LCA background report

Deventer rec 1248 C30/37 XC4 F4 N32 Valewaard (Q3 2026) 3.9.1 Acc. to PCR

Bruil

Programme operator:	Stichting NMD
Calculation number:	ReTHiNK-223346
Generation on:	01-10-2026
Issue date:	
Valid until:	
Status:	valid

R<THiNK



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NOT VERIFIED

1 Verification of the life cycle assessment

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

NOT VERIFIED

2 General

2.1 INTRODUCTION

This report for review is a result of a life cycle analysis (LCA) made by using the R<THINK application. The report is based on the following chapters which correspond to the phases of a LCA.

- Goal and Scope Definition
- Life Cycle Inventory
- Impact assessment
- Interpretation of results

2.2 COMPANY INFORMATION / DECLARATION OWNER

Declaration owner: Bruil

Address: Keesomstraat 9, 6717 AH Ede

E-mail: info@bruil.nl

Website: www.bruil.nl

Production location: Bruil Beton & Mix Deventer (3.9.1)

Address production location: Westfalenstraat 10, 7418 DB Deventer

2.3 INFORMATION LCA CALCULATION

LCA calculation for: Deventer rec 1248 C30/37 XC4 F4 N32 Valewaard (Q3 2026) 3.9.1 Acc. to PCR

Calculation number: ReTHiNK-223346

Generation on: 01-10-2026

Date of issue:

End of validity:

Version calculation core R<THINK: v2.0

Version Environmental Profile database: v3.20f (20260507)

PCR:

EN 15804:2012+A2:2019/AC:2021

Classification: -

2.4 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.

NOT VERIFIED

2.5 CALCULATION BASIS

LCA method R<THINK: NMD Determination method v 2.0 | Set 2

Characterization method: RETHINK characterization method (see references for more details)

LCA database profiles: ecoinvent (for version see references)

Version database: v3.20f (20260507)

2.6 COMPILER LCA

The project team for drafting this LCA consists the following persons

Bruil Beton B.V.
Arno Reuling, KAM-Manager
André Endeman, Beton Technoloog

2 General

2.7 ABBREVIATIONS

EPD
Environmental Product Declaration

RSL
Reference service life

LCA
Life Cycle Assessment

PCR
Product Category Rules

NOT VERIFIED

3 Product

3.1 PRODUCT DESCRIPTION

De geautomatiseerde productie van betonspecie voldoet aan KOMO® productcertificaat op basis van BRL 1801.

Productspecificaties:

- Productgroep: Betonmortel standaard
- Producten: Constructiebeton
- Sterkteklasse: **C30/37** Milieuklasse: **XC4**
- Volumieke massa betonspecie: **2352.45** kg/m³

Disclaimer:

De EPD van betonspecies zijn niet vergelijkbaar indien ze niet aan de Bepalingsmethode, PCR Cement of dezelfde database voldoen.

De resultaten in deze EPD vertegenwoordigen de stand van kennis en de geldende methodiek ten tijde van uitgifte. Tenzij anders overeengekomen, zijn de resultaten van deze EPD niet onafhankelijk getoetst bij uitgifte en worden deze niet als statisch of bevroren beschouwd. Toekomstige wijzigingen in software, rekenmethoden (Bepalingsmethode), databases, beschikbare productinformatie of regelgeving kunnen invloed hebben op de gerapporteerde resultaten. Bruil behoudt zich het recht voor om de resultaten en bijbehorende documentatie dienovereenkomstig te actualiseren.

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3.2 APPLICATION (INTENDED USE OF THE PRODUCT)

In-situ beton wordt op de bouwplaats gestort en toegepast voor uiteenlopende constructieve elementen zoals funderingen, vloeren, wanden, kolommen en kernen. Door de beschikbaarheid van verschillende sterkte- en milieuklassen is het geschikt voor zowel woningbouw als utiliteits- en infraprojecten, afhankelijk van de constructieve en duurzaamheidseisen.

3.3 TECHNICAL DATA

Voor de technische data van dit product wordt verwezen naar de korrelverdeling en betonsamenstelling.

3.4 SUBSTANCES OF VERY HIGH CONCERN

De toegepaste materialen bevatten geen Zeer Zorgwekkende Stoffen (ZZS/SVHC) boven de wettelijk vastgestelde drempelwaarde.

3.5 DESCRIPTION OF THE PRODUCTION PROCESS

Productie proces

Bruil beschikt over het CSC certificaat GOUD wat verzekerd dat de producten op een duurzame manier worden geproduceerd. De combinatie van CSC samen met onze certificering voor de MVO prestatieladder en de CO2 prestatieladder geeft ons een stabiel platform om onze missie uit te werken en te borgen.
De meeste grondstoffen zijn vermeld in de NMD en getoetst volgens het NMD-toetsingsprotocol.
Bruil beton en mix beschikt over verschillende productie locaties voor de productie van betonspecie.
De productie van deze betonspecie vind plaats op onze productielocatie in :

DEVENTER

Aanvoer grondstoffen en materialen
Toeslagmateriaal wordt voor het gros per schip aangevoerd.
Cementen en andere materialen worden per as aangevoerd.
Grondwater voor productie staat vermeld met profiel “Tapwater-part of the product” voor de juiste berekening in de tool. Inputs in R<THiNK moeten gekoppeld worden aan een leverancier, de afstand is 0 km, daardoor is het transportmiddel niet meer van belang.

Productieproces

Het productieproces is volledig geautomatiseerd. De productielocatie bestaat uit opslagterrein voor toeslagmaterialen, silo's voor opslag verschillende cementsoorten. Daarnaast kunnen hulpstoffen en andere toevoegingen worden toegevoegd aan de betonspecie. Toepassing van grondwater. De betonspecie wordt door de mixer opgenomen voor transport.

Reiniging

De mengunit wordt gereinigd met grondwater. Dit spoelwater wordt opgevangen en geschikt gemaakt voor hergebruik.

Restmateriaal

Het restmateriaal aan betonspecie wordt hergebruikt of aangeboden voor recycling tot een nieuwe grondstof voor de betonmortel.

