Package Pavement Co., Inc.

Stormville Plant

Packaged Concrete Mixes, Mortars, and Grouts

An Environmental Product Declaration

ASTM INTERNATIONAL
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An Environmental Product Declaration

In accordance with ISO 14025 and 21930

About this EPD

This is a Type III environmental product declaration (EPD) for packaged concrete mixes, mortars, and grouts as produced by Package Pavement Company, Inc. (PPC) at the company's Stormville plant in Stormville, New York. The results of the underlying LCA are computed using SimaPro 9.5.0.2 (1). This EPD and underlying LCA have been verified to conform to ISO 21930:2017 (the core PCR) (2) as well as ISO 14020:2000 (3), and ISO 14040/44:2006 LCA standards (4), (5).

This EPD is certified by ASTM to conform to the core PCR referenced above (2), as well as to the requirements of ISO 14020, ISO 14025 (6), ISO 21930 and ASTM International's General Program Instructions (7). This EPD is intended for business-to-business audiences.

General Summary

EPD Commissioner and Owner	**Package Pavement Company, Inc.** 675 Leetown Rd. Stormville, NY 12582 https://www.packagepavement.com/ Package Pavement company personnel have provided LCI and meta data in support of this EPD. *The owner of the declaration is liable for the underlying information and evidence*.
Product Description & Applicability	Packaged concrete mixes, mortars, and grouts are versatile construction materials with broad applicability in various building and repair projects. Mortars are primarily used to bond bricks, stone, and concrete blocks, forming masonry walls. Packaged concrete mixes are ideal for small-to-medium sized concrete projects where ready-mix concrete may not be suitable. Grouts are used in repairing and reinforcing structures. In reinforced masonry, grout is used to fill and bond cells of concrete masonry units together. Pre-packaged materials ensure precise mix ratios and consistent performance.
Product Category Rules (PCR)	ISO 21930:2017 – Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services (2).
Date of Issue & Validity Period	February 13, 2025 – 5 years
Declared Unit	1 metric ton of concrete mixes, mortars, and grouts

EPD and Project Report Information

Program Operator	ASTM International
Declaration Number	EPD 912
Declaration Type	Cradle-to-gate (modules A1 to A3). Facility and product-specific.
Applicable Regions	North America
Content of the Declaration	This declaration follows Section 9; Content of an EPD. ISO 21930:2017 – Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services (2).
This EPD was independently verified by ASTM in accordance with ISO 14025 and the reference PCR: Internal / External X	Tim Brooke ASTM International 100 Barr Harbor Drive PO Box C700 West Conshohocken PA 19428-2959, USA cert@astm.org Thomas P. Gloria, Ph. D. Industrial Ecology Consultants 35 Bracebridge Rd. Newton, MA
Notes	The EPD results reported herein are computed SimaPro version 9.5.0.2 (1), along with relevant background datasets from ecoinvent 3.9.1, US LCI, and supplier-specific EPDs where applicable.
Project Report	A Cradle-to-Gate Life Cycle Assessment of Packaged Concrete Mixes, Mortars, and Grouts Manufactured by Package Pavement Company, Inc. (8)
LCA Report and EPD Prepared by: Athena Sustainable Materials Institute	Athena Sustainable Materials Institute 280 Albert Street, Suite 404 Ottawa, Ontario, Canada K1P 5G8 info@athenasmi.org www.athenasmi.org

Product Description

This EPD reports environmental transparency information for packaged concrete mixes, mortars, and grouts as manufactured by Package Pavement at their Stormville plant in Stormville, New York. Packaged concrete mixes, mortars, and grouts are versatile construction materials with broad applicability in various building and repair projects. Mortars are primarily used to bond bricks, stone, and concrete blocks, forming masonry walls. Packaged concrete mixes are ideal for small-to-medium sized concrete projects where ready-mix concrete may not be suitable. Grouts are used in repairing and reinforcing structures. In reinforced masonry, grout is used to fill and bond cells of concrete masonry units together. Pre-packaged materials ensure precise mix ratios and consistent performance. Table 1 below outlines the declared products covered by this EPD.

