

Environmental Product Declaration

Belden Brick

Clay Masonry Products



Premier manufacturer of fired clay brick and paver units made by forming and firing prepared mixtures of clay, shale, and other materials. We offer an extensive selection of colors, sizes, textures, and shapes at the ready; we also produce customized clay brick products to meet specific needs.

BELDEN

THE BELDEN BRICK COMPANY

The Belden Brick Company is committed to protecting the environment and communities where we operate. We comply with local regulations and strive to exceed them to minimize our environmental impact. Our Environmental Management System enables us achieve ecological goals, reduce our footprint, and safeguard the long-term health of our local communities. Through consistent review, evaluation, and improvement of our environmental performance, we continue to create, design, and locally craft high-quality products while also working with other stakeholders to improve the state of the world.



**Certified
Environmental
Product Declaration**

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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	Belden The Belden Brick Company, 700 West Tuscarawas Street, Canton, OH, 44702	
DECLARATION NUMBER	EPD11241	
DECLARED PRODUCT & FUNCTIONAL UNIT	Belden 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:		
This declaration was independently verified in accordance with ISO 14025: 2006. The NSF/ASTM Clay Masonry Products PCR	Jack Geibig -	
<input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> 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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General Information

Description of Company/Organization

The Belden Brick Company, a long-standing pillar in the brick industry since its founding in 1885, is the largest family-owned brick manufacturer in the United States. Our success is built on the principles of integrity, community, quality, and service. At the heart of our vision and success are the skilled craftsmen in Sugarcreek, Ohio, who have been upholding brickmaking traditions since the 19th century.

Product Description

Products, as the industry describes them, are manufactured to meet the respective specifications noted:

- * ASTM C32.....Sewer Brick
- * ASTM C62.....Building Brick
- * ASTM C126.....Glazed Brick (Double Fired)
- * ASTM C216.....Facing Brick
- * ASTM C279.....Chemical Resistant Brick
- * ASTM C410.....Industrial Floor Brick
- * ASTM C652.....Hollow Clay Brick
- * ASTM C902.....Pedestrian and Light Traffic Paving Brick
- * ASTM C980.....Industrial Chimney Lining Brick
- * ASTM C1088.....Thin Veneer Brick
- * ASTM C1261..... Firebox Brick for Residential Fireplaces
- * ASTM C1272.....Heavy Vehicular Paving Brick

This EPD represents brick products from the following Belden facilities: Sugarcreek.

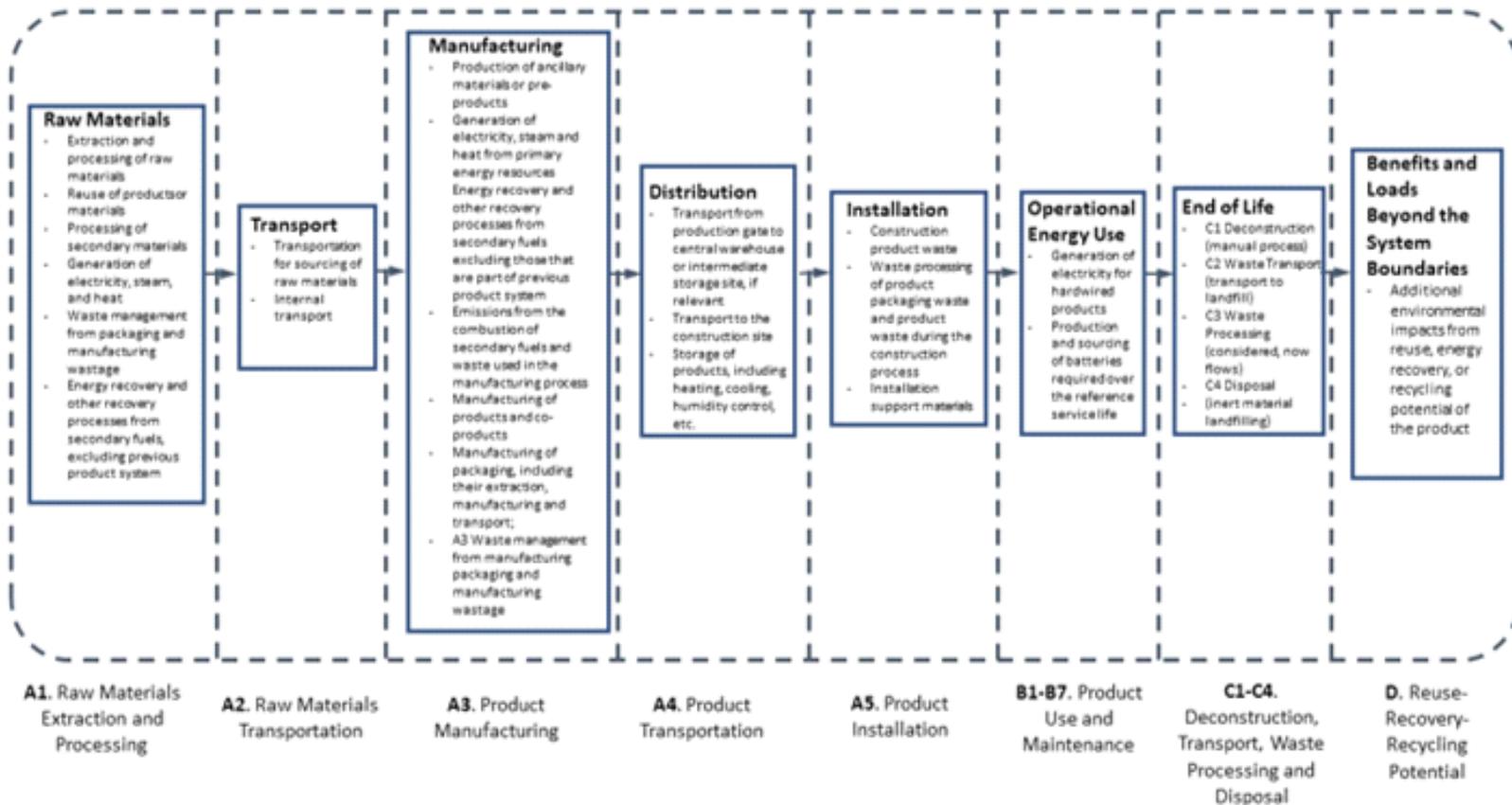
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Flow Diagram