Energie en watergebruik

3 Product

Elektriciteit: groene stroom, Hollandse windenergie van GvO. (bron: Eneco)
Aardgas: grijs (bron Eneco)
Water: leidingwater (bron Vitens)
Grondwater

Allocatie

De allocatie van energie is het gemiddelde van het totale jaarverbruik gedeeld door de productie.
Elektriciteit wordt verbruikt voor het productieproces, heftruck en overige bedrijfsinrichting.
Aardgas wordt verbruikt voor verwarming van kantoren en bedrijfshallen en vorstvrij houden van fabriek.
Spoelwater voor reiniging mengunit en mixers wordt opgevangen en hergebruikt.

Afval

Bedrijfsafval: container (bron: overzicht afvalinzamelaar)
Papier/karton: container (bron: overzicht afvalinzamelaar)

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Bouw- en & Sloopafval: restmateriaal/afkeur (bron: overzicht afvalinzamelaar)
Afvalwater op gemeentelijke riool. Verder geen emissies naar lucht of bodem.
Restbetonafval wordt geschikt gemaakt voor hergebruik.

3.6 REFERENCE SERVICE LIFE

RSL PRODUCT

Betonspecie voldoet aan de levensverwachting van **50 jaar** indien geleverd is volgens: **NEN-EN 206 + NEN 8005:2017 zie bijlage F.**

www.betonhuis.nl/betonhuis/beton-en-de technische-levensduur

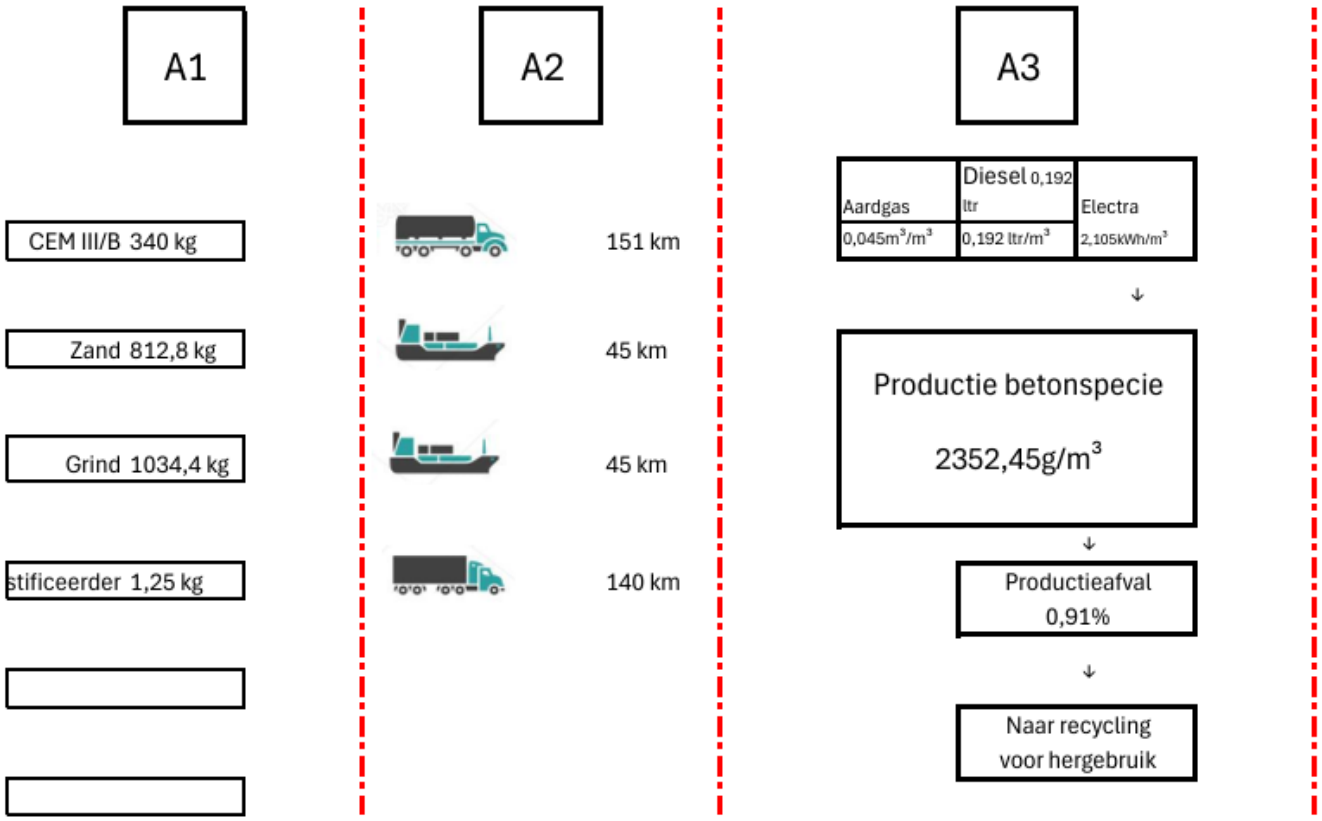
USED RSL (YR) IN THIS LCA CALCULATION:

50

3 Product

3.7 PRODUCT FLOW DIAGRAM

Proces flow Bruil beton&mix centrale Deventer rec 1248



4 Goal and Scope Definition

4.1 PURPOSE AND TARGET GROUPS

The purpose of this LCA is to compile environmental data of materials and products used in the built environment. So that the environmental data can be used in calculations of buildings and / or civil works. The purpose of this report is to draw up a review dossier with the results of 'set 1' and 'set 2' for the product as mentioned in the NMD Determination method Environmental performance Construction works v1.2 December 2024. This document defines a standardized method for a LCA in the Netherlands, of a product used in the build environment, in addition to EN 15084+A2.The review dossier is in accordance with EN15804+A2, ISO14040 and ISO14044.

The target groups of this LCA study are: Users of the NMD or programs that use this database, such as BREEAM-NL, GPR gebouw and GPR bouwbesluit, MRPI freetool, DuboCalc, etc..

EPD is for Business-to-Business (B2B) communication. All buyers of Bruil concrete will also be able to use this LCA.

4.2 DECLARED UNIT

Reference unit: m3

4.3 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	m3
Weight per reference unit	2352.450	kg
Conversion factor to 1 kg	0.000425	m3

4.4 REPRESENTATIVENESS

The input data are representative for **Deventer rec 1248 C30/37 XC4 F4 N32 Valewaard (Q3 2026) 3.9.1 Acc. to PCR**, a product of Bruil beton&mix-NL. The data is representative for this production location, so data cannot be used for other production locations of Bruil or by other concrete suppliers.

