TCNA
Tile Council of North America, Inc.

Guide to EPDs for Ceramic Tile, Mortar, and Grout Made in North America

2026

*Note: The industry-wide EPD for ceramic tile and the North American flooring PCR are being updated. The current ceramic tile EPD is valid through May 30, 2026. Access the online version of TNC for updates.

IPA℠
International Product Assurance
LABORATORIES

Green Squared® Certification

Green Squared®–the world's first multi-attribute certification for tile and tile installation products. Certified by ANSI A138.1 and trusted in major green building programs including LEED, NAHB, and Green Globes.

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EPDs FOR NORTH AMERICAN-MADE CERAMIC TILE, MORTAR, AND GROUT

The environmental product declarations (EPDs) for North American-made ceramic tile, mortar, and grout provide a comprehensive overview of how these products impact the environment. The combination of the three provides environmental impact data, per square meter, of the main materials used to set tile.

The EPDs address the most important environmental considerations affecting the well-being of the planet and those who call it home—specifically, global warming, fossil fuel resource depletion, acidification, smog formation, eutrophication, and ozone depletion.

And, because EPDs and product environmental transparency are increasingly required in green construction standards and rating systems, specifying ceramic tiles, mortars, and grouts covered by the EPDs can help achieve green building points and meet transparency requirements. In fact, as most green building standards, codes and rating systems provide incremental credit for the use of each product covered by an EPD, using tile in a project, with the accompanying mortar and grout, means that a single tile installation using materials covered by North American EPDs could potentially contribute "three times (3X)."

The Credibility Process

When selecting construction materials, it's important to know decisions are supported by reliable, life cycle-based sustainability information. For the North American-made Ceramic Tile, Mortar, and Grout EPDs, the life-cycle assessments were independently performed by WAP Sustainability Consulting, all

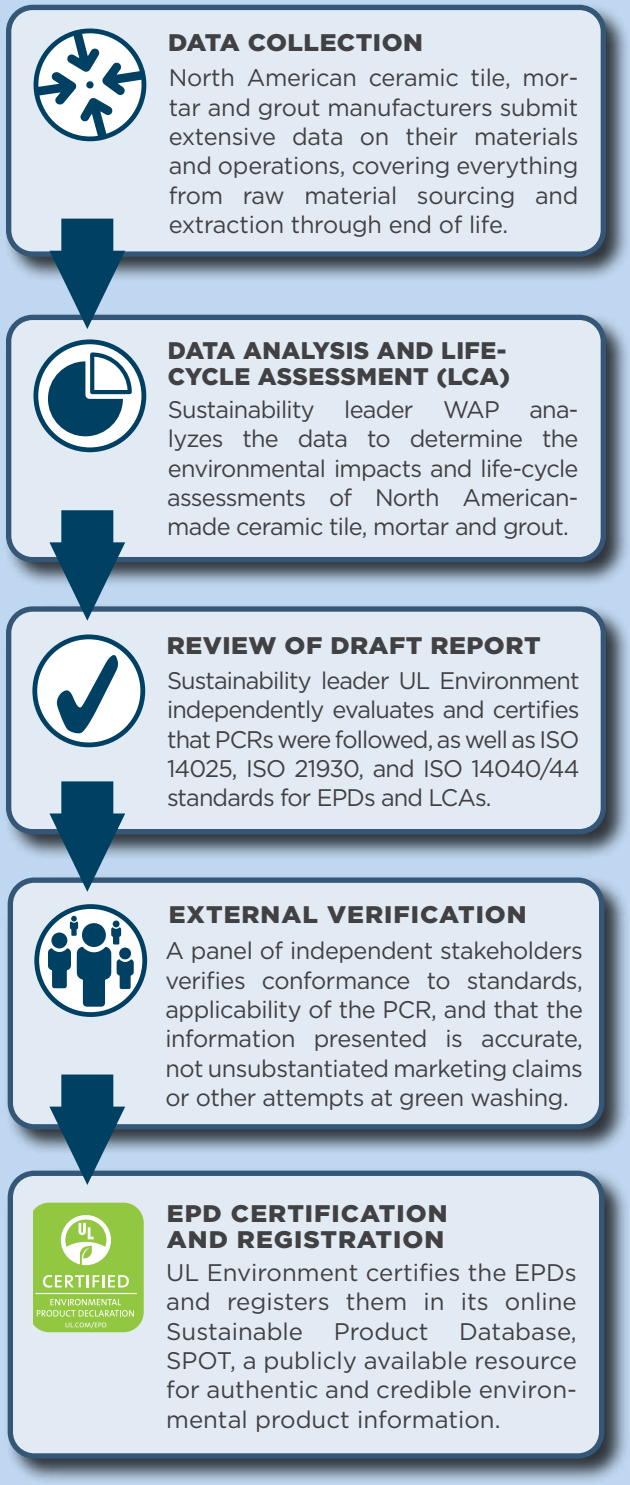
per the ISO standard 14040/44, *LCA Principles, Framework, Requirements, and Guidelines.* Additionally, UL Environment, as Program Operator, verified the validity of the LCAs and certified the requirements of ISO 14025, *Principles and Procedures for EPDs*, and ISO 21930, *Core Rules for EPDs of Construction Products and Services,* were met. Conformance to these standards, plus certification of the EPDs by a globally recognized sustainability leader, ensures the EPDs are accurate, not unsubstantiated marketing claims or other attempts at "green washing."

To produce the EPDs, the participating manufacturers provided extensive data on their materials and operations and participated in a cradle-to-grave evaluation of their products, from raw material sourcing/extraction, through manufacturing, delivery, installation, use, and end of life.

For each EPD, the specific environmental impacts measured, and the methodology for measuring those, are dictated by a Product Category Rule (PCR). For the tile EPD, the North American PCR, UL 10010-7 Part B: Flooring EPD Requirements v2.0, was followed. Using product category rules developed for all flooring allows tile covered by the EPD to be compared to other flooring products evaluated under the same PCR.

For the mortar and grout EPDs, the North American PCR, UL Part B: Cement-Based Grout, Adhesive Mortar, and Leveling Underlayment EPD Requirements v1.0, was followed.

The standardized reporting of tile, mortar and grout required by the PCRs additionally provides transparency and prevents green washing, as all parameters and impacts in the PCR must be reported, not just those areas in which a product performs well.



TOTAL TRANSPARENCY
EPDs FOR NORTH AMERICAN-MADE CERAMIC TILE, MORTAR, AND GROUT

Products Covered by the EPDs

Because the EPDs are based on aggregated data from all participating manufacturers, they are "generic" or "non-proprietary" EPDs. As most major North American tile industry manufacturers participated, over 85% of North American-made products are covered: 3.4 billion square feet of tile and 1 billion kilograms of mortar and grout.

To find out if a specific product line is covered by a certified EPD, contact the participating manufacturers.

Participating Tile Manufacturers

American Wonder Porcelain
Arto
Crossville
Dal-Tile Corporation
Del Conca USA
Florida Tile
Interceramic
Ironrock
Porcelanite Lamosa
Portobello America
Quarry Tile Company
StonePeak Ceramics
Vitromex de Norteamérica

Participating Grout and Mortar Manufacturers

Ardex
Bostik
Cemenquin/Cement Pro
Cemix/Texrite
Crest
Custom Building Products
HB Fuller/Tec
Interceramic
Laticrete
Mapei
Parex
Schluter

The EPDs were initiated by Tile Council of North America (TCNA) and its participating members, with data analysis and modeling by WAP Sustainability and third-party, independent certification by UL Environment.

TCNA
TILE COUNCIL OF NORTH AMERICA, INC.

WAP SUSTAINABILITY CONSULTING

UL Solutions

UL CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

Download the EPDs at TCNAtile.com

Just as nutrition labels inform the calorie conscious on food choices, an EPD informs with respect to sustainability. When using the North American-made Tile EPD alongside other flooring products' generic EPDs, one thing is clear: Overall ceramic tile has the lowest 75-year environmental impact per square meter. Similarly, the industry-wide EPDs for North American-made mortar and grout report very low 75-year environmental impacts per installed square meter.

