



**Environmental  
Product  
Declaration**

According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:  
**CALUMEX-E.A.**

Provided by:  
**Caltra Nederland B.V.**



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## DETAILED PRODUCT DESCRIPTION (PART 1)

### Production

Calumex® E.A. is produced with kiln temperatures that tend to be lower than traditional cements, this way Calumex® C.S.A. is actively reducing their energy consumption during manufacturing.

## DETAILED PRODUCT DESCRIPTION (PART 2)

### Application

In application, Calumex® E.A. achieves rapid strength development. This allows for accelerated project timelines while maintaining long-term structural reliability. The product's exceptional durability also reduces the need for repairs or replacements, supporting sustainable construction practices by lowering material usage and waste over the lifecycle of a structure.

Calumex® E.A. strives to reduce its environmental impact by minimizing 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. Additionally, its compatibility with supplementary cementitious materials (SCMs) helps decrease the demand for clinker, contributing to a lower carbon footprint.

Component (> 1%)	%
CSA	1-70%
Binder	1-50%

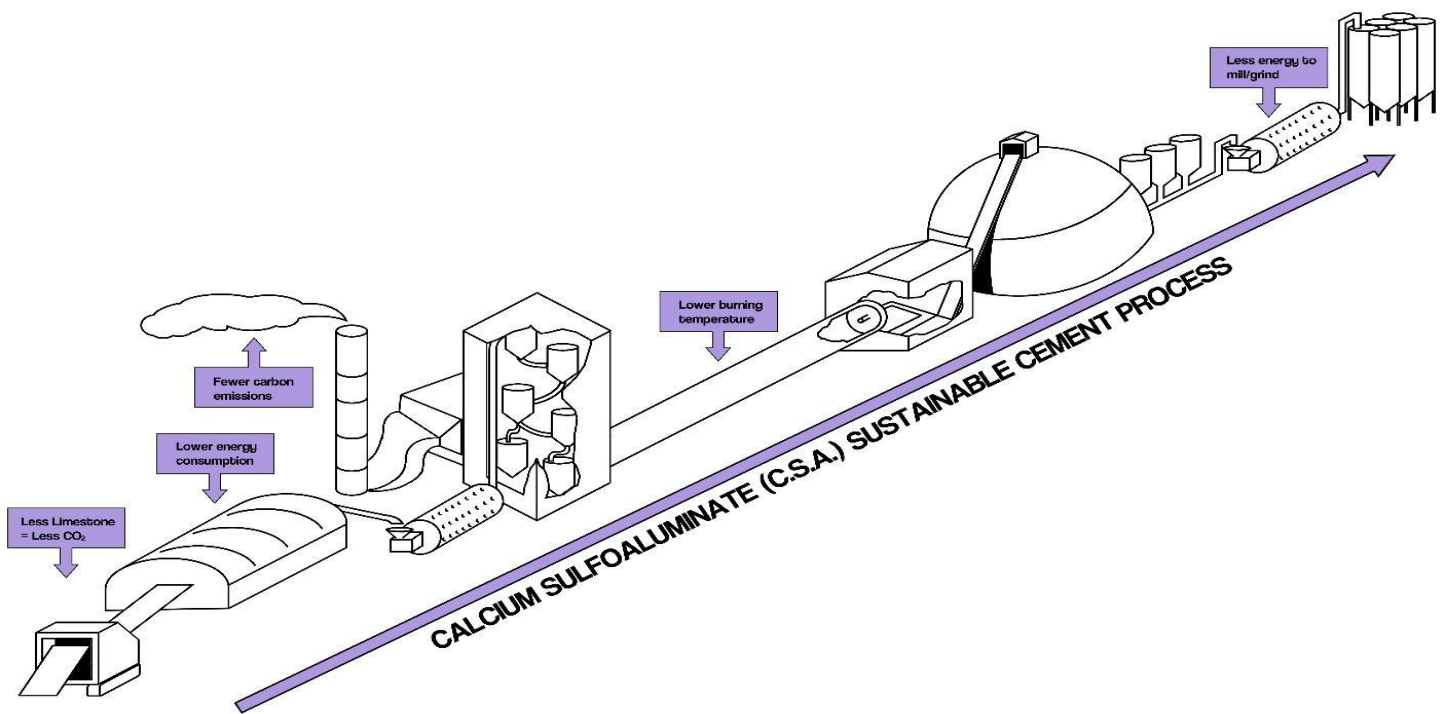
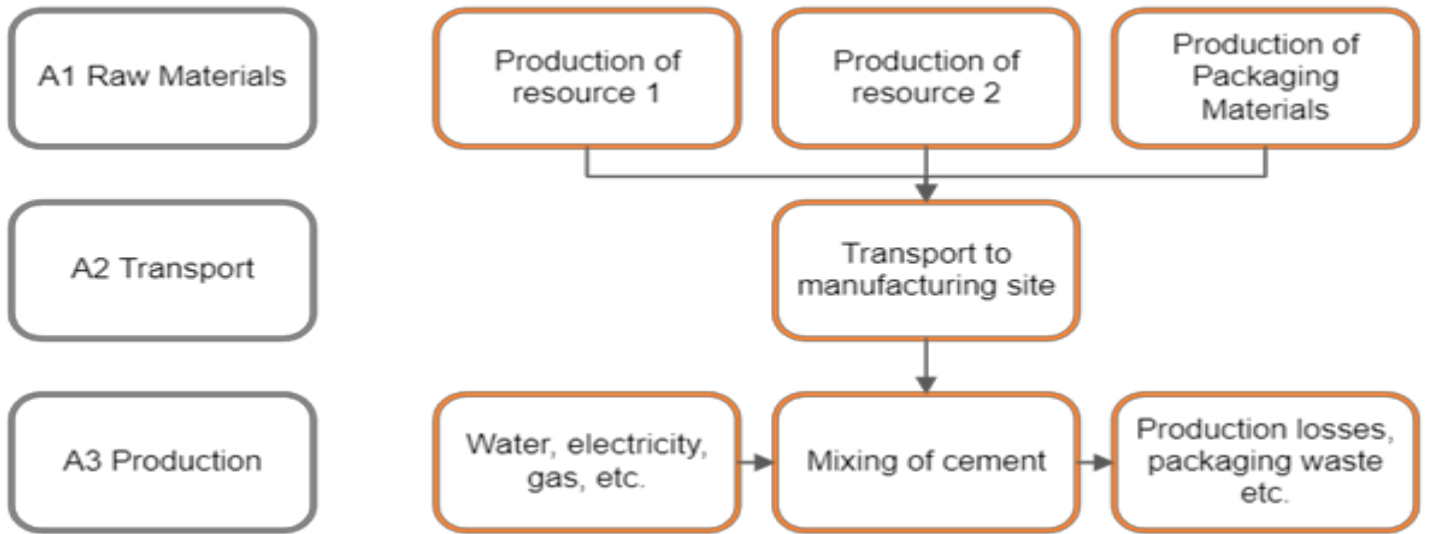
## SCOPE AND TYPE

