Product Specific

Environmental Product Declaration for Cement

Heidelberg Materials

PATHWAYS

Mitchell, IN

Production Facility
Mitchell Cement Plant and Terminal
200 Mill Creek Road, Mitchell, IN

Program Operator
ASTM International
100 Barr Harbor Drive, West
Conshohocken, PA 19428
www.astm.org

ASTM INTERNATIONAL

In accordance with ISO 21930, ISO 14025, ISO 14040, and ISO 14044

EPD Scope: A1-A3 (Cradle to Gate)

Issuance Date: January 20, 2026

Expiration Date: January 20, 2031

Declaration Number: EPD 1112

Environmental Impacts

Mitchell Plant: Product-Specific EPD

Declared Cement Products: Masonry M, Masonry N, Masonry S, Type IL, Type III

Declared Unit: One metric tonne of cement

	Cement Products				
	Masonry M	Masonry N	Masonry S	Type IL	Type III
Total Global Warming Potential (kg CO_2-Eq)	**621**	**388**	**479**	**797**	**892**
Global Warming Potential, Fossil (kg CO_2 eq)	621	388	479	797	892
Global Warming Potential, Biogenic (kg CO_2 eq)	0.06	0.05	0.05	0.08	0.08
Global Warming Potential, Luluc (kg CO_2 eq)	0.02	0.02	0.02	0.03	0.04
Stratospheric Ozone Depl. Potential (kg CFC-11 eq)	2.62e-6	1.61e-6	2.00e-6	3.60e-6	3.78e-6
Eutrophication Potential, Marine (kg N eq)	0.06	0.04	0.05	0.07	0.08
Eutrophication Potential, Freshwater (kg P eq)	1.74e-3	6.65e-4	1.09e-3	2.93e-3	3.20e-3
Soil and Water Acidification Potential (kg SO_2 eq)	0.70	0.50	0.58	0.87	0.94
Tropospheric Ozone Formation Potential (kg O_3 eq)	17.2	12.0	14.1	21.5	23.1
Product Components					
Clinker	64.1%	37.9%	48.2%	86.2%	93.1%
Limestone, Gypsum, and Others	35.9%	62.1%	51.8%	13.8%	6.9%

Reference Standards	ISO 21930:2017 Sustainability in Building Construction-Environmental Declaration of Building Products: serves as the core PCR. Smart EPD Part A Product Category Rules for Building and Construction Products and Services: serves as the Part A PCR. Smart EPD (2025) Part B Product Category Rules for Cements for Construction Version 4.0. Standard 1000-010. Published July 2, 2025: serves as the Part B PCR.
Sub-Category PCR Reviewer	Dr Thomas Gloria (t.gloria@industrial-ecology.com) • Industry Ecology Consulting Garav Das (gd30gcc@gmail.com) • Independent Consultant Emily B Lorenz (emilyblorenz@gmail.com) • Independent Consultant
Internal/External	Independent verification of the declaration, according to ISO 21930:2017 and ISO 14025:2006: ☐ internal ☑ external
LCA Project Third Party Verifier	Dr Thomas Gloria • t.gloria@industrial-ecology.com • Industry Ecology Consulting
EPD Third Party Verifier	Dr Thomas Gloria • t.gloria@industrial-ecology.com • Industry Ecology Consulting
For Additional Material	Manufacturer Representative: Jeff Hook (jeff.hook@heidelbergmaterials.com) This LCA EPD was prepared by: Capucine Richard • Pathways (www.pathwaysai.co)

Limitations, Liability, and Ownership

The EPD owner has sole ownership, liability, and responsibility for the EPD.

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building or construction works level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD 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.

A manufacturer shall not make claims based on an industry-average EPD which leads the market to believe the industry-average is representative of manufacturer-specific or product-specific results.

Product Name	Masonry M, Masonry N, Masonry S, Type IL, Type III Cements	**Declaration Number**	EPD 1112
Declared Unit	1 metric ton	**Date of Issue**	01/20/2026
EPD Scope	A1 - A3	**Expiration**	01/20/2026
Markets of Applicability	United States and Canada	**Last Updated**	01/20/2026

Company Description

Heidelberg Materials, a leading supplier of cementitious construction materials in North America, has been manufacturing cement in Mitchell, Indiana for more than 100 years, making us a pillar of our community while providing employment and economic benefits to communities in the region.

In 2023, the k4 kiln and a new plant was commissioned. The Mitchell Plant is strategically located near the raw materials required for cement production, which combined with the good rail access from our plant helps to mitigate our environmental impacts through efficient and more sustainable transportation of raw materials to the plant. Rail access also helps with delivery of impacts for cement outbound to the many terminals we supply.

Heidelberg Materials' commitment to sustainable construction includes actively working to create lower carbon cements through use of alternative raw materials and fuels.

Heidelberg Materials believes that the health and well-being of their employees, communities and the natural environment are vital to their success. Our team at Mitchell works hard to give back through sponsorship of the local Little League baseball and softball fields, annual food drives to help supplement our local food bank, and donations to several local organizations and foundations such as our local schools, and fire department all with a focus on conservation and community development.

