



Porcelain Tile

EPD Optimization Assessment

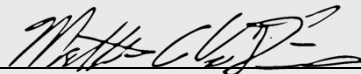
Date of Issue: June 10, 2021

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Product Information		
Manufacturer Name	Crossville Inc.	
Product Name	Porcelain Tile	
Impact Comparison Parameters		
Type of Comparison	Current vs Previous EPD of Product	
Current EPD	Porcelain Tile, 4788863727.101.1, UL Environment https://www.crossvilleinc.com/getmedia/62f75018-46a6-4fc7-ad8a-fdab6b0f9cb5/EPD-Product-Specific-(Crossville-Made-Porcelain-Tile).pdf	
Life Cycle Stages Reviewed	Cradle-to-Shipping Gate (A1-A3)	
Functional Unit	1 sq. meter of flooring covering	
Impact Assessment (TRACI)		
	Current EPD of Product	Previous EPD of Product*
GWP [kg CO ₂ eq]	24.02	27.37
ODP [kg CFC 11 eq]	3.22E-09	5.07E-09
Resources [MJ]	4.14E+01	4.72E+01
POCP [kg O ₃ eq]	8.09E-01	8.70E-01
	* Note: The values above will not correspond directly with values disclosed in the EPDs listed above. To complete this analysis, the third-party verifier conducted a separate analysis based on primary data using the same software platform and model. This additional analysis was required to assure that the comparison was accurate and meaningful.	
Impact Comparison Results		
Comparison Summary	The current Crossville product has greater than 10% GWP impact reduction, and more than 5% ODP, Resources, and POCP impact reduction than the historical product.	
LEED Credit Achieved	<input checked="" type="checkbox"/> LEED v4.0 @ 100% cost <input type="checkbox"/> LEED v4.1 @ 100% cost or 1 product	<input checked="" type="checkbox"/> LEED v4.1 @ 150% cost or 1.5 products <input type="checkbox"/> LEED v4.1 @ 200% cost or 2 products
Verifier	Matt Van Duinen, LCACP Sustainability Director, WAP Sustainability 	
Date of Issue	6/10/2021	
Expiration Date	6/10/2024	

Third Party LEED Verification Statement

It is WAP Sustainability's professional opinion that the product(s) in question meets the following LEED Materials and Resource Credit, Environmental Product Declaration, Option 2 criteria:

<input type="checkbox"/> Product Does Not Meet LEED Option 2 Criteria
<input checked="" type="checkbox"/> Impact Reduction in 3+ Categories (value at 100% by cost for LEED v4.0)
<input type="checkbox"/> GWP Reduction >0% (value at 100% by cost or 1 product for LEED v4.1)
<input checked="" type="checkbox"/> GWP Reduction 10+% (value at 150% by cost or 1.5 products for LEED v4.1)
<input type="checkbox"/> GWP Reduction 20+% and Impact Reduction 5+% in 2+ Additional Categories (value at 200% by cost or 2 products for LEED v4.1)

This determination was made for the following reasons:

- The comparability assessment initially reviewed the EPDs and gaps to comparability were initially found. However, the LCA reports were provided and reviewed. This second level of analysis helped to fill the gaps and provided enough information for us to come to the conclusion that comparability was achieved.
- Additionally, a separate LCA-based analysis was conducted to align the LCA software use and time boundaries of the datasets. Primary data from the 2014 LCA study were extracted, verified and used in the 2019 LCA study model for analysis. This analysis showed reductions in the footprint outlined in this document. This level of reduction was the basis for determining optimization.
- GWP reductions of at least 10%, and more than 5% ODP, Resources and POCP reductions were shown.
- The narrative provided by Crossville was found to adequately address the source of the reductions found in the comparison. The narrative is attached as an appendix to this report.
- Crossville has provided a timeline for publishing this report publicly and given direction as to the location that this report will be published.



