



GENERAL INFORMATION

This cradle to gate Environmental Product Declaration covers three cement products produced at the Bellingham Cement Grinding Plant. The Life Cycle Assessment (LCA) was prepared in conformity with ISO 21930, ISO 14025, ISO 14040, and ISO 14044. This EPD is intended for business-to-business (B-to-B) audiences.

HEIDELBERG CEMENT

Bellingham Cement Grinding Plant and Terminal
741 Marine Dr.
Bellingham, WA. 98226



PROGRAM OPERATOR

National Ready Mixed Concrete
Association
900 Spring Street
Silver Spring, MD 20910

<https://www.nrmca.org/>

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ENVIRONMENTAL IMPACTS

Bellingham Plant: Product Specific Type III EPD

Declared Cement Products (two):

Type IT (P20)(L10) and Type IL (HE)

Declared Unit: one metric tonner of cement

	ecocem PLUS Type IT (P20)(L10) (GULb/HSLb)	Type IL (HE) (Type HEL)
Global Warming Potential (kg CO ₂ eq)	591	743
Ozone Depletion Potential (kg CFC-11 eq)	1.67E-05	2.12E-05
Eutrophication Potential (kg N eq)	5.86E+01	75.5
Acidification Potential (kg SO ₂ eq)	2.46E+00	2.84
Photochemical Ozone Formation Potential (kg O ₃ eq)	1.22E+01	6.09
Abiotic Depletion, non-fossil (kg Sb eq)	8.92E-06	1.14E-05
Abiotic Depletion, fossil MJ, NCV	591	3645

Product Components:		
Clinker Percent	65%	85%
Limestone, Gypsum and others Percent	35%	15%

Additional detail and impacts are reported on page 5.

ISO 21930:2017 Sustainability in Building Construction-Environmental Declaration of Building Products: serves as the core PCR
NSF PCR for Portland, Blended, Masonry, Mortar, and Plastic (Stucco) Cements V2: serves as the sub-category PCR

Sub-category PCR review was conducted by

Thomas P. Gloria, PhD. (t.gloria@industrial-ecology.com) • Industrial Ecology Consultants

Independent verification of the declaration, according to ISO 21930:2017 and ISO 14025:2006.: ☐ internal ☒ external

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

For additional explanatory material

Manufacture Representative: Ignacio Cariaga (Ignacio.Cariaga@heidelbergmaterials.com)

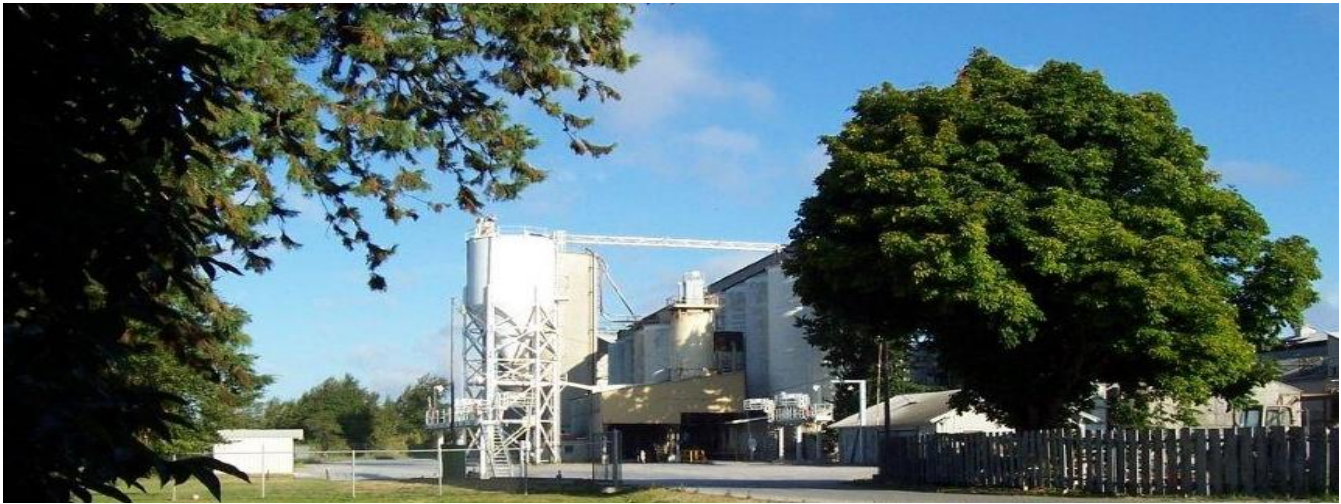
This LCA EPD was prepared by: Melissa Diaz, LCA and EPD Project Manager • Climate Earth (www.climateearth.com)

Environmental declarations from different programs may not be comparable.

