

ENVIRONMENTAL PRODUCT DECLARATION

TRU-BRIX CLADDING SYSTEM



Glen-Gery is committed to making strong and aesthetic cladding system as well as protecting the environment. Through comprehensive Life Cycle Assessments, energy efficiency initiatives, responsible raw material sourcing, and robust waste management practices, Glen-Gery is working to ensure its cladding system contribute to a more sustainable future. Their dedication extends to innovation in alternative materials, and circular economy practices, while maintaining transparency in reporting and collaborating with industry partners.

The Glen-Gery's Tru-Brix cladding system Environmental Product Declaration (EPD) document is just one of many actions that back its responsible stance. It is a standardized, internationally recognized tool containing data to help evaluate the products' impact from a comprehensive level.

For more details, visit <https://www.glenery.com>



ENVIRONMENTAL PRODUCT DECLARATION



Tru-Brix Cladding System



According to ISO 14025,
and ISO 21930:2017

| | |
|---|--|
| EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE | UL SOLUTIONS 333 PFINGSTEN RD, NORTHBROOK, IL 60062, UNITED STATES |
| GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER | UL Environment- Environmental Product Declaration Program, General Program Instructions, Version 2.7, March 2022 |
| MANUFACTURER NAME AND ADDRESS | Glen-Gery 423 South Pottsville Pike, Shoemakersville PA |
| DECLARATION NUMBER | 4791908431.103.1 |
| DECLARED UNIT | 1 m ² of installed cladding system |
| REFERENCE PCR AND VERSION NUMBER | Part A: Life Cycle Assessment Calculation Rules and Report Requirements (UL Environment, V4, 2022) Part B: Cladding Product System EPD Requirements (UL Environment V2.0, 2021) |
| DESCRIPTION OF PRODUCT APPLICATION/USE | Wall cladding application |
| PRODUCT RSL DESCRIPTION (IF APPL.) | 50 years |
| MARKETS OF APPLICABILITY | North America |
| DATE OF ISSUE | February 11 th , 2026 |
| PERIOD OF VALIDITY | 5 Years |
| EPD TYPE | Product-specific |
| RANGE OF DATASET VARIABILITY | n/a |
| EPD SCOPE | Cradle to Grave |
| YEAR(S) OF REPORTED PRIMARY DATA | 2023 |
| LCA SOFTWARE & VERSION NUMBER | Sphera LCA for Experts (fka GaBi) 10.9.1.17 |
| LCI DATABASE(S) & VERSION NUMBER | Sphera Managed LCA Content (fka GaBi) 2025.1 |
| LCIA METHODOLOGY & VERSION NUMBER | IPCC AR5, TRACI 2.1, CML-2016 |

| | |
|---|--|
| The PCR review was conducted by: | Jim Mellentine, Thrive ESG |
| | Christopher White, Ph.D., NIST |
| | Philip S. Moser, P.E. (MA), Simpson Gumpertz & Heger |
| This declaration was independently verified in accordance with ISO 14025: 2006. <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL | Cooper McCollum, UL Solutions |
| This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by: | WAP Sustainability Consulting, LLC |
| This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by: | Thomas P. Gloria, Industrial Ecology Consultant |

LIMITATIONS

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; the level of accuracy in estimation of effect differs for any particular product line and reported impact.

Comparability: EPDs from different programs may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.



1. Product Definition and Information

1.1. Description of Company/Organization

Glen-Gery is one of the nation's largest brick manufacturers. Glen-Gery is known for its unique selection of Wall System solutions and components. Their comprehensive Wall Systems offering exemplifies classic brick aesthetics and permanence when traditional masonry is not an option, with products like Tru-Brix and Thin Tech. Glen-Gery products are sold across North America through a large distributor network as well as company-owned supply centers. It is a part of Brickworks Limited of Australia.

