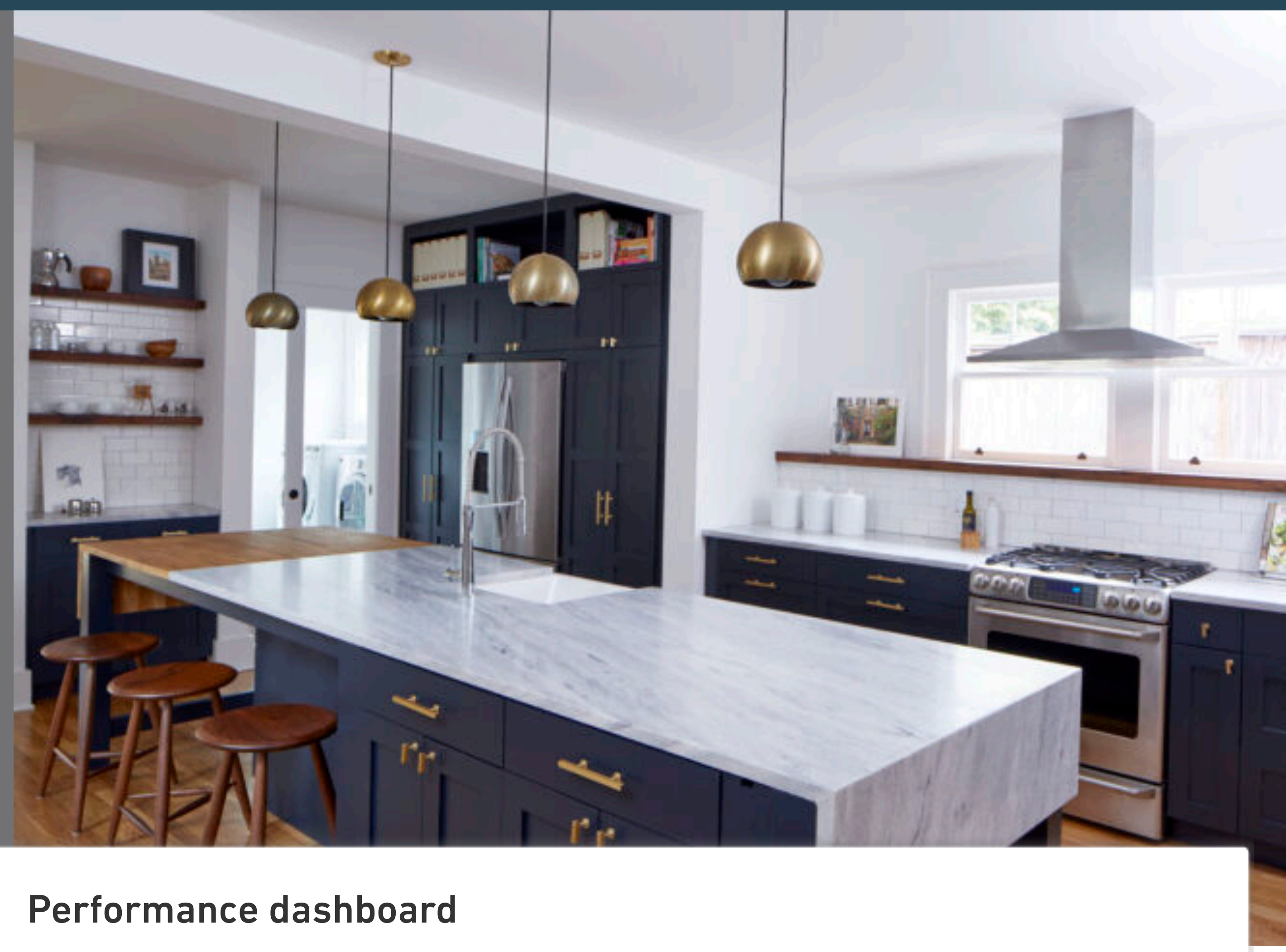
POLYCOR



# Marble Countertops

The slab of marble supplied to fabricators and dealers is a semi-processed product that can be installed in a kitchen of any other space. Polycor's top-quality countertops offer an large choice of colors & finishes. Marble being the most durable surface material, it makes sense aethetically and financially to bring this natural and healthy material on top of everything.

## Performance dashboard

### Features & functionality

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

Has an unmatched durability and minimal maintenance needs.