Product Information

Masonry M

Product Type	Masonry Cement	**Standard Designation**	Type M
Applicable Standards	ASTM C91, CSA A3001, 30111504	**Supply-Chain Specificity of Product**	99.8%
UNSPSC Code	NA	**UNCPC Code**	3744

Masonry N

Product Type	Masonry Cement	**Standard Designation**	Type N
Applicable Standards	ASTM C91, CSA A3001	**Supply-Chain Specificity of Product**	99.5%
UNSPSC Code	30111506	**UNCPC Code**	3744

Masonry S

Product Type	Masonry Cement	**Standard Designation**	Type S
Applicable Standards	ASTM C91, CSA A3001	**Supply-Chain Specificity of Product**	99.6%
UNSPSC Code	30111506	**UNCPC Code**	3744

Type IL (GUL)

Product Type	Portland Limestone Cement	**Standard Designation**	Type IL (GUL)
Applicable Standards	ASTM C595, CSA A3001	**Supply-Chain Specificity of Product**	99.7%
UNSPSC Code	30111504	**UNCPC Code**	3744

Type III (HE)

Product Type	Portland Cement	**Standard Designation**	Type III (HE)
Applicable Standards	ASTM C150, CSA A3001	**Supply-Chain Specificity of Product**	99.7%
UNSPSC Code	30111504	**UNCPC Code**	3744

Product Description

This EPD reports environmental transparency information for five cement products, produced by Heidelberg Materials at its Mitchell, IN 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 is branded as EcoCemPLC™ and was developed to be more environmentally friendly by reducing its carbon footprint (reduction measured through GWP). This product is a general use product for concrete and mortar as well as all the other various applications for cement, including engineered soils and solidification/stabilization of materials and wastes.

Masonry cements are used in mortar mixes, each for specific purposes. When mixed with water, these cements act as a glue to bind together sand to form mortar used in concrete masonry unit and brick veneer construction techniques. Each of these Masonry cements are branded as Brixment™.

Materials and Composition

Product	Product components
Masonry M	Clinker, Limestone, Gypsum, Masonry Additives
Masonry N	Clinker, Limestone, Gypsum, Masonry Additives
Masonry S	Clinker, Limestone, Gypsum, Masonry Additives
Type IL (GUL)	Clinker, Limestone, Gypsum, Grinding Aids
Type III (HE)	Clinker, Limestone, Gypsum, Grinding Aids

Hazardous Materials
No hazardous substances are contained in the products according to the normative requirements of the US and Canadian EPD markets per the Smart EPD Part A PCR. Wastes classifications have been assessed per the US waste classification: Resource Conservation and Recovery Act (RCRA), Subtitle C.

EPD Representativeness

Primary Data Year	2024	
Manufacturing Specificity	X	Industry average
	X	Manufacturer average
	✓	Facility-specific
	✓	Product-specific
	X	Product-average

System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	
	A5	Assembly / install	
Use	B1	Use	
	B2	Maintenance	
	B3	Repair	
	B4	Replacement	
	B5	Refurbishment	
	B6	Operational energy use	
	B7	Operational water use	

End of Life	C1	Deconstruction	
	C2	Transport	
	C3	Waste processing	
	C4	Disposal	
Benefits & Loads Beyond System Boundary	D	Recycling, reuse, recovery potential	