NOT VERIFIED

4 Goal and Scope Definition

4.5 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle-to-gate 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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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 = Deconstruction / 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	

NOT VERIFIED

4 Goal and Scope Definition

4.6 CUT-OFF CRITERIA

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 or 5% on impact per environmental effect.

The production stage consists of the production and extraction of raw materials, including all steps for transportation of the raw materials, processing the raw materials into materials and the production of the product. The system boundary to nature is considered and included in the Eco-Invent processes. The required energy for production, external treatments, ancillary materials, packaging material and production emissions are considered and included where necessary.

Assumed is that the capital goods and infrastructure processes have a negligible contribution. The capital goods associated with the manufacturing facility have a negligible contribution to the total production. These processes are not taken in account in this LCA, except such processes that are included in the Ecoinvent background data

4.7 ALLOCATION

Allocatie

De allocatie van energie is het gemiddelde van het totale jaarverbruik gedeeld door de productie.

Elektriciteit wordt verbruikt voor het productieproces, heftruck en overige bedrijfsinrichting. Groene stroom, Hollandse windenergie voorzien van Garantie van Oorsprong.

Aardgas wordt verbruikt voor verwarming van kantoren en bedrijfshallen en vorstvrij houden van fabriek.

Spoelwater voor reiniging mengunit en mixers wordt opgevangen en hergebruikt.

ALLOCATION USED ENVIRONMENTAL PROFILES / DATASETS

There is no allocation applied for the environmental profiles / datasets used in this LCA. For the sake of clarity, the generic processes which are not changed (e.g. EcoInvent waste treatment processes) are not shown in this overview.

4.8 DATA COLLECTION & REFERENCE PERIOD

De samenstelling van het product en de energiegegevens zijn conform de werkwijze en verbruiken in **2025**.

4.9 ESTIMATES AND ASSUMPTIONS

Er zijn geen belangrijke aannames gemaakt die niet elders in het rapport zijn benoemd. Indien er aannames zijn gedaan zijn deze gebaseerd op een worst-case aanname.

4.10 DATA QUALITY

De data verzameld beslaat fabrieksgemiddelden.

Compleetheid

Compleetheid milieu-ingrepen: Alle milieu-ingrepen voor zover bekend zijn beschouwd (**score 1**).
Compleetheid economische stromen: De stromen die naar verwachting relevant zijn voor het milieuprofiel van het proces, zijn gekwantificeerd en gekwalificeerd (**score 1**).
Compleetheid massabalans: Massabalans op procesniveau en productielocatie (bedrijfsniveau) is sluitend t.o.v. het totaal van producten + emissies + afval (**score 1**).
Compleetheid energiebalans: Een energiebalans is aanwezig (jaargegevens), voor de productielocatie zijn alle energiebronnen in kaart zijn gebracht en gerelateerd aan de netto productiehoeveelheid (**score 1**).

Representativiteit

Tijdsgebonden representativiteit: Alle data heeft betrekking op de jaargegevens van de productielocatie, die niet ouders is dan <2 jaar (**score 1**).
Geografische representativiteit: De productie locatie bevindt zich in Nederland en staat daarmee in directe relatie met het gewenste gebied (**score 1**).
Technologische representativiteit: Gegevens van het bedrijf, proces en product van studie zijn gangbaar voor de periode die in de LCA wordt bestudeerd (**score 1**) en de vormgeving heeft specifiek betrekking op het uitgewerkte product (**score 1**).

Consistentie en reproduceerbaarheid

Reproduceerbaarheid door derden: Op basis van de uitgangspunten in dit (achtergrond)rapport is het goed mogelijk om de LCA te reproduceren de resultaten te verifiëren (**score 1**).

4.11 POWER MIX

Elektriciteitsmix: Electricity, 100% wind power (NL) - low voltage (max 1kV) [Location-based approach – foreground data] met Grantie van Oorsprong.

NOT VERIFIED

5 Life Cycle Inventory

5.1 RAW MATERIALS SUPPLY (A1)

To produce the product the following raw material inputs are needed per m3. The net amounts (leaving the factory gate as a product) are displayed. Excluding additional amounts related to production waste, construction waste, etc., these amounts are declared at the module they appear. The waste scenario is declared per modeled input to show the link between the amounts accounted for waste processing and the net raw material input. However, waste processing, final disposal and loads and benefit beyond the system boundaries are not declared in module A1 but in C3, C4 and D." The total amount of secondary content at the last row of the table is displayed in kilograms.

Description	Environmental profile / dataset used*	Amount	Unit	Secondary content [%]	LHV [MJ/kg]	Supplier	Comments
CEM III/B	CEM III/B 42,5 N-LH/SR (na), Spenner, Duisburg, [NL-PCR Cement], A1-A3, cat 1, (03-2030)	340.000	kg	0.00		Spenner zement Duisburg	Leverancier: Spenner Laadplaats: Am Röhrenwerk 52 Duisburg Aanvoer per as
Water	(ei3.9.1) Tap water - part of the product | market group for (RER)	164.000	kg	0.00		Grondwater voor productie	Grondwater voor productie staat vermeld met profiel "Tapwater-part of the product" voor de juiste berekening in de tool. Tapwater-part of the product: geen vermelding van "leverancier". Afstand is 0, daardoor transportmiddel niet van belang.
Zand 0-4	Industrial sand, average NL [Cascade]	812.800	kg	0.00		K3 Havikerwaard	Leverancier: K3 Delta Laadplaats: Havikerwaard 8a de Steeg Aanvoer per schip
Grind 4-32	Gravel 4-32, average NL [Cascade]	1034.400	kg	0.00		K3 Havikerwaard	Leverancier: K3 Delta Laadplaats: Havikerwaard 8a de Steeg Aanvoer per schip
Plastificeerder	(ei3.9.1) Plasticiser, for concrete, based on sulfonated melamine formaldehyde {GLO}| production | Cut-off, U	1.250	kg	0.00		Master Builders Solutions	Leverancier: Master Builders Solution Karolusstraat 2, Oosterhout Aanvoer per as
Total [kg]		**2352.450**		**0.000**			

NOT VERIFIED

* A shortened name for the used process/data set is presented in the report. The full name of the used data set is shown at Annex 10.3

5 Life Cycle Inventory

5.2 TRANSPORT TO MANUFACTURER (A2)

Aanvoer grondstoffen en materialen

Toeslagmateriaal wordt voor het gros per schip aangevoerd.

