basis of the LCA background report 'Weber 3D ECO (BB EIH)' with the calculation identifier ReTHiNK-97631.

2 Product

2.1 PRODUCT DESCRIPTION

Weber 3D mortars are factory-produced dry mortar made in accordance with EN 206, regarding specifications, characteristics, fabrication and conformity.

3D printing with concrete creates high freedom in terms of shape and size of produced objects, due to elimination of traditional formwork, which allows for further reduction in waste. All those factors, combined with the process automation, result in decreased production time, especially for unique objects.

The 3D printing technique results in a 40-60% CO2 reduction compared to traditional constructions. This is because concrete is printed only where it is needed and no reinforcement is used.

The cradle-to-gate with options, modules C1 - C4 and Module D analysis was chosen.

2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

The application is fully automated with a 3D-printing robot.

A nozzle is mounted onto the robot arm. This robot is programmed to follow a specific pattern. The robot is connected to a silo where the mortar is mixed with water until desired consitency is achieved. The mix is then pumped through the printing device until the nozzle. Layers are extruded, on top of each other, building up the desired final shape.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT
According to “SBR levensdurengids voor bouwproducten”.

USED RSL (YR) IN THIS LCA CALCULATION:
100

2.4 TECHNICAL DATA

Strength class: C45/55

Mortar based on EN 206

Processing time: 1 hour at 20 °C

Compressive strength after 28 days: > 45 N/mm2 (EN12390-3)

Shrinkage at 28 days: < 0,7 mm/m (DIN 52450)

Additional requirement : pumpable

2.5 SUBSTANCES OF VERY HIGH CONCERN

The product does not contain any substances listed in the “Candidate List of Substances of Very High Concern" (SVHC) exceeding 0.1% of the weight of the product.

2.6 DESCRIPTION PRODUCTION PROCESS

First, it is important to ensure that our raw materials are dried before mixing then into our final drymix product. All our raw materials are delivered dry except for the sand. A gas-fired dryer is used for the sand drying process.
After drying, the sand passes through a sieving unit to separate it into different fractions based on particle size. This ensures consistent quality in the final product.

Various raw materials, including hydraulic binders, fillers and additives, are mixed to create the dry mortar mixture.

The mortar is then poured in big bags which are palletized and ready for delivery.

3 Calculation rules

3.1 FUNCTIONAL UNIT

ton

Declared unit : one tonne of dry mortar including aggregates, binder and additives. Quantities are calculated to 1 tonne. Produced in the Netherlands by Saint-Gobain Weber.

Reference unit: ton (ton)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	ton
Weight per reference unit	1000.000	kg
Conversion factor to 1 kg	0.001000	ton

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	ND	X	ND	ND	ND	ND	ND	ND	X	X	X	X	X

The modules of the EN 15804 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:

the Weber 3D ECO, a 3D mortar of Saint-Gobain Weber Beamix.
The results of this LCA are representative for the Dutch market.

3.5 CUT-OFF CRITERIA

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

3 Calculation rules

therefore not exceed the limit of 5% of energy use and mass or 5% on impact per environmental effect.

The contribution of capital goods to each environmental impact category of the production phase module is considered less than 5% and therefore not considered in the scope of the LCA.

As an example:
the service life of heavy machinery is often > 25 years, and the amount of product being processed by this machinery is millions of tons over the service life. Therefore the impact of the machinery on the declared unit quantity of product in this LCA is negligible.

However, capital goods from the background profiles of Ecoinvent, are included.

Construction process stage (A4-A5)

A4, transportation to the construction site, is included in this LCA.
A5, however, is not considered in this LCA.

Use stage (B1-B3)

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 or 5% on impact per environmental effect.

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 or 5% on impact per environmental effect.

Benefits and loads beyond the system boundary (Module 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

Electricity powers the entire process: it is averaged annually and allocated to all products.

However, gas is exclusively used to dry sand: it is averaged annually and allocated only to products including wet sand, including this 3D mortar.

3.7 DATA COLLECTION & REFERENCE PERIOD

Energy consumption data from 2023

Raw materials consumption from 2023

Suppliers data from 2024

3.8 DATA QUALITY

<5 years for composition/energy

<10 years for generic data

Background data based on EPDs and EcoInvent 3.6.

Foreground data <2 years and background data <10 years.

3.9 POWER MIX

Saint-Gobain Weber Beamix purchases Electricity with Guaranty of Origin. The Guaranty of Origin as provided by Endesa Energia Branche Nederland are included in the project dossier.