General Cement System Boundary Diagram

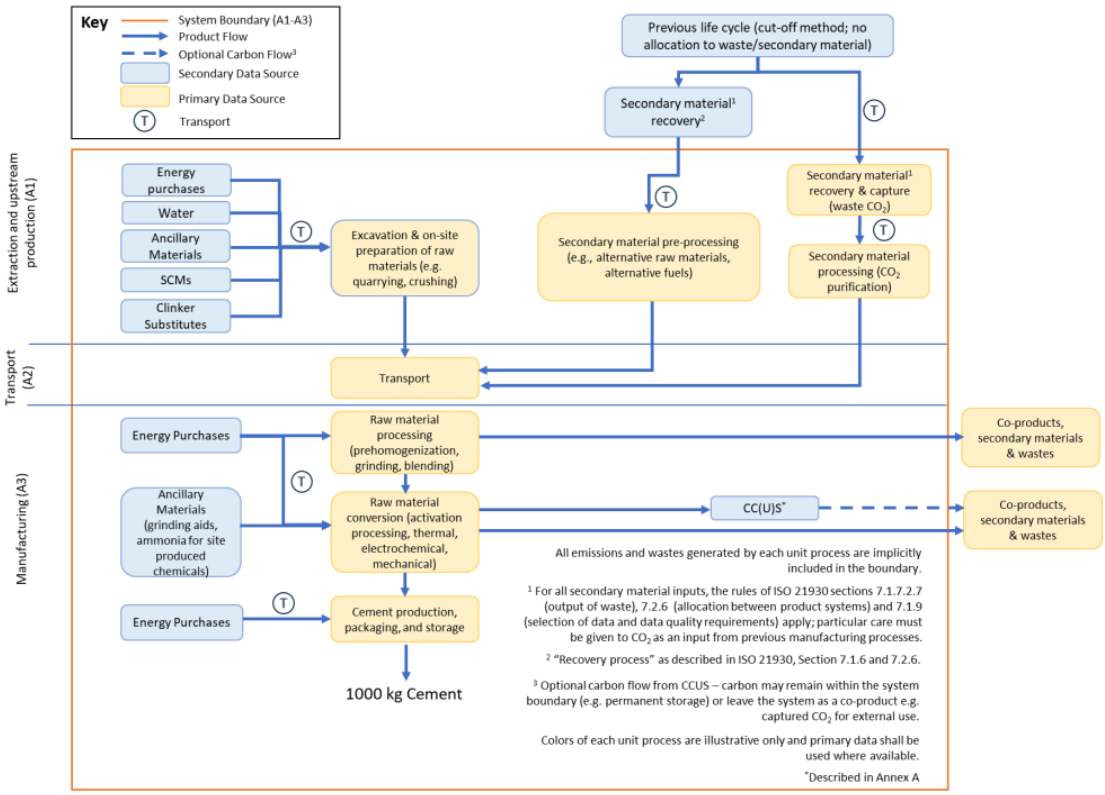

Diagram from Smart EPD (2025) Part B Product Category Rules for Cements for Construction Version 4.0. Standard 1000-010

Manufacturing Info

Plant Name	Address
Mitchell	200 Mill Creek Rd, Mitchell, Indiana

Manufacturing Process Description

Masonry M

Masonry M cement manufacturing uses clinker as a main cementitious input; additional raw materials include gypsum, limestone, and masonry additives. These materials are ground together using electricity to produce Masonry S cement.

Masonry N

Masonry N cement manufacturing uses clinker as the main cementitious input; additional raw materials include gypsum, limestone, and masonry additives. These materials are ground together using electricity to produce Masonry N cement.

Masonry S

Masonry S cement manufacturing uses clinker as a main cementitious input; additional raw materials include gypsum, limestone, and masonry additives. These materials are ground together using electricity to produce Masonry S cement.

Type IL

Type IL cement manufacturing uses clinker as a main cementitious input; additional raw materials include gypsum, limestone, and grinding aids. These materials are ground together using electricity to produce Type IL Cement.

Type III

Type III cement manufacturing uses clinker as a cementitious input; additional raw materials include gypsum, limestone, and grinding aids. These materials are ground together using electricity to produce Type III Cement.

Software and Data

Software

LCA Software	Pathways v1.0

Data Quality

Indicator	**Definition**		**Data Quality Score Meaning**	**Data Quality Score** (1=lowest; 5=highest)
Temporal representativeness	Indicates the temporal difference between the date of data generation and the date the data are supposed to represent based on the PCR		Previous calendar or financial year (1 year)	1
Geographical representativeness	Indicates how well the geographical area from which data for a unit process are collected satisfies the goal of the study		Site-specific data	1
Technological representativeness	Indicates technical representativeness based on four categories: process design, operating conditions, material quantity/type and process scale		Site-specific data	1
Reliability (Precision, Accuracy, Verification)	Indicates quality of data generation method and verification of data collection methods	Combustion emissions		1
		Calcination emissions		1
		Thermal energy quantity by source type	Site-specific data	1
		Electricity quantities	Site-specific data	1
		Raw material quantities	Site-specific data	1
		Waste quantities	Site-specific data	1
		Inbound transport distance	Site-specific data	1
		Outbound transport distances from A3	Default values	2

		Raw material quantities	Site-specific data	1
		Waste quantities	Site-specific data	1

Data Sources

Material / Process Category	Module	Material / Process Name	Inventory Dataset Name	Dataset Geographic Region	Reporting Period / Dataset Year(s)	Reference
Material/ Product	A1	Ammonia	Ammonia, steam reforming, liquid, at plant	North America	2011-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.
	A1	Clay	Market for clay	Rest of World	2011-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.
	A1	Hydrated lime	Lime production, hydrated, loose weight	Rest of World	2000-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.
	A1	Missouri clay	Market for kaolin	Global	2011-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.
	A1	Ponded/ bottom ash	Treatment of bottom ash, MSWI-WWT-SLF, hard coal ash, slag compartment	Global	2012-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.
	A1	Shale	Market for shale	Global	2012-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.
	A1	Mill scale	Treatment of mill scale, residual material landfill - GLO (Ecoinvent 3.10)	Global	2010-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.
	A1	Natural gas production	Market for natural gas, high pressure	United States	2000-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.
	A1	Masonry additives	EFCA 2021 Concrete Admixtures - Plasticizers and Superplasticizers	Europe	2021	*Environmental Product Declaration: Concrete Admixtures – Plasticizers and Superplasticizers for CO_2 Optimized Concrete, Group C*, European Federation of Concrete Admixtures Associations (EFCA) and Deutsche Bauchemie e.V. (DBC), Declaration No. EPD-DBE-20230568-IBG2-EN, Institut Bauen und Umwelt e.V. (IBU), Mar. 6, 2024.
	A1	Grinding aids	Alkylbenzene sulfonate production, linear, petrochemical RoW (Ecoinvent 3.10)	Rest of World	1992-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.
	A1	Gypsum	Market for gypsum, mineral - RoW (Ecoinvent 3.10)	Rest of World	2017-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.
	A1	Process water	Market for tap water - RoW (Ecoinvent 3.10)	Rest of World	2012-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.