Cementen en andere materialen worden per as aangevoerd.

Bruil heeft afspraken met leveranciers van grondstoffen betreffende milieu klasse van de transportmiddelen, Bruil verklaard dat alle aanleveringen met EURO 5 of beter wordt volbracht bij transport per as

The raw materials are transported from the production location and/or mining location of the supplier to the production location of the manufacturer. The following transport conveyances and distances are applicable for suppliers of the raw materials.

Supplier	Transport conveyance 1	Distance 1 [km]	Transport conveyance 2	Distance 2 [km]	Transport conveyance 3	Distance 3 [km]	Transport conveyance 4	Distance 4 [km]	Transport conveyance 5	Distance 5 [km]
Spenner zement Duisburg	(ei3.9.1) Lorry (Truck) >32t, EURO6 | market for (EU)	151								
K3 Havikerwaard	(ei3.9.1) Barge (inland waterways)	45								
Master Builders Solutions	(ei3.9.1) Lorry (Truck) >32t, EURO5 | market for (EU)	140								

NOT VERIFIED

5.3 PRODUCTION PROCESS (A3)

ENERGY CONSUMPTION
Energie

Elektriciteit: groene stroom, Hollandse windenergie van GvO. (bron: Eneco)

Certificaat kan op verzoek aangeleverd worden.

Energieverbruiken van shovel en heftruck zijn meegenomen in de gealloceerde hoeveelheden

To produce the product the following energy inputs are modeled per reference unit (m3).

5 Life Cycle Inventory

Description	Environmental profile / dataset used*	Amount	Unit	Supplier	Comments
Aardgas	(ei3.9.1) Gas, natural gas (incl. emissions) (31,65MJ/Nm3)	0.045	m3	n.a.	
Diesel	(ei3.9.1) Diesel, burned in machine (incl. emissions)	0.192	l	n.a.	Verbruik shovel en loskraan
Elektra	(ei3.9.1) Electricity (NL) - low voltage (max 1kV)	2.105	kWh	n.a.	

* A shortened name for the used process/data set is presented in the report. The full name of the used data set is shown at Annex 10.3

EMISSIONS

No emissions to soil, water and/or air are taken into account in the LCA calculation.

EXTERNAL TREATMENTS

No treatments are performed by an external party during the production of the product.

PRODUCTION WASTE

Omdat het productieproces is volledig geautomatiseerd, is er minder productieverlies. Het restmateriaal aan betonspecie wordt hergebruikt of aangeboden voor recycling tot een nieuwe grondstof voor de betonmortel. De data hiervan is op te vragen bij Bruil. Deze locatie had een productieverlies in **2025** van **0.91**%.

NOT VERIFIED

The following amount of waste is generated during production per m3 of the product. The additional needed raw materials, transport to the production plant and waste processing of the production waste up to the end-of-waste state are are all included in module A3. Detailed information of the used waste scenario(s) can be found at chapter 6 Waste scenarios.

Description	Environmental profile / dataset used*	Amount	Unit	Secondary content [%]	LHV [MJ/kg]	Supplier	Waste Scenario used
CEM III/B	CEM III/B 42,5 N-LH/SR (na), Spenner, Duisburg, [NL-PCR Cement], A1-A3, cat 1, (03-2030)	3.094	kg	0.00		Spenner zement Duisburg	(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)
Water	(ei3.9.1) Tap water - part of the product | market group for (RER)	1.492	kg	0.00		Grondwater voor productie	(ei3.9.1) waste not applicable or evaporated (empty scenario) (NMD ID 26)
Zand 0-4	Industrial sand, average NL [Cascade]	7.396	kg	0.00		K3 Havikerwaard	

5 Life Cycle Inventory

Description	Environmental profile / dataset used*	Amount	Unit	Secondary content [%]	LHV [MJ/kg]	Supplier	Waste Scenario used
							(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)
Grind 4-32	Gravel 4-32, average NL [Cascade]	9.413	kg	0.00		K3 Havikerwaard	(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)
Plastificeerder	(ei3.9.1) Plasticiser, for concrete, based on sulfonated melamine formaldehyde {GLO}| production | Cut-off, U	0.011	kg	0.00		Master Builders Solutions	(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)
Total [kg]		**21.407**	**0.000**				

* A shortened name for the used process/data set is presented in the report. The full name of the used data set is shown at Annex 10.3

NOT VERIFIED

PACKAGING MATERIALS

No packaging materials are included in this LCA calculation.

ANCILLARY MATERIALS

No ancillary/auxcillary materials are included in this LCA calculation.

TRANSPORT TO MANUFACTURER

The following transport conveyances and distances to the production location are assumed. The supplier is stated per input flow at this module. The suppliers taken into account for production waste aree equal to the supplier declared per input in chapter 5.2.

OUTPUT FLOWS AT MODULE A3

The waste scenario(s) applicable for the production waste and/or ancillary materials are resulting in the following output flows at module A3:

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
Production waste					
(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	0	0.1991	0	19.72	0
Total	**0.000**	**0.199**	**0.000**	**19.716**	**0.000**

5 Life Cycle Inventory

In the EN15804 is stated that, as a general rule, potential loads and/or benefits from modules A1-A3 do not appear in module D. Therefore the potential loads and/or benefits from A1-A3 as a result of the net output flows from the production stage are declared in module A3. The following table shows the amount of potential loads and/or benefits beyond the system boundaries that are taken into account.

The primary equivalent that has been accounted as benefit when recycling and/or reusing primary material (net output) are stated in chapter 6 Waste scenarios. This chapter also contains the process taken into account as a benefit for energy recovery for the energy amount as stated in the following table.

The net output flow [kg] is determined by reducing the 'materials for recycling [kg]' by the amount of 'secondary material input [kg]' resulting in the net output flow.

