Environmental Product Declaration

Yankee Hill Brick

Clay Masonry Products

Yankee Hill Brick has over 140 year tradition of making high quality, beautiful clay brick and pavers.

This is a site specific and product specific Environmental Product Declaration (EPD) for Yankee Hill Brick (YHB) clay bricks and pavers produced at the Lincoln, NE Plant. Our goal, to provide products and services that are environmentally friendly and sustainable, continually means we must strive to innovate and evaluate our manufacturing process.

NSF

Certified Environmental Product Declaration

www.nsf.org

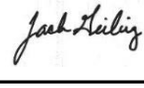
Environmental Product Declaration

Yankee Hill Brick

Clay Masonry Products

According to the following ISO Standards: 14025, 14027, 14040, 14044, 21930:2017

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025 and ISO 21930. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	NSF International 789 N. Dixboro Road, Ann Arbor, MI 48105, USA https://www.nsf.org/
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	NSF/ASTM Clay Masonry Products PCR, NSF Program Operator Rules (2015)
MANUFACTURER NAME AND ADDRESS	Yankee Hill Brick 3705 S Coddington Ave. Lincoln, NE 68522
DECLARATION NUMBER	EPD11239
DECLARED PRODUCT & FUNCTIONAL UNIT	Yankee Hill Brick - Clay Masonry Products Functional Unit = 1 square meter of installed clay brick product over 75 year building lifetime (See section 'Functional Unit' for full description per product category)
REFERENCE PCR AND VERSION NUMBER	NSF/ASTM Clay Masonry Products PCR
DESCRIPTION OF PRODUCT(S) APPLICATION/USE	Clay masonry products fulfill multiple functions in wall and paving applications, including but not limited to, serving as a cladding, structural wall, or solid base for pedestrian and vehicular traffic.
PRODUCT RSL DESCRIPTION	150 years
MARKETS OF APPLICABILITY	North America
DATE OF ISSUE	3/5/2026
PERIOD OF VALIDITY	5 years
EPD TYPE	Facility-Specific Product-Specific
DATASET VARIABILITY	N/A
EPD SCOPE	Cradle-to-Grave
YEAR(S) OF REPORTED PRIMARY DATA	2023
LCA SOFTWARE & VERSION NUMBER	SimaPro v9.6
LCI DATABASE(S) & VERSION NUMBER	Ecoinvent v3.11 & USLCI v2.0
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.2
The sub-category PCR review was conducted by:	Jack Geibig - 
This declaration was independently verified in accordance with ISO 14025: 2006. The NSF/ASTM Clay Masonry Products PCR ☐ INTERNAL ☒ EXTERNAL	
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Jack Geibig - 

The EPD Owner has sole ownership, responsibility, and liability for the content of this EPD

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Clay Masonry Products

According to the following ISO Standards: 14025, 14027, 14040, 14044, 21930:2017

General Information

Description of Company/Organization

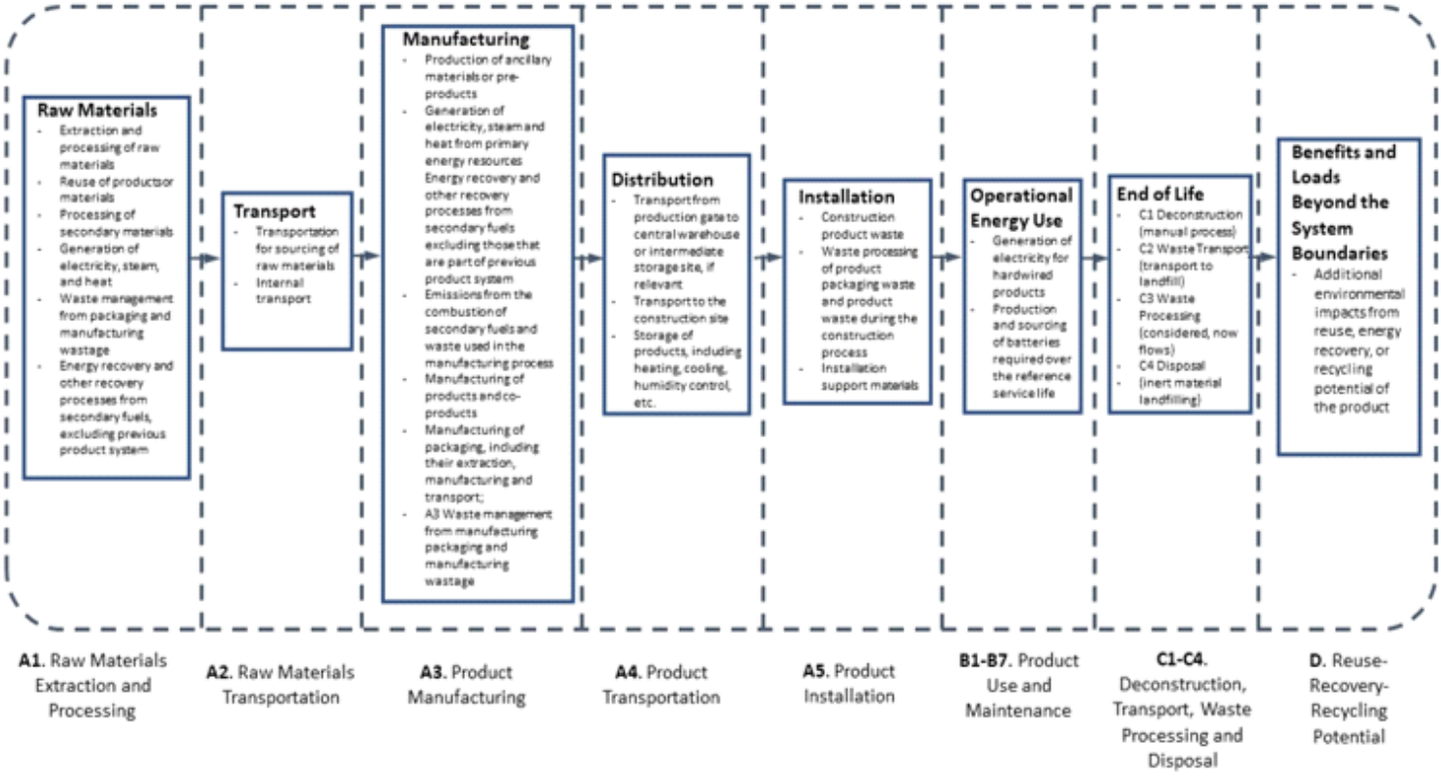
YHB exhibits a proud tradition of making beautiful bricks and pavers that last generations. With 140+ years of brick making experience, we are known for our wide range of colors, our ability to make shapes, and our ability to make a quality product.

