Environmental
Product
Declaration

According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:
Calumex® SC-A

Provided by:
Caltra Nederland B.V.

MRPI® registration
1.1.00752.2025

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COMPANY INFORMATION

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MRPI® REGISTRATION

1.1.00752.2025

DATE OF THIS ISSUE

12-12-2024

EXPIRY DATE

12-12-2029

SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by Gert-Jan Vroege, Eco-Intelligence. The LCA study has been done by Max Molhuizen, SGS Search. The certificate is based on an LCA-dossier according to ISO14025+EN15804 A2 (+indicators A1). It is verified according to the 'MRPI®-EPD verification protocol November 2020.v4.0'. EPDs of construction products may not be comparable if they do not comply with EN15804+A2. Declaration of SVHC that are listed on the 'Candidate list of Substances of Very High Concern for authorisation' when content exceeds the limits for registration with ECHA.

PROGRAM OPERATOR

Stichting MRPI®
Kingsfordweg 151
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Amsterdam

PRODUCT

Calumex® SC-A

DECLARED UNIT / FUNCTIONAL UNIT

1000 Weight per piece (kg)

DESCRIPTION OF PRODUCT

Calumex® SC-A is an amorphous calcium aluminate (ACA)-based accelerator designed to deliver ultra-fast setting times and high early strength in demanding cementitious applications. As one of the latest developments in cement chemistry, ACA ensures rapid ettringite formation during hydration, significantly enhancing dimensional stability and mitigating shrinkage.

VISUAL PRODUCT

MORE INFORMATION

https://caltra.com

Ing. L. L. Oosterveen MSc. MBA Managing Director MRPI	DEMONSTRATION OF VERIFICATION
	CEN standard EN15804 serves as the core PCR [1]
	Independent verification of the declaration an data according to ISO14025+EN15804 A2 (+indicators A1) internal: external: X
	Third party verifier: Gert-Jan Vroege, Eco-Intelligence
	[1] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION (PART 1)

Production

Calumex® SC-A aligns with sustainable construction practices. Its production process involves lower energy consumption compared to traditional accelerators, and, its compatibility with supplementary cementitious materials (SCMs) enables a reduction in clinker content in formulations. By enhancing efficiency and reducing materials waste, Calumex® C.S.A. strives to achieve a lower environmental footprint by combining these factors in the production phase while maintaining the highest standards of performance.

DETAILED PRODUCT DESCRIPTION (PART 2)

Application

Calumex® SC-A is an amorphous calcium aluminate (ACA)-based accelerator designed to deliver fast setting times and early strength in demanding cementitious applications. As one of the latest developments in cement chemistry, ACA ensures rapid ettringite formation during hydration, enhancing dimensional stability and mitigating shrinkage. These properties make Calumex® SC-A compatible with time-critical applications such as water plugs, rapid repair mortars, and nuclear waste encapsulation, where structural integrity is required within minutes. Calumex® SC-A achieves a setting time of approximately one minute, enabling immediate usability in critical environments. Its amorphous structure allows for high solubility and reactivity, even in low-temperature conditions. The rapid formation if ettringite crystals not only fills micro-pores but also contributes to volumetric stability, reducing the potential for cracking and ensuring long-term durability. This makes it particularly effective for projects requiring fast hardening and reliable results.

Calumex® SC-A strives to reduce its environmental impact by minimising the energy needed in the production where possible and by using materials with lower environmental footprints where it is technically possible and there is enough demand. Its unique properties align with the growing need for innovative, sustainable construction materials that maintain exceptional performance and reliability.