1.2. Product Description

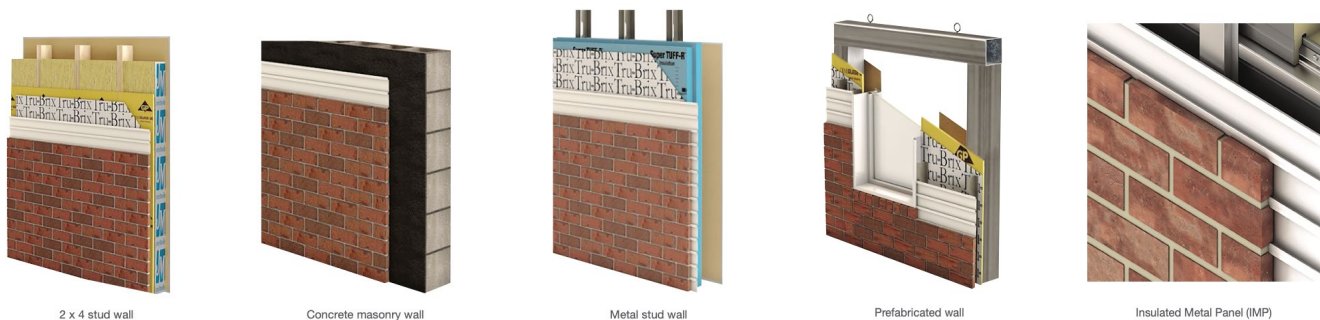
This LCA was conducted for a thin brick façade system known as Tru-Brix. Tru-Brix Thin Brick Façade System is a highly functional, contemporary evolution of a classic building material. It expands the design palette, bringing brick's distinctive appeal and permanence to an expanded range of building types. The Tru-Brix system also accommodates cast stone, window sills and headers, accent bands, soldier courses, and many other attractive features, shapes, and designs not possible with other thin-brick methods. The study includes 2 Tru-Brix products with variation in dimension, i.e., Tru-Brix 2-3/4" and Tru-Brix 2-1/4".

- **Tru-Brix 2-3/4"**

This is a Tru-Brix wall system with an oversize brick size of 2-3/4", with 5 rails, 16" courses, and adjusts up to 5 Courses of 16-5/8"

- **Tru-Brix 2-1/4"**

This is a Tru-Brix wall system with a modular brick size of 2-1/4", with 3 rails, 8" courses, and adjusts up to 3 Courses of 8-3/8".



The UNSPSC code for the product is 30161505, and the CSI number is 074200.

1.3. Application

The application of the Tru-Brix wall system includes structural support, creating building envelopes for shelter, and defining interior spaces.





1.4. Declaration of Methodological Framework

This LCA follows an attributional approach and is a cradle-to-grave study. The third-party verified ISO 14040/44 secondary LCI data sets contribute more than 67% of the total impact (either at the unit process level or in aggregate) to any of the required impact categories identified by the applicable PCR. No known flows are deliberately excluded from this EPD.

1.5. Technical Requirements

Table 1: Technical Data

| PROPERTIES | |
|--|---|
| Water penetration | Load: 10 psf, Wind speed: 52 mph- No leakage |
| Wind loading on metal stud wall system | walls returned to 0.07" or less deflection after the 100 psf positive loading |
| Fire resistance | Adds only non-combustible materials to rated walls. |
| Screw pull out test | Pull put load 240 lbs at Load: 670 psf for 2.8 screws per sq.ft. |

1.6. Properties of Declared Product as Delivered

Different components of the product are grouped and packaged at the Glen-Gery facility using HDPE, PE, and finally packed in wooden crate for shipment.

1.7. Material Composition

Table 2: Material composition of the product

| MATERIAL | TRU-BRIX 2-3/4" | TRU-BRIX 2-1/4" |
|-----------------|-----------------|-----------------|
| Glen Gery brick | 75%-80% | 58%-62% |
| Supplier brick | 4%-8% | 3%-6% |
| Steel rails | 12%-15% | 13%-18% |
| Mortar | 13%-16% | 14%-17% |
| Fastener | <1% | <1% |

1.8. Manufacturing

Glen-Gery has its own brick-making facility, which is the primary source of bricks used in the product, while it sources some percentage of bricks from the supplier. All the other components of the products, i.e., mortar, steel rails, and fasteners, are sourced from the supplier, grouped and packaged at the Glen-Gery facility using HDPE, PE, and finally packed in wooden crate for shipment.

1.9. Packaging

Different components of the product are grouped and packaged at the Glen-Gery facility using HDPE, PE, and finally packed in wooden crate and then delivered to the customer or job site.





Table 3: Packaging details of the product

| PACKAGING | UNIT | QUANTITY |
|-----------|-------------------|----------|
| Wood | kg/m ² | 1.13 |
| HDPE | kg/m ² | 0.02 |
| PE | kg/m ² | 0.001 |

1.10. Transportation

The materials are delivered to the manufacturing facility via truck and ship, and the product is then delivered to the customer or installation site via truck. The distances for material transport were calculated using the supplier location and the location of manufacturing, and for the product delivery to the installation site, the distance was considered as per Section 3.11 of UL PCR Part B. This applies to both the products Tru-Brix 2-3/4" and Tru-Brix 2-1/4".

