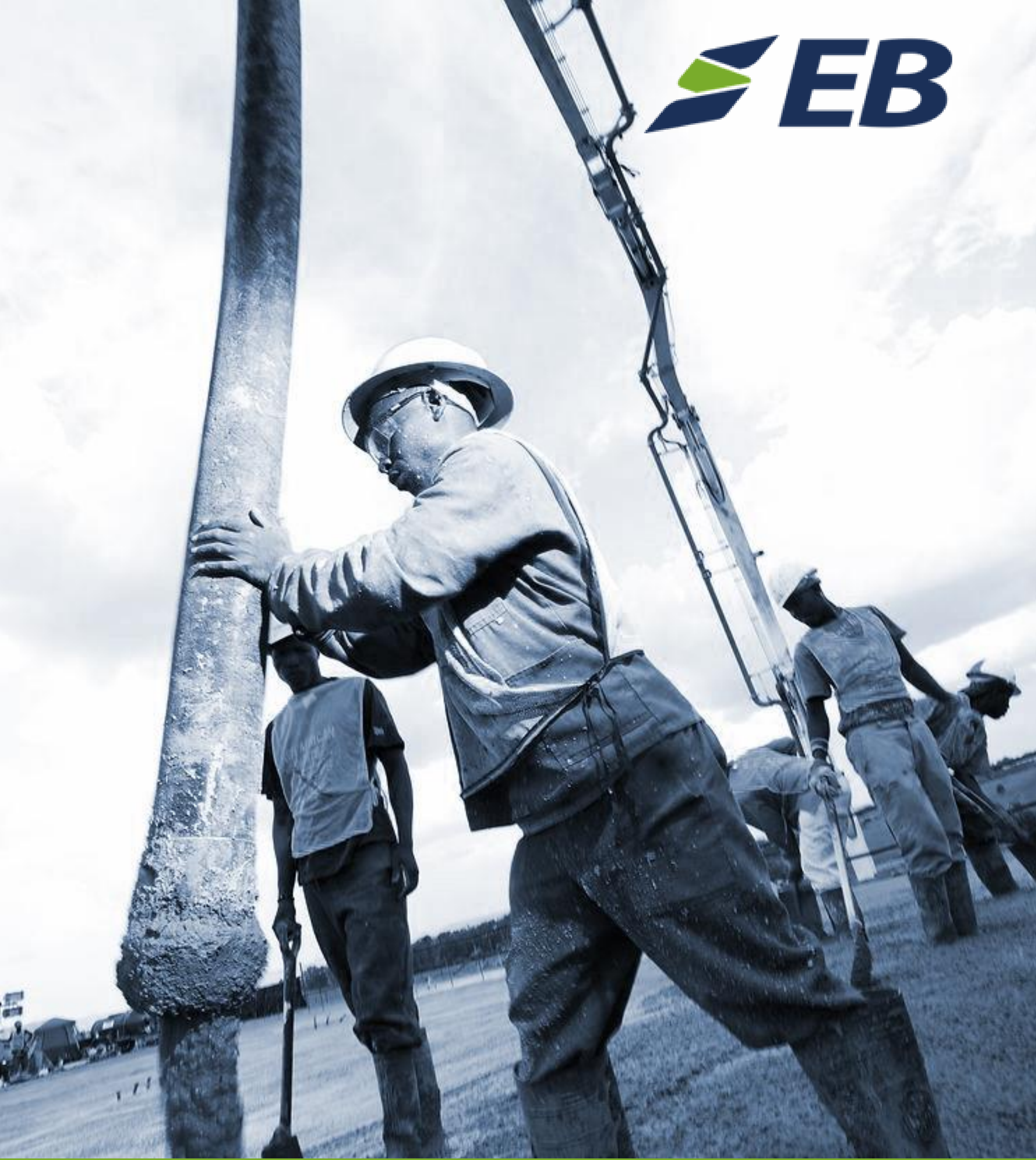

Environmental Product Declaration

A cradle-to-gate EPD according to ISO 14025 and ISO 21930

ASTM INTERNATIONAL

Ready-mix Concrete as Manufactured by Emirates Beton

About Emirates Beton

Emirates Beton Ready Mix (EB) is a ready-mix concrete company that leads the industry in the design, production and supply of ready-mix concrete.

