

Denver Plant

Environmental Product Declaration



AMERIMIX
AMX400 SERIES



AMERIMIX
AMX405



AMERIMIX
AMX600 SERIES



US SPEC
Quickset



US SPEC MP
Grout



US SPEC
Transpatch



Sakrete Stone
Veneer Mortar



US SPEC Transpatch
Concrete

General Information

This cradle to gate Environmental Product Declaration covers dry mix products produced at the Denver 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.

Oldcastle APG
US Mix
Denver Plant
112 South Santa Fe Drive
Denver, CO, USA 80223

Program Operator
ASTM International
100 Barr Harbor Drive
West Conshohocken, PA 19428
610-832-9500
<https://www.astm.org>



EPD 677
May 10, 2024
May 9, 2029 (valid for 5 years)

LCA/EPD Developer
Climate Earth, Inc.
137 Park Place, Suite 204
Pt Richmond, CA 94801
415-391-2725
<https://www.climateearth.com>



ISO 21930:2017 Sustainability in Building Construction-Environmental Declaration of Building Products serves as the core PCR

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: Jeff Lindgren (Jeff.Lindgren@oldcastle.com)

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

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.

General Information

Producer

As a CRH company, Oldcastle APG is part of one of the largest global networks of manufacturers in the architectural products industry. We create. We build. We innovate. Most importantly, we care for our people and our planet. Across the globe, we stand together to reinvent the way our world is built.

Product

This EPD reports environmental information for the products produced by Oldcastle at its Denver facility.

The products covered in this EPD meet the following description and standards:

Product Type	Product Name	Applicable Standard	Description
Grout	GP Grout	ASTM C1107	GP Grout is a blend of Portland cement, special admixtures and proprietary aggregates designed to provide high flexural and compressive strength performance from plastic to fluid consistencies. GP Grout is non-metallic, non-shrink, non-corrosive and contains no added chlorides.
Grout	MP Grout	ASTM C1107	MP Grout is a blend of Portland cement, special admixtures and proprietary aggregates designed to provide high flexural and compressive strength performance from plastic to fluid consistencies. MP Grout is non-metallic, non-shrink, non-corrosive and contains no added chlorides.
Grout	Amerimix 600 Core Grout	ASTM C476	AMX 600 series core fill grouts are a factory blend of Portland cement, sand and lime formulated for maximum yield, performance and workability. AMX 600 core fill grouts are available in fine- and coarse-aggregate formulas.
Mortar	Quickset	ASTM C928	Quickset is a rapid setting, rapid hardening concrete patching material designed for horizontal, vertical and overhead applications. Quickset is a blend of Portland cement, selected aggregates and proprietary admixtures.
Mortar	Transpatch	ASTM C928	Transpatch is a rapid setting, rapid hardening concrete patching material that exhibits excellent flexural properties, shear bond strength and compressive strength. Transpatch is a blend of portland cement and proprietary admixtures.
Concrete	Transpatch Concrete	ASTM C928	Transpatch Concrete is a polymer modified, rapid setting, rapid hardening, full depth concrete repair material that exhibits excellent flexural properties, shear bond strength and compressive strength. Transpatch Concrete is a blend of Portland cement, selected aggregates and proprietary admixtures.
Mortar	STR Mortar CI	ASTM C928	STR Mortar CI is a slow setting, pumpable, structural concrete repair mortar that exhibits excellent flexural properties, shear bond strength and compressive strength. STR Mortar CI is a blend of Portland cement, selected aggregates and proprietary admixtures.
Mortar	Sakrete Stone Veneer Mortar	ASTM C270	Sakrete Stone Veneer Mortar is a high-performance mortar designed to set and grout artificial stone and natural stone veneers.
Mortar	Amerimix Masonry Mix "N"	ASTM C270	Amerimix 400 series mortars are a factory blend of Portland cement, sand and lime formulated for maximum yield, performance and workability. AMX400 mortars are available in Types N, S and M. Product offerings in this category include colors available in the M Series/S Series/U Series
	Amerimix Masonry Mix "S"	ASTM C270	
	Amerimix Masons Mix "S" M Color Series	ASTM C270	
	Amerimix Masons Mix "S" S Color Series	ASTM C270	
	Amerimix Masons Mix "S" U Color Series	ASTM C270	

Product Components

The main product components used in the manufacturing of Denver plant products are:

Main Materials	Input range
Cement	15-45%
Sand	25-80%
Lime	3-25%
Silica	20-55%
Fly ash	0-5%

Declared Unit

The declared unit is one metric tonne of finished product.