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	(ei3.6) Lorry (Truck), unspecified (default) | market group for (GLO)
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 USE STAGE (B1)

Emissions to air/soil/water are applicable, the scenario accounted in module B1 is as follows in the table below:

Description	Cycle (yr)	Number of cycles	Amount per cycle	Total Amount	Unit
Carbonation - CO2 uptake	100	1	-6334200	-6334200	mg

4.3 DE-CONSTRUCTION, DEMOLITION (C1)

The following information describes the scenario for demolition at end of life.

Description	Amount	Unit
(ei3.6) Diesel, burned in machine (incl. emissions)	0.280	l

4.4 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]
		0	100	150	50	0

4 Scenarios and additional technical information

Waste Scenario	Transport conveyance	Not removed (stays in work) [km]	Landfill [km]	Incineration [km]	Recycling [km]	Re-use [km]
(ei3.6) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	(ei3.6) Lorry (Truck), unspecified (default) | market group for (GLO)					

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	(ei3.6) 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)
Bulk density of transported products	inapplicable
Volume capacity utilisation factor	1

4.5 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 [%]
(ei3.6) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	NL	0	1	0	99	0

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
(ei3.6) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	0.000	10.000	0.000	990.000	0.000
Total	**0.000**	**10.000**	**0.000**	**990.000**	**0.000**

4.6 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.

4 Scenarios and additional technical information

Waste Scenario	Net output flow [kg]	Energy recovery [MJ]
(ei3.6) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	990.000	0.000
Total	**990.000**	**0.000**

5 Results

For the impact assessment long-term emissions (>100 years) are not considered. 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 TON

CORE ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	B1	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq.	1.31E+2	8.92E+0	1.08E+1	1.51E+2	2.04E+1	-6.33E+0	9.18E-1	6.82E+0	1.61E+0	5.27E-2	-4.17E+0
GWP-f	kg CO_2 eq.	1.31E+2	8.92E+0	1.62E+1	1.56E+2	2.03E+1	-6.33E+0	9.18E-1	6.82E+0	1.61E+0	5.27E-2	-4.15E+0
GWP-b	kg CO_2 eq.	2.66E-1	3.59E-3	-5.36E+0	-5.09E+0	8.20E-3	0.00E+0	1.66E-4	2.75E-3	2.55E-3	3.33E-5	-1.06E-2
GWP-luluc	kg CO_2 eq.	7.06E-2	3.27E-3	1.08E-2	8.47E-2	7.46E-3	0.00E+0	7.22E-5	2.50E-3	3.06E-4	1.47E-5	-4.46E-3
ODP	kg CFC 11 eq.	4.93E-6	1.97E-6	1.68E-6	8.57E-6	4.49E-6	0.00E+0	1.98E-7	1.50E-6	2.09E-7	2.17E-8	-4.15E-7
AP	mol H+ eq.	4.05E-1	5.17E-2	5.85E-2	5.15E-1	1.18E-1	0.00E+0	9.60E-3	3.95E-2	1.01E-2	5.00E-4	-3.00E-2
EP-fw	kg P eq.	4.13E-3	8.98E-5	2.97E-4	4.52E-3	2.05E-4	0.00E+0	3.33E-6	6.87E-5	5.02E-5	5.90E-7	-1.53E-4
EP-m	kg N eq.	7.77E-2	1.82E-2	1.12E-2	1.07E-1	4.16E-2	0.00E+0	4.24E-3	1.39E-2	4.02E-3	1.72E-4	-8.59E-3
EP-T	mol N eq.	9.56E-1	2.01E-1	1.80E-1	1.34E+0	4.58E-1	0.00E+0	4.65E-2	1.54E-1	4.47E-2	1.90E-3	-9.97E-2
POCP	kg NMVOC eq.	2.99E-1	5.73E-2	4.23E-2	3.99E-1	1.31E-1	0.00E+0	1.28E-2	4.38E-2	1.21E-2	5.51E-4	-2.75E-2
ADP-mm	kg Sb-eq.	8.81E-4	2.26E-4	2.02E-4	1.31E-3	5.16E-4	0.00E+0	1.41E-6	1.73E-4	4.54E-6	4.82E-7	-2.07E-4
ADP-f	MJ	1.62E+3	1.34E+2	2.80E+2	2.04E+3	3.07E+2	0.00E+0	1.26E+1	1.03E+2	2.16E+1	1.47E+0	-5.18E+1