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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 $\pm 10\%$ in any impact category.

Application

Clay brick products are versatile and ideal for a wide range of applications. These products are commonly used to construct both interior and exterior walls, including structural and veneer applications, as well as for interior and exterior paving, and other assemblies.

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	99.42%
External Grog	0.00%
Primary Pigments	0.44%
Body additives	0.15%
Sand	0.00%
Total	100%

Properties of Declared Product as Shipped

Clay brick products are most often packaged and shipped by cube. To protect the load, paper or wood dividers are used, and the package is secured with plastic, steel straps, or stretch wrap.

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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	145.8 kg per m ²	0.0069
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 m ²	0.0048
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.	208.64 kg per m ²	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.

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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 Belden. 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.

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Units

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

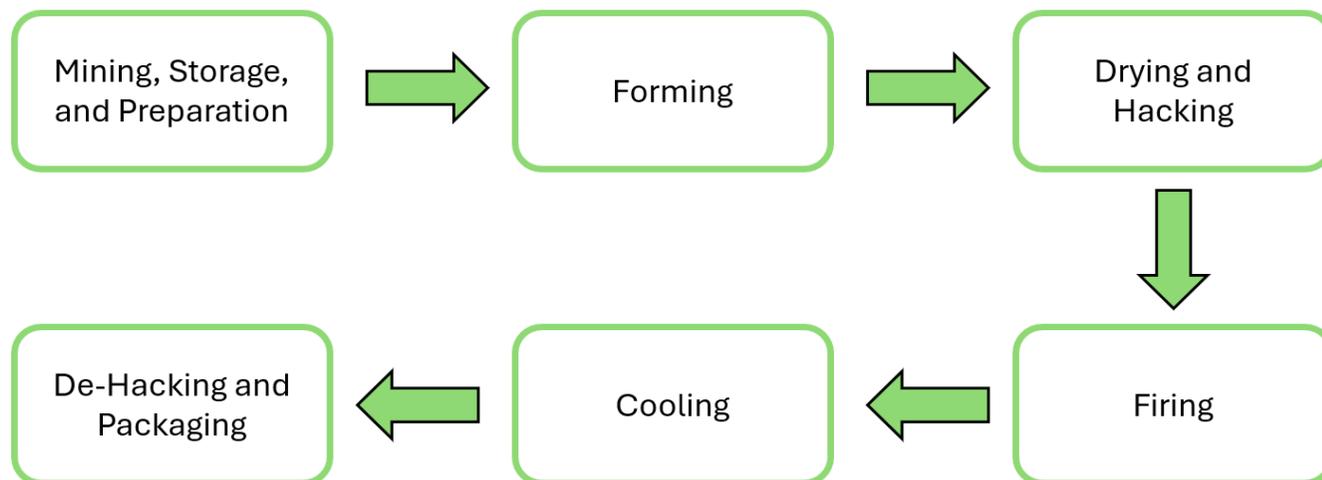
Additional Environmental Information

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 - 0.511 kg per functional unit

