

This Environmental Product Declaration (EPD) reports the impacts for 1 m³ of ready mixed concrete mix, meeting the following specifications:

- ASTM C94: Ready-Mixed Concrete
- UNSPSC Code 30111505: Ready Mix Concrete
- CSA A23.1/A23.2: Concrete Materials and Methods of Concrete Construction
- CSI Division 03-30-00: Cast-in-Place Concrete

COMPANY**LAFARGE CANADA INC. - WCAN**

300, 115 Quarry Park Rd SE
Calgary, AB T2C 5G9

PLANT**Chilliwack Ready-Mix Plant**

46050 Brinx Road
Chilliwack, BC V2P 8B8

EPD PROGRAM OPERATOR**ASTM International**

100 Barr Harbor Drive
West Conshohocken, PA 19428

**DATE OF ISSUE**

03/30/2021 (valid for 5 years until 03/30/2026)

ENVIRONMENTAL IMPACTS**Declared Product:**

Mix RMXUG35A3A8M • Chilliwack Ready-Mix Plant
ECOPACTMAX35 20MM 1-4%
Compressive strength: 35 MPa at 56 days

Declared Unit: 1 m³ of concrete

Global Warming Potential (kg CO ₂ -eq)	170
Ozone Depletion Potential (kg CFC-11-eq)	9.29E-6
Acidification Potential (kg SO ₂ -eq)	1.25
Eutrophication Potential (kg N-eq)	0.16
Photochemical Ozone Creation Potential (kg O ₃ -eq)	23.6
Abiotic Depletion, non-fossil (kg Sb-eq)	2.01E-5
Abiotic Depletion, fossil (MJ)	658
Total Waste Disposed (kg)	0.31
Consumption of Freshwater (m ³)	3.52

Product Components: admixture (ASTM C494), crushed aggregate (ASTM C33), natural aggregate (ASTM C33), slag cement (ASTM C989), batch water (ASTM C1602), portland limestone cement (ASTM 595)

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

ISO 21930:2017 Sustainability in Building Construction — Environmental Declaration of Building Products: serves as the core PCR
PCR for Concrete, NSF International, February 2019 serves as the sub-category PCR

Sub-category PCR review was conducted by Thomas P. Gloria • Industrial Ecology Consultants

Independent verification of the declaration, according to ISO 14025:2006: internal external

Third party verifier: Thomas P. Gloria (t.gloria@industrial-ecology.com) • Industrial Ecology Consultants

For additional explanatory material

Manufacture Representative: Piero Nanfara (piero.nanfara@lafargeholcim.com)

Software Tool: [CarbonCLARITY Suite](#), [EPD Generator](#) • [Verification](#)

LCA & EPD Developer: Climate Earth (support@climateearth.com)

LIFE CYCLE ASSESSMENT

SYSTEM BOUNDARY

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

PRODUCTION Stage (Mandatory)			CONSTRUCTION Stage		USE Stage					END-OF-LIFE Stage			
Extraction and upstream production	Transport to factory	Manufacturing	Transport to site	Installation	Use	Maintenance	Repair	Replacement	Relubrication	De-constructory Demolition	Transport to waste processing or disposal	Waste processing	Disposal of waste
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4

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.

ALLOCATION PROCEDURE

Allocation follows the requirements and guidance of ISO 14044:2006, Clause 4.3.4.

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.

Chilliwack Ready-Mix Plant is a truck (transit) mixing plant. 30% of all mixing truck(fleet) energy has been allocated to module A3.

LIFE CYCLE INVENTORY (LCI)

This EPD was calculated using manufacturer specific cement data that represents 100% of the total cement used in this mix.