Includes ultra-thin countertops 1CM

**Visit Polycor for more product information**

Marbles
Countertops
Ultra-thin 1CM slabs

### Environment & materials

**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® 12 36 40**

**Marble Countertops Guide Specs**

For spec help, contact us or call 418.692.4695

See LCA, interpretation & rating systems

## SM Transparency Report (EPD)™

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

Validity: 2023/02/13 – 2028/02/12

Decl #: POL– 20230213 – 005

**This environmental product declaration (EPD) was externally verified, according to the NSF PCR and ISO 14025:2006, by Jack Geibig, President, Ecoform.**

**Ecoform, LLC**
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www.ecoform.com

(865) 850-1883

**SUMMARY**

**Reference PCR**
NSF PCR For Residential Countertops

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North America; Cradle to grave

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1 $m^2$ of natural stone countertops; 10 years

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**LCA software; LCI database**
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EcoInvent 3.8, US-EI 2.2

**LCA conducted by:** Sustainable Minds

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Contact us

# LCA results & interpretation

Marble Countertops

Life cycle assessment

## Scope and summary

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

### Product description

Countertops refer to raised, flat, and horizontal surfaces, built for work mainly in kitchens, bathrooms, and workrooms. This surface is mostly supported by cabinets and is positioned at a suitable height for the user to perform the intended tasks. Countertops processed and fabricated by Polycor are made of natural stone, and the stone type included in this report is marble.

The results in this study are presented for countertops with a thickness of 29.36mm. However, this study applies to countertops 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 countertops for a service life of 10 years in residential use, including a front edge and a backsplash. The amount of marble needed to meet the functional unit is **82.75 kg**.

### Manufacturing data

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

After marble is extracted from the quarry, it goes to a processing facility. Stone processor operations data were collected from one Polycor marble processing site in North America. NSI resources and other literature data were used to develop estimates or assumptions for other upstream or downstream activities where necessary.

### Default installation, packaging, and disposal scenarios

Countertops are delivered at the job site ready for installation, where minor cuts may be necessary to accommodate design. Drills and grinders are typically used for install. Ancillary materials used in the installation of the product include adhesives, resins, acrylics, sealers, and silicones. 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 countertop is removed and transported to be either landfilled (31.5%) or recycled (68.5%).

### Other life cycle stages

**Installation impacts are driven by the use of fuels and electricity during installation (A5), and it results in significant impacts.**

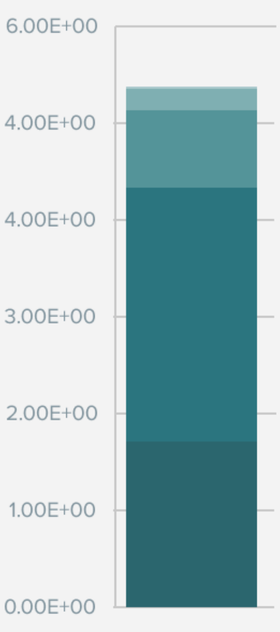
**For maintenance (B2),** marble countertops require monthly cleaning and resealing every five years under normal operating conditions. These maintenance activities also have significant impacts on the total life cycle impacts.

Due to the nature of natural stone, it is anticipated that marble countertops will last for a service life of 10 years. End-of-life stages have lower contributions on the total life cycle impacts.

### Material composition greater than 1% by weight

| MATERIAL | % WEIGHT |
|---|---|
| Marble | 100% |

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




| LIFE CYCLE STAGE | MPTS/FUNC. UNIT |
|---|---|
| Material acquisition and pre-processing | 1.73E+00 |
| Construction | 2.60E+00 |
| Installation | 8.15E-01 |
| Use and maintenance | 2.39E-01 |
| End of life | 1.88E-02 |

## What's causing the greatest impacts

### All life cycle stages

**For the marble flooring product, the cradle-to-gate stage (A1-A3) dominates the results for all the impact categories.** 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.

For granite countertops, the cradle-to-gate stages (A1-A3) dominates the results for all the impact categories. The construction stage (A3) dominates the results, followed by the quarry operation (A1) stage, the next highest impact contributor to five out of ten categories. The cradle-to-gate stage (A1-A3) contributes to over 60% of the total impacts in all impact categories. Installation of countertops (A5) and maintenance (B2) also make considerable impacts, but the end-of-life (C) stage has insignificant contribution to the overall impacts.

