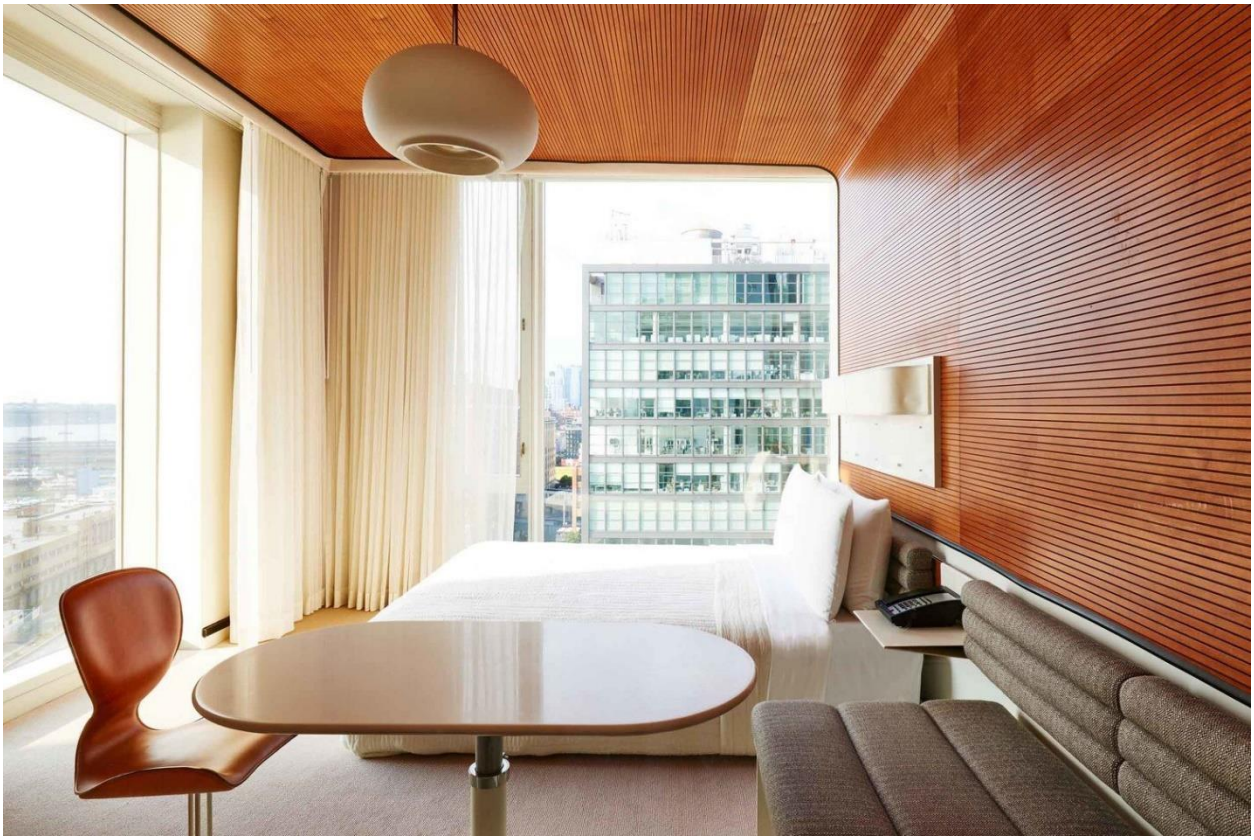
SurfacingSolution™

Environmental Product Declaration



Environmental Product Declaration for wood panels products produced by Surfacing Solution (Global Specialty Products Ltd.) at their facility in Chaska, MN

ADMINISTRATIVE INFORMATION

International Certified Environmental Product Declaration

Declared Product:	This Environmental Product Declaration (EPD) covers wood panels products produced by Surfacing Solution (Global Specialty Products Ltd.). Declared unit: 1 m2
Declaration Owner:	Surfacing Solution (Global Specialty Products Ltd.). 2100 Stroughton Avenue Chaska, Minnesota www.surfacingsolution.com
Program Operator:	Labeling Sustainability Address, 11670 W Sunset Blvd. City, State, Los Angeles, CA www.labelinsustainability.com/
Product Category Rule:	ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services and Sub Product Category Rule: Part B: Non-Metal Ceiling and Interior Wall Panel EPD Requirements. PCR Program Operator: UL PCR review was conducted by: Dr. Lindita Bushi, Dr. Tom Gloria, Olivia Palmer
Independent LCA Reviewer and EPD Verifier:	This declaration was independently verified in accordance with ISO 14025:2006 Independent verification of the declaration, according to ISO 14025:2006 Internal ☐ ; External X Third Party Verifier Geoffrey Guest, Certified 3rd Party Verifier under Labeling Sustainability Program (www.labelingsustainability.com), CSA Group (www.csaregistries.ca)
Date of Issue:	06 November 2024
Period of Validity:	5 years; valid until 06 November 2029
EPD Number:	5da66c6e-5d68-4097-8baf-1a0ce3cc2341

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COMPANY DESCRIPTION

Surfacing Solution is a family-owned business specializing in the manufacturing of tambour, a unique product consisting of flexible wood wall panels. With over 38 years of experience in the industry, we prioritize the highest quality craftsmanship, offering a range of unfinished wood panels to millworkers and general contractors who customize the final look for their projects. From custom projects to innovative designs, Surfacing Solution is trusted by mill workers and contractors across various industries for superior quality tambour panels that enhance interior spaces.

STUDY GOAL

The intended application of this life cycle assessment (LCA) is to comply with the procedures for creating a Type III environmental product declaration (EPD) and publish the EPD for public review on the website, www.labelingsustainability.com . This level of study is in accordance with EPD Product Category Rule (PCR) for Wood Panels published by; International Standards Organization (ISO) 14025:2006 Environmental labels and declarations, Type III environmental declarations-Principles and procedures; ISO 14044:2006 Environmental management, Life cycle assessment- Requirements and guidelines; and ISO 14040:2006 Environmental management, Life cycle assessment-Principles and framework. The performance of this study and its subsequent publishing is in alignment with the business-to-business (B2B) communication requirements for the environmental assessment of building products. The study does not intend to support comparative assertions and is intended to be disclosed to the public.

