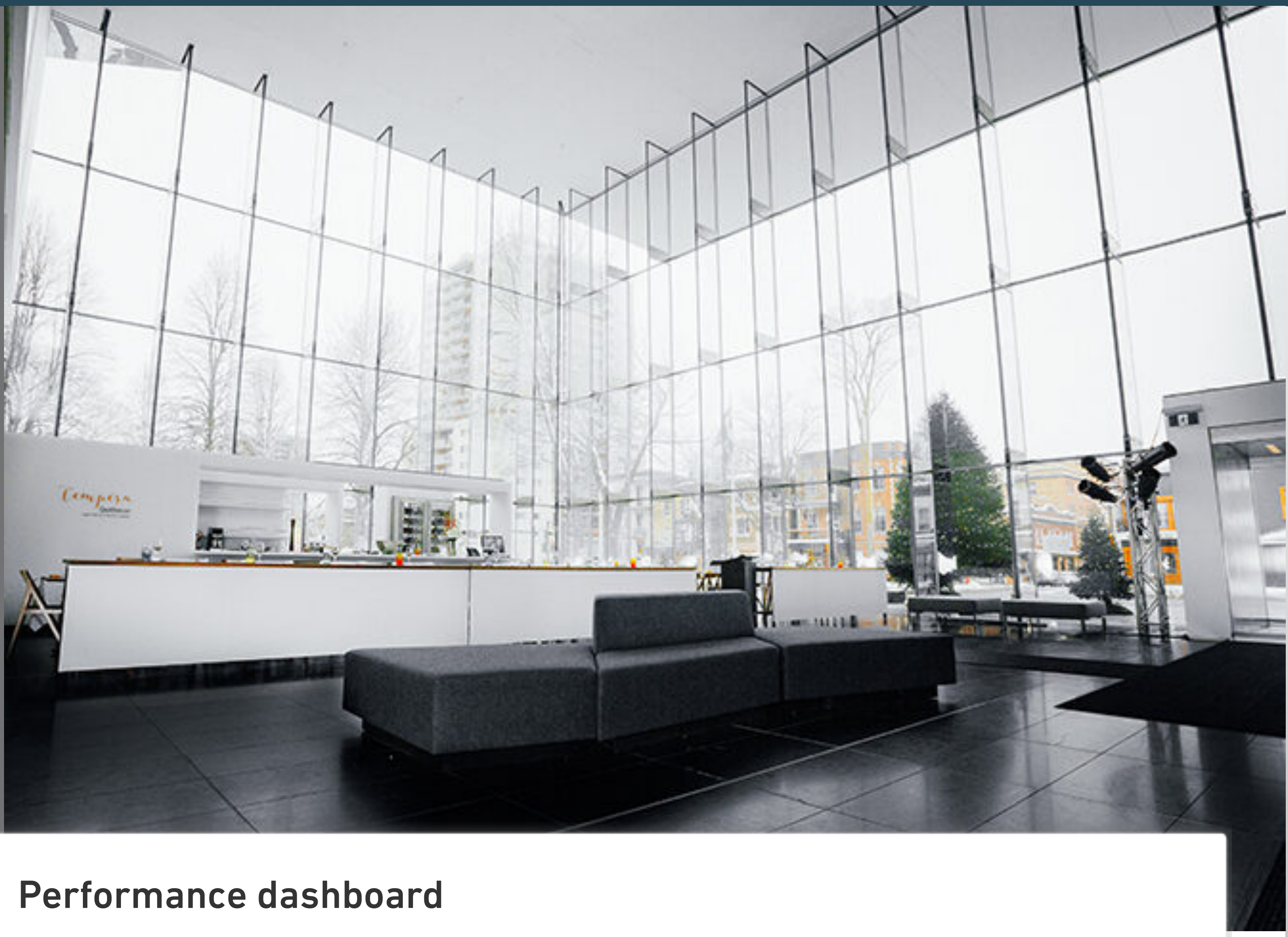
POLYCOR

Granite Floor and Pavers

Originating at the Polycor quarries and through production, granites are manufactured to tiles and pavers with a wide range of finishes. Granite is an inherently nonemitting source of VOCs and its durability allows it to perform impeccably in commercial & residential applications, interior or exterior.