Clay Brick Paver - 0.731 kg per functional unit

Thin Brick - 0.393 kg per functional unit

Material	Quantity (% By Weight)
Plastic Straps	85.00%
Steel Straps	0.00%
Paper Dividers	4.53%
Wood Dividers	7.37%
Wood Pallets	3.09%
Total	100%

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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	1670.0	1670.0	1670.0	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	62.84	0.00	8.91	kg
	Water	12.57	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		7.29	10.43	1.00	kg
Waste materials at construction site		7.42	10.62	1.02	kg
Output substance (recycle)		0.95	1.36	0.13	kg
Output substance (landfill)		6.34	9.08	0.87	kg
Output substance (incineration)		0.00	0.00	0.00	kg
Packaging waste (recycle)		0.0886	0.1268	0.0122	kg
Packaging waste (landfill)		0.0341	0.0487	0.0047	kg
Packaging waste (incineration)		0.0093	0.0132	0.0013	kg
Biogenic carbon contained in packaging		0.0075	0.0108	0.0010	kg
VOC emissions		-	-	-	kg

*CO2 emissions to air from disposal of packaging

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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	0.009	0.0	m ³
Electricity consumption	0.0	0.0808	0.0	kWh
Ancillary materials	Cleaning agent	0.0	6.23E-02	kg/m ²
	Water	0.0	2.17E-01	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	145.80	208.64	20.09	kg
Collected as mixed construction waste	0.00	0.00	0.00	kg
Recycling	17.50	25.04	2.41	kg
Landfilling	128.30	183.60	17.68	kg
Incineration with energy recovery	0.00	0.00	0.00	kg

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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.	17.50	25.04	2.41	kg

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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 Acid Proof Clay Brick and Structural Clay Tile, the Jumbo Paver, and the Modular Thin Brick which serve as the baseline products evaluated. Specification for the baseline brick are identified in Scaling Factor Tables for Clay Brick and Stuctural Clay Tile, Clay Brick Paver, and Thin Bricks.

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.	7.09E+01	5.51E+00	4.10E+00	1.90E+01	0.00E+00	1.77E+00	2.73E+00	-7.92E-02
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	8.85E-08	2.08E-10	7.22E-09	8.56E-08	0.00E+00	7.40E-11	5.51E-08	-8.15E-10
AP Air	Acidification potential for air emissions	kg SO ₂ -Eq.	1.21E+00	3.29E-02	6.42E-02	6.02E-02	0.00E+00	2.34E-02	1.52E-02	-4.80E-04
FEP	Freshwater eutrophication potential	kg P-Eq.	1.10E-03	6.22E-06	1.19E-04	1.96E-03	0.00E+00	2.21E-06	1.61E-04	-1.46E-05
MEP	Marine eutrophication potential	kg N-Eq.	3.55E-02	7.50E-03	2.66E-03	1.03E-02	0.00E+00	6.18E-03	3.54E-03	-9.26E-05
SP	Smog formation potential	kg O ₃ -Eq.	3.82E+00	9.01E-01	2.88E-01	1.16E+00	0.00E+00	5.99E-01	4.18E-01	-1.03E-02

*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	1.00E+03	7.08E+01	5.51E+01	4.98E+01	0.00E+00	2.54E+01	3.62E+00	-3.41E-01

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

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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	3.18E+00	0.00E+00	1.87E-01	1.55E+01	0.00E+00	0.00E+00	5.43E-01	-8.01E-02
RPR _M	Renewable primary energy resources as material utilization	MJ	3.2E+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	1.00E+03	7.08E+01	5.53E+01	5.56E+01	0.00E+00	2.54E+01	4.18E+00	-4.30E-01
NRPR _M	Nonrenewable primary energy as material utilization	MJ	1.00E+01	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	0.00E+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	1.80E-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	3.94E-02	0.00E+00	2.97E-03	1.02E-01	0.00E+00	0.00E+00	2.35E-02	-2.66E-02

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

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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	1.06E-04	0.00E+00	2.09E-05	5.02E-04	0.00E+00	0.00E+00	3.10E-04	-5.15E-06
NHWD	Non-hazardous waste disposed	kg	9.54E-01	0.00E+00	6.51E+00	2.20E+00	0.00E+00	0.00E+00	1.28E+02	-9.10E-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	4.38E-05	0.00E+00	2.60E-06	8.63E-05	0.00E+00	0.00E+00	7.98E-06	-1.33E-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	1.04E+00	0.00E+00	0.00E+00	0.00E+00	1.75E+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	3.29E-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	3.29E-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	7.32E-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	6.64E+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.