Table 1: List of Declared Products from Stormville Plant

Concrete Mixes	Mortars	Grouts
Air Entrained 4000 Concrete Mix	Type N Mortar (Colored & Non-Colored)	Fine Grout 3000 & 4000
Low Carbon AE 5000 Air Entrained Concrete Mix	Type S Mortar (Colored & Non-Colored)	Fine Grout 5000
Fast Set Concrete Mix	Type O Mortar (Colored & Non-Colored)	Low carbon Fine Grout 3000-15 w/ Pozzotive®
Shotcrete	Type M Mortar (Colored & Non-Colored)	Low Carbon Fine Grout 5000-15 w/ Pozzotive®
NYC DOT Concrete Mix	Low Carbon Pozzotive® Type N Mortar	Coarse Grout 3000
Quikrete 5000 Concrete Mix	Low Carbon Pozzotive® Type S Mortar	Coarse Grout 5000
Quikrete 1101 Concrete Mix	IWR Mortar	Self-Consolidating FG 3000
Quikrete Crack Resistant Concrete Mix	Setting Bed Mortar	-
Quikrete Fiber Reinforced Deck Mix	Polymer Modified Setting Bed Mortar	-
Quikrete Commercial Grade Fast-Set Concrete Mix	Polymer Modified Adhered Veneer Mortar	-
-	Quikrete Mortar Mix (Type N)	-
-	Quikrete Mason Mix (Type S)	-

Product Material Composition and Relevant Standards

The material content of all covered products varies significantly by product type. Generally, the concrete mixes, mortars, and grouts consist of the following materials in order of greatest mass:

1. Coarse and/or fine aggregates
2. Cement
3. Supplementary cementitious materials (such as pozzolans, lime, etc.)
4. Additives (such as admixtures, pigments, polymer modifiers, etc.)

The plant's packaged products comply with the following standards:

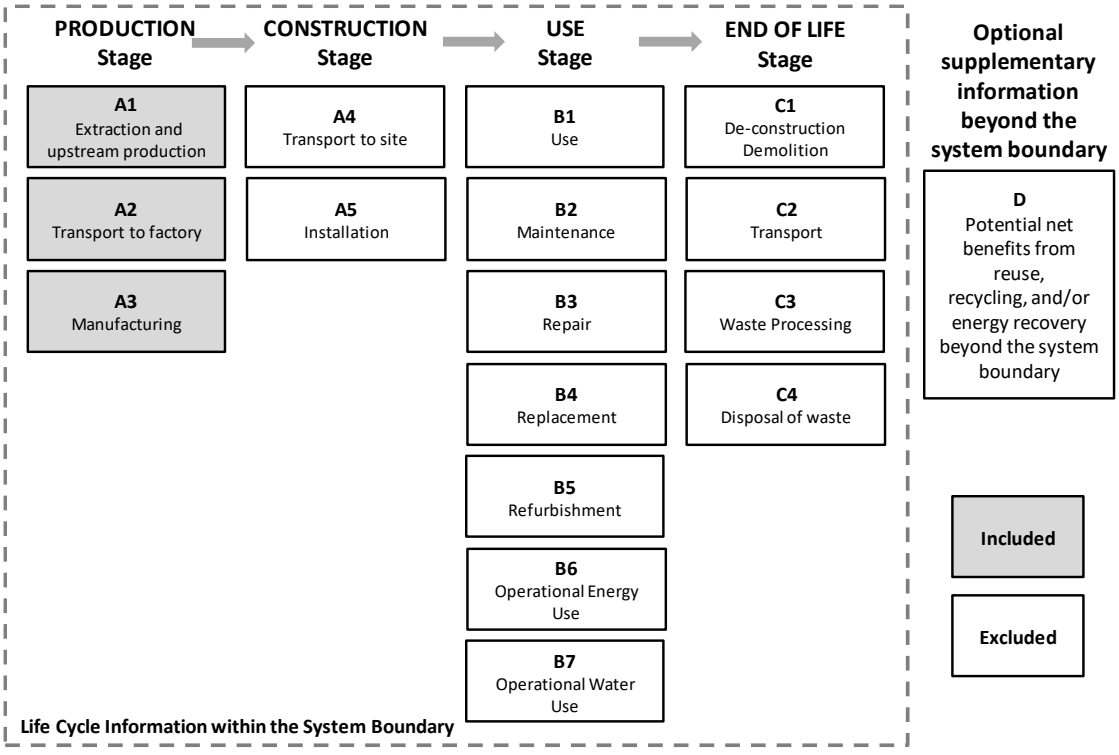
Concrete Mixes:	ASTM C387/C387M-17 – Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar (9).
Mortars:	ASTM C270-24 – Standard Specification for Mortar for Unit Masonry (10).
Grouts:	ASTM C476-23 – Standard Specification for Grout for Masonry (11).