Performance dashboard

Features & functionality

Covers the wide selection of Polycor's heritage granites and any surface finishes available

Covers interior flooring solutions to exterior paving products, from tiles to XL pavers

Has an unmatched durability and minimal maintenance needs

Visit Polycor for more product information

Granites
Commercial flooring
Walkways and patios
Floor tile

Environment & materials

Improved by:

Polycor's commitment to carbon neutrality translates into:

Reduction of product's GWP

Reduction of product's energy intensity

Polycor's ownship of the chain of custody from quarries to plants ensures:

No child labor and forced labor

Materials remain 100% natural, free from chemicals or dyes

Certifications & rating systems:

Environmental Product Declaration (EPD)

Natural Stone Sustainability Standard (ANSI 373)

Health Product Declaration (HPD)

MasterFormat® 09 30 33, 09 63 40, 32 14 40
Granite Floor and Pavers Guide Specs
For spec help, contact us or call 418.692.4695

See LCA, interpretation & rating systems

hpd VERSION 2.2

SM Transparency Report (EPD)™

VERIFICATION LCA
3rd-party reviewed ✔
Transparency Report (EPD)
3rd-party verified ✔

Validity: 2023/02/13 - 2028/02/13
Decl #: POL – 20230213 – 001

This environmental product declaration (EPD) was externally verified, according to ISO 21930:2017, SM Part A, and ISO 14025:2006, by Jack Geibig, President, Ecoform.

Ecoform, LLC
11903 Black Road,
Knoxville, TN 37932
www.ecoform.com
(865) 850-1883

ecoform

SUMMARY
Reference PCR
SM PCR Part B: Interior and Exterior Stone Flooring
Regions; system boundaries
North America; Cradle to grave
Functional unit / reference service life:
1 m^2 of floor covering; 75 years
LCIA methodology: TRACI 2.1
LCA software; LCI database
SimaPro Developer 9.4
EcoInvent 3.8, US-EI 2.2
LCA conducted by: Sustainable Minds
Public LCA:
Life Cycle Assessment of Natural Stone Flooring for Polycor

Polycor Inc.
76 rue Saint-Paul, Suite 100
Quebec City (Quebec), Canada G1K 3V9
418-692-4695
www.polycor.com

Contact us

LCA results & interpretation

Granite Floor and Pavers

Life cycle assessment

Scope and summary

○ Cradle to gate ○ Cradle to gate with options ✔ Cradle to grave

Product description

Granite stone flooring can be applied as interior flooring, exterior flooring, landscaping, and terracing. It tends to be durable and easy to maintain, with an elegant outlook. Granite makes up 100% of the total mass of the flooring and is used in commercial, residential, and public sector buildings.

The results in this study are presented for flooring with a thickness of 0.5 inches. However, this study applies to both interior flooring and exterior paving with a range of thicknesses and can be scaled using the scaling factors on Page 4.

Functional unit

The functional unit is **one square meter** of floor covering. The amount of granite needed to meet the functional unit is **29.79 kg**.

Manufacturing data

The data for all granite stone products were collected from Polycor's granite quarries and processing facilities covering a period of two years: January 2020 to December 2021. Data for granite quarry operations were collected from 13 quarry sites across North America and grouped as American granite quarries and Canadian granite quarries.

After granite is extracted from the quarry, it goes to a processing facility. Stone processor operations data were collected from eight Polycor granite processing sites across North America.

- **American granite plants:** three manufacturing facilities respectively in North Carolina, New Hampshire, and Maine.
- **Canadian granite plants:** five manufacturing facilities in Quebec.

Data were collected from quarries and producers mainly operating in North America (mainly the US and Canada). As such, the geographical coverage for this study is based on North American conditions.

Default installation, packaging, and disposal scenarios

Flooring is delivered at the job site ready for installation, where minor cuts may be necessary to accommodate design. Ancillary materials used in the installation of the product include mortar, grout, and acrylate. These materials are structural enhancement components used as bonding agents or fillers for joints. Wood and cardboard used as packaging to safely deliver the stone to the site is then transported to be either landfilled or recycled, following US EPA's end of life scenarios for containers and packaging. At the end of its useful life, the flooring is removed and transported to be landfilled.

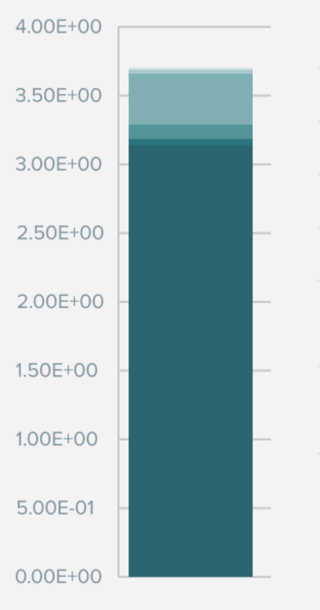
Other life cycle stages

Use of mortar during installation and periodic cleaning also generate significant impacts to the overall life cycle impacts of granite flooring. Under normal operating conditions, granite flooring only requires monthly cleaning but does not require resealing. Due to the nature of natural stone, it is anticipated that the granite flooring products will last for the lifetime of the building. The reference service life (RSL) thus meets an ESL of 75 years, and flooring will need no replacements during its service life. End-of-life stages have lower contributions to the total life cycle impacts.