This project report was commissioned to differentiate Surfacing Solution (Global Specialty Products Ltd.) from their competition for the following reasons: generate an advantage for the organization; offer customers information to help them make informed product decisions; improve the environmental performance of Surfacing Solution (Global Specialty Products Ltd.) by continuously measuring, controlling and reducing the environmental impacts of their products; help project facilitators working on Leadership in Energy and Environmental Design (LEED) projects achieve their credit goal; and to strengthen Surfacing Solution (Global Specialty Products Ltd.)'s license to operate in the community. The intended audience for this LCA report is Surfacing Solution (Global Specialty Products Ltd.)'s employees, their suppliers, project specifiers of their products, architects, and engineers. The EPD report is also available for policy makers, government officials interested in sustainability, academic professors, and LCA professionals. This LCA report does not include product comparisons of other facilities.

DESCRIPTION OF PRODUCT AND SCOPE

Trees function as carbon sinks by capturing and storing CO_2 from the atmosphere, so any wood-based product contains carbon from this source. This carbon is considered a negative emission in some carbon accounting systems. The biogenic carbon contained in the wood-based products covered in this EPD is shown in the table below.

Table 1: **Biogenic carbon content per the declared unit**

Profile	kg bio-carbon / FU	kg bio-CO2 eq / FU
T311	0.1921466	0.7045376
T324A	0.5701399	2.0905131
T355	0.1921466	0.7045376
T374	0.1921466	0.7045376
T375	0.1921466	0.7045376
T378	0.1921466	0.7045376
T383	0.1921466	0.7045376
T412	0.1921466	0.7045376
T424	0.1921466	0.7045376
T474	0.1921466	0.7045376
T478	0.2393958	0.8777845
T493	0.3338941	1.2242784
T438	0.2393958	0.8777845
T455	0.2866449	1.0510315
T458	0.1921466	0.7045376
T475	0.2393958	0.8777845
T484A	0.3811433	1.3975254
T501	0.2393958	0.8777845
T505	0.2393958	0.8777845
T530	0.2393958	0.8777845
T593	0.3338941	1.2242784
T611	0.2393958	0.8777845
T623	0.2866449	1.0510315
T674	0.1921466	0.7045376
T624	0.4693417	1.7209196
T625	0.5197408	1.9057164
T655	0.2393958	0.8777845
T676	0.4315424	1.5823221
T675	0.2393958	0.8777845
T678	0.4693417	1.7209196
T684A	0.6583384	2.4139074
T693	0.4693417	1.7209196
T855	0.4693417	1.7209196
T869	0.2866449	1.0510315
T864	0.1921466	0.7045376
T1283	0.5701399	2.0905131
T1164	0.2866449	1.0510315

This EPD reports on various flexible tambour wood panels manufactured at Surfacing Solutions' Chaska facility in Minnesota. The solid natural wood tambour panel offers all the benefits of real wood and is available in a range of premium species, including Poplar, Red Oak, Maple, Ash, Grandis, Beech, Cherry, White Oak, and Walnut. It is highly durable and can be stained or painted to match specific applications. Additionally, it can flex around curves and corners, giving a modern look to an otherwise conventional installation.

According to the PCR, the declared unit is 0.093 m^2 (1 square foot) of constructed area using the product, including all layers required to achieve the expected performance and take into consideration 7% installation waste by default. The PCR also states that a weighted average thickness or other aspects of the products shall be provided when the EPD deals with a product group. The table below represents the technical properties of the products covered in this study. *The weight per unit volume (density) and surface density represent the average values of solid wood slats available in various wood species for each profile.

Table 2: **Declared Unit and Technical Properties**

Name	Value	Unit
Declared unit	1	sq ft
	0.093	m2
Density*	323 - 1082	kg/m^3
Surface density*	4.13 - 14.17	kg/m^2
Slats thickness	3/16 - 1	in
Slats width	3/4 - 3 1/2	in

This LCA assumes the impacts from products manufactured in accordance with the standards outlined in this report. This LCA is a cradle-to-gate study, and therefore, stages extending beyond the plant gate are not included in this LCA. Excluded stages include transportation of the manufactured material to the construction site; on-site construction processes and components; building (infrastructure) use and maintenance; and "end-of-life" effects.

WOOD PANELS DESIGN SUMMARY

The following tables provide a list of the wood panels products considered in this EPD along with key performance parameters.

Table 3: **Declared products with All declared products considered in this environmental product declaration**

Prod#	Unique name/ID	Short description	Product type	Unit	Density, dry kg/Unit	bio-carbon content, kg C/FU dry basis	Slat height (in)	Slat width (in)
1	T311	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.384	0.19215	5/16	3/4
2	T324A	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	1.140	0.57014	3/4	3/4
3	T355	Flexible solid wood tambour panels	Wood Panel	sq ft	0.384	0.19215	11/32	3/4

		available in a variety of premium wood species						
4	T374	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.384	0.19215	7/32	3/4
5	T375	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.384	0.19215	11/32	3/4
6	T378	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.384	0.19215	3/8	3/4
7	T383	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.384	0.19215	5/16	3/4
8	T412	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.384	0.19215	11/32	1
9	T424	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.384	0.19215	11/32	1
10	T474	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.384	0.19215	1/4	1
11	T478	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.479	0.23940	1/2	1
12	T493	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.668	0.33389	1/2	1
13	T438	Flexible solid wood tambour panels available in a variety	Wood Panel	sq ft	0.479	0.23940	11/32	1

		of premium wood species						
14	T455	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.573	0.28664	1/2	1
15	T458	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.384	0.19215	3/8	1
16	T475	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.479	0.23940	1/2	1
17	T484A	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.762	0.38114	3/4	1
18	T501	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.479	0.23940	11/32	1.25
19	T505	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.479	0.23940	3/8	1.25
20	T530	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.479	0.23940	3/16	1.25
21	T593	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.668	0.33389	5/8	1.25
22	T611	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.479	0.23940	3/8	1.5
23	T623	Flexible solid wood tambour panels available in a variety	Wood Panel	sq ft	0.573	0.28664	3/4	1.5

		of premium wood species						
24	T674	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.384	0.19215	1/4	1.5
25	T624	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.939	0.46934	3/4	1.5
26	T625	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	1.039	0.51974	3/4	1.5
27	T655	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.479	0.23940	1/2	1.5
28	T676	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.863	0.43154	5/8	1.5
29	T675	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.479	0.23940	11/32	1.5
30	T678	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.939	0.46934	3/4	1.5
31	T684A	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	1.317	0.65834	1	1.5
32	T693	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.939	0.46934	3/4	1.5
33	T855	Flexible solid wood tambour panels available in a variety	Wood Panel	sq ft	0.939	0.46934	3/4	2

		of premium wood species						
34	T869	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.573	0.28664	1/2	2
35	T864	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.384	0.19215	1/4	2
36	T1283	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	1.140	0.57014	11/16	3
37	T1164	Flexible solid wood tambour panels available in a variety of premium wood species	Wood Panel	sq ft	0.573	0.28664	1/4	3.5

WOOD PANELS DESIGN COMPOSITION

The following figures provide mass breakdown (kg per functional unit) of the material composition of each wood panels design considered.

