# Environmental Product Declaration

Boise Cascade®
ENGINEERED WOOD PRODUCTS

## Cradle-to-Gate EPD - BOISE GLULAM Beams and Glue-Laminated Timber (GLT)

| Summary Results | | Cradle-to-Gate (A1-A3) |
|---|---|---|
| Global warming potential, Total | kg $CO_2e$ | 112.90 |
| Global warming potential, Biogenic | kg $CO_2e$ | 0.00 |
| Global warming potential, Fossil | kg $CO_2e$ | 112.90 |
| Ozone Depletion | kg CFC11e | 9.64E-07 |
| Acidification | kg $SO_2e$ | 0.9599 |
| Eutrophication | kg Ne | 0.3784 |
| Smog | kg $O_3e$ | 29.08 |
| Renewable Energy | MJ, LHV | 190.05 |
| Non-renewable Energy | MJ, LHV | 1,733.58 |

# ASTM Certified Environmental Product Declaration

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|---|---|---|
| **PROGRAM OPERATOR** | ASTM International<br>100 Barr Harbor Drive<br>PO Box C700<br>West Conshohocken, PA,<br>19428-2959 USA<br>www.astm.org | ASTM INTERNATIONAL<br>Helping our world work better |
| **GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER** | ASTM Program Operator Rules.<br>Version: 8.0, Revised 04/29/20 | |
| **DECLARATION OWNER** | Boise Cascade Company | Boise Cascade®<br>ENGINEERED WOOD PRODUCTS |
| **DECLARATION NUMBER** | EPD 1228 | Boise Cascade GLULAM Beams and Glue-Laminated Timber |
| **DECLARED PRODUCT** | GLULAM Beams and Glue-Laminated Timber | |
| **DECLARED UNIT** | One cubic meter (1 $m^3$) of BOISE GLULAM and Glue-Laminated Timber (GLT) produced at Homedale, Idaho, Boise Cascade facility. | |
| **REFERENCE PCR AND VERSION NUMBER** | ISO 21930:2017 Sustainability in Building and Civil Engineering works – Core Rules for environmental Product Declaration of Construction Products and Services. [8]<br><br>UL Environment: Product Category Rules for Building-Related Products and Services Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report, v4.0 2022 [13]<br>Part B: Structural and Architectural Wood Products EPD Requirements, v1.1 2020 [14] | |
| **DESCRIPTION OF PRODUCT'S INTENDED APPLICATION AND USE** | Boise Cascade® Glued laminated timber (BOISE GLULAM and Glue-Laminated Timber (GLT) is used in building construction (residential and commercial) for industrial and architectural applications. | |
| **MARKETS OF APPLICABILITY** | Construction Sector, Mass timber design | |
| **DATE OF ISSUE** | July 24, 2026 | |
| **PERIOD OF VALIDITY** | 5 years | |
| **EPD TYPE** | Product-Specific EPD | |
| **EPD SCOPE** | Cradle to Gate | |
| **YEAR OF REPORTED MANUFACTURER PRIMARY DATA** | 2024 | |
| **LCA SOFTWARE** | SimaPro v10.2 | |

| | |
|---|---|
| **LCI DATABASES** | USLCI [10], Ecoinvent 3.11 [4], Datasmart 2023 [9] |
| **LCIA METHODOLOGY** | TRACI 2.1 v1.09 [3], CML-IA Baseline V3.11, CED, LHV 1.01 |
| **THE SUB-CATEGORY PCR REVIEW WAS CONDUCTED BY:** | Dr. Thomas Gloria (chair)<br>t.gloria@industrial-ecology.com |
| **LCA AND EPD DEVELOPER**<br>This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by: | The Consortium for Research on Renewable Industrial Materials (CORRIM)<br>PO Box 2432<br>Corvallis, OR 97330<br>541-231-2627<br>www.corrim.org<br>CORRIM<br>Consortium for Research on Renewable Industrial Materials |

This declaration was independently verified in accordance with ISO 14025:2006 [5].
The UL Environment "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report," v4.0 (2022), in conformance with ISO 21930:2017 with additional considerations from the USGBC/UL Environment Part A Enhancement (2017).

Tim Brooke, ASTM International

☐Internal ☒ External

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|---|---|
| **INDEPENDENT VERIFIER**<br>This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by: | Thomas Gloria, Ph.D., Industrial Ecology Consultants |

## LIMITATIONS

- Environmental declarations from different programs (ISO 14025) may not be comparable.
- Comparison of the environmental performance of Structural and Architectural Wood Products 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.
- Full conformance with the PCR for BOISE GLULAM and Glue-Laminated Timber (GLT) allows EPD comparability only when all stages of a life cycle have been considered, when they comply with all referenced standards (ISO 21930:2017 §5.5), use the same sub-category Part B PCR, and use equivalent scenarios with respect to construction works. However, variations and deviations are possible. It should be noted that different LCA software and background LCI datasets may lead to different results for upstream or downstream of the life cycle stages declared.