The company was established in 2008 by a dynamic and highly qualified group of people with over 20 years of pioneering experience in the ready-mix concrete industry. The fast-growing company is now a major industry player and boasts of a reputation for superb products and outstanding services.

ASTM International Certified EPD

This is a business-to-business Type III environmental product declaration (EPD) for ready mix concrete products as produced by Emirates Beton. This declaration has been prepared in accordance with ISO 14025 and ISO 21930, and the Carbon Leadership Forum product category rules (PCR) and EPD program operator rules.

The intent of this document is to further the development of environmentally compatible and more sustainable construction products by providing comprehensive environmental information related to potential impacts of ready-mix concrete available in the UAE in accordance with international standards.

Program Operator	
ASTM INTERNATIONAL	**ASTM International** Environmental Product Declarations 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 www.astm.org
Owner of the EPD	
EB	**Emirates Beton Ready Mix LCC** P.O. Box: 111576 Jebel Ali Dubai - United Arab Emirates emiratesbeton.com
Concrete Consultant	
Grey Matters Consultancy	**Grey Matters Consultancy** P.O. Box: 283079 Dubai Investment Park Dubai - UAE www.greymatters.ws

EPD Information	
Product Name Ready-mix concrete	**Product Definition** A composite material that consists of a binding medium (cement paste, hydraulic cement and water, and possibly one or more admixtures) embedded with fine aggregate (typically sand) and coarse aggregate (typically gravel) to form a hard solid mass.
Declared Unit 1 m^3 ready-mix concrete	**Declaration Number** EPD 083

Declaration Type
A “cradle-to-gate” EPD - activity stages or information modules covered include production (modules A1 to A3). The declaration is intended for use in Business-to-Business (B-to-B) communication. This EPD of ready-mix concrete (UN CPC 3751) is applicable to those manufactured at the Emirates Beton Jebel Ali facility.

Content of the Declaration
The declaration follows Section 4, Reporting: Content of the EPD, Carbon Leadership Forum, Product Category Rules (PCR) for ISO 14025 Type III Environmental Product Declarations (EPDs) for Concrete.

EPD Information

Declaration Comparability Limitation Statement

The following ISO statement indicates the EPD comparability limitations and intent to avoid any market distortions or misinterpretation of EPDs based on the CLF's PCR: 2013:

- EPDs from different programs (using different PCR) may not be comparable.
- Declarations based on the CLF PCR are not comparative assertions; that is, no claim of environmental superiority may be inferred or implied.

Applicable Countries	**Date of Issue**	**Period of Validity**
United Arab Emirates	June 22 2018	5 years

EPD Prepared by Athena Sustainable Materials Institute	Matt Bowick, Athena Sustainable Materials Institute 119 Ross Avenue, Suite 100 Ottawa, Ontario, K1Y 0N6, Canada matt.bowick@athenasmi.org
This EPD was independently verified by ASTM in accordance with ISO 14025: Internal <u>External</u> X	Timothy Brooke , ASTM International 100 Barr Harbor Dr. West Conshohocken, PA 19428 cert@astm.org

EPD Project Report Information

EPD Project Report

A Cradle-to-Gate Life Cycle Assessment of Ready-Mix Concrete Manufactured by Emirates Beton Ready Mix in the Emirate of Dubai, UAE, April 2018.

The report is available upon request at *cert@astm.org*.

EPD Project Prepared by Athena Sustainable Materials Institute	Matt Bowick, Athena Sustainable Materials Institute 119 Ross Avenue, Suite 100 Ottawa, Ontario, K1Y 0N6, Canada matt.bowick@athenasmi.org
This EPD and EPD project report were independently verified by in accordance with ISO 14025 and the reference PCR:	Thomas Gloria, Ph.D. (LCACP ID: 2008-03) Industrial Ecology Consultants Email: info@industrial-ecology.com

PCR Information

Reference PCR	The Carbon Leadership Forum PCR: Product Category Rules (PCR) for ISO 14025 Type III Environmental Product Declarations (EPDs) for Concrete Version 1.1
Date of Issue	December 2013
PCR review was conducted by:	Nicholas Santero, PE International Holly Lahd, EL Analytics Medgar Marceau, Morrison Hershfield Contact information available upon request via www.carbonleadershipforum.org.

1. PRODUCT IDENTIFICATION

This EPD reports environmental information for six ready-mix concrete designs, produced by Emirates Beton at their Jebel Ali plant in Dubai, United Arab Emirates. See Figure 1 below for a visual representation of ready-mix concrete.

