# ANGELUS BLOCK CO., INC.

ENVIRONMENTAL PRODUCT DECLARATION CMU: MW • Oxnard Plant



This Environmental Product Declaration (EPD) reports the impacts for 1 m<sup>3</sup> of concrete formed into manufactured concrete and masonry products meeting the following specifications:

• ASTM C90, Concrete Masonry Unit, Load-Bearing

## **PRODUCT DESCRIPTION**

### Medium Weight Concrete Masonry Units:

Angelus Medium Weight CMU are made with ASTM C595 Portland Limestone Cement Type IL, and ASTM C33 and C331 aggregates. Available in 4, 6, and 8-inch heights, and widths from veneers to 16-inch wide structural. Dimensional properties as defined in ASTM C90.



### **ENVIRONMENTAL IMPACTS**

### **Declared Product:**

CMU: MW • Oxnard Plant Density Factor: 1954 kg / m<sup>3</sup> Compressive strength: 14 MPa

**Declared Unit:** 1 m<sup>3</sup> of concrete formed into manufactured concrete masonry product (CMU)

Global Warming Potential (kg CO2-eq)	203
Acidification Potential (kg SO <sub>2</sub> -eq)	0.77
Eutrophication Potential (kg N-eq)	0.15
Smog Creation Potential (kg O <sub>3</sub> -eq)	18.2
Ozone Depletion Potential (kg CFC-11-eq)	2.16E-6

**Material Composition:** Aggregate (natural), Cinder, Portland Limestone Cement, Aggregate (recycled concrete), Batch water

Additional detail and impacts are reported on page five of this EPD

## PROGRAM OPERATOR

ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428



## DATE OF ISSUE

08/09/2023 (valid for 5 years until 08/09/2028)





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General Program Instructions	ASTM Program Operator for Product Category Rules (PCRs) and Environmental Product Declarations (EPDs), General Program Instructions. Version 8.0, revised April 29, 2020.
Reference PCR	Part B: Concrete Masonry and Segmental Concrete Paving Product EPD Requirements, November 11 2020. V1.0
The sub-category PCR review was conducted by:	Jack Geibig, Ecoform, LLC, Terrie Boguski, Harmony Environmental, LLC, Christine Subasic, P.E., LEED AP, Consulting Architectural Engineer
Product RSL	n/a
Markets of Applicability	North America
EPD Type	Product Specific
Declared Unit	One cubic meter (m3) of concrete formed into manufactured concrete products
Dataset Variability	n/a
EPD Scope	Cradle to Gate
Year(s) of Reported Manufacturer Primary Data	-
LCA Software	CarbonCLARITY Suite, Concrete Block EPD Generator  Verification
LCIDatabase(s)	Ecoinvent, USLCI, US-EI
LCIA Methodology	TRACI 2.1 v1.04
This declaration was independently verified in accordance with ISO 14025:2006. The UL Environment "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report," v3.2 (December 2018), in conformance with ISO 21930:2017, serves as the core PCR, with additional considerations from the USGBC/UL environment Part A Enhancement (2017). □ internal ☑ external	Thomas P. Gloria (t.gloria@industrial-ecology.com) Industrial Ecology Consultants
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	Climate Earth (support@climateearth.com)
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Thomas P. Gloria (t.gloria@industrial-ecology.com) Industrial Ecology Consultants

### Limitations

Environmental declarations from different programs (ISO 14025) may not be comparable. EPDs are comparable only if they use the same PCR (or sub-category PCR where applicable), include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works. This PCR allows EPD comparability only when the same functional requirements between products are ensured and the requirements of ISO 21930:2017 §5.5 are met. However, variations and deviations are possible. Example of variations: different LCA software and background LCI datasets may lead to different results for the life cycle stages declared.



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## LIFE CYCLE ASSESSMENT

## SYSTEM BOUNDARY

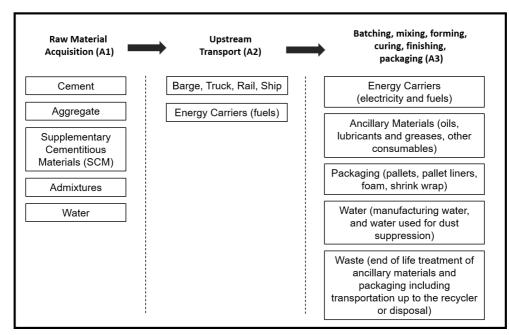
CMU: MW • Oxnard Plant

This EPD is a cradle-to-gate EPD covering the product stages (A1-A3) only

	UCTION landator			RUCTION	USE Stage			END-OF-LIFE Stage					
Extraction and upstream production	Transport to factory	Manufacturing	Transport to site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	De-construction/ Demolition	Transport to waste processing or disposal	Waste processing	Disposal of waste
A1	A2	A3	A4	A5	B1	B2	В3	В4	<b>B</b> 5	C1	C2	С3	C4
x	х	Х	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Note: MND = module not declared; x = module included.