# Company and Product Description

## Boise Cascade Company

Boise Cascade® is a manufacturer of engineered wood products. Since our founding in 1957, we have grown to become a leading manufacturer and distributor of building materials in North America and beyond. Through conservation and sustainable practices, we are actively contributing to the responsible use and protection of the natural environment, which benefits our employees, our customers, and the communities we work and live in.

## Product Description

Glulam/GLT is an engineered, stress-rated product that consists of two or more layers of lumber that are glued together with the grain of the layers parallel to the length of the beam or column. These layers are typically referred to as laminations as seen in Figure 2. Glulam/GLT is made from suitably selected and prepared pieces of wood either in a straight or curved form, with the grain of all pieces essentially parallel to the longitudinal axis of the member (Figure 2). The maximum lamination thickness permitted is 50 mm (2 in.), and the laminations are typically made of standard 25 or 50 mm (nominal 1 or 2 in.) thick lumber. The lumber is joined end to end, edge to edge, and face to face, so the size of glulam/GLT is limited only by the capabilities of the manufacturing plant and the transportation system. North American standards require that glulam/GLT be manufactured in an approved manufacturing plant.

Glulam/GLT produced by APA (Engineered Wood Association) members are certified with an APA trademark and are tested for compliance to ANSI/AITC Standard A190.1-2022 to verify quality in product manufacturing. All glulam/GLT properties are tested to adhere to ASTM D3737-18(2023)e1 Standard Practice for Establishing Allowable Properties for Structural Glued-Laminated Timber (Glulam).

Glulam/GLT beams are used as concealed or exposed structural beams and columns in residential and commercial construction, warehouse roof beams and purlins, church arches, and girders and deck panels for timber bridges. Glulam/GLT comes in a variety of sizes with production based on a volume basis, typically board feet (1 BF = 0.0024 $m^3$) and sold by retailers on a linear basis.

Glulam/GLT is produced from softwood lumber called lamstock. Lamstock is defined as a special grade of lumber used in the construction of laminated timbers. Green lamstock cut from logs must be kiln-dried to a moisture content (MC) of 16 percent or less to minimize any additional dimensional changes. Lamstock that exceeds the 16 percent MC limit cannot be utilized and has to be re-dried, since this will prevent the laminations from properly adhering to each other in the following processes. Lamstock grading entails either one of two methods, either visual or machine grading. Visual grading is based upon the appearance of the material and any apparent flaws. Machine E-rated lamstock is graded by stiffness and visual characteristics

Boise Glulam/GLT is manufactured in a variety of widths (3.5-inch to 14.25-inch) depths of 6- to 48-inches, and lengths up to 66-feet. Boise Glulam/GLT manufactures industrial and architectural grades using exterior-grade adhesives suitable for interior and exterior applications.

NAICS product code 321213 is used in identifying products that can be labeled as engineered wood products like glued-laminated timbers. Additional classification codes for Glulam/GLT are the United Nations Standard Products and Services Code (UNSPSC) – Engineered wood products/glued laminated timber 111220 05 and Construction Specifications Institute (CSI) code for heavy timber construction 06 13 00 and glued-laminated construction 06 18 00 (Table 1).

**Table 1. United Nations Standard Products and Services Code (UNSPSC) and Construction Specification Institute (CSI) MasterFormat Code for Boise Glulam/GLT.**

| Classification Scheme | Product category | Subcategory | Product Code |
|---|---|---|---|
| UNSPSC | Engineered wood products | Engineered Wood Products | 111220 00 |
| | | Glued Laminated Timber | 111220 05 |
| CSI/CSC | | Engineered Wood Products | 06 11 13 |
| | | Heavy Timber Framing | 06 13 23 |
| | | Glued-Laminated Construction | 06 18 00 |
| | | Glued-Laminated Beams | 06 18 13 |
| | | Glued-Laminated Columns | 06 18 16 |

# Methodological Framework

The underlying LCA [12] was performed in conformance with ISO 14040/44 [6,7] and ISO 21930 [8], as well as the PCR.