Declared Unit

The declared unit is one metric ton of concrete mixes, mortars, and grouts.

System Boundary

This is a cradle-to-gate EPD covering the production stage (A1-A3) as depicted in the figure below. The production stage includes extraction of raw materials (cradle) through the manufacture and transport of concrete mixes, mortars, and grouts ready for shipment (gate) inclusive of packaging.



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 per ISO 21930, Section 7.1.8 (2) have been followed. Per ISO 21930, 7.1.8, all input/output data required were 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 EPD.

Data Collection
Gate-to-gate input/output flow data were collected for the following processes for the company's 2023 fiscal year (April 2023 to March 2024):

- Facility operations (fuel and electricity use, waste, and total production)
- Product-specific formulation, packaging information & annual production

Allocation Rules

The allocation rules generally conform to ISO 14044 section 4.3.4.1 and 4.3.4.2 (5) and ISO 21930 (2) section 7.2.5 Allocation for co-products.

Given the wide range of products manufactured by Package Pavement, it was not possible to collect waste generation and energy and fuel use data specific to each product. Instead, these inputs and outputs were allocated over the total production of all declared products on a "mass" basis. Additionally, allocation related to transport is based on the mass of transported inputs and outputs.

Stormville plant produces both colored and non-colored mortars (Type M, N, S, and O), and Fine Grout 3000 & 4000, which have been grouped together respectively, using a production weighted average. The grouped products are as follows:

1. Type M Mortar (Colored and non-colored)
2. Type N Mortar (Colored and non-colored)
3. Type S Mortar (Colored and non-colored)
4. Type O Mortar (Colored and non-colored)
5. Fine Grout 3000 & 4000

Data Quality Requirements and Assessment

Data Quality Requirements	Description
Technology Coverage	Data represents the prevailing technology in use at Package Pavement's Stormville plant. Whenever available, for all upstream and core material and processes, both International and North American typical or global average industry LCI datasets were utilized. Technological *representativeness is characterized as "high".*
Geographic Coverage	The geographic region considered is US. *Geographical representativeness is characterized as "high".*
Time Coverage	Gate-to-gate input/output flow data were collected for the following processes for the company's 2023 fiscal year (April 2023 to March 2024): • Facility operations (fuel and electricity use, waste, and total production) • Product-specific formulation, packaging information & annual production *Temporal representativeness is characterized as "high".*
Completeness	All relevant, specific processes, including inputs (raw materials, intermediate products, energy, and ancillary materials) and outputs (emissions and production volume) were considered and modeled in SimaPro to complete the production profile for Package Pavement's concrete mixes, mortars, and grouts. The completeness of the foreground process chain in terms of process steps was rigorously assessed.
Reproducibility	Internal reproducibility is possible since the data and the models are stored and available in Athena's Package Pavement LCI database developed in SimaPro, 2024. External reproducibility is not possible as the source LCI data and subsequent LCA background reports are confidential.
Transparency	Activity datasets are disclosed in the project report, including all data sources.
Uncertainty	A *sensitivity check* was performed to assess the reliability of the reported LCA results and conclusions by determining how they are affected by value choices in the data or assumptions on calculation of LCIA and energy indicator results. The results of the sensitivity analysis are documented in the project report.

Life Cycle Impact Assessment Results: Package Pavement – Stormville

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 ton of each product as produced at the Stormville plant. LCIA category and inventory indicators are listed below in Table 2 below.

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 (2), (5). Further, many LCA impact categories and inventory items are still emerging or under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting results for these categories – identified with an "*".