Matt Van Duinen, LCACP
Sustainability Director
WAP Sustainability Consulting, LLC

Assessment of Impact Results

Life Cycle Stages Under Review

Sourcing and Manufacturing	Transportation and Installation	Use Phase	End of Life	Other
<input checked="" type="checkbox"/> A1 <input checked="" type="checkbox"/> A2 <input checked="" type="checkbox"/> A3	<input type="checkbox"/> A4 <input type="checkbox"/> A5	<input type="checkbox"/> B1 <input type="checkbox"/> B5 <input type="checkbox"/> B2 <input type="checkbox"/> B6 <input type="checkbox"/> B3 <input type="checkbox"/> B7 <input type="checkbox"/> B4	<input type="checkbox"/> C1 <input type="checkbox"/> C2 <input type="checkbox"/> C3 <input type="checkbox"/> C4	<input type="checkbox"/> D

Functional/Declared Unit

As this comparison reviewed A1-A3 impacts only, a Declared unit is provided rather than a functional unit.

	Declared Unit
Current LCA/EPD	1 sq. meter of flooring covered
Baseline LCA/EPD	1 sq. meter of flooring covered

Assessment Results

As the original life cycle assessments for the products in question were not performed in a similar manner, the results were not directly comparable. An additional LCA-based analysis was necessary to generate the comparison table below, and as such, the results are now directly comparable.

	AP [kg SO ₂ eq]	EP [kg N eq]	GWP [kg CO ₂ eq]	ODP [kg CFC 11 eq]	Resources [MJ]	POCP [kg O ₃ eq]
Porcelain Tile in 2019	5.60E-02	4.01E-03	2.40E+01	3.22E-09	4.14E+01	8.09E-01
Porcelain Tile in 2014	5.73E-02	3.13E-03	2.74E+01	5.07E-09	4.72E+01	8.70E-01
Impact Change	-2.3%	28.2%	-12.2%	-36.6%	-12.3%	-7.0%

WAP Sustainability’s Criteria for Comparability

Per ISO14025, “Type III environmental declarations are intended to allow a purchaser or user to compare the environmental performance of products on a life cycle basis. Therefore, comparability of Type III environmental declarations is critical. The information provided for this comparison shall be transparent in order to allow the purchaser or user to understand the limitations of comparability inherent in the Type III environmental declarations.”

WAP Sustainability takes this requirement very seriously. No EPD is an exact replica of another. Due to the human element and the embodied uncertainty in complex supply chain, there are nearly always limitations to comparability. The goal is to limit those limitations. It is important for the user of an EPD to understand that the environmental impact values presented are ballpark figures based on the best available science, expert decisions and available budgets. At WAP Sustainability, we agree with the above statement taken from ISO14025 and believe that “comparability of Type III environmental declarations is critical”. Without comparability, the power of LCAs and EPDs to help facilitate a transition to an environmentally sustainable economy will always be limited. The key is for the comparison to be done in a manner that is critically reviewed and open.

To facilitate transparency, we have presented our entire criteria for the assessment of comparability in the table below.

	Data is not at all comparable	Data is significantly not comparable. Modification may need to be made.	Data is comparable but opportunities for improvement exist.	Data is highly comparable.
Score Category	Score = 0	Score = 1	Score = 2	Score = 3
Count	0	1	3	21
Note: A single score of 0 will result in LCA/EPD not being able to be compared. Additionally, multiple scores of 1 will result in LCA/EPD not being able to be compared.				

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Comparability Findings

Comparable for the Purposes of LEED Credit Achievement

Not Comparable for the Purposes of LEED Credit Achievement

The products in question are similar in application, size, and use scenarios. The production method in manufacturing is similar. The boundary conditions are the same between the studies. Additionally, further LCA modeling and expert analysis was conducted to account for the difference in PCRs. It is because of these facts that the EPDs are comparable.