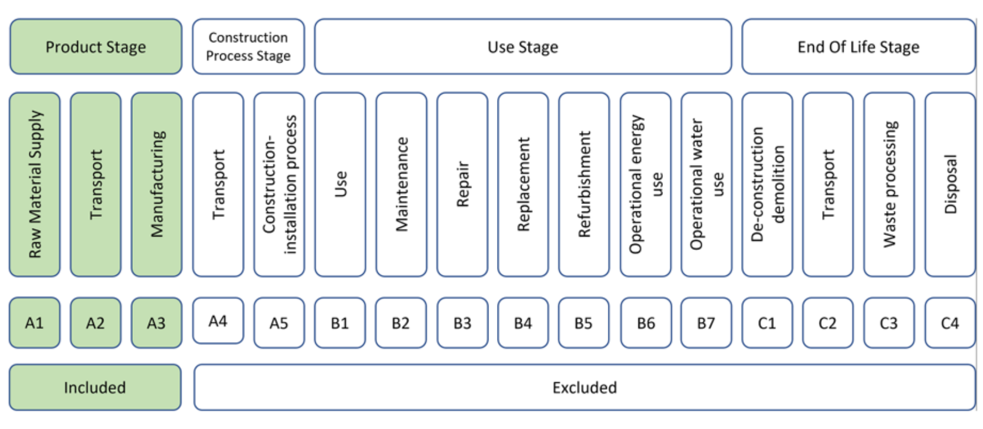
The overall results are consistent with expectations for stone countertop products' life cycles, as these products are not associated with energy consumption during their use stage.

### Quarry operations and transport to processors

**Impacts generated at marble 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 marble from quarries to processing plants generates considerable impacts in numerous impact categories.

### Construction and transport to building sites

**For marble countertops, construction (A3) stage is the highest contributor to most of the impact categories.** Energy consumed at the construction sites, including both processors and fabricators, is responsible for the majority of impacts, while other material inputs have little contribution. Transporting countertops from fabricators includes not only the shipment of countertops to the building sites, but also the initial visit for site measurements, which also makes significant contributions to overall impacts.




### Sensitivity analysis

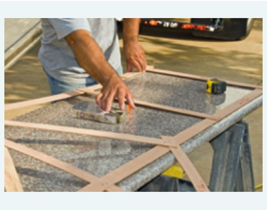
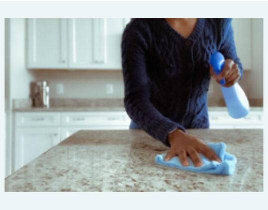
Based on the recommendation provided by Polycor, impacts for processor operations specific to a $m^2$ of marble countertops was calculated to be 10% more than the average stone processing for $m^2$ of other marble products as they go through heavy polishing than other stone products and consume 10% more energy. A sensitivity analysis was performed to check the robustness of the results when the energy consumed is +-20% of the estimate used in this study. The resulting variation in the potential $CO_2$ equivalent emissions and fossil fuel depletion impacts was ~11%. But the variation in total life cycle impacts of marble countertops is just ~6% for the two impacts.

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.

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.

## LCA results

| LIFE CYCLE STAGE | MATERIAL ACQUISITION AND PRE-PROCESSING | CONSTRUCTION | INSTALLATION | USE AND MAINTENANCE | END-OF-LIFE |
|---|---|---|---|---|---|
| **Information modules: Included** \| Stages B1, B3-B7, C1, C3, and D have no associated activities and are not applicable for this study. | **A1 Quarry operations** | **A3 Construction** | **A4 Transport to building sites** | **B2 Maintenance** | **C2 Waste transport** |
| | **A2 Transport to processors** | | **A5 Installation** | | **C4 Disposal** |
| |  |  |  |  |  |

## SM Single Score

Learn about SM Single Score results

| Impacts of 1 square meter of natural stone countertop | 1.73E+00 mPts | 2.60E+00 mPts | 8.15E-01 mPts | 2.39E-01 mPts | 1.88E-02 mPts |
|---|---|---|---|---|---|
| **Materials or processes contributing >20% to total impacts in each life cycle stage** | Energy consumed during stone quarrying (electricity and fuels). | Energy consumed during stone processing and fabrication (electricity and fuels). | Use of ancillary materials (adhesives) for installation and transport of product to building site. | Material consumed for maintenance. | Waste transport to end-of-life centers. |