The production stages and primary unit processes included in the study by product stage are:



Relevant Information for product stages not included in system boundary (A4-C4):

Other products not included in assessment needed for the product to serve intended function in the construction work can include mortar, grout, and reinforcement for concrete masonry product;

Product packaging waste per declared unit include: 31.78 kg pallet waste, 0.06 kg stretch wrap waste;

Typical end of life treatment is unknown but can include landfill or crushing and then re-use as a recycled aggregate or as road base; The reference service life for concrete masonry is 75 years and for segmental concrete paving is 50 years.



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### CUT-OFF

Items excluded from system boundary include: production, manufacture, and construction of manufacturing capital goods and infrastructure; production and manufacture of production equipment, delivery vehicles, and laboratory equipment; personnel-related activities (travel, furniture, and office supplies); and energy and water use related to company management and sales activities that may be located either within the factory site or at another location. No known flows were deliberately excluded from this EPD.

### ALLOCATION PROCEDURE

Allocation follows the requirements and guidance Part A: Life Cycle Assessment Calculation Rules and Report Requirements, section 3.3.

The product category rules for this EPD recognize fly ash, silica fume and slag as waste products recovered materials and thus the environmental impacts allocated to these materials are limited to the treatment and transportation required to use as a concrete material input.

### PRIMARY SOURCES OF LCI DATA

- Aggregate (natural): US-EI (2020): "Gravel, round, at mine/US", 2001
- Aggregate (recycled concrete): custom process, based on US-EI (2016) "Gravel, crushed, at mine/US", 2001
- Cleaning Chemicals: Ecoinvent 3.4: 50% Citric acid and 50% Phosphoric acid, industrial grade, without water, in 70% solution state, market for/GLO, 2017
- Diesel: USLCI (2015): "Diesel, combusted in industrial equipment/NREL/US", 2007
- Electricity (WECC): Ecoinvent 3.4: " Electricity, medium voltage, market for, cut-off", 2015
- Natural gas: USLCI (2015): "Natural gas, combusted in industrial boiler/NREL/US", 2007
- Non-Hazardous Solid Waste: US-EI (2016): Disposal, municipal solid waste, 2008
- Oils, Lubricants and Greases: Ecoinvent 3.5: Lubricating oil, GLO, market for, cut-off, 2011
- Portland Cement: Supplier specific primary data, 2021
- Propane: USLCI (2015): "Liquefied petroleum gas, at refinery/NREL/US, 2007
- Pumice: US-EI (2020): "Pumice, at mine/US, 2010
- Truck transport: USLCI (2015):"Transport, combination truck, long-haul, diesel powered/tkm/RNA", 2010
- Truck transport: USLCI (2015):"Transport, combination truck, short-haul, diesel powered/tkm/RNA", 2010

### INTERPRETATION

The material extraction (A1) product stage dominates most of the potential environmental impacts with cement contributing the greatest percentage of impacts in this stage. This EPD was calculated using manufacturer specific cement data that represents 100% of the total cement used in this mix.

Life cycle impact assessment (LCIA) results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks (ISO 14044, ISO 14040). EPDs are comparable only if they comply with ISO 21930 (2017), use the same, sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works.