Environmental Facts

Functional unit: 1 m^2 of Ceramic Tile Floor Covering
Reference Service Life (RSL): 75 Years

75 YEAR IMPACT ASSESSMENT	Total
Global Warming Potential (kg CO_2 eq)	19.6
Acidification Potential (kg SO_2 eq)	0.037
Ozone Depletion Potential (kg R11 eq)	6.7E-10
Smog Potential (kg O_3 eq)	0.8
Eutrophication Potential (kg N eq)	0.003
Fossil Resource Depletion (MJ)	32

OTHER INFORMATION	
Zero VOCs	
Boundaries	Cradle to Grave
Recycled Content	Varies
Green Squared Certification®	Some Tiles

Ceramic Tile Ingredients: Clay (69.8%), Sand (6.2%), Talc (1.1%), Feldspar (11.3%), Scrap (6.5%), Frit (0.4%), Calcium Carbonate (1.5%), Ash (1.4%), Additives (0.7%), Ink (0.2%), Glaze (1.1%)

Visit **www.TCNAtile.com** for further information.

Environmental Facts

Functional Unit: 1 m^2 of Installed Grout
(Application Rate, 0.212 kg/m^2)
Reference Service Life (RSL): 75 Years

75 YEAR IMPACT ASSESSMENT	Total
Global Warming Potential (kg CO_2 eq)	0.192
Acidification Potential (kg SO_2 eq)	0.000528
Ozone Depletion Potential (kg R11 eq)	7.12E-12
Smog Potential (kg O_3 eq)	9.06E-03
Eutrophication Potential (kg N eq)	3.59E-05
Fossil Resource Depletion	0.26

OTHER INFORMATION	
VOC Emissions-CDPH Section 01350	Meets
Recycled Content	Varies
Green Squared® Certification	Some Grout
ANSI A118.6, ANSI A118.7	Meets

Tile Grout Ingredients: Sand, White Cement, Limestone, Grey Cement, Calcium Aluminate, Calcium Formate, Other Additives

Visit **www.TCNAtile.com** for further information.

Environmental Facts

Functional Unit: 1 m^2 of Installed Tile Mortar
(Application Rate, 4.07 kg/m^2)
Reference Service Life (RSL): 75 Years

75 YEAR IMPACT ASSESSMENT	Total
Global Warming Potential (kg CO_2 eq)	2.9
Acidification Potential (kg SO_2 eq)	0.0077
Ozone Depletion Potential (kg R11 eq)	2.53E-10
Smog Potential (kg O_3 eq)	0.144
Eutrophication Potential (kg N eq)	6.29E-04
Fossil Resource Depletion	4.05

OTHER INFORMATION	
VOC Emissions-CDPH Section 01350	Meets
Recycled Content	Varies
Green Squared® Certification	Some Mortar
ANSI A118.1, ANSI A118.4, ANSI A118.11, ANSI A118.15, ISO 13007	Meets

Tile Mortar Ingredients: Sand, Calcium Carbonate, Grey Cement, White Cement, Ethylene Vinyl Acetate, Admixture, Cellulose Ether, Other Additives

Visit **www.TCNAtile.com** for further information.

CREDITS AND COMPLIANCE
NORTH AMERICAN-MADE CERAMIC TILE, MORTAR, AND GROUT

Scan the QR code for the online version of TNC, where updates to LEED v5 and related sustainability credits will be reflected as they become available.

LEED v4.1

Under the credit category Building Product Disclosure and Optimization–Environmental Product Declarations, up to 2 points toward LEED certification can be earned by using products with EPDs, such as North American-made ceramic tile, mortar and grout.

Option 1 (1 Point)
Environmental Product Declaration

AND/OR

One point can be earned for using at least 20 different permanently installed "products," which are construction materials that meet one of the specified disclosure criteria and are therefore eligible for the valuation associated with that disclosure criteria. Valuations for such materials are awarded on a per-material basis, and this LEED point is earned by using enough materials that their combined valuations total at least 20 "products."

Disclosure Criteria	Valuation
Proprietary LCA (Internally Reviewed)	1 product
Proprietary EPD (Internally Reviewed)	1 product
Generic EPD (Third-Party Certified)	1 product
Proprietary EPD (Third-Party Certified)	1.5 products

Materials that meet multiple criteria are eligible only for the highest valuation available; the valuations cannot be combined. Also, materials must be sourced from at least five different manufacturers.

EPD Products covered by the North American-made Ceramic Tile, Mortar, and Grout EPDs can each contribute at least ½ product toward the 20-product requirement. For example, for a project with 8 different tiles installed with the same mortar but different grouts (all covered by EPDs), the 17 products (8 tiles, 8 grouts, 1 mortar) would contribute 8.5 "products" toward the 20-product requirement (Example A). In the same scenario, if the mortar, grout, and 1 of the 8 tiles also have a proprietary EPD, the same 17 tiles and related materials would contribute 13.5 "products" (Example B).

Example A
(8 tiles + 1 mortar + 8 grouts) × .5 products = 8.5

Example B
(1 tile × 1 product) + (1 mortar × 1 product)
+ (8 grouts × 1 product) + (7 tiles × .5 products) = 13.5

Option 2 (1 Point)
Multi-Attribute Optimization

One point can be earned by using products with improved, or plans for improved environmental life-cycle impacts when at least 10 of those products are used or those products comprise at least 10% of the total value of permanently installed products in the project. Valuations for such materials are awarded on a per-material basis, and this LEED point is earned by using enough materials that their combined valuations total at least 10 "products" or 10% of the total value of the project.

Optimization Criteria	Valuation
Life-Cycle Impact Reduction Plan	½ product or 50% cost
Reduced Global Warming Potential (GWP)	1 product or 100% cost
10% Reduced GWP	1.5 products or 150% cost
20% Reduced GWP & 5% Reduction in Two Other Impact Categories	2 products or 200% cost

EPD For this LEED point, generic EPDs provide a convenient baseline for comparison, and manufacturers of tiles, mortars, or grouts included in generic EPDs that also have one or more proprietary EPDs have the option to show below-industry-average impacts or an impact reduction plan, either of which can contribute to meeting the 10-product or 10% value threshold.

Example calculation 1: For a project with $1,000,000 in permanently installed products, including $20,000 of mortar and grout with GWP 10% lower than industry average, and $80,000 of ceramic tiles for which the manufacturer has included a publicly available action plan to reduce life-cycle environmental impacts:

$$\frac{[\$20K \text{ (mortar and grout value) x } 150\%] + [\$80K \text{ (tile value) x } 50\%]}{\$1M \text{ (all materials value)}} = 7\%$$

In the previous example using the cost calculation method, the contribution of the tile and related installation materials toward the 10% minimum would be 7% (70% of the requirement).

Example calculation 2: For a project with 2 different tiles with GWP lower than industry average, 1 tile with a life-cycle impact reduction plan, 3 different grouts with life-cycle environmental impact reduction plans, and 1 mortar with GWP 10% lower than industry average:

(2 tiles x 1 product) + (1 tile x .5 product) +
(3 grout x .5 product) + (1 mortar x 1.5 products) = 5.5

In the above example using the product calculation method, the 7 tiles and related installation materials would contribute 5.5 "products" toward the 10-product minimum (55% of the requirement).

Green Globes ANSI/GBI 01-2024

Under the provisions of Section 5.2, *Product Life Cycle*, using North American-made ceramic tiles, mortars, and/or grouts can contribute toward the 39 available points for using products with EPDs.

29 points are awarded for using products with **cradle-to-gate** life-cycle evaluations based on:

EPDs: Generic or Proprietary	AND / OR	Third-Party Verified Proprietary Life-Cycle Assessment	AND / OR	Third-Party Certification to Multiple Attribute Standards

10 points are awarded for using products with **cradle-to-grave** life-cycle evaluations based on:

EPDs: Generic or Proprietary	AND / OR	Third-Party Verified Proprietary Life-Cycle Assessment

Products recognized as having cradle-to-grave life cycle evaluations are additionally recognized for cradle-to-gate.

Points are awarded based on the number of products used. Products with EPDs are valued the same, regardless of whether their EPDs are generic or proprietary; both contribute equally toward the product total.

	# Products	Points
Cradle-to-Gate Life-Cycle Evaluations	≥40	29
	≥38 to ≤39	26
	≥35 to ≤37	23
	≥33 to ≤34	20
	≥30 to ≤32	17
	≥28 to ≤29	14
	≥25 to ≤27	11
	≥23 to ≤24	8
	≥21 to ≤22	7
	≥18 to ≤20	6
	≥15 to ≤17	5
	≤15	0
Cradle-to-Grave Life-Cycle Evaluations	10	10
	9	9
	8	8
	7	7
	6	6
	5	5

Without limit, using North American-made ceramic tiles, mortars, and grouts covered by EPDs will contribute to this requirement on a cradle-to-gate and cradle-to-grave basis. Products that are also Green Squared Certified® will earn double points under the cradle-to-gate provisions for also meeting the requirement for products with third-party certifications based on multiple attribute standards.