Waste Scenario	Recycling [kg]	Secondary material input [kg]	Net output flow [kg]	Re-use [kg]	Energy recovery [MJ]
Production waste					
(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	19.72	0	19.72	0	0
Total	**19.716**	**0.000**	**19.716**	**0.000**	**0.000**

NOT VERIFIED

The amount of secondary material input during the production stage by using extra material to compensate production losses is based on the following raw materials which contain (partly) secondary content:

Environmental profile / dataset	Secondary material input [kg]	Primary equivalent for secondary material input
Total	**0.000**	

6 Waste Scenarios

In this chapter the used waste scenarios for waste generated during production, construction, use and end-of-life are shown. Per needed input at every stage of the life cycle assessment the used waste scenario is declared. The used scenario design, used processes for impacts and other assumptions are listed per paragraph in this chapter.

6.1 SCENARIO DESIGN

The following scenario design is used per type of waste scenario.

Waste Scenario	Region	Not removed (stays in work) [%]	Landfill [%]	Incineration [%]	Recycling [%]	Re-use [%]
(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	NL	0	1	0	99	0
(ei3.9.1) waste not applicable or evaporated (empty scenario) (NMD ID 26)	NL	0	0	0	0	0

The following considered transport conveyance(s) and distances per waste flow are used for the (different) waste scenario(s).

Waste Scenario	Transport conveyance*	Not removed (stays in work) [km]	Landfill [km]	Incineration [km]	Recycling [km]	Re-use [km]
(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	50
(ei3.9.1) waste not applicable or evaporated (empty scenario) (NMD ID 26)	(ei3.9.1) Lorry (Truck), unspecified (default) | market group for (GLO)	0	0	0	0	0

NOT VERIFIED

* A shortened name for the used process/data set is presented in the report. The full name of the used data set is shown at Annex 10.3

6.2 END OF WASTE STATUS

In accordance with the EN 15804+A2:2019 all process needed up until the end-of-waste state must be taken into account in module C. In the following table the assumed end-of-waste state for recycling for each used waste scenario is listed. When not applicable, when for example the scenario consists only of 100% incineration, it is declared at the waste scenario.

6 Waste Scenarios

Waste Scenario	Substantiation End-of-Waste status
(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	The criteria for the end-of-waste status of recycled granulate are taken from the national regulation for the Netherlands. All the operations necessary to reach end-of-waste status are part of the reprocessing. [Recycling granulates from stony waste: Regulation No. IENM/BSK-2015/18222 of 5 February 2015]
(ei3.9.1) waste not applicable or evaporated (empty scenario) (NMD ID 26)	Not applicable

NOT VERIFIED

6 Waste Scenarios

6.3 WASTE PROCESSING

The following processes are taken into account for each waste processing type. The applicable amount(s) can be found at chapter 5, where all inventory data is declared.

Waste Scenario	Waste processing type	Used environmental profile / dataset*
(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	Recycling	(ei3.9.1) Crushing, per kg stoney material [NMD generic]

* A shortened name for the used process/data set is presented in the report. The full name of the used data set is shown at Annex 10.3

6.4 FINAL DISPOSAL

For final disposal the following process(es) are considered for the different types of final disposal. The applicable amount(s) can be found at chapter 5, where all inventory data is declared.

NOT VERIFIED

Waste Scenario	Type of final disposal	Used environmental profile / dataset*
(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	Landfill	(ei3.9.1) Waste concrete {Europe without Switzerland}| treatment of waste concrete, inert material landfill

* A shortened name for the used process/data set is presented in the report. The full name of the used data set is shown at Annex 10.3

6.5 LOADS FROM END-OF-WASTE STATE TO POINT OF SUBSTITUTION

When the substituted process for recycling and/or reuse of primary content goes beyond the end-of-waste state. An additional burden should be taken into account in module D for the difference between the end-of-waste state and the substituted process. When applicable, in the following table the additional process taken into account is declared per waste scenario.

Waste Scenario	Loads from EoW to point of substitution	Used environmental profile / dataset*
(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	Recycling	

6 Waste Scenarios

* A shortened name for the used process/data set is presented in the report. The full name of the used data set is shown at Annex 10.3

6.6 BENEFITS RECYCLING AND/OR RE-USE

When recycling or reusing a raw material of product a benefit may be taken into account in module D. The following table shows the waste scenario's where recycling is applicable and which process is used as avoided primary equivalent. Also the used Q factor is declared and substantiated.

Waste Scenario	Benefit for	Avoided primary equivalent	Q factor (Qr out / Qsub)	Substantiation Q factor
(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	Recycling	(ei3.9.1) Gravel, round | gravel and sand quarry operation (RoW)	1	No loss of quality when recycling the material

6.7 LOADS SECONDARY MATERIAL LOST

NOT VERIFIED

In R<THiNK the net output flow is determined by reducing the materials for recycling by the secondary material input. The amount of materials for recycling and the amount of secondary material input are declared in the applicable chapters. The following table shows the Q factor used for secondary material input and the substantiation of the value.

Waste Scenario	Q factor (Qr out / Qsub)	Substantiation Q factor
(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	1	Not applicable

6.8 BENEFITS ENERGY RECOVERY

When waste is incinerated with energy recovery a benefit may be taken into account in module D. The following table shows the waste scenario where benefits related to energy recovery is applicable, which energy process is taken into account for avoided energy production and the used electrical en thermal efficiency.

Waste Scenario	Used environmental profile / dataset*
(ei3.9.1) concrete (i.a. elements, brickwork, reinforced concrete) (NMD ID 9)	not_applicable

* A shortened name for the used process/data set is presented in the report. The full name of the used data set is shown at Annex 10.3

7 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.