This EPD is a specific EPD made for Calumex® C.S.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® E.A., which is produced by Caltra Nederland B.V. at 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.	5,24E-04	1,08E-03	2,77E-04	1,88E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADPF	MJ	1,23E+03	1,33E+03	3,39E+02	2,90E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP	kg CO2 eq.	3,10E+02	9,99E+01	2,02E+01	4,30E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ODP	kg CFC11 eq.	8,25E-06	1,64E-05	1,03E-06	2,57E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
POCP	kg ethene eq.	3,80E-02	1,16E-01	1,11E-02	1,65E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AP	kg SO2 eq.	3,94E-01	1,95E+00	1,09E-01	2,45E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP	kg (PO4) 3- eq.	4,97E-02	2,02E-01	1,77E-02	2,69E-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.	1,69E+01	5,58E+01	6,37E+00	7,90E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FAETP	kg DCB eq.	4,05E-01	1,01E+00	9,43E-01	2,36E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MAETP	kg DCB eq.	1,79E+03	4,52E+03	5,08E+02	6,82E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TETP	kg DCB eq.	7,13E-02	1,71E-01	1,90E-01	4,32E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ECI	euro	1,94E+01	2,05E+01	2,32E+00	4,22E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADPF	kg Sn eq.	5,93E-01	6,39E-01	1,63E-01	1,39E+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	3,12E+02	1,01E+02	2,05E+01	4,33E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP-fossil	kg CO2 eq	3,11E+02	1,01E+02	2,04E+01	4,32E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP-biogenic	kg CO2 eq	4,38E-01	-2,60E-02	-1,58E-03	4,11E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP-luluc	kg CO2 eq	3,23E-02	7,45E-02	1,18E-01	2,24E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ODP	kg CFC11 eq	9,67E-06	2,07E-05	1,17E-06	3,15E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AP	mol H+ eq.	5,01E-01	2,41E+00	1,35E-01	3,05E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP-fresh water	kg PO4 eq.	1,31E-03	5,51E-04	1,38E-03	3,24E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP-marine	kg N eq.	1,16E-01	5,49E-01	2,95E-02	6,95E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP-terrestrial	mol N eq.	1,39E+00	6,12E+00	3,02E-01	7,82E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
POCP	kg NMVOC eq.	3,67E-01	1,63E+00	7,87E-02	2,08E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADP-minerals & metals	kg Sb eq.	5,24E-04	1,08E-03	2,72E-04	1,88E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADP-fossil	MJ, net calorific value	1,09E+03	1,34E+03	3,13E+02	2,74E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
WDP	m3 world eq. Deprived	9,96E+00	2,92E+00	1,14E+01	2,43E+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 incidence	4,81E-06	4,30E-06	1,14E-06	1,03E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
IRP	kBq U235 eq.	1,86E+00	5,72E+00	5,53E-01	8,14E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	4,88E+03	9,51E+02	4,61E+02	6,29E+03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	2,18E-08	5,89E-08	8,07E-09	8,88E-08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	5,67E-07	8,61E-07	2,45E-07	1,67E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SQP	-	3,00E+02	5,04E+02	3,33E+02	1,14E+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	1,89E-03	1,77E-03	6,55E-04	4,31E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NHWD	kg	7,34E+00	3,04E+01	1,37E+01	5,14E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RWD	kg	2,31E-03	9,19E-03	5,88E-04	1,21E-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	3,29E+01	1,16E+01	1,13E+02	1,57E+02	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	3,29E+01	1,16E+01	1,13E+02	1,57E+02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PENRE	MJ	1,19E+03	1,42E+03	3,34E+02	2,94E+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	1,19E+03	1,42E+03	3,34E+02	2,94E+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	3,29E-01	1,00E-01	3,48E-01	7,77E-01	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® E.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® E.A. is a factory controlled pre-blend of basic Calumex® C.S.A. cement and synthetic anhydrite. It is used as an additive to Portlandcement to achieve either shrinkage compensation or positive expansion, depending on the applied dosage. The temperature development during hydration caused by the addition of Calumex® E.A. will contribute to strength development in the final mortar. Furthermore, due to the controlled ettringite formation achieved by the combination of Calumex® E.A. with Portlandcement, early strengths will be significantly improved, increasing efficiency in many applications. The recommended dosage of Calumex® E.A. is a 8-12% replacement of Portlandcement content. Be mindful that excessive dosing of Calumex® E.A. will lead to positive expansion, which could lead to cracking and would be undesirable for many applications.

## SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION (PART 2)

### Technical information

(The test results given are based on a mixture where 12% of OPC CEM I 52,5R is replaced by Calumex® E.A.)

Technical aspect	Value	Unit
Applied wcf	0,4	
Setting times (Vicat) - initial	0,083333333	min
Setting times (Vicat) - final	0,25	min
Temperature development	65	°C
Achieved after	45:00	min



### SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION (PART 3)

Technical data

In the table below, the compressive strength of the products is presented. The Vicat-time (min) from the beginning >2:00 to end <6:00 is tested.

	Temperature (°C)	Tim (min)	Compressive strength - 1 (avg)	Compressive strength - 2 (avg)	Compressive strength - 3 (avg)
Compressive Strength development (MPa)	> 65	≤ 45:00	40 (± 4)	50 (± 4)	60 (± 5)

### SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION (PART 4)

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

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