Product Description

The YHB EPD covers two types of products.
Type 1: Clay Bricks
YHB produces 39 different through-body colors, in 8 different textures, and many different shapes and sizes, some cored and some solid. All bricks exceed the ASTM-C216 standard. The bricks are very strong, with low water absorption.
Type 2: Clay Pavers
YHB offers three types of pavers. Heavy Vehicular, Pavers, and Solids. All pavers exceed the minimum compressive strength set forth in ASTM C902 and C1272.

This EPD represents brick products from the following Yankee Hill facilities: Yankee Hill Lincoln, NE.

Flow Diagram



Manufacturer Specific EPD

This product-specific EPD was developed based on a Cradle-to-Grave Life Cycle Assessment. The EPD accounts for raw material extraction and processing, transport, product manufacturing, distribution, installation, maintenance, disposal, and potential benefits and loads following the end of life disposal. Manufacturing data were gathered directly from company personnel. When company-specific data were not available for a given process input, the BIA Industry Average LCA value was used as a proxy. For any product group EPDs, an impact assessment was completed for each product and the highest impacts were reported as conservative representations of the product group. Product grouping was considered appropriate if the individual product impacts differed by no more than ±10% in any impact category.

Application

Clay Bricks are used for building interior and exterior walls, columns, partitions, fireplaces and chimneys, and other structures.
Clay Pavers are used for driveways, walkways and patios, sidewalks and roads. They can be placed on a flexible or rigid base.

Material Composition

The primary product components and/or materials must be indicated as a percentage mass to enable the user of the EPD to understand the composition of the product in delivery status. No regulated hazardous or toxic substances that pose a concern to human health and/or the environment are present in the products described in this study.

The average composition of the brick products are as follows:

Material	Clay Brick Assemblies
Mined Clay and Shale	96.01%
External Grog	2.96%
Primary Pigments	0.81%
Body Additives	0.09%
Sand	0.12%
Total	**100%**

Properties of Declared Product as Shipped

YHB bricks are shipped in cubes formed by stacking bricks, using wood lathe to create a void space for transporation, and banded by plastic strapping. Specials are shipped via wrapped pallets. Some cubes may be placed on pallets and wrapped, per customer's request.

Methodological Framework

Functional Unit

This EPD defines the functional unit (FU) for clay brick, clay brick pavers, and structural clay tile products as 1 m² of product installed as per Table 2 of the PCR. Depending upon the application, other characteristics of clay masonry products should be considered when making comparisons. Fire rating, thermal properties, and acoustic performance may be important in characterizing the performance of clay masonry assemblies.
The clay masonry products listed below are baseline products. Results for all products can be found utilizing the conversion factor tables found in this EPD. Baseline products are listed in the conversion factor tables on the first line.

Name	Functional Unit Description	Mass of brick product in functional unit	Conversion of FU to 1 kilogram of the product
Clay Brick, Structural Clay Tile	1 m^2 of vertically installed clay brick (or structural clay tile) using 0.95 cm (3/8”) mortar joints for the estimated life of the building	124.91 kg per m²	0.0080
Thin Brick	1 m^2 of vertically installed thin brick using 0.95 cm (3/8”) mortar joints for the estimated life of the building	20.09 kg per m²	0.0083
Clay Brick Paver	1 m^2 of horizontally installed clay brick paver using 3.2 mm (1/8”) sand joints for the estimated life of the installed surface.	120.86 kg per m²	0.0498

System Boundary

This is a Cradle-to-Grave Environmental Product Declaration. The following life cycle phases were considered:

Product Stage			Construction Process Stage		Use Stage							End of Life Stage*				Benefits and Loads Beyond the System Boundaries
Raw material supply	Transport	Manufacturing	Transport from gate to the site	Construction/ installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction /demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Description of the System Boundary Stages Corresponding to the PCR
(X = Included; MND = Module Not Declared)

Reference Service Life

The reference service life of a properly installed brick is 150 years. The building estimated service life is 75 years.

Allocation

Allocation was determined on a per kilogram basis for primary data using the guidance of ISO 21930. Since the majority of energy is used in the firing of brick products, the inputs were allocated evenly over the fired brick weight production. Energy usage did not depend on brick specifications (such as pigment usage or shape) so the allocation over mass is not expected to introduce error.
For secondary data, cut-off methodology was used.

Cut-off Criteria

Processes whose total contribution to the final result, with respect to their mass and in relation to all considered impact categories, is less than 1% can be neglected. The sum of the neglected processes may not exceed 5% by mass of the considered impact categories. For that a documented assumption is admissible.

For Hazardous Substances the following requirements apply:

- The Life Cycle Inventory (LCI) of hazardous substances will be included, if the inventory is available.
- If the LCI for a hazardous substance is not available, the substance will appear as an input in the LCI of the product, if its mass represents more than 0.1% of the product composition.
- If the LCI of a hazardous substance is approximated by modeling another substance, documentation will be provided.

This EPD is in compliance with the cut-off criteria. No processes were neglected or excluded. Capital items for the production processes (machine, buildings, etc.) were not taken into consideration.

Data Sources

Primary data were collected for every process in the product system under the control of Yankee Hill. Secondary data from the ecoinvent v3.11 and USLCI v2.0 databases were utilized. These data were evaluated and have temporal, geographic, and technical coverage appropriate to the scope of the brick product category.

Data Quality

The data sources used are complete and representative of the study's geographic and technological coverage and are a recent vintage. The data used for primary data are based on direct information sources of the manufacturer. Secondary data sets were used for raw materials extraction and processing, end of life, transportation, and energy production flows. Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty. The processes modeled represent the specific situations in the clay brick assembly life cycle. System boundaries and exclusions are clearly defined, and no other data gaps were identified.

Period Under Review

The period under review is the full calendar year of 2023.

Treatment of Biogenic Carbon

The uptake and release of biogenic carbon throughout the product life cycle follows ISO 21930 Section 7.2.7.

Comparability and Benchmarking

EPDs are only comparable if they comply with ISO 21930, this sub-category PCR, include all relevant information modules and are based on equivalent scenarios with respect to the construction works context.
Environmental declarations from different programs may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building or construction works level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of the life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background datasets may lead to differences in the results upstream or downstream of the life cycle stages declared.

Units

The LCA results within this EPD are reported in SI units.