Figure 1: Ready-mix Concrete

Products covered by this EPD satisfy general purpose concrete as used in residential, commercial and public works applications in Dubai, UAE. This EPD reports the impacts for six ready-mix concrete products (listed in Table 1 on the following page) in accordance with the following:

- Dubai Municipality Circular 202: Use of Eco-friendly Cementitious Materials in Concrete
- ACI 211: Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
- ACI 318: Building Code Requirements for Structural Concrete
- ASTM C94: Standard Specification for Ready-Mixed Concrete
- CSI MasterFormat Division 03-30-00: Cast-in-Place Concrete
- UNSPSC Code 30111500: Ready Mix Concrete

Table 1: Ready-mix Concrete Designs

Mix Design #	1	2	3	4	5	6
Code	NS2027	SB5035	SB5036	SB6021	SB4013	SB4518
Concrete Grade, Fcy/Fcu[1] (MPa)	C15/20	C40/50	C40/50	C50/60	C32/40	C36/45
End-use	Blinding	Substructure - Slabs	Substructure - Raft / External Basement walls	Substructure - Column / Wall / Canopy Ring Beam & Pile Cap	General Substructure	General Substructure

2. DECLARED UNIT

The declared unit is 1 m³ of ready-mix concrete.

3. MATERIAL CONTENT

Table 2 below presents the material content by input material for the six mix designs, as produced by Emirates Beton.

Table 2: Material Content of Ready-mix Concrete Designs

Material	NS2027 - C15/20	SB5035 - C40/50	SB5036 - C40/50	SB6021 - C50/60	SB4013 - C32/40	SB4518 - C36/45
Portland Cement	0	176	176	179	160	168
Sulphate Resistant Cement	122	0	0	0	0	0
Slag Cement	228	242	242	248	240	252
Silica Fume	0	22	22	23	0	0
Crushed Coarse Aggregate - 20mm	562	576	576	578	586	579
Crushed Coarse Aggregate - 10mm	382	336	336	345	349	337
Crushed Fine Aggregate - 5mm	604	600	600	576	616	593
Natural Fine Aggregate - dune Sand	333	327	327	322	330	337
Low-range Admixture (plasticizer)	6	0	0	0	7.5	0
Mid-range Admixture (plasticizer)	0	7	7	7	0	6.5
Corrosion Inhibitor Admixture	0	0	0.6	0	0	0
Water	158	141	141	144	140	147
Total, kg/m^3	2,395	2,427	2,428	2,422	2,429	2,420

[1] Fcy/Fcu is the ratio of 28-day compressive strength (in MPa) of a concrete cylinder vs. a concrete cube

4. SYSTEM BOUNDARY

This EPD is intended for use in Business to Business (B-to-B) communication. The scope of this EPD is cradle-to-gate and considers the following life cycle modules:

- A1 - Raw Material Supply
- A2 - Transportation
- A3 - Manufacturing

Figure 2 shows the product stage system boundary for ready-mix concrete.