Material composition greater than 1% by weight

MATERIAL	AVG % WT.
Granite	100%

Total impacts by life cycle stages [mPts/per func unit]



LIFE CYCLE STAGE	MPTS/FUNC. UNIT
Quarry and processor operations	3.15E+00
Stone transport to building sites	4.38E-02
Installation	1.20E-01
Use	3.57E-01
Deconstruction and waste transport	2.88E-02
Waste processing and end-of-life disposal	4.10E-03

What's causing the greatest impacts

All life cycle stages

For granite flooring, the cradle-to-gate stage (A1-A3) dominates the results for all impact categories except eutrophication and respiratory effects. This study assessed a multitude of inventory and environmental indicators. In addition to the six major impact categories (global warming potential, ozone depletion, acidification, smog, eutrophication, and fossil fuel depletion), additional impact categories have also been included. These six impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined, and LCA should continue making advances in their development. However, the EPD users shall not use additional measures for comparative purposes. LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Overall results are consistent with expectations for stone flooring's life cycles, with most of the impacts being generated during cradle-to-gate stages.

The primary finding, across the environmental indicators, was that cradle-to-gate stage (A1-A3) dominates the impacts due to the energy consumed at the quarries and processing plants. The processor operations (A3) stage is the highest contributor to most of the impact categories, followed by the maintenance stage (B2) and quarry operations (A1). The cradle-to-gate-stage (A1-A3) contributes to ~60% of the total impacts in all impact categories except for eutrophication and respiratory effects. The transportation of stone from quarries to processing plants, transportation of flooring from processing plants to the installation sites, and use of mortar during installation also generate significant impacts in the overall life cycle impacts of granite flooring.

Quarry operations and transport to processors

Impacts generated at quarries (A1) are mainly due to the use of grid electricity and fuels in the quarries. Other material inputs generate little impact in comparison to the electricity and fuel consumed. The transportation of granite from quarries to processing plants also generates considerable impacts in numerous impact categories.

Processor operations and transport to building sites

Manufacturing operations at granite processing plants (A3) make up the greatest impact share. Energy consumed at processors (both electricity and fuels) is responsible for the majority of impacts, while other material inputs have an insignificant contribution. The transportation of granite flooring manufactured in processor plants to the building sites also makes a significant impact on the overall life cycle impacts of granite flooring.

Sensitivity analysis

Based on the recommendation provided by Polycor, impacts for processor operations specific to a square meter of granite flooring was assumed to match the average stone processing for a square meter of granite. A sensitivity analysis was performed to check the robustness of the results when the energy consumed during processing is varied by +/-20% from the estimated used in this study. The resulting variation in the total life cycle impacts is about 15%, implying that the system is not sensitive to this assumed value.

Another parameter that affects the overall life cycle impacts is the thickness of granite flooring. The thickness of stone flooring studied varied up to 2 inches. Results have been presented for a typical interior thickness of 0.5 inches, but as the functional mass of varies with the thickness, the impacts also vary. A sensitivity analysis has thus been conducted for various thicknesses of granite flooring used for different flooring applications. For the thickness of 1.25 inches and larger, the variation in overall life cycle impacts is greater than 20%, implying that the system is sensitive to thickness value.

Natural stone is one of the lowest embodied carbon construction materials. Although we are proud of this intrinsic quality, we want to make sure that we'll never stop improving it. Our main driver is our ambitious 2025 carbon neutrality pledge. By increasing the use of renewable energy, reducing our dependency on fossil fuels, electrifying our car fleet and increasing the energy efficiency throughout our value chain, we aim to reduce our embodied carbon by 40% by the end of 2025!

Beyond embodied carbon, Polycor only uses rainwater for stone extraction, recycles it, and also uses dry sawing technology in a growing number of quarry operations. In quarrying, production, installation and maintenance, natural stone lowers water use throughout its life cycle.

Polycor is the leader within the Natural Stone Sustainability Standard (ANSI 373) with 25% of our sites certified. This standard examines and verifies numerous areas of natural stone production, effectively improving the baseline for the environmental and social performance of natural stone in alignment with green building practices.

See how we make it greener

LCA results

LIFE CYCLE STAGE	A1-A3 PRODUCTION (QUARRY AND PROCESSOR OPERATIONS)	A4 STONE TRANSPORT TO BUILDING SITES	A5 INSTALLATION	B1-B7 USE	C1-C2 DECONSTRUCTION AND WASTE TRANSPORT	C3-C4 WASTE PROCESSING AND END-OF-LIFE DISPOSAL
Information modules: Included (X) | Excluded* (MND) Stages B1, B3-B7, C1, and C3 though included, have no associated activities. *Module D is excluded.	**A1 Quarry operations**	**A4 Transport to building sites**	**A5 Installation**	**B1 Use**	**C1 Deconstruction**	**C3 Waste Processing**
	A2 Transport to processors			**B2 Maintenance**	**C2 Waste transport**	**C4 End of life disposal**
	A3 Processor operations			**B3 Repair**		
				B4 Replacement		
				B5 Refurbishment		
				B6 Operational energy use		
				B6 Operational water use		
						