## Type of EPD and Life Cycle Stages

This EPD is intended to represent a product specific life cycle assessment (LCA) for BOISE GLULAM/GLT products produced by Boise Cascade in Homedale, Idaho. The manufacturer provided production data, resource use, energy and fuel use, transportation distances, and onsite processing emissions. The underlying LCA [12] investigates BOISE GLULAM/GLT production from cradle-to-gate. Information modules included in the LCA are shown in Table 2. This EPD includes mandatory modules A1-A3 for a cradle-to-gate analysis.

**Table 2. Life Cycle Stages & Information Modules per ISO 21930**

| PRODUCTION STAGE | | | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END-OF-LIFE STAGE | | | | OPTIONAL BENEFITS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | A2 | A3 | A4 | A5 | B1 – B7 | | | | | | | C1-C4 | | | | D |
| Extraction and up-stream production | Transport to factory | Manufacturing | Transport to site | Installation | Use | Maintenance | Repair | Replacement | Refurbishment | Building Operational Energy During Use | Building Operational Water Use During Use | Deconstruction | Transport | Waste | Disposal | Reuse, Recycle, & Recovery benefits |
| X | X | X | MND | MND | MND | | | | | | | MND | | | | MND |

MND – Module not declared in this EPD

# System Boundaries and Product Flow Diagram

The product system described in Figure 1 includes the following information modules and unit processes:

| | |
|---|---|
| **A1 Extraction and upstream production** | Includes the cradle to gate production of lamstock.<br><br>Includes the cradle to gate resin production data. |
| **A2 Transport to facility** | Average or specific transportation of raw materials (including secondary materials and fuels) from extraction site or source to manufacturing site. |
| **A3 Manufacturing** | Manufacturing of glulam/GLT including energy consumption and fuel use, resource use, water use, emissions to air and water, waste disposal, and packaging.<br>Packaging materials represent less than one percent (0.61%) of the mass of the main product. The packaging is allocated 100 percent to glulam/GLT. |