Environmental Product Declaration

Belden Brick

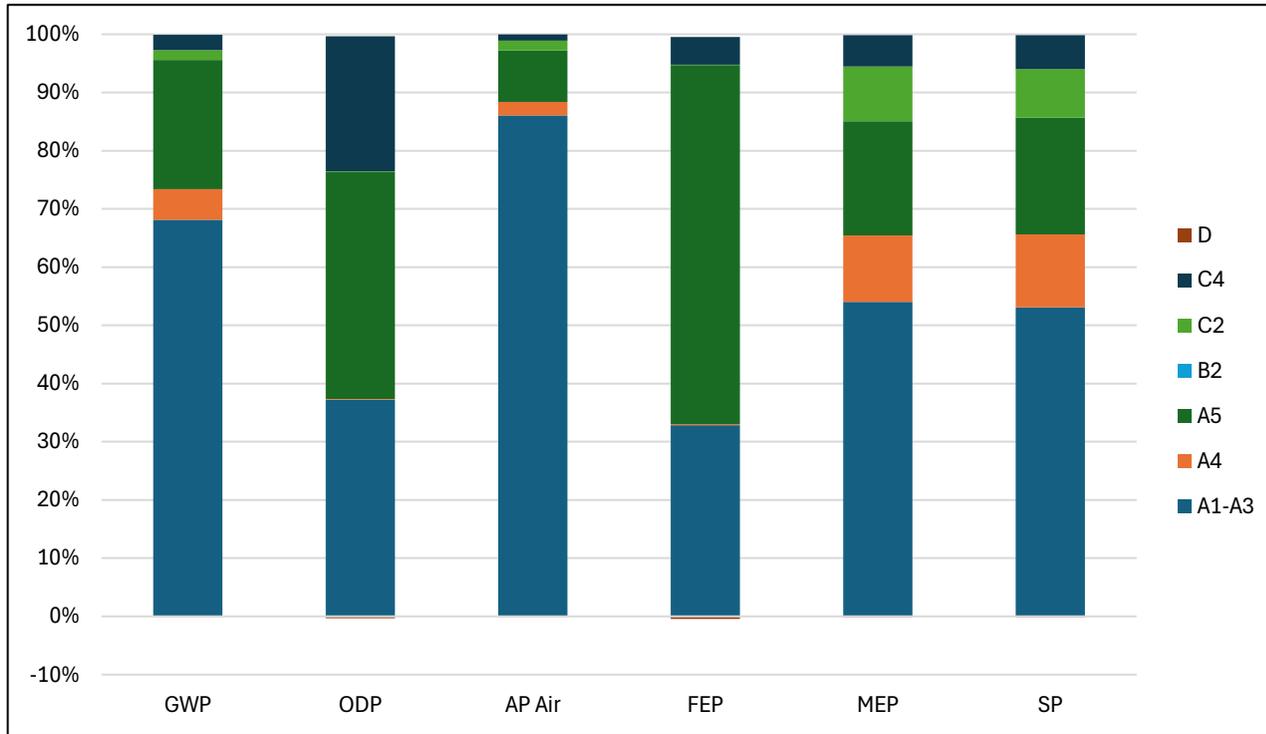
Clay Masonry Products



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

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.