Environmental declarations from different programs may not be comparable (6). EPDs 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 (2).

Table 2: LCIA Category and Inventory Indicators

Impact Category and Inventory Indicators	Abbreviation	Unit	Source of the characterization method
Global warming potential [1)]	GWP 100	kg CO_2 eq.	TRACI 2.1 2012 updated with IPCC 2013, AR5[1)]
Acidification potential	AP	kg SO_2 eq.	TRACI 2.1 2012
Eutrophication potential	EP	kg N eq.	TRACI 2.1 2012
Smog formation potential	SFP	kg O_3 eq.	TRACI 2.1 2012
Depletion potential of the stratospheric ozone layer	ODP	kg CFC-11 eq.	TRACI 2.1 2012/WMO:2003
Abiotic depletion potential, elements	ADP_e	Kg Sb eq.	CML-baseline, v4.7 2016
Abiotic depletion potential, fossil	ADP_f	MJ, LHV	CML-baseline, v4.7 2016
Renewable primary resources used as energy carrier (fuel)	RPR_E	MJ,LHV	Cumulative Energy Demand (CED) V1.0, 2019
Renewable primary resources with energy content used as material	RPR_M	MJ,LHV	Cumulative Energy Demand (CED) V1.0, 2019
Non-renewable primary resources used as an energy carrier (fuel)	$NRPR_E$	MJ,LHV	Cumulative Energy Demand (CED) V1.0, 2019
Non-renewable primary resources with energy content used as material	$NRPR_M$	MJ,LHV	Cumulative Energy Demand (CED) V1.0, 2019
Secondary Material	SM	kg	Inventory
Renewable secondary fuels	RSF	MJ, LHV	Inventory
Non-renewable secondary fuels	NRSF	MJ, LHV	Inventory
Recovered energy	RE	MJ, LHV	Inventory
Consumption of freshwater	FW	m^3	Inventory
Hazardous waste disposed	HWD	kg	Inventory
Non-hazardous waste disposed	NHWD	kg	Inventory
High level radioactive waste, conditioned, to final repository	HLRW	m^3	Inventory
Intermediate and low level radioactive waste, conditioned, to final repository	ILLRW	m^3	Inventory
Components for re-use	CRU	kg	Inventory
Materials for recycling	MR	kg	Inventory
Materials for energy recovery	MER	kg	Inventory
Exported energy	EE	MJ, LHV	Inventory
Calcination CO_2 emissions, reporting the emissions associated with calcination	GWP_{calc}	kg CO_2	Inventory
Biogenic CO_2, reporting the removals associated with biogenic carbon content contained within bio-based packaging	$GWP_{bio\text{-}pack}$	kg CO_2	Inventory

Table 3: Production Stage EPD Results (A1 to A3 Total) – Stormville – Concrete Mixes