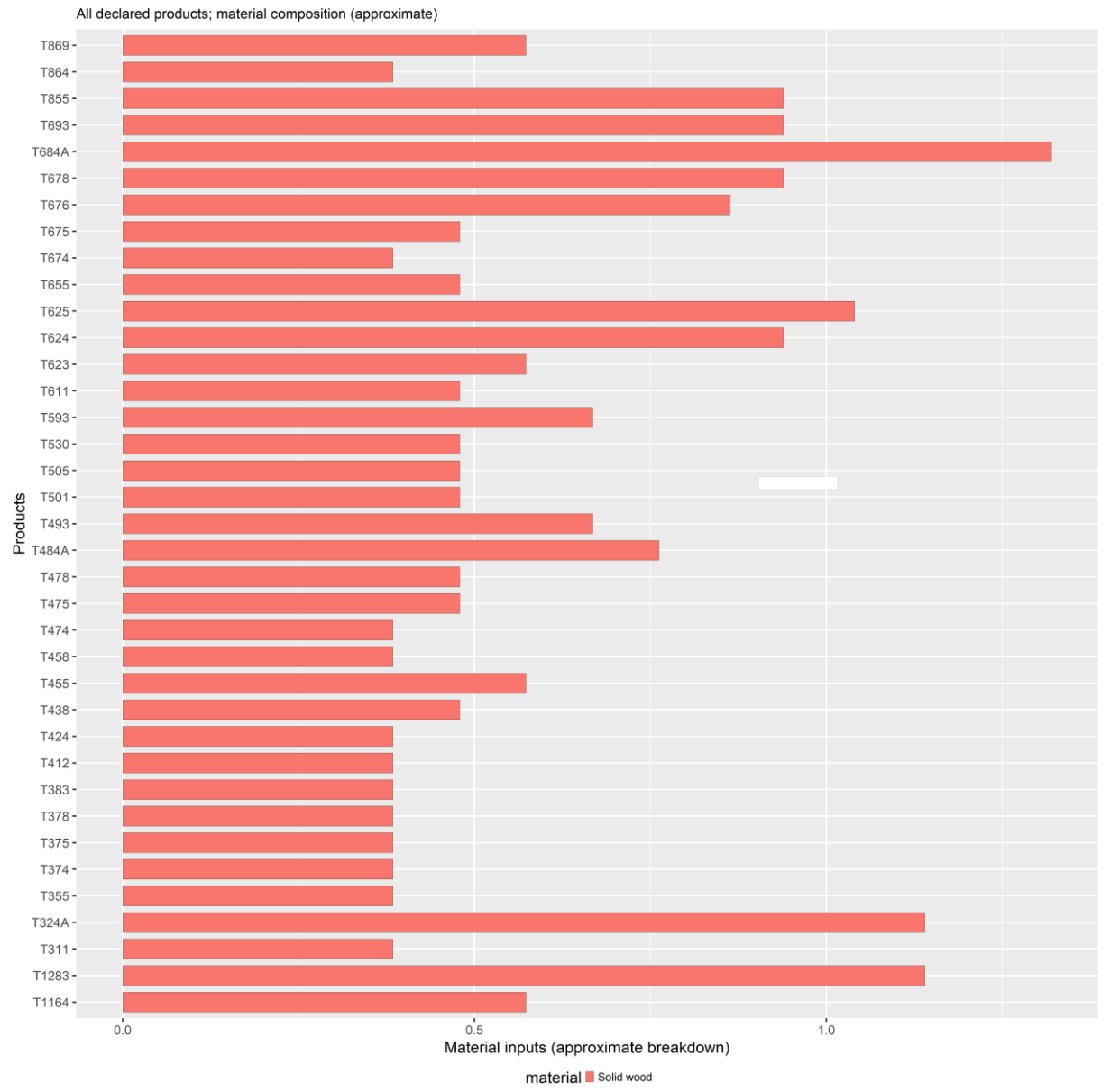

Figure 1: **Material composition - All declared products per 1 square foot (0.093 m2) of Flexible Wood Panel**

SYSTEM BOUNDARIES

The following figure depicts the cradle-to-gate system boundary considered in this study:

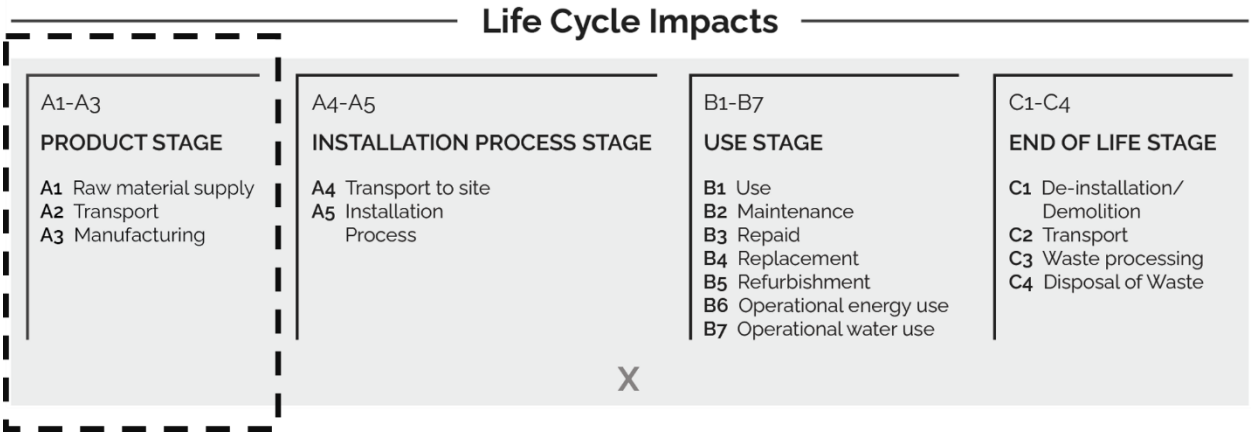

Figure 2: General life cycle phases for consideration in a construction works system

This is a Cradle-to-gate life cycle assessment and the following life cycle stages are included in the study:

- A1: Raw material supply (upstream processes) - Extraction, handling, and processing of the materials used in manufacturing the declared products in this LCA.
- A2: Transportation - Transportation of A1 materials from the supplier to the "gate" of the manufacturing facility (i.e. A3).
- A3: Manufacturing (core processes)- The energy and other utility inputs used to store, move, and manufacturer the declared products and to operate the facility.