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.

LIFE CYCLE ASSESSMENT

PRODUCER



Heidelberg Cement is a leading supplier of cementitious construction materials in North America. The Bellingham plant started operation in May 1913, under the name Olympic Portland Cement. The cement plant was one of Bellingham's largest employers until the 1950s. The plant stopped producing clinker in 1987. The Bellingham plant is now a cement grinding facility and supplementary cementitious materials distribution location. The Bellingham plant receives all of its clinker from the Delta cement plant in Delta, British Columbia. Raw materials for cement production are received by rail, truck and barge into the Port of Bellingham. Water and rail access helps mitigate our environmental impacts through efficient, more sustainable transportation of raw materials, and delivery of cement. Heidelberg Material's commitment to sustainable construction includes actively working to create lower carbon cements through supplementary cementitious materials (SCMs) and alternative raw materials and fuels.

The health and well-being of our employees, communities and the natural environment are vital to our success. In Bellingham, Heidelberg Materials supports Alderwood Elementary School with an annual donation which helps the school provide much needed meals and access to the music, art and sports programs. Alderwood Elementary is less than one mile from the plant, the annual donation has a positive impact on the community in which we operate.

PRODUCT

The cement products covered in this EPD meet UN CPC 3744 classification and the following standards:

Product Type	Applicable Standard	Standard Designation
Ternary Blended Cement / (General Use Limestone Blended (Portland) Cement	ASTM C595, C1157, AASHTO M240	Type IT (P20)(L10)
	CSA A3001	Type GULb/HSLb
High Early Strength Portland Limestone Cement	ASTM C595, C1157, AASHTO M240	Type IL (HE)
	CSA A3001	Type HEL

PRODUCT DESCRIPTION

This EPD reports environmental transparency information for two cement products, produced by Heidelberg Materials at their Bellingham, WA grinding facility. These cements are hydraulic binders and are manufactured by grinding cement clinker and other main or minor constituents into a finely ground, usually grey colored mineral powder. Cement is just one ingredient in the mixture that creates concrete, but it is the most chemically active ingredient and crucial to the quality of the final product. When mixed with water, cement acts as a glue to bind together the sand, gravel or crushed stone to form concrete, one of the most durable, resilient and widely used construction materials in the world. Our Type IL (HE) was developed to be more environmental friendly by reducing the carbon footprint (reduction measured through GWP). The Type IL (HE) is a high early portland limestone cement used for precast, concrete, mortar, as well as all other various applications for cement, including engineered soils, solidification/stabilisation of materials and wastes, and wherever high early application is needed. Another one of our low carbon cements is EcoCem®PLUS. It was developed by Heidelberg Materials to reduce the carbon footprint of cement and concrete. EcoCem®PLUS is a blended cement capable of producing strong and durable concrete with high sulphate resistance. EcoCem®PLUS is designated as a Type IT (P20)(L10) and produced at the cement plant by intergrinding clinker, Type F fly ash, limestone and gypsum.



DECLARED UNIT

The declared unit is one metric tonne of Type IT (P20)(L10), and Type IL (HE) cements.

SYSTEM BOUNDARY

This EPD is a cradle-to-gate EPD covering A1-A3 stages of the life cycle.

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	Refurbishment	De-construction/ 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
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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

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; NSF PCR:2021 and ISO 21930:2017 section 7.2. Recycling and recycled content is modeled using the cut-off rule.

This sub-category PCR recognizes fly ash, silica fume, granulated blast furnace slag, cement kiln dust, flue gas desulfurization (FGD) gypsum, and post-consumer gypsum as recovered materials and thus the environmental impacts allocated to these materials are limited to the treatment and transportation required to use as a cement material input.