Impact category and inventory indicators	Unit	Air Entrained 4000 Concrete Mix	Low Carbon AE 5000 Air Entrained Concrete Mix	Fast Set Concrete Mix	Shotcrete	NYC DOT Concrete Mix
		A1-A3 Total	A1-A3 Total	A1-A3 Total	A1-A3 Total	A1-A3 Total
GWP 100[1) 2)]	kg CO_2 eq	219	206	229	315	220
AP[1)]	kg SO_2 eq	0.85	0.73	1.04	1.22	0.66
EP[1)]	kg N eq	0.22	0.13	0.26	0.33	0.18
SFP[1)]	kg O_3 eq	18.3	17.5	21.9	26.2	16.8
ODP[1)]	kg CFC-11 eq	5.59E-06	3.98E-06	6.30E-06	8.45E-06	6.10E-06
ADPe*[3)]	kg Sb eq	12.8	14.0	4.48E-05	2.81	1.58E-05
ADPf*[3)]	MJ, LHV	1706	1173	1621	2155	1486
RPRE*[4)]	MJ, LHV	430	493	537	591	441
RPRM*[4)]	MJ, LHV	0	0	0	0	0
NRPRE*[4)]	MJ, LHV	1811	1240	1702	2267	1666
NRPRM*[4)]	MJ, LHV	0	0	0	0	0
SM*[4)]	kg	2.89	33.0	4.65	29.5	4.30
RSF*[4)]	MJ, LHV	23.0	0	18.0	36.00	0
NRSF*[4)]	MJ, LHV	73	0	57	114.0	0
RE*[4)]	MJ, LHV	5.26	0	3.62	8	0
FW*[4)]	m^3	0.22	0.25	0.21	0.33	0.14
HWD*[4)]	kg	6.19E-03	6.70E-03	7.00E-05	1.49E-03	3.60E-04
NHWD*[4)]	kg	0.66	0.66	4.11	0.82	0.66
HLRW*[4) 5)]	m^3	6.36E-08	4.43E-08	5.80E-08	6.36E-08	1.13E-07
ILLRW*[4) 5)]	m^3	5.10E-07	2.20E-07	4.30E-07	7.40E-07	1.27E-06
CRU*[4)]	kg	0	0	0	0	0
MR*[4)]	kg	0.23	0.18	1.24	0.26	0.18
MER*[4)]	kg	0.66	0.66	0.66	0.66	0.66
EE*[4)]	MJ, LHV	0	0	0	0	0
GWP_{calc}*[4)]	kg CO_2	79	83	80	123	87
$GWP_{bio\text{-}pack}$*[4)]	kg CO_2	-23.5	-25.9	-28.3	-25.8	-26.0

Table 4: Production Stage EPD Results (A1 to A3 Total) – Stormville – Concrete Mixes Continued

Impact category and inventory indicators	Unit	Quikrete 5000 Concrete Mix	Quikrete Concrete Mix 1101	Quikrete Crack Resistant Concrete Mix	Quikrete Fiber Reinforced Deck Mix	Quikrete Commercial Grade Fast-Set Concrete Mix
		A1-A3 Total	A1-A3 Total	A1-A3 Total	A1-A3 Total	A1-A3 Total
GWP 100[1) 2)]	kg CO_2 eq	225	197	227	280	375
AP[1)]	kg SO_2 eq	0.68	0.78	0.86	0.83	1.37
EP[1)]	kg N eq	0.18	0.22	0.25	0.25	0.34
SFP[1)]	kg O_3 eq	17.2	17.4	18.6	19.9	30.2
ODP[1)]	kg CFC-11 eq	6.23E-06	4.89E-06	5.86E-06	8.14E-06	1.19E-05
ADPe*[3)]	kg Sb eq	1.60E-05	3.35E-05	2.55	21.3	7.65
ADPf*[3)]	MJ, LHV	1520	1435	1582	1922	2331
RPRE*[4)]	MJ, LHV	443	507	525	461	526
RPRM*[4)]	MJ, LHV	0	0	0	0	0
NRPRE*[4)]	MJ, LHV	1702	1521	1677	2166	2528
NRPRM*[4)]	MJ, LHV	0	0	0	0	0
SM*[4)]	kg	4.39	2.62	3.16	5.52	10.1
RSF*[4)]	MJ, LHV	0	21.0	25.0	0	5.0
NRSF*[4)]	MJ, LHV	0	66	79	0	14
RE*[4)]	MJ, LHV	0	4.77	5.74	0	0.00
FW*[4)]	m^3	0.15	0.19	0.23	0.20	0.29
HWD*[4)]	kg	3.70E-04	9.00E-05	1.32E-03	1.06E-02	4.05E-03
NHWD*[4)]	kg	0.66	0.66	0.66	0.66	7.56
HLRW*[4) 5)]	m^3	1.13E-07	6.18E-08	6.48E-08	1.35E-07	1.14E-07
ILLRW*[4) 5)]	m^3	1.29E-06	4.80E-07	5.30E-07	1.61E-06	1.38E-06
CRU*[4)]	kg	0	0	0	0	0
MR*[4)]	kg	0.18	0.22	0.23	0.18	2.23
MER*[4)]	kg	0.66	0.66	0.66	0.66	0.66
EE*[4)]	MJ, LHV	0	0	0	0	0
GWP_{calc}*[4)]	kg CO_2	89	72	86	112	148
$GWP_{bio\text{-}pack}$*[4)]	kg CO_2	-26.1	-26.2	-26.0	-26.0	-29.4