Sample calculation for a project with 10 tile products, 2 mortars, and 10 grouts covered by the EPD:

7 Points (22 products with cradle-to-gate, covered by EPD)
+ 10 Points (22 products with cradle-to-grave, also covered by EPD)
= 17 Total Points

Sample calculation for the same project, but with 3 of the tile products, 1 mortar and 2 grouts additionally having Green Squared® Certification:

13 Points (28 products; 22 with cradle-to-gate, covered by EPD, 6 of which are additionally recognized as Green Squared Certified®)
+ 10 Points (22 products with cradle-to-grave, also covered by EPD)
= 23 Total Points

CREDITS AND COMPLIANCE
NORTH AMERICAN-MADE CERAMIC TILE, MORTAR, AND GROUT

NAHB National Green Building Standard

NAHB National Green Building Standard is commonly referred to as ICC 700. North American-made ceramic tile can help achieve points under Section 611.1, Product Declarations, in this ANSI-approved standard and rating system for residential construction. In this section of the standard, 5 points are awarded if EPDs are submitted for 10 different products installed in the building project. Each building material with an industry-wide EPD contributes a full 'product' toward the 10-product goal. Each building material with a product-specific EPD contributes two 'products' toward the 10-product goal.

Additionally, up to 10 points can be awarded under Section 610, Life Cycle Analysis, for using products with lower environmental impacts, compared to products intended for the same use. To garner points under Section 610, the selected product must improve upon multiple environmental impacts by an average of 15%, with the number of points awarded tied to the number of impact categories in which the selected product performs better.

Number of Impact Categories	Points
4	2
5	3

Applicable Impact Categories:
- Primary energy use
- Global warming potential
- Acidification potential
- Eutrophication potential
- Ozone depletion potential
- Smog potential

The standard requires that the LCA tool used to determine the environmental impacts must be based on a minimum reference service life for a building of 60 years. It allows comparisons to be made between different types of products with the same use. It also allows comparison of individual product impacts to the industry averages for the same product type.

Each tiling product covered by the North American-made tile, mortar and/or grout EPDs contributes a full product toward the 10-product threshold specified by Section 611.1 of this standard. Those which have product-specific EPDs count double, expanding opportunities for garnering the previously discussed 5 points and creating the possibility of satisfying the 10-product requirement solely with tile installations alone!

Furthermore, the North American-made Ceramic Tile, Mortar, and Grout EPDs report environmental impacts over 75 years, as analyzed by GaBi LCA software, according to the requirements of the standard, fulfilling the 60-year minimum building service life with no requirement to account for product replacements.

When choosing between tile and an alternate flooring material, using ceramic tile covered by the EPD is advantageous when building to this standard, because the EPD shows very low environmental impacts in all categories. In fact, tile covered by the EPD has the lowest impact in all six impact categories, as compared to the impacts reported for other common flooring options in their publicly available, generic EPDs. Refer to the 75-year impact analysis graphs included in this guide for details.

When choosing between specific tiles, mortars, and/or grouts, products covered by generic EPDs will additionally contribute when such products also have proprietary EPDs showing impacts that are on average 15% lower, as compared to the industry average reported in the generic EPD, in at least 4 categories.

Additionally, products that are Green Squared Certified® can also contribute points as detailed elsewhere in the NAHB Green Building Standard. Refer to the Tile and Green Building chart in ***Tile: The Natural Choice*** for details.

International Green Construction Code (IgCC) Powered by ASHRAE Standard 189.1

About IgCC: An initiative of the International Code Council (ICC). IgCC was developed as model code language for states and municipalities to establish baseline sustainability requirements for new and existing commercial buildings.

About ASHRAE 189.1: An ANSI-approved standard, ASHRAE 189.1 was designed to be incorporated into governing jurisdictions' codes and ordinances for commercial buildings and enforced by building officials and inspectors.

IgCC and ASHRAE Standard 189.1 are now integrated into a single model code and standard for high-performance buildings.

In IgCC Section 901.5.1.4 (ASHRAE 189.1 Section 9.5.1.4), *Third-Party Multi-Attribute Certification*, at least five different products installed in the building project at the time of issuance of certificate of occupancy shall be in accordance with one or more standards listed under section 901.5.1.4.

EPD Each tiling product used, if covered by one or more of the North American made Ceramic Tile, Mortar, and/or Grout EPDs, counts as one product toward the ten-product threshold.

CALGreen

This standard is part of the California Building Standards Code and is commonly adopted as model language by developers of green building standards and rating systems in other parts of the country.

Section A5.409.3 for Non-Residential Construction requires at least 50% use of materials or assemblies based on life-cycle assessment (LCA) of their global warming potential (climate change/greenhouse gases) and two more environmental impacts from the list below:

- Fossil fuel depletion
- Stratospheric ozone depletion
- Acidification of land and water resources
- Eutrophication
- Photochemical oxidants (smog)

EPD Tiling products covered by the North American-made Ceramic Tile, Mortar and/or Grout EPDs are eligible for consideration under this section of CALGreen, as the EPDs provides LCA data and address the referenced environmental impacts.

GSA P-100 Facilities Standards

This standard incorporates sustainability criteria into design standards for the construction of government-funded buildings. Section 3.7 (Interior Finishes Performance) sets forth several provisions for ceramic tile:

The "Baseline" provision specifies that tiles conform to ANSI A137.1, the ANSI standard for ceramic tile.

*Note: At the time of this publication, there are no GSA P-100 provisions for tile mortar or tile grout.

ENVIRONMENTAL FOOTPRINT: TILE, MORTAR AND GROUT
A 75-YEAR IMPACT ANALYSIS

Today, North American construction products are increasingly being evaluated based on their 75-year environmental footprint, a time frame chosen for the average service life of a building. Accordingly, the EPDs for North American-made Ceramic Tile, Mortar, and Grout provide long-term environmental impact data. In fact, the North American flooring Product Category Rule (PCR), UL 10010-7, requires EPDs to provide a life-cycle assessment (LCA) with a 75-year impact analysis. This appropriately includes the environmental impacts associated with acquiring a product's raw materials, manufacturing the product, and then delivering, installing, maintaining, and disposing of it, multiplied by the theoretical number of times the product would wear out and would have to be reinstalled (i.e., 75 years divided by the product's service life, in years).

In all six standard LCA environmental impact assessment categories, as included in the EPD for North American-made Ceramic Tile, Mortar, and Grout, the environmental benefits resulting from tile's inherent durability, long life, and low maintenance are clearly realized.

The EPDs for North American-made tiles, mortars, and grouts all report very low 75-year environmental impacts per installed square meter. In fact, when the EPD for North American-made Tile is compared to the generic EPDs for other types of flooring, developed under the same PCR and using the same building service life, North American-made ceramic tile has the lowest overall environmental impact. This includes the lowest Global Warming Potential and the lowest Fossil Fuel Resource Depletion.

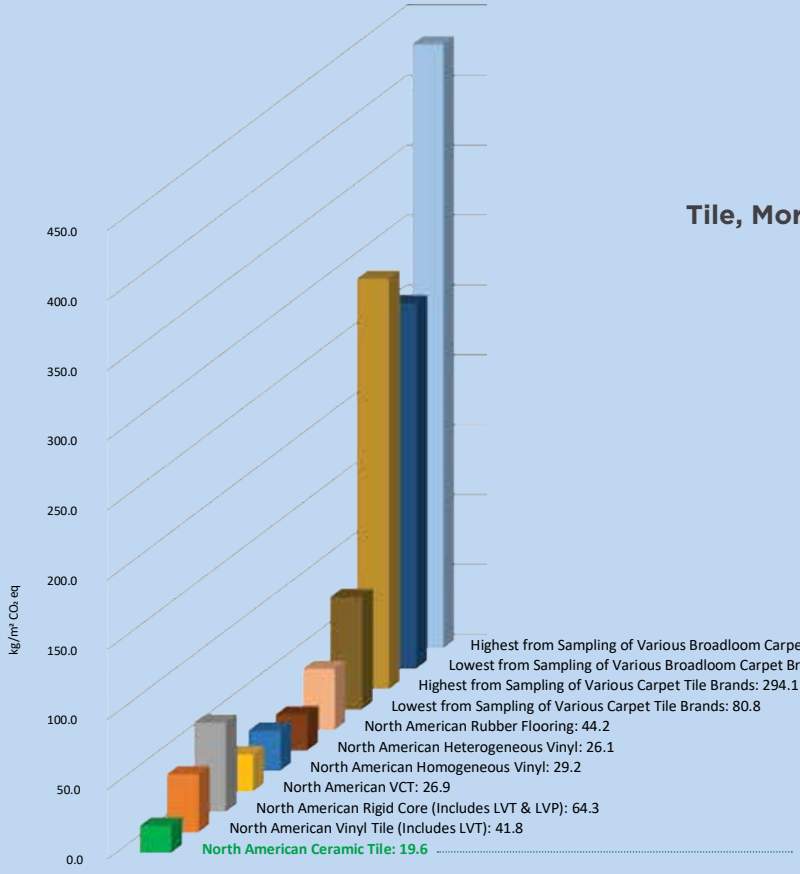
ENVIRONMENTAL FOOTPRINT: TILE, MORTAR AND GROUT
A 75-YEAR IMPACT ANALYSIS

Global Warming Potential (GWP)