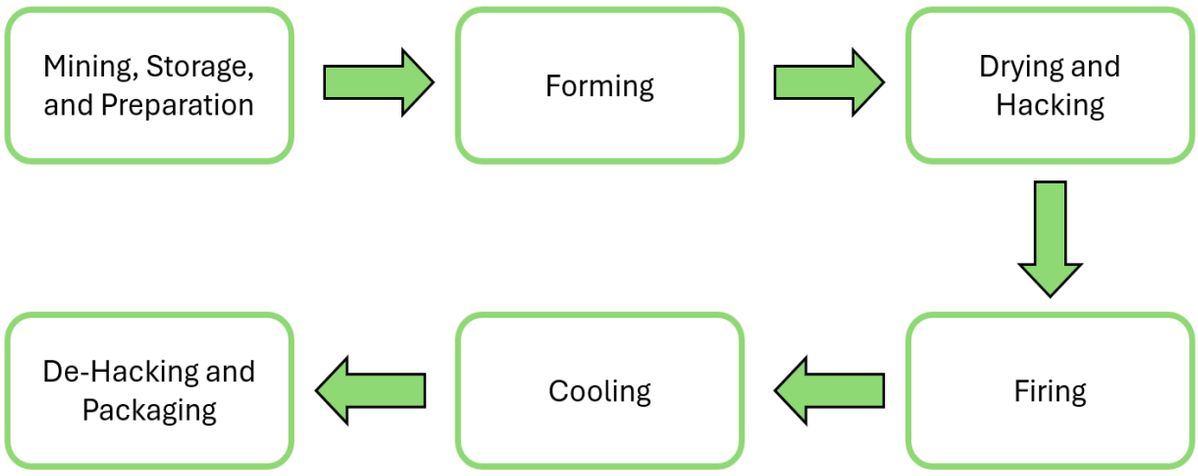
Additional Environmental Information

Background data

For life cycle modeling of the considered products, SimaPro by PRe Sustainability is used. The Ecoinvent 3.11 and USLCI 2.0 databases contain consistent and documented datasets which can be found online. To ensure comparability of results in the LCA, the basic data of the SimaPro databases were used for energy, transportation and auxiliary materials.

Manufacturing

The brick manufacturing process follows the following general steps: 1). Mining, storage, and raw material preparation; 2). Forming; 3). Hacking and Drying; 4). Firing; 5). Cooling; 6). De-hacking and Packaging. The firing stage consumes the majority of energy required for brick production and can be powered by a variety of fuel sources. Depending on the facility, mining may occur on-site or the clay material may be transported from off-site.



Packaging

Packaging is recyclable depending on material type and national statistics. The packaging material consists of cardboard, polypropylene, steel, and wood. Total mass of packaging per functional unit:
Clay Brick, Structural Clay Tile - 0.71 kg per functional unit
Clay Brick Paver - 0.687 kg per functional unit
Thin Brick - 0.638 kg per functional unit

Material	Quantity (% By Weight)
Plastic Straps	78.44%
Steel Straps	0.00%
Paper Dividers	12.09%
Wood Dividers	8.58%
Wood Pallets	0.89%
Total	**100%**

Transportation

Transport to Building Site (A4)				
Name	**Structural Clay Brick**	**Clay Brick Paver**	**Thin Brick**	**Unit**
Fuel type	Diesel	Diesel	Diesel	-
Liters of fuel (for freight (combination) truck with a 32t payload)	2.72E-03	2.72E-03	2.72E-03	L / 100km-kg
Vehicle Type	Combination Truck	Combination Truck	Combination Truck	-
Transport distance	407	407	407	km
Capacity utilization (including empty runs)	49.9	49.9	49.9	%
Gross density of products transported	1987.9	1987.9	1987.9	kg/m^3
Weight of products transported (if gross density not reported)	-			kg
Volume of products transported (if gross density not reported)	-			m^3
Capacity utilization volume factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaging products)	<1			-

Product Installation

Products installed with mortar: Mortar creates a 3/8 inch (0.95 cm) wide joint between bricks in the square meter functional unit. Mixing energy was excluded from installation, per the PCR. For thin brick products, a 1/8 inch (0.32 cm) layer of bonding mortar is included on the bed side of the square meter.

Products installed with sand: A 1/8 inch (0.32 cm) wide joint was included between paver bricks. These joints are filled with sand, however, per the PCR, sand for this installation was excluded.

Installation into the building (A5)					
Name		**Structural Clay Brick**	**Clay Brick Paver**	**Thin Brick**	**Unit**
Auxiliary materials	Mortar	27.31	0.00	8.91	kg
	Water	5.46	0.00	1.78	kg
Water consumption		0.00	0.00	0.00	m^3
Electricity consumption		0.00	0.00	0.00	kWh
Product loss per functional unit		6.25	6.04	1.00	kg
Waste materials at construction site		6.45	6.24	1.04	kg
Output substance (recycle)		0.81	0.79	0.13	kg
Output substance (landfill)		5.43	5.26	0.87	kg
Output substance (incineration)		0.00	0.00	0.00	kg
Packaging waste (recycle)		0.1282	0.1241	0.0206	kg
Packaging waste (landfill)		0.0597	0.0578	0.0096	kg
Packaging waste (incineration)		0.0175	0.0169	0.0028	kg
Biogenic carbon contained in packaging		0.0196	0.0190	0.0032	kg
VOC emissions		-	-	-	kg

*CO2 emissions to air from disposal of packaging

Product Use

Once installed, clay masonry products last the life of a building, and they can be salvaged, reclaimed, or recycled for future construction after a building is demolished. The RSL for clay masonry established by this PCR is 150 years, but masonry products can and do last longer. While the impacts presented in this EPD are calculated for an ESL of 75 years, the cradle-to-grave impacts reported would be identical for a building life up to 150 years or more.

Maintenance of Clay Pavers was modeled per the PCR using water from a pressure washer (average 13hp) and a cleaning solution applied to the target area.