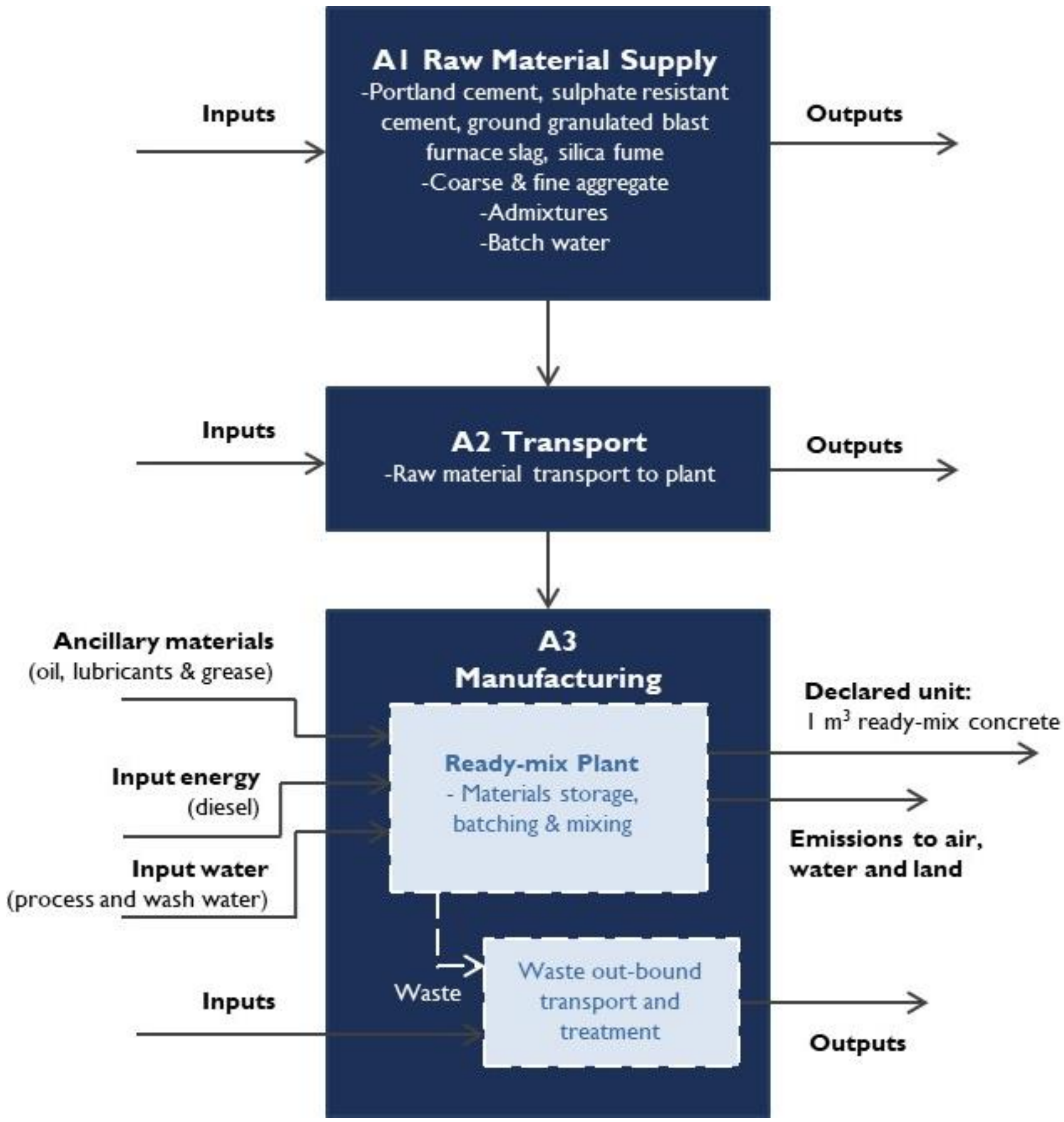

Figure 2: Product Stage (module A1 to A3) System Boundary

A summary of life cycle activities included in the EPD is as follows:

- Raw Material Supply (upstream processes): Extraction, handling and processing of the raw materials used in the production of concrete: cement, supplementary cementitious materials, aggregate (coarse and fine), water, admixtures and other materials or chemicals used in concrete mixtures.
- Transportation: Transportation of these materials from the supplier to the 'gate' of the concrete producer.
- Manufacturing (core processes): The energy used to store, batch, mix and distribute the concrete and operate the facility (concrete plant).
- Water use in mixing and distributing concrete.

A summary of life cycle activities excluded from the EPD is as follows:

- Production, manufacture and construction of buildings capital goods and infrastructure.
- Production and manufacture of concrete production equipment, concrete delivery vehicles, earthmoving equipment, and laboratory equipment.
- Personnel-related activities (travel, furniture, office supplies).
- Energy use related to company management and sales activities.

5. DATA SOURCES AND DATA QUALITY ASSESSMENT

This EPD is based on foreground LCI data collected from the participating company's production facilities for the calendar year 2016. All upstream material, resource and energy carrier inputs have been sourced from various industry-average datasets and literature. Table 3 through Table 6 describe each LCI data source and the data quality for each data source.