Component (> 1%)	%
ACA	1-60%
Binder	1-70%

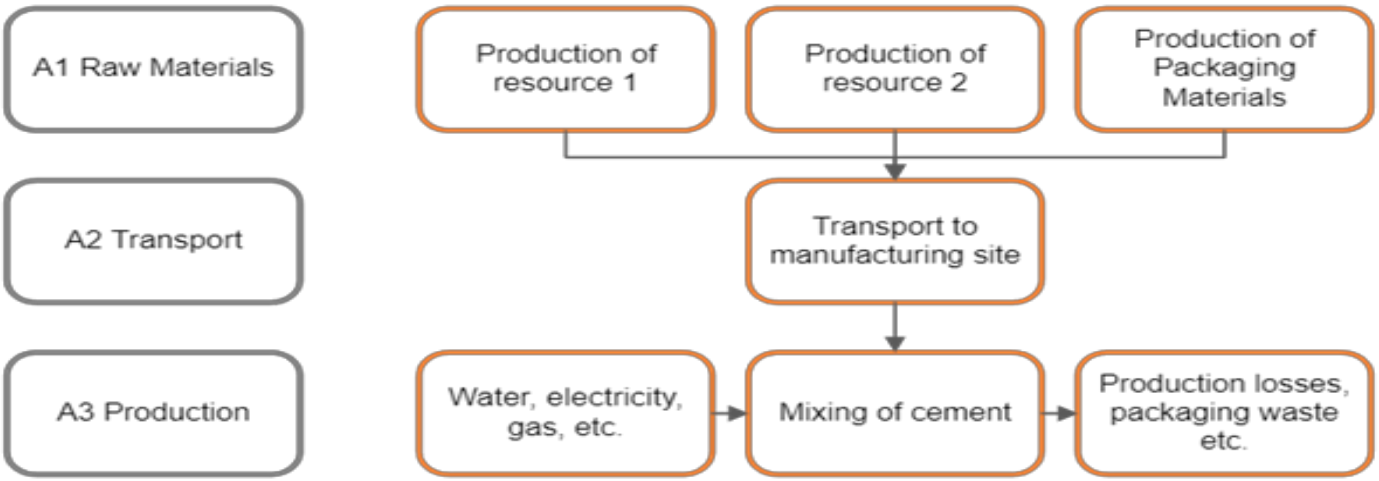
SCOPE AND TYPE

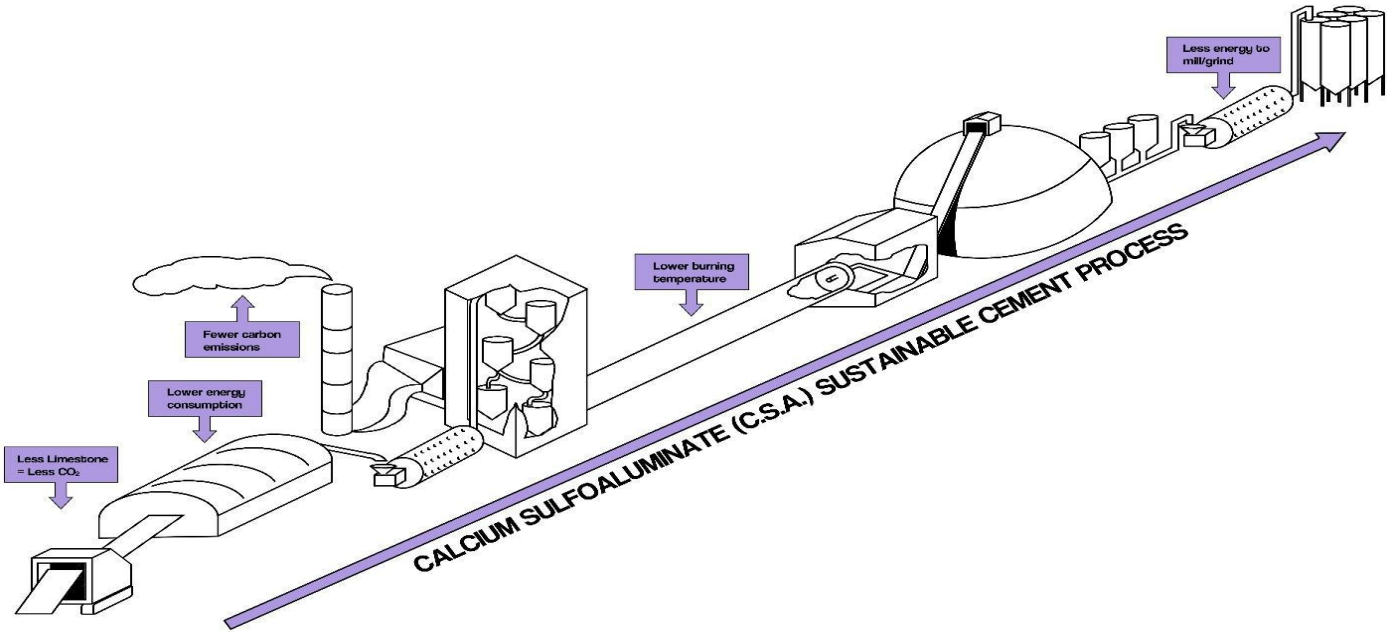
This EPD is a specific EPD made for Calumex® SC-A produced in facility Mijdrecht, The Netherlands. The material input are from suppliers across the globe. The data collection is done in production year 2023. The results are calculated with SimaPro 9.5.0.0, using the databases ecoinvent 3.6 and the NMD process database 3.9 (cut-off method system model).