SM Single Score

Learn about SM Single Score results

Impacts of 1 square meter of floor covering	3.15E+00 mPts	4.38E-02 mPts	1.20E-01 mPts	3.57E-01 mPts	2.88E-02 mPts	4.10E-03 mPts
Materials or processes contributing >20% to total impacts in each life cycle stage	Energy consumed during stone quarrying and processing (electricity and fuels).	Truck transportation used to transport product to building site.	Use of ancillary materials (mainly mortar) for installation.	Soap used for periodic cleaning.	Waste transport to the landfill centers.	Landfilling after the end of life.

TRACI v2.1 results per functional unit

LIFE CYCLE STAGE		A1-A3 PRODUCTION (QUARRY AND PROCESSOR OPERATIONS)	A4 STONE TRANSPORT TO BUILDING SITES	A5 INSTALLATION	B2 MAINTENANCE	C2 WASTE TRANSPORT	C4 END-OF-LIFE DISPOSAL
Ecological damage							
Impact category	Unit						
Acidification	kg SO_2 eq	1.30E-01	3.26E-03	1.18E-02	3.31E-02	2.14E-03	7.36E-04
Eutrophication	kg N eq	1.66E-02	4.38E-04	6.90E-04	2.53E-02	2.88E-04	7.20E-05
Global warming (Embodied Carbon)	kg CO_2 eq	2.40E+01	1.04E+00	2.56E+00	3.03E-02	6.84E-01	7.62E-02
Ozone depletion	kg CFC-11 eq	1.10E-06	2.07E-07	1.23E-07	2.81E-07	1.36E-07	1.30E-08
Human health damage							
Impact category	Unit						
Carcinogenics	CTU_h	1.05E-06	4.32E-10	1.70E-08	3.57E-08	2.84E-10	2.23E-11
Non-carcinogenics	CTU_h	2.11E-06	3.91E-08	1.97E-07	3.79E-07	2.57E-08	8.83E-10
Respiratory effects	kg $PM_{2.5}$ eq	1.26E-02	2.05E-04	1.07E-03	1.31E-02	1.34E-04	9.55E-05
Smog	kg O_3 eq	3.14E+00	8.56E-02	1.70E-01	4.40E-01	5.63E-02	2.22E-02
Additional environmental information							
Impact category	Unit						
Fossil fuel depletion	MJ, LHV	2.96E+01	2.12E+00	2.46E+00	7.04E+01	1.39E+00	1.62E-01
Ecotoxicity	CTU_e	2.87E+01	5.67E-01	5.87E-01	6.22E+00	3.72E-01	7.25E-03

See the additional content required by the SM Part B for interior and exterior stone flooring on page 4 of the **Transparency Report PDF**.

References

LCA Background Report
Polycor Natural Stone Flooring LCA Background Report (public version), Polycor 2023. SimaPro Analyst 9.4, ecoinvent 3.4 database.

PCRs

ISO 21930:2017 serves as the core PCR along with EN 15804 and SM Part A.

SM Part A: Life Cycle Assessment Calculation Rules and Report Requirements, v2018
March, 2018. Document created by Joep Meijer, Naji Kasem, and Kim Lewis and is managed and maintained by the Sustainable Minds Technical Advisory Board (TAB) as outlined in ISO 14025:2006.

SM Part B: Product group definition for Interior and exterior stone flooring, 2022
April, 2022. Part B review conducted by the Sustainable Minds TAB, tab@sustainableminds.com

ISO 14025, "Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services"

Download PDF SM Transparency Report, which includes the additional EPD content required by the SM Part B.

SM Transparency Reports (TR) are ISO 14025 Type III environmental declarations (EPD) that enable purchasers and users to compare the potential environmental performance of products on a life cycle basis. They are designed to present information transparently to make the limitations of comparability more understandable. A limitation to this study is that not all manufacturers in North America participated. TRs/EPDs of products that conform to the same PCR and include the same life cycle stages, but are made by different manufacturers, may not sufficiently align to support direct comparisons. They therefore, cannot be used as comparative assertions unless the conditions defined in ISO 14025 Section 6.7.2. 'Requirements for Comparability' are satisfied. Comparison of the environmental performance of building envelope thermal insulation using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building energy use phase as instructed under the PCR. Full conformance with the PCR for stone flooring allows EPD comparability only when all stages of a life cycle have been considered, when they comply with all referenced standards, use the same sub-category PCR, and use equivalent scenarios with respect to construction works. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI data sets may lead to different results upstream or downstream of the life cycle stages declared.