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## DECLARATION OF ENVIRONMENTAL INDICATORS DERIVED FROM LCA

Global warring potentialkg QQ-eq1.57E+022.03E+012.57E+012.03E+02Depiction potential of the stratespheric acone layer (CDP)kg VA-q5.8E+021.5EE Q7.38E+021.48E+01Acidification potential of sol and water sources (AP)kg VQ-eq3.4SE+012.57E+011.48E+011.42E+01Remation potential of topospheric acone (FOCP)kg VQ-eq3.4SE+002.57E+011.48E+011.42E+01Resource Laescattering optential of topospheric acone (FOCP)kg VQ-eq3.4SE+002.57E+011.48E+011.42E+01Abidic depiction potential of topospheric acone (FOCP)kg VQ-eq3.4SE+002.57E+013.4SE+003.4SE+003.4SE+001.4SE+01Abidic depiction potential for forsal meanures (APP enerstic)Mg VQ-eq3.4SE+013.4SE+013.4SE+017.52E+023.4SE+017.52E+023.4SE+017.52E+023.4SE+017.52E+023.4SE+017.52E+023.4SE+017.52E+027.52E+023.4SE+017.52E+023.4SE+017.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+027.52E+02 <th>Impact Assessment</th> <th>Unit</th> <th>A1</th> <th>A2</th> <th>A3</th> <th>Total</th>	Impact Assessment	Unit	A1	A2	A3	Total
Etrophication potential         Isp Net 1         S8SE02         1.58E02         7.38E02         1.48E01           Acidification potential of sol and water sources (AP)         Isp S0,-eq         3.45E01         2.57E01         1.68E01         7.7E01           Formation potential of tropospheric ocone (POO?)         Isp S0,-eq         3.32E00         6.58E00         3.31E00         1.82E01           Resource Use         Emblait for non-fossil mineral resources (ADR4ements)*         Isg S0,-eq         1.08E06         -         6.16E06         7.25E05           Abilito deplation potential for fossil resources (ADR4ements)*         Isg S0,-eq         1.08E00         -         6.16E06         7.25E05           Abilito deplation potential for fossil mineral resources (ADR4ements)*         MQ         8.81E-02         2.9E-02         3.9E-02         1.57E-03           Renewable primary ensources as energy (fuel), (FFRE)*         MU         0.E-00         -         0.E-00         0.E-00           Non-renewable primary resources as enterial (FFRM*         MU         0.E-00         -         0.E-00         0.E-00 <t< td=""><td>Global warming potential</td><td>kg CO<sub>2</sub>-eq</td><td>1.57E+02</td><td>2.03E+01</td><td>2.57E+01</td><td>2.03E+02</td></t<>	Global warming potential	kg CO <sub>2</sub> -eq	1.57E+02	2.03E+01	2.57E+01	2.03E+02
Addiciation potential of soil and water sources (AP)kg SQ-eq3.45E-012.57E-011.68E-017.7E-01Remation potential of tropospheric acone (PCCP)kg Q-eq8.32E+006.58E+003.31E+001.82E+01Resources Use1.08E-06-6.16E-067.25E-06Abidic displation potential for non-fossil mineral resources (ADPReements)*kg SD-eq1.08E-06-6.16E-067.25E-06Abidic displation potential for fossil resources (ADPReements)*MJ8.81E+022.9E+023.96E+021.57E+03Renewable primary resources as energy (fuel), (RFRE)*MJ0.6100-0.6+000.6+00Non-renewable primary resources as material (NFRM*)*MJ0.56E+022.9E+024.3E+021.66E+03Non-renewable primary resources as material (NFRM*)*MJ0.6+00-0.6+000.6+00Consumption of fresh watern#2.2E+00-0.6+000.6+000.6+00Consumption of fresh waterNU0.6+00-0.6+000.6+000.6+00Renewable secondary fuels, (RSF)*MJ2.16+01-0.6+000.6+000.6+00Non-renewable secondary fuels, (RSF)*MJ0.6+00-0.6+000.6+000.6+000.6+00Renewable secondary fuels, (RSF)*MJ0.6+00-0.6+000.6+000.6+000.6+000.6+000.6+00Non-renewable secondary fuels, (RSF)*MJ0.6+00-0.6+000.6+000.6+000.6+000.6+00 <t< td=""><td>Depletion potential of the stratospheric ozone layer (ODP)</td><td>kg CFC-11-eq</td><td>1.08E-06</td><td>8.56E-10</td><td>1.08E-06</td><td>2.16E-06</td></t<>	Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11-eq	1.08E-06	8.56E-10	1.08E-06	2.16E-06
Remail on potential of tropospheric ozone (FOG?)         kg Q-eq         8.32E+00         6.58E+00         3.31E+00         1.82E+01           Resource Lie                  Abdic depletin potential for non-fossil mineral resources (ADFResil)         Mg Sb-eq         1.08E+06         -         6.16E+06         7.25E+06           Abdic depletin potential for fossil resources (ADFResil)         Md         8.81E+02         2.9E+02         3.96E+02         7.52E+02           Renewable primary energy resources as energy (fue), (RFFE)*         Md         0.45E+00         -         0.6E+00         0.6E+00           Non-renewable primary resources as energy (fue), (NFFE)*         Md         0.6E+00         -         0.6E+00	Eutrophication potential	kg N-eq	5.85E-02	1.55E-02	7.38E-02	1.48E-01