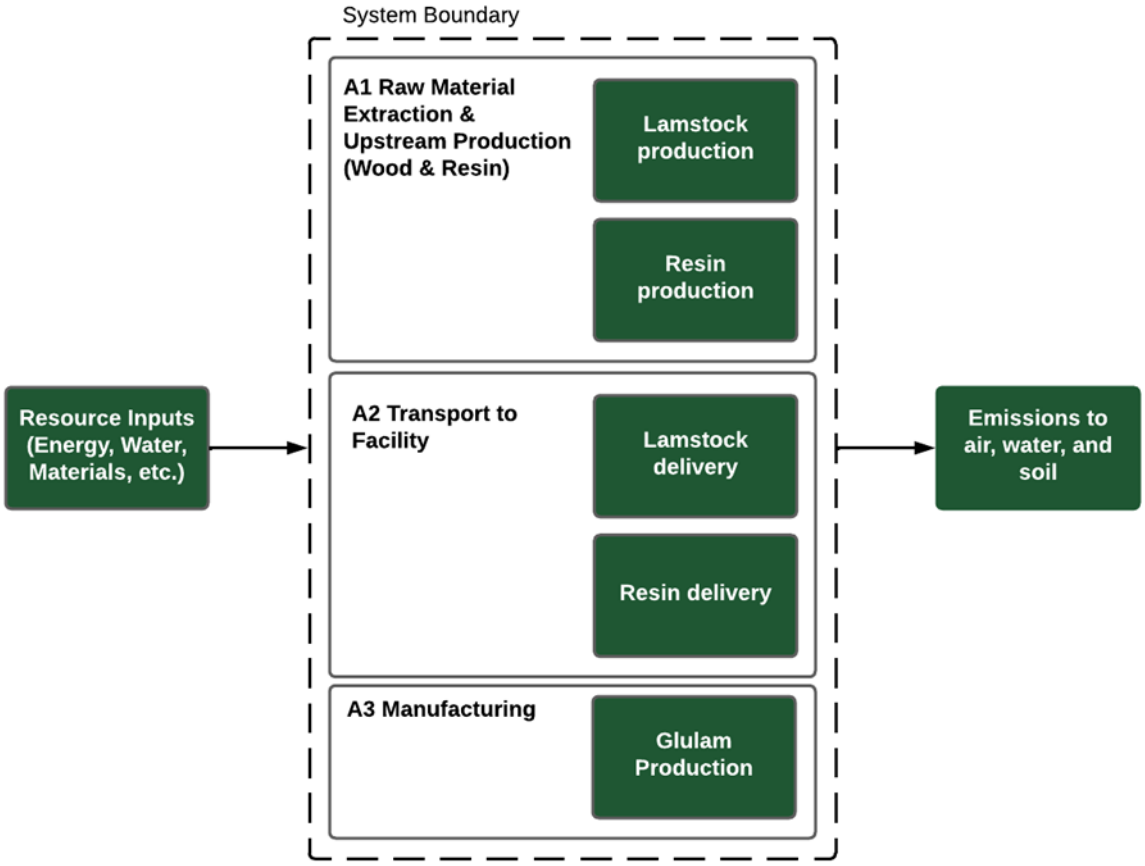



**Figure 1. Cradle-to-Gate System Boundary for Boise Glulam/GLT.**

## Declared Unit

This LCA considers the life cycle from "cradle to gate" (Module A1-A3) The declared unit is defined as "the production of one cubic meter (1 $m^3$) of Boise Glulam/GLT produced in Homedale, Idaho. The product properties and composition associated with the declared unit are provided in Table 3.

**Table 3. Product Properties and Composition of 1 Cubic Meter ($m^3$) of Boise Glulam/GLT**

| Product Properties | Unit per m3 | Value | |
|---|---|---|---|
| Mass @ moisture content | kg | 569.69 | |
| Mass @ oven dry | odkg | 495.38 | |
| Moisture content | % | 12-16 | |
| **Product Composition** | **Unit** | **Value** | |
| Wood | odkg | 488.92 | 98.69% |
| Adhesive, neat | kg | 6.47 | 1.31% |
| Total Glulam/GLT, oven dry | odkg | 495.38 | 100% |

## Allocation Methods

Allocation is the method used to partition the environmental load of a process when several products or functions share the same process. The input material for producing glulam/GLT is lamstock. Following the PCR [13,14] and ISO 21930:2017, allocation is based on physical properties (e.g., mass or volume). For this study, a mass allocation was achieved for the primary product and subsequent by-products. Packaging inputs are not related to the by-products and are allocated 100% to the final product.

## Cut-off Criteria

The cut-off criteria for all activity stage flows considered within the system boundary conform with ISO 21930: 2017 Section 7.1.8. Specifically, the cut-off criteria were applied as follows:

- All inputs and outputs for which data are available are included in the calculated effects and no collected core process data are excluded.
- A one percent cut-off is considered for renewable and non-renewable primary energy consumption and the total mass of inputs within a unit process. The sum of the total neglected flows does not exceed 5% of all energy consumption and mass of inputs.
- All flows known to contribute to a significant impact or to uncertainty are included.
- The cut-off rules are not applied to hazardous and toxic material flows – all of which are included in the life cycle inventory.
- No material or energy input or output was knowingly excluded from the system boundary.

## Data Sources

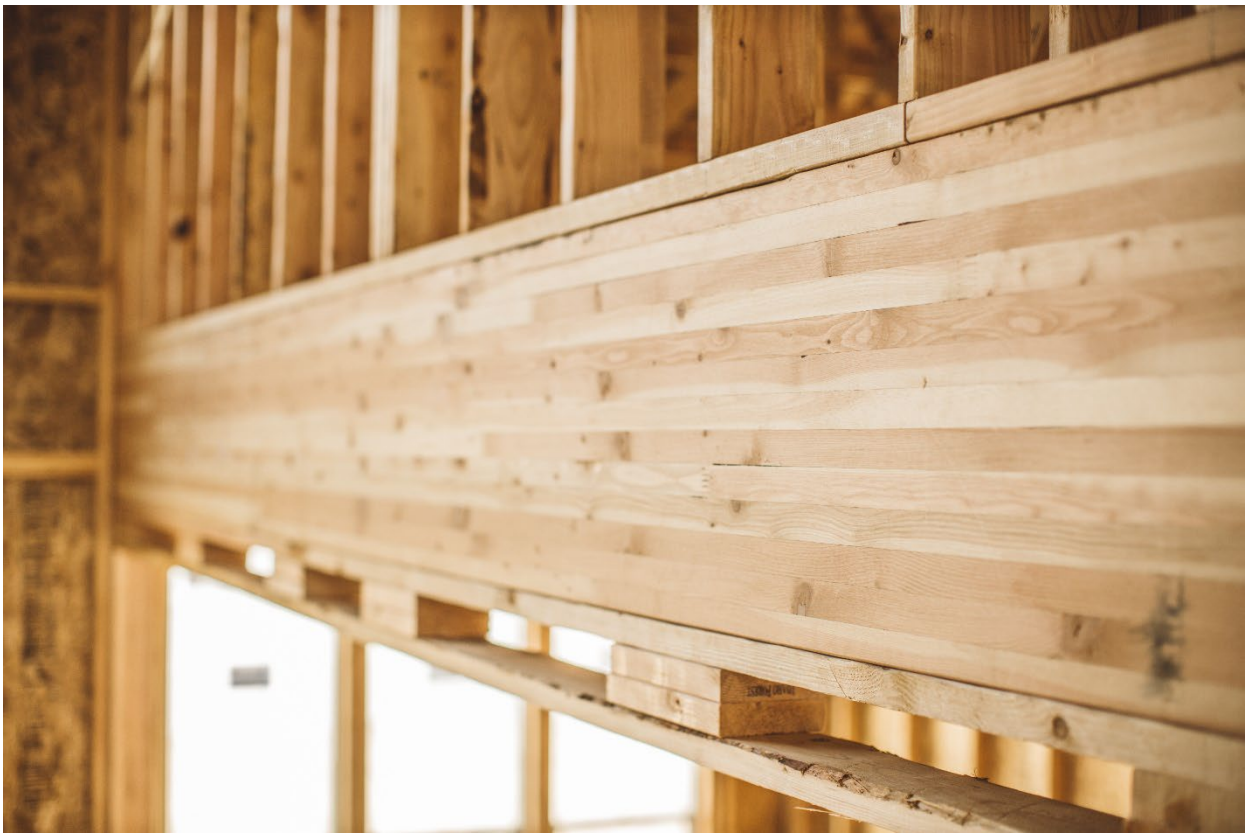
Primary and secondary data sources, as well as the respective data quality assessment, are documented in the underlying LCA project report in accordance with PCR ([13].Third party verified ISO [5,6,7] secondary LCI data sets contribute 0.1 - 99% of total impact to any of the required impact categories identified by the applicable PCR [13,14].