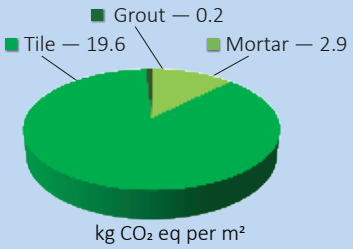
GWP, commonly referred to as "carbon footprint," is measured by emissions of carbon-equivalent gases and relates to climate change.

The 75-year GWP for North American-made Ceramic Tile, Mortar and Grout, based on their EPDs, is 19.6 kg CO_2 equivalent (eq.) per square meter for tile, 2.9 kg per m^2 for mortar, and 0.2 kg per m^2 for grout.

GWP: Tile vs Other Types of Flooring



Tile, Mortar and Grout: Combined GWP



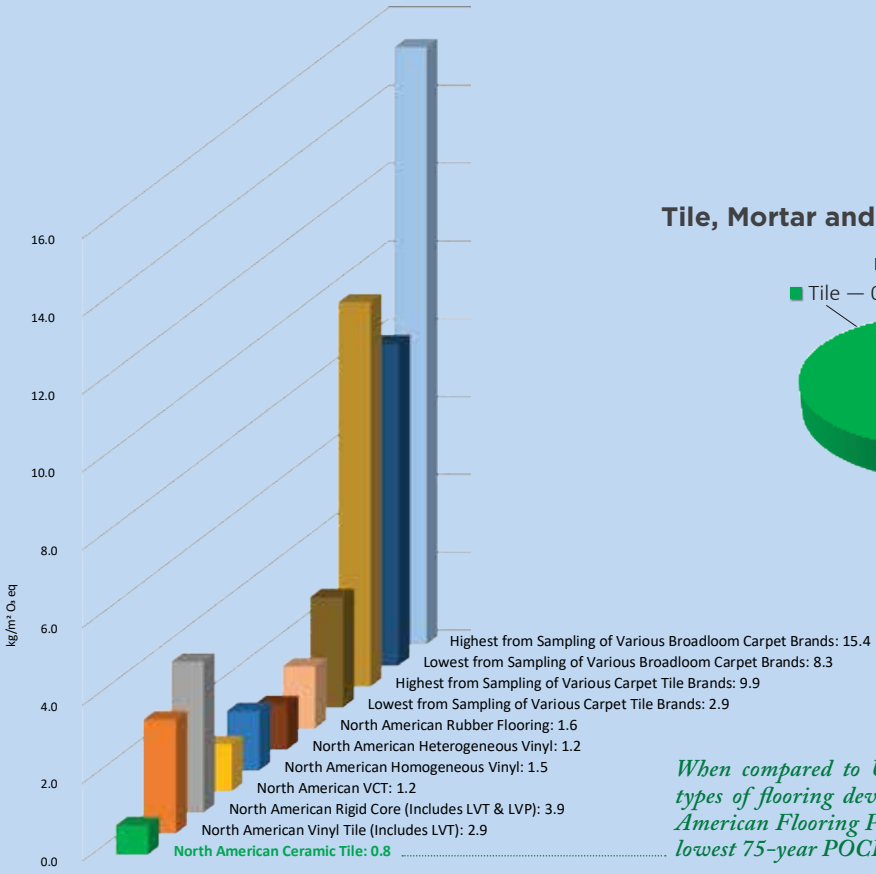
When compared to UL Certified EPDs for other types of flooring developed under the 2018 North American Flooring PCR, UL 10010-7, tile has the lowest 75-year GWP value.

Photochemical Oxidant Creation Potential (POCP)

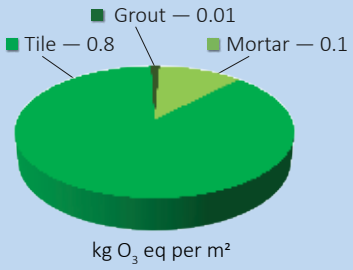
POCP is directly linked to smog formation. Smog is harmful to humans and animals, most notably for aggravating bronchial-related diseases; it also inhibits plant growth due to decreased UV radiation, and can discolor ground-level materials like building exteriors.

The 75-year POCP for North American-made Ceramic Tile, Mortar, and Grout, based on their EPDs, is 0.8 kg O_3 equivalent (eq.) per square meter for tile, 0.1 kg per m^2 for mortar, and 0.01 kg per m^2 for grout.

POCP: Tile vs Other Types of Flooring



Tile, Mortar and Grout: Combined POCP



When compared to UL Certified EPDs for other types of flooring developed under the 2018 North American Flooring PCR, UL 10010-7, tile has the lowest 75-year POCP value.

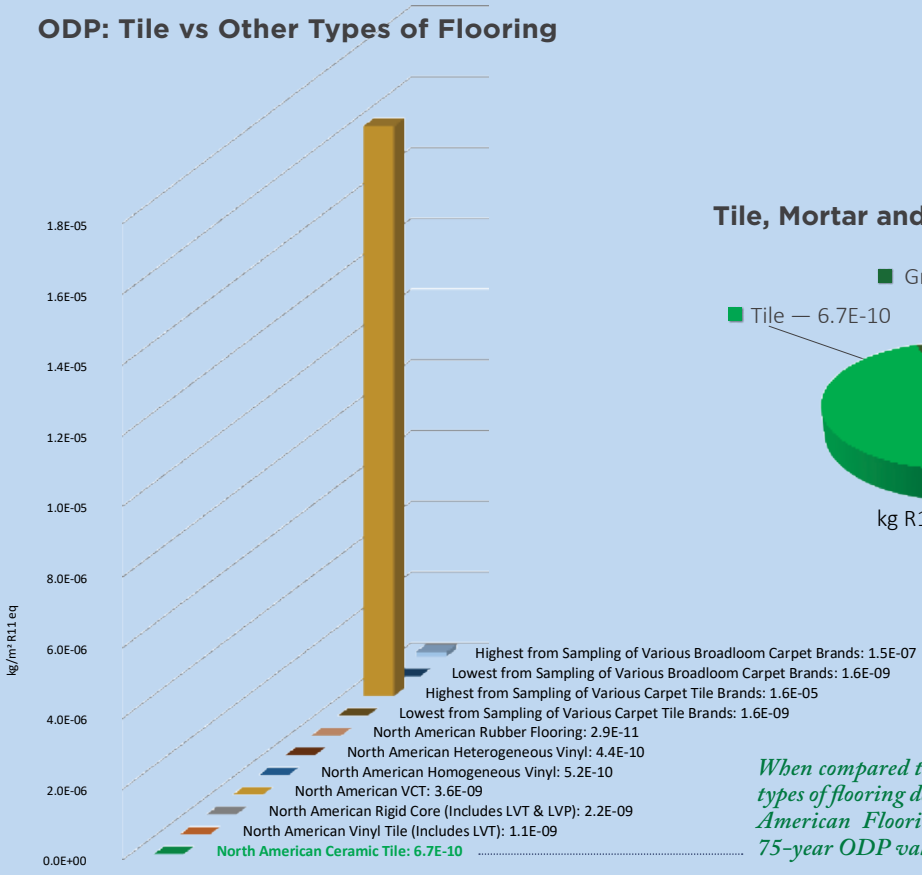
ENVIRONMENTAL FOOTPRINT: TILE, MORTAR AND GROUT
A 75-YEAR IMPACT ANALYSIS

Ozone Depletion Potential (ODP)

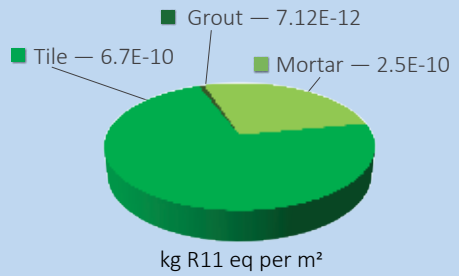
Ozone depletion occurs when chlorofluorocarbons (CFCs) and hydrofluorocarbons (HCFCs) reach the stratosphere, react with the sun, and break down the ozone layer. Decreased ozone can lead to an increase in the amount of UV-B radiation that reaches Earth's surface, having harmful effects on human health, animal health, terrestrial and aquatic ecosystems, biochemical cycles, and materials.