Environmental Product Declaration

Belden Brick

Clay Masonry Products



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

Clay Brick, Structural Clay Tile - 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, multiply 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 impact for 'Ambassador', multiply the above impact (7.09E+01) by the Brick Conversion Factor (1.011) for a result of 7.17E+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
Acid Proof (Baseline)	C216,C279	7.75 x 1.813 x 11.75	19.7 x 4.6 x 29.8	0.0%	2.50	58.43	1.000	75.41	---
Ambassador	C216 ,C652	3.625 x 2.25 x 15.625	9.2 x 5.7 x 39.7	24.0%	3.99	36.90	1.011	29.17	0.387
Barrier	C216 ,C652, CBRN	4.331 x 2.362 x 4.331	11 x 6 x 11	24.0%	3.18	120.34	2.621	44.02	0.584
Double Monarch	C216 ,C652	3.625 x 7.625 x 15.625	9.2 x 19.4 x 39.7	24.0%	11.57	12.11	0.961	12.39	0.164
Double Utility	C216 ,C652	3.625 x 7.625 x 11.625	9.2 x 19.4 x 29.5	24.0%	9.53	16.15	1.055	13.72	0.182
Econom Modular	C216 ,C652	3.625 x 3.625 x 7.625	9.2 x 9.2 x 19.4	24.0%	3.09	48.44	1.025	24.39	0.323
Jumbo Modular	C216 ,C652	3.625 x 2.75 x 7.625	9.2 x 7 x 19.4	24.0%	2.31	62.00	0.984	28.87	0.383
Jumbo Norman	C216 ,C652	3.625 x 2.75 x 11.625	9.2 x 7 x 29.5	24.0%	3.54	41.33	1.003	26.41	0.350
Jumbo Standard	C216 ,C652	3.625 x 2.75 x 8	9.2 x 7 x 20.3	24.0%	2.68	59.22	1.087	28.54	0.378
Metric Modular	C216 ,C652	3.543 x 2.244 x 7.48	9 x 5.7 x 19	24.0%	1.72	75.34	0.891	32.21	0.427
Metric Norman	C216 ,C652	3.543 x 2.244 x 11.417	9 x 5.7 x 29	24.0%	2.64	50.19	0.909	29.82	0.395
Metric Ontario	C216 ,C652	4.016 x 2.362 x 8.386	10.2 x 6 x 21.3	24.0%	2.51	64.64	1.112	34.50	0.458
Metric Utility	C216 ,C652	3.543 x 3.543 x 11.417	9 x 9 x 29	24.0%	4.55	33.55	1.047	21.78	0.289
Mini Brick	C216 ,C652	1 x 0.438 x 2.25	2.5 x 1.1 x 5.7	0.0%	0.04	726.29	0.203	26.58	0.352
Modular	C216 ,C652	3.625 x 2.25 x 7.625	9.2 x 5.7 x 19.4	24.0%	1.91	73.81	0.965	32.77	0.435
Monarch	C216 ,C652	3.625 x 3.625 x 15.625	9.2 x 9.2 x 39.7	24.0%	5.67	24.22	0.942	20.59	0.273
Norman	C216 ,C652	3.625 x 2.25 x 11.625	9.2 x 5.7 x 29.5	24.0%	2.90	49.21	0.980	30.37	0.403
Quad	C216 ,C652	3.625 x 7.625 x 7.625	9.2 x 19.4 x 19.4	24.0%	6.40	24.22	1.063	16.39	0.217
Queen	C216 ,C652	3.125 x 2.75 x 9.625	7.9 x 7 x 24.4	24.0%	2.54	49.60	0.864	23.61	0.313
Refractory	C232 ,C652	4.5 x 2.5 x 9	11.4 x 6.4 x 22.9	24.0%	3.90	57.51	1.539	36.72	0.487
Roman	C216 ,C652	3.625 x 1.625 x 11.625	9.2 x 4.1 x 29.5	24.0%	2.13	64.58	0.945	38.11	0.505
Shapes	C216 ,C652	3.63 x 2.25 x 10.188	9.2 x 5.7 x 25.9	0.0%	2.27	55.90	0.870	31.07	0.412
Standard	C216 ,C652	3.625 x 2.25 x 8	9.2 x 5.7 x 20.3	24.0%	2.04	70.50	0.987	32.45	0.430
Utility	C216 ,C652	3.625 x 3.625 x 11.625	9.2 x 9.2 x 29.5	24.0%	4.63	32.29	1.025	21.85	0.290

Environmental Product Declaration

Belden Brick

Clay Masonry Products



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

The following shows a photo of a Modular Clay Brick.



Environmental Product Declaration

Belden Brick

Clay Masonry Products



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

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.	1.02E+02	7.88E+00	5.87E+00	1.63E+00	2.53E+00	3.91E+00	-1.13E-01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	1.27E-07	2.98E-10	1.03E-08	1.54E-07	1.06E-10	7.89E-08	-1.17E-09
AP Air	Acidification potential for air emissions	kg SO ₂ -Eq.	1.74E+00	4.71E-02	9.19E-02	1.07E-02	3.34E-02	2.17E-02	-6.87E-04
FEP	Freshwater eutrophication potential	kg P-Eq.	1.58E-03	8.90E-06	1.70E-04	2.94E-04	3.16E-06	2.30E-04	-2.08E-05
MEP	Marine eutrophication potential	kg N-Eq.	5.09E-02	1.07E-02	3.81E-03	1.89E-03	8.85E-03	5.07E-03	-1.33E-04
SP	Smog formation potential	kg O ₃ -Eq.	5.47E+00	1.29E+00	4.12E-01	2.36E-01	8.57E-01	5.98E-01	-1.48E-02

*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	1.43E+03	1.01E+02	7.89E+01	1.31E+01	3.63E+01	5.18E+00	-4.88E-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	4.55E+00	0.00E+00	2.67E-01	1.51E+00	0.00E+00	7.78E-01	-1.15E-01
RPR _M	Renewable primary energy resources as material utilization	MJ	4.62E+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	1.44E+03	1.01E+02	7.91E+01	1.46E+01	3.63E+01	5.98E+00	-6.15E-01
NRPR _M	Nonrenewable primary energy as material utilization	MJ	1.43E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	Use of secondary material	kg	0.00E+00						
RSF	Use of renewable secondary fuels	MJ	2.57E-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						
RE	Energy recovered from disposed waste	MJ	0.00E+00						
FW	Use of net fresh water	m ³	5.63E-02	0.00E+00	4.25E-03	1.83E-01	0.00E+00	3.36E-02	-3.81E-02