Table 3: Secondary Data Sources, A1 Raw Material Supply

Materials	LCI Data Source	Geography	Time Span[2]	Data Quality Assessment
Portland Cement (kg)	Results for 1 kg Cement in United Arab Emirates as modeled in WBCSD-CSI tool for EPDs of concrete and cement. UAE-specific clinker factors and kiln fuels assumed in model.	UAE	2014-2015	• **Technology:** very good Process represents average cement production in the UAE • **Time:** very good Data is within 3 years • **Geography:** very good • **Completeness** : very good Data is based on an average of national production • **Reliability:** very good

[2] "Time Frame" is the period between the known initiation of data and its final update and/or validation

Materials	LCI Data Source	Geography	Time Span[2]	Data Quality Assessment
Sulphate Resistant Cement (kg)	n/a	n/a	n/a	Secondary data for this product was unavailable; portland cement data was used as a proxy (see above)
Slag Cement (kg)	Slag Cement Association N. America EPD Slag Cement, 2015	N. America	2013-2014	• **Technology:** very good Process models ground granulated blast furnace slag • **Time:** very good Data is within 4 years • **Geography:** fair • **Completeness:** very good • **Reliability:** very good Third-party verified EPD
Silica Fume (kg)	n/a	n/a	n/a	Transport of silica fume to facility considered but no preprocessing is assumed
Crushed Aggregates (kg) *coarse and fine* **Natural Aggregates (kg)** *fine*	ecoinvent 3.3: Gravel, crushed {RoW}| production | Alloc Rec ecoinvent 3.3 ecoinvent 3.3: Sand {RoW}| gravel and quarry operation | Alloc Rec, Modified with UAE electricity, water	ROW/UAE	1997-2016	• **Technology:** good Processes represent aggregate, with and without crushing • **Time:** good • **Geography:** good Modified with UAE electricity and water • **Completeness:** good • **Reliability:** good ecoinvent has verified the data
Admixtures (kg) *Low- and mid-range water reducers*	Concrete admixtures – Plasticisers and Superplasticisers European Federation of Concrete Admixtures Associations Ltd. (EFCA)	EU	2015	• **Technology:** good Processes represents admixture production for use in concrete • **Time:** very good • **Geography:** fair • **Completeness:** very good Data from a federation of European admixture producers • **Reliability:** very good Third-party verified EPD
Admixtures (kg) *corrosion inhibitor*	n/a	n/a	n/a	Secondary data for this product was unavailable; plasticisers and superplasticisers data was used as a proxy (see above)

Materials	LCI Data Source	Geography	Time Span[2]	Data Quality Assessment
Batch Water (kg)	ecoinvent 3.3: Tap water {GLO}| tap water production, seawater reverse osmosis, conventional pretreatment, enhance module, single stage | Alloc Rec Modfied with UAE electricity	GLO/UAE	2004-2016	• **Technology:** good • **Time:** very good • **Geography:** good Modified with UAE electricity • **Completeness:** good • **Reliability:** good ecoinvent has verified the data

Table 4: Secondary Data Sources, A2 – Transport

Process	LCI Data Source	Geography	Time Span	Data Quality Assessment
Road (t*km)	ecoinvent 3.3: Transport, freight, lorry, unspecified {GLO}| market for | Alloc Rec	Global	2012-2016	• **Technology:** good Process represents global average • **Time:** very good • **Geography:** good • **Completeness:** good • **Reliability:** good ecoinvent has verified the data
Ocean (t*km)	ecoinvent 3.3: Transport, freight, sea, transoceanic ship {GLO}| market for | Alloc Rec	Global	2011-2016	• **Technology:** good Process represents global average • **Time:** very good • **Geography:** good • **Completeness:** good • **Reliability:** good ecoinvent has verified the data

Table 5: Secondary Data Sources, A3 – Manufacturing

Process	LCI Data Source	Geography	Time Span	Data Quality Assessment
Diesel (MJ)	ecoinvent 3.3: Heat, central or small-scale, other than natural gas {RoW}| heat production, light fuel oil, at boiler 10kW, non-modulating | Alloc Rec	RoW	1991-2016	• **Technology:** very good Process represents combustion of fuel oil in a condensing boiler. • **Time:** very good • **Geography:** good • **Completeness:** good • **Reliability:** good ecoinvent has verified the data
Process Water (kg)	ecoinvent 3.3: Tap water {GLO}| tap water production, seawater reverse osmosis, conventional pretreatment, enhance module, single stage | Alloc Rec Modfied with UAE electricity	GLO/UAE	2004-2016	• **Technology:** good • **Time:** good • **Geography:** good • **Completeness:** good • **Reliability:** good ecoinvent has verified the data