Table 5: Production Stage EPD Results (A1 to A3 Total) – Stormville – Mortars

Impact category and inventory indicators	Unit	Type N Mortar (Coloured & Non-Coloured)	Type S Mortar (Coloured & Non-Coloured)	Type O Mortar (Coloured & Non-Coloured)	Type M Mortar (Coloured & Non-Coloured)	Low Carbon Pozzotive Type N Mortar	Low Carbon Pozzotive Type S Mortar
		A1-A3 Total	A1-A3 Total	A1-A3 Total	A1-A3 Total	A1-A3 Total	A1-A3 Total
GWP 100[1) 2)]	kg CO_2 eq	272	288	295	303	228	234
AP[1)]	kg SO_2 eq	0.94	0.92	1.05	0.90	0.92	0.89
EP[1)]	kg N eq	0.20	0.20	0.19	0.22	0.13	0.13
SFP[1)]	kg O_3 eq	22.3	22.3	24.0	22.4	21.3	21.2
ODP[1)]	kg CFC-11 eq	5.64E-06	6.93E-06	5.06E-06	7.97E-06	3.00E-06	3.65E-06
ADPe*[3)]	kg Sb eq	3.15E-05	2.23E-05	4.16E-05	2.23E-05	2.33E-05	2.81E-05
ADPf*[3)]	MJ, LHV	1883	1915	2031	1952	1417	1364
RPRE*[4)]	MJ, LHV	435	409	435	445	470	487
RPRM*[4)]	MJ, LHV	0	0	0	0	0	0
NRPRE*[4)]	MJ, LHV	2037	2095	2175	2153	1479	1426
NRPRM*[4)]	MJ, LHV	0	0	0	0	0	0
SM*[4)]	kg	3.67	4.76	3.07	5.58	45.4	59
RSF*[4)]	MJ, LHV	0	0	0	0	0	0
NRSF*[4)]	MJ, LHV	0	0	0	0	0	0
RE*[4)]	MJ, LHV	0	0	0	0	0	0
FW*[4)]	m^3	0.12	0.16	0.10	0.19	0.16	0.21
HWD*[4)]	kg	3.10E-04	4.00E-04	2.60E-04	4.70E-04	0	0
NHWD*[4)]	kg	0.66	0.66	2.66	2.66	0.66	0.66
HLRW*[4) 5)]	m^3	9.05E-08	1.01E-07	9.21E-08	1.10E-07	5.39E-08	5.47E-08
ILLRW*[4) 5)]	m^3	1.07E-06	1.31E-06	9.60E-07	1.50E-06	2.50E-07	2.50E-07
CRU*[4)]	kg	0	0	0	0	0	0
MR*[4)]	kg	0.18	0.18	0.18	0.18	0.30	0.34
MER*[4)]	kg	0.66	0.66	0.66	0.66	0.66	0.66
EE*[4)]	MJ, LHV	0	0	0	0	0	0
GWP_{calc}*[4)]	kg CO_2	74	96	62	113	56	73
$GWP_{bio\text{-}pack}$*[4)]	kg CO_2	-25.9	-23.7	-25.8	-25.8	-25.8	-25.8

Table 6: Production Stage EPD Results (A1 to A3 Total) – Stormville – Mortars Continued