1.11. Product Installation

The product installation scenario is modeled as per Section 3.11 of UL PCR Part B, where installation is considered manual, and hence no energy is required. However, the water is consumed during installation. Packaging and installation waste disposal have been modeled as per the guidelines in Table 3 of Section 2.8.5 of UL PCR Part A. The following data applies to both the products Tru-Brix 2-3/4" and Tru-Brix 2-1/4".

Table 4: Installation details of the product

| MATERIAL | QUANTITY | UNIT |
|--|----------|------------------------|
| Freshwater consumption | 0.25 | Liters/kg mortar |
| Plastic waste to landfill | 68 | % |
| Plastic waste to incineration | 17 | % |
| Plastic waste to recycling | 9 | % |
| Cardboard and wood waste to landfill | 20 | % |
| Cardboard and wood waste to incineration | 5 | % |
| Cardboard and wood waste to recycling | 68 | % |
| Biogenic carbon content of packaging | 1.56 | kg CO ₂ /kg |

1.12. Use Phase

The use stage consists of the replacement of the installed product after its service life of 50 years. As per the PCR Part B, the number of replacements of the product expected during the building ESL of 75 years is required to be declared. The RSL of the product is 50 years, and the building's ESL is 75 years. The number of replacements that will be necessary to fulfil the required performance and functionality over the building ESL is identified as 0.5. There is no energy, water, or materials consumed during the use of the product during its service life. This applies to both the products Tru-Brix 2-3/4" and Tru-Brix 2-1/4".





1.13. Disposal

Product waste disposal has been classified and modeled in accordance with the guidelines in Section 2.8.5 of UL PCR Part A, Table 2. The distance from the installation site to the waste processing site is considered as per section 3.11 of UL PCR Part B. This applies to both the products Tru-Brix 2-3/4" and Tru-Brix 2-1/4".

1.14. Benefits and Loads Beyond the System Boundary

As the steel is recycled at the end of the life of the product, it leads to the recycling potential benefits, which are calculated in this module. The methodology used to calculate the recycling potential benefits is done by accounting for credits through the value of steel scrap.

2. Life Cycle Assessment Background Information

2.1. Functional Unit

The functional unit, according to the UL PCR Part B, is 1 m² of installed product, used to protect the building from external elements, improving energy efficiency, and enhancing aesthetic appearance for the building's estimated service life period of 75 years. The products under study have a reference service life (RSL) of 50 years. The table provides additional details about the functional unit.

Table 5: Functional Unit Details

| PROPERTY | TRU-BRIX 2-3/4" | TRU-BRIX 2-1/4" |
|---|-----------------|-----------------|
| Mass per functional unit [kg/m ²] | 58.60 | 58.60 |

2.2. System Boundary

This LCA is a Cradle-to-Grave study. An overview of the system boundary and a summary of the life cycle stages included in this LCA are presented below.

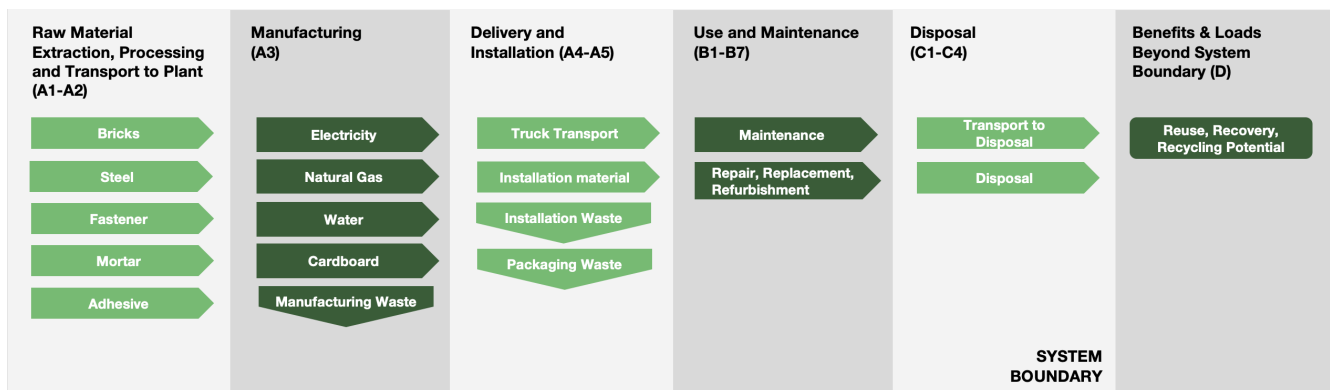


Figure 1: System Boundary Diagram





Table 6: Life Cycle Stages Included in the Study

| PRODUCTION | | | CONSTRUCTION | | USE | | | | | | | END OF LIFE | | | | BENEFITS & LOADS BEYOND SYSTEM BOUNDARY |
|---------------------|-----------|---------------|-------------------|------------------|-----|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------|-----------|------------------|----------|---|
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| Raw Material Supply | Transport | Manufacturing | Transport to Site | Assembly/Install | Use | Maintenance | Repair | Replacement | Refurbishment | Operational Energy Use | Operational Water Use | Deconstruction | Transport | Waste Processing | Disposal | Reuse, Recovery, Recycling Potential |
| X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