	A1	Explosives	Market for blasting	Global	2011-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.
Transportation	A2	Truck Transport (short-haul)	Transport, combination truck, short-haul, diesel powered, (adjusted Petroleum for Diesel Coproduction) Market for transport, freight, sea, container ship	United States	2024	U.S. Life Cycle Inventory Database. (2012). National Renewable Energy Laboratory. Accessed Sept. 9, 2025: https://www.lcacommons.gov/nrel/search
	A2	Truck Transport (long-haul)	Transport, combination truck, long-haul diesel powered, Northeast (adjusted petroleum for diesel coproduct)	United States	2024	U.S. Life Cycle Inventory Database. (2012). National Renewable Energy Laboratory. Accessed Sept. 9, 2025: https://www.lcacommons.gov/nrel/search
	A2	Ocean freight	Transport, ocean freighter, average fuel mix (adjusted petroleum for diesel coproduct)	United States	2024	U.S. Life Cycle Inventory Database. (2012). National Renewable Energy Laboratory. Accessed Sept. 9, 2025: https://www.lcacommons.gov/nrel/search
Electricity	A3	Electricity	RFCW EPD Power Profile 2023 (eGRID)	United States	2023	U.S. Environmental Protection Agency. *Power Profiler – eGRID*. Washington, DC: U.S. EPA, last updated Oct. 1, 2025: https://www.epa.gov/egrid/power-profiler
Energy	A3	Diesel - mobile equipment	Diesel, combusted in industrial equipment (USLCI)	United States	2003	U.S. Life Cycle Inventory Database. (2012). National Renewable Energy Laboratory. Accessed Sept. 9, 2025: https://www.lcacommons.gov/nrel/search
	A3	Gasoline - mobile equipment	Gasoline, combusted in industrial equipment (USLCI)	United States	1995-2002	U.S. Life Cycle Inventory Database. (2012). National Renewable Energy Laboratory. Accessed Sept. 9, 2025: https://www.lcacommons.gov/nrel/search
	A3	Natural gas	Heat production, natural gas, at industrial furnace >100 kW	Rest of World	2021-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.
	A3	Process water	Market for tap water	Rest of World	2012-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.
Waste/Other	A1-A3	Non-hazardous waste	Treatment of inert waste, sanitary landfill - RoW (Ecoinvent 3.10)	Rest of World	2012-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.
	A1-A3	wastewater	Treatment of wastewater, average, wastewater treatment - RoW (Ecoinvent 3.10)	Rest of World	2010-2023	ecoinvent Association. (2023). *ecoinvent database, version 3.10*. Zurich, Switzerland: ecoinvent Association.

LCA Discussion

Allocation Procedure

Allocation follows the requirements and guidance of ISO 14044:2006, Clause 4.3.4; ISO 21930:2017 section 7.2 and Smart EPD (2025) Part B Product Category Rules for Cements for Construction Version 4.0. Recycling and recycled content is modeled using the cut-off rule.

This sub-category PCR recognizes coal combustion products, other combustion ashes, granulated blast-furnace slag, silica fume, off-spec lime, mine tailings, recycled concrete fines, ponded/washed fines from grinding or crushing of aggregates, metallurgical slag, flue gas desulfurization gypsum, lime kiln dust, and cement kiln dust 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.

Cut-Off Procedure

All known energy and material flow data were included in accordance with the system boundary. Proxy data were used as needed in the model to capture all considered life cycle impacts, aligning with ISO requirements for data completeness.

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.

Results: Masonry M

Impact Assessment	Unit	A1	A2	A3	A1-A3
Global warming potential - total (GWP-total)	kg CO_2 eq	20.7	2.03	599	621
Global warming potential – fossil (GWP-fossil)	kg CO_2 eq	20.6	2.03	599	621
Global warming potential – biogenic (GWP-biogenic)	kg CO_2 eq	0.03	5.03e-4	0.02	0.06
Global warming potential – luluc (GWP-luluc)[1]	kg CO_2 eq	0.01	0	0.01	0.02
Global warming potential – cc (GWP-cc)	kg CO_2 eq	0	0	0	0
Global warming potential – s (GWP-s)	kg CO_2 eq	0	0	0	0
Global warming potential – u (GWP-u)	kg CO_2 eq	0	0	0	0
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq	1.79e-7	1.45e-8	2.42e-6	2.62e-6
Eutrophication potential - marine (EP-marine)	kg N eq	0.02	2.08e-3	0.04	0.06
Eutrophication potential - freshwater (EP-freshwater)	kg P eq	8.17e-4	1.51e-6	9.62e-4	1.74e-3
Acidification potential of soil and water sources (AP)	kg SO2 eq	0.25	0.02	0.44	0.70
Formation potential of tropospheric ozone (POCP)	kg O_3 eq	5.53	0.56	11.1	17.2
Resource Use					
Use of renewable primary energy resources (RPR_E)	MJ	15.3	0	8.23	23.5
Use of renewable primary energy resources used as raw materials (RPR_M)	MJ	0.18	0	0	0.18
Total use of renewable primary energy resources (RPR_T)	MJ	15.5	0	8.23	23.7
Use of non-renewable primary energy resources ($NRPR_E$)	MJ	199	0	390	590