7.1 ENVIRONMENTAL IMPACT INDICATORS PER M3

CORE ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	Total
GWP-total	kg CO_2 eq.	1.23E+2	9.40E+0	3.13E+0	1.36E+2	1.36E+2
GWP-f	kg CO_2 eq.	1.22E+2	9.39E+0	3.11E+0	1.34E+2	1.34E+2
GWP-b	kg CO_2 eq.	1.26E+0	3.62E-3	1.35E-2	1.28E+0	1.28E+0
GWP-luluc	kg CO_2 eq.	3.21E-2	1.12E-2	1.31E-3	4.47E-2	4.47E-2
ODP	kg CFC 11 eq.	3.81E-6	1.81E-7	8.69E-8	4.08E-6	4.08E-6
AP	mol H+ eq.	2.33E-1	5.05E-2	1.17E-2	2.96E-1	2.96E-1
EP-fw	kg P eq.	5.38E-3	8.66E-5	9.47E-5	5.56E-3	5.56E-3
EP-m	kg N eq.	5.92E-2	2.04E-2	4.36E-3	8.40E-2	8.40E-2
EP-T	mol N eq.	7.41E-1	2.21E-1	4.87E-2	1.01E+0	1.01E+0
POCP	kg NMVOC eq.	2.30E-1	7.22E-2	1.48E-2	3.17E-1	3.17E-1
ADP-mm	kg Sb-eq.	2.66E-4	1.92E-5	1.24E-5	2.97E-4	2.97E-4
ADP-f	MJ	7.22E+2	1.30E+2	3.47E+1	8.87E+2	8.87E+2
WDP	m3 world eq.	1.63E+1	7.60E-1	-8.41E-1	1.62E+1	1.62E+1

NOT VERIFIED

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)

7 Results

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	Total
PM	disease incidence	2.39E-6	6.04E-7	2.23E-7	3.22E-6	3.22E-6
IR	kBq U235 eq.	1.52E+0	7.74E-2	4.98E-2	1.65E+0	1.65E+0
ETP-fw	CTUe	1.49E+3	6.14E+1	2.22E+1	1.57E+3	1.57E+3
HTP-c	CTUh	1.01E-7	4.32E-9	1.55E-9	1.07E-7	1.07E-7
HTP-nc	CTUh	1.39E-6	7.20E-8	2.84E-8	1.49E-6	1.49E-6
SQP	Pt	2.09E+2	1.14E+2	7.30E+0	3.31E+2	3.31E+2

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 index (SQP)

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

NOT VERIFIED

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
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2

7 Results

ILCD classification	Indicator	Disclaimer
	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.

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

PARAMETERS DESCRIBING RESOURCE USE

Abbr.	Unit	A1	A2	A3	A1-A3	Total
PERE	MJ	5.03E+1	2.37E+0	3.20E+0	5.59E+1	5.59E+1
PERM	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	5.03E+1	2.37E+0	3.20E+0	5.59E+1	5.59E+1
PENRE	MJ	7.75E+2	1.30E+2	3.52E+1	9.40E+2	9.40E+2
PENRM	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	MJ	7.75E+2	1.30E+2	3.52E+1	9.40E+2	9.40E+2
SM	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	MJ	4.17E+1	0.00E+0	3.79E-1	4.20E+1	4.20E+1
NRSF	MJ	1.40E+2	0.00E+0	1.27E+0	1.41E+2	1.41E+2
FW	m^3	5.15E-1	2.47E-2	-1.34E-2	5.26E-1	5.26E-1

NOT VERIFIED

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

7 Results

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3	Total
HWD	Kg	2.14E-3	8.07E-4	1.54E-4	3.11E-3	3.11E-3
NHWD	Kg	6.13E+0	7.11E+0	5.79E-1	1.38E+1	1.38E+1
RWD	Kg	1.99E-3	5.14E-5	4.91E-5	2.09E-3	2.09E-3

HWD=Hazardous waste disposed | **NHWD**=Non-hazardous waste disposed | **RWD**=Radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbr.	Unit	A1	A2	A3	A1-A3	Total
CRU	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	Kg	0.00E+0	0.00E+0	1.97E+1	1.97E+1	1.97E+1
MER	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

NOT VERIFIED

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

7 Results

7.3 INFORMATION ON BIOGENIC CARBON CONTENT PER M3

BIOGENIC CARBON CONTENT

The following Information describes the biogenic carbon content in (the main parts of) the product at the factory gate per m3:

Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	0	kg C

NOT VERIFIED

7 Results

7.4 ENVIRONMENTAL COST INDICATOR NL PER M3

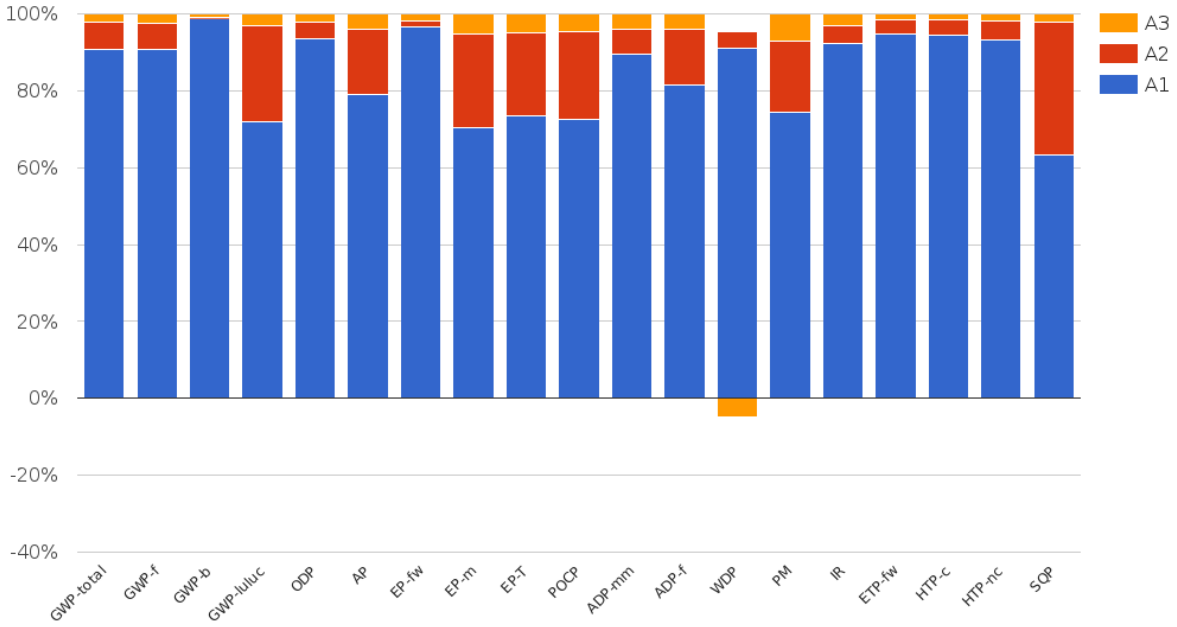
Using the environmental cost indicator (ECI) method, which is presented in the NMD Determination Method (2025), the results are aggregated to the single-point score. The ECI is a relevant valuation method, especially in the Dutch construction sector. In the Netherlands, it is a prerequisite for public 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 2024	Share in total (%)
A1 Raw Materials Supply	€ 17.38	88,2 %
A2 Transport	€ 1.76	8,9 %
A3 Manufacturing	€ 0.56	2,8 %
ECI NL 2024 per functional unit	**€ 19.70**	