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USER STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport gate to site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse - Recovery - Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

X = Modules Assessed

ND = Not Declared





REPRESENTATIVENESS

This EPD is representative for CALUMEX SC-A®, which is produced by Caltra Nederland B.V. on one (1) production site located in Mijdrecht, the Netherlands.

ENVIRONMENTAL IMPACT per functional unit or declared unit (indicators A1)

	Eenheid	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADPE	kg Sb eq.	2,07E-03	1,26E-03	1,90E-04	3,51E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADPF	MJ	3,02E+03	1,39E+03	1,85E+02	4,59E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP	kg CO2 eq.	3,85E+02	9,94E+01	1,09E+01	4,95E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ODP	kg CFC11 eq.	3,83E-05	1,69E-05	8,95E-07	5,60E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
POCP	kg ethene eq.	1,10E-01	9,97E-02	6,02E-03	2,16E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AP	kg SO2 eq.	8,66E-01	1,46E+00	5,03E-02	2,38E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP	kg (PO4) 3- eq.	1,16E-01	1,59E-01	6,09E-03	2,81E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	5,65E+01	5,28E+01	3,18E+00	1,12E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FAETP	kg DCB eq.	1,69E+00	1,08E+00	1,27E-01	2,89E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MAETP	kg DCB eq.	6,31E+03	4,64E+03	2,94E+02	1,12E+04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TETP	kg DCB eq.	1,80E+00	1,64E-01	4,09E-02	2,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ECI	euro	3,01E+01	1,78E+01	1,15E+00	4,90E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADPF	kg Sn eq.	1,45E+00	6,66E-01	8,87E-02	2,21E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ADPE = Abiotic Depletion Potential for non-fossil resources
ADPF = Abiotic Depletion Potential for fossil resources
GWP = Global Warming Potential
ODP = Depletion potential of the stratospheric ozone layer
POCP = Formation potential of tropospheric ozone photochemical oxidants
AP = Acidification Potential of land and water
EP = Eutrophication Potential
HTP = Human Toxicity Potential
FAETP = Fresh water aquatic ecotoxicity potential
MAETP = Marine aquatic ecotoxicity potential
TETP = Terrestrial ecotoxicity potential
ECI = Environmental Cost Indicator
ADPF = Abiotic Depletion Potential for fossil resources

ENVIRONMENTAL IMPACT per functional unit or declared unit (core indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	3,95E+02	1,00E+02	1,11E+01	5,07E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP-fossil	kg CO2 eq	3,88E+02	1,00E+02	1,11E+01	5,00E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP-biogenic	kg CO2 eq	6,88E+00	-1,55E-03	-8,62E-03	6,87E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP-luluc	kg CO2 eq	1,79E-01	6,10E-02	1,38E-02	2,54E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ODP	kg CFC11 eq	3,66E-05	2,12E-05	9,45E-07	5,88E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AP	mol H+ eq.	1,07E+00	1,82E+00	6,17E-02	2,95E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP-fresh water	kg PO4 eq.	7,86E-03	6,51E-04	3,45E-04	8,86E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP-marine	kg N eq.	1,97E-01	4,22E-01	1,23E-02	6,31E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP-terrestrial	mol N eq.	2,40E+00	4,70E+00	1,38E-01	7,24E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
POCP	kg NMVOC eq.	6,98E-01	1,27E+00	4,14E-02	2,01E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADP-minerals & metals	kg Sb eq.	2,07E-03	1,26E-03	1,89E-04	3,51E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADP-fossil	MJ, net calorific value	4,67E+03	1,39E+03	1,97E+02	6,26E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
WDP	m3 world eq. Deprived	3,36E+01	3,70E+00	3,85E+00	4,12E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