Use of non-renewable primary energy resources used as raw materials ($NRPR_M$)	MJ	12	0	3,226	3,238
Total use of non-renewable primary energy resources ($NRPR_T$)	MJ	211	0	3,616	3,828
Use of secondary material (SM)	kg	0.15	0	0.44	0.59
Use of renewable secondary fuels (RSF)	MJ	4.64e-3	0	6.08e-4	5.23e-3
Use of net fresh water (FW)	m^3	1.15	0	127	128
Use of recovered energy (RE)	MJ	0.38	0	0.10	0.48
Waste & Output Flows					
Hazardous waste disposed	kg	26.3	0	1.85	28.1
Non-hazardous waste disposed	kg	21.4	0	155	176
High-level radioactive waste	kg	4.69e-5	0	6.42e-5	1.11e-4
Intermediate and low-level radioactive waste	kg	1.22 e-3	0	1.53e-4	1.37e-3
Components for reuse	kg	0	0	0	0
Materials for recycling	kg	4.70e-3	0	2.8e-3	7.5e-3
Materials for energy recovery	kg	4.49e-5	0	2.63e-5	7.12e-5

Additional Carbon Emissions and Removals: Masonry M

Parameter	Value, kg CO_2 eq
Biogenic Carbon Removal from Product	0
Biogenic Carbon Emission from Product	0
Biogenic Carbon Removal from Packaging	0
Biogenic Carbon Emission from Packaging	0
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	0
Calcination Carbon Emissions	306
Carbonation Carbon Removals	0
Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	0
Global Warming Potential - Carbon Capture	0
Global Warming Potential - Sequestration	0
Global Warming Potential - Utilization	0
Global Warming Potential - Carbon Capture, Utilization, and Sequestration	Same as GWP-total for all products

GWP Impact Reporting for Different Processes: Masonry M

Impact Category		Unit	Primary Fuels Combustion	Alternative Fuels Combustion	Calcination	Other	GWP-CC	GWP-S	GWP-U	GWP-CC US
GWP	Fossil	kg CO2 eq	183.6	0	306	0	0	0	0	0
	Biogenic	kg CO2 eq	0	0	0	0	0	0	0	0
	Total	kg CO2 eq	183.6	0	306	0	0	0	0	0

Results: Masonry N

Impact Assessment	Unit	A1	A2	A3	A1-A3
Global warming potential - total (GWP-total)	kg CO_2 eq	13.2	1.43	374	388
Global warming potential – fossil (GWP-fossil)	kg CO_2 eq	13.1	1.43	374	388
Global warming potential – biogenic (GWP-biogenic)	kg CO_2 eq	0.02	3.55e-4	0.02	0.04
Global warming potential – luluc (GWP-luluc)*	kg CO_2 eq	9.42e-3	0	6.53e-3	0.02
Global warming potential – cc (GWP-cc)	kg CO_2 eq	0	0	0	0
Global warming potential – s (GWP-s)	kg CO_2 eq	0	0	0	0
Global warming potential – u (GWP-u)	kg CO_2 eq	0	0	0	0
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq	1.14e-7	1.03e-8	1.48e-6	1.61e-6
Eutrophication potential - marine (EP-marine)	kg N eq	0.02	1.47e-3	0.02	0.04
Eutrophication potential - freshwater (EP-freshwater)	Kg P eq	6.22e-4	1.06e-6	4.21e-5	6.65e-4
Acidification potential of soil and water sources (AP)	kg SO2 eq	0.21	0.01	0.27	0.50
Formation potential of tropospheric ozone (POCP)	kg O_3 eq	4.78	0.40	6.83	12.0
Resource Use					
Use of renewable primary energy resources (RPR_E)	MJ	10.7	0	5.12	15.8
Use of renewable primary energy resources used as raw materials (RPR_M)	MJ	0.17	0	0	0.17
Total use of renewable primary energy resources (RPR_T)	MJ	10.9	0	5.12	16.0
Use of non-renewable primary energy resources ($NRPR_E$)	MJ	138	0	234	371
Use of non-renewable primary energy resources used as raw materials ($NRPR_M$)	MJ	9.89	0	1908	1918
Total use of non-renewable primary energy resources ($NRPR_T$)	MJ	148	0	2,142	2,289
Use of secondary material (SM)	kg	0.10	0	0.27	0.36
Use of renewable secondary fuels (RSF)	MJ	3.42e-3	0	3.66e-4	3.79e-3
Use of net fresh water (FW)	m^3	0.69	0	80.3	81.0
Use of recovered energy (RE)	MJ	0.23	0	0.06	0.29
Waste & Output Flows					
Hazardous waste disposed	kg	15.6	0	1.12	16.7
Non-hazardous waste disposed	kg	14.0	0	143	157
High-level radioactive waste	kg	2.89e-5	0	3.94e-5	6.83e-5
Intermediate and low-level radioactive waste	kg	1.06e-3	0	9.38e-5	1.15e-3
Components for reuse	kg	0	0	0	0
Materials for recycling	kg	3.46e-3	0	1.87e-3	5.33e-3
Materials for energy recovery	kg	2.83e-5	0	1.57e-5	4.41e-5

* 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.