Reference Service Life		
Name	**Value**	**Unit**
Reference Service Life	150	years
Estimated Building Service Life	75	years
Number of Replacements	0.0	replacements

Maintenance Stage (B2)					
Name		**Structural Clay Brick**	**Clay Brick Paver**	**Thin Brick**	**Unit**
Maintenance cycle		0.0	37.5	0.0	Number/ RSL
Maintenance cycle		0.0	18.8	0.0	Number/ ESL
Water consumption (from tap, to sewer)		0.0	9.46E-03	0.0	m^3
Electricity consumption		0.0	0.0808	0.0	kWh
Ancillary materials	Cleaning agent	0.0	6.23E-02	0.0	kg/m^2
	Water	0.0	2.17E-01	0.0	kg/m^2

Disposal

Clay Brick, Clay Brick Pavers, and Structural Clay Tiles are collected separately from mixed construction waste in the demolition stage. Demolition and collection require no additional considerations from normal demolition; therefore, demolition impacts are de minimis. Upon collection, 12% of the product (by mass) is reused in the form of bulk aggregate to offset virgin material in other product life cycles, with the remaining 88% being landfilled.

End of life (C1-C4)				
Name	**Structural Clay Brick**	**Clay Brick Paver**	**Thin Brick**	**Unit**
Collected separately	124.91	120.86	20.09	kg
Collected as mixed construction waste	0.00	0.00	0.00	kg
Recycling	14.99	14.50	2.41	kg
Landfilling	109.92	106.36	17.68	kg
Incineration with energy recovery	0.00	0.00	0.00	kg

Re-use Phase

Part of the product can be reused in construction outside of the current system boundary. Currently, there are companies that salvage brick and sell reclaimed brick to be used in new construction or in the repair of existing construction. However, due to limited data available on the number of reclaimed brick units that are reused, a value of 0% is assumed. Per the PCR, a value of 12% of brick are reused as aggregate gravel. The following table provides values on the extent of brick reused.

Re-Use, recovery, And/Or Recycling Potential (D)				
Name	**Structural Clay Brick**	**Clay Brick Paver**	**Thin Brick**	**Unit**
Scenario of benefits and loads after the system boundary	Brick product collected for reuse is used as construction aggregate. It is assumed to displace gravel on a kilogram per kilogram basis.			-
Aggregate gravel displaced from partial reuse of collected brick product.	14.99	14.50	2.41	kg

Clay Brick, Structural Clay Tile - Results per Functional Unit Over the Building Lifetime of 75 Years

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks. Results reported below are for the Modular Clay Brick and Structural Clay Tile product and the 4 x 2.24 x 8 Paver which serve as the baseline products evaluated. Specification for the baseline brick are identified in Conversion Factor Table for Clay Brick and Stuctural Clay Tile.

Results shown below were calculated using TRACI 2.2 Methodology.

TRACI 2.2 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5		B2	C2	C4	D
					Brick Impacts	Mortar Impacts				
GWP	Global warming	kg CO_2-Eq.	3.97E+01	4.72E+00	2.50E+00	8.25E+00	0.00E+00	1.51E+00	2.34E+00	-6.78E-02
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	3.88E-08	1.79E-10	4.38E-09	3.72E-08	0.00E+00	6.34E-11	4.72E-08	-6.98E-10
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	3.49E-01	2.82E-02	2.06E-02	2.62E-02	0.00E+00	2.00E-02	1.30E-02	-4.12E-04
FEP	Freshwater eutrophication potential	kg P-Eq.	2.15E-03	5.33E-06	3.65E-04	8.50E-04	0.00E+00	1.89E-06	1.38E-04	-1.25E-05
MEP	Marine eutrophication potential	kg N-Eq.	1.81E-02	6.43E-03	1.77E-03	4.46E-03	0.00E+00	5.30E-03	3.03E-03	-7.94E-05
SP	Smog formation potential	kg O_3-Eq.	2.13E+00	7.72E-01	1.90E-01	5.02E-01	0.00E+00	5.13E-01	3.58E-01	-8.87E-03

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

The additional results shown below were calculated using the CML 4.1 (2001 - April 2013) Methodology.

Parameter	Parameter	Unit	A1-A3	A4	A5		B2	C2	C4	D
					Brick Impacts	Mortar Impacts				
ADPF	Abiotic depletion potential for fossil resources	MJ	5.11E+02	6.07E+01	2.99E+01	2.17E+01	0.00E+00	2.17E+01	3.10E+00	-2.92E-01

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

Statement on EPD Results

A) Results in the above table and those that follow for modules A1-A3 and A4 reflect the manufacture and transportation to the job site of the clay masonry product only. Beginning with module A5 installation, the remaining columns reflect the impacts of the masonry product within the construction works, and thus consider the presence of mortar, etc.
B) Results in the impact tables reflect the life cycle impacts associated with the baseline product only. Impacts for other products in the EPD can be determined using a conversion factor. To determine the results for another product simply multiply the impacts for the baseline product by the appropriate conversion factor as follows:
1) Where applicable, multiply the results from the mortar column (under A5) by the mortar conversion factor.
2) Multiply all non-mortar column results by the applicable clay masonry product conversion factor for that product

Results below contain the resource use throughout the life cycle of the product.

Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5		B2	C2	C4	D
					Brick Impacts	Mortar Impacts				
RPR_E	Renewable primary energy as energy carrier	MJ	3.48E+00	0.00E+00	1.98E-01	6.74E+00	0.00E+00	0.00E+00	4.66E-01	-6.87E-02
RPR_M	Renewable primary energy resources as material utilization	MJ	8.4E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	Nonrenewable primary energy as energy carrier	MJ	5.15E+02	6.07E+01	3.01E+01	2.42E+01	0.00E+00	2.17E+01	3.58E+00	-3.68E-01
$NRPR_M$	Nonrenewable primary energy as material utilization	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	Use of secondary material	kg	4.85E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	Use of renewable secondary fuels	MJ	1.29E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Use of nonrenewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	Energy recovered from disposed waste	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	Use of net fresh water	m^3	3.87E-02	0.00E+00	2.56E-03	4.44E-02	0.00E+00	0.00E+00	2.01E-02	-2.28E-02

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories

Parameter	Parameter	Unit	A1-A3	A4	A5		B2	C2	C4	D
					Brick Impacts	Mortar Impacts				
HWD	Hazardous waste disposed	kg	1.29E-04	0.00E+00	2.01E-05	2.18E-04	0.00E+00	0.00E+00	2.65E-04	-4.41E-06
NHWD	Non-hazardous waste disposed	kg	1.99E+00	0.00E+00	5.71E+00	9.57E-01	0.00E+00	0.00E+00	1.10E+02	-7.80E-03
HLRW	High-level radioactive waste	kg or m^3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ILLRW	Intermediate- and low-level radioactive waste	kg or m^3	6.19E-05	0.00E+00	3.45E-06	3.75E-05	0.00E+00	0.00E+00	6.84E-06	-1.14E-06
CRU	Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	Materials for recycling	kg	0.00E+00	0.00E+00	9.40E-01	0.00E+00	0.00E+00	0.00E+00	1.50E+01	0.00E+00
MER	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	Recovered energy exported from system	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