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

Environmental Product Declaration

Belden Brick

Clay Masonry Products



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

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	1.52E-04	0.00E+00	2.99E-05	4.47E-04	0.00E+00	4.43E-04	-7.37E-06
NHWD	Non-hazardous waste disposed	kg	1.37E+00	0.00E+00	9.31E+00	9.77E-02	0.00E+00	1.83E+02	-1.30E-02
HLRW	High-level radioactive waste	kg or m ³	0.00E+00						
ILLRW	Intermediate- and low-level radioactive waste	kg or m ³	6.27E-05	0.00E+00	3.72E-06	2.33E-05	0.00E+00	1.14E-05	-1.91E-06
CRU	Components for re-use	kg	0.00E+00						
MR	Materials for recycling	kg	0.00E+00	0.00E+00	1.48E+00	0.00E+00	0.00E+00	2.50E+01	0.00E+00
MER	Materials for energy recovery	kg	0.00E+00						
EE	Recovered energy exported from system	MJ	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	4.70E-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	4.7E-01	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	1.05E-03	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	9.5E+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.

Environmental Product Declaration

Belden Brick

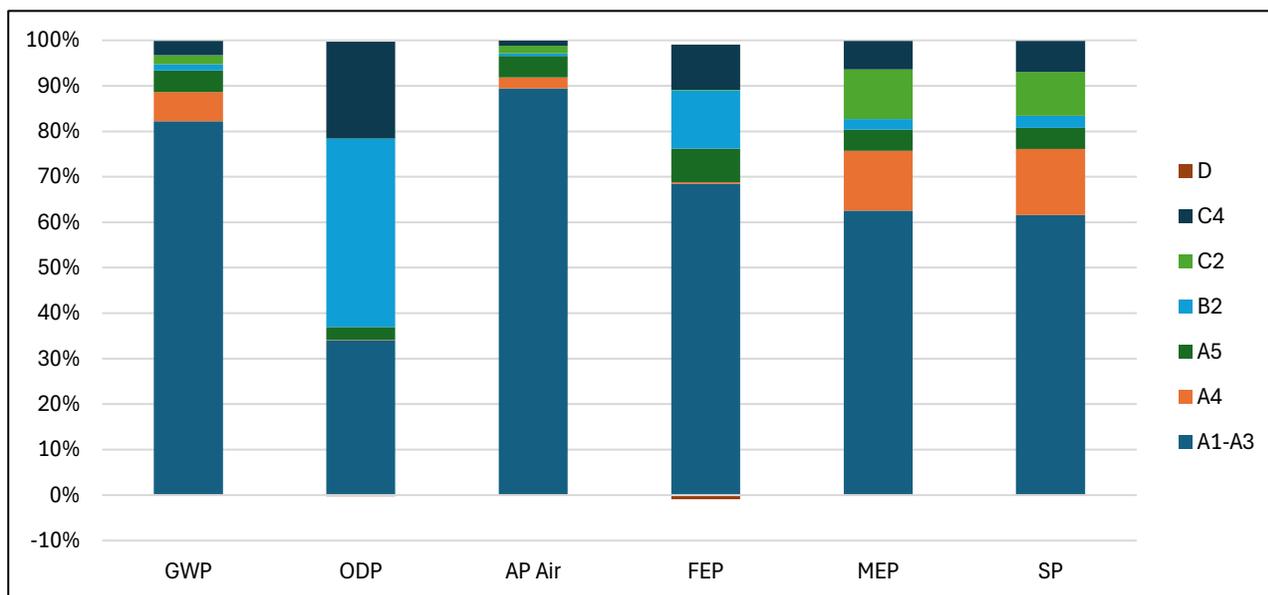
Clay Masonry Products



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

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.



Environmental Product Declaration

Belden Brick

Clay Masonry Products



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

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, multiply the impact by that product's 'Brick Conversion Factor'.

For example: To determine the A1-A3 TRACI GWP impact for 'Jumbo Permeable Paver', multiply the above impact (1.02E+02) by the Brick Conversion Factor (1.000) for a result of 1.02E+02.