The 75-year ODP for North American-made Ceramic Tile, Mortar, and Grout, based on their EPDs, is 0.00000000067 kg R11 equivalent (eq.) per square meter for tile, 0.00000000025 kg per m^2 for mortar, and 0.00000000000712 kg per m^2 for grout.

ODP: Tile vs Other Types of Flooring



Tile, Mortar and Grout: Combined ODP



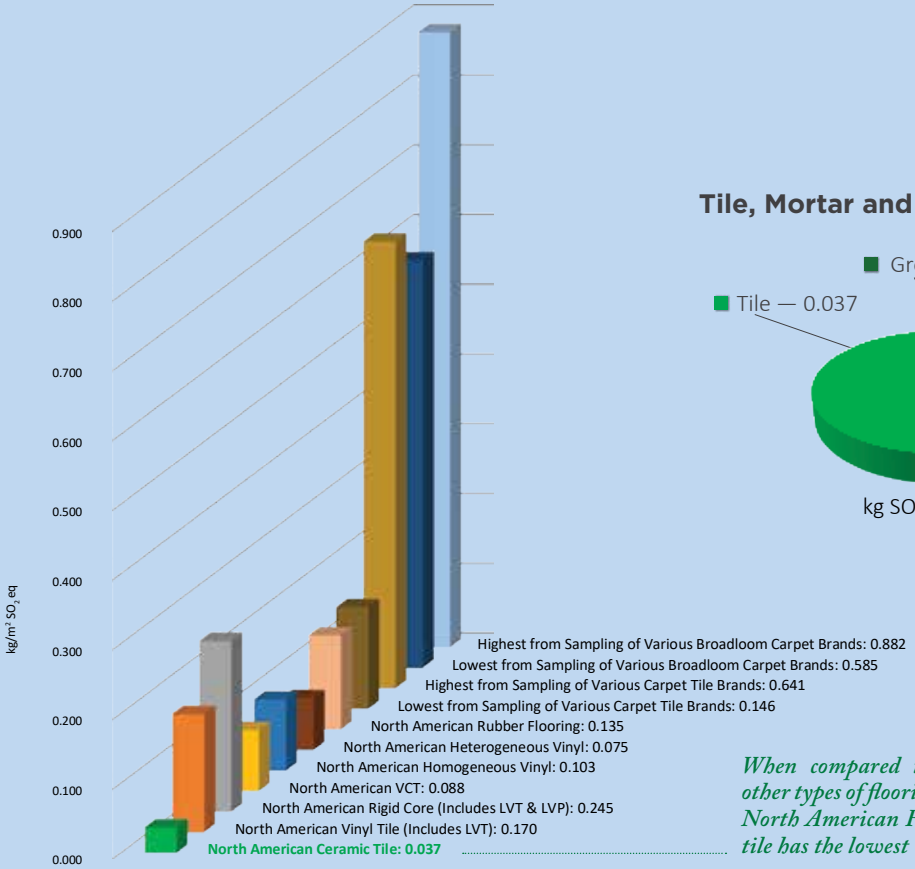
When compared to UL Certified EPDs for other types of flooring developed under the 2018 North American Flooring PCR, UL 10010-7, tile's 75-year ODP value is among the lowest.

Acidification Potential (AP)

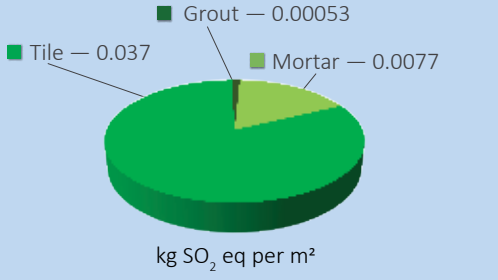
Acidification occurs when soil, groundwater, surface water and atmospheric moisture pH levels are lowered. This can have a harmful impact on organisms, ecosystems, and man-made materials, including buildings.

The 75-year AP for North American-made Ceramic Tile, Mortar and Grout, based on their EPDs, is 0.037kg SO_2 equivalent (eq.) per square meter for tile, 0.0077 kg per m^2 for mortar, and 0.00053 kg per m^2 for grout.

AP: Tile vs Other Types of Flooring



Tile, Mortar and Grout: Combined AP

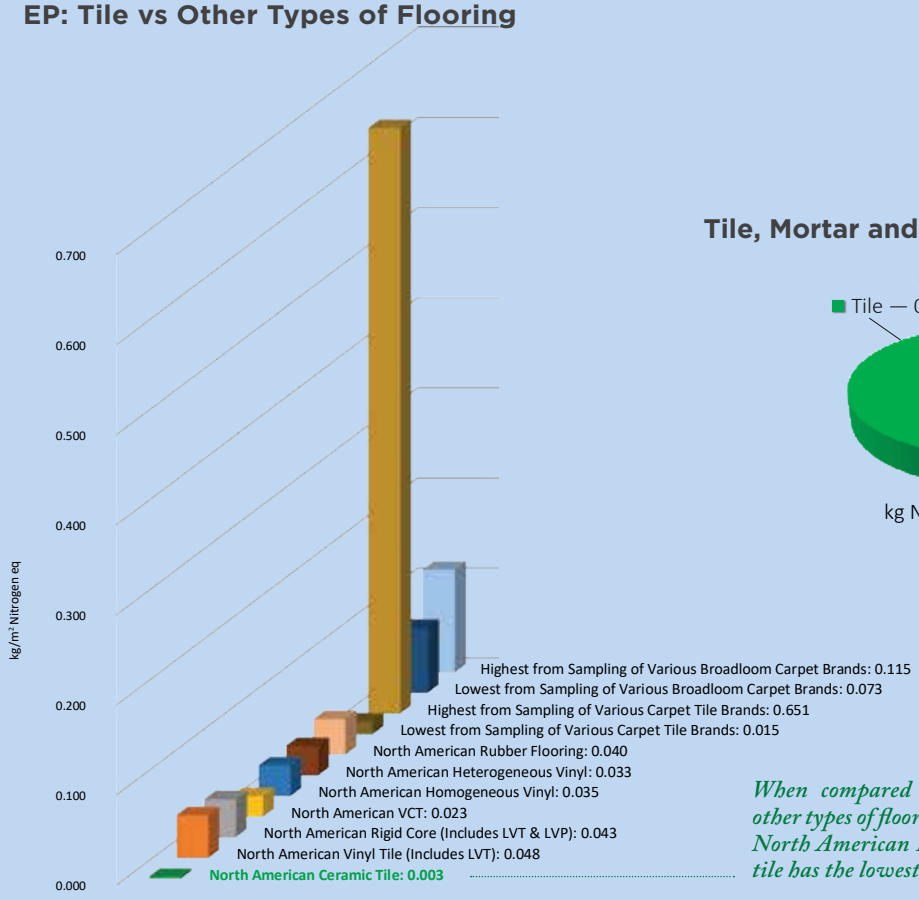


When compared to UL Certified EPDs for other types of flooring developed under the 2018 North American Flooring PCR, UL 10010-7, tile has the lowest 75-year AP value.

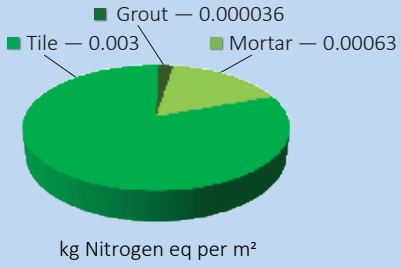
ENVIRONMENTAL FOOTPRINT: TILE, MORTAR AND GROUT
A 75-YEAR IMPACT ANALYSIS

Eutrophication Potential (EP)

EP: Tile vs Other Types of Flooring



Tile, Mortar and Grout: Combined EP



When compared to UL Certified EPDs for other types of flooring developed under the 2018 North American Flooring PCR, UL 10010-7, tile has the lowest 75-year EP value.