Impact category and inventory indicators	Unit	IWR Mortar	Setting Bed Mortar	Polymer Modified Setting Bed Mortar	Polymer Modified Adhered Veneer Mortar	Quikrete Mortar Mix (Type N)	Quikrete Mason Mix (Type S)
		A1-A3 Total	A1-A3 Total	A1-A3 Total	A1-A3 Total	A1-A3 Total	A1-A3 Total
GWP 100[1) 2)]	kg CO_2 eq	293	283	341	356	187	224
AP[1)]	kg SO_2 eq	0.94	0.84	1.04	1.14	0.92	0.89
EP[1)]	kg N eq	0.22	0.21	0.31	0.31	0.23	0.22
SFP[1)]	kg O_3 eq	22.6	21.3	23.7	25.1	19.7	20.3
ODP[1)]	kg CFC-11 eq	7.09E-06	8.06E-06	1.10E-05	9.92E-06	4.30E-06	5.71E-06
ADPe*[3)]	kg Sb eq	12.8	1.84E-05	3.59E-04	3.57E-04	2.66E-05	2.34E-05
ADPf*[3)]	MJ, LHV	2010	1842	2204	2284	1842	1838
RPRE*[4)]	MJ, LHV	420	447	478	477	406	419
RPRM*[4)]	MJ, LHV	0	0	0	0	0	0
NRPRE*[4)]	MJ, LHV	2201	2042	2453	2514	1879	1937
NRPRM*[4)]	MJ, LHV	0	0	0	0	0	0
SM*[4)]	kg	4.76	5.74	6.70	5.76	0	2.16
RSF*[4)]	MJ, LHV	0	0	0	0	0	0
NRSF*[4)]	MJ, LHV	0	0	0	0	0	0
RE*[4)]	MJ, LHV	0	0	0	0	0	0
FW*[4)]	m^3	0.17	0.19	0.22	0.19	0.14	0.16
HWD*[4)]	kg	6.49E-03	4.80E-04	5.60E-04	4.80E-04	0	1.80E-04
NHWD*[4)]	kg	0.66	0.66	0.66	0.66	0.66	0.66
HLRW*[4) 5)]	m^3	1.01E-07	1.06E-07	1.38E-07	1.35E-07	1.77E-08	5.09E-08
ILLRW*[4) 5)]	m^3	1.32E-06	1.52E-06	1.84E-06	1.65E-06	1.30E-07	6.50E-07
CRU*[4)]	kg	0	0	0	0	0	0
MR*[4)]	kg	0.18	0.18	0.18	0.18	0.23	0.21
MER*[4)]	kg	0.66	0.66	0.66	0.66	0.66	0.66
EE*[4)]	MJ, LHV	0	0	0	0	0	0
GWP_{calc}*[4)]	kg CO_2	96	116	135	116	61	82
$GWP_{bio\text{-}pack}$*[4)]	kg CO_2	-25.2	-25.8	-26.0	-26.0	-26.4	-26.1

Table 7: Production Stage EPD Results (A1 to A3 Total) – Stormville – Grouts

Impact category and inventory indicators	Unit	Fine Grout 3000 & 4000	Fine Grout 5000	Low Carbon Fine Grout 3000-15 w/Pozzotive	Low Carbon Fine Grout 5000-15 w/Pozzotive	Coarse Grout 3000	Coarse Grout 5000	Self-Consolidating FG 3000
		A1-A3 Total	A1-A3 Total	A1-A3 Total	A1-A3 Total	A1-A3 Total	A1-A3 Total	A1-A3 Total
GWP 100[1) 2)]	kg CO_2 eq	316	379	237	279	265	311	290
AP[1)]	kg SO_2 eq	1.22	1.36	0.94	1.01	1.00	1.12	1.18
EP[1)]	kg N eq	0.32	0.39	0.13	0.14	0.28	0.32	0.31
SFP[1)]	kg O_3 eq	26.5	28.7	23.1	24.3	21.7	23.6	25.7
ODP[1)]	kg CFC-11 eq	8.28E-06	1.04E-05	4.33E-06	5.44E-06	6.94E-06	8.50E-06	7.41E-06
ADPe*[3)]	kg Sb eq	5.26E-05	6.50E-05	3.34E-05	4.12E-05	4.52E-05	5.40E-05	9.35
ADPf*[3)]	MJ, LHV	2145	2393	1397	1448	1793	1995	2080
RPRE*[4)]	MJ, LHV	569	626	499	539	549	575	541
RPRM*[4)]	MJ, LHV	0	0	0	0	0	0	0
NRPRE*[4)]	MJ, LHV	2234	2496	1461	1517	1882	2094	2170
NRPRM*[4)]	MJ, LHV	0	0	0	0	0	0	0
SM*[4)]	kg	4.57	5.79	74	94	3.80	4.70	3.98
RSF*[4)]	MJ, LHV	36.4	46.0	0	0	30.0	38.0	32.0
NRSF*[4)]	MJ, LHV	115	145	0	0	95	118	100
RE*[4)]	MJ, LHV	8.31	10.5	0	0	6.91	8.55	7.24
FW*[4)]	m^3	0.33	0.42	0.27	0.35	0.28	0.34	0.30
HWD*[4)]	kg	1.52E-04	1.90E-04	0	0	1.30E-04	1.60E-04	4.60E-03
NHWD*[4)]	kg	0.66	0.66	2.24	0.66	0.66	0.66	0.66
HLRW*[4) 5)]	m^3	4.57E-08	5.30E-08	5.19E-08	6.08E-08	5.51E-08	5.93E-08	4.18E-08
ILLRW*[4) 5)]	m^3	5.74E-07	6.90E-07	2.50E-07	2.80E-07	5.50E-07	6.30E-07	5.20E-07
CRU*[4)]	kg	0	0	0	0	0	0	0
MR*[4)]	kg	0.26	0.28	0.38	0.44	0.24	0.26	0.25
MER*[4)]	kg	0.66	0.66	0.66	0.66	0.66	0.66	0.66
EE*[4)]	MJ, LHV	0	0	0	0	0	0	0
GWP_{calc}*[4)]	kg CO_2	124	158	91	117	104	128	109
$GWP_{bio\text{-}pack}$*[4)]	kg CO_2	-25.8	-26.0	-25.8	-26.0	-26.0	-25.6	-25.4