### Treatment of Biogenic Carbon

Biogenic carbon emissions and removals are reported in accordance with ISO 21930 7.2.7. and 7.2.12. ISO 21930 requires a demonstration of forest sustainability to characterize carbon removals with a factor of -1 kg $CO_2$eq/kg $CO_2$. ISO 21930 Section 7.2.11 Note 2 states the following regarding demonstrating forest sustainability: “Other evidence such as national reporting under the United Nations Framework Convention on Climate Change (UNFCCC) can be used to identify forests with stable or increasing forest carbon stocks.” The United States UNFCCC annual report Table 6-1 provides annual NET GHG Flux Estimates for different land use categories. This report indicates non-decreasing forest carbon stocks and thus the source forests meet the conditions for characterization of removals with a factor of -1 kg $CO_2$eq/kg $CO_2$.

## Environmental Parameters Derived from the LCA

The impact categories and characterization factors for the LCIA were derived from the U.S. EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts - TRACI 2.1 v1.09 [3]. The total primary energy consumption is tabulated from the LCI results based on the Cumulative Energy Demand Method (CED, LHV, v1.01) published by Ecoinvent [4]. Lower heating value of primary energy carriers is used to calculate the primary energy values reported in the study. Other inventory parameters concerning material use, waste, water use, and biogenic carbon were drawn from the LCI results. We followed the ACLCA’s Guidance to Calculating non-LCIA Inventory Metrics in accordance with ISO 21930:2017 [1]. SimaPro 10.2 [11] was used to organize and accumulate the LCI data, and to calculate the LCIA results (Table 4).