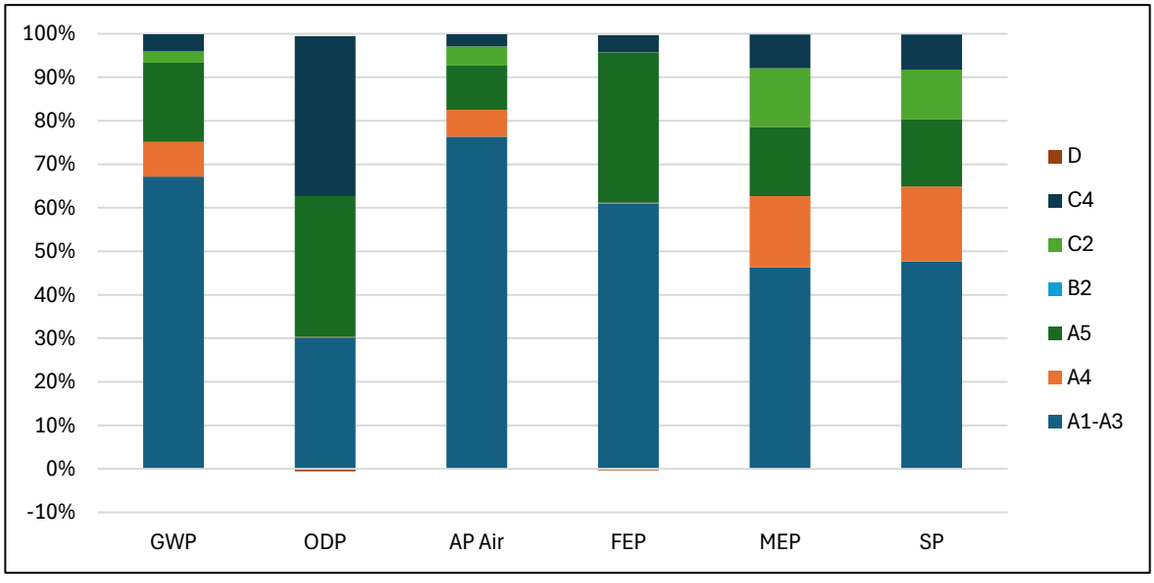
Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

Resource Use										
Parameter	Parameter	Unit	A1-A3	A4	A5		B2	C2	C4	D
					Brick Impacts	Mortar Impacts				
BCRP	Biogenic Carbon Removal from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP	Biogenic Carbon Emissions from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK	Biogenic Carbon Removal from Packaging	kg CO_2	8.55E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK	Biogenic Carbon Emissions from Packaging	kg CO_2	0.00E+00	0.00E+00	8.55E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO_2	5.27E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE	Calcination Carbon Emissions	kg CO_2	5.69E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR	Carbonation Carbon Removal	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

Clay Brick, Structural Clay Tile - LCA Interpretation

The production life cycle stage (A1-A3) dominates the impacts across all impact categories. This is due to the upstream production of materials used in the product, along with electricity and natural gas use in the manufacturing of the product. Downstream stages are effected by the weight of the product, except for the mortar used in installation.



Clay Brick, Structural Clay Tile - Conversion Factors for Results

The following table can be used to scale the impacts given above to any of the products listed below by using the appropriate factors.
To calculate an impact for a given product, mutiply the impact by that products conversion factor. For impacts in the 'A5 - Mortar Impacts' column, use the 'Mortar Conversion Factor' below. Otherwise, use the 'Brick Conversion Factor' column.

For example: To determine the A1-A3 TRACI GWP imapct for 'Modular Solid', multiply the above impact (3.97E+01) by the Brick Conversion Factor (1.335) for a result of 5.30E+01.

To determine impact over the entire lifecycle, multiply the impact for each stage by the correct conversion factor and summate.

Unit Size Designation	ASTM Specification	Dimensions (inch) (W x H x L)	Dimensions (cm) (W x H x L)	Void Space (%)	Mass of Masonry unit (kg/unit)	No. of Units/m^2 (0.95 cm joint)	Brick Conversion Factor	Mortar Mass (kg/m^2)	Mortar Conversion Factor
Modular (Baseline)	*C216*	*3.625 x 2.25 x 7.625*	*9.2 x 5.7 x 19.4*	*23.0%*	*1.69*	*73.81*	*---*	*32.77*	*1.000*
Modular Solid	*C216,C902*	*3.625 x 2.25 x 7.625*	*9.2 x 5.7 x 19.4*	*0.0%*	*2.26*	*73.81*	*1.335*	*32.77*	*1.000*
Closure	*C216*	*3.625 x 3.625 x 7.625*	*9.2 x 9.2 x 19.4*	*23.0%*	*2.73*	*48.44*	*1.057*	*24.39*	*0.744*
Closure Solid	*C216*	*3.625 x 3.625 x 7.625*	*9.2 x 9.2 x 19.4*	*0.0%*	*3.72*	*48.44*	*1.443*	*24.39*	*0.744*
Triple	*C216*	*3.625 x 7.625 x 7.625*	*9.2 x 19.4 x 19.4*	*23.0%*	*5.78*	*24.22*	*1.122*	*16.39*	*0.500*
Roman	*C216*	*3.625 x 1.625 x 11.625*	*9.2 x 4.1 x 29.5*	*24.0%*	*1.77*	*64.58*	*0.915*	*38.11*	*1.163*
Solid Roman	*C216*	*3.625 x 1.625 x 11.625*	*9.2 x 4.1 x 29.5*	*0.0%*	*2.49*	*64.58*	*1.286*	*38.11*	*1.163*
Norman	*C216*	*3.625 x 2.25 x*	*9.2 x 5.7 x 29.5*	*24.0%*	*2.58*	*49.21*	*1.017*	*30.37*	*0.927*
Solid Norman	*C216*	*3.625 x 2.25 x 11.625*	*9.2 x 5.7 x 29.5*	*0.0%*	*3.40*	*49.21*	*1.340*	*30.37*	*0.927*
Utility	*C216*	*3.625 x 3.625 x 11.625*	*9.2 x 9.2 x 29.5*	*24.0%*	*4.16*	*32.29*	*1.076*	*21.85*	*0.667*
Solid Utility	*C216*	*3.625 x 3.625 x 11.625*	*9.2 x 9.2 x 29.5*	*0.0%*	*5.54*	*32.29*	*1.433*	*21.85*	*0.667*
3" BD Utility	*C216*	*3 x 3.625 x 11.625*	*7.6 x 9.2 x 29.5*	*21.0%*	*3.40*	*32.29*	*0.880*	*18.09*	*0.552*
3" BD Norwegian	*C216*	*3 x 2.75 x 11.625*	*7.6 x 7 x 29.5*	*21.0%*	*2.61*	*41.33*	*0.863*	*21.85*	*0.667*
Standard 8"	*C216*	*3.625 x 2.25 x 8*	*9.2 x 5.7 x 20.3*	*23.0%*	*1.78*	*70.50*	*1.004*	*32.45*	*0.990*