NOT VERIFIED

8 Interpretation of results

8.1 CONTRIBUTION ANALYSIS OF THE MODULES



Kijkend naar de 19 gewogen milieu effecten zijn alle 19 die het meest impact hebben op de module A1. Dit zijn:

Global Warming Potential total (GWP-total)
Global Warming Potential fossil fuels (GWP-fossil)
Global Warming Potential biogenic (GWP-biogenic)
Global Warming Potential land use and land use change (GWP-luluc)

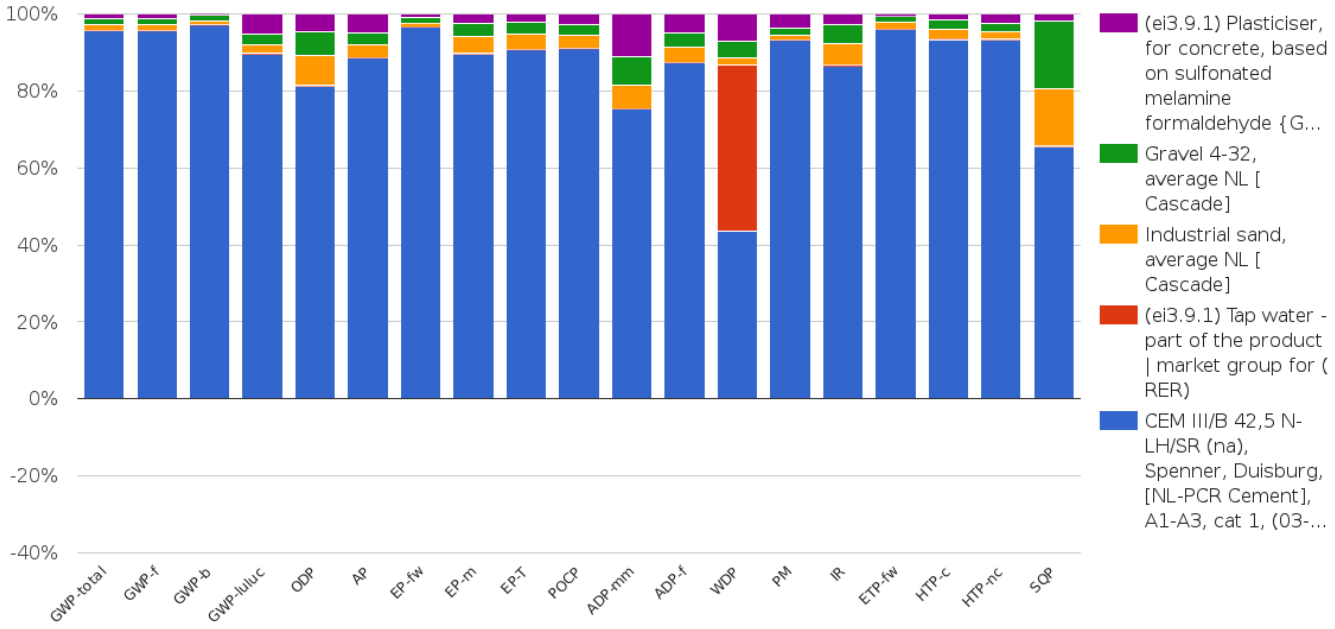
8 Interpretation of results

Depletion potential of the stratosperic ozon layer (ODP)
Acidification potential, Accumulated Exceedance (AP)
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater)
Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine)
Eutrophication potential, Accumulated Exceedance (EP-terrestrial)
Formation potential of tropospheric ozone (POCP)
Abiotic depletion potential for non fossil resources (ADP mm)
Abiotic depletion for fossil resources potential (ADP fossil)
Water (user) deprication potential, deprivation-weighted water consumption (WDP)
Potential incidence of disease due to PM emissions (PM)
Potential Human exposure efficiency relative to U235 (IRP)
Potential Comparative Toxic Unit for ecosystems (ETP-fw)
Potential Comparative Toxic Unit for humans (HTP-c)
Potential Comparative Toxic Unit for humans (HTP-nc)
Potential soil quality index (SQP)

