SEATTLE CEMENT PLANT

SELF-DECLARED ENVIRONMENTAL DECLARATION

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ABOUT THIS DECLARATION

This is a cradle-to-gate environmental declaration for NewCem Plus blended SCM produced at Amrize Canada's Seattle, WA plant. The life cycle assessment was prepared according to ISO 14021:2016, ISO 21930:2017 (the core standard), the Smart EPD Part A Product Category Rules for Building and Construction Products and Services Standard 1000 v1.01 (the core PCR) and the Smart EPD Part B Product Category Rules for Supplementary Cementitious Materials Standard 1000-002 v1.0 (sub-category PCR). This environmental declaration (ED) is intended for business-to-business audiences.

Product Group and Name	NewCem Plus Blended SCM
ED Commissioner and Owner	Amrize Canada Inc. #300 115 Quarry Park Road SE Calgary AB, T2C 5G9 www.amrize.ca Amrize provided LCI and meta-data for cement blending for the reference year 2022. The owner of the declaration is liable for the underlying information and evidence.
Manufacturer Name and Address	Amrize Canada Inc. Amrize Seattle Plant 5400 W Marginal Way SW Seattle WA 98106
Program Operator	Not Applicable (Self-Declaration)
General Program Instructions and Version Number	Not Applicable (Self-Declaration)
Declaration Number	Not Applicable (Self-Declaration)
Reference PCR and Version Number	ISO 21930:2017 Sustainability in Building Construction – Environmental Declarations of Building Products serves as the core standard. Smart EPD Part A Product Category Rules for Building and Construction Products and Services Standard 1000 v1.01 serves as the core PCR. Smart EPD Part B Product Category Rules for Supplementary Cementitious Materials Standard 1000-002 v1.0 serves as the sub-category PCR.
ED Type and Scope	Cradle-to-gate (modules A1 to A3). Facility and product-specific.
Declared Unit	1 metric tonne of NewCem Plus.
Product Intended Application and Use	**NewCem® Plus** blended SCM is typically used in concrete, concrete products, and mortars where storage limitations do not permit the separate storage of multiple SCMs. NewCem® Plus provides a significant contribution to sustainable construction for concrete production due to the production of concrete from cement and SCMs rather than pure cement.
Product Reference Service Life	Not Applicable (B modules not included in scope)
Markets of Applicability	United States and Canada

Date of Issue	August, 2024
Period of Validity	5 years (August, 2029)
Year of Reported Manufacturer Primary Data	2022 Calendar Year
LCA Software and Version Number	GCCA Industry EPD tool for Clinker, Cement, Aggregates, Concrete, and Precast products, North America version 4.2
LCI Database and Version Number	GCCA Inventory v4.2 and ecoinvent v3.5
LCIA Methodology and Version Number	TRACI 2.1
Overall Data Quality Assessment Score	High
Sub-category PCR review	The sub-category PCR review was conducted by: Mr. Jack Geibig (Chair), Ecoform Consulting jgeibig@ecoform.com Dr. Larry Sutter, PHD, Sutter Engineering Mr. Craig Heidrich, Ash Development Association of Australia
ACLCA PCR Guidance Conformance Level	Transparency
ACLCA PCR Guidance Version	1.0
ED Verification	This declaration was verified in accordance with ISO 14021:2016. Core Standard: ISO 21930:2017. Core PCR: Smart EPD Part A Product Category Rules for Building and Construction Products and Services Standard 1000 v1.01. Sub-Category PCR: Smart EPD Part B Product Category Rules for Supplementary Cementitious Materials Standard 1000-002 v1.0. ☑ Internal ☐ External This life cycle assessment was verified in accordance with ISO 14044 and the reference PCR by: Paul Deram Amrize Canada Inc. 7591 No 9 Road Richmond BC V6W 0A6 Canada
LCA Report and ED Preparation	This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by: Matt Dalkie Amrize Canada Inc. 2300 Rogers Avenue Coquitlam BC V3K 5X6 Canada

Explanatory Material	For any explanatory material, regarding this ED, please contact Matt Dalkie (matt.dalkie@amrize.com).