Environmental Product Declaration

Yankee Hill Brick

Clay Masonry Products

According to the following ISO Standards: 14025, 14027, 14040, 14044, 21930:2017

Unit Size Designation	ASTM Specification	Dimensions (inch) (W x H x L)	Dimensions (cm) (W x H x L)	Void Space (%)	Mass of Masonry unit (kg/unit)	No. of Units/m^2 (0.95 cm joint)	Brick Conversion Factor	Mortar Mass (kg/m^2)	Mortar Conversion Factor
King	*C216*	*2.75 x 2.625 x 9.625*	*7 x 6.7 x 24.4*	*21.0%*	*1.89*	*51.67*	*0.783*	*21.43*	*0.654*
King Solid	*C216*	*2.75 x 2.625 x 9.625*	*7 x 6.7 x 24.4*	*0.0%*	*2.52*	*51.67*	*1.043*	*21.43*	*0.654*
Estate	*C216*	*2.75 x 3.625 x 9.625*	*7 x 9.2 x 24.4*	*21.0%*	*2.77*	*38.75*	*0.859*	*17.35*	*0.529*
Engineer	*C216*	*3.625 x 2.75 x 7.625*	*9.2 x 7 x 19.4*	*23.0%*	*2.07*	*62.00*	*1.027*	*28.87*	*0.881*
Norwegian	*C216*	*3.625 x 2.75 x 11.625*	*9.2 x 7 x 29.5*	*24.0%*	*3.09*	*41.33*	*1.021*	*26.41*	*0.806*
Queen	*C216*	*2.625 x 2.75 x 7.625*	*6.7 x 7 x 19.4*	*21.0%*	*1.50*	*62.00*	*0.743*	*20.90*	*0.638*
Engineer King	*C216*	*2.75 x 2.75 x 9.625*	*7 x 7 x 24.4*	*21.0%*	*1.98*	*49.60*	*0.786*	*20.78*	*0.634*

The following photo shows a depiction of a Modular Clay Brick.

Clay Brick Paver - Results per Functional Unit Over the Building Lifetime of 75 Years

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks.

Results shown below were calculated using TRACI 2.2 Methodology.

TRACI 2.2 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	C2	C4	D
GWP	Global warming	kg CO_2-Eq.	3.84E+01	4.57E+00	2.41E+00	1.63E+00	1.47E+00	2.26E+00	-6.56E-02
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq	3.75E-08	1.73E-10	4.24E-09	1.54E-07	6.14E-11	4.57E-08	-6.76E-10
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	3.38E-01	2.73E-02	1.99E-02	1.07E-02	1.94E-02	1.26E-02	-3.98E-04
FEP	Freshwater eutrophication potential	kg P-Eq.	2.08E-03	5.16E-06	3.53E-04	2.94E-04	1.83E-06	1.33E-04	-1.21E-05
MEP	Marine eutrophication potential	kg N-Eq.	1.76E-02	6.22E-03	1.72E-03	1.89E-03	5.12E-03	2.94E-03	-7.68E-05
SP	Smog formation potential	kg O_3-Eq.	2.06E+00	7.47E-01	1.84E-01	2.36E-01	4.97E-01	3.47E-01	-8.58E-03

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

The additional results shown below were calculated using the CML 4.1 (2001 - April 2013) Methodology.

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	C2	C4	D
ADPF	Abiotic depletion potential for fossil resources	MJ	4.94E+02	5.87E+01	2.89E+01	1.31E+01	2.10E+01	3.00E+00	-2.83E-01

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

Results below contain the resource use throughout the life cycle of the product.

Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	C2	C4	D
RPR_E	Renewable primary energy as energy carrier	MJ	3.37E+00	0.00E+00	1.92E-01	1.51E+00	0.00E+00	4.50E-01	-6.64E-02
RPR_M	Renewable primary energy resources as material utilization	MJ	8.12E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	Nonrenewable primary energy as energy carrier	MJ	4.98E+02	5.87E+01	2.91E+01	1.46E+01	2.10E+01	3.47E+00	-3.56E-01
$NRPR_M$	Nonrenewable primary energy as material utilization	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	Use of secondary material	kg	4.69E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	Use of renewable secondary fuels	MJ	1.25E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Use of nonrenewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	Energy recovered from disposed waste	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	Use of net fresh water	m^3	3.74E-02	0.00E+00	2.48E-03	1.83E-01	0.00E+00	1.94E-02	-2.21E-02

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	C2	C4	D
HWD	Hazardous waste disposed	kg	1.25E-04	0.00E+00	1.94E-05	4.47E-04	0.00E+00	2.57E-04	-4.27E-06
NHWD	Non-hazardous waste disposed	kg	1.92E+00	0.00E+00	5.53E+00	9.77E-02	0.00E+00	1.06E+02	-7.54E-03
HLRW	High-level radioactive waste	kg or m^3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ILLRW	Intermediate- and low-level radioactive waste	kg or m^3	5.99E-05	0.00E+00	3.34E-06	2.33E-05	0.00E+00	6.61E-06	-1.11E-06
CRU	Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	Materials for recycling	kg	0.00E+00	0.00E+00	9.10E-01	0.00E+00	0.00E+00	1.45E+01	0.00E+00
MER	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	Recovered energy exported from system	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