Process	LCI Data Source	Geography	Time Span	Data Quality Assessment
Hazardous Solid Waste, (kg)	ecoinvent 3.3: Hazardous waste, for incineration {RoW}| treatment of hazardous waste, hazardous waste incineration | Alloc Rec	RoW	1997-2016	• **Technology:**good • **Time:** very good • **Geography:** good • **Completeness:** good • **Reliability:** good ecoinvent has verified the data
Non-Hazardous Solid Waste, (kg)	ecoinvent 3.3: Inert waste {RoW}| treatment of, sanitary landfill | Alloc Rec	RoW	1994-2016	• **Technology:** good • **Time:** very good • **Geography:** good • **Completeness:** good • **Reliability:** good ecoinvent has verified the data
Oil, Lubricants & Grease (kg)	ecoinvent 3.3: Lubricating oil {GLO}| market for | Alloc Rec	Global	2011-2016	• **Technology:** good • **Time:** very good • **Geography:** good • **Completeness:** good • **Reliability:** good ecoinvent has verified the data

Table 6: Secondary Data Sources, electricity generation

Process	LCI Data Source	Geography	Data Quality Assessment
Electricity (kWh)	Energy source breakdown: International Energy Agency electricity statistics for 2014 UAE electricity generation Electricity generation processes: ecoinvent 3.3 (specific LCI data sets listed below)	UAE/RoW	• **Technology:** very good Process represents production of electricity in the UAE in 2014. (See % contribution by source below) • **Time:** very good Electricity production data and breakdown is within three years • **Geography:** very good • **Completeness:** very good Data is representative of UAE production • **Reliability:** good ecoinvent has verified the data

Electricity source grid mix	LCI Data Set	kWh production per kWh at user
Oil	Electricity, high voltage {RoW}| electricity production, oil | Alloc Rec	0.0144
Natural Gas	Electricity, high voltage {RoW}| electricity production, natural gas, at conventional power plant | Alloc Rec	1.0545
Solar	Electricity, low voltage {RoW}| electricity production, photovoltaic, 570kWp open ground installation, multi-Si | Alloc Rec	0.0029
Total		**1.0718**

6. LIFE CYCLE ASSESSMENT

This section summarizes the results of the life cycle impact assessment (LCIA) based on the cradle-to-gate life cycle inventory inputs and outputs analysis. The results are calculated on the basis of 1 m^3 ready-mix concrete (Table 7 through Table 12). The production results are delineated by information modules A1 through A3.

As per the CLF PCR, Section 3.2, US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI, version 2.1) impact categories are used for the mandatory category indicators to be included in this EPD. Total primary and sub-set energy consumption was compiled using a cumulative energy demand model. Material resource consumption and generated waste reflect cumulative life cycle inventory flow information.

The limitations of this EPD include:

- This EPD does not report all of the environmental impacts due to manufacturing of the product, but rather reports the environmental impacts for those categories with established LCA-based methods to track and report. Unreported environmental impacts include (but are not limited to) factors attributable to human health, land use change, and habitat destruction.
- In order to assess the local impacts of product manufacturing, additional analysis is required.
- This EPD reports the results of an LCA or the 'cradle-to-gate' analysis. Thus, declarations themselves are not comparative assertions, defined as an environmental claim regarding the superiority or equivalence of one product versus a competing product that performs the same function. An EPD does not make any statements that the product covered by the EPD is better or worse than any other product.
- The EPD participants may participate in other sustainability or environmental best practice programs. However, no such additional environmental claim or declaration is conveyed in this EPD.
- EPDs of concrete mixtures may not be comparable if they do not comply with this standard and data from this EPD. The data cannot be used to compare between concrete mixes, construction products or concrete mixtures used in different concrete products unless the data is integrated into a comprehensive LCA. For example, precast concrete, concrete masonry units and site cast concrete all have different manufacturing processes whose impacts are attributed to different LCA stages. This precludes direct comparison between mixtures used in these different products unless all lifecycle phases are included.
- 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.
- This EPD was created using industry average data for upstream materials. Variation can result from differences in supplier locations, manufacturing processes, manufacturing efficiency and fuel type used.