AMRIZE AND PRODUCTION FACILITY

Facility Name	Amrize Seattle Plant 5400 W Marginal Way SW Seattle WA 98106

PRODUCT DESCRIPTION

This ED reports environmental transparency information for blended SCM produced at Amrize Canada's Seattle, WA plant. The blended SCM is produced by blending NewCem® manufactured at Amrize Canada's Seattle, WA plant and fly ash. Blended SCMs are intended to be used as supplied for both general concrete and specialty applications. Blended SCMs are manufactured according to ASTM C1697-21 and CSA A3001: 23.

PRODUCTS AND STANDARDS

The Table below sets out the blended SCM constituents and applicable standards. All Seattle products are sold in bulk.

Material Inputs	**% of Total Inputs**
	NewCem® Plus
Clinker	0%
Granulated Blast Furnace Slag	45%
Fly Ash, Gypsum, Cement Kiln Dust	55%
Total	**100%**

Applicable Standards:
ASTM C697 – 21 Standard Specification for Blended Supplementary Cementitious Materials
CSA A3000: 23 Cementitious Materials Compendium

Note:
ASTM cement type designations have been used throughout this document as the primary identifier. Cements are produced to meet all applicable standards shown.

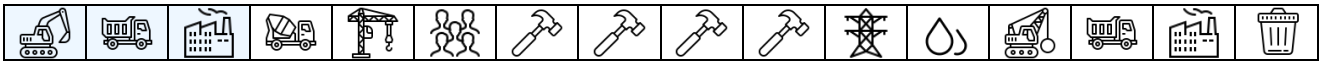
DECLARED UNIT

The declared unit is one metric tonne of blended SCM.

SYSTEM BOUNDARY

This cradle-to-gate ED covers the production stage (LCA modules A1-A3) as depicted in the figure below. The production stage includes procurement of raw materials (cradle) through the manufacture of blended SCM ready for shipment (gate).

Production			Construction		Use							End-of-Life				
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Extraction and upstream processing	Transport to factory	Manufacturing	Transport to site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction or demolition	Transport	Waste Processing	Disposal of waste	Optional information beyond system boundary



Included in LCA scope
Excluded from LCA scope

Items *excluded* from the 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)
- Energy and water use related to company management and sales activities that may be located either within the factory site or at another location

Cut-off Criteria

The cut-off criteria as per Part B PCR, Section 7.1.8 and ISO 21930, 7.1.8 were followed. Per ISO 21930, 7.1.8, all input/output data required was collected and included in the LCI modelling. No substances with hazardous and toxic properties that pose a concern for human health and/or the environment were identified in the framework of this ED. Any plant specific data gaps for the reference year 2022 e.g. waste transport distances were filled in with industry data (generic data).

Primary Data Collection

Gate-to-gate input/output flow data was collected for the following processes for the reference year 2022:

- Product blending – Seattle, WA

ALLOCATION RULES

Allocation follows the requirements and guidance of ISO 14044 Clause 4.3.4, ISO 21930 section 7.2, Smart EPD Part A, and Smart EPD Part B. Recycling and recycled content are modelled using the cut-off rule. The sub-category PCR recognizes fly ash, furnace bottom ash, bypass dust, mill scale, polluted soils, spent catalyst, aluminum oxide waste, silica fume, granulated blast-furnace slag, iron-rich waste, cement kiln dust (CKD), flue gas desulfurization (FGD) gypsum, and calcium fluoride-rich waste 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. Further, used tires, plastics, solvents, used oils and oily waste, coal/carbon waste, roofing asphalt, household refuse-derived waste and non-hazardous liquid waste are considered non-renewable and/or renewable secondary fuels. Only the

materials, water, energy, emissions, and other elemental flows associated with reprocessing, handling, sorting and transportation from the point of the generating industrial process to their use in the production process are considered. All emissions from combustion at the point of use are considered.