Resource Use         Resource Use           Abidic depietion potential for non-focsil mineral resources (ADPRiements)*         kg Sb-eq         1.08E66         -         6.18E96         7.28E06           Abidic depietion potential for fossil resources (ADPRiements)*         MJ         8.81E402         2.9E402         3.98E402         1.57E+03           Renewable primary energy resources as energy (fuel), (RFRE)*         MJ         4.15E401         0E400         7.11E+02         7.52E+02           Renewable primary resources as energy (fuel), (NFRE)*         MJ         0E400         -         0E400         0E400           Non-renewable primary resources as material (NFRM)*         MJ         0E400         -         0E400         0E400           Non-renewable primary resources as material (NFRM)*         MJ         0E400         -         0E400         0E400           Consumption of fresh water         m²         2.2E+00         -         0E400         2.5EE+00           Secondary Materials, (SM*         kg         9.81E+01         -         0E400         2.5EE+00           Renewable secondary fuels (NSF)*         MJ         0E400         -         0E400         2.1E+01           Non-renewable secondary fuels (NSF)*         MJ         0E400         -         0E400         0E400	Acidification potential of soil and water sources (AP)	kg SO <sub>2</sub> -eq	3.45E-01	2.57E-01	1.68E-01	7.7E-01
Abidic depletion potential for non-fossil mineral resources (ADPdeements)"kg Sb-eq1.08E-06-6.16E-067.25E-06Abidic depletion potential for fossil resources (ADPdeem)MI8.81E-022.9E+023.96E+021.57E+03Renew able primary resources as energy (fuel), (RFRE)"MI4.15E+010E+007.11E+027.52E+02Renew able primary resources as energy (fuel), (RFRE)"MI9.36E+022.9E+024.3E+021.66E+03Non-renew able primary resources as material (RFRM)"MI0E+00-0E+000E+00Consumption of fresh waterm?2.2E+00-3.6E+012.56E+00Secondary Material, Fuel and Recovered EnergyKg9.8E+01-0E+009.8E+01Secondary fuels, (RSF)*MI2.1E+01-0E+009.8E+01Non-renewable secondary fuels, (RSF)*MI0E+00-0E+000E+00Non-renewable secondary fuels, (RSF)*MI0E+00-0E+000E+00Non-renewable secondary fuels (RSF)*MI0E+00-0E+000E+00	Formation potential of tropospheric ozone (POCP)	kg O3-eq	8.32E+00	6.58E+00	3.31E+00	1.82E+01
Abidic depletion potential for fossil resources (ADFlossil)         NU         8.81F-02         2.9E-02         3.96E-02         1.57E-03           Renew able primary resources as energy (fue), (NFRE)*         NU         4.15E-01         0E-00         7.12E-02         7.52E-02           Renew able primary resources as energy (fue), (NFRE)*         NU         9.36E-02         2.9E-02         4.3E-02         1.66E-03           Non-renewable primary resources as material (NFRM)*         NU         0E-00         -         0E-00         0E-00           Consumption of fresh water         m²         2.2E-00         -         0E-00         0E-00           Consumption of fresh water         m²         2.2E-00         -         0E-00         0E-00           Secondary Material, Fuel and Recovered Energy         MI         0E-00         -         0E-00         9.81E-01           Renewable secondary fuels, (RSP*         MU         0E-00         -         0E-00         0E-00           Non-renewable secondary fuels, (RSP*         MU         0E-00         -         0E-00         0E-00           Non-renewable secondary fuels, (RSP*         MU         0E-00         0E-00         0E-00         0E-00         0E-00         0E-00         0E-00         0E-00         0E-00         0E-00 </th <th>Resource Use</th> <th></th> <th></th> <th></th> <th></th> <th></th>	Resource Use					
Renewable primary resources as energy (fue), (RFRE)*         NU         4.15E-01         0E-00         7.11E-02         7.52E-02           Renewable primary resources as material, (RFRM)*         NU         9.36E-02         2.9E-02         4.3E-02         1.66E-03           Non-renewable primary resources as material (NFRM)*         NU         9.36E-02         2.9E-02         4.3E-02         1.66E-03           Non-renewable primary resources as material (NFRM)*         NU         0E-00	Abiotic depletion potential for non-fossil mineral resources (ADPelements)*	kg Sb-eq	1.08E-06	-	6.16E-06	7.25E-06