As according to the PCR, the following figure illustrates the general activities and input requirements for producing wood panels products and is not necessarily exhaustive.

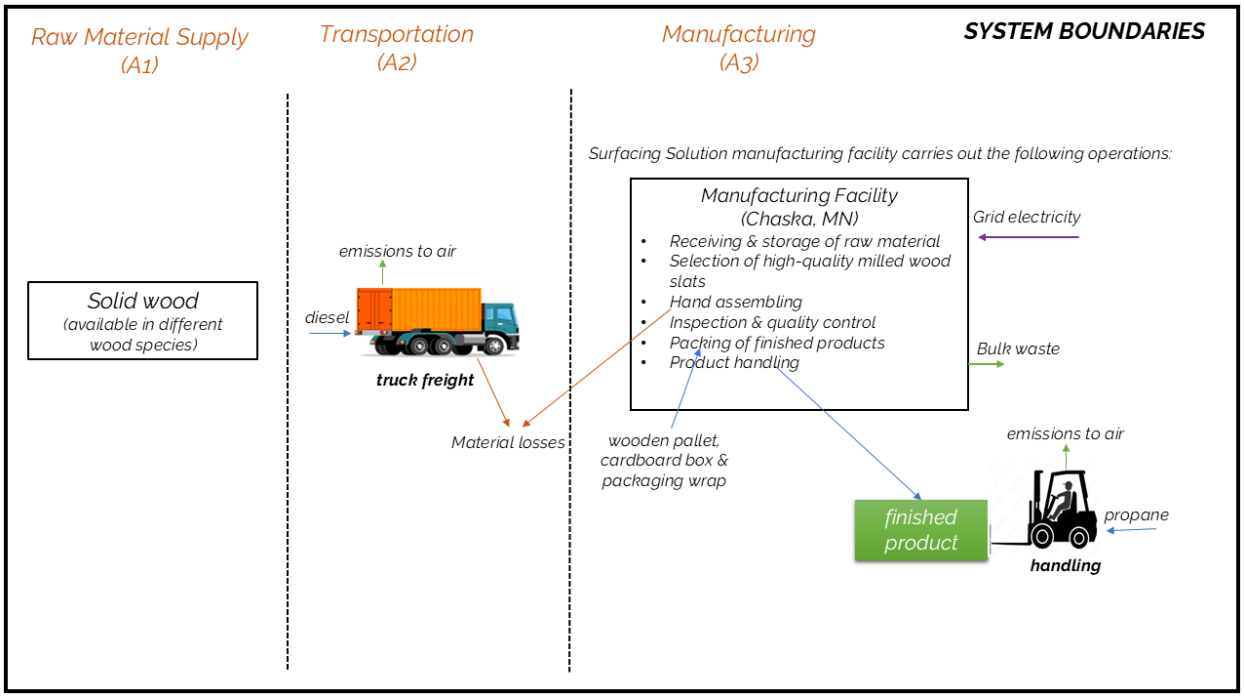

Figure 3: **General system inputs considered in the product system and categorized by modules in scope**

In addition, according to the relevant PCR, the following requirements are excluded from this study:

- Production, manufacture and construction of A3 building/capital goods and infrastructure;
- Production and manufacture of steel production equipment, steel delivery vehicles, earth-moving equipment, and laboratory equipment;
- Personnel-related activities (travel, furniture, office supplies);
- Energy use related to company management and sales activities.

For this LCA the manufacturing plant, owned and operated by Surfacing Solution (Global Specialty Products Ltd.), is located at their Surfacing Solution Products1 facility in MN, USA. All operating data is formulated using the actual data from Surfacing Solution (Global Specialty Products Ltd.)'s plant at the above location, including water, energy consumption and waste generation. All inputs for this system boundary are calculated for the plant.

This life cycle inventory was organized in a spreadsheet and was then input into an RStudio environment where pre-calculated LCIA results for relevant products/activities stemming from the ecoinvent v3.10 database and a local EPD database in combination with primary data from Surfacing Solution (Global Specialty Products Ltd.) were utilized. Explanations of the contribution of each data source to this study are outlined in the section 'Data Sources and Quality'. Further LCI details for each declared product are provided in the sections 'Detailed LCI tables' and 'Transport tables' of the detailed LCA report. A parameter uncertainty analysis was also performed where key statistical results (e.g. min/mean/max etc.) are provided in the detailed LCA report.

No known flows are deliberately excluded from this EPD.

CUT-OFF CRITERIA

ISO 14044:2006 and the focus PCR requires the LCA model to contain a minimum of 95% of the total inflows (mass and energy) to the upstream and core modules be included in this study. The cut-off criteria were applied to all other processes unless otherwise noted above as follows. A 1% cut-off is considered for all renewable and non-renewable primary energy consumption and the total mass of inputs within a unit process where the total of the neglected inputs does not exceed 5%.

DATA SOURCES AND DATA QUALITY ASSESSMENT

No recovered on-site energy occurs at this facility.

No re-used or recycled material for utilization on-site or off-site was reported at this facility.

The following statements explain how the above facility requirements/generation were derived:

Raw material transport: Surfacing Solution provided all the primary information for the reference year 2023 regarding the manufacturing of solid wood tambour panels, including comprehensive details on raw material consumption and logistics data for its Chaska manufacturing facility. This includes a wide range of raw materials, such as various wood species used to manufacture solid wood tambour products. The transportation of these materials was determined based on the actual distances from the supplier. Logistics for A2 requirements relied on primary data to document transportation specifics, including the actual distances, modes of transport, and location details such as city, state, and country.

Electricity: The reported electricity consumption is based on the primary information from the Surfacing Solution utility bills for the reporting period. Electricity usage allocation was initially determined by calculating the percentage of each product covered in this study relative to its sales volume. Subsequently, the resulting sales percentage values were multiplied by the total electricity consumption. Thus, giving specific value for each product to the overall electricity consumption.

Process/space heating: The facility does not employ natural gas or any fuel for operational processes or on-site space heating.

Fuel required for machinery: The machinery at this facility operates on either electricity or propane. Electricity usage is documented through utility bills, while propane consumption is calculated from direct purchase records for the reporting period. The conversion factor used for cubic meters (m^3) to megajoules (MJ), representing the propane heating value, was 1 cubic meter equating to 93 MJ of energy.