Notes:

[1] Calculated as per U.S EPA TRACI 2.1, v1.05, SimaPro v.9.5.0.2

[2] GWP-100 excludes biogenic CO_2 removals and emissions associated with biobased products, including bio-based packaging. Biogenic carbon content of packaging materials is reported separately. 100-year time horizon GWP factors are provided by the IPCC 2013 Fifth Assessment Report (AR5), TRACI 2.1, v1.05.

[3] Calculated as per CML-IA baseline, V4.7, SimaPro v.9.5.0.2. ADP_f is required in LEED v4.0/v4.1 MR2 Credit: Building Product Disclosure and Optimization – Environmental Product Declarations.

[4] Calculated as per ACLCA ISO 21930 Guidance (12).

[5] It should be noted that the foreground system (A3 manufacturing process) does not generate any high-level radioactive waste or low/intermediate level radioactive waste. Radioactive waste is primarily generated from electricity production. High level radioactive waste consists mainly of spent fuel from reactors. Low/intermediate level radioactive waste is primarily generated from routine facility maintenance and operation (2).

LCA Interpretation

The Extraction and Upstream Production module (A1) drives most of the potential environmental impacts. The A1 impacts are primarily driven by cement manufacturing and the associated emissions during the pyroprocessing of limestone in the production of clinker. Transportation (A2) is the second largest contributor to the Production stage EPD results, followed by Manufacturing (A3).

Additional Environmental Information

The Stormville plant operates baghouse filters, sweepers, and industrial vacuum technology to limit the emissions of particulates.

References

1. PRé Sustainability. SimaPro LCA Software. Version 9.5.0.2. 2024.

2. ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services.

3. ISO 14020:2000 Environmental labels and declarations.

4. ISO 14040:2006/Amd 1:2020 Environmental Management – Life Cycle Assessment – Principles and Framework.

5. ISO 14044/Amd1:2017/Amd2:2020 Environmental Management – Life Cycle Assessment – Requirements and guidelines.

6. ISO 14025: 2006 Environmental labeling and declarations - Type III environmental declarations - Principles and procedures.

7. ASTM Program Operator Rules. Version: 8.0, Revised April 2020.

8. Athena Sustainable Materials Institute. A Cradle-to-Gate Life Cycle Assessment of Packaged Concrete Mixes, Mortars, and Grouts Manufactured by Package Pavement Company, Inc. 2024.

9. ASTM C387/C387M - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar.

10. ASTM C270-24 - Standard Specification for Mortar for Unit Masonry.

11. ASTM C476-23 - Standard Specification for Grout for Masonry.

12. ACLCA 2019, Guidance to Calculating Non-LCIA Inventory Metrics in Accordance with ISO 21930:2017. The American Centre for Life Cycle Assessment. May, 2019.