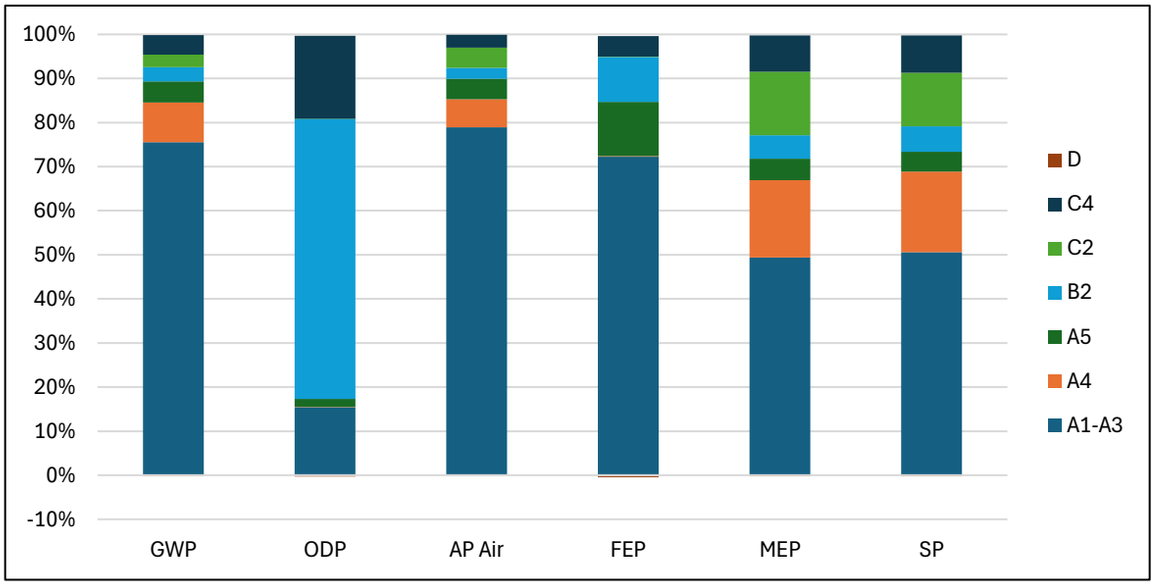
Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	C2	C4	D
BCRP	Biogenic Carbon Removal from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0E+00	0.0E+00	0.0E+00
BCEP	Biogenic Carbon Emissions from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0E+00	0.0E+00	0.0E+00
BCRK	Biogenic Carbon Removal from Packaging	kg CO_2	8.27E-01	0.0E+00	0.0E+00	0.00E+00	0.0E+00	0.0E+00	0.0E+00
BCEK	Biogenic Carbon Emissions from Packaging	kg CO_2	0.0E+00	0.0E+00	0.0E+00	0.00E+00	0.0E+00	0.0E+00	0.0E+00
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO_2	5.09E-04	0.0E+00	0.0E+00	0.00E+00	0.0E+00	0.0E+00	0.0E+00
CCE	Calcination Carbon Emissions	kg CO_2	5.5E+00	0.0E+00	0.0E+00	0.00E+00	0.0E+00	0.0E+00	0.0E+00
CCR	Carbonation Carbon Removal	kg CO_2	0.00E+00	0.0E+00	0.0E+00	0.00E+00	0.0E+00	0.0E+00	0.0E+00
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.0E+00	0.0E+00	0.00E+00	0.0E+00	0.0E+00	0.0E+00

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

Clay Brick Paver - LCA Interpretation

The production life cycle stage (A1-A3) dominates the impacts across all impact categories. This is due to the upstream production of materials used in the product, along with electricity and natural gas use in the manufacturing of the product. Downstream stages are effected by the weight of the product, except for the washing required in the use stage.



Clay Brick Paver - Scaling Factors for Results

The following table can be used to scale the impacts given above to any of the products listed below by using the appropriate factors.
To calculate an impact for a given product, mutiply the impact by that product's 'Brick Conversion Factor'.

For example: To determine the A1-A3 TRACI GWP imapct for '4 x 2.625 x 8 Paver', multiply the above impact (3.84E+01) by the Brick Conversion Factor (1.128) for a result of 4.33E+01.

To determine impact over the entire lifecycle, multiply the impact for each stage by the correct conversion factor and summate.

Paver Designation	ASTM Specification	Dimensions (inch) (W x H x L)	Dimensions (cm) (W x H x L)	Void Space (%)	Mass of Paver (kg/unit)	No. of Units/m^2 (0.32 cm joint)	Paver Conversion Factor
4 x 2.24 x 8 Paver (Baseline)	*C902*	*4 x 2.25 x 8*	*10.2 x 5.7 x 20.3*	*0.0%*	*2.61*	*46.25*	---
4 x 2.625 x 8 Paver	*C1272*	*4 x 2.625 x 8*	*10.2 x 6.7 x 20.3*	*0.0%*	*2.95*	*46.25*	*1.128*
Modular Solid	*C902*	*3.625 x 2.25 x 7.625*	*9.2 x 5.7 x 19.4*	*0.0%*	*2.26*	*53.33*	*0.997*
4 x 2.24 x 12 Paver	*C902*	*4 x 2.25 x 12*	*10.2 x 5.7 x 30.5*	*0.0%*	*3.88*	*30.99*	*0.995*

The following photo shows a depiction of a 4x8 Clay Brick Paver.

Thin Brick - Results per Functional Unit Over the Building Lifetime of 75 Years

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks.

Results shown below were calculated using TRACI 2.2 Methodology.

TRACI 2.2 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5		B2	C2	C4	D
					Brick Impacts	Mortar Impacts				
GWP	Global warming	kg CO_2-Eq.	3.56E+01	7.59E-01	4.01E-01	2.69E+00	0.00E+00	2.44E-01	3.76E-01	-1.09E-02
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq	3.48E-08	2.87E-11	7.04E-10	1.21E-08	0.00E+00	1.02E-11	7.60E-09	-1.12E-10
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	3.14E-01	4.53E-03	3.31E-03	8.54E-03	0.00E+00	3.22E-03	2.09E-03	-6.62E-05
FEP	Freshwater eutrophication potential	kg P-Eq.	1.93E-03	8.57E-07	5.86E-05	2.77E-04	0.00E+00	3.05E-07	2.22E-05	-2.01E-06
MEP	Marine eutrophication potential	kg N-Eq.	1.63E-02	1.03E-03	2.85E-04	1.46E-03	0.00E+00	8.52E-04	4.88E-04	-1.28E-05
SP	Smog formation potential	kg O_3-Eq.	1.92E+00	1.24E-01	3.06E-02	1.64E-01	0.00E+00	8.26E-02	5.76E-02	-1.43E-03

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

The additional results shown below were calculated using the CML 4.1 (2001 - April 2013) Methodology.