Table 7: LCA Results – NS2027 – C15/20, per m^3

Environmental Indicator	Unit	A1 Raw Material Supply	A2 Transport	A3 Manu-facturing	Total
Global warming potential (climate change)	kg CO_2 eq.	180	12	9	201
Ozone depletion potential	kg CFC-11 eq.	7.39E-05	3.15E-06	3.54E-06	8.06E-05
Acidification potential	kg SO_2 eq.	1.18	0.06	0.02	1.26
Eutrophication potential	kg N eq.	0.226	0.009	0.005	0.241
Photochemical Ozone Creation/Smog Potential	kg O_3 eq.	12.7	1.6	0.2	14.5
Total primary energy consumption	MJ (HHV)	2,045	199	144	2,388
Depletion of non-renewable energy resources	MJ (HHV)	2,010	198	143	2,351
Use of renewable primary energy	MJ (HHV)	34.8	1.1	0.7	36.6
Depletion of non-renewable material resources	kg	2,420	1	0	2,421
Use of renewable material resources	kg	0.139	0.021	0.006	0.166
Concrete batching water consumption	m^3	0.159	0.000	0.000	0.159
Concrete washing water consumption	m^3	0.000	0.000	0.056	0.056
Total water consumption	m^3	1.61	0.02	0.02	1.65
Hazardous waste	kg	0.010	0.000	0.003	0.012
Non-hazardous waste	kg	1.32	0.00	19.86	21.19
Carbon emissions from bio fuel combustion	kg CO_2 eq.	0	0	0	0

Table 8: LCA Results – SB5035 – C40/50, per m^3

Environmental Indicator	Unit	A1 Raw Material Supply	A2 Transport	A3 Manu-facturing	Total
Global warming potential (climate change)	kg CO_2 eq.	232	13	9	254
Ozone depletion potential	kg CFC-11 eq.	7.61E-05	3.35E-06	3.54E-06	8.30E-05
Acidification potential	kg SO_2 eq.	1.37	0.08	0.02	1.46
Eutrophication potential	kg N eq.	0.298	0.010	0.005	0.313
Photochemical Ozone Creation/Smog Potential	kg O_3 eq.	15.0	1.9	0.2	17.1
Total primary energy consumption	MJ (HHV)	2,455	212	144	2,811
Depletion of non-renewable energy resources	MJ (HHV)	2,416	211	143	2,770
Use of renewable primary energy	MJ (HHV)	39.2	1.1	0.7	41.1
Depletion of non-renewable material resources	kg	2,478	1	0	2,479
Use of renewable material resources	kg	0.172	0.022	0.006	0.200
Concrete batching water consumption	m^3	0.142	0.000	0.000	0.142
Concrete washing water consumption	m^3	0.000	0.000	0.056	0.056
Total water consumption	m^3	1.99	0.02	0.02	2.03
Hazardous waste	kg	0.010	0.000	0.003	0.013
Non-hazardous waste	kg	1.32	0.00	19.86	21.18
Carbon emissions from bio fuel combustion	kg CO_2 eq.	0	0	0	0

Table 9: LCA Results – SB5036 – C40/50, per m^3

Environmental Indicator	Unit	A1 Raw Material Supply	A2 Transport	A3 Manu-facturing	Total
Global warming potential (climate change)	kg CO_2 eq.	232	13	9	254
Ozone depletion potential	kg CFC-11 eq.	7.61E-05	3.35E-06	3.53E-06	8.30E-05
Acidification potential	kg SO_2 eq.	1.37	0.08	0.02	1.47
Eutrophication potential	kg N eq.	0.298	0.010	0.005	0.313
Photochemical Ozone Creation/Smog Potential	kg O_3 eq.	15.1	1.9	0.2	17.1
Total primary energy consumption	MJ (HHV)	2,464	212	143	2,819
Depletion of non-renewable energy resources	MJ (HHV)	2,425	211	142	2,778
Use of renewable primary energy	MJ (HHV)	39.7	1.1	0.7	41.6
Depletion of non-renewable material resources	kg	2,478	1	0	2,479
Use of renewable material resources	kg	0.172	0.022	0.006	0.200
Concrete batching water consumption	m^3	0.142	0.000	0.000	0.142
Concrete washing water consumption	m^3	0.000	0.000	0.056	0.056
Total water consumption	m^3	1.99	0.02	0.02	2.03
Hazardous waste	kg	0.010	0.000	0.003	0.013
Non-hazardous waste	kg	1.33	0.00	19.86	21.20
Carbon emissions from bio fuel combustion	kg CO_2 eq.	0	0	0	0