GWP-total=Global Warming Potential total (GWP-total) | **GWP-f**=Global Warming Potential fossil fuels (GWP-fossil) | **GWP-b**=Global Warming Potential biogenic (GWP-biogenic) | **GWP-luluc**=Global Warming Potential land use and land use change (GWP-luluc) | **ODP**=Depletion potential of the stratosperic ozon layer (ODP) | **AP**=Acidification potential, Accumulated Exceedance (AP) | **EP-fw**=Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) | **EP-m**=Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine) | **EP-T**=Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | **POCP**=Formation potential of tropospheric ozone (POCP) | **ADP-mm**=Abiotic depletion potential for non fossil resources (ADP mm) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprication potential, deprivation-weighted water consumption (WDP)

5 Results

Abbr.	Unit	A1	A2	A3	A1-A3	A4	B1	C1	C2	C3	C4	D
WDP	m3 world eq.	2.85E+1	4.81E-1	2.40E+0	3.14E+1	1.10E+0	0.00E+0	1.69E-2	3.68E-1	9.80E-2	6.60E-2	-5.96E+1

GWP-total=Global Warming Potential total (GWP-total) | **GWP-f**=Global Warming Potential fossil fuels (GWP-fossil) | **GWP-b**=Global Warming Potential biogenic (GWP-biogenic) | **GWP-luluc**=Global Warming Potential land use and land use change (GWP-luluc) | **ODP**=Depletion potential of the stratosperic ozon layer (ODP) | **AP**=Acidification potential, Accumulated Exceedance (AP) | **EP-fw**=Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) | **EP-m**=Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine) | **EP-T**=Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | **POCP**=Formation potential of tropospheric ozone (POCP) | **ADP-mm**=Abiotic depletion potential for non fossil resources (ADP mm) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprication potential, deprivation-weighted water consumption (WDP)

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	B1	C1	C2	C3	C4	D
PM	disease incidence	3.30E-6	7.99E-7	5.83E-7	4.69E-6	1.82E-6	0.00E+0	2.55E-7	6.11E-7	2.23E-7	9.72E-9	-5.17E-7
IR	kBq U235 eq.	2.89E+0	5.63E-1	3.09E-1	3.76E+0	1.29E+0	0.00E+0	5.41E-2	4.31E-1	6.86E-2	6.04E-3	-2.09E-1
ETP-fw	CTUe	2.03E+3	1.20E+2	1.92E+2	2.34E+3	2.74E+2	0.00E+0	7.62E+0	9.17E+1	1.75E+1	9.55E-1	-8.36E+1
HTP-c	CTUh	8.80E-8	3.89E-9	1.03E-8	1.02E-7	8.88E-9	0.00E+0	2.66E-10	2.97E-9	4.16E-10	2.21E-11	-3.09E-9
HTP-nc	CTUh	1.35E-6	1.31E-7	1.79E-7	1.66E-6	3.00E-7	0.00E+0	6.55E-9	1.00E-7	1.18E-8	6.79E-10	-8.72E-8
SQP	Pt	2.15E+2	1.17E+2	1.15E+3	1.48E+3	2.66E+2	0.00E+0	1.61E+0	8.91E+1	3.61E+0	3.09E+0	-6.69E+1

PM=Potential incidence of disease due to PM emissions (PM) | **IR**=Potential Human exposure efficiency relative to U235 (IRP) | **ETP-fw**=Potential Comparative Toxic Unit for ecosystems (ETP-fw) | **HTP-c**=Potential Comparative Toxic Unit for humans (HTP-c) | **HTP-nc**=Potential Comparative Toxic Unit for humans (HTP-nc) | **SQP**=Potential soil quality idex (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

5 Results

ILCD classification	Indicator	Disclaimer
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
	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	B1	C1	C2	C3	C4	D
ADPE	kg Sb eq.	8.82E-4	2.26E-4	2.02E-4	1.31E-3	5.16E-4	0.00E+0	1.41E-6	1.73E-4	4.54E-6	4.82E-7	-2.07E-4
GWP	kg CO_2 eq.	1.29E+2	8.84E+0	1.61E+1	1.53E+2	2.02E+1	-6.33E+0	9.08E-1	6.76E+0	1.59E+0	5.17E-2	-4.06E+0
ODP	kg CFC 11 eq.	4.86E-6	1.57E-6	1.51E-6	7.93E-6	3.57E-6	0.00E+0	1.57E-7	1.20E-6	1.74E-7	1.72E-8	-3.54E-7