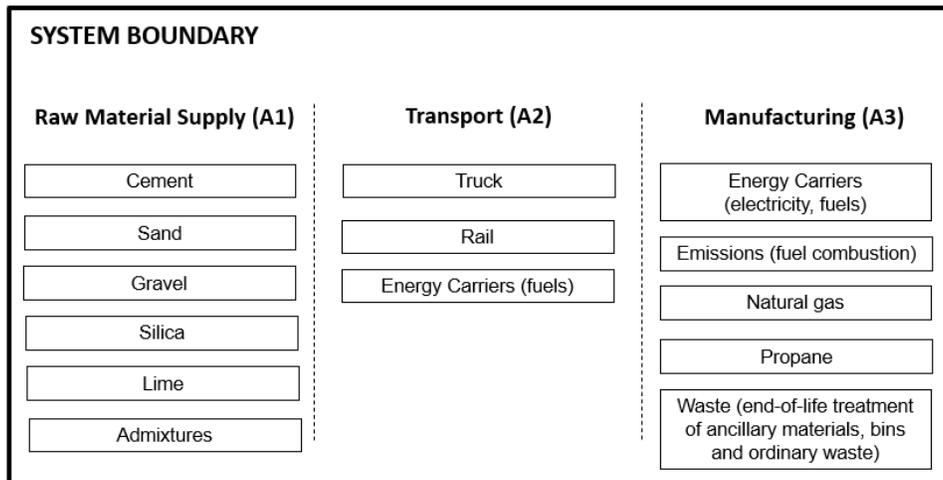
System Boundary

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.

The production stages and primary unit processes included in the study by product stage are:



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

Life Cycle Assessment

Denver Products¹, bulk shipped per 1 metric tonne.**

Impact Assessment	Unit	GP Growth	MP Growth	Quickset	Trans patch	Transpatch Concrete	STR Mortar CI	Amerimix Masons Mix "N"	Amerimix Masons Mix "S"	Sakrete Stone Veneer Morta	Amerimix Masons Mix "S" Light Buff 20 M	Amerimix Masons Mix "S" Light Buff 20 S	Amerimix Masons Mix "S" Light Buff 20 U	Amerimix 600 Core Grout
Global warming potential (GWP) ²	kg CO ₂ eq	408	463	548	422	326	371	197	225	263	224	220	217	159
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq	8.82E-06	9.92E-06	5.28E-05	4.47E-05	3.66E-05	4.38E-05	3.53E-06	4.14E-06	6.22E-06	5.26E-05	3.38E-05	1.95E-05	3.52E-06
Eutrophication potential (EP)	kg N eq	5.14E-01	5.75E-01	7.18E-01	4.14E-01	3.23E-01	3.57E-01	2.56E-01	2.86E-01	3.54E-01	2.75E-01	2.75E-01	2.74E-01	2.23E-01
Acidification potential of soil and water sources (AP)	kg SO ₂ eq	9.07E-01	1.03E+00	1.61E+00	9.63E-01	7.89E-01	8.75E-01	9.18E-01	9.69E-01	6.04E-01	9.29E-01	9.27E-01	9.25E-01	3.77E-01
Formation potential of tropospheric ozone (POCP)	kg O ₃ eq	17.8	20.0	30.7	19.0	15.6	18.1	21.5	22.5	11.8	21.4	21.4	21.4	7.49
Resource Use														
Abiotic depletion potential for non-fossil mineral resources (ADPelements)*	kg Sb eq	7.02E-05	8.18E-05	3.24E-03	2.66E-03	2.38E-03	2.23E-03	2.38E-05	2.85E-05	4.63E-05	2.69E-05	2.69E-05	2.69E-05	2.38E-05
Abiotic depletion potential for fossil resources (ADP _{fossil})	MJ, NCV	2228	2583	3500	2728	2230	2312	1418	1549	1417	1702	1616	1549	872
Renewable primary energy resources as energy (fuel), (RPRE ³) *	MJ, NCV	86	100	207	145	131	102	38.7	42.8	59.4	41.4	41.5	41.5	38.7
Renewable primary resources as material, (RPRM ²) *	MJ, NCV	0.00E+00	0.00E+00	7.80E-01	0.00E+00	2.60E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable primary resources as energy (fuel), (NRPRE ³) *	MJ, NCV	2248	2610	3879	2799	2305	2384	1437	1567	1434	1721	1635	1568	891
Non-renewable primary resources as material, (NRPRM ²) *	MJ, NCV	17.1	20.7	41.3	22.9	17.3	6.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Consumption of fresh water, (FW ²)	m ³	1.81E+00	1.83E+00	2.97E+00	1.78E+00	1.77E+00	1.65E+00	1.35E+00	1.38E+00	1.43E+00	1.69E+00	1.58E+00	1.49E+00	1.41E+00
Secondary Material, Fuel and Recovered Energy														
Secondary Materials, (SM ²) *	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.70E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E+01
Renewable secondary fuels, (RSF ²) *	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuels (NRSF ²) *	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recovered energy, (RE ²) *	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste & Output Flows														
Hazardous waste disposed, (HW ²) *	kg	6.29E-02	6.36E-02	1.80E-01	6.18E-02	5.21E-02	6.13E-02	1.95E-03	2.34E-03	3.33E-03	2.21E-03	2.21E-03	2.21E-03	1.95E-03
Non-hazardous waste disposed, (NHWD ²) *	kg	9.22	9.6	37.0	21.4	17.8	21.1	7.85E-01	9.41E-01	1.36E+00	8.89E-01	8.90E-01	8.89E-01	7.85E-01
High-level radioactive waste, (HLRW ²) *	kg	5.48E-03	8.45E-03	2.16E-02	1.96E-02	1.70E-02	1.31E-02	1.04E-08	1.04E-08	1.01E-08	1.04E-08	1.04E-08	1.04E-08	1.06E-08
Intermediate and low-level radioactive waste, (ILLRW ²) *	kg	6.12E-08	7.21E-08	4.15E-07	4.84E-08	5.11E-08	4.82E-08	5.01E-08	5.00E-08	4.86E-08	5.02E-08	5.02E-08	5.02E-08	5.10E-08
Components for reuse, (CRU ²) *	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling, (MR ²) *	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery, (MER ²) *	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recovered energy exported from the product system, (E ²) *	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+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. The following optional indicators are not reported and also have high levels of uncertainty: Land use related impacts, toxicological aspects, and emissions from land use change **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.

¹These products contain no materials that are considered hazardous as defined by the PCR.

²GWP 100; 100-year time horizon GWP factors are provided by the IPCC 2013 Fifth Assessment Report (AR5).

³CO₂ from biogenic secondary fuels used in kiln are climate-neutral (CO₂ sink = CO₂ emissions), ISO 21930, 7.2.7.

⁴Calculated per ACLCA ISO 21930 Guidance.

References

- ACLCA. (2019). *ACLCA Guidance to Calculating Non-LCIA Inventory Metrics in Accordance with ISO 21930:2017*.
- ASTM. (April 2020). *General Program Instructions*.
- ecoinvent. (2021). *The ecoinvent Database v.3.8*. Zurich, Switzerland: The Swiss Centre for Life Cycle Inventories.
- ISO 14020. (2000). *Environmental labels and declarations – General principles*.
- ISO 14025. (2006). *Environmental labels and declarations, Type III environmental declarations, Principles and procedures*.
- ISO 14040. (2006). *ISO 14040: Environmental Management – Life Cycle Assessment – Principles and Framework*.
- ISO 14044. (2006/Amd 1:2017/Amd 2:2020). *Environmental management – Life cycle assessment – Requirements and guidelines*
- ISO 21930. (2017). *ISO 21930; Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services*.
- Long Trail Sustainability. (2021). *DATASMART (ES-EI Database)*. Huntington, VT: Long Trail Sustainability.
- National Renewable Energy Laboratory. (2015). *U.S. Life-Cycle Inventory (LCI) database*.
- PRé Sustainability. (2020). *SimaPro Vers. 9.1.0.8*. www.pre-sustainability.com/simapro.
- 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)*.