Additional Carbon Emissions and Removals: Masonry N

Parameter	Value, kg CO_2 eq
Biogenic Carbon Removal from Product	0
Biogenic Carbon Emission from Product	0

Biogenic Carbon Removal from Packaging	0
Biogenic Carbon Emission from Packaging	0
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	0
Calcination Carbon Emissions	181
Carbonation Carbon Removals	0
Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	0
Global Warming Potential - Carbon Capture	0
Global Warming Potential - Sequestration	0
Global Warming Potential - Utilization	0
Global Warming Potential - Carbon Capture, Utilization, and Sequestration	Same as GWP-total for all products

GWP Impact Reporting for Different Processes: Masonry N

Impact Category		Unit	Primary Fuels Combustion	Alternative Fuels Combustion	Calcination	Other	GWP-CC	GWP-S	GWP-U	GWP-CC US
GWP	Fossil	kg CO2 eq	108.6	0	181	0	0	0	0	0
	Biogenic	kg CO2 eq	0	0	0	0	0	0	0	0
	Total	kg CO2 eq	108.6	0	181	0	0	0	0	0

Results: Masonry S

Impact Assessment	Unit	A1	A2	A3	A1-A3
Global warming potential - total (GWP-total)	kg CO_2 eq	16.1	1.68	462	479
Global warming potential – fossil (GWP-fossil)	kg CO_2 eq	16.1	1.68	462	479
Global warming potential – biogenic (GWP-biogenic)	kg CO_2 eq	0.02	1.72e-3	0.03	0.05
Global warming potential – luluc (GWP-luluc)*	kg CO_2 eq	0.01	0	8.16e-3	0.02
Global warming potential – cc (GWP-cc)	kg CO_2 eq	0	0	0	0
Global warming potential – s (GWP-s)	kg CO_2 eq	0	0	0	0
Global warming potential – u (GWP-u)	kg CO_2 eq	0	0	0	0
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq	1.40e-7	1.20e-8	1.85e-6	2.00e-6
Eutrophication potential - marine (EP-marine)	kg N eq	0.05	0.02	1.72e-3	0.03
Eutrophication potential - freshwater (EP-freshwater)	Kg P eq	7.00e-4	1.25e-6	3.86e-4	1.09e-3
Acidification potential of soil and water sources (AP)	kg SO2 eq	0.23	0.01	0.34	0.58
Formation potential of tropospheric ozone (POCP)	kg O_3 eq	5.09	0.47	8.5	14.1
Resource Use					
Use of renewable primary energy resources (RPR_E)	MJ	12.1	0	6.34	18.5
Use of renewable primary energy resources used as raw materials (RPR_M)	MJ	0.15	0	0	0.15
Total use of renewable primary energy resources (RPR_T)	MJ	12.3	0	6.34	18.7

Use of non-renewable primary energy resources ($NRPR_E$)	MJ	158	0	295	453
Use of non-renewable primary energy resources used as raw materials ($NRPR_M$)	MJ	9.66	0	2,423	2,432
Total use of non-renewable primary energy resources ($NRPR_T$)	MJ	168	0	2,718	2,885
Use of secondary material (SM)	kg	0.12	0	0.33	0.45
Use of renewable secondary fuels (RSF)	MJ	3.90e-3	0	4.61e-4	4.36e-3
Use of net fresh water (FW)	m^3	0.87	0	98.7	99.6
Use of recovered energy (RE)	MJ	0.29	0	0.08	0.36
Waste & Output Flows					
Hazardous waste disposed	kg	19.8	0	1.4	21.2
Non-hazardous waste disposed	kg	16.9	0	148	165
High-level radioactive waste	kg	3.6e-5	0	4.91e-5	8.51e-5
Intermediate and low-level radioactive waste	kg	9.95e-4	0	1.17e-4	1.11e-3
Components for reuse	kg	0	0	0	0
Materials for recycling	kg	3.95e-3	0	2.23e-3	6.18e-3
Materials for energy recovery	kg	3.48e-5		1.99e-5	5.47e-5

Additional Carbon Emissions and Removals: Masonry S

Parameter	Value, kg CO_2 eq
Biogenic Carbon Removal from Product	0
Biogenic Carbon Emission from Product	0
Biogenic Carbon Removal from Packaging	0
Biogenic Carbon Emission from Packaging	0
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	0
Calcination Carbon Emissions	230
Carbonation Carbon Removals	0
Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	0
Global Warming Potential - Carbon Capture	0
Global Warming Potential - Sequestration	0
Global Warming Potential - Utilization	0
Global Warming Potential - Carbon Capture, Utilization, and Sequestration	Same as GWP-total for all products

GWP Impact Reporting for Different Processes: Masonry S

Impact Category		Unit	Primary Fuels Combustion	Alternative Fuels Combustion	Calcination	Other	GWP-CC	GWP-S	GWP-U	GWP-CC US
GWP	Fossil	kg CO2 eq	138	0	230	0	0	0	0	0
	Biogenic	kg CO2 eq	0	0	0	0	0	0	0	0
	Total	kg CO2 eq	138	0	230	0	0	0	0	0