X = Module Included in LCA Report, MND = Module not Declared

2.3. Estimates and Assumptions

All estimates and assumptions are within the requirements of ISO 14040/44. The majority of the estimations are within the primary data. Some assumptions made in the study that may have affected the results are:

- The primary data was collected as annual totals, including all utility usage and production information. For the LCA, the usage information was divided by the production to create an energy and water use per square meter.
- The distance of transport to the installation site, installation data, and distance of transport from the installation site to the waste processing are assumed, as recommended by the PCR.
- The disposal pathways and the corresponding transportation distances of unused product waste, packaging waste, and post-consumer product waste are assumed in accordance with the PCR.
- The selection of which generic dataset to use to represent an aspect of a supply chain is a significant value choice. Collaboration between LCA practitioners, Glen-Gery associates, and LCA fE data experts was valuable in determining best-case scenarios in the selection of data. However, no generic data can be a perfect fit. Improved supply chain-specific data would improve the accuracy of results; however, budgetary and time constraints have to be taken into account.

2.4. Cut-off Criteria

Cumulative excluded material inputs, energy inputs, and environmental impacts did not exceed 5% based on total weight, energy use, or environmental impact of the functional unit. In the present study, all the inputs or outputs, including those less than 1% (based on the total mass of the final product), were included within the scope of analysis.





2.5. Data Sources

Primary data was collected by Glen-Gery associates for onsite energy, water, and waste during the course of manufacturing. Whenever available, supplier data was used for raw materials used in the production process. When primary data did not exist, secondary data for raw material production were used from the LCA fE Database 2025.1. All calculation procedures adhere to ISO14044.

2.6. Data Quality

The assessed data quality for each data point utilized within the study can be viewed in the Data Quality Section of the report, found in Section 3.7. Overall data quality is considered good. Improvements can be made through the modification of datasets to incorporate more regional specificity, both in terms of energy and technology. However, the data were considered appropriate in relation to the goal, scope, and budget of the project.

Primary data in the form of energy consumption and water consumption were normalized based on the functional unit of the product. The resulting energy and water per unit were used for products manufactured at the facilities under study. Overall, primary energy and water data quality are considered good.

Primary data also includes the bills of materials used to formulate the products that are included in the study. Overall, this data is considered very good.

2.7. Period under Review

The period under review was CY 2023.

2.8. Allocation

General principles of allocation were based on ISO 14040/44. There are no products other than the product under study that are produced as part of the specific manufacturing processes under study. To derive a per-unit value for manufacturing inputs such as electricity, thermal energy, and water, allocation based on total production by mass was adopted. As a default, secondary MLC datasets use a physical basis for allocation.

2.9. Comparability

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase, when product performance and specifications have been established, and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted.

Comparison of the environmental performance of the wall cladding system using EPD information shall be based on the product's use and impacts at the construction works level, and therefore, EPDs may not be used for comparability purposes when not considering the construction works energy use phase as instructed under this PCR.

Any comparison of EPDs shall be subject to the requirements of ISO 21930. EPDs are not comparative assertions





and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules, or are missing relevant environmental impacts. Such a comparison can be inaccurate and could lead to erroneous selection of materials or products that are higher-impact, at least in some impact categories.

3. Life Cycle Assessment Scenarios

Table 7. Transport to the building site (A4)

| NAME | VALUE | UNIT |
|---|------------------------------|---------|
| Fuel type | Diesel | |
| Liters of fuel | 42 | l/100km |
| Vehicle type | Diesel-powered truck/trailer | |
| Transport distance | 500 | km |
| Capacity utilization (including empty runs, mass based) | 67% | % |

Table 8. Installation into the building (A5)

| PARAMETER | UNIT | QUANTITY |
|--|------|------------------------|
| Freshwater consumption | 0.25 | Liters/kg mortar |
| Plastic waste to landfill | 68 | % |
| Plastic waste to incineration | 17 | % |
| Plastic waste to recycling | 9 | % |
| Cardboard and wood waste to landfill | 20 | % |
| Cardboard and wood waste to incineration | 5 | % |
| Cardboard and wood waste to recycling | 68 | % |
| Biogenic carbon content of packaging | 1.56 | kg CO ₂ /kg |