Eutrophication is the enrichment of a body of water (or ecosystem) with nutrients needed for photosynthesis, such as carbon dioxide and nutrient compounds containing nitrogen and/or phosphorus, commonly from fertilizer runoff and sewage. It is a significant cause of oxygen depletion in bodies of water, resulting from excess plant and algal growth, causing hypoxic conditions in which marine life cannot be sustained.

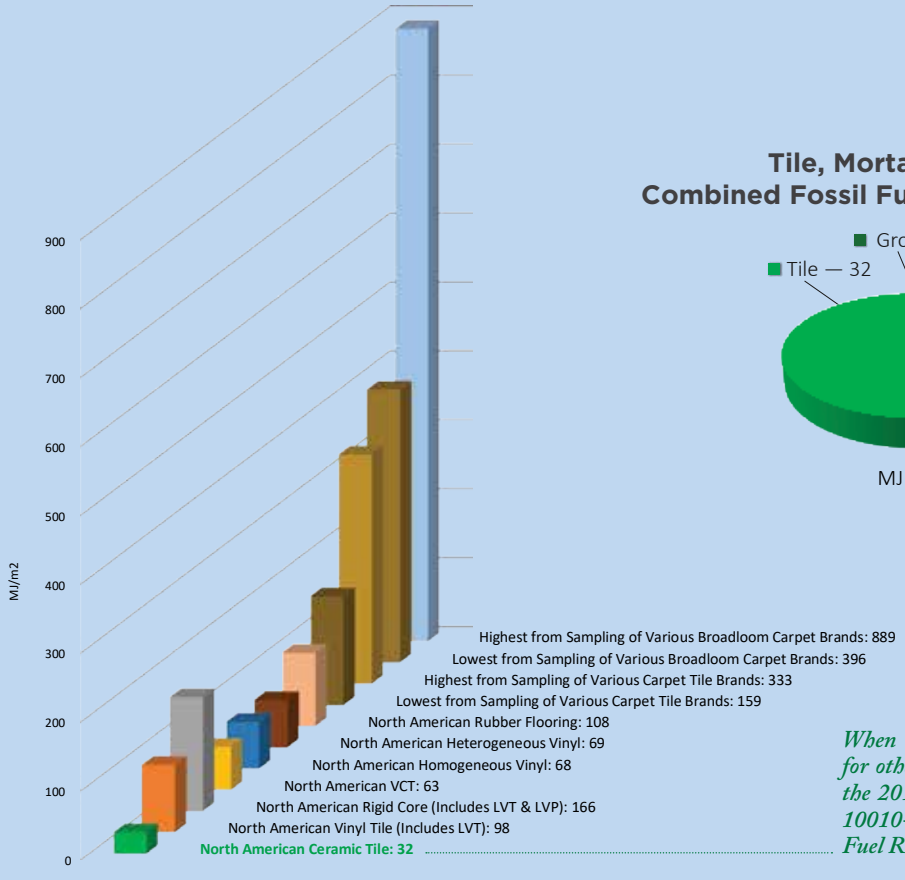
The 75-year EP for North American-made Ceramic Tile, Mortar, and Grout, based on their EPDs, is 0.003 kg Nitrogen equivalent (eq.) per square meter for tile, 0.00063 kg per m^2 for mortar, and 0.000036 kg per m^2 for grout.

Fossil Fuel Resource Depletion

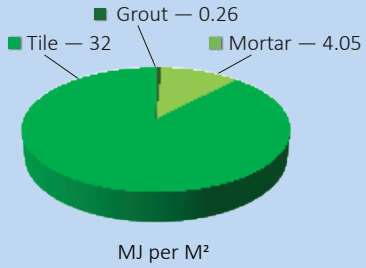
The utilization of fossil fuel resources throughout the life cycle of a product includes primary non-renewable energy resources such as petroleum, coal, and natural gas used as raw materials and as fuel in the manufacture, installation, maintenance, and disposal of the product. Efforts among environmental life cycle experts have been made to consider depletion of other types of resources, including land and water, but such evaluations are not often included in product LCAs due to difficulties in quantification at the site level.

The Fossil Fuel Resource Depletion over 75 years for North American-made Ceramic Tile, Mortar, and Grout, based on their EPDs, is 32 MJ per square meter for tile, 4.05 MJ per m^2 for mortar and 0.26 MJ per m^2 for grout.

Fossil Fuel Resource Depletion: Tile vs Other Types of Flooring



Tile, Mortar and Grout: Combined Fossil Fuel Resource Depletion



When compared to UL Certified EPDs for other types of flooring developed under the 2018 North American Flooring PCR, 10010-7, tile has the lowest 75-year Fossil Fuel Resource Depletion.

EPD
TRANSPARENCY SUMMARY: TILE

COMPANY NAME	Industry-Wide
PRODUCT NAME	North America Ceramic Tile: Porcelain, Pressed Floor, Mosaic,Quarry, Glazed Wall
PRODUCT DESCRIPTION	Floor or wall covering which is inert, fire resistant, non-combustible, durable, easy to maintain and made of mineral-based natural materials. Manufacturers include American Wonder Porcelain, Arto, Crossville, Dal-Tile, Del Conca USA, Florida Tile, Interceramic, Ironrock, Porcelanite-Lamosa, Portobello America, Quarry Tile Company, StonePeak Ceramics, and Vitromex
PRODUCT CATEGORY RULE (PCR)+ VERSION	UL PCR Part B: Flooring, 10010-7, Version 2.0, September 2018
CERTIFICATION PERIOD	April 1, 2020 to May 30, 2026
DECLARATION NUMBER	4789101745.101.1
EPD TYPE	☐ PRODUCT SPECIFIC ☑ INDUSTRY AVERAGE
DECLARED/ FUNCTIONAL UNIT	Functional Unit: 1 meter squared

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*Note:
The industry-wide EPD for ceramic tile and the North American flooring PCR are being updated. The current ceramic tile EPD is valid through May 30, 2026. Access the online version of TNC for updates.

GREEN BUILDING QUALIFICATIONS

LEED v4 Building Product Disclosure and Optimization - EPDs, Option 1
ASHRAE 189.1 Material Compliance
IgCC Material Compliance
Green Globes 3.5.1.2.1
NAHB Material Selection

REFERENCE SERVICE LIFE (IF APPLICABLE)	75 Years
LCA SOFTWARE + VERSION	GaBi Database Version 9.2.0.58
IMPACT ASSESSMENT METHOD + VERSION	TRACI 2.1 & CML 2001-2016

LIFECYCLE IMPACT CATEGORIES

The environmental impacts listed below were assessed through the product's lifecycle over 75 years (cradle to grave impacts)—including production, construction, use (including use, maintenance, refurbishment and replacement), and end of life.

	ATMOSPHERE			WATER		EARTH	
	Global Warming Potential refers to long-term changes in global weather patterns that are caused by increased concentrations of greenhouse gases in the atmosphere.	**Ozone Depletion Potential** is the destruction of the stratospheric ozone layer, which shields the earth from ultraviolet radiation that's harmful to life, caused by human-made air pollution.	**Photochemical Ozone Creation Potential** happens when sunlight reacts with hydrocarbons, nitrogen oxides, and volatile organic compounds, to produce air pollution known as smog.	**Acidification Potential** is the result of human-made emissions and refers to the decrease in pH and increase in acidity of oceans, lakes, rivers, and streams – polluting groundwater and harming aquatic life.	**Eutrophication Potential** occurs when excessive nutrients cause increased algae growth in lakes, blocking the underwater penetration of sunlight needed to produce oxygen and resulting in the loss of aquatic life.	**Depletion of Abiotic Resources (Elements)** refers to the reduction of available non-renewable resources, such as metals, that are found on the periodic table of elements, due to human activity.	**Depletion of Abiotic Resources (Fossil Fuels)** refers to the decreasing availability of non-renewable carbon-based compounds, such as oil and coal, due to human activity.
TRACI	19.6 kg CO_2-Equiv.	6.7E-10 kg CFC 11-Equiv.	0.757 kg O_3-Equiv.	0.0371 kg SO_2-Equiv.	0.00268 kg N-Equiv.	N/A kg Sb-Equiv.	N/A MJ
CML	19.7 kg CO_2-Equiv.	5.72E-10 kg R11-Equiv.	0.00176 kg Ethene-Equiv.	0.0323 kg SO_2-Equiv.	0.00536 kg PO_4-Equiv.	1.34E-05 kg Sb-Equiv.	242 MJ

Environment

MATERIAL CONTENT

Material content measured to 1%.