Results: Type IL

Impact Assessment	Unit	A1	A2	A3	A1-A3
Global warming potential - total (GWP-total)	kg CO_2 eq	28.1	2.95	766	797
Global warming potential – fossil (GWP-fossil)	kg CO_2 eq	28.1	2.95	766	797
Global warming potential – biogenic (GWP-biogenic)	kg CO_2 eq	0.05	7.29e-4	0.03	0.08
Global warming potential – luluc (GWP-luluc)*	kg CO_2 eq	0.02	0	0.01	0.03
Global warming potential – cc (GWP-cc)	kg CO_2 eq	0	0	0	0
Global warming potential – s (GWP-s)	kg CO_2 eq	0	0	0	0
Global warming potential – u (GWP-u)	kg CO_2 eq	0	0	0	0
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq	2.61e-7	2.11e-8	3.32e-6	3.6e-6
Eutrophication potential - marine (EP-marine)	kg N eq	0.02	3.01e-3	0.05	0.07
Eutrophication potential - freshwater (EP-freshwater)	Kg P eq	1.16e-3	2.19e-6	1.77e-3	2.93e-3
Acidification potential of soil and water sources (AP)	kg SO2 eq	0.29	0.02	0.55	0.87
Formation potential of tropospheric ozone (POCP)	kg O_3 eq	6.16	0.82	14.5	21.5
Resource Use					
Use of renewable primary energy resources (RPR_E)	MJ	16.3	0	11.1	27.4
Use of renewable primary energy resources used as raw materials (RPR_M)	MJ	0	0	0	0
Total use of renewable primary energy resources (RPR_T)	MJ	16.3	0	11.1	27.4
Use of non-renewable primary energy resources ($NRPR_E$)	MJ	229	0	603	832
Use of non-renewable primary energy resources used as raw materials ($NRPR_M$)	MJ	18.3	0	4,336	4,355
Total use of non-renewable primary energy resources ($NRPR_T$)	MJ	247.3	0	4,939	5,187
Use of secondary material (SM)	kg	0.21	0	0.59	0.80
Use of renewable secondary fuels (RSF)	MJ	5.76e-3	0	8.23e-4	6.58e-3
Use of net fresh water (FW)	m^3	1.53	0	166	168
Use of recovered energy (RE)	MJ	0.54	0	0.14	0.67
Waste & Output Flows					
Hazardous waste disposed	kg	35.3	0	2.5	37.8
Non-hazardous waste disposed	kg	28.9	0	164	192
High-level radioactive waste	kg	6.43e-5	0	8.64e-5	1.51e-4
Intermediate and low-level radioactive waste	kg	1.70e-4	0	2.06e-4	3.77e-4
Materials for recycling	kg	6.04e-3		3.72e-3	9.76e-3

Additional Carbon Emissions and Removals: Type IL

Parameter	Value, kg CO_2 eq
Biogenic Carbon Removal from Product	0
Biogenic Carbon Emission from Product	0
Biogenic Carbon Removal from Packaging	0
Biogenic Carbon Emission from Packaging	0
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	0
Calcination Carbon Emissions	411

Carbonation Carbon Removals	0
Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	0
Global Warming Potential - Carbon Capture	0
Global Warming Potential - Sequestration	0
Global Warming Potential - Utilization	0
Global Warming Potential - Carbon Capture, Utilization, and Sequestration	Same as GWP-total for all products

GWP Impact Reporting for Different Processes: Type IL

Impact Category		Unit	Primary Fuels Combustion	Alternative Fuels Combustion	Calcination	Other	GWP-CC	GWP-S	GWP-U	GWP-CC US
GWP	Fossil	kg CO2 eq	247	0	411	0	0	0	0	0
	Biogenic	kg CO2 eq	0	0	0	0	0	0	0	0
	Total	kg CO2 eq	247	0	411	0	0	0	0	0

Results: Type III

Impact Assessment	Unit	A1	A2	A3	A1-A3
Global warming potential - total (GWP-total)	kg CO_2 eq	30.5	3.71	858	892
Global warming potential – fossil (GWP-fossil)	kg CO_2 eq	30.5	3.71	858	892
Global warming potential – biogenic (GWP-biogenic)	kg CO_2 eq	0.05	9.19e-4	0.03	0.08
0Global warming potential – luluc (GWP-luluc)[1]	kg CO_2 eq	0.02	0	0.02	0.04
Global warming potential – cc (GWP-cc)	kg CO_2 eq	0	0	0	0
Global warming potential – s (GWP-s)	kg CO_2 eq	0	0	0	0
Global warming potential – u (GWP-u)	kg CO_2 eq	0	0	0	0
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq	2.85e-7	2.66e-8	3.47e-6	3.78e-6
Eutrophication potential - marine (EP-marine)	kg N eq	0.02	3.8e-3	0.05	0.08
Eutrophication potential - freshwater (EP-freshwater)	Kg P eq	1.25e-3	2.75e-6	1.95e-3	3.2e-3
Acidification potential of soil and water sources (AP)	kg SO2 eq	0.30	0.03	0.62	0.95
Formation potential of tropospheric ozone (POCP)	kg O_3 eq	6.33	1.03	16.0	23.3
Resource Use					
Use of renewable primary energy resources (RPR_E)	MJ	17.6		11.7	29.3
Use of renewable primary energy resources used as raw materials (RPR_M)	MJ	0	0	0	0
Total use of renewable primary energy resources (RPR_T)	MJ	17.6		11.7	29.3
Use of non-renewable primary energy resources ($NRPR_E$)	MJ	250		564	814
Use of non-renewable primary energy resources used as raw materials ($NRPR_M$)	MJ	19.5		4,682	4,702
Total use of non-renewable primary energy resources ($NRPR_T$)	MJ	270		5,246	5,516
Use of secondary material (SM)	kg	0.23		0.63	0.86
Use of renewable secondary fuels (RSF)	MJ	6.07e-3		8.76e-4	6.95e-3