## TRACI v2.1 results per functional unit

| LIFE CYCLE STAGE | | MATERIAL ACQUISITION AND PRE-PROCESSING | CONSTRUCTION | INSTALLATION | USE AND MAINTENANCE | END-OF-LIFE |
|---|---|---|---|---|---|---|
| **Ecological damage** | | | | | | |
| Impact category | Unit | | | | | |
| **Acidification** | kg $SO_2$ eq | 1.56E-01 | 1.15E-01 | 6.74E-02 | 2.14E-02 | 1.76E-03 |
| **Eutrophication** | kg N eq | 1.70E-02 | 2.86E-02 | 5.82E-03 | 1.48E-02 | 2.14E-04 |
| **Global warming (Embodied carbon)** | kg $CO_2$ eq | 2.32E+01 | 4.29E+01 | 9.80E+00 | 5.68E-01 | 4.28E-01 |
| **Ozone depletion** | kg CFC-11 eq | 1.50E-06 | 2.97E-06 | 1.18E-06 | 4.85E-07 | 8.32E-08 |
| **Human health damage** | | | | | | |
| Impact category | Unit | | | | | |
| **Carcinogenics** | $CTU_h$ | 2.21E-07 | 3.90E-07 | 1.29E-07 | 2.52E-08 | 1.70E-10 |
| **Non-carcinogenics** | $CTU_h$ | 1.92E-06 | 2.65E-06 | 8.38E-07 | 2.67E-07 | 1.43E-08 |
| **Respiratory effects** | kg $PM_{2.5}$ eq | 2.21E-02 | 5.66E-02 | 2.88E-03 | 8.03E-03 | 1.52E-04 |
| **Smog** | kg $O_3$ eq | 4.40E+00 | 1.46E+00 | 1.95E+00 | 2.85E-01 | 4.84E-02 |
| **Additional environmental information** | | | | | | |
| Impact category | Unit | | | | | |
| **Fossil fuel depletion** | MJ, LHV | 3.80E+01 | 6.62E+01 | 2.09E+01 | 4.99E+00 | 8.74E-01 |
| **Ecotoxicity** | $CTU_e$ | 3.09E+01 | 1.75E+01 | 1.43E+01 | 3.89E+00 | 2.03E-01 |

See the additional content required by the NSF PCR for residential countertops on page 4 of the **Transparency Report PDF**.

## References

**LCA Background Report**
Polycor Natural Stone Flooring LCA Background Report (public version), Polycor 2022. SimaPro Analyst 9.4, ecoinvent 3.4 database.

**PCRs**

**NSF PCR for residential countertops**
PCR review conducted by Evan Griffing, Ph.D.; Thomas P. Gloria, Ph.D.; and Jack Geibig.

**ISO 14025, "Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services", ISO 21930:2017**

**Download PDF** SM Transparency Report, which includes the additional EPD content required by the NSF PCR.

**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.** This EPD was not written to support comparative assertions. Even for similar products, differences in functional unit, use and end-of-life stage assumptions, and data quality may produce incomparable results. It is not recommended to compare EPDs with another organization as there may be differences in methodology, assumptions, allocation methods, data quality such as variability in datasets, and results of variability in assessment software tools used. 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.

## 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) |
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Validity: 2023/02/13 – 2028/02/12
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Contact us

# How we make it greener

Marble Countertops

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)™

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|---|---|
| 3rd-party reviewed | ✔ |
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# Additional EPD content required by:
# NSF PCR For Residential Countertops

Marble Countertops

## Data

**Background** This product-specific declaration was created by collecting product data for one square meter of natural stone countertops. Material and production inputs from each of Polycor's quarry and processor sites were used to calculate weighted averages of those inputs based on the production share of the site. industry average data for countertop fabrication was also used.

**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 marble 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 marble. 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 marble 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.