LIFE CYCLE INVENTORY (LCI)

Primary Sources of LCI Data:

Barge transport: ecoinvent 3.8 (2021) "Transport, freight, inland waterways, barge {RoW}| market for transport, freight, inland waterways, barge | Cut-off, U"

Clinker: primary data (2020) "Lehigh Hanson Delta Cement Plant and Terminal, Delta, BC"

Electricity: ecoinvent 3.8 (2021) "Electricity, high voltage {WECC, US only}| market for | Cut-off, U"

Gypsum: ecoinvent 3.8 (2021) "Gypsum, mineral {GLO}| market for | Cut-off, U"

Limestone: ecoinvent 3.8 (2021) "Limestone, crushed, for mill {CA-QC}| production | Cut-off, U"

Ocean transport: ecoinvent 3.8 (2021) "Transport, freight, sea, transoceanic ship {GLO}| market for | Cut-off, U"

Rail transport: ecoinvent 3.8 (2021) "Transport, freight train {US}| market for | Cut-off, U"

Truck transport: USLCI (2015) "Transport, combination truck, long-haul, diesel powered, Northwest/tkm/RNA"

Truck transport: USLCI (2015) "Transport, combination truck, short-haul, diesel powered, Northwest/tkm/RNA"

Electricity grid mix includes: 34.16% Natural Gas, 17.16% Coal, 9.97% Wind, 7.72% Nuclear, 7.78% Solar, 2.15% Geothermal, 19.31% Hydro, 1.22% Biomass, 0.11% oil, with a global warming potential of 0.465 kg CO₂eq/kWh.

Clinker calcination emissions were calculated based on the Cement CO₂ and Energy Protocol detailed output method (B2) published by the World Business Council for Sustainable Development (WBCSD) Cement Sustainability Initiative (CSI). All cement kiln dust is recycled back into kiln.

REFERENCES

Climate Earth (2025). Heidelberg Cement – LCA Project Report, Bellingham Plant

ecoinvent v3.8 (2021). The Swiss Centre for Life Cycle Inventories

ISO 21930 (2017). Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services

ISO 14044 (2006). Environmental Management - Life Cycle Assessment - Requirements and Guidelines

ISO 14040 (2006). Environmental Management - Life Cycle Assessment - Principles and Framework


NSF International (2021). PCR for Portland, Blended, Masonry, Mortar and Plastic (Stucco) Cements v3.2

USLCI (2015). The U.S. Life Cycle Inventory Database

US EPA. (2014). Tool for the Reduction of Assessment of Chemical and Other Environmental Impacts (TRACI).

US EPA. (2022). Emissions & Generation Resource Integrated Database (eGRID).

LIFE CYCLE IMPACT ASSESSMENT RESULTS – Bellingham Cement Products: Type IT (P20)(L10) named EcoCem®PLUS, and Type IL (HE); per 1 metric tonne

Impact Assessment	Unit	Type IT (P20)(L10) (GULb/HSLb) 	Type IL (HE) (Type HEL)
Global warming potential (GWP) ¹	kg CO ₂ eq	591	743
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq	1.67E-05	2.12E-05
Eutrophication potential (EP)	kg N eq	5.86E+01	75.5
Acidification potential of soil and water sources (AP)	kg SO ₂ eq	2.46E+00	2.84
Formation potential of tropospheric ozone (POCP)	kg O ₃ eq	1.22E+01	6.09
Resource Use			
Abiotic depletion potential for non-fossil mineral resources (ADPelements)*	kg Sb eq	8.92E-06	1.14E-05
Abiotic depletion potential for fossil resources (ADPfossil)	MJ, NCV	3,171	3,645
Renewable primary energy resources as energy (fuel), (RPRE)*	MJ, NCV	521	644
Renewable primary resources as material, (RPRM)*	MJ, NCV	0.00E+00	0.00E+00
Non-renewable primary resources as energy (fuel), (NRPRE)*	MJ, NCV	3,290	3,775
Non-renewable primary resources as material (NRPRM)*	MJ, NCV	0.00E+00	0.00E+00
Consumption of fresh water	m ³	1.44E+00	1.54
Secondary Material, Fuel and Recovered Energy			
Secondary Materials, (SM)*	kg	9.21	9.52
Renewable secondary fuels, (RSF)*	MJ, NCV	0.00E+00	0.00E+00
Non-renewable secondary fuels (NRSF)*	MJ, NCV	0.00E+00	0.00E+00
Recovered energy, (RE)*	MJ, NCV	0.00E+00	0.00E+00
Waste & Output Flows			
Hazardous waste disposed*	kg	2.18E-02	2.82E-02
Non-hazardous waste disposed*	kg	3.47E-01	3.91E-01
High-level radioactive waste*	kg	5.35E-08	5.61E-08
Intermediate and low-level radioactive waste*	kg	2.95E-07	3.07E-07
Components for reuse*	kg	0.00E+00	0.00E+00
Materials for recycling*	kg	3.49E-02	3.49E-02
Materials for energy recovery*	kg	0.00E+00	0.00E+00
Recovered energy exported from the product system*	MJ, NCV	0.00E+00	0.00E+00
Additional Inventory Parameters for Transparency			
Emissions from calcination and uptake from carbonation	kg CO ₂ eq	333	429