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
Jumbo Paver (Baseline)	C902	2.75 x 4 x 8	7 x 10.2 x 20.3	0.0%	3.14	66.35	---
Jumbo Permeable Paver	C902	2.75 x 4 x 8	7 x 10.2 x 20.3	0.0%	3.14	66.35	1.000
Modular Paver	C902	2.25 x 3.625 x 7.625	5.7 x 9.2 x 19.4	0.0%	2.22	84.21	0.897
Paver - 2-3/4 x 6 x 6	C902	2.25 x 6 x 6	5.7 x 15.2 x 15.2	0.0%	3.54	106.55	1.807
Paver 2-3/4 x 8 x 8	C902	2.75 x 8 x 8	7 x 20.3 x 20.3	0.0%	6.29	66.35	2.001
Paver 3 x 4 x 8	C902	3 x 4 x 8	7.6 x 10.2 x 20.3	0.0%	3.43	61.05	1.004
Paver 3-5/8 x 3-5/8 x 8-3/4	C902	3.625 x 3.625 x 8.75	9.2 x 9.2 x 22.2	0.0%	4.11	46.57	0.918
Paver Permeable 2-1/4 x 4 x 8	C902	2.25 x 4 x 8	5.7 x 10.2 x 20.3	0.0%	2.57	80.32	0.990
Paver Split 1-1/4 x 3-5/8 x 7-5/8	C902	1.25 x 3.625 x 7.625	3.2 x 9.2 x 19.4	0.0%	1.23	145.45	0.860
Split Paver	C902	1.125 x 3.625 x 7.625	2.9 x 9.2 x 19.4	0.0%	1.11	160.00	0.852
Standard 8 x 8 Paver	C902	2.25 x 8 x 8	5.7 x 20.3 x 20.3	0.0%	5.15	80.32	1.983
Standard Paver	C902	2.25 x 4 x 8	5.7 x 10.2 x 20.3	0.0%	2.57	80.32	0.990
Standard Plank Paver	C902	4 x 2.25 x 12	10.2 x 5.7 x 30.5	0.0%	3.86	30.99	0.574

The following shows a photo of a Clay Brick Paver.



Environmental Product Declaration

Belden Brick

Clay Masonry Products



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

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.	5.46E+01	7.59E-01	5.65E-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.	6.81E-08	2.87E-11	9.94E-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.	9.33E-01	4.53E-03	8.85E-03	8.54E-03	0.00E+00	3.22E-03	2.09E-03	-6.62E-05
FEP	Freshwater eutrophication potential	kg P-Eq.	8.50E-04	8.57E-07	1.64E-05	2.77E-04	0.00E+00	3.05E-07	2.22E-05	-2.01E-06
MEP	Marine eutrophication potential	kg N-Eq.	2.74E-02	1.03E-03	3.66E-04	1.46E-03	0.00E+00	8.52E-04	4.88E-04	-1.28E-05
SP	Smog formation potential	kg O ₃ -Eq.	2.94E+00	1.24E-01	3.97E-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	7.71E+02	9.76E+00	7.60E+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.

Environmental Product Declaration

Belden Brick

Clay Masonry Products



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

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	2.45E+00	0.00E+00	2.57E-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	2.48E+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	7.73E+02	9.76E+00	7.62E+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	7.72E+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	0.00E+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	1.38E-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	3.03E-02	0.00E+00	4.09E-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	8.17E-05	0.00E+00	2.88E-06	7.12E-05	0.00E+00	0.00E+00	4.27E-05	-7.09E-07
NHWD	Non-hazardous waste disposed	kg	7.34E-01	0.00E+00	8.97E-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	3.37E-05	0.00E+00	3.58E-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	1.43E-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.

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Clay Masonry Products



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

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	2.53E-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	2.53E-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	1.01E-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	5.11E+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.