Use of non-renewable secondary fuels (NRSF)	MJ				
Abiotic depletion potential - fossil (ADP-fossil)	MJ				
Use of net fresh water (FW)	m^3	1.65		178	180
Use of recovered energy (RE)	MJ	0.58		0.14	0.72
Waste & Output Flows					
Hazardous waste disposed	kg	38.1		2.65	40.8
Non-hazardous waste disposed	kg	31.1		164	196
High-level radioactive waste	kg	6.97e-5		9.17e-5	1.61e-4
Intermediate and low-level radioactive waste	kg	1.85e-4		2.19e-4	4.04e-4
Components for reuse	kg				
Materials for recycling	kg	6.43e-3		3.82e-3	0.01
Materials for energy recovery	kg	7.22e-5		3.80e-5	1.10e-4

Additional Carbon Emissions and Removals: Type III

Parameter	Value, kg CO_2 eq
Biogenic Carbon Removal from Product	0
Biogenic Carbon Emission from Product	0
Biogenic Carbon Removal from Packaging	0
Biogenic Carbon Emission from Packaging	0
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	0
Calcination Carbon Emissions	444
Carbonation Carbon Removals	0
Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	0
Global Warming Potential - Carbon Capture	0
Global Warming Potential - Sequestration	0
Global Warming Potential - Utilization	0
Global Warming Potential - Carbon Capture, Utilization, and Sequestration	Same as GWP-total for all products

GWP Impact Reporting for Different Processes: Type III

Impact Category		Unit	Primary Fuels Combustion	Alternative Fuels Combustion	Calcination	Other	GWP-CC	GWP-S	GWP-U	GWP-CC US
GWP	Fossil	kg CO2 eq	267	0	444	0	0	0	0	0
	Biogenic	kg CO2 eq	0	0	0	0	0	0	0	0
	Total	kg CO2 eq	267	0	444	0	0	0	0	0

Additional information for reporting transport from cement plant gate

Plant/Gate Location	Percent of Supply	Transport Mode (Leg 1)	Distance and Unit	End User or Terminal Location
Mitchell, IN	42%	Rail	134 mi	Anderson, IN
Mitchell, IN	58%	Truck	129 mi	Anderson, IN
Mitchell, IN	100%	Rail	314 mi	Apple Grove, WV
Mitchell, IN	100%	Rail	179 mi	Bowling Green, OH
Mitchell, IN	100%	Rail	712 mi	Burnsville, MN
Mitchell, IN	100%	Truck	204 mi	Decatur, IL
Mitchell, IN	80%	Rail	125 mi	Cincinnati, OH
Mitchell, IN	20%	Truck	144 mi	Cincinnati, OH
Mitchell, IN	100%	Rail	544 mi	College Park, GA
Mitchell, IN	100%	Rail	308 mi	Columbus, OH
Mitchell, IN	100%	Rail	427 mi	Flint, MI
Mitchell, IN	100%	Rail	375 mi	Lodi, OH
Mitchell, IN	100%	Rail	409 mi	Middlebranch, OH
Mitchell, IN	100%	Rail	423 mi	Nitro, WV
Mitchell, IN	100%	Rail	410 mi	Parkersburg, WV
Mitchell, IN	100%	Rail	336 mi	Plainfield, IL
Mitchell, IN	8%	Rail	79 mi	Speed, IN
Mitchell, IN	92%	Truck	53 mi	Speed, In
Mitchell, IN	100%	Rail	883 mi	Jacksonville, FL
Mitchell, IN	100%	Truck	136 mi	Wilder, KY
Mitchell, IN	100%	Rail	855 mi	Worthington, MN

Additional Environmental Information

Environmental Management System (EMS)

The Mitchell Plant has an EMS in place. The EMS identifies environmental impacts and compliance requirements and ensures that these are continually updated to reflect current environmental knowledge and regulations. Environmental requirements are documented in the EMS which serves as a reference and provides operating personnel with relevant information and compliance deadlines. For environmental reporting the plant complies with the U.S. EPA and Indiana Department of Environmental Management requirements:

- Toxics Release Inventory (TRI) Program
- Greenhouse Gas Reporting Program
- Portland Cement MACT (40 CFR 63 Subpart LLL) Semi-annual Reporting
- Air Permit Compliance Monitoring Reporting, Compliance Certification, Emission Statement
- Toxic Substances Control Act (TSCA) Chemical Data Reporting
- NPDES Discharge Monitoring Reports

Air Permit

The Mitchell Plant has been issued a Part 70 Title V Operating Permit from the Indiana Department of Environmental Management's Office of Air Quality. The permit details all state and federal regulations and pollution control requirements applicable to the Mitchell Plant.

Oil, Used Oil, Waste Chemicals, and Anti-Freeze

The Mitchell Plant stores these materials and wastes in appropriate storage containers in a containment area and in compliance with Spill Containment, Control and Countermeasure (SPCC) requirements. The facility maintains an SPCC Plan that is in compliance with all applicable regulations and has been certified by a Professional Engineer. A third-party contractor removes these wastes and properly recycles or disposes of them in accordance with Federal, State, and Local regulations. Documentation of final disposal is maintained at the Mitchell Plant.

Recycling Programs

The Mitchell Plant has instituted a recycling program to ensure that the following materials are recycled: used batteries, spent fluorescent bulbs, discarded paper, cardboard, aluminum and other scrap metals, and outdated or damaged electronic hardware and fuses. Used vehicle batteries are collected and sent off-site for recycling.

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