Waste generation: Waste generation values for non-hazardous waste are reported directly from Surfacing Solution's operational activities. Transportation defaults were used because the driver's route and ultimate final destination are unknown. Therefore, the waste hauler could not confirm the exact mileage.

Recovered energy: No on-site energy is recovered on site.

Recycled/reused material/components: No recycling is assumed in this cradle-to-gate study.

Module A1 material losses: Default material losses, 2% were used.

Direct A3 emissions accounting: Direct emissions were modeled with the best available ecoinvent processes (see LCI list).

The following tables depict a list of assumed life cycle inventory utilized in the LCA modeling to generate the impact results across the life cycle modules in scope. An assessment of the quality of each LCI activities utilized from various sources is also provided.

Table 4: **LCI inputs assumed for module A1 (i.e. raw material supply)**

Input	LCI.activity	Data.source	Geo	Year	Technology	Time	Geography	Reliability	Completeness
Solid wood slat	Hardwood lumber production, Planed, Kiln-dry/Solid wood/US/m3	ecoinvent v3.10 in 2024	Minnesota	2024	2	3	2	3	3

Table 5: **LCI inputs assumed for module A2 (i.e., transport of A1 inputs)**

Input	LCI.activity	Data.source	Geo	Year	Technology	Time	Geography	Reliability	Completeness
Bulk waste-freight transport via Truck	market for transport, freight, lorry 7.5-16 metric ton, EURO4/transport, freight, lorry 7.5-16 metric ton, EURO4/RER/tkm	ecoinvent v3.10 in 2024	RER	2024	2	3	1	3	3
Cardboard box- freight transport via Truck	market for transport, freight, lorry 7.5-16 metric ton, EURO4/transport, freight, lorry 7.5-16 metric ton, EURO4/RER/tkm	ecoinvent v3.10 in 2024	RER	2024	2	3	1	3	3
Packaging film wrapping-freight	market for transport, freight, lorry 7.5-16 metric ton, EURO4/transport, freight, lorry 7.5-16	ecoinvent v3.10 in 2024	RER	2024	2	3	1	3	3

transport via Truck	metric ton, EURO4/RER/tkm								
Solid wood slat- freight transport via Truck	market for transport, freight, lorry 7.5-16 metric ton, EURO4/transport, freight, lorry 7.5-16 metric ton, EURO4/RER/tkm	ecoinvent v3.10 in 2024	RER	2024	2	3	1	3	3

Table 6: **LCI inputs assumed for module A3**

Input	LCI.activity	Data.source	Geo	Year	Technology	Time	Geography	Reliability	Completeness
Bulk waste	process-specific burdens, residual material landfill/process-specific burdens, residual material landfill/RoW/kg	ecoinvent v3.10 in 2024	Minnesota	2024	2	3	2	3	3
Cardboard box	market for corrugated board box/corrugated board box/RoW/kg	ecoinvent v3.10 in 2024	Minnesota	2024	2	3	2	3	3
Electricity	market for electricity, medium voltage/electricity, medium voltage/US-MRO/kWh	ecoinvent v3.10 in 2024	Minnesota	2024	2	3	2	3	3
Packaging film wrapping	market for packaging film, low density polyethylene/packaging film, low density polyethylene/GLO/kg	ecoinvent v3.10 in 2024	Minnesota	2024	2	3	2	3	3
Propane	propane, burned in building machine/propane, burned in building machine/GLO/MJ	ecoinvent v3.10 in 2024	Minnesota	2024	2	3	2	3	3
Wooden pallet	market for EUR-flat pallet/EUR-flat pallet/RoW/unit	ecoinvent v3.10 in 2024	Minnesota	2024	2	3	2	3	3

DATA QUALITY ASSESSMENT

Data quality/variability requirements, as specified in the PCR, are applied. This section describes the data quality achieved relative to the ISO 14044:2006 requirements. Data quality is judged based on its precision (measured, calculated or estimated), completeness (e.g., unreported emissions), consistency (degree of uniformity of the methodology applied within a study serving as a data source) and representativeness (geographical, temporal, and technological).

Precision: Through measurement and calculation, the manufacturers collected and provided primary data on their annual production. For accuracy, the LCA practitioner and 3rd Party Verifier validated the plant gate-to-gate data.

Completeness: All relevant specific processes, including inputs (raw materials, energy and ancillary materials) and outputs (emissions and production volume) were considered and modeled to represent the specified and declared products. Most relevant background materials and processes were taken from ecoinvent v3.10 LCI datasets where relatively recent region-specific electricity inputs were utilized. The most relevant EPDs requiring key A1 inputs were also utilized where readily available.

Consistency: To ensure consistency, the same modeling structure across the respective product systems was utilized for all inputs, which consisted of raw material inputs and ancillary material, energy flows, water resource inputs, product and co-products outputs, returned and recovered Wood Panels materials, emissions to air, water and soil, and waste recycling and treatment. The same background LCI datasets from the ecoinvent v3.10 database were used across all product systems. Cross checks concerning the plausibility of mass and energy flows were continuously conducted. The LCA team conducted mass and energy balances at the plant and selected process level to maintain a high level of consistency.

Reproducibility: Internal reproducibility is possible since the data and the models are stored and available in a machine-readable project file for all foreground and background processes, and in Labeling Sustainability's proprietary Wood Panels LCA calculator* for all production facility and product-specific calculations. A considerable level of transparency is provided throughout the detailed LCA report as the specifications and material quantity make-up for the declared products are presented and key primary and secondary LCI data sources are summarized. The provision of more detailed publicly accessible data to allow full external reproducibility was not possible due to reasons of confidentiality.

*Labeling Sustainability has developed a proprietary tool that allows the calculation of PCR-compliant LCA results for Wood Panels product designs. The tool auto-calculates results by scaling base-unit technosphere inputs (i.e. 1 kg sand, 1 kWh electricity, etc.) to replicate the reference flow conversions that take place in any typical LCA software like openLCA or SimaPro. The tool was tested against several LCAs performed in openLCA and the tool generated identical results to those realized in openLCA across every impact category and inventory metric (where comparisons could be readily made).

Representativeness: The representativeness of the data is summarized as follows.

- Time related coverage of the manufacturing processes' primary collected data from 2023-01-01 to 2023-12-31.
- Upstream (background) LCI data was either the PCR specified default (if applicable) or more appropriate LCI datasets as found in the country-adjusted ecoinvent v3.10 database.