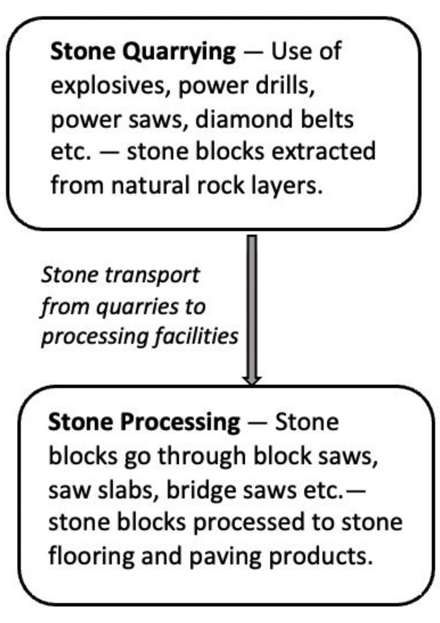
### Relevant technical properties

| Parameter | Unit | Test Method | Value |
|---|---|---|---|
| CSI Masterformat classification | 12 36 40 | | |
| Stone type | Marble | | |
| Stone grades | All grades | | |
| Thickness to achieve functional unit | mm | | 29.36 |
| Product weight | kg | | 82.75 |
| Density | $kg/m^3$ | | 2,699 |
| Flexural strength | Mpa | C880 | 6.89 |
| Modulus of rupture | MPa | C99 | 6.89 |
| Compressive strength | MPa | C170 | 51.71 |
| Thermal conductivity | W/m.k | C518 | 2.07 |
| Thermal resistance | m.K/W | C518 | 0.49 |
| 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 marble quarry and processing facilities varies, & the weighted distance is 157 km. For the quarries who had no primary information, a conservative stone transportation distance of 100 km via truck & trailer was assumed.

### Transport to the building site (A4)

| Parameter | Value | Unit |
|---|---|---|
| Vehicle type | Passenger car<br>Lorry, 16-32 ton | |
| Fuel type | Petrol (for initial visit)<br>Diesel (for countertop transport) | |
| Liters of fuel | 0.41 | l/100 km |
| Distance from manufacturer to installation site<br>Initial visit<br>Delivery of the countertop | <br>80<br>80 | km (weighted avg) |
| Capacity utilization (mass based) | 100 | % |
| Gross density of products transported | 2,699 | $kg/m^3$ |
| Capacity utilization volume factor | 1 | |

### Installation into the building (A5)

It is assumed that countertop fabrication (cutting and finishing to required size) is done at the processing plants and is typically delivered to the job site ready for installation. The scrap generated is insignificant and will be recycled if generated, so an installation scrap rate of 0% is assumed.

| | | |
|---|---|---|
| Installation scrap assumed | 0 | % |
| Ancillary materials -<br>Adhesive<br>Resin<br>Acrylate<br>Sealer<br>Silicone | <br>0.017<br>0.089<br>0.0005<br>0.009<br>0.078 | kg |
| Net freshwater consumption | 0 | $m^3$ |
| Power of Drills and grinders | 1.38 | kW |
| Operation time for Drills and grinders | 15 | min. |
| Packaging waste transport distance | 32 | km |
| Direct emissions to ambient air, soil and water | 0 | kg |
| VOC emissions | 0 | $\mu g/m^3$ |

### Maintenance scenario parameters (B1-B7)

| | | |
|---|---|---|
| Maintenance process information | Cleaning the surface of marble countertops | |
| Maintenance cycle | Weekly cleaning (520 cycles per RSL)<br>Resealing every 5 years (2 cycles per RSL) | |
| Net freshwater consumption - municipal water supply | 52 (for entire lifetime) | Liter |
| Ancillary materials - Soap<br>Silicone sealant | 2.6 (for entire lifetime)<br>0.165 (for each cycle) | kg |
| Energy input during maintenance | Not necessary | |

### Reference service life information

| | | |
|---|---|---|
| Reference Service Life (RSL) | 10 | years |
| Design application parameters | Indoor applications | |
| 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. | | |
| Disposal scenarios | Recycling | 68.5 | % |
| | Landfill | 31.5 | % |
| Waste transport | | 32 | km |
| Removals of biogenic carbon (excluding packaging) | | 0 | kg $CO_2$ |

### Hazardous waste

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

## Scaling factors

The results presented below have been reported to 1.156 inches (29.36 mm) for marble countertops. 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 | **1.156" (29.36 mm)** | 7/8" (22.24 mm) | 1" (25.41 mm) | 1 1/8" (28.58 mm) |
|---|---|---|---|---|
| **Conversion Factor** | **1** | 0.757 | 0.865 | 0.973 |