Parameter	Parameter	Unit	A1-A3	A4	A5		B2	C2	C4	D
					Brick Impacts	Mortar Impacts				
ADPF	Abiotic depletion potential for fossil resources	MJ	4.59E+02	9.77E+00	4.80E+00	7.07E+00	0.00E+00	3.50E+00	4.99E-01	-4.70E-02

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

Results below contain the resource use throughout the life cycle of the product.

Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5		B2	C2	C4	D
					Brick Impacts	Mortar Impacts				
RPR_E	Renewable primary energy as energy carrier	MJ	3.13E+00	0.00E+00	3.19E-02	2.20E+00	0.00E+00	0.00E+00	7.49E-02	-1.10E-02
RPR_M	Renewable primary energy resources as material utilization	MJ	7.54E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	Nonrenewable primary energy as energy carrier	MJ	4.62E+02	9.77E+00	4.84E+00	7.88E+00	0.00E+00	3.50E+00	5.76E-01	-5.92E-02
$NRPR_M$	Nonrenewable primary energy as material utilization	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	Use of secondary material	kg	4.36E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	Use of renewable secondary fuels	MJ	1.16E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Use of nonrenewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	Energy recovered from disposed waste	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	Use of net fresh water	m^3	3.47E-02	0.00E+00	4.12E-04	1.45E-02	0.00E+00	0.00E+00	3.23E-03	-3.67E-03

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories

Parameter	Parameter	Unit	A1-A3	A4	A5		B2	C2	C4	D
					Brick Impacts	Mortar Impacts				
HWD	Hazardous waste disposed	kg	1.16E-04	0.00E+00	3.23E-06	7.12E-05	0.00E+00	0.00E+00	4.27E-05	-7.09E-07
NHWD	Non-hazardous waste disposed	kg	1.79E+00	0.00E+00	9.19E-01	3.12E-01	0.00E+00	0.00E+00	1.77E+01	-1.25E-03
HLRW	High-level radioactive waste	kg or m^3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ILLRW	Intermediate- and low-level radioactive waste	kg or m^3	5.56E-05	0.00E+00	5.56E-07	1.22E-05	0.00E+00	0.00E+00	1.10E-06	-1.84E-07
CRU	Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	Materials for recycling	kg	0.00E+00	0.00E+00	1.51E-01	0.00E+00	0.00E+00	0.00E+00	2.41E+00	0.00E+00
MER	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	Recovered energy exported from system	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

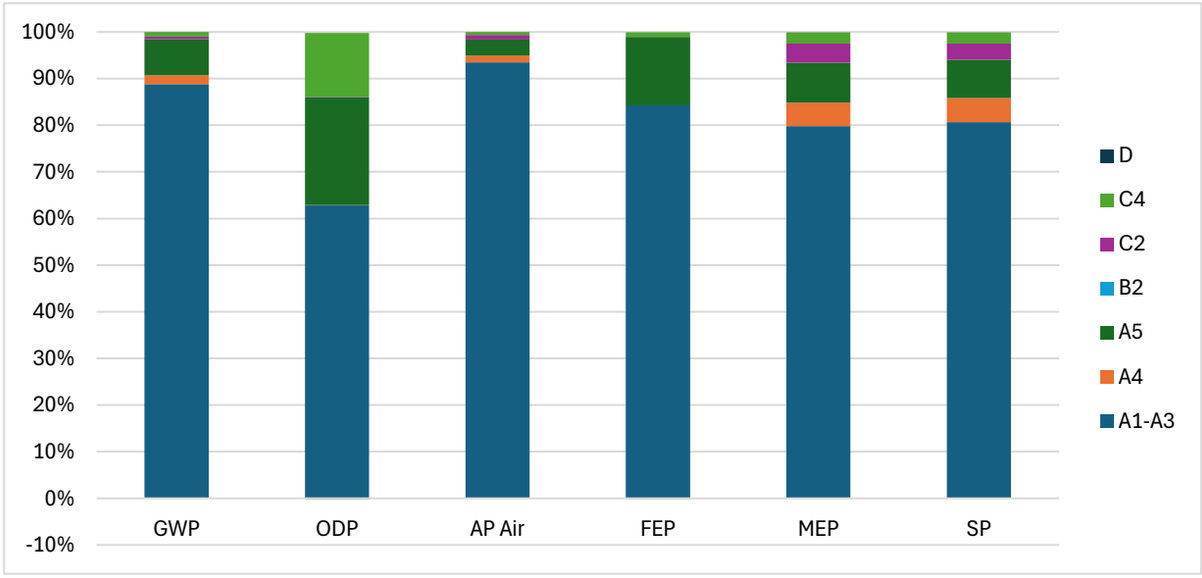
Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5		B2	C2	C4	D
					Brick Impacts	Mortar Impacts				
BCRP	Biogenic Carbon Removal from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP	Biogenic Carbon Emissions from Product	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK	Biogenic Carbon Removal from Packaging	kg CO_2	7.68E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK	Biogenic Carbon Emissions from Packaging	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO_2	8.47E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE	Calcination Carbon Emissions	kg CO_2	5.11E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR	Carbonation Carbon Removal	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

**B1, B3, B4, B5, B6, B7, C1, and C3 are included in this study and have values of zero in all impact categories.*

Thin Brick - LCA Interpretation

The production life cycle stage (A1-A3) dominates the impacts across all impact categories. This is due to the upstream production of materials used in the product, along with electricity and natural gas use in the manufacturing of the product. Downstream stages are effected by the weight of the product, except for the mortar used in installation.



Additional Environmental Information

Environmental and Health During Manufacturing

YHB utilizes a dry lime scrubber to limit the emissions of acidic gases. We follow state and federal guidelines to reduce fugitive dust, prevent stormwater contamination, and reduce exposure to respirable silica.

Environmental and Health During Installation

Bricks have no VOC and as shipped are safe for the environment. Installation of clay brick and pavers carries the potential environmental and health risks, primarily from dust containing crystalline silica and exposure to wet cement products used in mortar. The risks can be minimized by following safety protocols and using personal protective equipment (PPE), especially when cutting or grinding bricks and pavers.

Extraordinary Effects

Fire

YHB fires brick to 1990F+. A fire will not affect the brick. The bricks have no VOC's.

Water

No negative effects due to contact with water.

Mechanical Destruction

Grinding or cutting of bricks and pavers results in the release of silica dust.

Delayed Emissions

Global warming potential is calculated using the TRACI 2.2 impact assessment methodology. Delayed emissions are not considered.

Environmental Activities and Certifications

For additional details on Yankee Hill’s mining, forming, drying, and firing activities, visit yankeehillbrick.com/about-us.

Further Information

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