- Geographical coverage for inputs required by the A3 facility(ies) is representative of its region of focus; other upstream and background processes are based on US, North American, or global average data and adjusted to regional electricity mixes when relevant.
- Technological coverage is typical or average and specific to the participating facilities for all primary data.

ENVIRONMENTAL INDICATORS AND INVENTORY METRICS

Per the PCR, this EPD supports the life cycle impact assessment indicators and inventory metrics as listed in the tables below. As specified in the PCR, the most recent US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI), impact categories were utilized as they provide a North American context for the mandatory category indicators to be included in the EPD. Additionally, the PCR requires a set of inventory metrics to be reported with the LCIA indicators (see tables below).

Table 7: **Life cycle impact categories and life cycle inventory metrics**

ID	LCIA.indicators	Abbreviations	Units
1	Climate change: global warming potential (GWP100)	GWP	kg CO2-eq
2	Ozone depletion: ozone depletion potential (ODP)	ODP	kg CFC-11-eq
3	Acidification: acidification potential (AP)	AP	kg SO2-eq
4	Eutrophication: eutrophication potential	EP	kg N-eq
5	Smog formation potential	SFP	kg O3-eq
6	Energy resources: non-renewable: abiotic depletion potential (ADP): fossil fuels	ADPfossil	MJ
Inventory metrics			
7	Inventory indicators ISO21930: Cumulative Energy Demand - renewable energy resources	RPRE	MJ
8	Inventory indicators ISO21930: Renewable primary resources with energy content used as material (i.e., PERM)	PRM	MJ
9	Inventory indicators ISO21930: Cumulative Energy Demand - non-renewable energy resources	NRPRE	MJ
10	Inventory indicators ISO21930: Non-renewable primary resources with energy content used as material (i.e., PENRM)	NRPRM	kg
11	Inventory indicators ISO21930: use of secondary material	SM	MJ
12	Inventory indicators ISO21930: use of renewable secondary fuels	RSF	MJ
13	Inventory indicators ISO21930: recovered energy	RE	MJ
14	Inventory indicators ISO21930: use of net fresh water	FW	m3
15	Inventory indicators ISO21930: hazardous waste disposed	HWD	kg
16	Inventory indicators ISO21930: non-hazardous waste disposed	NHWD	kg
17	Inventory indicators ISO21930: high-level radioactive waste disposed	HLRW	kg
18	Inventory indicators ISO21930: intermediate and low-level radioactive waste disposed	ILLRW	kg
19	Inventory indicators ISO21930: materials for recycling	MR	kg

20	Inventory indicators ISO21930: materials for energy recovery	MER	kg
21	inventory indicators ISO21930: exported energy - electricity	EEel	MJ
22	inventory indicators ISO21930: exported energy - heat	EEheat	MJ

It should be noted that emerging LCA impact categories and inventory items are still under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting data in any of the following categories.

- Renewable primary energy resources as energy (fuel);
- Renewable primary resources as material;
- Non-renewable primary resources as energy (fuel);
- Non-renewable primary resources as material;
- Secondary Materials;
- Renewable secondary fuels;
- Non-renewable secondary fuels;
- Recovered energy;
- Abiotic depletion potential for non-fossil mineral resources.
- Land use related impacts, for example on biodiversity and/or soil fertility;
- Toxicological aspects;
- Emissions from land use change [GWP 100 (land-use change)];
- Hazardous waste disposed;
- Non-hazardous waste disposed;
- High-level radioactive waste;
- Intermediate and low-level radioactive waste;
- Components for reuse;
- Materials for recycling;
- Materials for energy recovery;
- Recovered energy exported from the product system.

TOTAL IMPACT SUMMARY

Interpretation

The Environmental Product Declaration (EPD) for Surfacing Solutions, which produces 37 different types of wood panels from 7 different types of hardwood lumber, outlines the significant environmental impacts associated with its operations. The primary contributor to the carbon footprint is hardwood lumber, which accounts for 85% of the total kgCO2 equivalent (kg CO2 eq). Following this, electricity consumption during manufacturing contributes approximately 12.28%, while transportation of lumber to the manufacturing facility accounts for around 0.5%. These figures highlight the critical areas where environmental impacts are concentrated.

To mitigate these impacts, Surfacing Solutions can adopt several strategies transitioning to renewable energy sources, such as solar or wind power, can significantly lower emissions have linked to electricity

consumption. Additionally, investing in energy-efficient machinery and optimizing production processes can enhance energy use efficiency.

The following table reports the total LCA results for each product produced at the given wood panels facility on a per 1 m3 of Flexible Wood Panel basis.

Table 8: **Total life cycle (across modules in scope) impact results for All declared products, assuming the geometric mean point values on a per 1 m3 of Flexible Wood Panel basis**

a) Midpoint Impact Categories:

Indicator/LCI Metric	GWP100	ODP	AP	EP	SFP	ADPfossil
Unit	kg CO2-eq	kg CFC-11-eq	kg SO2-eq	kg N-eq	kg O3-eq	MJ
Minimum	0.171	6.56e-09	0.000788	0.00081	0.00966	1.49
Maximum	0.508	2.71e-08	0.00269	0.00116	0.0284	2.35
Mean	0.294	1.4e-08	0.00148	0.000938	0.0165	1.81
Median	0.25	1.13e-08	0.00123	0.000892	0.014	1.69
T311	0.223	9.74e-09	0.00108	0.000865	0.0126	1.63
T324A	0.405	2.08e-08	0.0021	0.00105	0.0227	2.09
T355	0.236	1.05e-08	0.00116	0.000878	0.0133	1.66
T374	0.184	7.36e-09	0.000862	0.000824	0.0104	1.53
T375	0.236	1.05e-08	0.00116	0.000878	0.0133	1.66
T378	0.249	1.13e-08	0.00123	0.000892	0.014	1.69
T383	0.223	9.74e-09	0.00108	0.000865	0.0126	1.63
T412	0.237	1.05e-08	0.00116	0.000879	0.0133	1.66
T424	0.236	1.05e-08	0.00116	0.000878	0.0133	1.66
T474	0.197	8.15e-09	0.000935	0.000837	0.0111	1.56
T478	0.301	1.45e-08	0.00152	0.000946	0.0169	1.82
T493	0.301	1.45e-08	0.00152	0.000946	0.0169	1.82
T438	0.236	1.05e-08	0.00116	0.000878	0.0133	1.66
T455	0.301	1.45e-08	0.00152	0.000947	0.0169	1.83
T458	0.25	1.13e-08	0.00123	0.000892	0.014	1.69
T475	0.301	1.45e-08	0.00152	0.000947	0.0169	1.83
T484A	0.405	2.08e-08	0.00211	0.00106	0.0227	2.09
T501	0.236	1.05e-08	0.00116	0.000879	0.0133	1.66
T505	0.249	1.13e-08	0.00123	0.000892	0.014	1.69
T530	0.171	6.56e-09	0.000788	0.00081	0.00966	1.49
T593	0.353	1.76e-08	0.00181	0.001	0.0198	1.96
T611	0.25	1.13e-08	0.00123	0.000892	0.014	1.69
T623	0.404	2.08e-08	0.0021	0.00105	0.0227	2.09
T674	0.197	8.16e-09	0.000936	0.000837	0.0111	1.56
T624	0.405	2.08e-08	0.0021	0.00105	0.0227	2.09
T625	0.405	2.08e-08	0.00211	0.00105	0.0227	2.09
T655	0.301	1.45e-08	0.00152	0.000946	0.0169	1.82
T676	0.353	1.77e-08	0.00181	0.001	0.0198	1.96
T675	0.236	1.05e-08	0.00115	0.000878	0.0133	1.66
T678	0.405	2.08e-08	0.00211	0.00105	0.0227	2.09
T684A	0.508	2.71e-08	0.00269	0.00116	0.0284	2.35
T693	0.405	2.08e-08	0.0021	0.00105	0.0227	2.09