## LCIA results, resource use, output & waste flows, and carbon emissions & removals per $m^2$ of marble countertops

| Parameter | Unit | Material acquisition and pre-processing stage A1-A2 | Countertop Construction A3 | Installation stage A4-A5 | Use and maintenance stage B2 | End of life C2 | End of life C4 | Total |
|---|---|---|---|---|---|---|---|---|
| **LCIA results (per $m^2$ of marble countertops)** | | | | | | | | |
| **Ozone depletion** | kg CFC-11 eq | 1.50E-06 | 2.97E-06 | 1.18E-06 | 4.85E-07 | 7.23E-08 | 1.09E-08 | **6.22E-06** |
| **Global warming** | kg CO2 eq | 2.32E+01 | 4.29E+01 | 9.80E+00 | 5.68E-01 | 3.64E-01 | 6.42E-02 | **7.69E+01** |
| **Smog** | kg O3 eq | 4.40E+00 | 1.46E+00 | 1.95E+00 | 2.85E-01 | 2.98E-02 | 1.86E-02 | **8.14E+00** |
| **Acidification** | kg SO2 eq | 1.56E-01 | 1.15E-01 | 6.74E-02 | 2.14E-02 | 1.14E-03 | 6.19E-04 | **3.61E-01** |
| **Eutrophication** | kg N eq | 1.70E-02 | 2.86E-02 | 5.82E-03 | 1.48E-02 | 1.53E-04 | 6.05E-05 | **6.65E-02** |
| **Carcinogenics** | CTUh | 2.21E-07 | 3.90E-07 | 1.29E-07 | 2.52E-08 | 1.51E-10 | 1.88E-11 | **7.65E-07** |
| **Non-carcinogenics** | CTUh | 1.92E-06 | 2.65E-06 | 8.38E-07 | 2.67E-07 | 1.36E-08 | 7.42E-10 | **5.69E-06** |
| **Respiratory effects** | kg PM2.5 eq | 2.21E-02 | 5.66E-02 | 2.88E-03 | 8.03E-03 | 7.13E-05 | 8.02E-05 | **8.98E-02** |
| **Ecotoxicity** | CTUe | 3.09E+01 | 1.75E+01 | 1.43E+01 | 3.89E+00 | 1.97E-01 | 6.09E-03 | **6.68E+01** |
| **Fossil fuel depletion** | MJ surplus | 3.80E+01 | 6.62E+01 | 2.09E+01 | 4.99E+00 | 7.38E-01 | 1.36E-01 | **1.31E+02** |
| **Energy consumption, energy type, and material resources (per $m^2$ of marble countertops)** | | | | | | | | |
| **Renewable fuels** | MJ, LHV | 1.87E+01 | 3.00E+01 | 8.59E+00 | 1.14E+02 | 7.56E-03 | 1.85E-03 | **1.71E+02** |
| **Virgin renewable resources** | MJ, LHV | 0 | 4.38E+01 | 4.81E-01 | 0 | 0 | 0 | **4.43E+01** |
| **Fossil fuels** | MJ, LHV | 2.92E+02 | 5.94E+02 | 3.20E+02 | 3.80E+01 | 4.83E+00 | 8.91E-01 | **1.25E+03** |
| **Nuclear fuels** | MJ, LHV | 5.37E+01 | 2.28E+02 | 5.48E+00 | 4.94E+00 | 3.03E-02 | 7.41E-03 | **2.92E+02** |
| **Miscellaneous fuels** | MJ, LHV | 4.92E-04 | 1.67E-02 | 1.60E-03 | 1.10E+01 | 1.18E-06 | 2.21E-07 | **1.10E+01** |
| **Virgin non-renewable resources** | MJ, LHV | 3.46E+02 | 8.03E+02 | 3.24E+02 | 5.39E+01 | 4.86E+00 | 8.98E-01 | **1.53E+03** |
| **Recycled resources** | kg | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Renewable secondary fuels** | MJ, LHV | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Non-renewable secondary fuels** | MJ, LHV | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Recovered energy** | MJ, LHV | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Use of net freshwater resources** | $m^3$ | 5.38E+01 | 9.64E+00 | 2.26E+00 | 1.06E+00 | 8.24E-04 | 1.58E-04 | **6.68E+01** |
| **Primary energy demand** | MJ | 3.65E+02 | 8.96E+02 | 3.36E+02 | 1.68E+02 | 4.87E+00 | 9.00E-01 | **1.77E+03** |
| **Primary energy demand (fossil, nuclear)** | MJ | 3.46E+02 | 8.22E+02 | 3.27E+02 | 4.29E+01 | 4.86E+00 | 8.98E-01 | **1.54E+03** |