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

Abbr.	Unit	A1	A2	A3	A1-A3	A4	B1	C1	C2	C3	C4	D
POCP	kg ethene eq.	5.87E-2	5.33E-3	8.19E-3	7.22E-2	1.22E-2	0.00E+0	9.25E-4	4.08E-3	9.09E-4	5.51E-5	-3.00E-3
AP	kg SO_2 eq.	3.24E-1	3.88E-2	4.30E-2	4.06E-1	8.86E-2	0.00E+0	6.85E-3	2.97E-2	7.36E-3	3.78E-4	-2.31E-2
EP	Kg PO43- eq.	5.09E-2	7.66E-3	7.36E-3	6.59E-2	1.75E-2	0.00E+0	1.56E-3	5.86E-3	1.64E-3	7.29E-5	-3.76E-3

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

NATIONAL ANNEX NMD

Abbr.	Unit	A1	A2	A3	A1-A3	A4	B1	C1	C2	C3	C4	D
ADPF	kg Sb eq.	8.26E-1	6.50E-2	1.44E-1	1.04E+0	1.48E-1	0.00E+0	5.99E-3	4.97E-2	1.13E-2	7.04E-4	-2.74E-2
HTP	kg 1,4 DB eq.	2.41E+1	3.72E+0	4.64E+0	3.24E+1	8.49E+0	0.00E+0	3.36E-1	2.85E+0	3.78E-1	2.34E-2	-1.88E+0
FAETP	kg 1,4 DB eq.	5.52E-1	1.09E-1	1.26E-1	7.86E-1	2.48E-1	0.00E+0	4.68E-3	8.31E-2	6.52E-3	5.54E-4	-2.91E-2
MAETP	kg 1,4 DB eq.	1.47E+3	3.91E+2	2.05E+2	2.06E+3	8.92E+2	0.00E+0	1.63E+1	2.99E+2	2.46E+1	1.98E+0	-1.21E+2
TETP	kg 1,4 DB eq.	1.90E-1	1.31E-2	6.70E-2	2.70E-1	3.00E-2	0.00E+0	5.54E-4	1.00E-2	4.65E-3	5.87E-5	-9.77E-3

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

5 Results

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	B1	C1	C2	C3	C4	D
PERE	MJ	6.46E+1	1.68E+0	1.82E+2	2.48E+2	3.84E+0	0.00E+0	6.83E-2	1.29E+0	1.23E+0	1.19E-2	-3.59E+0
PERM	MJ	0.00E+0	0.00E+0	5.60E+1	5.60E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	6.46E+1	1.68E+0	2.38E+2	3.04E+2	3.84E+0	0.00E+0	6.83E-2	1.29E+0	1.23E+0	1.19E-2	-3.59E+0
PENRE	MJ	1.37E+3	1.43E+2	2.67E+2	1.78E+3	3.26E+2	0.00E+0	1.34E+1	1.09E+2	2.31E+1	1.56E+0	-5.50E+1
PENRM	MJ	3.69E+2	0.00E+0	3.86E+1	4.08E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	MJ	1.74E+3	1.43E+2	3.05E+2	2.19E+3	3.26E+2	0.00E+0	1.34E+1	1.09E+2	2.31E+1	1.56E+0	-5.50E+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
RSF	MJ	8.88E+1	0.00E+0	1.94E+0	9.07E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	MJ	5.29E+1	0.00E+0	1.16E+0	5.41E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	m^3	9.32E-1	1.64E-2	6.37E-2	1.01E+0	3.74E-2	0.00E+0	6.50E-4	1.25E-2	7.23E-3	1.57E-3	-1.40E+0

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

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3	A4	B1	C1	C2	C3	C4	D
HWD	Kg	2.83E-3	3.41E-4	7.52E-4	3.92E-3	7.78E-4	0.00E+0	3.44E-5	2.61E-4	3.77E-5	2.20E-6	-1.05E-4
NHWD	Kg	4.99E+0	8.53E+0	1.31E+0	1.48E+1	1.95E+1	0.00E+0	1.50E-2	6.52E+0	3.01E+0	1.00E+1	-5.62E-1
RWD	Kg	1.92E-3	8.85E-4	3.30E-4	3.14E-3	2.02E-3	0.00E+0	8.76E-5	6.77E-4	9.71E-5	9.67E-6	-2.27E-4

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	B1	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
MFR	Kg	0.00E+0	0.00E+0	2.20E+1	2.20E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.90E+2	0.00E+0	0.00E+0
MER	Kg	0.00E+0	0.00E+0	4.03E-3	4.03E-3	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	1.73E-1	1.73E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	MJ	0.00E+0	0.00E+0	1.10E-1	1.10E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	MJ	0.00E+0	0.00E+0	6.36E-2	6.36E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