COMPONENT	MATERIAL	AVAILABILITY	MASS%	ORIGIN
Body	Clay	Mineral perpetual	69.78	US, Mexico, Europe
	Sand	Mineral perpetual	6.22	US, Mexico, Europe
	Talc	Mineral perpetual	1.12	US, Mexico, Europe
	Feldspar	Mineral perpetual	11.26	US, Mexico, Europe
	Internal Scrap	Pre-consumer	6.48	US, Mexico, Europe
	Frit	Mineral perpetual	0.41	US, Mexico, Europe
	Calcium Carbonate	Mineral perpetual	1.46	US, Mexico, Europe
	Ash	Mineral perpetual	1.35	US, Mexico, Europe
	Additives	Mineral perpetual	0.66	US, Mexico, Europe
Surface	Ink	Mineral perpetual	0.15	US, Mexico, Europe
	Glaze	Mineral perpetual	1.06	US, Mexico, Europe

ADDITIONAL ENVIRONMENTAL INFORMATION

PRE-CONSUMER RECYCLED CONTENT	VARIES %
POST-CONSUMER RECYCLED CONTENT	VARIES %
VOC EMISSIONS	ZERO/INORGANIC
WATER CONSUMPTION	0.0242 CUBIC METERS

RECYCLING OR REUSE

Ceramic tile can outlast multiple generations of building occupants and is commonly reused in an existing building or salvaged for use in a new building. Solid and inert, it can also be used in a variety of post-life applications such as clean fill, roadway paving, and raw materials used to manufacture new products. To represent a "worst case" scenario, this EPD reports environmental impacts based on 100% of all tile removal waste being disposed of in a landfill.

ENERGY

RENEWABLE ENERGY	5.12 %	13.7	**MJ**
NON-RENEWABLE ENERGY	94.88 %	254	**MJ**

STANDARDS

ANSI A137.1 American National Standard Specifications for Ceramic Tile

ISO 13006 International Organization for Standardization Specifications for Ceramic Tile

ANSI A138.1/Green Squared® American National Standard Specifications for Sustainable Ceramic Tiles, Glass Tiles, and Tile Installation Materials

CERTIFICATIONS

MANUFACTURER CONTACT INFO

NAME	Tile Council of North America (TCNA)
PHONE	864-646-8453
EMAIL	
WEBSITE	www.TCNAtile.com

www.UL.com/environment | environment@ul.com

EPD
TRANSPARENCY SUMMARY: GROUT

COMPANY NAME	**Industry-Wide**
PRODUCT TYPE	**ANSI A118.6, A118.7, and ISO 13007**
PRODUCT NAME	Cement Grout for Tile Installation: Made in North America
PRODUCT DEFINITION	Factory-prepared mixture of cement, aggregate and other ingredients used to fill joints, or the spaces between tiles. Once cured, it is durable, fire-resistant, and moisture insensitive. Manufacturers include Ardex, Bostik, Crest, Custom, HB Fuller/TEC, Interceramic, Laticrete, MAPEI, Parex and Cemix/Texrite
PRODUCT CATEGORY RULE (PCR)	UL PCR Part B: Cement-Based Grout, Adhesive Mortar, and Leveling Underlayment, v1.0, 2022
CERTIFICATION PERIOD	**January 1, 2023 to January 1, 2028**
DECLARATION NUMBER	**Pending**

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LIFECYCLE IMPACT CATEGORIES

The environmental impacts listed below were assessed throughout the product's lifecycle – including raw material extraction, transportation, manufacturing, packaging, use, and disposal at end of life.

ATMOSPHERE			WATER		EARTH	
Global Warming Potential refers to long-term changes in global weather patterns – including temperature and precipitation – that are caused by increased concentrations of greenhouse gases in the atmosphere.	**Ozone Depletion Potential** is the destruction of the stratospheric ozone layer, which shields the earth from ultraviolet radiation that's harmful to life, caused by human-made air pollution.	**Photochemical Ozone Creation Potential** happens when sunlight reacts with hydrocarbons, nitrogen oxides, and volatile organic compounds, to produce a type of air pollution known as smog.	**Acidification Potential** is the result of human-made emissions and refers to the decrease in pH and increase in acidity of oceans, lakes, rivers, and streams – a phenomenon that pollutes groundwater and harms aquatic life.	**Eutrophication Potential** occurs when excessive nutrients cause increased algae growth in lakes, blocking the underwater penetration of sunlight needed to produce oxygen and resulting in the loss of aquatic life.	**Depletion of Abiotic Resources (Elements)** refers to the reduction of available non-renewable resources, such as metals and gases, that are found on the periodic table of elements, due to human activity.	**Depletion of Abiotic Resources (Fossil Fuels)** refers to the decreasing availability of non-renewable carbon-based compounds, such as oil and coal, due to human activity.
TRACI **0.192** kg CO2-Equiv.	**7.12E-12** kg CFC 11-Equiv.	**0.00906** kg O3-Equiv.	**0.000528** kg SO2-Equiv.	**3.59E-05** kg N-Equiv.	**N/A**	**.026** MJ

FUNCTIONAL UNIT: One square meter (1 sqm) of installed grout. Life cycle impact results are expressed for 75 years. Assumed application rate is 0.212 kilograms per square meter.

Environment

MATERIAL CONTENT

Material content measured to 1%.

MATERIAL	AVAILABILITY	MASS%	ORIGIN
Quartz	Mineral perpetual	34	Locally sourced US, Canada, Mexico
Portland cement	Mineral manufactured	33	US, Canada, Mexico, Europe
Calcium carbonate	Mineral perpetual	27	Locally sourced US, Canada, Mexico
Proprietary additives	Varies	2	US, Canada, Europe, Asia
Iron oxide	Mineral perpetual	1	Locally sourced US, Canada, Mexico
Calcium hydroxide	Mineral perpetual	1	Locally sourced US, Canada, Mexico
Gypsum	Mineral perpetual	1	Locally sourced US, Canada, Mexico
Vinyl acetate ethylene polymer	Polymer manufactured	<1	Locally sourced US, Canada, Mexico
Fly ash	Mineral manufactured	<1	Locally sourced US, Canada, Mexico
Silica	Mineral perpetual	<1	Locally sourced US, Canada, Mexico

ADDITIONAL ENVIRONMENTAL INFORMATION

PRE-CONSUMER RECYCLED CONTENT	**VARIES %**
POST-CONSUMER RECYCLED CONTENT	**VARIES %**
VOC EMISSIONS	**CDPH 01350 COMPLIANT**
WATER CONSUMPTION	**0.51 L**

RECYCLING OR REUSE

Tile installations with cement grout can last as long as buildings and are often reused for multiple generations of building occupants. Although tile and cement grout can be used in a variety of post-life applications (e.g., clean fill, roadway paving, aggregate for new products, etc.), this analysis adopts a conservative approach and assumes that 100% of tile and associated waste are disposed in a landfill.

ENERGY

RENEWABLE ENERGY	**9 %**	**0.26 MJ**
NON-RENEWABLE ENERGY	**91 %**	**2.59 MJ**

STANDARDS

ANSI A118.6 American National Standard Specifications, Standard Cement Grouts for Tile Installation
ANSI A118.7 American National Standard Specifications, High Performance Cement Grouts for Tile Installation
ISO 13007 Terms, Definitions and Specifications, Ceramic Tile Grouts and Adhesives
ANSI A138.1/Green Squared® American National Standard Specifications, Sustainable Ceramic Tiles, Glass Tiles and Tiles, and Tile Installation Materials

CERTIFICATIONS

MANUFACTURER CONTACT INFO

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PHONE	864-646-8453
EMAIL	
WEBSITE	www.TCNAtile.com

www.UL.com/environment | environment@ul.com

EPD
TRANSPARENCY SUMMARY: MORTAR

COMPANY NAME	**Industry-Wide**
PRODUCT TYPE	**ANSI A118.1, A118.4/11, A118.15, and ISO 13007**
PRODUCT NAME	Cement Mortar for Tile Installation: Made in North America
PRODUCT DEFINITION	Blend of cement, sand, water retention compounds and other additives used to adhere tile to a substrate. Once cured, it is durable, fire-resistant, moisture insensitive, and maintenance-free. Manufacturers include Ardex, Bostik, Cemenquin/Cement Pro, Crest, Custom, HB Fuller/TEC, Interceramic, Laticrete, MAPEI, Parex, Schluter and Cemix/Texrite
PRODUCT CATEGORY RULE (PCR)	UL PCR Part B: Cement-Based Grout, Adhesive Mortar, and Leveling Underlayment, v1.0, 2022
CERTIFICATION PERIOD	**January 1, 2023 to January 1, 2028**
DECLARATION NUMBER	**Pending**

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LIFECYCLE IMPACT CATEGORIES

The environmental impacts listed below were assessed throughout the product's lifecycle – including raw material extraction, transportation, manufacturing, packaging, use, and disposal at end of life.