Rating systems

The intent is to reward project teams for selecting products from manufacturers who have verified improved life-cycle environmental performance.

LEED BD+C: New Construction | v4 - LEED v4
Building product disclosure and optimization
Environmental product declarations

○ Industry-wide (generic) EPD	½product
✔ Product-specific Type III EPD	1 product

LEED BD+C: New Construction | v4.1 - LEED v4.1
Building product disclosure and optimization
Environmental product declarations

○ Industry-wide (generic) EPD	1 product
✔ Product-specific Type III EPD	1.5 product

BREEAM New Construction 2018
Mat 02 - Environmental impacts from construction products
Environmental Product Declarations (EPD)

○ Industry-average EPD	.5 point
○ Multi-product specific EPD	.75 points
✔ Product-specific EPD	1 point

SM Transparency Report (EPD)™

VERIFICATION	LCA
3rd-party reviewed	✔
	Transparency Report (EPD)
3rd-party verified	✔

Validity: 2023/02/13 - 2028/02/13
Decl #: POL – 20230213 – 001

This environmental product declaration (EPD) was externally verified, according to ISO 21930:2017, SM Part A, and ISO 14025:2006, by Jack Geibig, President, Ecoform.

Ecoform, LLC
11903 Black Road,
Knoxville, TN 37932
www.ecoform.com
(865) 850-1883

SUMMARY
Reference PCR
SM PCR Part B: Interior and Exterior Stone Flooring
Regions; system boundaries
North America; Cradle to grave
Functional unit / reference service life:
1 m^2 of floor covering; 75 years
LCIA methodology: TRACI 2.1
LCA software; LCI database
SimaPro Developer 9.4
EcoInvent 3.8, US-EI 2.2
LCA conducted by: Sustainable Minds
Public LCA:
Life Cycle Assessment of Natural Stone Flooring for Polycor

Polycor Inc.
76 rue Saint-Paul, Suite 100
Quebec City (Quebec), Canada G1K 3V9
418-692-4695
www.polycor.com

Contact us

How we make it greener

Granite Floor and Pavers

Collapse all

See LCA results by life cycle stage

RAW MATERIALS ACQUISITION

Natural stone quarrying process has high yields and little excess material because the stone is close to surface. It's different from metal mining, where large amounts of earth must be removed to extract very little quantities. Also, underground quarrying, which has been perfected for generations at our Eureka Quarry, reduces land use and is a practice that Polycor wishes to extend to several quarries.

In addition, few consumables are needed to extract natural stone. Contrast that with other building materials, Polycor specifically focuses on sourcing the highest grades of natural stone so that, for instance, a black granite stone, doesn't need dyes to achieve its rich color.

From the bedrock to the point of sale, Polycor maintains an unbroken ownership of the supply chain allowing it to maintain standards of quality and practice.

TRANSPORTATION

Using stone from local sources is the single biggest opportunity to reduce its embodied carbon. Since natural stone is a heavy material, the environmental impacts for transporting it end up being one of its most significant source of carbon. Natural stone is sourced world-wide and each deposit has unique aesthetic and performance characteristics so this is not always avoidable. Be sure to understand the distances between the quarry, the processing facility, sometimes the distribution centers but also the transportation mode. In most of Polycor's operations, the quarry is within miles of the processing facility.

MANUFACTURING

Manufacturing natural stone is so simple that you can sumarize it by a single action, cutting. Cutting large piece into smaller pieces ending in a finished product. Also, the beauty of natural stone products is that there is no chemical mixed within our products. Therefore, they are inherently a non-emitting source of VOCs.

Recycling water is reused several times into the manufacturing process and is compulsory to achieve ANSI 373 Standard.

There are a large variety of sizes and finishes that are commonly used for natural stone. Design teams can help reducing energy consumption in the following ways: Usage of low embodied carbon finishes such as water jet, 3D analysis to loose as few stone as possible troughout it's transformation, accepting the natural variation in the material so there is more usable material.

OTHER (USE, END OF LIFE)

Whether you think of the Egyptian pyramids, the Colosseum of Rome, the cathedrals of the European capitals or closer to us; the famous Empire State building; natural stone is the most durable, classic and timeless building material on Earth. With 100+ years of durability, natural stone lasts longer than other building construction material and projects that use natural stone require less maintenance.

Since we don't use any chemicals, natural stone products as well as excess process materials throughout the extraction and transformation phases can be reused or recycled into gravel for roads, landscaping products and even furniture and jewelry. In short, natural stone can be reused and recycled multiple times during its life cycle; the only limit is your imagination!

Nevertheless, even if natural stone ends up in a construction landfill, there will be no toxic chemicals seeping into the earth as the material degrades. It simply returns to the earth, cradle to cradle.