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 TON

BIOGENIC CARBON CONTENT

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

Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	1.818	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
Packaging	6.667	kg CO2 (biogenic)

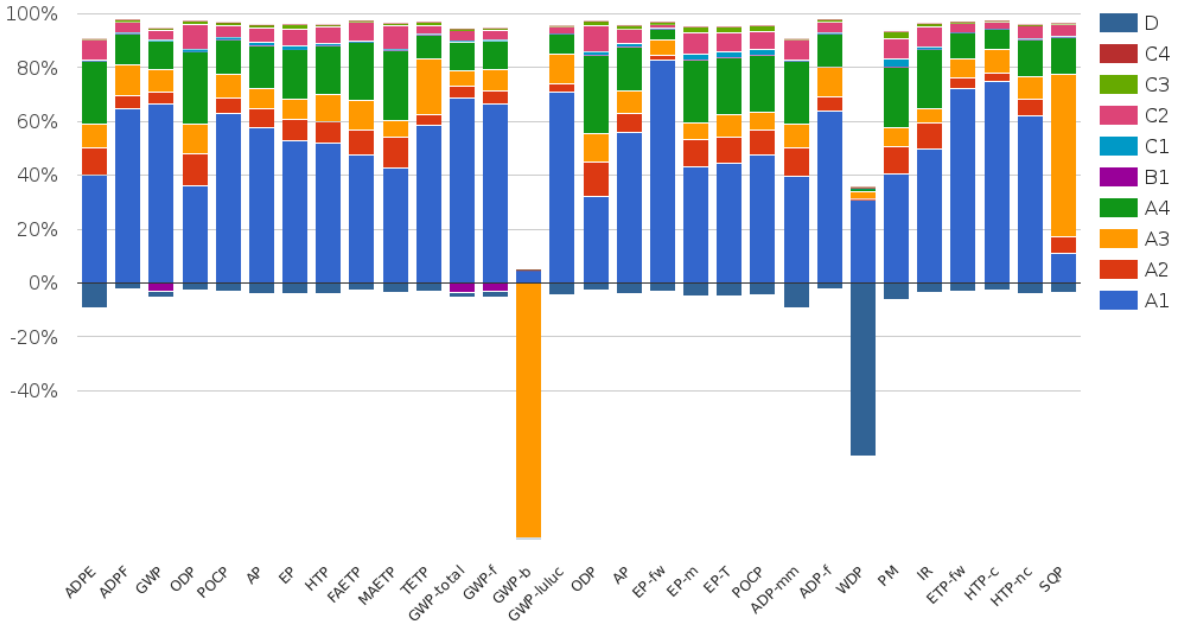
5 Results

5.4 ENVIRONMENTAL COST INDICATOR NL PER TON

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 2010	Share in total (%)
A1 Raw Materials Supply	€ 10.77	67,0 %
A2 Transport	€ 1.07	6,6 %
A3 Manufacturing	€ 1.53	9,5 %
A4 Transport from the gate to the site	€ 2.43	15,1 %
B1 Use	€ -0.32	-2,0 %
C1 De-construction / demolition	€ 0.12	0,8 %
C2 Transport	€ 0.81	5,1 %
C3 Waste processing	€ 0.16	1,0 %
C4 Disposal	€ 0.01	0,0 %
D Benefits and loads beyond the product system boundary	€ -0.52	-3,2 %
ECI NL 2010 per functional unit	**€ 16.07**	

6 Interpretation of results



Modules A1 and A4 have an important contribution in all the environmental categories except in GWP-luluc and GWP-b where Module A3 is dominant. This dominance of module A3 is due to the green electricity which comes from a mix of wood, biogas from manure, bio-waste, wind and hydro. All those sources use land.

Dominance of module A1 is due to the production process of cement in which incineration releases fossil carbon dioxide.

Dominance of module A2 is due to the raw material transport from suppliers to our production site.

Dominance of module A4 is due to the product transportation, predefined by the NMD Determination method v 1.1 | set1+2 at 150km in the Netherlands, for packed products.

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 1.2, August 2024, foundation NMD

NMD Determination method
NMD Determination method Environmental performance Construction works v1.2 | set1+2

NL-PCR Cement and raw materials for cement production
Product Category Rules for cement and raw materials for cement production v1.0 April 2023, SGS INTRON B.V.

SGS LCA Report
Comparison between a staircase made of 3D printed concrete and a traditional prefab staircase. 2021.

8 Contact information

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