Table 9. Reference Service Life

| NAME | VALUE | UNIT |
|---|--|-------|
| RSL | 50 | years |
| Declared product properties (at the gate) and finishes, etc. | See Table 1 | - |
| Design application | Installation per recommendation by PCR | - |
| An assumed quality of work, when installed in accordance with the manufacturer's instructions | Accepted industry standard | - |
| Indoor environment (if relevant for indoor applications) | Normal building operating conditions | - |
| Use conditions, e.g. frequency of use, mechanical exposure | Normal building operating conditions | - |

Table 10. Replacement (B4)

| NAME | VALUE | UNIT |
|------------------------|---------------------|-------|
| Reference Service Life | 50 | years |
| Replacement cycle | $(75/50) - 1 = 0.5$ | |





| | | |
|--|---|----------------|
| Energy input | 0 | kWh |
| Net freshwater consumption | 0 | m ³ |
| Replacement of worn parts, specify parts/materials | 0 | kg |

Table 11. End of life (C1-C4)

| PARAMETER | UNIT | QUANTITY |
|--------------------------------|------|----------|
| Steel to recycling | % | 59 |
| Steel to landfill | % | 41 |
| Steel to incineration | % | 0 |
| Other material to recycling | % | 0 |
| Other material to landfill | % | 100 |
| Other material to incineration | % | 0 |
| Distance to landfill | km | 100 |

Table 12. Reuse, recovery, and/or recycling potentials (D)

| PARAMETER | UNIT | QUANTITY |
|---------------------------|------|----------|
| Recycling rate of steel | % | 59 |
| Recycled content of steel | % | 35 |

4. Life Cycle Assessment Results

Environmental impacts were calculated using the LCA fE software platform. As per PCR Part A section 4.7, Life Cycle Impact Assessment results have been calculated as per the methodology rules for the North America region, using characterization factors based on the current version of the U.S. EPA’s TRACI v2.1 for all the impact categories except GWP, which is based on IPCC AR5 and ADP-fossil, which is based on CML-baseline, v4.7 August 2016 characterization factors. Results presented in this report are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks.

Table 13: Acronyms

| ABBREVIATION | PARAMETER | ABBREVIATION | PARAMETER |
|--------------|--|-------------------|--|
| GWP | Global warming potential (excluding biogenic CO ₂) | RPR _E | Use of renewable primary energy excluding renewable primary energy resources used as raw materials |
| AP | Acidification potential of soil and water | RPR _M | Use of renewable primary energy resources used as raw materials |
| EP | Eutrophication potential | NRPR _E | Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials |
| ODP | Depletion of stratospheric ozone layer | NRPR _M | Use of non-renewable primary energy resources used as raw materials |



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| | | | |
|------------|---|------|---|
| SFP | Smog formation potential | SM | Use of secondary materials |
| ADP-fossil | Abiotic resource depletion potential of non-renewable (fossil) energy resources | RSF | Use of renewable secondary fuels |
| PM | Potential incidence of disease due to PM emissions | NRSF | Use of non-renewable secondary fuels |
| IRP | Potential human exposure efficiency relative to U235 | RE | Recovered energy |
| ETP-fw | Potential comparative toxic unit for ecosystems | FW | Net use of fresh water |
| HTP-c | Potential comparative toxic unit for humans | HWD | Disposed-of-hazardous waste |
| HTP-nc | Potential comparative toxic unit for humans | NHWD | Disposed-of non-hazardous waste |
| SQP | Potential soil quality index | HLRW | High-level radioactive waste, conditioned, to final repository |
| BCRP | Biogenic carbon removal from product | EEE | Exported energy |
| BCEP | Biogenic carbon emission from product | CCE | Calcination carbon emissions |
| BCRK | Biogenic carbon removal from packaging | CCR | Carbonation carbon removals |
| BCEW | Biogenic carbon emission from combustion of waste from renewable sources used in production processes | CWNR | Carbon emissions from combustion of waste from non-renewable sources used in production processes |





4.1. Life Cycle Impact Assessment Results for Tru-Brix 2-3/4”

The LCIA results are presented below for the functional unit, i.e., 1 m² of Tru-Brix 2-3/4” installed cladding system.