Renewable primary resources as material (RFRM)*         NU         0E+00         -         0E+00         0E+00           Non-renewable primary resources as material (NFRM)*         NU         9.36E+02         2.9E+02         4.3E+02         1.66E+03           Non-renewable primary resources as material (NFRM)*         NU         0E+00         -         0E+00         0E+00           Consumption of fresh water         m²         2.2E+00         -         3.6E>11         2.56E+00           Secondary Materials, (SM)*         kg         9.81E+01         -         0E+00         9.81E+01           Renewable secondary fuels, (RSF)*         NU         2.1E+01         -         0E+00         0E+00           Non-renewable secondary fuels, (RSF)*         MU         0E+00         -         0E+00         0E+00           Non-renewable secondary fuels, (RSF)*         MU         0E+00         -         0E+00         0E+00           Recovered energy, (FE)*         MU         0E+00         -         0E+00         0E+00           Non-renewable secondary fuels (NRSF)*         MU         0E+00         -         0E+00         0E+00           Non-renewable secondary fuels (NRSF)*         MU         0E+00         -         0E+00         0E+00	Abiotic depletion potential for fossil resources (ADPfossil)	MJ	8.81E+02	2.9E+02	3.96E+02	1.57E+03
Non-renew able primary resources as energy (fuel), (NRFRE)*         NU         9.36E402         2.9E402         4.3E402         1.66E403           Non-renew able primary resources as material (NRFRM)*         NU         0E400         -         0E400         0E400           Consumption of fresh water         n°         2.2E400         -         0E400         0E400           Secondary Material, Fuel and Recovered Energy         kg         9.81E401         -         0E400         9.81E401           Secondary Materials, (SM)*         kg         9.81E401         -         0E400         9.81E401           Non-renew able secondary fuels, (RSF)*         NU         2.1E+01         -         0E400         2.1E+01           Non-renew able secondary fuels, (NSF)*         NU         0E400         -         0E400         0E400           Non-renew able secondary fuels, (NSF)*         NU         0E400         -         0E400         0E400           Non-renew able secondary fuels, (NSF)*         NU         0E400         -         0E400         0E400           Non-renew able secondary fuels, (NSF)*         NU         0E400         -         0E400         0E400           Non-renew able secondary fuels, (NSF)*         NU         0E400         -         0E400         0	Renew able primary energy resources as energy (fuel), (RPRE)*	MJ	4.15E+01	0E+00	7.11E+02	7.52E+02
Non-renew able primary resources as material (NRTRM)*         NU         OE+00         -         OE+00         OE+00           Consumption of fresh water         m³         2.2E+00         -         OE+00         2.56E+00           Secondary Material, Fuel and Recovered Energy         kg         9.81E+01         -         OE+00         9.81E+01           Secondary Materials, (SM)*         kg         9.81E+01         -         OE+00         9.81E+01           Non-renew able secondary fuels, (RSF)*         NU         2.1E+01         -         OE+00         2.1E+01           Non-renew able secondary fuels, (RSF)*         NU         OE+00         -         OE+00         0E+00	Renew able primary resources as material, (RPRM)*	MJ	0E+00	-	0E+00	0E+00
Consumption of fresh waterm³2.2E+00-3.6E-012.56E+00Secondary Material, Fuel and Recovered Energykg9.81E+01-0E+009.81E+01Secondary Materials, (SM*kg9.81E+01-0E+009.81E+01Renewable secondary fuels, (RSF)*MJ2.1E+01-0E+000E+000E+00Nor-renewable secondary fuels, (RSF)*MJ0E+00-0E+000E+000E+000E+00Recovered energy, (RE)*MJ0E+00-0E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+000E+00 <th< td=""><td>Non-renew able primary resources as energy (fuel), (NRPRE)*</td><td>MJ</td><td>9.36E+02</td><td>2.9E+02</td><td>4.3E+02</td><td>1.66E+03</td></th<>	Non-renew able primary resources as energy (fuel), (NRPRE)*	MJ	9.36E+02	2.9E+02	4.3E+02	1.66E+03
