



CARBONCURE™
SIMPLY BETTER CONCRETE



Environmental Product Declaration

Brampton Brick with CarbonCure

Lightweight (15 MPa) Concrete Masonry Unit with CarbonCure



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Introduction

Brampton Brick has commissioned CarbonCure Technologies for this Environmental Product Declaration (EPD) to provide environmental information about Lightweight (15 MPa) Concrete Masonry Units produced using CarbonCure’s Masonry Technology. The scope of the EPD is from raw material extraction through shipment to the customer (cradle-to-gate). The information provided here meets both the requirements of ISO 21930 and the Concrete Product Category Rule.

Product Manufacturer
This EPD was issued for Lightweight (15 MPa) Concrete Masonry Units with CarbonCure.
Commissioner
This EPD was commissioned by CarbonCure Technologies.
Product Category Rule
The ASTM International PCR: Manufactured Concrete and Concrete Masonry Products (UN CPC 3755), dated December 2014, serves as the PCR for this EPD. www.astm.org .
Verification
Independent verification of the declaration, according to ISO 14025:2006 ■ internal □ external
Date of Issue and Period of Validity
This EPD was issued on July 10th, 2015 and is valid for 5 years until July 10th, 2020.

Product Description

This Environmental Product Declaration (EPD) reports the impacts of concrete masonry units (CMU) products:

- ASTM C90 Load Bearing Concrete Masonry Units
- CSI Specification Sector 04 22 00 - Concrete Unit Masonry
- UNSPSC Code 30131502 - Concrete Blocks

The product has compressive strength of 15 MPa (3,000 psi) at 28 days. Concrete masonry unit are used in concrete masonry systems in all low-rise building types. Units are non-combustible and the tough exterior of exposed units provides a durable finish in demanding environments.





Life cycle assessment

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

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

A summary of processes excluded from the EPD is as follows:

1. Production, manufacture and construction of buildings, capital goods and infrastructure.
2. Production and manufacture of concrete production equipment, concrete delivery vehicles, earthmoving equipment and laboratory equipment.
3. Personnel related activities (e.g. travel, furniture, office supplies).
4. Energy and water use related to company management and sales activities.
5. Impacts related to the disposal or end of life of the concrete product.

A summary of the limitations of this EPD include:

1. 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 life cycle assessment 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.
2. This EPD reports the results of an LCA for '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 an EPD is better or worse than any other product.
3. In order to assess the local impacts of product manufacturing, additional analysis is required.
4. Life Cycle Impact Assessment results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.



Data quality and variability

This EPD was created using plant-specific data for upstream materials. Potential variations due to supplier locations, manufacturing processes and efficiencies and fuel use are thus accounted for in this EPD.

Material	LCI data sources	LCI process	Geography, Year
Portland cement, at plant, no infrastructure/kg NREL/US U (kg)	USEI 2.2 (modified EI 2.2)	Portland cement, at plant NREL/US U	USA, 2002
Gravel, unspecified, at mine, no infrastructure/US US-EI U (kg)	USEI 2.2 (modified EI 2.2)	Gravel, unspecified, at mine/US US-EI U	USA, 2001
Plasticizing Admixtures, Normal, (kg)	EFCA Environmental Declaration: Plasticizing Admixtures	Plasticizing Admixtures, Normal	Europe, 2006
Diesel Consumed (gal)	USEI 2.2 (modified USLCI)	Diesel, combusted in industrial equipment NREL/US U	USA, 2008
Natural gas, combusted in industrial boiler/m ³ /US (gal)	US EI 2.2 (modified EI 2.2)	Natural gas, at power plant/US US-EI U	USA, 2008
Disposal, concrete, 4.00% water, to landfill (kg),	Producer Concrete Product batch water, Company Source Data, 2013	Disposal, concrete, 4.00% water, to inert landfill/ US US-EI U	ON, 2013
Electricity, medium voltage, at grid, no infrastructure/kWh/US (kWh)	USEI 2.2 (modified EI 2.2)	Electricity, medium voltage, at grid, no infrastructure /US US-EI U	USA, 2008
Water, concrete batching (m ³)	Producer Concrete Product batch water, Company Source Data, 2015	Substance - water, unspecified natural origin, ON	ON, 2015
Transportation Transport, combination truck, diesel powered/tkm NREL/US U (km)	USEI 2.2 (modified USLCI)	Transportation, combination truck, diesel powered NREL/US U	USA, 2008



Declared Unit

The declared unit of this EPD is 1 m³ of concrete used in Brampton Brick’s Concrete Masonry Unit made with CarbonCure’s technology, produced in Brampton, Ontario.

Environmental Impacts

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 use in these different products unless all life cycle phases are included.

Life Cycle Inventory Data

Indicator	Units	Raw material supply	Manufacturing	Transportation	Total
Total Primary Energy Production					
Non-renewable fossil	MJ	266.7	1237	290.3	1794
Non-renewable nuclear	MJ	309.7	636.2	4.00	949.9
Renewable (solar, wind, hydro, geothermal)	MJ	34.1	68.4	0.499	103.0
Renewable (biomass)	MJ	9.87	0.189	0.128	10.2
Material Resources Consumption					
Non-renewable material resources	kg	1887	0.079	0.100	1887
Net fresh water (inputs minus outputs)	L	1.85E+05	3.47E+05	0.944	5.00E+05
Non-hazardous waste	kg	84.3	0.853	0.271	85.4
Hazardous waste	kg	5.62	0.287	7.89E-05	5.91

*Note - The impact assessment method used is designed to quantify net fresh water (inputs minus outputs); however, at present, the primary and secondary data sets available to characterize this product do not include data for freshwater outputs. This indicator will be updated if/when relevant data on freshwater outputs become available.



Life Cycle Impact Assessment Results

Indicator	Units	Raw material supply	Manufacturing	Transportation	Total
Acidification	kg SO ₂ eq	1.41	0.664	0.132	2.21
Eutrophication	kg N eq	0.074	0.020	0.011	0.105
Global warming	kg CO ₂ eq	289.5	76.5	21.9	387.9
Ozone depletion	kg CFC-11 eq	4.34E-06	2.89E-06	3.89E-08	7.27E-06
Smog	kg O ₃ eq	18.5	4.72	3.47	26.7

References

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