## Table 4. Selected Impact Category Indicators and Inventory Parameters

| Impact Indicators per ISO 21930 | Abbreviation | Units | Method |
|---|---|---|---|
| **Core Mandatory Impact Indicator** | | | |
| Global warming potential, Total | $GWP_{TOTAL}$ | kg $CO_2$ eq | $GWP_{BIOGENIC}$ + $GWP_{FOSSIL}$ |
| Global warming potential, Biogenic | $GWP_{BIOGENIC}$ | kg $CO_2$ eq | TRACI 2.1 V1.09 + LCI Indicator |
| Global warming potential, Fossil | $GWP_{FOSSIL}$ | kg $CO_2$ eq | TRACI 2.1 V1.09 |
| Depletion potential of the stratospheric ozone layer | ODP | kg CFC-11eq | TRACI 2.1 V1.09 |
| Acidification potential of soil and water sources | AP | kg $SO_2$ eq | TRACI 2.1 V1.09 |
| Eutrophication potential | EP | kg N eq | TRACI 2.1 V1.09 |
| Formation potential of tropospheric ozone | SFP | kg $O_3$ eq | TRACI 2.1 V1.09 |
| Fossil fuel depletion | FFD | MJ Surplus | TRACI 2.1 V1.09 |
| Abiotic depletion potential (ADP fossil) for fossil resources; | ADPf | MJ, LHV | CML-IA Baseline V3.11 |
| **Use of Primary Resources** | | | |
| Renewable primary energy carrier used as energy | RPRE | MJ, LHV | CED (LHV) V1.01 |
| Renewable primary energy carrier used as material | RPRM | MJ, LHV | LCI Indicator |
| Non-renewable primary energy carrier used as energy | NRPRE | MJ, LHV | CED (LHV) V1.01 |
| Non-Renewable primary energy carrier used as material | NRPRM | MJ, LHV | LCI Indicator |
| **Secondary material, secondary fuel and recovered energy** | | | |
| Secondary material | SM | kg | LCI Indicator |
| Renewable secondary fuel | RSF | MJ, LHV | LCI Indicator |
| Non-renewable secondary fuel | NRSF | MJ, LHV | LCI Indicator |
| Recovered energy | RE | MJ, LHV | LCI Indicator |
| **Mandatory Inventory Parameters** | | | |
| Consumption of freshwater resources; | FW | $m^3$ | LCI Indicator |
| **Indicators Describing Waste** | | | |
| Hazardous waste disposed | HWD | kg | LCI Indicator |
| Non-hazardous waste disposed | NHWD | kg | LCI Indicator |
| High-level radioactive waste, conditioned, to final repository | HLRW | $m^3$ | LCI Indicator |
| Intermediate- and low-level radioactive waste, conditioned, to final repository | ILLRW | $m^3$ | LCI Indicator |
| Components for re-use | CRU | kg | LCI Indicator |
| Materials for recycling | MR | kg | LCI Indicator |
| Materials for energy recovery | MER | kg | LCI Indicator |
| Recovered energy exported from the product system | EE | MJ, NCV | LCI Indicator |
| **Additional Inventory Parameters for Transparency** | | | |
| Biogenic Carbon Removal from Product | BCRP | kg CO2e | Manual |
| Biogenic Carbon Emission from Product | BCEP | kg CO2e | Manual |
| Biogenic Carbon Removal from Packaging | BCRK | kg CO2e | Manual |
| Biogenic Carbon Emission from Packaging | BCEK | kg CO2e | Manual |
| Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes | BCEW | kg CO2e | Manual |

# Life Cycle Impact Assessment Results

Table 5 presents the cradle-to-gate (A1-A3) LCIA and LCI parameter results for the declared unit of one $m^3$ of Boise Glulam/GLT. No permanent carbon storage is included in the cradle-to-gate (A1-A3) results. As a result, the biogenic carbon balance for the cradle-to-gate portion of the life cycle is net neutral. Cradle-to-gate results for Boise Glulam/GLT on a relative basis are presented in Table 6.

**Table 5. Cradle-to-Gate LCIA Results for 1 $m^3$ of Boise Glulam/GLT – Absolute Basis.**

| Core Mandatory Impact Indicator | Total | A1 | A2 | A3 |
|---|---|---|---|---|
| $GWP_{TOTAL}$ [kg $CO_2$ eq] | 112.87 | -891.49 | 7.92 | 996.44 |
| $GWP_{BIOGENIC}$ [kg $CO_2$ eq] | 0.00 | -983.22 | 0.00 | 983.22 |
| $GWP_{FOSSIL}$ [kg $CO_2$ eq] | 112.87 | 91.73 | 7.92 | 13.23 |
| ODP [kg CFC-11eq] | 0.00 | 0.00 | 0.00 | 0.00 |
| AP [kg $SO_2$ eq] | 0.96 | 0.83 | 0.04 | 0.09 |
| EP [kg N eq] | 0.38 | 0.37 | 0.00 | 0.01 |
| SFP [kg $O_3$ eq] | 29.08 | 24.96 | 1.26 | 2.86 |
| FFD [MJ, surplus] | 198.49 | 160.90 | 14.02 | 23.57 |
| $ADP_{FOSSIL}$ [MJ, LHV] | 1,596.59 | 1,326.77 | 99.19 | 170.62 |
| **Use of Primary Resources** | | | | |
| RPRE [MJ, LHV] | 2,944.94 | 2,926.23 | 0.21 | 18.50 |
| RPRM [MJ, LHV] | 10,462.68 | 10,462.68 | | |
| NRPRE [MJ, LHV] | 1,713.34 | 1,440.08 | 100.63 | 172.62 |
| NRPRM [MJ, LHV] | 210.99 | 210.99 | 0.00 | 0.00 |
| **Secondary Material, Secondary Fuel and Recovered Energy** | | | | |
| SM [kg] | 0.00 | 0.00 | 0.00 | 0.00 |
| RSF [MJ, LHV] | 0.00 | 0.00 | 0.00 | 0.00 |
| NRSF [MJ, LHV] | 0.00 | 0.00 | 0.00 | 0.00 |
| RE [MJ, LHV] | 0.00 | 0.00 | 0.00 | 0.00 |
| **Mandatory Inventory Parameters** | | | | |
| FW [$m^3$] | 0.8584 | 0.8150 | 0.0008 | 0.0426 |
| **Indicators Describing Waste** | | | | |
| HWD [kg] | 2.62E-03 | 2.36E-03 | 2.48E-04 | 1.28E-05 |
| NHWD [kg] | 6.97E+00 | 5.67E+00 | 6.70E-01 | 6.30E-01 |
| HLRW [m3] | 9.48E-08 | 9.45E-08 | 0.00E+00 | 3.46E-10 |
| ILLRW [m3] | 8.52E-07 | 8.49E-07 | 0.00E+00 | 3.14E-09 |
| CRU [kg] | 0.00 | 0.00 | 0.00 | 0.00 |
| MR [kg] | 0.00 | 0.00 | 0.00 | 0.00 |
| MER [kg] | 0.00 | 0.00 | 0.00 | 0.00 |
| EE [MJ, LHV] | 0.00 | 0.00 | 0.00 | 0.00 |