Secondary Material, GM*         Repaired Recovered Energy           Secondary Materials, GM*         kg         9.81E-01         0E-00         9.81E-01           Renewable secondary fuels, (RSF)*         MJ         2.1E-01         0E-00         2.1E-01           Non-renewable secondary fuels, (RSF)*         MJ         0E-00         0E-00         0E-00           Recovered energy, (RE)*         MJ         0E-00         0E-00         0E-00         0E-00           Non-hazardous waste disposed*         Mg         6.37E-03         0E-00         6.37E-03           Non-hazardous waste disposed*         kg         1.11E-01         9.36E-01         9.36E-01           Hat-rediate and low-level radioactive waste*         m <sup>9</sup> 7.86E-09         1.24E-07         1.61E-07           Components for reuse*         kg         0E-00	Non-renew able primary resources as material (NRPRM)*	MJ	0E+00	-	0E+00	0E+00
Secondary Materials, (SM)*         kg         9.81E+01         -         0E+00         9.81E+01           Renewable secondary fuels, (RSF)*         MJ         2.1E+01         -         0E+00         2.1E+01           Non-renewable secondary fuels, (NFSF)*         MJ         0E+00         -         0E+00         0E+00           Recovered energy, (RE)*         MJ         0E+00         -         0E+00         0E+00           Waste & Output Rows         NU         0E+00         -         0E+00         0E+00           Waste & Output Rows         Kg         6.37E-03         -         0E+00         6.37E-03           Non-hazardous waste disposed*         kg         1.11E-01         -         8.24E-01         9.35E-01           Hermediate and low-level radioactive waste*         m³         7.96E-09         -         1.71E-08         2.5E-08           Intermediate and low-level radioactive waste*         m³         3.79E-08         -         1.24E-07         1.61E-07           Components for reuse*         kg         0E+00         -         0E+00         0E+00           Materials for necycling*         kg         0E+00         -         3.2E-01         3.2E-01	Consumption of fresh water	m²	2.2E+00	-	3.6E-01	2.56E+00
Renewable secondary fuels, (RSF)*         MJ         2.1E+01         -         0E+00         2.1E+01           Non-renewable secondary fuels (NRSF)*         MJ         0E+00         -         0E+00         10E+01	Secondary Material, Fuel and Recovered Energy					
Non-renewable secondary fuels (NPSF)*MJ0E+00-0E+000E+00Recovered energy, (RE)*MJ0E+00-0E+000E+00Waste & Cutput FlowsHazardous waste disposed*kg6.37E-03-0E+006.37E-03Non-hazardous waste disposed*kg1.11E-01-8.24E-019.35E-01Hgh-level radioactive waste*m³7.86E-09-1.71E-082.5E-08Intermediate and low-level radioactive waste*m³3.79E-08-1.24E-071.61E-07Components for reuse*kg0E+00-0E+000E+002.5E-08Materials for recycling*kg0E+00-0E+003.2E-013.2E-01Materials for energy recovery*kg0E+00-1.15E-011.15E-011.15E-01	Secondary Materials, (SM)*	kg	9.81E+01	-	0E+00	9.81E+01
Recovered energy, (RE)*MJ0E+00-0E+000E+00Waste & Output FlowsHazardous waste disposed*kg6.37E.03-0E+006.37E.03Non-hazardous waste disposed*kg1.11E.01-8.24E.019.35E.01Hgh-level radioactive waste*m³7.86E.09-1.71E.082.5E.08Intermediate and low-level radioactive waste*m³3.79E.08-1.24E.071.61E.07Components for reuse*kg0E+00-0E+000E+00Materials for recycling*kg0E+00-3.2E.013.2E.01Materials for energy recovery*kg0E+00-1.15E.011.15E.01	Renewable secondary fuels, (RSF)*	MJ	2.1E+01	-	0E+00	2.1E+01
Waste & Output FlowsHazardous waste disposed*kg6.37E03-0E+006.37E03Non-hazardous waste disposed*kg1.11E01-8.24E019.35E01Hgh-level radioactive waste*n³7.86E09-1.71E082.5E08Intermediate and low-level radioactive waste*n³3.79E08-1.24E071.61E07Components for reuse*kg0E+00-0E+000E+000E+00Materials for necycling*kg0E+00-3.2E013.2E01Materials for energy recovery*kg0E+00-1.15E011.15E01	Non-renew able secondary fuels (NRSF)*	MJ	0E+00	-	0E+00	0E+00