GWP-total = Global Warming Potential total
GWP-fossil = Global Warming Potential fossil fuels
GWP-biogenic = Global Warming Potential biogenictotal
GWP-luluc = Global Warming Potential land use and land use change
ODP = Depletion potential of the stratospheric ozone layer
AP = Acidification Potential, Accumulated Exceedence
EP-freshwater = Eutrophication Potential, fraction of nutrients reaching freshwater end compartment
EP-marine = Eutrophication Potential, fraction of nutrients reaching marine end compartment
EP-terrestrial = Eutrophication Potential, Accumulated Exceedence
POCP = Formation potential of tropospheric ozone photochemical oxidants
ADP-minerals & metals = Abiotic Depletion Potential for non-fossil resources [1]
ADP-fossil = Abiotic Depletion for fossil resources potential [1]
WDP = Water (user) deprivation potential, deprivation-weighted water consumption [1]

Disclaimer [1]:

- 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 experience with the indicator.

ENVIRONMENTAL IMPACT per functional unit or declared unit (additional indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease inci-dence	8,69E-06	5,65E-06	4,28E-07	1,48E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
IRP	kBq U235 eq.	5,82E+01	5,92E+00	8,92E-01	6,50E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	7,09E+03	1,06E+03	2,08E+02	8,36E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	7,49E-08	5,02E-08	3,91E-09	1,29E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	3,44E-06	1,02E-06	1,42E-07	4,60E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SQP	-	1,37E+03	8,66E+02	6,97E+01	2,31E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

PM = Potential incidence of disease due to PM emissions

IRP = Potential Human exposure efficiency relative to U235 [1]

ETP-fw = Potential Comparative Toxic Unit for ecosystems [2]

HTP-c = Potential Comparative Toxic Unit for humans [2]

HTP-nc = Potential Comparative Toxic Unit for humans, non-cancer [2]

SQP = Potential soil quality index [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.

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 experience with the indicator.

OUTPUT FLOWS AND WASTE CATEGORIES per functional unit or declared unit (A1 en A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	3,63E-03	2,35E-03	5,23E-04	6,50E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NHWD	kg	4,69E+01	6,04E+01	1,35E+01	1,21E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RWD	kg	4,03E-02	9,45E-03	7,19E-04	5,05E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EEE	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETE	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

HWD = Hazardous Waste Disposed
NHWD = Non Hazardous Waste Disposed
RWD = Radioactive Waste Disposed
CRU = Components for reuse
MFR = Materials for recycling
MER = Materials for energy recovery
EEE = Exported Electrical Energy
ETE = Exported Thermal Energy

RESOURCE USE per functional unit or declared unit (A1 and A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	1,73E+03	1,30E+01	6,35E+01	1,81E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PERT	MJ	1,73E+03	1,30E+01	6,35E+01	1,81E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PENRE	MJ	4,88E+03	1,48E+03	2,10E+02	6,56E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PENRT	MJ	4,88E+03	1,48E+03	2,10E+02	6,56E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NSRF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FW	m3	5,92E+00	1,25E-01	1,63E-01	6,21E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

PERE = Use of renewable energy excluding renewable primary energy resources
PERM = Use of renewable energy resources used as raw materials
PERT = Total use of renewable primary energy resources
PENRE = Use of non-renewable primary energy resources excluding non-renewable 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 materials
RSF = Use of renewable secondary fuels
NSRF = Use of non-renewable secondary fuels
FW = Use of net fresh water

BIOGENIC CARBON CONTENT per functional unit or declared unit (A1 and A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
BBCpr	kg C	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BCCpa	kg C	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

BCCpr = Biogenic carbon content in product
BCCpa = Biogenic carbon content in packaging

CALCULATION RULES (PART 1)

Declared unit
The declared unit for the life cycle assessment is 1000 kg of Calumex® SC-A.