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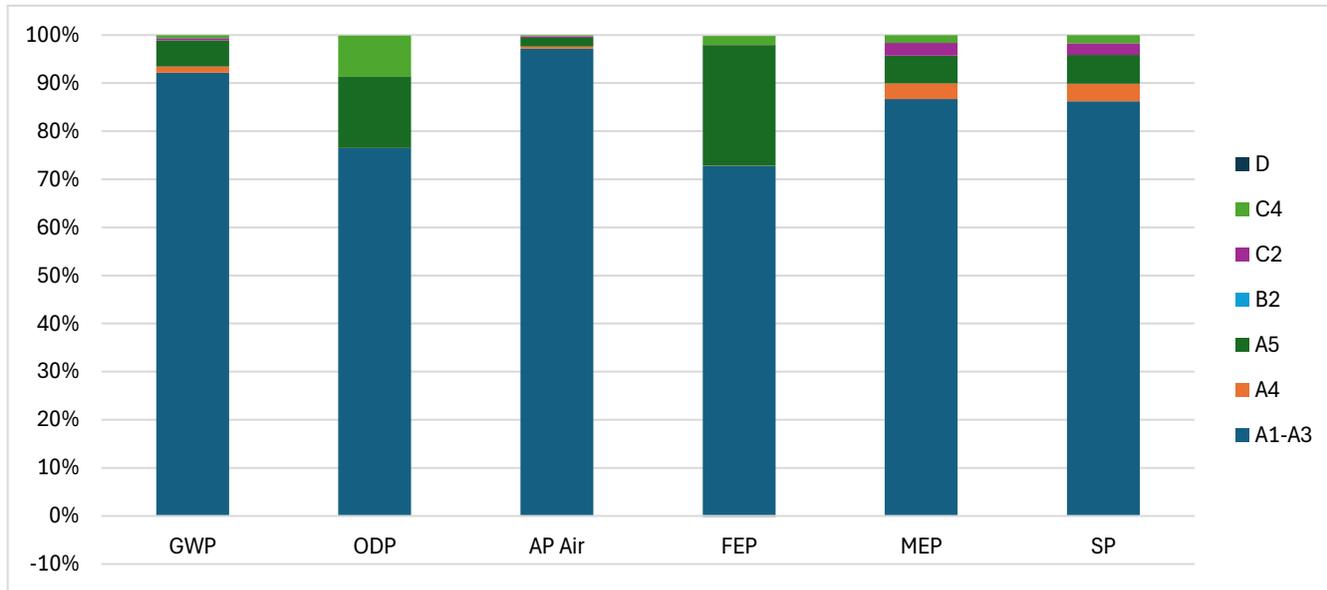
Clay Masonry Products



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

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.



Thin Brick - 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, multiply 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 impact for '0', multiply the above impact (5.46E+01) by the Brick Conversion Factor (0.000) for a result of 0.00E+00.

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)	Mass of Thin Brick (kg/unit)	No. of Units/m ² (0.95 cm joint)	Thin Brick Conversion Factor	Mortar Mass (kg/m ²)	Mortar Conversion Factor
Modular thin brick (Baseline)	C1088	0.5 x 2.25 x 7.625	1.3 x 5.7 x 19.4	0.27	73.81	1.000	10.693	1.000

The following shows a photo of a Thin Brick.



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

Additional Environmental Information

Environmental and Health During Manufacturing

The Belden Brick Company has established robust Environmental, Health, and Safety (EHS) and product stewardship programs to effectively evaluate and monitor the processes and raw materials used in our manufacturing. These programs ensure compliance with all environmental regulations, including the EPA's NESHAP standards for air emissions, and meet or exceed OSHA requirements, promoting the health and safety of our employees and contractors.

Belden Brick is dedicated to resource efficiency and waste minimization through recycling initiatives. We manage emissions through appropriate engineering controls and strive to have our Environmental Product Declarations (EPDs) third-party verified, in accordance with ISO standards 14025 and 21930.

Environmental and Health During Installation

Resources for health and safety of workers during the installation of clay masonry products:

Clay Masonry Units:

<https://www.osha.gov/silica-crystalline>

<https://www.cdc.gov/niosh/silica>

Mortar:

<https://www.cement.org/advocacy/occupational-health-and-safety/>

Extraordinary Effects

Fire

Brick is a noncombustible material that emits no volatile organic compounds (VOCs). For the rated fire resistance of brick walls, refer to International Building Code Table 721.1(2). Refer to BIA Technical Note 16: Fire Resistance of Brick Masonry, available at: <https://www.gobrick.com/resources/technical-notes> for additional information

Water

Clay brick and paver products have no negative effects when in contact with water. However, continuous exposure may cause staining.

Mechanical Destruction

Resources for ensuring the health and safety of workers during the mechanical destruction of clay masonry products:

Clay Brick Units:

<https://www.osha.gov/silica-crystalline>

<https://www.cdc.gov/niosh/silica>

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 sustainability information about The Belden Brick Company's products, refer to BIA Technical Note 48: Sustainability and Brick, and visit our sustainability webpage at: <https://www.beldenbrick.com/resources/sustainability>

Further Information

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According to the following
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21930:2017

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- SimaPro 9.4 PRe Sustainability. SimaPro Life Cycle Assessment version 9 (software).
- ISO 14025 ISO 14025:2011-10, Environmental labels and declarations — Type III environmental declarations — Principles
- ISO 14040 ISO 14040:2009-11, Environmental management — Life cycle assessment — Principles and framework.
- ISO 14044 ISO 14044:2006-10, Environmental management — Life cycle assessment — Requirements and guidelines.
- ISO 21930 ISO 21930:2017, Sustainability in buildings and civil engineering works - Core rules for environmental product
- NSF GPI NSF Program Operator Rules (2015)
- Characterization Method IPCC. 2014. Climate Change 2013. The Physical Science Basis. Cambridge University Press. (<http://www.ipcc.ch/report/ar5/wg1/>).
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- Characterization Method Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers- version 1.2, January 2017.

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