NOT VERIFIED

8 Interpretation of results

8.2 CONTRIBUTION ANALYSIS OF THE RAW MATERIALS (A1)



Analyse zwaartepunt milieulasten grondstoffen A1

CEM III/B	94.7%
Zand	1.7%
Plastificeerder	1.7%
Grind	1.6%

8 Interpretation of results

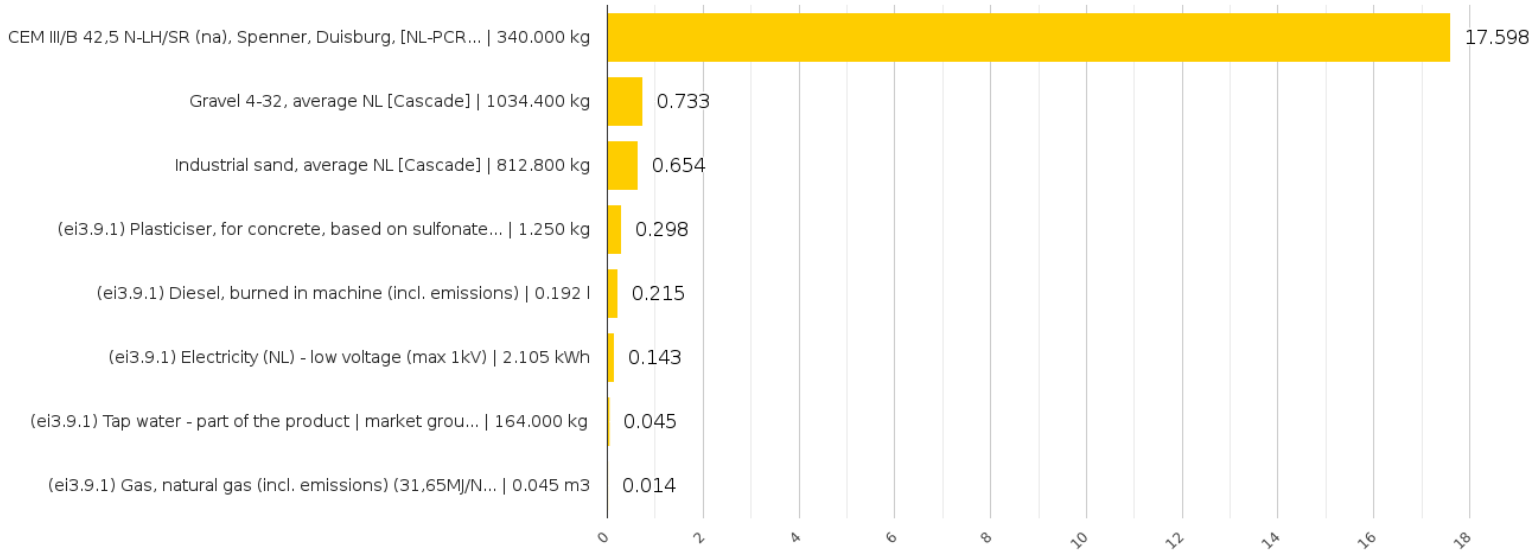
Door het maken van een zwaartepuntanalyse hebben we in kaart gebracht wat de grootste milieu impact veroorzaakt.

NOT VERIFIED

8 Interpretation of results

8.3 CONTRIBUTION ANALYSIS OF THE INPUTS

The following diagram shows the contribution of the inputs, expressed in the Environmental Cost Indicator NL 2024. The results per input are the sum of all declared modules including module D.



Analyse zwaartepunt milieulasten grondstoffen A1 - A3

8 Interpretation of results

CEM III/B	89.3%
Grind	3.7%
Zand	3.3%
Plastificeerder	1.5%

Door het maken van een zwaartepuntanalyse hebben we in kaart gebracht wat de grootste milieu impact veroorzaakt.

NOT VERIFIED

9 Sensitivity analysis

NOT VERIFIED

10 Data collection details

10.1 DATA QUALITY OF THE LIFECYCLE INVENTORY DATA

Description	Determination matter	Data source
Raw material(s)		
CEM III/B	measured	Bruil
Water	measured	Bruil
Zand 0-4	measured	Bruil
Grind 4-32	measured	Bruil
Plastificeerder	measured	Bruil
Energy consumption		
Aardgas	measured	Bruil
Diesel	measured	Bruil
Elektra	measured	Bruil

NOT VERIFIED

10.2 APPROACH OF SUPPLIERS FOR LCA DATA

Supplier	supplier approached for company-specific environmental data?	Manner in which the supplier is approached	Received document type
Spenner zement Duisburg	yes	by letter/email	none
Grondwater voor productie	no		none
K3 Havikerwaard	no		none
Master Builders Solutions	yes	by letter/email	none

10.3 USED PROCESSES

Shortened name in report	Processes used	Source	Third-party verified	Valid until	Comments
CEM III/B 42,5 N-LH/SR (na), Spenner, Duisburg, [NL-PCR Cement], A1-A3, cat 1, (03-2030)	CEM III/B 42,5 N-LH/SR (na), Spenner, Duisburg, [NL-PCR Cement], A1-A3, cat 1, (03-2030)	NMD 3.12	yes	01-03-2030	
	1kg Tap water {RER}| market group for tap water | Cut-off, U		no		

10 Data collection details

Shortened name in report	Processes used	Source	Third-party verified	Valid until	Comments
(ei3.9.1) Tap water - part of the product | market group for (RER)		ecoinvent 3.9.1 (2022)			
Industrial sand, average NL [Cascade]	Zand 0-4, in en nabij Nederland geproduceerd door Cascade-leden (A1-A3), c2	NMD 3.12	yes	01-08-2028	
(ei3.9.1) Gas, natural gas (incl. emissions) (31,65MJ/Nm3)	1m3 NIBE 1m3 (31,65MJ/Nm3) Heat, district or industrial, natural gas {Europe without Switzerland}| heat production, natural gas, at industrial furnace >100kW | Cut-off, U	ecoinvent 3.9.1 (2022)	no		
(ei3.9.1) Diesel, burned in machine (incl. emissions)	1l 0095-pro&Diesel, gasolie, gebruik, liter (o.b.v. 35,8 MJ Diesel, burned in building machine {GLO}| processing | Cut-off, U)	NMD 3.12	no		The combustion emissions of diesel are included in the environmental profile.
(ei3.9.1) Electricity (NL) - low voltage (max 1kV)	1kWh Electricity, low voltage {NL}| market for electricity, low voltage | Cut-off, U	ecoinvent 3.9.1 (2022)	no		
Gravel 4-32, average NL [Cascade]	Grind 4-32, in en nabij Nederland geproduceerd door Cascade-leden (A1-A3), c2	NMD 3.12	yes	01-08-2028	
(ei3.9.1) Plasticiser, for concrete, based on sulfonated melamine formaldehyde {GLO}| production | Cut-off, U	1kg Plasticiser, for concrete, based on sulfonated melamine formaldehyde {GLO}| plasticiser production, for concrete, based on sulfonated melamine formaldehyde | Cut-off, U	ecoinvent 3.9.1 (2022)	no		

NOT VERIFIED

11 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 14044:2006

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

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-Toetsingsprotocol Opname data in de Nationale Milieudatabase, Versie 2.0.1, July 2026

NMD Assessment method
Bepalingsmethode Milieuprestatie Bouwwerken, Berekeningswijze voor het bepalen van de milieuprestatie van bouwwerken gedurende hun gehele levensduur, gebaseerd op de EN 15804+A2, versie 1.2, January 2025 + Amendement 6

Ecoinvent
ecoinvent Version 3.9.1, December 2022

RETHINK characterization method
ecoinvent 3.9.1: EN 15804+A1 indicators (CML-IA Baseline v3.09), EN 15804+A2 indicators (EF 3.1)

NOT VERIFIED