Table 14: LCIA results

| IMPACT | UNIT | A1 | A2 | A3 | A4 | A5 | B1-B3 | B4 | B5-B7 | C1 | C2 | C3 | C4 | D |
|------------------|-----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|
| IPCC AR5 | | | | | | | | | | | | | | |
| GWP | kg CO ₂ eq | 3.29E+01 | 5.47E-01 | 2.02E+00 | 2.59E+00 | 7.95E-02 | 0.00E+00 | 2.40E+01 | 0.00E+00 | 0.00E+00 | 4.80E-01 | 8.12E+00 | 1.27E+00 | -4.15E+00 |
| TRACI 2.1 | | | | | | | | | | | | | | |
| AP | kg SO ₂ eq | 1.44E-01 | 2.25E-03 | 2.75E-03 | 1.19E-02 | 3.99E-04 | 0.00E+00 | 9.27E-02 | 0.00E+00 | 0.00E+00 | 1.36E-03 | 1.62E-02 | 6.50E-03 | -8.17E-03 |
| EP | kg N eq | 3.67E-03 | 1.72E-04 | 2.07E-04 | 9.21E-04 | 1.74E-05 | 0.00E+00 | 3.10E-03 | 0.00E+00 | 0.00E+00 | 1.17E-04 | 8.31E-04 | 2.69E-04 | -4.88E-04 |
| ODP | kg CFC 11 eq | 7.03E-09 | 2.45E-14 | 2.92E-12 | 1.16E-13 | 1.63E-14 | 0.00E+00 | 3.52E-09 | 0.00E+00 | 0.00E+00 | 2.16E-14 | -6.75E-15 | 2.69E-13 | 1.12E-13 |
| SFP | kg O ₃ eq | 1.49E+00 | 5.05E-02 | 5.21E-02 | 2.73E-01 | 7.24E-03 | 0.00E+00 | 1.15E+00 | 0.00E+00 | 0.00E+00 | 3.06E-02 | 2.80E-01 | 1.16E-01 | -8.82E-02 |
| CML-2016 | | | | | | | | | | | | | | |
| ADPF | MJ | 3.35E+02 | 6.96E+00 | 2.71E+01 | 3.29E+01 | 1.15E+00 | 0.00E+00 | 2.59E+02 | 0.00E+00 | 0.00E+00 | 6.13E+00 | 9.10E+01 | 1.86E+01 | -4.29E+01 |

Table 15: Resource use, waste, and output flow results

| IMPACT | UNIT | A1 | A2 | A3 | A4 | A5 | B1-B3 | B4 | B5-B7 | C1 | C2 | C3 | C4 | D |
|---------------------|------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Resource Use | | | | | | | | | | | | | | |
| RPRE | MJ | 2.58E+01 | 2.90E-01 | -4.99E+00 | 1.38E+00 | 1.68E-01 | 0.00E+00 | 1.54E+01 | 0.00E+00 | 0.00E+00 | 2.57E-01 | 5.19E+00 | 2.73E+00 | 1.63E+00 |
| RPRM | MJ | 0.00E+00 | 0.00E+00 | 2.14E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.07E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NRPRE | MJ | 3.53E+02 | 7.03E+00 | 4.20E+01 | 3.33E+01 | 1.19E+00 | 0.00E+00 | 2.80E+02 | 0.00E+00 | 0.00E+00 | 6.18E+00 | 9.88E+01 | 1.92E+01 | -4.13E+01 |
| NRPRM | MJ | 0.00E+00 | 0.00E+00 | 8.43E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.21E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| SM | kg | 2.51E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.26E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RSF | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

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|-------------------------------|----------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| NRSF | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RE | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| FW | m ³ | 1.10E-01 | 3.13E-04 | 8.41E-03 | 1.49E-03 | 2.13E-03 | 0.00E+00 | 8.18E-02 | 0.00E+00 | 0.00E+00 | 2.78E-04 | 3.88E-02 | 2.09E-03 | -4.20E-01 |
| Output Flows and Waste | | | | | | | | | | | | | | |
| HWD | kg | 9.92E-06 | 1.16E-09 | 7.92E-09 | 5.51E-09 | 2.85E-10 | 0.00E+00 | 6.93E-06 | 0.00E+00 | 0.00E+00 | 1.03E-09 | 3.92E-06 | 4.60E-09 | -3.09E-07 |
| NHWD | kg | 5.46E+00 | 7.16E-04 | 9.37E-03 | 3.40E-03 | 3.45E+00 | 0.00E+00 | 3.34E+01 | 0.00E+00 | 0.00E+00 | 6.33E-04 | 3.28E-01 | 5.75E+01 | 5.00E-01 |
| HLRW | kg | 7.57E-06 | 2.86E-08 | 6.64E-06 | 1.36E-07 | 1.57E-08 | 0.00E+00 | 9.18E-06 | 0.00E+00 | 0.00E+00 | 2.52E-08 | 3.71E-06 | 2.40E-07 | 4.55E-09 |
| ILLRW | kg | 6.60E-03 | 2.40E-05 | 5.55E-03 | 1.14E-04 | 1.38E-05 | 0.00E+00 | 7.82E-03 | 0.00E+00 | 0.00E+00 | 2.12E-05 | 3.10E-03 | 2.11E-04 | 4.52E-06 |
| CRU | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MR | kg | 0.00E+00 | 0.00E+00 | 3.35E+01 | 0.00E+00 | 7.71E-01 | 0.00E+00 | 1.78E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.33E+00 | 0.00E+00 | 0.00E+00 |
| MER | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.04E-02 | 0.00E+00 | 3.02E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EE | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.11E-02 | 0.00E+00 | 3.06E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