Table 10: LCA Results – SB6021 – C50/60, per m^3

Environmental Indicator	Unit	A1 Raw Material Supply	A2 Transport	A3 Manu-facturing	Total
Global warming potential (climate change)	kg CO_2 eq.	235	13	9	257
Ozone depletion potential	kg CFC-11 eq.	7.59E-05	3.35E-06	3.53E-06	8.28E-05
Acidification potential	kg SO_2 eq.	1.39	0.08	0.02	1.49
Eutrophication potential	kg N eq.	0.302	0.010	0.005	0.318
Photochemical Ozone Creation/Smog Potential	kg O_3 eq.	15.3	1.9	0.2	17.4
Total primary energy consumption	MJ (HHV)	2,487	212	143	2,841
Depletion of non-renewable energy resources	MJ (HHV)	2,447	211	142	2,800
Use of renewable primary energy	MJ (HHV)	39.8	1.1	0.7	41.6
Depletion of non-renewable material resources	kg	2,471	1	0	2,472
Use of renewable material resources	kg	0.174	0.022	0.006	0.202
Concrete batching water consumption	m^3	0.145	0.000	0.000	0.145
Concrete washing water consumption	m^3	0.000	0.000	0.056	0.056
Total water consumption	m^3	2.01	0.02	0.02	2.04
Hazardous waste	kg	0.010	0.000	0.003	0.013
Non-hazardous waste	kg	1.31	0.00	19.86	21.18
Carbon emissions from bio fuel combustion	kg CO_2 eq.	0	0	0	0

Table 11: LCA Results – SB4013 – C32/40, per m^3

Environmental Indicator	Unit	A1 Raw Material Supply	A2 Transport	A3 Manu-facturing	Total
Global warming potential (climate change)	kg CO_2 eq.	217	13	9	239
Ozone depletion potential	kg CFC-11 eq.	7.63E-05	3.23E-06	3.53E-06	8.30E-05
Acidification potential	kg SO_2 eq.	1.32	0.06	0.02	1.41
Eutrophication potential	kg N eq.	0.278	0.010	0.005	0.293
Photochemical Ozone Creation/Smog Potential	kg O_3 eq.	14.4	1.7	0.2	16.3
Total primary energy consumption	MJ (HHV)	2,359	204	143	2,707
Depletion of non-renewable energy resources	MJ (HHV)	2,320	203	142	2,666
Use of renewable primary energy	MJ (HHV)	38.8	1.1	0.7	40.6
Depletion of non-renewable material resources	kg	2,495	1	0	2,495
Use of renewable material resources	kg	0.163	0.022	0.006	0.191
Concrete batching water consumption	m^3	0.141	0.000	0.000	0.141
Concrete washing water consumption	m^3	0.000	0.000	0.056	0.056
Total water consumption	m^3	1.93	0.02	0.02	1.97
Hazardous waste	kg	0.010	0.000	0.003	0.013
Non-hazardous waste	kg	1.35	0.00	19.86	21.21
Carbon emissions from bio fuel combustion	kg CO_2 eq.	0	0	0	0

Table 12: LCA Results – SB4518 – C36/45, per m^3

Environmental Indicator	Unit	A1 Raw Material Supply	A2 Transport	A3 Manu-facturing	Total
Global warming potential (climate change)	kg CO_2 eq.	226	13	9	247
Ozone depletion potential	kg CFC-11 eq.	7.62E-05	3.22E-06	3.53E-06	8.29E-05
Acidification potential	kg SO_2 eq.	1.38	0.06	0.02	1.46
Eutrophication potential	kg N eq.	0.289	0.010	0.005	0.304
Photochemical Ozone Creation/Smog Potential	kg O_3 eq.	15.0	1.7	0.2	16.9
Total primary energy consumption	MJ (HHV)	2,419	204	143	2,766
Depletion of non-renewable energy resources	MJ (HHV)	2,380	202	142	2,725
Use of renewable primary energy	MJ (HHV)	39.2	1.1	0.7	41.0
Depletion of non-renewable material resources	kg	2,484	1	0	2,485
Use of renewable material resources	kg	0.168	0.022	0.006	0.195
Concrete batching water consumption	m^3	0.148	0.000	0.000	0.148
Concrete washing water consumption	m^3	0.000	0.000	0.056	0.056
Total water consumption	m^3	1.89	0.02	0.02	1.93
Hazardous waste	kg	0.010	0.000	0.003	0.013
Non-hazardous waste	kg	1.32	0.00	19.86	21.18
Carbon emissions from bio fuel combustion	kg CO_2 eq.	0	0	0	0