**Table 6. Cradle-to-Gate LCIA Results for 1 $m^3$ of Boise Glulam/GLT – Relative Basis.**

| Core Mandatory Impact Indicator | Total | A1 | A2 | A3 |
|---|---|---|---|---|
| $GWP_{FOSSIL}$ [kg $CO_2$ eq] | 100% | 81.3% | 7.0% | 11.7% |
| ODP [kg CFC-11eq] | 100% | 89.9% | 1.2% | 9.0% |
| AP [kg $SO_2$ eq] | 100% | 86.1% | 4.6% | 9.3% |
| EP [kg N eq] | 100% | 96.9% | 1.1% | 2.1% |
| SFP [kg $O_3$ eq] | 100% | 85.8% | 4.3% | 9.8% |
| FFD [MJ, surplus] | 100% | 81.1% | 7.1% | 11.9% |
| $ADP_{FOSSIL}$ [MJ, LHV] | 100% | 83.1% | 6.2% | 10.7% |
| **Use of Primary Resources** | | | | |
| RPRE [MJ, LHV] | 100% | 99.4% | 0.0% | 0.6% |
| RPRM [MJ, LHV] | 100% | 100.0% | 0.0% | 0.0% |
| NRPRE [MJ, LHV] | 100% | 84.1% | 5.9% | 10.1% |
| NRPRM [MJ, LHV] | 100% | 100.0% | 0.0% | 0.0% |
| **Secondary Material, Secondary Fuel and Recovered Energy** | | | | |
| SM [kg] | 0.00 | 0.00 | 0.00 | 0.00 |
| RSF [MJ, LHV] | 0.00 | 0.00 | 0.00 | 0.00 |
| NRSF [MJ, LHV] | 0.00 | 0.00 | 0.00 | 0.00 |
| RE [MJ, LHV] | 0.00 | 0.00 | 0.00 | 0.00 |
| **Mandatory Inventory Parameters** | | | | |
| FW [$m^3$] | 100% | 94.9% | 0.1% | 5.0% |
| **Indicators Describing Waste** | | | | |
| HWD [kg] | 100% | 90.1% | 9.5% | 0.5% |
| NHWD [kg] | 100% | 81.3% | 9.6% | 9.0% |
| HLRW [m3] | 100% | 99.6% | 0.0% | 0.4% |
| ILLRW [m3] | 100% | 99.6% | 0.0% | 0.4% |
| CRU [kg] | 0.00 | 0.00 | 0.00 | 0.00 |
| MR [kg] | 0.00 | 0.00 | 0.00 | 0.00 |
| MER [kg] | 0.00 | 0.00 | 0.00 | 0.00 |
| EE [MJ, LHV] | 0.00 | 0.00 | 0.00 | 0.00 |

## Biogenic Carbon Results

Wood is a biobased material and thus contains biogenic carbon. The accounting of biogenic carbon follows the requirements set out in ISO 21930:2017 where biogenic carbon enters the product system (removal) as primary or secondary material. Carbon removal is considered a negative emission. The biogenic carbon leaves the system (emission) as a product, by-products, or directly to the atmosphere when combusted for heat energy. These mass flows of biogenic carbon from and to nature are listed in the LCI and are expressed in kg $CO_2$. The biogenic $CO_2$ component for Boise Glulam/GLT are shown in detail in Table 7.