DATA SOURCES, QUALITY REQUIREMENTS, AND ASSESSMENT

As NewCem® Plus is produced from NewCem®, the most recent LCA has been used to reflect the potential environmental impacts. The NewCem® LCA results were calculated from the 2022 calendar year and are presented in EPD 607 – Amrize Seattle Cement Plant available from ASTM as the program operator.

It should be noted that the data quality assessment here covers only the blended SCM production inventories (i.e., activity data). An evaluation of the quality of data used to model background processes (e.g., electricity generation) has also been carried out, and the results are located in the *LCA core model and database report* of the *North American version of GCCA tool for EPDs of concrete and cement.*

Data Quality Requirements	Description
Technology Coverage	Data represents the prevailing technology in use at the Seattle, WA facility. The Seattle, WA facility utilizes a pneumatic blending system. *Technological representativeness is characterized as "high".*
Geographic Coverage	The geographic region for manufacturing is considered Pacific Northwest. The electricity is modelled based on Seattle City Light, consisting of 86% hydro, 5% wind, 5% nuclear, 3% unspecified (taken as gas), and 1% biogas. *Geographical representativeness is characterized as "high".*
Time Coverage	Activity (primary) data is representative of 2022 calendar year (12 months). - Seattle, WA product blending, - In-bound/out-bound transportation data - primary data collected for Seattle, WA manufacturing plant. *Temporal representativeness is characterized as "high".*
Completeness	All relevant, specific processes, including inputs (raw materials, energy, and ancillary materials) and outputs (emissions and production volume) were considered and modelled to complete the production profile for Seattle products.

Data Quality Requirements	Description
Consistency	To ensure consistency, the modelling of the production input and output LCI data for the Seattle products of interest used the same LCI modelling structure, which consisted of input material and intermediate products, ancillary and packaging materials (if applicable), energy flows, water resource inputs, product outputs, co-products, by-products, emissions to air, water and soil, and solid and liquid waste disposal. The calculated LCI was subsequently inputted into the N.A. version of GCCA Industry EPD tool for Clinker, Cement, Aggregates, Concrete, and Precast products (https://concrete-epd-tool.org). Crosschecks concerning the plausibility of mass and energy flows were continuously conducted. The LCA team conducted mass and energy balances at the facility level and selected process levels to maintain a high level of consistency.
Reproducibility	Internal reproducibility is possible since the data and the models are stored in the N.A. version of GCCA Industry EPD tool for Clinker, Cement, Aggregates, Concrete, and Precast products (https://concrete-epd-tool.org). Key primary (manufacturer specific) and secondary (generic) LCI data sources are also summarized in the GCCA Tool documentation. External reproducibility is not possible as the background report is confidential.
Transparency	Activity and LCI datasets are disclosed in the project report, including all data sources.

LIFE-CYCLE IMPACT ASSESSMENT RESULTS

This section summarizes the production stage life cycle impact assessment (LCIA) results, including resource use and waste generated metrics, based on the cradle-to-gate life cycle inventory inputs and outputs analysis. The results are calculated based on 1 metric tonne of blended SCM as produced at the Seattle, WA plant.

It should be noted that LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Only EDs 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. Environmental declarations from different programs may not be comparable. EDs are comparable only if they comply with ISO 21930, 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.