T855	0.404	2.08e-08	0.0021	0.00105	0.0227	2.09
T869	0.301	1.45e-08	0.00152	0.000946	0.0169	1.82
T864	0.199	8.28e-09	0.000947	0.00084	0.0112	1.57
T1283	0.378	1.92e-08	0.00196	0.00103	0.0212	2.02
T1164	0.197	8.15e-09	0.000935	0.000837	0.0111	1.56

b) Resource Inventory Metrics:

Indicator/LCI Metric	**RPRE**	**PRM**	**NRPRE**	**NRPRM**	**SM**	**RSF**	**RE**	**FW**
Unit	**MJ**	**MJ**	**MJ**	**kg**	**MJ**	**MJ**	**MJ**	**m3**
Minimum	9.26	4.2	9.3	0.255	0.0198	0.00464	0.000985	0.00126
Maximum	46.7	20.6	46.9	0.255	0.0209	0.0047	0.00129	0.00313
Mean	22.9	10.2	23	0.255	0.0202	0.00466	0.0011	0.00194
Median	17.9	8.02	18	0.255	0.0201	0.00466	0.00106	0.0017
T311	15	6.73	15.1	0.255	0.02	0.00465	0.00103	0.00155
T324A	35.2	15.6	35.3	0.255	0.0206	0.00467	0.0012	0.00256
T355	16.5	7.36	16.5	0.255	0.02	0.00464	0.00104	0.00162
T374	10.7	4.84	10.8	0.255	0.0198	0.00464	0.000997	0.00133
T375	16.4	7.36	16.5	0.255	0.02	0.00465	0.00104	0.00162
T378	17.9	7.99	18	0.255	0.0201	0.00466	0.00106	0.0017
T383	15	6.73	15.1	0.255	0.02	0.00465	0.00103	0.00155
T412	16.5	7.38	16.6	0.255	0.02	0.00464	0.00104	0.00163
T424	16.5	7.37	16.5	0.255	0.02	0.00465	0.00104	0.00162
T474	12.1	5.46	12.2	0.255	0.0199	0.00466	0.00101	0.00141
T478	23.6	10.5	23.8	0.255	0.0202	0.00466	0.0011	0.00198
T493	23.7	10.5	23.8	0.255	0.0202	0.00466	0.0011	0.00198
T438	16.5	7.36	16.5	0.255	0.02	0.00465	0.00104	0.00162
T455	23.7	10.5	23.8	0.255	0.0202	0.00466	0.0011	0.00199
T458	17.9	8.02	18	0.255	0.0201	0.00464	0.00106	0.0017
T475	23.7	10.5	23.8	0.255	0.0202	0.00465	0.0011	0.00199
T484A	35.2	15.6	35.4	0.255	0.0206	0.00467	0.0012	0.00256
T501	16.5	7.37	16.6	0.255	0.02	0.00466	0.00104	0.00163
T505	17.9	7.99	18	0.255	0.0201	0.00465	0.00106	0.0017
T530	9.26	4.2	9.3	0.255	0.0198	0.00464	0.000985	0.00126
T593	29.4	13	29.5	0.255	0.0204	0.00467	0.00115	0.00227
T611	17.9	8.01	18	0.255	0.0201	0.00468	0.00106	0.0017
T623	35.2	15.6	35.3	0.255	0.0206	0.00467	0.0012	0.00256
T674	12.1	5.47	12.2	0.255	0.0199	0.00466	0.00101	0.00141
T624	35.2	15.6	35.3	0.255	0.0206	0.00467	0.0012	0.00256
T625	35.2	15.6	35.4	0.255	0.0206	0.00466	0.0012	0.00256
T655	23.7	10.5	23.8	0.255	0.0202	0.00466	0.0011	0.00198
T676	29.4	13.1	29.6	0.255	0.0204	0.00467	0.00115	0.00227
T675	16.4	7.36	16.5	0.255	0.02	0.00464	0.00104	0.00162
T678	35.2	15.6	35.4	0.255	0.0206	0.00467	0.0012	0.00256
T684A	46.7	20.6	46.9	0.255	0.0209	0.00467	0.00129	0.00313
T693	35.2	15.6	35.3	0.255	0.0206	0.00467	0.0012	0.00256
T855	35.2	15.6	35.3	0.255	0.0206	0.00467	0.0012	0.00256
T869	23.6	10.5	23.7	0.255	0.0202	0.00467	0.0011	0.00198
T864	12.4	5.57	12.4	0.255	0.0199	0.0047	0.00101	0.00142

T1283	32.2	14.3	32.4	0.255	0.0205	0.00465	0.00117	0.00241
T1164	12.1	5.47	12.2	0.255	0.0199	0.00464	0.00101	0.00141

c) Waste/output Inventory Metrics:

Indicator/LCI Metric	HWD	NHWD	HLRW	ILLRW	MR	MER	EEel	EEheat
Unit	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**MJ**	**MJ**
Minimum	0.00588	0.401	5e-07	1.43e-06	0.0033	1.61e-06	0.000634	0.000351
Maximum	0.00937	0.489	8.74e-07	1.73e-06	0.00332	1.68e-06	0.000794	0.000492
Mean	0.00716	0.433	6.37e-07	1.54e-06	0.0033	1.64e-06	0.000692	0.000403
Median	0.0067	0.421	5.87e-07	1.5e-06	0.0033	1.63e-06	0.000671	0.000384
T311	0.00643	0.414	5.58e-07	1.48e-06	0.0033	1.62e-06	0.000659	0.000373
T324A	0.0083	0.462	7.59e-07	1.64e-06	0.00331	1.66e-06	0.000745	0.000449
T355	0.00656	0.418	5.72e-07	1.49e-06	0.0033	1.62e-06	0.000665	0.000378
T374	0.00602	0.404	5.14e-07	1.44e-06	0.0033	1.61e-06	0.00064	0.000357
T375	0.00656	0.418	5.72e-07	1.49e-06	0.0033	1.62e-06	0.000665	0.000378
T378	0.0067	0.421	5.87e-07	1.5e-06	0.0033	1.63e-06	0.000671	0.000384
T383	0.00643	0.414	5.58e-07	1.48e-06	0.0033	1.62e-06	0.000659	0.000373
T412	0.00657	0.418	5.73e-07	1.49e-06	0.0033	1.62e-06	0.000665	0.000379
T424	0.00656	0.418	5.72e-07	1.49e-06	0.0033	1.62e-06	0.000665	0.000378
T474	0.00616	0.408	5.29e-07	1.45e-06	0.0033	1.62e-06	0.000646	0.000362
T478	0.00723	0.435	6.45e-07	1.55e-06	0.0033	1.64e-06	0.000696	0.000406
T493	0.00723	0.435	6.45e-07	1.55e-06	0.0033	1.64e-06	0.000696	0.000406
T438	0.00656	0.418	5.72e-07	1.49e-06	0.0033	1.62e-06	0.000665	0.000378
T455	0.00724	0.435	6.45e-07	1.55e-06	0.0033	1.64e-06	0.000696	0.000406
T458	0.0067	0.421	5.87e-07	1.5e-06	0.0033	1.62e-06	0.000671	0.000384
T475	0.00724	0.435	6.45e-07	1.55e-06	0.0033	1.64e-06	0.000696	0.000406
T484A	0.00831	0.462	7.6e-07	1.64e-06	0.00331	1.66e-06	0.000745	0.000449
T501	0.00656	0.418	5.73e-07	1.49e-06	0.0033	1.62e-06	0.000665	0.000379
T505	0.0067	0.421	5.87e-07	1.5e-06	0.0033	1.62e-06	0.000671	0.000384
T530	0.00588	0.401	5e-07	1.43e-06	0.0033	1.61e-06	0.000634	0.000351
T593	0.00777	0.448	7.02e-07	1.59e-06	0.00331	1.65e-06	0.00072	0.000427
T611	0.0067	0.421	5.87e-07	1.5e-06	0.0033	1.63e-06	0.000671	0.000384
T623	0.0083	0.462	7.59e-07	1.64e-06	0.00331	1.66e-06	0.000745	0.000449
T674	0.00616	0.408	5.29e-07	1.45e-06	0.0033	1.62e-06	0.000646	0.000362
T624	0.0083	0.462	7.59e-07	1.64e-06	0.00331	1.66e-06	0.000745	0.000449
T625	0.00831	0.462	7.6e-07	1.64e-06	0.00331	1.66e-06	0.000745	0.000449
T655	0.00723	0.435	6.45e-07	1.55e-06	0.0033	1.64e-06	0.000696	0.000406
T676	0.00777	0.449	7.02e-07	1.59e-06	0.00331	1.65e-06	0.00072	0.000428
T675	0.00656	0.418	5.72e-07	1.49e-06	0.0033	1.62e-06	0.000665	0.000378
T678	0.0083	0.462	7.6e-07	1.64e-06	0.00331	1.66e-06	0.000745	0.000449
T684A	0.00937	0.489	8.74e-07	1.73e-06	0.00332	1.68e-06	0.000794	0.000492
T693	0.0083	0.462	7.59e-07	1.64e-06	0.00331	1.66e-06	0.000745	0.000449
T855	0.0083	0.462	7.59e-07	1.64e-06	0.00331	1.66e-06	0.000745	0.000449
T869	0.00723	0.435	6.44e-07	1.55e-06	0.0033	1.64e-06	0.000695	0.000406
T864	0.00618	0.408	5.31e-07	1.45e-06	0.0033	1.62e-06	0.000647	0.000363
T1283	0.00803	0.455	7.3e-07	1.62e-06	0.00331	1.65e-06	0.000732	0.000438
T1164	0.00616	0.408	5.29e-07	1.45e-06	0.0033	1.61e-06	0.000646	0.000362

ADDITIONAL ENVIRONMENTAL INFO

No regulated substances of very high concern are utilized on site.

REFERENCES

ISO Standards:

- ISO 6707-1: 2014 Buildings and Civil Engineering Works - Vocabulary - Part 1: General Terms
- ISO 14021:1999 Environmental Labels and Declarations - Self-declared Environmental Claims (Type II Environmental Labeling)
- ISO 14025:2006 Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures
- ISO 14040:2006 Environmental Management - Life Cycle Assessment - Principles and Framework
- ISO 14044:2006 Environmental Management - Life Cycle Assessment - Requirements and Guidelines
- ISO 14067:2018 Greenhouse Gases – Carbon Footprint of Products – Requirements and Guidelines for Quantification
- ISO 14050:2009 Environmental Management - Vocabulary
- ISO 21930:2017 Sustainability in Building Construction - Environmental Declaration of Building Products

EN Standards:

- EN 16757 Sustainability of construction works - Environmental product declarations – Product Category Rules for concrete and concrete elements
- EN 15804 Sustainability of construction works - Environmental product declarations -Core rules for the product category of construction products

Other References:

- USGBC LEED v4 for Building Design and Construction, 11 Jan 2019 available at https://www.usgbc.org/resources/pcr-committee-process-resources-part-b
- USGBC PCR Committee Process & Resources: Part B, USGBC, 7 July 2017 available at https://www.usgbc.org/resources/pcr-committee-process-resources-part-b.
- US EPA (2020) Advancing Sustainable Materials Management: 2018 Fact Sheet, https://www.epa.gov/sites/production/files/2021-01/documents/2018_ff_fact_sheet_dec_2020_fnl_508.pdf