Table 16: Carbon emissions and removals

| Impact | Unit | A1 | A2 | A3 | A4 | A5 | B1-B3 | B4 | B5-B7 | C1 | C2 | C3 | C4 | D |
|--------|--------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| BCRP | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| BCEP | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| BCRK | kg CO ₂ | 0.00E+00 | 0.00E+00 | 1.78E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.91E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| BCEK | kg CO ₂ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.78E+00 | 0.00E+00 | 8.91E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| BCEW | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| CCE | kg CO ₂ | 1.33E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.66E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| CCR | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| CWNR | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

ENVIRONMENTAL PRODUCT DECLARATION



Tru-Brix Cladding System



According to ISO 14025,
and ISO 21930:2017

4.2. Life Cycle Impact Assessment Results for Tru-Brix 2-1/4"

The LCIA results are presented below for the functional unit, i.e., 1 m² of Tru-Brix 2-1/4" installed cladding system.

Table 17: LCIA results

| IMPACT | UNIT | A1 | A2 | A3 | A4 | A5 | B1-B3 | B4 | B5-B7 | C1 | C2 | C3 | C4 | D |
|------------------|-----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|
| IPCC AR5 | | | | | | | | | | | | | | |
| GWP | kg CO ₂ eq | 3.16E+01 | 5.98E-01 | 1.63E+00 | 2.25E+00 | 7.19E-02 | 0.00E+00 | 2.54E+01 | 0.00E+00 | 0.00E+00 | 4.15E-01 | 1.30E+01 | 1.08E+00 | -6.66E+00 |
| TRACI 2.1 | | | | | | | | | | | | | | |
| AP | kg SO ₂ eq | 1.27E-01 | 2.47E-03 | 2.53E-03 | 1.04E-02 | 3.60E-04 | 0.00E+00 | 8.79E-02 | 0.00E+00 | 0.00E+00 | 1.18E-03 | 2.60E-02 | 5.51E-03 | -1.31E-02 |
| EP | kg N eq | 3.48E-03 | 1.88E-04 | 1.79E-04 | 8.01E-04 | 1.58E-05 | 0.00E+00 | 3.16E-03 | 0.00E+00 | 0.00E+00 | 1.01E-04 | 1.33E-03 | 2.28E-04 | -7.83E-04 |
| ODP | kg CFC 11 eq | 8.30E-09 | 2.68E-14 | 3.43E-12 | 1.01E-13 | 1.46E-14 | 0.00E+00 | 4.15E-09 | 0.00E+00 | 0.00E+00 | 1.87E-14 | -1.08E-14 | 2.27E-13 | 1.80E-13 |
| SFP | kg O ₃ eq | 1.39E+00 | 5.53E-02 | 4.88E-02 | 2.37E-01 | 6.56E-03 | 0.00E+00 | 1.15E+00 | 0.00E+00 | 0.00E+00 | 2.64E-02 | 4.48E-01 | 9.84E-02 | -1.41E-01 |
| CML-2016 | | | | | | | | | | | | | | |
| ADPF | MJ | 3.20E+02 | 7.60E+00 | 2.21E+01 | 2.86E+01 | 1.03E+00 | 0.00E+00 | 2.73E+02 | 0.00E+00 | 0.00E+00 | 5.29E+00 | 1.46E+02 | 1.58E+01 | -6.89E+01 |

Table 18: Resource use, waste, and output flow results

| IMPACT | UNIT | A1 | A2 | A3 | A4 | A5 | B1-B3 | B4 | B5-B7 | C1 | C2 | C3 | C4 | D |
|---------------------|------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Resource Use | | | | | | | | | | | | | | |
| RPRE | MJ | 2.37E+01 | 3.16E-01 | -7.34E+00 | 1.20E+00 | 1.52E-01 | 0.00E+00 | 1.44E+01 | 0.00E+00 | 0.00E+00 | 2.22E-01 | 8.32E+00 | 2.31E+00 | 2.61E+00 |
| RPRM | MJ | 0.00E+00 | 0.00E+00 | 2.54E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.27E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NRPRE | MJ | 3.39E+02 | 7.68E+00 | 3.35E+01 | 2.89E+01 | 1.07E+00 | 0.00E+00 | 2.95E+02 | 0.00E+00 | 0.00E+00 | 5.34E+00 | 1.58E+02 | 1.63E+01 | -6.62E+01 |
| NRPRM | MJ | 0.00E+00 | 0.00E+00 | 8.43E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.21E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| SM | kg | 2.72E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.36E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RSF | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