* 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.

Only EPDs prepared from cradle-to-grave life-cycle results and based on the same function, quantified by the same functional unit, and taking account of replacement based on the product reference service life (RSL) relative to an assumed building service life, can be used to assist purchasers and users in making informed comparisons between products.

¹ GWP 100; 100-year time horizon GWP factors are provided by the IPCC 2013 Fifth Assessment Report (AR5).

CO₂ from biomass secondary fuels (wood chips made from construction waste as well as whole wood construction waste) used in kiln are climate-neutral (CO₂ sink = CO₂ emissions), ISO 21930, 7.2.7.

ADDITIONAL ENVIROMENTAL INFORMATION

Environmental Management System (EMS)

The Bellingham Grinding Plant has processes in place which identifies environmental impacts and related best management practices and controls. These policies and procedures are continually reviewed and updated to reflect current environmental knowledge and regulations. The various plans provide plant personnel with information on environmental procedures and requirements.

- Site Specific Emergency Management Plan
- Spill Prevention, Control, and Countermeasures Plan
- Stormwater Pollution Prevention Plan
- Operations and Maintenance Plan for Air Emission Sources
- Solid Waste Control Plan

For environmental reporting the plant complies with Washington State and United States federal requirements and reporting. The Plant maintains a Title V Air Operating Permit (AOP 022R1) issued by the Northwest Clean Air Agency (NWCAA) in accordance with the provisions of the Regulation of the NWCAA and Chapter 173-401 of the Washington Administrative Code. The permit also requires compliance with the federal New Source Performance Standards (NSPS) and the National Emission Standards for Hazardous Air Pollutants (NESHAP). Emissions reporting is completed annually through the Washington Emissions Inventory Reporting System.

The plant maintains coverage under the Washington State Industrial Stormwater General Permit. The program includes stormwater outfall monitoring, online data submittal, routine inspections, and annual compliance reporting.

The Plant maintains a Tier II inventory and submits annual reports to the Washington Department of Ecology, Whatcom County, and the local fire department under the Community-Right-to-Know reporting program.

The Plant maintains a Solid Waste Control Plan which outlines the proper handling, management, and disposal requirements for general office waste, universal waste (e.g. batteries, light bulbs, scrap metal), electronics, and hazardous materials (e.g. waste oil, waste chemicals, oily rags, etc.).

Sustainability Commitments

Heidelberg Materials, a leading construction materials company worldwide. Heidelberg Materials Sustainability Commitments 2030 define the key topics and core principles of Heidelberg Materials sustainability strategies, aligning with the UN Assembly Sustainable Development Goals (SDGs). Company sustainability performance ratings and ranking are publicly available at <https://www.heidelbergcement.com/en/sustainability-report>.

The basis of Heidelberg Materials sustainability commitments is shaped by our Sustainability Commitments. Heidelberg Materials goal of a 30% carbon footprint reduction as compared to 1990 levels, encourages the discovery of innovative approaches and thought processes to reduce environmental impacts while ensuring a sustainable business model. Working to incorporate knowledge and practices learned from global resources for local applications, Heidelberg Materials continuously innovates to improve services and products that increase efficiency on the jobsite. Heidelberg Materials strives for effective management of all processes and resources and works with the local communities to promote resilient infrastructure and provide increased transparency. Heidelberg Materials also works globally to push toward carbon neutral concrete by 2050. To learn more about Heidelberg Materials Sustainability Commitments 2030 visit <https://www.heidelbergmaterials.us/home/sustainability>.