PRIMARY SOURCES OF LCI DATA

- **Admixture (other):** Highest impact in each impact category of the six EFCA admixture EPD, 2015
- **Admixture (plasticizing):** EFCA EPD, 2015
- **Admixture (superplasticizing):** EFCA EPD, 2015
- **Aggregate (crushed):** US-EI (2020): "Gravel, crushed, at mine/US", 2001
- **Aggregate (natural):** US-EI (2020): "Gravel, round, at mine/US", 2001
- **Barge transport:** USLCI: "Transport, barge, average fuel mix", 2007
- **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: "Diesel, combusted in industrial equipment/NREL/US", 2007
- **Electricity (WECC):** Ecoinvent 3.4: "Electricity, medium voltage, market for, cut-off", 2015
- **Municipal Water:** US-EI (2016): "Tap water, at user/US", 2000
- **Non-Hazardous Solid Waste:** US-EI (2016): Disposal, municipal solid waste, 2008
- **Portland-limestone Cement:** Supplier specific primary data, 2019
- **Propane:** USLCI: "Liquefied petroleum gas, at refinery/NREL/US", 2007, and US EPA emission factors, 2008
- **Slag cement:** Slag Cement Association, industry average EPD, 2014
- **Truck transport:** USLCI: "Transport, combination truck, long-haul, diesel powered/tkm/RNA", 2010
- **Truck transport:** USLCI: "Transport, combination truck, short-haul, diesel powered/tkm/RNA", 2010

DECLARATION OF ENVIRONMENTAL INDICATORS DERIVED FROM LCA

Impact Assessment	Unit	A1	A2	A3	Total
Global warming potential (GWP)	kg CO ₂ -eq	1.36E+02	2.56E+01	7.72E+00	1.7E+02
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11-eq	9.24E-06	1.07E-09	5.46E-08	9.29E-06
Eutrophication potential (EP)	kg N-eq	1.3E-01	1.78E-02	1.18E-02	1.59E-01
Acidification potential of soil and water sources (AP)	kg SO ₂ -eq	8.48E-01	3.02E-01	9.71E-02	1.25E+00
Formation potential of tropospheric ozone (FOCP)	kg O ₃ -eq	1.29E+01	7.64E+00	3.05E+00	2.36E+01

Resource Use

Abiotic depletion potential for non-fossil mineral resources (ADP _{elements})*	kg Sb-eq	1.99E-05	-	1.97E-07	2.01E-05
Abiotic depletion potential for fossil resources (ADP _{fossil})	MJ	1.9E+02	3.64E+02	1.04E+02	6.58E+02
Renewable primary energy resources as energy (fuel), (RPFRE)*	MJ	7.61E+01	0E+00	2.15E+00	7.82E+01
Renewable primary resources as material, (RPRM)*	MJ	6.02E-02	-	0E+00	6.02E-02
Non-renewable primary resources as energy (fuel), (NRFRE)*	MJ	1.27E+03	3.64E+02	1.06E+02	1.74E+03
Non-renewable primary resources as material (NRPRM)*	MJ	7.2E+00	-	0E+00	7.2E+00
Consumption of fresh water	m ³	3.49E+00	-	3.11E-02	3.52E+00

Secondary Material, Fuel and Recovered Energy

Secondary Materials, (SM)*	kg	2.33E+02	-	0E+00	2.33E+02
Renewable secondary fuels, (RSF)*	MJ	-	-	0E+00	0E+00
Non-renewable secondary fuels (NRSF)*	MJ	-	-	0E+00	0E+00
Recovered energy, (RE)*	MJ	-	-	0E+00	0E+00

Waste & Output Flows

Hazardous waste disposed*	kg	1.69E-02	-	0E+00	1.69E-02
Non-hazardous waste disposed*	kg	1.77E-01	-	1.11E-01	2.88E-01
High-level radioactive waste*	m ³	1.36E-03	-	8.73E-10	1.36E-03
Intermediate and low-level radioactive waste*	m ³	1.11E-07	-	8.15E-09	1.19E-07
Components for reuse*	kg	-	-	0E+00	0E+00
Materials for recycling*	kg	-	-	1.1E+01	1.1E+01
Materials for energy recovery*	kg	-	-	0E+00	0E+00
Recovered energy exported from the product system*	MJ	-	-	0E+00	0E+00

* 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.

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.

REFERENCES

ISO 21930:2017 Sustainability in Building Construction — Environmental Declaration of Building Products ISO 14044:2006 Environmental Management — Life Cycle Assessment — Requirements and Guidelines