Data collection
Input- and output data has been provided by Caltra of the production year 2023 for the following inventory categories:
- Materials (raw materials and auxiliary materials);
- Energy (electricity and heat);
- Emissions to air, water and soil;
- Treatment and disposal of production wastes.

Data quality
Data was validated by SGS at the process level. This means that not only the mass balance was verified, but that in the case of major deviations from the average (for all type of in- and output) the suppliers were asked for further explanation.

Allocations
Allocation of environmental interventions can apply to multi-input, multi-output, recycling and reuse processes. No allocation of multi output processes is applied in this study. For other allocations, the provisions from the EN 15804 are followed.

Cut-off criteria
This LCA contains all relevant data. The following processes are not included in this LCA:
- Assumed is that the maintenance and use of auxiliary equipment have a negligible contribution to the total (<1%). Because of this, these processes are not taken in account in this LCA, except such processes that are included in the Ecoinvent background data.
- Assumed is that the capital goods and infrastructure processes have a negligible contribution. These processes are not taken in account in this LCA, except such processes that are included in the Ecoinvent background data.
There is no reason to believe that relevant in- or outputs are excluded from this study.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION (PART 1)

Calumex® SC-A is an Amorphous Calcium Aluminate (C12A7) additive to Ordinary Portlandcement, used to accelerate setting times, compensate shrinkage and increase both early and late strength development. Calumex® SC-A is the most reactive accelerator for Portlandcement systems. At a 10% replacement of OPC setting times can be reduced from several hours to less than 1 minute. The specialized chemistry of Calumex® SC-A, as well as Calumex® XT-20, allows the formulation of ultra-fast setting formulations with extremely high early strengths at early stages of hydration. Furthermore, through the high formation of ettringite crystals, drying is accelerated and shrinkage and permeability are reduced. As is the case with Calumex® XT-20, the basis of Calumex® SC-A is an amorphous clinker, making it a lot more reactive than crystalline alternatives. This means the required dosage in end formulations can be a lot lower. Between 5-20% of the binder weight should be replaced by Calumex® SC-A, depending on the desired effect.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION (PART 2)

Additional information
In order to optimize setting times, combine Calumex® SC-A with Delta-20 set retarder. Delta-20 is specifically formulated for application in ACA based systems. It will provide an extended workability, with minimal sacrifice of strength development. For formulations where extremely fast setting times are not desired, Calumex® XT-20 would be a more suitable alternative. Both Calumex® SC-A and Calumex® XT-20 are white in color and suitable to be mixed with White OPC.

Chemical Analysis	Value
SiO2	≤ 3 %
Al2O3	20 - 25 %
Fe2O3	≤ 0,5 %
CaO	40 - 45 %
SO3	≤ 30 %
TiO2	≤ 1 %
MgO	≤ 1 %
Temperature development	≥ 50°C
Achieved after	≤ 10:00 min

Physical composition	
Appearance	White powder
Blaine	~ 6000 cm2/g
Bulk density	~ 2,9 – 3,1 g/cm3

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION (PART 4)

Technical data
In the table below, the compressive strength of the products is presented. The Vicat-time (min) from the beginning >0:20 to end <1:15 is tested.

	Temperature (°C)	Tim (min)	Compressive strength - 1 (avg)	Compressive strength - 2 (avg)	Compressive strength - 3 (avg)
Compressive strength development	> 55	≤ 16:00	8 (± 2)	38 (± 4)	47 (± 3)

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION (PART 5)

Product stage (A1-A3)
This stage consists of the extraction of raw materials, energy that occurs upstream to the manufacturing process, transportation of raw materials, processing of the raw materials into the final product with all processes and energy required for production as well as packaging materials.

Data collection was performed by Caltra in cooperation with their suppliers. The manufacturer compiled mass and energy balances based on average production in year 2023. The production facility in Mijdrecht uses renewable electricity from photovoltaic panels (own production) in their production process.

DECLARATION OF SVHC

No substances of very high concern are present in concentrations greater than 0,1% by weight in the product.

REFERENCES

NMD Bepalingsmethode Milieuprestatie Bouwwerken 1.1, NMD March 2022.

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