SM Transparency Report (EPD)™

VERIFICATION	LCA
3rd-party reviewed	✔
	Transparency Report (EPD)
3rd-party verified	✔

Validity: 2023/02/13 - 2028/02/13

Decl #: POL – 20230213 – 001

This environmental product declaration (EPD) was externally verified, according to ISO 21930:2017, SM Part A, and ISO 14025:2006, by Jack Geibig, President, Ecoform.

Ecoform, LLC
11903 Black Road,
Knoxville, TN 37932
www.ecoform.com
(865) 850-1883

SUMMARY

Reference PCR
SM PCR Part B: Interior and Exterior Stone Flooring

Regions; system boundaries
North America; Cradle to grave

Functional unit / reference service life:
1 m^2 of floor covering; 75 years

LCIA methodology: TRACI 2.1

LCA software; LCI database
SimaPro Developer 9.4
EcoInvent 3.8, US-EI 2.2

LCA conducted by: Sustainable Minds

Public LCA:
Life Cycle Assessment of Natural Stone Flooring for Polycor

Polycor Inc.
76 rue Saint-Paul, Suite 100
Quebec City (Quebec), Canada G1K 3V9
418-692-4695
www.polycor.com

Contact us

Additional EPD content required by:
SM Part B: Interior and Exterior Stone Flooring EPD Requirements

Data

Background This product-specific declaration was created by collecting product data for one square meter of granite floor covering. Material and production inputs from each quarry and processor site were used to calculate weighted averages of those inputs based on the production share of the site.

Allocation The allocation methods used were examined according to the updated allocation rules in ISO 21930:2017. Quarry inputs and outputs were divided evenly among the quarried granite by mass, and no co-product allocation was needed. Similarly, no co-product allocation was required for processor operations as well since processing data was collected from Polycor's processing plants specific to granite. The processor inputs and outputs were divided evenly among the processed stone by area.

Cut-off criteria for the inclusion of mass and energy flows are 1% of renewable primary resource (energy) usage, 1% nonrenewable primary resource (energy) usage, 1% of the total mass input of that unit process, and 1% of environmental impacts. The total of neglected input flows per module does not exceed 5% of energy usage, mass, and environmental impacts. No known flows are deliberately excluded from this declaration. Biogenic carbon is included in reported results.

Quality Primary data was collected for a time period of two years, which represents typical operations of Polycor's granite quarry and processors across North America. Inventory data is considered to have a good precision and provide a representative depiction of the industry average. Data is also considered to be complete as no know flows are deliberately excluded from this analysis other than those defined to be outside of the system boundary. Proxy and generic datasets have been used for some materials and processes, but are considered to be sufficiently representative.

Quarry and Manufacturing Plant information

Data Group	Quarry location(s)
American Granite Quarries	American Black Quarry, Elverson, PA Barre Gray Quarry, Graniteville, VT Bethel White Quarry, Bethel, VT Concord Gray Quarry, Concord, NH Mount Airy Quarry, Mount Airy, NC
Canadian Granite Quarries	Caledonia 4 Quarry, Quebec Cambrian Black Quarry, Quebec Kodiak Brown Quarry Laurentian Rose Quarry, Quebec Picasso Quarry, Quebec Saint Henry Black Quarry, Quebec Saint Sebastien Quarry, Quebec Stanstead ROA Quarry, Quebec
Data Group	**Manufacturing Plant location(s)**
American Granite Plants	Mount Airy Plant, Mount Airy, NC Concord Plant, Concord, NH Jay White Plant, Jay, ME
Canadian Granite Plants	Beaudoin Plant, Quebec Precision Plant, Quebec Rivière-à-Pierre Plant, Quebec Saint Sebastien Slab Plant, Quebec Saint Sebastien Tile Plant, Quebec

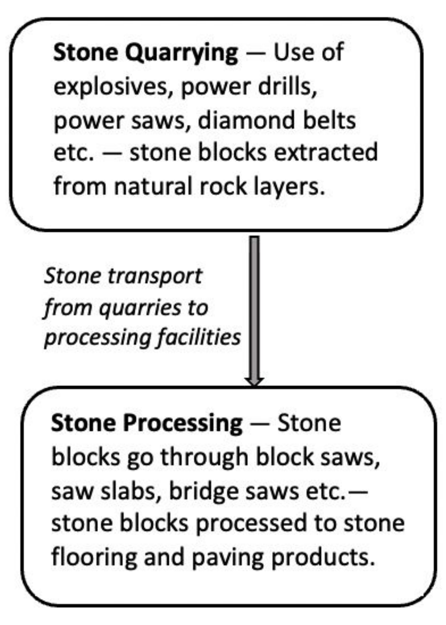
Relevant technical properties

Parameter	Unit	Test Method	Value
CSI Masterformat classification	09 30 33; 09 63 40; 32 14 40		
Stone type	Granite		
Stone grades	All grades		
Thickness to achieve functional unit	mm		12.70
Product weight	kg		29.79
Density	kg/m³		2654
Flexural strength	Mpa	C880	8.27
Modulus of rupture	MPa	C99	10.34
Compressive strength	MPa	C170	131.00
Thermal conductivity	W/m.k	C518	1.73
Thermal resistance	m.K/W	C518	0.56
Liquid water absorption	% of dry wt	C97	0.1-1.0

Major system boundary exclusions

- Capital goods and infrastructure,
- Maintenance and operation of support equipment;
- Manufacture and transport of packaging materials not associated with final product;
- Human labor and employee transport;
- Building operational energy and water use not associated with final product.