| **Renewable (solar, wind, hydro, biomass)** | MJ | 1.87E+01 | 7.38E+01 | 9.08E+00 | 1.14E+02 | 7.56E-03 | 1.85E-03 | **2.16E+02** |
| **Emissions to air (per $m^2$ of marble countertops)** | | | | | | | | |
| **Sulphur oxides ($SO_x$)** | kg | 3.04E-02 | 4.46E-02 | 1.15E-02 | 6.82E-03 | 2.88E-04 | 9.19E-05 | **9.36E-02** |
| **Nitrogen oxides ($NO_x$)** | kg | 1.77E-01 | 5.31E-02 | 7.75E-02 | 9.90E-03 | 1.20E-03 | 7.51E-04 | **3.19E-01** |
| **Carbon dioxide ($CO_2$)** | Kg | 2.21E+01 | 2.92E+01 | 9.24E+00 | 6.30E+00 | 3.48E-01 | 6.24E-05 | **6.72E+01** |
| **Methane ($CH_4$)** | kg | 4.51E-02 | 1.74E+01 | 1.82E-02 | 1.53E-02 | 3.55E-04 | 3.85E-05 | **1.75E+01** |
| **Nitrous oxide ($N_2O$)** | kg | 1.09E-03 | 6.97E-02 | 3.37E-04 | 1.58E-03 | 1.44E-05 | 2.11E-06 | **7.27E-02** |
| **Carbon monoxide (CO)** | kg | 2.04E-01 | 1.16E-02 | 4.01E-02 | 6.40E-02 | 6.52E-05 | 1.93E-04 | **3.20E-01** |
| **Water usage and emissions to water (per $m^2$ of marble countertops)** | | | | | | | | |
| **Phosphates, nitrates, dioxin, and heavy metals** | kg | 8.36E-03 | 2.02E-02 | 7.85E-04 | 3.59E-02 | 1.37E-06 | 3.15E-07 | **6.53E-02** |
| **Consumption (total water input)** | $m^3$ | 1.06E+02 | 1.67E+01 | 5.52E+00 | 1.93E+00 | 9.28E-04 | 1.82E-04 | **1.30E+02** |
| **Output flows and waste category indicators (per $m^2$ of marble countertops)** | | | | | | | | |
| **Hazardous waste disposed** | kg | 3.06E-02 | 1.94E-03 | 0 | 0 | 0 | 0 | **3.25E-02** |
| **Non-hazardous waste disposed** | kg | 1.77E+00 | 3.27E+01 | 3.20E+00 | 0 | 0 | 2.61E+01 | **6.37E+01** |
| **High-level radioactive waste, conditioned, to final repository** | kg | 1.92E+00 | 5.42E-02 | 7.49E-06 | 1.98E-04 | 5.17E-07 | 9.69E-08 | **1.97E+00** |
| **Intermediate- and low-level radioactive waste, conditioned, to final repository** | kg | 1.87E-03 | 1.54E-08 | 1.31E-10 | 6.34E-08 | 5.90E-07 | 4.15E-09 | **1.87E-03** |
| **Components for re-use** | kg | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Landfill avoidance / materials for recycling** | kg | 4.59E+04 | 1.07E+02 | 6.41E+00 | 0 | 0 | 5.67E+01 | **4.61E+04** |
| **Incineration with energy recovery** | kg | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Incineration without energy recovery** | kg | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Carbon emissions and removals (per $m^2$ of marble countertops)** | | | | | | | | |
| **Biogenic Carbon Removal from Product** | kg $CO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Biogenic Carbon Emission from Product** | kg $CO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Biogenic Carbon Removal from Packaging** | kg $CO_2$ | 0 | 7.63E-02 | 3.81E-03 | 0 | 0 | 0 | **8.01E-02** |
| **Biogenic Carbon Emission from Packaging** | kg $CO_2$ | 0 | 0 | 1.12E-02 | 0 | 0 | 0 | **1.12E-02** |
| **Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes** | kg $CO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes** | kg $CO_2$ | 0 | 0 | 0 | 0 | 0 | 0 | **0** |