

This Environmental Product Declaration (EPD) reports the impacts for 1 m<sup>3</sup> 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**

**Independent Concrete Ltd.**  
 765 Industrial Way  
 Victoria, BC V9B 6E2

**PLANT**

**Plant 1 Plant**  
 765 Industrial Way  
 Langford, BC V9B 6E2

**EPD PROGRAM OPERATOR**

**ASTM International**  
 100 Barr Harbor Drive  
 West Conshohocken, PA 19428



**DATE OF ISSUE**

10/26/2022 (valid for 5 years until 10/26/2027)

**ENVIRONMENTAL IMPACTS**

**Declared Product:**

Mix S3528N40 • Plant 1 Plant  
 Description: 35 MPa 40 % cement reduction  
 Compressive strength: 35 MPa at 56 days

**Declared Unit:** 1 m<sup>3</sup> of concrete

|  |         |
|--|---------|
| Global Warming Potential (kg CO <sub>2</sub> -eq)              | 250     |
| Ozone Depletion Potential (kg CFC-11-eq)                       | 1.17E-5 |
| Acidification Potential (kg SO <sub>2</sub> -eq)               | 1.51    |
| Eutrophication Potential (kg N-eq)                             | 0.19    |
| Photochemical Ozone Creation Potential (kg O <sub>3</sub> -eq) | 32.8    |
| Abiotic Depletion, non-fossil (kg Sb-eq)                       | 3.48E-6 |
| Abiotic Depletion, fossil (MJ)                                 | 664     |
| Total Waste Disposed (kg)                                      | 3.98    |
| Consumption of Freshwater (m <sup>3</sup> )                    | 1.61    |

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

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, August 2021 v2.1 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](mailto:t.gloria@industrial-ecology.com)) • Industrial Ecology Consultants

**For additional explanatory material**

Manufacture Representative: Todd Hanson ([thanson@iconcrete.ca](mailto:thanson@iconcrete.ca))  
 Software Tool: [CarbonCLARITY Suite](#), [EPD Generator](#) • [Verification](#)  
 LCA & EPD Developer: Climate Earth ([support@climateearth.com](mailto: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<br>(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 | Refurbishment | De-construction/ Demolition | Transport to waste processing or disposal | Waste processing | Disposal of waste |
| <b>A1</b>                          | <b>A2</b>            | <b>A3</b>     | <b>A4</b>          | <b>A5</b>    | <b>B1</b> | <b>B2</b>   | <b>B3</b> | <b>B4</b>   | <b>B5</b>     | <b>C1</b>                   | <b>C2</b>                                 | <b>C3</b>        | <b>C4</b>         |

### 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.

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.

Plant 1 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 (superplasticizing):** EFCAEPD, 2015
- **Aggregate (crushed):** US-EI (2020): "Gravel, crushed, at mine/US", 2001
- **Aggregate (recycled concrete):** custom process, based on US-EI (2016) "Gravel, crushed, at mine/US", 2001
- **Barge transport:** USLCI: "Transport, barge, average fuel mix", 2007
- **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 (2020): "Tap water, at user/US", 2000
- **Oils, Lubricants and Greases:** Ecoinvent 3.5: Lubricating oil, GLO, market for, cut-off, 2011
- **Portland-limestone Cement:** Supplier specific primary data, 2019
- **Propane:** USLCI: "Liquefied petroleum gas, at refinery/NREL/US", 2007, and US EPA emission factors, 2008
- **Ship transport:** USLCI: "Transport, ocean freighter, average fuel mix NREL/US", 2007
- **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                                   | kg CO <sub>2</sub> -eq | 211     | 30.0    | 9.04    | 250     |
| Depletion potential of the stratospheric ozone layer (ODP) | kg CFC-11-eq           | 1.16E-5 | 1.17E-9 | 1.62E-7 | 1.17E-5 |
| Eutrophication potential                                   | kg N-eq                | 0.14    | 0.03    | 0.02    | 0.19    |
| Acidification potential of soil and water sources (AP)     | kg SO <sub>2</sub> -eq | 0.90    | 0.53    | 0.08    | 1.51    |
| Formation potential of tropospheric ozone (FOCP)           | kg O <sub>3</sub> -eq  | 15.3    | 15.0    | 2.52    | 32.8    |

### Resource Use

|  |                |         |         |         |         |
|--|----------------|---------|---------|---------|---------|
| Abiotic depletion potential for non-fossil mineral resources (ADP <sub>elements</sub> )* | kg Sb-eq       | 3.44E-6 | -       | 4.33E-8 | 3.48E-6 |
| Abiotic depletion potential for fossil resources (ADP <sub>fossil</sub> )                | MJ             | 149     | 394     | 121     | 664     |
| Renewable primary energy resources as energy (fuel), (RPRE)*                             | MJ             | 116     | 0.00E+0 | 6.40    | 123     |
| Renewable primary resources as material, (RPRM)*   | MJ             | 0.00E+0 | -       | 0.00E+0 | 0.00E+0 |
| Non-renewable primary resources as energy (fuel), (NRPRE)*                               | MJ             | 1,459   | 394     | 126     | 1,979   |
| Non-renewable primary resources as material (NRPRM)*                                     | MJ             | 5.24    | -       | 0.00E+0 | 5.24    |
| Consumption of fresh water   | m <sup>3</sup> | 1.54    | -       | 0.07    | 1.61    |

### Secondary Material, Fuel and Recovered Energy

|                                       |    |         |   |         |         |
|---------------------------------------|----|---------|---|---------|---------|
| Secondary Materials, (SM)*            | kg | 1,392   | - | 0.00E+0 | 1,392   |
| Renewable secondary fuels, (RSF)*     | MJ | 0.00E+0 | - | 0.00E+0 | 0.00E+0 |
| Non-renewable secondary fuels (NRSF)* | MJ | 0.00E+0 | - | 0.00E+0 | 0.00E+0 |
| Recovered energy, (RE)*               | MJ | 0.00E+0 | - | 0.00E+0 | 0.00E+0 |

### Waste & Output Flows

|  |                |         |   |         |         |
|--|----------------|---------|---|---------|---------|
| Hazardous waste disposed*                          | kg             | 0.03    | - | 3.85    | 3.87    |
| Non-hazardous waste disposed*                      | kg             | 0.10    | - | 0.00E+0 | 0.10    |
| High-level radioactive waste*                      | m <sup>3</sup> | 9.79E-4 | - | 2.67E-9 | 9.79E-4 |
| Intermediate and low-level radioactive waste*      | m <sup>3</sup> | 1.23E-7 | - | 2.47E-8 | 1.48E-7 |
| Components for reuse*                              | kg             | 0.00E+0 | - | 0.00E+0 | 0.00E+0 |
| Materials for recycling*                           | kg             | 0.00E+0 | - | 63.5    | 63.5    |
| Materials for energy recovery*                     | kg             | 0.00E+0 | - | 0.00E+0 | 0.00E+0 |
| Recovered energy exported from the product system* | MJ             | 0.00E+0 | - | 0.00E+0 | 0.00E+0 |

\* 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/Amd 1:2017/Amd 2:2020 Environmental Management — Life Cycle Assessment — Requirements and Guidelines

NSF International, August 2021 v2.1 — PCR for Concrete