Hazardous waste disposed*         kg         6.37E-03         OE+00         6.37E-03           Non-hazardous waste disposed*         kg         1.11E-01         -         8.24E-01         9.35E-01           Hgh-level radioactive waste*         m³         7.86E-09         -         1.71E-08         2.5E-08           Intermediate and low-level radioactive waste*         m³         3.79E-08         -         1.24E-07         1.61E-07           Components for reuse*         kg         0E+00         -         0E+00         0E+00         0E+00         0E+00         0E+00         0E+00         0E+00         0E+00         1.24E-07         1.61E-07         1.61	Recovered energy, (RE)*	MJ	0E+00	-	0E+00	0E+00
Non-hazardous waste disposed*         kg         1.11E01         -         8.24E01         9.35E01           Hgh-level radioactive waste*         m³         7.86E09         -         1.71E08         2.5E08           Intermediate and low-level radioactive waste*         m³         3.79E08         -         1.24E07         1.61E07           Components for reuse*         kg         0E+00         -         0E+00         0E+00         0E+00         3.2E01           Materials for recycling*         kg         0E+00         -         3.2E01         3.2E01	Waste & Output Flows					
Hgh-level radioactive waste*       m³       7.86E09       -       1.71E08       2.5E08         Intermediate and low-level radioactive waste*       m³       3.79E08       -       1.24E07       1.61E07         Components for reuse*       kg       0E+00       -       0E+00       0E+00       0E+00         Materials for recycling*       kg       0E+00       -       3.2E01       3.2E01	Hazardous waste disposed*	kg	6.37E-03	-	0E+00	6.37E-03
Intermediate and low-level radioactive waste*         m³         3.79E-08         -         1.24E-07         1.61E-07           Components for reuse*         kg         0E+00         -         0E+00         0E+00         0E+00         3.2E-01         3.2E-01           Materials for energy recovery*         kg         0E+00         -         1.15E-01         1.15E-01	Non-hazardous waste disposed*	kg	1.11E-01	-	8.24E-01	9.35E-01
Components for reuse*         kg         0E+00         -         0E+00         0E+00           Materials for recycling*         kg         0E+00         -         3.2E-01         3.2E-01           Materials for energy recovery*         kg         0E+00         -         1.15E-01         1.15E-01	Hgh-level radioactive waste*	m³	7.86E-09	-	1.71E-08	2.5E-08
Materials for nergy recovery*kg0E+00-3.2E-013.2E-01Materials for energy recovery*kg0E+00-1.15E-011.15E-01	Intermediate and low-level radioactive waste*	m³	3.79E-08	-	1.24E-07	1.61E-07
Materials for energy recovery*         kg         0E+00         -         1.15E-01         1.15E-01	Components for reuse*	kg	0E+00	-	0E+00	0E+00
	Materials for recycling*	kg	0E+00	-	3.2E-01	3.2E-01
	Materials for energy recovery*	kg	0E+00	-	1.15E-01	1.15E-01
Recovered energy exported from the product system* MJ 0E+00 - 0E+00 0E+00	Recovered energy exported from the product system*	MJ	0E+00	-	0E+00	0E+00

#### Additional Inventory Parameters for Transparency

Emissions from calcination and uptake from carbonation*	kg CO <sub>2</sub> -eq	7.92E+01	0E+00	0 <del>E+</del> 00	7.92E+01

\* Emerging LCA impact categories and inventory items are still under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting data in these categories.

- Not all LCA datasets for upstream materials include these impact categories and thus results may be incomplete. Use caution when interpreting data in these categories

No substances required to be reported as hazardous are associated with the production of this product.

## REFERENCES

- ISO 14025: 2006 Environmental labels and declarations Type III environmental declarations Principles and procedures
- ISO 14040: 2006 Environmental management Life cycle assessment Principles and framework
- ISO 14044: 2006/Amd 2:2020 Environmental management Life cycle assessment Requirements and guidelines
- ISO 21930:2017 Sustainability in buildings and civil engineering works Core rules for environmental product declarations of construction products and services
- Part A: Life Cycle Assessment Calculation Rules and Report Requirements UL Environment (December 2018, version 3.2)
- Part B: Concrete Masonry and Segmental Concrete Paving Product EPD Requirements UL Environment (November 2020, v1.0)



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