**Table 7 Biogenic Carbon Inventory Parameters for Boise Glulam/GLT per $m^3$**

| Additional Inventory Parameters | | A1 | A3 | A5 | C3/C4 | Total |
|---|---|---|---|---|---|---|
| Biogenic Carbon Removal from Product | kg $CO_2$ | -983.22 | 0.00 | 0.00 | 0.00 | -983.22 |
| Biogenic Carbon Emission from Product | kg $CO_2$ | 0.00 | 86.86 | 0.00 | 896.35 | 983.22 |
| Biogenic Carbon Removal from Packaging | kg $CO_2$ | 0.00 | -5.04 | 0.00 | 0.00 | -5.04 |
| Biogenic Carbon Emission from Packaging | kg $CO_2$ | 0.00 | 0.00 | 5.04 | 0.00 | 5.04 |
| Biogenic Carbon Emission from Combustion of Waste from Renew. Sources Used in Production | kg $CO_2$ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total Biogenic $CO_2$ Removals & Emissions** | | | | | | |
| Net Biogenic Carbon Emission | kg $CO_2$ | -983.22 | 81.82 | 5.04 | 896.35 | 0.00 |

# LCA Interpretation

## Comparability

Environmental declarations from different programs [5] may not be comparable. Comparison of the environmental performance using EPD information shall consider all relevant information modules over the full life cycle of the products within the building. This PCR allows EPD comparability only when the same functional requirements between products are ensured and the requirements of ISO 21930:2017 §5.5 are met. In addition, to be compared, EPDs must comply with the same core and sub-category PCRs (Part A and B) and include all relevant information modules. It should be noted that different LCA software and background LCI datasets may lead to different results for upstream or downstream of the life cycle stages declared.

## Limitations

This LCA was created using manufacturer average data for upstream materials. Variation can result from differences in supplier locations, manufacturing processes, manufacturing efficiency, and fuel type used. This LCA does not report all of the environmental impacts due to manufacturing of the product but rather reports the environmental impacts for those categories with established LCA-based methods to track and report. Unreported environmental impacts include (but are not limited to) factors attributable to human health, land use change, and habitat destruction. In order to assess the local impacts of product manufacturing, additional analysis is required.

## Additional Environmental Information

According to ISO 21930 section 9.6, a manufacturer is required to report hazardous and/or dangerous substances. Drying and pressing processes contribute to the production of emissions during product manufacturing. Mills classed as major sources under EPA rules are required to report methanol, formaldehyde, phenol, acetaldehyde, propionaldehyde, and acrolein which are on the US Environmental Agency (EPA) Toxics Release Inventory. These emissions are reported in this EPD.

Boise Cascade Company obtain their wood fiber from sources that are legally and sustainably sourced. Participating facilities reported Fiber Sourcing data for the three sourcing categories established in ASTM-D7612-21: Standard Practice for Categorizing Wood and Wood-Based Products According to Their Fiber Sources [2]. The standard provides criteria for differentiating wood products into three categories:

1. Non-controversial Sources of Forest Products,
2. Responsible Sources of Forest Products, and
3. Certified Sources of Forest Products.

Fiber from non-controversial, or legal, sources are from geographic areas with a low risk of illegal activity and are compliant with legal or other proprietary standards. Products from responsible sources are produced with wood fiber acquired according to an independently certified procurement standard or are from jurisdictions with regulatory or quasi-regulatory programs to implement best management practices. Independently certified procurement standards include FSC Controlled Wood and SFI Fiber Sourcing. To qualify for either standard, a facility must have a system in place that verifies their logs are coming from areas in compliance with forestry best management practices to protect air and water quality and ensure all fiber comes from known and legal sources. Products from certified sources are independently certified to an internationally recognized forest management certification standard, such as those from the Sustainable Forestry Initiative (SFI), Forest Stewardship Council (FSC), Programme for the Endorsement of Forest Certification (PEFC), American Tree Farm System (ATFS), or the Canadian Standards Association (CSA).

## Forest Management

While this EPD does not address landscape level forest management impacts that influence forest carbon, wildlife habitat, endangered species, and soil and water quality, these potential impacts may be addressed through requirements put forth in regional regulatory frameworks, ASTM 7612-21 guidance, and ISO 21930 Section 7.2.11 including notes therein. These documents, combined with this EPD, may provide a more complete picture of environmental and social performance of wood products.

## Scope of the EPD

EPDs can complement but cannot replace tools and certifications that are designed to address environmental impacts and/or set performance thresholds, e.g., Type 1 certifications, health assessments, and declarations, etc.

## Data

National or regional life cycle averaged data for raw material extraction does not distinguish between extraction practices at specific sites and can greatly affect the resulting impacts.

## Accuracy of Results

EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any product line and reported impact when averaging data.

# References

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