ATMOSPHERE			WATER		EARTH	
Global Warming Potential refers to long-term changes in global weather patterns – including temperature and precipitation – that are caused by increased concentrations of greenhouse gases in the atmosphere.	**Ozone Depletion Potential** is the destruction of the stratospheric ozone layer, which shields the earth from ultraviolet radiation that's harmful to life, caused by human-made air pollution.	**Photochemical Ozone Creation Potential** happens when sunlight reacts with hydrocarbons, nitrogen oxides, and volatile organic compounds, to produce a type of air pollution known as smog.	**Acidification Potential** is the result of human-made emissions and refers to the decrease in pH and increase in acidity of oceans, lakes, rivers, and streams – a phenomenon that pollutes groundwater and harms aquatic life.	**Eutrophication Potential** occurs when excessive nutrients cause increased algae growth in lakes, blocking the underwater penetration of sunlight needed to produce oxygen and resulting in the loss of aquatic life.	**Depletion of Abiotic Resources (Elements)** refers to the reduction of available non-renewable resources, such as metals and gases, that are found on the periodic table of elements, due to human activity.	**Depletion of Abiotic Resources (Fossil Fuels)** refers to the decreasing availability of non-renewable carbon-based compounds, such as oil and coal, due to human activity.
TRACI **2.9** kg CO2-Equiv.	**2.53E-10** kg CFC 11-Equiv.	**0.144** kg O3-Equiv.	**0.0077** kg SO2-Equiv.	**6.29E-04** kg N-Equiv.	**N/A**	**4.05** MJ

FUNCTIONAL UNIT One square meter (1 sqm) of installed mortar. Life cycle impact results are expressed for 75 years. Assumed application rate is 4.07 kilograms per square meter.

Environment

MATERIAL CONTENT

Material content measured to 1%.

MATERIAL	AVAILABILITY	MASS%	ORIGIN
Calcium carbonate	Mineral perpetual	36	Locally sourced US, Canada, Mexico
Portland cement	Mineral manufactured	28	Locally sourced US, Canada, Mexico
Quartz	Mineral perpetual	20	Locally sourced US, Canada, Mexico
Silica	Mineral perpetual	11	US, Canada, Mexico
Fly ash	Mineral manufactured	2	US, Canada, Mexico
Proprietary additives	Varies	1	US, Mexico, Europe
Vinyl acetate ethylene polymer	Polymer manufactured	1	US, Mexico, Europe
Gypsum	Mineral perpetual	<1	US, Canada, Mexico
Calcium hydroxide	Mineral perpetual	<1	US, Canada, Mexico
Iron oxide	Mineral perpetual	<1	US, Canada, Mexico

ADDITIONAL ENVIRONMENTAL INFORMATION

PRE-CONSUMER RECYCLED CONTENT	**VARIES %**
POST-CONSUMER RECYCLED CONTENT	**VARIES %**
VOC EMISSIONS	**CDPH 01350 COMPLIANT**
WATER CONSUMPTION	**6.5 L**

RECYCLING OR REUSE

Tile installations with cement mortar can last as long as buildings and are often reused for multiple generations of building occupants. Although tile and cement mortar can be used in a variety of post-life applications (e.g., clean fill, roadway paving, aggregate for new products, etc.), this analysis adopts a conservative approach and assumes that 100% of tile and associated waste are disposed in a landfill.

ENERGY

RENEWABLE ENERGY	**10 %**	**4.51 MJ**
NON-RENEWABLE ENERGY	**90 %**	**39.3 MJ**

STANDARDS

ANSI A118.1 American National Standard Specifications, Dry-Set Cement Mortar
ANSI A118.4/11 American National Standard Specifications, Modified Dry-Set Cement Mortar
ANSI A118.15 American National Standard Specifications, Improved Modified Dry-Set Cement Mortar
ISO 13007 Terms, Definitions and Specifications, Ceramic Tile Grouts and Adhesives
ANSI A138.1/Green Squared® American National Standard Specifications, Sustainable Ceramic Tiles, Glass Tiles and Tiles, and Tile Installation Materials

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Release date: January 2026

Green building standards and rating systems are living documents, and the consensus regarding their use and interpretation is ever-evolving. Check for updates to *Tile: The Natural Choice* at www.TCNAtile.com.

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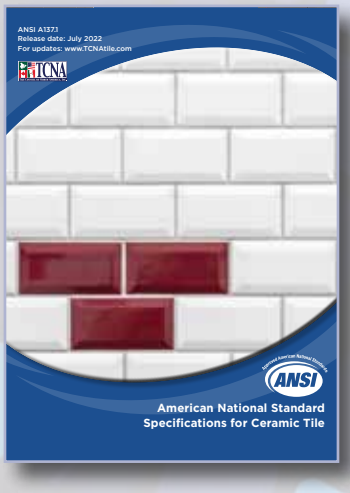
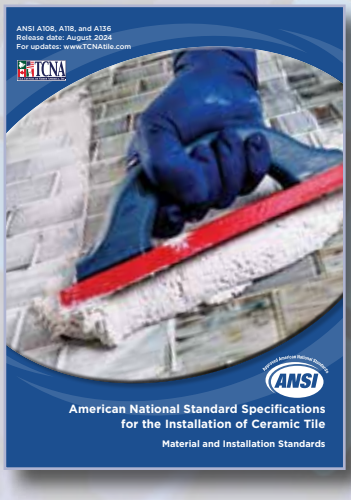
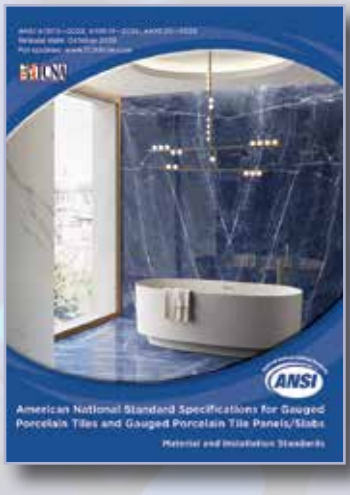
ANSI A137.2



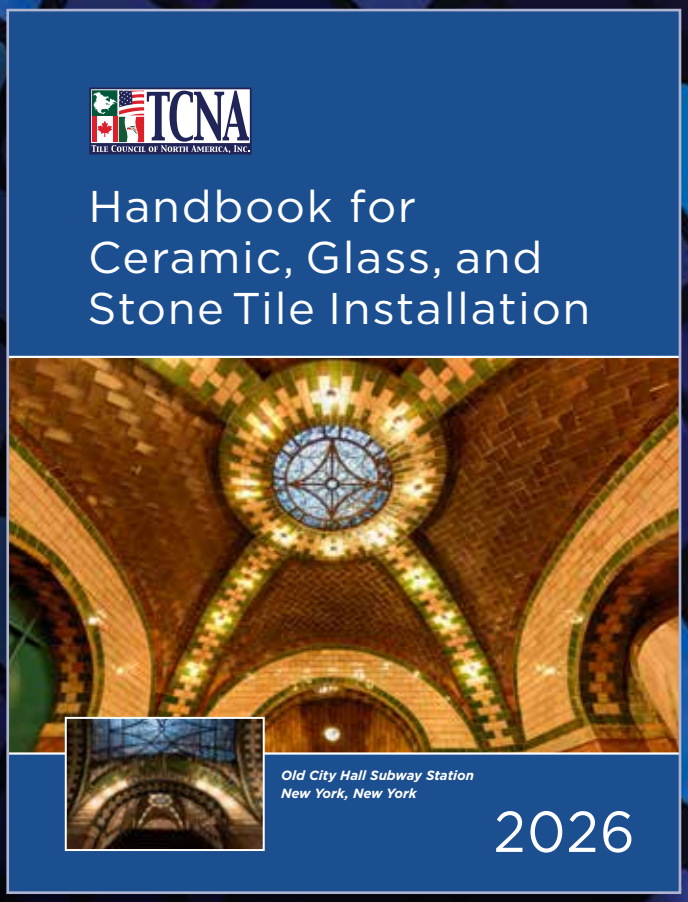
ANSI A137.1



ANSI A108, A118, and A136



ANSI A137.3, A108.19 and A108.20



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