Production Stage (A1 to A3) ED Results: Seattle, WA – per metric tonne

Impact category and inventory indicators	Unit	NewCem® Plus
Global warming potential (gross), GWP 100, AR5	kg CO_2 eq	52.9
Global warming potential (net), GWP 100, AR5	kg CO_2 eq	52.9
Ozone depletion potential, ODP	kg CFC-11 eq	9.01E-6
Acidification potential, AP	kg SO_2 eq	0.597
Eutrophication potential, EP	kg N eq	0.200
Photochemical oxidant creation potential, POCP	kg O_3 eq	4.71
Abiotic depletion potential for non-fossil mineral resources, $ADP_{elements}$*	kg Sb eq	5.32E-5
Abiotic depletion potential for fossil resources, ADP_{fossil}	MJ NCV	785
Renewable primary resources used as an energy carrier (fuel), RPR_E*	MJ NCV	156
Renewable primary resources with energy content used as material, RPR_M*	MJ NCV	0
Non-renewable primary resources used as an energy carrier (fuel), $NRPR_E$*	MJ NCV	785
Non-renewable primary resources with energy content used as material, $NRPR_M$*	MJ NCV	0
Secondary materials, SM*	kg	970
Renewable secondary fuels, RSF*	MJ NCV	0
Non-renewable secondary fuels, NRSF*	MJ NCV	0
Net use of freshwater, NFW	m^3	0.384
Hazardous waste disposed, HWD*	kg	0
Non-hazardous waste disposed, NHWD*	kg	7.17E-2
High-level radioactive waste, conditioned, to final repository, HLRW*	m^3	ND
Intermediate- and low-level radioactive waste, conditioned, to final repository, ILLRW*	m^3	ND
Components for re-use, CRU*	kg	0
Materials for recycling, MFR*	kg	1.45E-5
Materials for energy recovery, MER*	kg	0
Recovered energy exported from the product system, EE*	MJ NCV	0
Global Warming Potential – Biogenic (gross), GWPbio*	kg CO2 eq	0.161
Emissions from Calcination and removals from carbonation, CC*	kg CO_2 eq	0
Emissions from Combustion of secondary fuels from Renewable Sources, CWRS*	kg CO_2 eq	0
Emissions from Combustion of secondary fuels from Non-Renewable Sources, CWNRS*	kg CO_2 eq	0

Table Notes:

(ND) Not Declared.

(*) 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 results for these categories.

LCA INTERPRETATION

As this blended SCM is produced from manufactured products, the extraction and upstream processing module (A1) drives most of the potential environmental impacts. The transportation and manufacturing modules (A2 and A3) have minimal impact.

LIMITATIONS AND DISCLAIMER

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD or ED information shall be based on the product's use and impacts at the building or construction works level, and therefore EPDs and EDs may not be used for comparability purposes when not considering the whole building life cycle. EPD and ED comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences in results upstream or downstream of the life cycle stages declared.

The environmental impact results of products in this document are based on a declared unit and therefore do not provide sufficient information to establish comparisons. The results shall not be used for comparisons without knowledge of how the physical properties of the product impact the precise function at the construction level. The environmental impact results shall be converted to a functional unit basis before any comparison is attempted.

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REFERENCES

1. ASTM C697 – 21 Standard Specification for Blended Supplementary Cementitious Materials.
2. CSA A3000: 23 Cementitious materials compendium.
3. Smart EPD Part A Product Category Rules for Building and Construction Products and Services Standard 1000 v1.01, January 15, 2024.
4. Smart EPD Part B Product Category Rules for Supplementary Cementitious Materials Standard 1000-002 v1.0, May 7, 2024.
5. ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services.
6. GCCA Industry EPD tool for Clinker, Cement, Aggregates, Concrete, and Precast products, N.A. version 4.2 (https://concrete-epd-tool.org) accessed July 2024.
7. GCCA Industry EPD tool for Clinker, Cement, Aggregates, Concrete, and Precast products (v4.2) LCA Model, North American Version, December 18, 2023.
8. GCCA Industry EPD tool for Clinker, Cement, Aggregates, Concrete, and Precast products (v4.2) LCA Database, December 18, 2023.
9. GCCA Industry EPD tool for Clinker, Cement, Aggregates, Concrete, and Precast products, Verification Report – GCCA Industry EPD Tool for Cement and Concrete (v4.1), October 12, 2023.