Production flow chart



Scenarios and additional technical information

Transport from Quarry to Processor (A2)

Based on the primary data, the transport distance between Polycor's granite quarry and processing facilities varies, & the weighted distance is 83 km.

Transport to the building site (A4)

Parameter	Value	Unit
Vehicle type	Lorry, 16-32 ton	
Fuel type	Diesel	
Liters of fuel	0.41	l/100 km
Distance from manufacturer to installation site	199.5	km (weighted avg)
Capacity utilization (mass based)	100	%
Gross density of products transported	2,654	kg/m³
Capacity utilization volume factor	1	

Packaging scenario assumptions

Based on EPA's 2018 data, it has been assumed that 37% of all packaging will be landfilled, with the rest recycled.

Installation into the building (A5)

It is assumed that flooring fabrication (cutting and finishing to required size) is done at the processing plants and is typically delivered to the job site ready for installation. For the minor changes necessary to accommodate changes, we have considered the use of manual equipment like hackshaws, tile cutters, handle, chisels, tile nippers etc.

Installation scrap assumed	5	%
Ancillary materials - Mortar Grout Acrylate	4.07 0.21 0.04	kg
Net freshwater consumption	0.0004	m³
Electricity consumption	0	kWh
Product loss per functional unit (scrap)	1.49	kg
Waste materials at the construction site before waste processing (stone scrap and packaging waste)	2.41	kg
Output materials from on-site waste processing	0	kg
Mass of packaging waste by type Cardboard Wood	0.009 3.29	kg
Biogenic carbon contained in packaging	6.05	kg CO_2
Direct emissions to ambient air, soil and water	0	kg
VOC emissions	0	µg/m³
Transport distance for both stone scrap and packaging waste (Diesel-powered truck/trailer)	161	km

Maintenance scenario parameters

Maintenance process information	Cleaning the surface of granite flooring	
Maintenance cycle	Monthly cleaning (900 cycles per RSL & per ESL)	
Net freshwater consumption - municipal water supply	0.09 (for entire lifetime)	m³
Ancillary materials - Soap	4.5 (for entire lifetime)	kg
Energy input during maintenance	Not necessary	

Reference service life information

Reference Service Life (RSL)	75	years
Design application parameters	Outdoor and indoor applications	
Outdoor environment	Installation as recommended by manufacturer.	
Indoor environment	Installation as recommended by manufacturer.	
Use conditions	All conditions	

End of life (C1-C4)

Assumptions for scenario development	The product is dismantled and removed from the building manually. It is transported to a local facility where it requires no further processing before final disposition.		
Collection process	Collected separately	0	kg
	Collected with mixed construction waste	33.86	kg
Recovery	Reuse	0	kg
	Recycling (0%)	0	kg
	Landfill (100%)	33.86	kg
Waste transport		161	km
Final disposal		33.86	kg
Removals of biogenic carbon (excluding packaging)		0	kg CO_2

Hazardous waste

Polycor's granite flooring does not contain substances that are identified as hazardous according to the Resource Conservation and Recovery Act (RCRA), Subtitle C.

Calcination CO_2 emissions

Although calcination and carbonation is not relevant to granite flooring products, calcination occurs during installation stage due to the use of mortar. Mortar includes cement calcination CO_2 emissions which is calculated & reported separately using a carbon intensity factor of 886 CO_2 per ton of cement (Source: U.S. Cement Industry Carbon Intensities (2019)).

Scaling factors

The results presented below have been reported for a flooring thickness of 0.5 inches. However, they may be scaled according to different thicknesses as desired using scaling factors. To calculate the results for additional thickness options, simply multiply the results by the corresponding conversion factor presented here:

Thickness	5/16"	1/2"	3/4"	1 ½"	2"	4"	5"
Conversion factor	0.625	1.0	1.5	3.0	4.0	8.0	10.0

LCIA results, resource use, output & waste flows, and carbon emissions & removals per m² of granite flooring