ENVIRONMENTAL PRODUCT DECLARATION



Tru-Brix Cladding System

According to ISO 14025,
and ISO 21930:2017

| | | | | | | | | | | | | | | |
|-------------------------------|----------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| NRSF | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RE | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| FW | m ³ | 1.13E-01 | 3.42E-04 | 6.60E-03 | 1.30E-03 | 1.54E-03 | 0.00E+00 | 9.35E-02 | 0.00E+00 | 0.00E+00 | 2.40E-04 | 6.22E-02 | 1.77E-03 | -6.73E-01 |
| Output Flows and Waste | | | | | | | | | | | | | | |
| HWD | kg | 1.08E-05 | 1.27E-09 | 6.23E-09 | 4.79E-09 | 2.57E-10 | 0.00E+00 | 8.53E-06 | 0.00E+00 | 0.00E+00 | 8.86E-10 | 6.28E-06 | 3.89E-09 | -4.95E-07 |
| NHWD | kg | 4.65E+00 | 7.81E-04 | 7.35E-03 | 2.96E-03 | 3.09E+00 | 0.00E+00 | 2.85E+01 | 0.00E+00 | 0.00E+00 | 5.47E-04 | 5.26E-01 | 4.87E+01 | 8.01E-01 |
| HLRW | kg | 7.77E-06 | 3.13E-08 | 5.17E-06 | 1.18E-07 | 1.44E-08 | 0.00E+00 | 9.64E-06 | 0.00E+00 | 0.00E+00 | 2.18E-08 | 5.95E-06 | 2.03E-07 | 7.29E-09 |
| ILLRW | kg | 6.75E-03 | 2.63E-05 | 4.32E-03 | 9.92E-05 | 1.26E-05 | 0.00E+00 | 8.19E-03 | 0.00E+00 | 0.00E+00 | 1.83E-05 | 4.97E-03 | 1.79E-04 | 7.25E-06 |
| CRU | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MR | kg | 0.00E+00 | 0.00E+00 | 2.60E+01 | 0.00E+00 | 9.17E-01 | 0.00E+00 | 1.45E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.13E+00 | 0.00E+00 | 0.00E+00 |
| MER | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.11E-02 | 0.00E+00 | 3.56E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EE | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.20E-02 | 0.00E+00 | 3.60E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

Table 19: Carbon emissions and removals

| Impact | Unit | A1 | A2 | A3 | A4 | A5 | B1-B3 | B4 | B5-B7 | C1 | C2 | C3 | C4 | D |
|--------|--------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| BCRP | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| BCEP | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| BCRK | kg CO ₂ | 0.00E+00 | 0.00E+00 | 2.12E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.06E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| BCEK | kg CO ₂ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.12E+00 | 0.00E+00 | 1.06E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| BCEW | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| CCE | kg CO ₂ | 1.58E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.88E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| CCR | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| CWNR | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

5. LCA Interpretation

Analysis was performed for Tru-Brix 2-3/4" to show which of the life cycle modules contribute to the majority of the impacts. Due to the relevance of these impact categories to the product type and the manufacturer's interests, this dominance analysis is provided for TRACI's AP, EP, SFP, ODP results, IPCC AR5 GWP, and CML ADP-fossil. In the following analysis, module D has not been considered to keep the analysis within the system boundary.

Figure 2: Contribution by life cycle stage to LCIA Results for Tru-Brix 2-3/4"

The raw materials contribute the highest with around 45%-65% contribution across all the impact categories, followed by replacement impacts with 33% contribution. Waste processing contributes around 10% for all impact categories except ODP. Manufacturing contributes around 1% to 3%, as it only accounts for the brick-making process.

This LCA project report represents a systematic and comprehensive summary of project documentation and showcases any data and information of importance to the results, as required by the Product Category Rules (PCRs).

Some limitations to the study have been identified as follows:

- Only known and quantifiable environmental impacts are considered.
- Due to the assumptions and estimations from the PCR, these do not reflect real-life scenarios, and hence, they cannot assess actual and exact impacts, but only potential environmental impacts.

6. Additional Environmental Information

No substances required to be reported as hazardous are associated with the production of this product.

7. References

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