	Current EPD	Previous EPD	Comparability
General			
Program Operator	UL Environment	NSF International	3
PCR	UL PCR Part A UL PCR Part B: Flooring EPD Requirement	NSF International: Flooring	1
Product Category Definition			
Product Type	Porcelain Tile	Porcelain Tile	3
Manufacturing Description	Mixing, drying, pressing, glazing, and firing	Mixing, drying, pressing, glazing, and firing	3
Declared or Functional Unit	1 sq. meter	1 sq. meter	3
Weight Per Declared or Functional Unit	24.41 kg	26.52 kg	3
Reference Service Life (Product)	75	75	3
Estimated Service Life (Building)	N/A	N/A	3
Materials and Substances			
Raw Materials and Percent Listed in LCA or EPD	-	-	3
Feldspar - (%)	50.6%	50-55%	-
Kaolin - (%)	0.8%	15-20%	-
Clay - (%)	36.5%	20-25%	-

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Sand – (%)	0.9%	1-3%	-
Talc – (%)	1.2%	1-3%	-
Scrap – (%)	5.5%	4-6%	-
Dispersant – (%)	N/A	0.1-0.3%	-
Additives – (%)	1.2%	N/A	-
Stain – (%)	2.4%	0.1-1.0%	-
Glaze – (%)	0.5%	0.1-3.0%	-
Alumina – (%)	N/A	0.1-0.5%	-
Goal and Scope			
Stated Goal of LCA or EPD	Create an LCA for porcelain tile products to understand impacts and create EPDs	Better characterize environmental performance of products, create EPDs	3
Stated Scope of LCA or EPD	Cradle-to-Grave	Cradle-to-Grave	3
Format for Declaration			
LCA or EPD	EPD	EPD	3
ISO 14025 Series Compliance	Yes	Yes	3
ISO 21930 Compliance	Yes	No, but results have been updated using the same model as 2019	2
EN 15804 Compliance	N/A	N/A	-
Data Collection			
Assessed Data Quality	Data within 10 years, US datasets when possible, appropriate technologies used	Data within 10 years, US datasets when possible, appropriate technologies used	3
Vintage of Primary Data	2018	2012	3
Key Assumptions, Overall	Allocation based on production volume at plants	Allocation based on production volume at plants	3
Key Assumptions, Use Phase	N/A	N/A	-

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Key Assumptions, EOL	N/A	N/A	-
Defined Cut Off Rule	<1% mass <1% energy <5% total	<1% mass <1% energy <5% total	3
Percent of Materials Left Out of Study	Cumulative excluded <5%	Cumulative excluded <5%	3
Software Used to Model LCA	GaBi 8.7.0.18, but results have been updated using GaBi 10.0.1.92	GaBi 6 - 2013, but results have been updated using GaBi 10.0.1.92	2
Source of Secondary Datasets	Sphera	Sphera	3
Vintage of Secondary Datasets	2018	2012	2
Reporting Categories			
LCIA Impacts Assessment Methodology	TRACI 2.1	TRACI 2.1	3
Description of Any Modifications Made to Reporting Categories That Were Necessary to Facilitate Comparison	None	None	3
Equivalency of Stages			
Description of Any Modifications Made to Life Cycle Stages That Were Necessary to Facilitate Comparison	None	None	3

Appendix: Manufacturer Narrative of Impact Reductions

The reductions in the impacts between 2014 and 2019 Porcelain Tile were mainly derived from five factors:

- The per-unit energy consumption for manufacturing the product has been reduced. The electricity per-unit usage in 2019 had reduced 1.92% since 2014 while the natural gas per-unit usage in 2019 had reduced 4.09% since 2014.
- The product weight per square meter in 2019 had reduced 7.96% since 2014.
- Since 2017, Crossville has been participating in an energy efficiency program by identifying energy savings opportunities in their production process.
- The waste collection and recycling process had been optimized throughout the Crossville manufacturing plants to reduce the amount of landfilled material and increase the amount of reclaimed materials. To date the Eco-Cycle Waste Process had reclaimed 22,922,498 lbs.
- Crossville continues to use pre-consumer recycled content in their manufacturing process.

In addition to above, the measures Crossville took include changing the packaging configuration which reduced the plastic material while increasing the use of material that is able to capture biogenic carbon.