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	**Total**
LCIA results (per m² of granite flooring)												
Ozone depletion	kg CFC-11 eq	1.10E-06	2.07E-07	1.23E-07	0	2.81E-07	0	0	1.36E-07	0	1.30E-08	**1.86E-06**
Global warming	kg CO2 eq	2.40E+01	1.04E+00	2.56E+00	0	3.03E-02	0	0	6.84E-01	0	7.62E-02	**2.84E+01**
Smog	kg O3 eq	3.14E+00	8.56E-02	1.70E-01	0	4.40E-01	0	0	5.63E-02	0	2.22E-02	**3.91E+00**
Acidification	kg SO2 eq	1.30E-01	3.26E-03	1.18E-02	0	3.31E-02	0	0	2.14E-03	0	7.36E-04	**1.81E-01**
Eutrophication	kg N eq	1.66E-02	4.38E-04	6.90E-04	0	2.53E-02	0	0	2.88E-04	0	7.20E-05	**4.34E-02**
Carcinogenics	CTUh	1.05E-06	4.32E-10	1.70E-08	0	3.57E-08	0	0	2.84E-10	0	2.23E-11	**1.10E-08**
Non-carcinogenics	CTUh	2.11E-06	3.91E-08	1.97E-08	0	3.79E-07	0	0	2.57E-08	0	8.83E-10	**2.75E-06**
Respiratory effects	kg PM2.5 eq	1.26E-02	2.05E-04	1.07E-03	0	1.31E-02	0	0	1.34E-04	0	9.55E-05	**2.72E-02**
Ecotoxicity	CTUe	78.7%	1.6%	1.6%	0%	17.1%	0%	0%	1.0%	0%	0%	**100%**
Fossil fuel depletion	MJ surplus	2.96E+01	2.12E+00	2.46E+00	0	7.04E+00	0	0	1.39E+00	0	1.62E-01	**4.28E+01**
Resource use indicators (per m² of granite flooring)												
Renewable primary energy used as energy carrier (fuel)	MJ, LHV	1.04E+02	2.17E-02	1.48E+00	0	1.97E+02	0	0	1.43E-02	0	2.20E-03	**3.02E+02**
Renewable primary resources with energy content used as material	MJ, LHV	9.12E+01	0	0	0	0	0	0	0	0	0	**9.12E+01**
Total use of renewable primary resources with energy content	MJ, LHV	1.95E+02	2.17E-02	1.48E+00	0	1.97E+02	0	0	1.43E-02	0	2.20E-03	**3.93E+02**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, LHV	4.07E+02	1.40E+01	2.35E+01	0	7.90E+01	0	0	9.17E+00	0	1.07E+00	**5.34E+02**
Non-renewable primary resources with energy content used as material	MJ, LHV	6.00E+00	0	0	0	0	0	0	0	0	0	**6.00E+00**
Total use of non-renewable primary resources with energy content	MJ, LHV	4.13E+02	1.40E+01	2.35E+01	0	7.90E+01	0	0	9.17E+00	0	1.07E+00	**5.40E+02**
Secondary materials	kg	0	0	0	0	0	0	0	0	0	0	**0**
Renewable secondary fuels	MJ, LHV	0	0	0	0	0	0	0	0	0	0	**0**
Non-renewable secondary fuels	MJ, LHV	0	0	0	0	0	0	0	0	0	0	**0**
Recovered energy	MJ, LHV	0	0	0	0	0	0	0	0	0	0	**0**
Use of net fresh water resources	m3	3.27E+01	2.36E-03	2.21E+00	0	2.09E-01	0	0	5.15E-03	0	1.87E-04	**3.51E+01**
Output flows and waste category indicators (per m² of granite flooring)												
Hazardous waste disposed	kg	2.41E-03	0	0	0	0	0	0	0	0	0	**2.41E-03**
Non-hazardous waste disposed	kg	6.23E-01	0	2.69E+00	0	0	0	0	0	0	3.10E+01	**3.43E+01**
High-level radioactive waste, conditioned, to final repository	kg	2.59E-01	1.13E-06	3.10E-04	0	9.36E-05	0	0	7.46E-07	0	1.15E-07	**2.59E-01**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	2.71E-05	1.19E-08	5.84E-07	0	1.02E-06	0	0	7.82E-09	0	1.21E-09	**2.87E-05**
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	**0**
Materials for recycling	kg	1.76E+02	0	2.92E+00	0	0	0	0	0	0	0	**1.79E+02**
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	**0**
Exported energy	MJ, LHV	0	0	0	0	0	0	0	0	0	0	**0**
Carbon emissions and removals (per m² of granite flooring)												
Biogenic carbon removal from packaging	kg CO_2	6.05E+00	0	3.02E-01	0	0	0	0	0	0	0	**6.35E+00**
Biogenic carbon emission from packaging	kg CO_2	0	0	4.59E+00	0	0	0	0	0	0	0	**4.59E+00**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	0	0	0	0	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	1.01E+00	0	0	0	0	0	0	0	**1.01E+00**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	0	0	0	0	0	0	0	**0**